APPENDIX G
BIOLOGICAL RESOURCES

The following items are included as attachments to this Appendix:

LIST OF ATTACHMENTS

Attachment	Items
Attachment G-1	Desert Tortoise Incidental Take Permit and Habitat Conservation Plan for Washington County, Utah
Attachment G-2:	Research articles regarding aircraft noise effects on the Mexican Spotted Owl; conducted by the U.S. Forest Service, Rocky Mountain Research Center

G.1 BIOLOGICAL RESOURCES INVENTORY AND IMPACT EVALUATION

Wildlife inventories of the proposed replacement airport study area were performed during April and August 1997, September 2000, and April 2004. These wildlife inventories targeted special status vertebrate species identified by the U.S. Fish and Wildlife Service (FWS) and the Utah Division of Wildlife Resources (Utah DWR) as potentially occurring in the proposed replacement airport study area. During these inventories, the direct and indirect observations of all vertebrate species were recorded (see **Table G.1**). A total of 72 vertebrate species were observed during these surveys. This included 15 mammal species, 44 bird species, and 13 species of reptiles and amphibians. Most of these species were observed within desert-scrub communities and at rocky outcrops at the southwestern end of the proposed replacement airport study area. **Table G.2** lists the common plant species observed within the proposed replacement airport study area.

Special status species include those that are listed under the Endangered Species Act (ESA)[1] as threatened, endangered, or proposed for listing, and State of Utah sensitive species. **Table G.3** lists the special status species potentially occurring in the proposed replacement airport study area that could be potentially impacted by direct construction impacts (i.e., ground clearing, grading, and construction-related vehicle traffic) or by operational activities including aircraft overflights.

Table G.4 provides a summary of the potential impacts of the proposed replacement airport on special status species.

[1] 16 USC 1531–1544, as amended.

Table G.1
VERTEBRATE SPECIES OBSERVED IN THE PROPOSED REPLACEMENT AIRPORT STUDY AREA

Species	Scientific Name	Status[a]	ID Method
Reptiles and Amphibians			
Chuckwalla	*Sauromalus ater*	SPC	Visual
Collared lizard	*Crotaphytus insularis*	------	Visual
Desert spiny lizard	*Sceloporus magister*	------	Visual
Glossy snake	*Arizona elegans*	------	Visual
Leopard lizard	*Gambelia wislizenii*	------	Visual
Mojave sidewinder rattlesnake	*Crotalus cerastes*	SPC	Tracks in dune area
Short-horned lizard	*Phrynosoma douglassi*	------	Visual
Side-blotched lizard	*Uta stansburiana*	------	Visual
Sonoran lyre snake	*Trimorphodon biscutatus*	------	Visual
Western banded gecko	*Coleonyx variegatus*	SPC	Visual
Western coachwhip snake	*Masticophis flagellum*	------	Visual
Western whiptail lizard	*Cnemidophorus tigris*	------	Visual
Zebra-tailed lizard	*Callisaurus draconoides*	SPC	Visual
Birds			
Barn owl	*Tyto alba*	------	Visual
Black phoebe	*Sayornis nigricans*	------	Visual
Black-throated sparrow	*Amphispiza bilineata*	------	Visual
Blue-gray gnatcatcher	*Polioptila caerulea*	------	Visual
Brewers sparrow	*Spizella breweri*	------	Visual
Bronzed cowbird	*Molothrus aeneus*	------	Visual
Burrowing owl	*Athene cunicularia*	SPC	Visual
Cactus wren	*Campylorhynchus brunneicapillus*	------	Visual
Cliff swallow	*Hirundo pyrrhonota*	------	Visual
Cooper's hawk	*Accipiter cooperii*	------	Visual
English sparrow	*Passer domesticus*	------	Visual
Gambel's quail	*Callipepla gambelii*	------	Visual
Golden eagle	*Aquila chrysaetos*	------	Visual
Great blue heron	*Ardea herodias*	------	Visual
Great horned owl	*Bubo virginianus*	------	Visual
Horned lark	*Eremophila alpestris*	------	Visual
House finch	*Carpodacus mexicanus*	------	Visual
Kestrel	*Falco sparverius*	------	Visual
Killdeer	*Charadrius vociferous*	------	Visual
Loggerhead shrike	*Lanius ludovicianus*	------	Visual

Table G.1, Continued
VERTEBRATE SPECIES OBSERVED IN THE PROPOSED REPLACEMENT AIRPORT STUDY AREA

Species	Scientific Name	Status[a]	ID Method
Birds (continued)			
Long-billed curlew	*Numenius americanus*	SPC	Visual
Marsh hawk	*Circus cyaneus*	------	Visual
Meadow lark	*Sturnella neglecta*	------	Visual
Merlin	*Falco columbarius*	------	Visual
Mockingbird	*Mimus polyglottos*	------	Visual
Mourning dove	*Zenaida macroura*	------	Visual
Peregrine falcon	*Falco peregrinus*	------	Visual
Pinyon jay	*Gymnorhinus cyanocephalus*	------	Visual
Prairie falcon	*Falco mexicanus*	------	Visual
Raven	*Corvus corax*	------	Visual
Red-tailed hawk	*Buteo jamaicensis*	------	Visual
Roadrunner	*Geococcyx californianus*	------	Tracks
Rock wren	*Salpinctes obsoletus*	------	Visual
Sage thrasher	*Oreoscoptes montanus*	------	Visual
Savannah sparrow	*Passerculus sandwichensis*	------	Visual
Starling	*Sturnus vulgaris*	------	Visual
Turkey vulture	*Cathartes aura*	------	Visual
Vesper sparrow	*Pooecetes gramineus*	------	Visual
Western flycatcher	*Empidonax difficilis*	------	Visual
Western king bird	*Tyrannus verticalis*	------	Visual
White-crowned sparrow	*Zonotrichid leucophrys*	------	Visual
White-throated swift	*Aeronautes saxatalis*	------	Visual
Yellow warbler	*Dendroica petechia*	------	Visual
Mammals			
Black-tailed jack rabbit	*Lepus californicus*	------	Visual
Beaver	*Castor Canadensis*	------	Sapling cuts
Cottontail rabbit	*Sylvilagus audubonii*	------	Visual
Coyote	*Canis latrans*	------	Tracks
Desert wood rat	*Neotoma lepida*	------	Dens and scat
Kangaroo rat	*Dipodomys* spp.	------	Tracks in dune area
Kit fox	*Vulpes macrotis*	------	Tracks and assumed den
Mule deer	*Odocoileus hemionus*	------	Skull
Muskrat	*Ondatra zibethicus*	------	Den and tracks
Pocket gopher	*Thomomys bottae*	------	Earth mounds
Raccoon	*Procyon lotor*	------	Tracks

Table G.1, Continued
VERTEBRATE SPECIES OBSERVED IN THE PROPOSED REPLACEMENT AIRPORT STUDY AREA

Species	Scientific Name	Status[a]	ID Method
Mammals (continued)			
Ring tailed cat	*Bassariscus astutus*	------	Tracks
Rock squirrel	*Spermophilus variegatus*	------	Visual
Striped skunk	*Mephitis mephitis*	------	Tracks
White-tailed antelope squirrel	*Ammospermophilus leucurus*	------	Visual

[a]Status definitions: SPC=Species of Special Concern
Source: Logan Simpson Design, Inc., 2004

Table G.2
COMMON PLANT SPECIES FOUND IN THE PROPOSED REPLACEMENT AIRPORT STUDY AREA

Common Name	Scientific Name
Creosote bush	*Larrea tridentate*
White bursage	*Ambrosia dumosa*
Four-wing saltbush	*Atriplex canescens*
Rabbitbrush	*Chrysothamnus* spp.
Indian paint brush	*Castilleja* sp.
Blackbrush	*Coleogyne ramosissima*
Brigham tea	*Ephedra torreyana*
Prickly-pear cactus	*Opuntia* spp.
Hedgehog cactus	*Echinocereus engelmannii*
Cholla cactus	*Opuntia* spp.
Yucca	*Yucca* spp.
Globemallow	*Sphaeralcea ambigua*
Storksbill	*Erodium cicutarium*
Annual brome grass	*Bromus* spp.
Broom snakeweed	*Gutierrezia sarothrae*
Indian ricegrass	*Oryzopsis hymenoides*
Desert trumpet	*Eriogonum inflatum*
Buckwheat	*Eriogonum* spp.
Galleta grass	*Hilaria jamesii*
Wolfberry	*Lycium* spp.
Winter fat	*Ceratoides lanata*
Lupine	*Lupinus* spp.
Russian thistle	*Salsola iberica*
Range ratany	*Krameria parvifolia*

Source: Logan Simpson Design, Inc., 2004

Table G.3
SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROPOSED REPLACEMENT AIRPORT STUDY AREA

Species	Status[1]	Habitat	Potential Presence in Proposed Replacement Airport Study Area
Plants			
Dwarf bear-claw poppy (*Arctomecon humilis*)	ESA LE	Moenkopi (clay) Formation on rolling low hills and bluffs from 2,700 to 3,300 feet.	Restricted to certain soil horizons within the Moenkopi Formation. Known from the Warner Ridge and White Dome area. No suitable soils are present on the project site.
Holmgren (Paradox) milkvetch	ESA LE	Sites where water runoff occurs and the soil is covered by erosional pavement from 2,640 to 3,000 feet.	Restricted to certain soil horizons within the Moenkopi Formation. Known from the Warner Ridge and White Dome area. No suitable soils are present on the project site.
Shem (Shivwits) milkvetch	ESA LE	Unstable clay soil of Chinle Shale in warm desert shrub or pinyon-juniper communities from 2,860 to 3,660 feet.	Restricted to certain soil horizons within the Moenkopi Formation. Known from the Warner Ridge and White Dome area. No suitable soils are present on the project site.
Siler pincushion cactus	ESA LT	Gypsiferous and calcareous sandy or clay soils derived from the various members of the Moenkopi Formation.	Restricted to certain soil horizons within the Moenkopi Formation. Known from the Warner Ridge and White Dome area. No suitable soils are present on the project site.
Mammals			
Kit fox	SPC	Arid and semiarid landscapes.	Known to occur in project vicinity.
Spotted bat	SPC	Roosts in caves and rock crevices in deserts to forested mountains.	Known to occur in project vicinity.
Townsend's big-eared bat	SPC	Roosts in caves and mines in or near forested areas.	Expected to be present. The project site may include foraging habitat for the bat though appropriate roosting habitat is not found on the project site.
Birds			
Bald eagle	ESA LT	Areas with open water or where deer or rabbit carrion is readily available.	A bald eagle winter roost is located at sewer lagoons near SR-9, over 8 miles from the project site. No foraging, roosting, or nesting habitat occurs at the project site.
Burrowing owl	SPC	Found in association with prairie dog colonies.	Known to occur in project vicinity.

Table G.3, Continued
SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROPOSED REPLACEMENT AIRPORT STUDY AREA

Species	Status[1]	Habitat	Potential Presence in Proposed Replacement Airport Study Area
Birds, continued			
California condor	ESA LE EXN*	High desert canyonlands and plateaus	* Experimental / nonessential area designated for most of Southern Utah and Northern Arizona. Prefer mountainous country especially rocky and brushy areas near cliffs. Unlikely to occur within the project vicinity.
Ferruginous hawk	SPC	Grassland or shrubsteppe communities; nests in the ecotone between these communities and pinyon-juniper woodlands.	No suitable nesting habitat occurs in the project vicinity. Foraging habitat does occur in the project vicinity.
Long-billed curlew	SPC	Nests in dry grasslands in areas with sufficient cover and abundant prey species.	Known to occur in the project vicinity based on a 1997 survey observation. Project vicinity may be used by migratory individuals as no nesting, breeding, or foraging habitats occur at the project site. Known to occur in project vicinity.
Mountain plover	—	Associated with disturbed prairie and semidesert habitats.	No suitable habitat was identified for the mountain plover, which characteristically nests in the high plains of Wyoming and Colorado. The mountain plover is considered a casual migrant in Utah. No individuals were sighted during project surveys.
Peregrine falcon	—	Primarily found in wetlands, but sagebrush steppe, desert scrub, and grassland habitats are also used. Breeds on ledges of vertical rock faces.	Observed in project area. An immature peregrine falcon was observed perched and later hunting from the top of the rock escarpment near the western airport boundary. The peregrine was more than likely a transient individual that had hatched from somewhere outside the survey area. The rock escarpment is not representative of typical peregrine nesting cliffs that have been documented in Washington County.
Southwestern willow flycatcher	ESA LE	Found most frequently in riparian habitats, especially in areas of dense willow.	Riparian habitat in the area is restricted to the Virgin River corridor.
Yellow-billed cuckoo	ESA C	Nests in lowland riparian areas with dense sub-canopies or shrub layers with an overstory of developing or large, gallery-forming trees.	Riparian habitat in the area is restricted to the Virgin River corridor.

Table G.3, Continued
SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROPOSED REPLACEMENT AIRPORT STUDY AREA

Species	Status[1]	Habitat	Potential Presence in Proposed Replacement Airport Study Area
Reptiles and Amphibians			
Arizona toad	SPC	Lowland riparian areas, primarily along the Virgin River.	Historical records from the project vicinity. No aquatic or riparian habitats are within the project site.
Common chuckwalla	SPC	Rock outcrops in desert communities of creosote-bursage, black-brush, and salt desert scrub.	Known to occur in the project vicinity; observed in the project area. Found in rocky areas within the southwest portion of the project site.
Desert tortoise	ESA LT	Near water in deserts, semi-arid grasslands, canyon bottoms, and rocky hillsides.	The closest known occurrence is north of St. George at City Creek. No individuals or sign were recorded from the project site. Potentially suitable habitat is restricted to the southwest portion of the project site.
Gila monster	SPC	Desert habitat with scattered cacti, shrubs, and grasses, often in rocky canyon bottoms or washes.	Though no individuals have been recorded from the project site, potentially suitable habitat is found within the southwestern portion of the project site.
Relict leopard frog (extirpated from Utah)	ESA C	Cold springs and streams with pools deep enough (12–16 inches) to avoid predators.	No aquatic or riparian habitats are within the project site.
Sidewinder	SPC	Desert communities with open areas, sparse vegetation, and loose sand, but may also be found in rocky or gravelly sites.	Suitable habitat occurs within the southwestern portion of the project site.
Western banded gecko	SPC	Creosote-dominated vegetation communities, usually in rocky areas and along canyon walls of riparian zones.	Known to occur in the project area.
Zebra-tailed lizard	SPC	Open areas with little vegetation, washes, desert pavement, and hardpan.	Known to occur in the project area.
Fish			
Virgin River chub	ESA LE	Deep, protected areas of swift water.	Restricted to the aquatic habitats of the Virgin River.
Virgin spinedace	CA	Clear, slow-moving water of creeks and small streams; most often occur in areas with ample cover.	Restricted to the aquatic habitats of the Virgin River.
Woundfin	ESA LE	Main channel of swift, turbid, warm streams over sand substrate.	Restricted to the aquatic habitats of the Virgin River.

Table G.3, Continued
SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE PROPOSED REPLACEMENT AIRPORT STUDY AREA

Species	Status[1]	Habitat	Potential Presence in Proposed Replacement Airport Study Area
Fish, continued			
Virgin River chub	ESA LE	Deep, protected areas of swift water.	Restricted to the aquatic habitats of the Virgin River.
Virgin spinedace	CA	Clear, slow-moving water of creeks and small streams; most often occur in areas with ample cover.	Restricted to the aquatic habitats of the Virgin River.
Woundfin	ESA LE	Main channel of swift, turbid, warm streams over sand substrate.	Restricted to the aquatic habitats of the Virgin River.

[1] Status definitions:
ESA - Endangered Species Act
LE - Listed Endangered
LT - Listed Threatened
SPC - Species of Special Concern
C - Candidate
CA - Conservation Agreement

Source: Logan Simpson Design. 2004.

Table G.4
SUMMARY OF POTENTIAL IMPACTS TO SPECIAL STATUS SPECIES

Species	Status[a]	Potential Impacts
Plants		
Dwarf bear-claw poppy	ESA LE	No suitable habitat occurs on the project site. Plant populations in the general vicinity are not expected to be impacted as a result of airport construction or operation. No adverse effects are anticipated.
Holmgren (Paradox) milkvetch	ESA LE	No suitable habitat occurs on the project site. Plant populations in the general vicinity are not expected to be impacted as a result of airport construction or operation. No adverse effects are anticipated.
Shem (Shivwits) milkvetch	ESA LE	No suitable habitat occurs on the project site. Plant populations in the general vicinity are not expected to be impacted as a result of airport construction or operation. No adverse effects are anticipated.
Siler pincushion cactus	ESA LT	No suitable habitat occurs on the project site. Plant populations in the general vicinity are not expected to be impacted as a result of airport construction or operation. No adverse effects are anticipated.

Table G.4, Continued
SUMMARY OF POTENTIAL IMPACTS TO SPECIAL STATUS SPECIES

Species	Status[a]	Potential Impacts
Mammals		
Kit fox	SPC	Individuals may be displaced from suitable habitat. Possible mortality during construction activities and from increased vehicle traffic in the area.
Spotted bat	SPC	Potential for adverse effects from airport operations, including disrupting seasonal movement patterns between roost site and foraging locations.
Townsend's big-eared bat	SPC	No potential adverse affects have been identified.
Birds		
Bald eagle	ESA LT	Winter roost site at sewer lagoons near SR-9 is over 8 miles from replacement airport site. Noise events will not substantially increase in the area. No suitable roosting or nesting habitat occurs in the study area. No adverse effects are anticipated.
California Condor	ESA LE, EXN	Suitable habitat does not occur on or near the project site. Disturbance sensitive and unlikely to occur in metropolitan area. No adverse effects are anticipated.
Burrowing owl	SPC	Potential to adversely affect pairs nesting at the replacement airport site through displacement and possible destruction of active nest sites during construction.
Ferruginous hawk	SPC	Suitable nesting habitat does not occur on or near the project site. Birds may occasionally use the area as foraging habitat. No adverse effects are anticipated.
Long-billed Curlew	SPC	Suitable habitat does not occur on or near the project site. UDWR has no records of this species breeding in Washington County. No adverse effects are anticipated
Mexican spotted owl	ESA LE	Mexican spotted owls occur in the Pine Valley Mountains, about 15 miles north of the replacement airport site. No suitable habitat occurs at the project site. Noise will not substantially increase in the Pine Valley Mountains, and adverse effects from aircraft are unlikely.
Mountain plover	—	No suitable nesting habitat occurs on the project site. Birds may use the area as incidental foraging habitat during migration. No adverse effects are anticipated because the birds may move to equally marginally suitable habitat nearby.
Peregrine falcon	—	Suitable nesting habitat does not occur on or near to the project site. Birds may occasionally use the area as foraging habitat. No adverse effects are anticipated.
Southwestern willow flycatcher	ESA LE	No suitable habitat occurs on the project site. Flycatchers have been identified along the Virgin River in Washington County; however, noise will not substantially increase in the area, and no adverse effects are anticipated.
Yellow-billed cuckoo	ESA C	No suitable habitat occurs on the project site. No adverse effects are anticipated.

Table G.4, continued
SUMMARY OF POTENTIAL IMPACTS TO SPECIAL STATUS SPECIES

Species	Status[a]	Potential Impacts
Reptiles and Amphibians		
Arizona toad	SPC	No permanent or ephemeral wetland habitat occurs on the project site, although habitat may be found in the general project vicinity. No adverse effects are anticipated.
Common chuckwalla	SPC	Suitable habitat occurs at the replacement airport site, and individuals were observed during project surveys. Potential adverse impacts from construction of access roads and habitat disturbance.
Desert tortoise	ESA LT	Potentially suitable habitat occurs at the replacement airport site, although no known populations occur in the project vicinity. No adverse impacts anticipated.
Gila monster	SPC	Suitable habitat occurs at the replacement airport site; no individuals were observed during project surveys. Potential adverse impacts from construction of access roads and habitat disturbance.
Relict leopard frog (extirpated from Utah)	ESA C	No suitable habitat occurs on the project site. No adverse effects are anticipated.
Sidewinder	SPC	Suitable habitat occurs at the replacement airport site, and tracks were observed during project surveys. Potential adverse impacts from construction of access roads and habitat disturbance.
Western banded gecko	SPC	Suitable habitat occurs at the replacement airport site. Potential adverse impacts from habitat disturbance.
Zebra-tailed lizard	SPC	Suitable habitat occurs at the replacement airport site. Potential adverse impacts from habitat disturbance.
Fish		
Virgin River chub	ESA LE	No suitable habitat occurs on the project site. Best Management Practices (BMPs) established by the Environmental Protection Agency (EPA) provide for on-site containment of hazardous materials and the elimination of contaminants in off-site runoff. Adverse effects to the Virgin River from runoff or hazardous material spills are unlikely.
Virgin spinedace	CA	No suitable habitat occurs on the project site. BMPs established by the EPA provide for on-site containment of hazardous materials and the elimination of contaminants in off-site runoff. Adverse effects to the Virgin River from runoff or hazardous material spills are unlikely.
Woundfin	ESA LE	No suitable habitat occurs on the project site. BMPs established by the EPA provide for on-site containment of hazardous materials and the elimination of contaminants in off-site runoff. Adverse effects to the Virgin River from runoff or hazardous material spills are unlikely.

[a] Status definitions:
ESA - Endangered Species Act
LE - Listed Endangered
LT - Listed Threatened
SPC - Species of Special Concern
C - Candidate
CA - Conservation Agreement

Source: Logan Simpson Design, 2004

Based on the species listed in **Tables G.3 and G.4**, the following species are either not present in the replacement airport study area due to a lack of suitable habitat or due to the extirpation of the species from the State of Utah. Detailed descriptions of these species are not provided within this appendix.

Birds:

- California condor
- Long-billed curlew

Reptiles and Amphibians:

- Relict leopard frog

Fish:

- Virgin River chub
- Virgin spinedace
- Woundfin

The following sections provide a brief discussion of each species that could potentially be impacted by development of the proposed replacement airport.

G.1.1 PLANTS

G.1.1.1 DWARF BEAR-CLAW POPPY AND SILER PINCUSHION CACTUS

The dwarf bear-claw poppy, a listed endangered species under the ESA, is restricted to the Moenkopi (clay) Formation on rolling low hills and bluffs from 2,700 to 3,300 feet in elevation in desert scrub habitat. This rare plant species is endemic within a semi-circular area to the east, south, and southeast of St. George (UDWR 1998).

Siler pincushion cactus is classified as a listed threatened species under the ESA. In Utah, this species is found in Washington and Kane counties on white, occasionally red, gypsiferous and calcareous sandy or clay soils derived from the various members of the Moenkopi Formation. However, it is sometimes found on the Kaibab Formation, which is nearly identical. Siler pincushion cactus occurs on rolling hills, often with a badlands appearance, in warm desert shrub, sagebrush-grass, and, at its upper limits, pinyon-juniper communities, at elevations ranging from 2,640 to 5,415 feet (Utah Division of Wildlife Resources website: http://dwrcdc.nr.utah.gov/rsgis2/Search/Display.asp?FlNm=pedisile). Suitable habitat for these species, a gypsiferous substrate associated with the Moenkopi Formation, is not present on the project site. Populations of dwarf bear-claw poppy and Siler pincushion cactus are known to occur east of the airport site along the base of Warner Ridge and southwest of the airport site in the White Dome area (Lee Hughes, personal communication 2004). These environmentally sensitive areas have been signed in an attempt to exclude access, but show indications of recent off-highway vehicle use. Habitat degradation in these areas could be expected to increase with currently planned nearby residential, commercial, and transportation projects. Potential impacts to listed plant species along Warner Ridge may be

alleviated with the construction of the Southern Corridor highway; FWS stated in the biological opinion for the highway project that the roadway, with its right-of-way fences, will provide a barrier to trespassing and off-highway vehicle use in that area. Based on the lack of suitable habitat within the proposed replacement airport site, implementation of the proposed replacement airport should have no impact on the dwarf bear-claw poppy or Siler pincushion cactus.

G.1.1.2 HOLMGREN (PARADOX) MILKVETCH AND SHEM (SHIVWITS) MILKVETCH

Holmgren milkvetch is classified as a listed endangered species under the ESA. This plant grows in Washington and Mohave counties in Utah in sites where water runoff occurs and the soil, derived from the Moenkopi Formation, is covered by a stony or gravelly eroded pavement. Holmgren milkvetch is found in desert shrub communities at elevations ranging from 2,640 to 3,000 feet (Utah Division of Wildlife Resources website http://dwrcdc.nr.utah.gov/rsgis2/Search/Display.asp?FlNm=astrholm). The Shem milkvetch is classified as a listed endangered species under the ESA. In Utah, this species is found in Washington County on the unstable clay soil of Chinle Shale in warm desert shrub and pinyon-juniper communities, at elevations ranging from 2,860 to 3,660 feet (Utah Division of Wildlife Resources website: http://dwrcdc.nr.utah.gov/rsgis2/Search/Display.asp?FlNm=astrampu). No suitable habitat for either of these plants is present in or adjacent to the project area. The nearest known occurrence of Holmgren milkvetch is near Atkinville Wash, 2.5 miles west of the project area. Shem milkvetch is known from the Shivwits Indian Reservation north of St. George and several locations near Harrisburg. Because of the lack of suitable habitat for the Holmgren milkvetch or the Shem milkvetch on or adjacent to the project area, neither species is present and no impacts to either species will occur with implementation of the proposed project.

G.1.2 MAMMALS

G.1.2.1 KIT FOX

The kit fox, a Species of Concern in Utah, is a desert-adapted fox found in arid and semiarid landscapes. This species prefers regions with low predator numbers, sufficient prey, and soils suitable for denning. In Utah, the kit fox is found in only the most arid portions of the state: the western half of the state and the western foothills of the Rocky Mountains (UDWR 2003). Tracks and an assumed den were observed during project surveys within the boundaries of the proposed replacement airport site. According to UDWR, the kit fox appears to be declining range-wide, in part, because of expanding predator populations (UDWR 2003). UDWR also lists a decline in prey base attributable to an impact by invasive species as a threat to the kit fox. Because of the tracks and possible den site observed during recent surveys, the kit fox may be present on the proposed replacement airport site. The implementation of the proposed project may have a direct or indirect impact on the kit fox.

G.1.2.2 SPOTTED BAT

The spotted bat, a Species of Special Concern in Utah, is found throughout Utah. This bat utilizes a variety of habitats from deserts to forested mountains, but is most often found in dry, rough desert terrain and roosts and hibernates in caves and rock crevices (UDWR 2003). Spotted bats occur across western North America; however, they appear to be rather rare and relatively little is known about them. In the general vicinity of the proposed replacement airport site, spotted bats are regularly encountered in the Fort Pierce Wash area, with at least one known roost in northern Arizona. These bats forage widely and may seasonally partition their foraging habitat between the sexes. Lactating females are known to forage at high-elevation sites in the Pine Valley Mountains during late spring and summer. The expected flight path used by bats leaving the roost passes in the vicinity of the proposed replacement airport site. Little is known concerning the impact of aircraft (e.g., noise, disturbance, collisions) on bats. Information is needed regarding the foraging behavior and flight path selection of the spotted bat in this area (Mike Herder, personal communication 2004) to make a more definitive impact determination. Implementation of the proposed replacement airport may have a direct or indirect impact on the spotted bat.

G.1.2.3 TOWNSEND'S BIG-EARED BAT

The Townsend's big-eared bat, a Species of Concern in Utah, is found throughout the state at elevations below 9,000 feet. Although this species can occupy a variety of habitat types, it is most often found near forested areas where caves and mines are available for roosting. However, abandoned buildings are occasionally used for roosting (UDWR 2003). UDWR had a historical record of Townsend's big-eared bat within two to three miles of the proposed replacement airport area. Due to the lack of forested habitat and abandoned buildings on the proposed replacement airport site, it is likely that the Townsend's big-eared bat is not present on the site; and therefore, implementation of the proposed replacement airport should have no direct impact on the bat. Due to the presence of the species across Utah at elevations below 9,000 feet, there may be indirect impacts that could occur to this species, depending on their use of suitable habitat documented within two to three miles of the airport or from foraging activity on the proposed replacement airport site. Continued coordination with the UDWR is needed to make that final determination.

G.1.3 BIRDS

G.1.3.1 BALD EAGLE

The bald eagle, a federally listed threatened species, is found throughout Utah during the winter, most commonly in areas with open water but also where food resources (e.g., deer or rabbit carrion) are readily available. During the breeding season, the bald eagle is found in scattered locations across the state near bodies of water where fish and waterfowl prey are available (Utah Division of Wildlife Resources website: http://dwrcdc.nr.utah.gov/rsgis2/Search/Display.asp?FlNm=halileuc). No bald eagles were sighted during project surveys conducted in 2004. Although it is conceivable that occasional bald eagles might pass through this area in the winter

months, this site does not have the usual habitat characteristics identified with wintering areas (large cottonwood trees for roosting and hunting, and significant rabbit densities). No nesting sites or large bodies of water are present to support a nesting pair. A bald eagle roost site exists at the sewer lagoons near State Route-9, where abundant prey species are available, approximately eight miles from of the proposed replacement airport site. Due to the lack of suitable habitat, lack of roost, nesting, and foraging sites within the proposed replacement airport area, it is unlikely that bald eagles will be present within the project area. Therefore, implementation of the proposed replacement airport should have no direct or indirect impact on bald eagles.

G.1.3.2 BURROWING OWL

The burrowing owl, a Species of Concern in Utah, is found throughout the state, although its distribution was historically more extensive. This owl uses holes dug by prairie dogs or other burrowing mammals and, in Utah, is dependant on prairie dog colonies, whose numbers have been diminishing (UDWR 2003). According to UDWR records, the burrowing owl has been recently observed within one mile of the proposed replacement airport site. One adult and a presumed nesting pair of burrowing owls were observed on the eastern edge of the proposed replacement airport site during project surveys. Surveys have not been conducted recently to determine the status of these individuals, so it is unknown if nesting owls are currently present. If present, these individuals would likely be impacted by construction activities and could potentially be impacted by aircraft noise. Because of potential impacts to this and other raptor species, pre-project surveys would be conducted to determine the locations of existing raptor nests. UDWR would then be contacted to determine whether any of the nests found would be candidates for relocation or removal prior to construction. While the proposed replacement airport could potentially impact burrowing owls, no significant effects are anticipated.

G.1.3.3 FERRUGINOUS HAWK

The ferruginous hawk, a Species of Concern in Utah, is found throughout most of the state. When breeding, this hawk is found in grassland or shrub steppe communities, and nests mostly in the ecotone (i.e., edge habitat – a transitional area typically with high plant and animal species diversity) between these habitats and pinyon-juniper woodlands (UDWR 2003). According to UDWR records, the ferruginous hawk has been recently observed within one mile of the proposed replacement airport area. The project area does not contain suitable nesting habitat and would not be considered preferred foraging habitat because of the disturbed areas within and adjacent to the site and low prey availability. Although there are known occurrences of this species within the proposed replacement airport study area, disturbance to foraging habitat would be minimal and is not expected to reduce foraging opportunities for this species. Therefore, implementation of the proposed replacement airport would have an indirect impact on the ferruginous hawk, but no direct impacts should occur.

G.1.3.4 MEXICAN SPOTTED OWL

The Mexican spotted owl, a federally listed threatened species, is found in the southern and eastern parts of Utah on the Colorado Plateau. In Utah, this species is primarily found in steep rocky canyons but can also be found in various forest habitats (Utah Division of Wildlife Resources website: http://dwrcdc.nr.utah.gov/rsgis2/Search/Display.asp?FlNm=striocci). No Mexican spotted owl habitat occurs on or adjacent to the proposed replacement airport site. Typical nesting areas for this species in Utah are at significantly higher elevations often associated with narrow canyons. The closest potential habitat for the Mexican spotted owl is about 15 miles to the north in the Pine Valley Mountains. The potential impacts of the proposed replacement airport would be associated with disturbance of the owls by approaching or departing aircraft. However, the noise produced by the aircraft would have dissipated because of the elevation of the aircraft passing over the Pine Valley Mountains. Further, the location of existing flight tracks and routes through the Pine Valley Mountains is expected to be unchanged with the proposed replacement airport.

G.1.3.5 MOUNTAIN PLOVER

The mountain plover is a Species of Concern in Utah. It is found in Utah in Box Elder, Weber, Salt Lake, and Daggett Counties as a casual migrant, while breeding birds occur in Duchesne and Uinta Counties. The mountain plover is associated with disturbed prairie and semidesert habitats (Utah Division of Wildlife Resources website: http://dwrcdc.nr.utah.gov/rsgis2/Search/Display.asp?FlNm=charmont). No suitable nesting habitat was identified for the mountain plover, which characteristically nests in the high plains of Wyoming or Colorado, nor were any individuals sighted during project surveys conducted in 2004. This species is a casual migrant in Washington County, foraging in short-grass prairie and agricultural fields. While the project area contains suitable foraging habitat, this species would be expected to occur in the general area only occasionally. Therefore, implementation of the proposed replacement airport would have an indirect impact on foraging habitat for the mountain plover, but would not result in any direct impact to the species.

G.1.3.6 PEREGRINE FALCON

At the time of the analysis for the Biological Assessment (BA) conducted as part of the previously prepared airport Environmental Assessment, the peregrine falcon was a listed species under the Endangered Species Act; however, the peregrine has been delisted and is currently being monitored by the FWS. This species is found along the Colorado Plateau and to a lesser extent along the Wasatch Front in Utah, and breeds on ledges of vertical rock faces. Peregrine falcons, at least introduced individuals, also use city buildings and artificial nest sites. This species forages primarily in wetlands, but sagebrush steppe, desert scrub, and grassland habitats are also used (UDWR Vertebrate Report). The proposed replacement airport site includes marginally suitable foraging habitat that is not adjacent to cliffs or canyons, as typically used by foraging peregrines. Construction of the airport would not result in a reduction in prey availability and thus would not affect the

foraging behavior of the peregrine falcon in the general area. Therefore, implementation of the proposed replacement airport should have no direct or indirect impacts on the peregrine falcon.

G.1.3.7 SOUTHWESTERN WILLOW FLYCATCHER

The Southwestern willow flycatcher, a federally listed endangered species, although rare, can be found in southern Utah during the summer. This species is found most frequently in riparian habitats, especially in areas of dense willow (Utah Division of Wildlife Resources website: http://dwrcdc.nr.utah.gov/rsgis2/Search/Display.asp?FlNm=empitrex). No suitable habitat was identified for the Southwestern willow flycatcher on or near the project site, and no individuals were observed during project surveys. Willow flycatcher nesting habitat is characteristically associated with dense willow-cottonwood or salt cedar communities along riparian habitats with surface water. The Southwestern willow flycatcher has been positively identified along stretches of the Virgin River in Washington County and a wetland/riparian area near Riverside Road in St. George. Due to the absence of suitable habitat on or near the proposed replacement airport site, implementation of the proposed replacement airport should have no direct or indirect impact on the southwestern willow flycatcher.

G.1.3.8 YELLOW-BILLED CUCKOO

The yellow-billed cuckoo, a candidate for federal listing, can be found throughout the state of Utah. The yellow-billed cuckoo nests at low to mid-elevations (2,500–6,000 feet) in Utah in lowland riparian areas with dense sub-canopies or shrub layers (regenerating canopy trees, willows, or other riparian shrubs). The overstory can be either large, gallery-forming trees or developing trees, usually cottonwoods (Utah Division of Wildlife Resources website: http://dwrcdc.nr.utah.gov/rsgis2/Search/Display.asp?FlNm=coccamer). No suitable habitat was identified for the yellow-billed cuckoo near the project site, and no individuals were observed during project surveys. Nesting habitat for this small songbird is characteristically associated with riparian gallery forests with nearby surface water. Due to the absence of suitable habitat on or near the proposed replacement airport site, implementation of the proposed replacement airport should have no direct or indirect impact on the yellow-billed cuckoo.

G.1.4 REPTILES AND AMPHIBIANS

G.1.4.1 ARIZONA TOAD

The Arizona toad, a Species of Concern in Utah, is found only in the southern portion of the state, mostly in the Virgin River Basin. This toad occupies lowland riparian areas (UDWR 2003). UDWR documented the Arizona toad's occurrence within one to two miles of the project area. No aquatic habitats currently exist in or adjacent to the project area. No Arizona toads were observed during biological surveys in the project area. Arizona toads would not be expected to occupy the area other than sporadically during random overland travel movements by individuals. Due to the absence of suitable habitat on or near the proposed replacement airport site, implementation of the proposed replacement airport should have no direct or indirect impact on the Arizona toad.

G.1.4.2 COMMON CHUCKWALLA

The common chuckwalla is a Species of Concern in Utah. Within Utah, the common chuckwalla is found in the southern portion of Washington County near Gunlock, the greater St. George area, Leeds, Zion National Park, and in south-central Utah in the vicinity of Glen Canyon, Kane County. This species is found in desert communities of creosote-bursage, blackbrush, and salt desert scrub (UDWR 2003). Chuckwallas were observed during project surveys in rocky terrain on the extreme west end of the project area and were considered common in this immediate area. Chuckwalla habitat extends along the entire northwest boundary of the site and is also present in rock outcrops along the southern end of the site. Operation of heavy off-road equipment during site excavation and construction within suitable habitat for the chuckwalla could result in injury or death of individuals of this species, if present during construction. The amount of habitat disturbed as a result of implementation of the proposed replacement airport is minimal in relation to the total available habitat in the general area. Because of the potential for this species to inhabit the proposed replacement airport site, implementation of the proposed replacement airport may potentially result in direct, indirect, and cumulative impacts to chuckwallas.

G.1.4.3 DESERT TORTOISE

The Beaver Dam Slope population of the desert tortoise, a federally listed threatened species, is found in extreme southwestern Utah. This species is found near water in deserts, semiarid grasslands, canyon bottoms, and rocky hillsides in Utah. Burrows are often dug in compacted sandy or gravelly soil (Utah Division of Wildlife Resources website: http://dwrcdc.nr.utah.gov/rsgis2/Search/Display.asp?FlNm=gophagas). The proposed replacement airport site is in an area of potential desert tortoise habitat (geographically isolated areas with no documented desert tortoise sign). The site could theoretically support desert tortoises, but no evidence exists that desert tortoises have occupied the site. No live or dead individuals, scat, burrows, or tracks were found during surveys conducted for the project. An *incidental take permit* issued to Washington County by U.S Fish and Wildlife Service (FWS) in 1996 permits the "taking"[2] of desert tortoises for a period of 20 years for the development of up to 12,264 acres of private lands. FWS requirements for issuance of the take permit include the drafting of a Habitat Conservation Plan (HCP) and mitigation measures such as purchasing land for preservation and requirements for pre-project desert tortoise surveys in suitable habitat. Washington County's Desert Tortoise Incidental Take Permit and Habitat Conversation Plan are included in **Attachment G-1**.

The proposed replacement airport site is not within a designated *incidental take area*. However, a portion of the proposed replacement airport site does contain potential habitat (geographically isolated areas with no documented desert tortoise indications), as established by the Washington County HCP, within Sections 26 and 27, Township 43 South, Range 15 West at the southern end of the site.

[2] "Take" is defined under the Endangered Species Act (ESA) as "killing, harming, or harassment" of a federally listed species, while "incidental take" is that which is "incidental to, and not the purpose of, otherwise lawful activities."

According to the Washington County HCP, within potential habitat "[A] landowner or the authorized agent of any such owner wishing to undertake grading or any other disturbance of the lands under such owner or agent's ownership or control will notify the HCP administrator and schedule a desert tortoise survey by the HCP biologist." Coordination with Washington County regarding the completion of surveys to determine the presence or absence of desert tortoises at the proposed replacement airport site would be initiated prior to construction. Because of the extremely low probability that desert tortoises are present at the proposed replacement airport site, no adverse effects to desert tortoises would be anticipated as a result of the proposed project.

G.1.4.4 GILA MONSTER

The Gila monster is a Species of Concern in Utah. The range of the Gila monster within Utah includes only the extreme southwestern corner of the state. This species is found in desert habitat with scattered cacti, shrubs, and grasses. The Gila monster often occurs in rocky canyon bottoms or washes (UDWR 2003). UDWR reported having historical records of Gila monsters within two to three miles of the project area. No Gila monsters were found during project surveys. This species spends much of its time underground, making its presence hard to detect. It is therefore difficult to confirm whether or not Gila monsters occur in the project area. If Gila monsters are present at this site, the habitat and locations described for chuckwallas probably represent the best habitat available to this species. Because of the potential for this species to inhabit the proposed replacement airport site, implementation of the proposed replacement airport may potentially result in direct, indirect, and cumulative impacts to the Gila monster.

G.1.4.5 SIDEWINDER

The Sidewinder is a Species of Special Concern in Utah. The UDWR has records of historical occurrences of the sidewinder within one mile of the proposed replacement airport site. Additionally, during biological surveys conducted for this proposed replacement airport, tracks from this species were observed in the isolated dune communities at the south end of the site in the 100-year floodplain of Fort Pearce Wash. Due to the potential for sidewinders to inhabit or forage within the project site based on the signs observed during recent surveys, implementation of the proposed replacement airport may have direct, indirect, and cumulative impacts on sidewinders.

G.1.4.6 WESTERN BANDED GECKO

The Western banded gecko is a Species of Concern in Utah. This species was observed during project surveys and is known to occur in the proposed replacement airport area. Due to the presence of suitable habitat and documented observations of the species within the boundaries of the replacement airport site, construction within suitable habitat for the Western banded gecko could result in injury or death to individuals of this species. Therefore, implementation of the proposed replacement airport may have direct, indirect, and cumulative impacts on the Western banded gecko.

G.1.4.7 ZEBRA-TAILED LIZARD

The Zebra-tailed lizard is a Species of Special Concern in Utah. Zebra-tailed lizards were observed in the proposed replacement airport area during project surveys conducted in 2004. Due to the presence of suitable habitat and documented observations of the species within the boundaries of the proposed replacement airport site, construction within suitable habitat for the zebra-tailed lizard could result in injury or death of individuals of this species. Therefore, implementation of the proposed replacement airport may have direct, indirect, and cumulative impacts on the zebra-tailed lizard.

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ATTACHMENT G-1

WASHINGTON COUNTY, UTAH
DESERT TORTOISE INCIDENTAL TAKE PERMIT
AND HABITAT CONSERVATION PLAN

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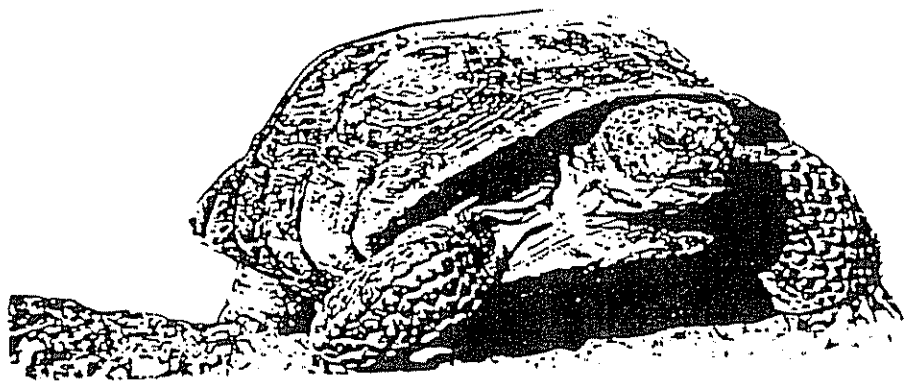
WASHINGTON COUNTY, UTAH
DESERT TORTOISE INCIDENTAL TAKE PERMIT APPLICATION/DOCUMENTS
Part I

Application Form

Submitted by
Washington County Commission
Washington County, Utah

December 1995



WASHINGTON COUNTY, UTAH
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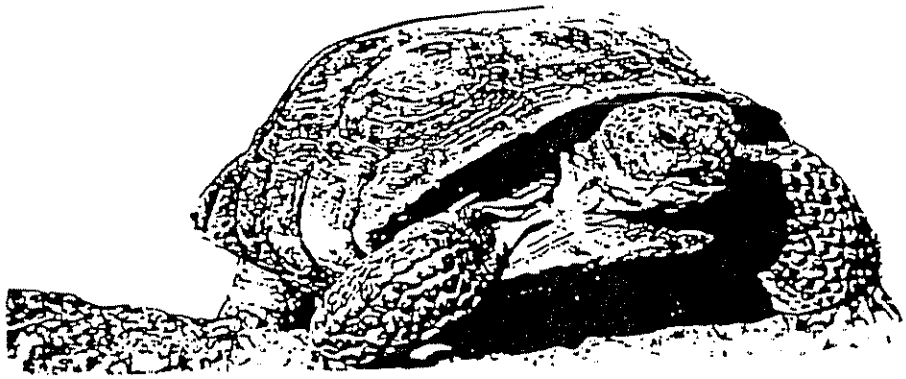


WASHINGTON COUNTY, UTAH
DESERT TORTOISE INCIDENTAL TAKE PERMIT APPLICATION/DOCUMENTS

Part I	**Application Form**
Part II	**Washington County, Utah Habitat Conservation Plan**
Part III	**Final Environmental Impact Statement for Incidental Take Permit Issuance for Desert Tortoise, Washington County, Utah**
Part IV	**Final Implementation Agreement**

Washington County Commission
Washington County, Utah

U. S. Department of the Interior
Fish and Wildlife Service

December 1995

OMB NO. 43-R1[illegible]

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

FEDERAL FISH AND WILDLIFE LICENSE/PERMIT APPLICATION

1. APPLICATION FOR (Indicate only one)

☐ IMPORT OR EXPORT LICENSE ☒ PERMIT

2. BRIEF DESCRIPTION OF ACTIVITY FOR WHICH REQUESTED LICENSE OR PERMIT IS NEEDED.

All land disturbing activities to allow growth and development to continue in Desert Tortoise habitat in Washington County.

XX 3. APPLICANT. (Name, complete address and phone number of individual, business, agency, or institution for which permit is requested)

Washington County
197 East Tabernacle
St. George, Utah 84770
(801) 634-5700

XX 4. IF "APPLICANT" IS AN INDIVIDUAL, COMPLETE THE FOLLOWING:

☐ MR. ☐ MRS. ☐ MISS ☐ MS.	HEIGHT	WEIGHT
DATE OF BIRTH	COLOR HAIR	COLOR EYES
PHONE NUMBER WHERE EMPLOYED	SOCIAL SECURITY NUMBER	
OCCUPATION		

ANY BUSINESS, AGENCY, OR INSTITUTIONAL AFFILIATION HAVING TO DO WITH THE WILDLIFE TO BE COVERED BY THIS LICENSE/PERMIT

N/A

5. IF "APPLICANT" IS A BUSINESS, CORPORATION, PUBLIC AGENCY, OR INSTITUTION, COMPLETE THE FOLLOWING.

EXPLAIN TYPE OR KIND OF BUSINESS, AGENCY, OR INSTITUTION

County Government

NAME, TITLE, AND PHONE NUMBER OF PRESIDENT, PRINCIPAL OFFICER, DIRECTOR, ETC.

William Mader (801) 634-5756

IF "APPLICANT" IS A CORPORATION, INDICATE STATE IN WHICH INCORPORATED.

XX 6. LOCATION WHERE PROPOSED ACTIVITY IS TO BE CONDUCTED

Washington County, Utah

(see HCP for specific details)

XX 7. DO YOU HOLD ANY CURRENTLY VALID FEDERAL FISH AND WILDLIFE LICENSE OR PERMIT? ☐ YES ☒ NO
(If yes, list license or permit number)

XX 8. IF REQUIRED BY ANY STATE OR FOREIGN GOVERNMENT, DO YOU HAVE THEIR APPROVAL TO CONDUCT THE ACTIVITY YOU PROPOSE? ☐ YES ☐ NO
(If yes, list jurisdictions and type of documents)

XX 9. CERTIFIED CHECK OR MONEY ORDER (If applicable) PAYABLE TO THE U.S. FISH AND WILDLIFE SERVICE, ENCLOSED IN AMOUNT OF

$ XXXXXXXXXXXXXXXX N/A

XX 10. DESIRED EFFECTIVE DATE: 1/1/96

XX 11. DURATION NEEDED: 20 years

12. ATTACHMENTS. THE SPECIFIC INFORMATION REQUIRED FOR THE TYPE OF LICENSE/PERMIT REQUESTED (See 50 CFR 13.12(b)) MUST BE ATTACHED. IT CONSTITUTES AN INTEGRAL PART OF THIS APPLICATION. [illegible] OF 50 CFR UNDER WHICH ATTACHMENTS ARE PROVIDED.

See 50 CFR 17.22(b) & 17.32(b); 50 CFR 13

CERTIFICATION

I HEREBY CERTIFY THAT I HAVE READ AND AM FAMILIAR WITH THE REGULATIONS CONTAINED IN TITLE 50, PART 13, OF THE CODE OF FEDERAL REGULATIONS AND THE OTHER APPLICABLE PARTS IN SUBCHAPTER B OF CHAPTER I OF TITLE 50, AND I FURTHER CERTIFY THAT THE INFORMATION SUBMITTED IN THIS APPLICATION FOR A LICENSE/PERMIT IS COMPLETE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF. I UNDERSTAND THAT ANY FALSE STATEMENT HEREIN MAY SUBJECT ME TO THE CRIMINAL PENALTIES OF 18 U.S.C. 1001.

SIGNATURE (In ink)	DATE
XX Wm J Mader	XX 12/7/95

3-200
(8/94)

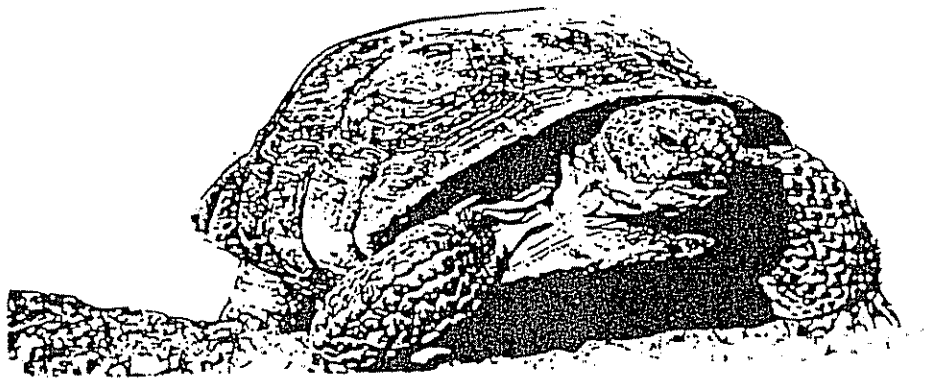
WASHINGTON COUNTY, UTAH
DESERT TORTOISE INCIDENTAL TAKE PERMIT
APPLICATION/DOCUMENTS

Submitted by

Washington County Commission

Washington County, Utah

December 1995



WASHINGTON COUNTY, UTAH
DESERT TORTOISE INCIDENTAL TAKE PERMIT APPLICATION/DOCUMENTS
Part II

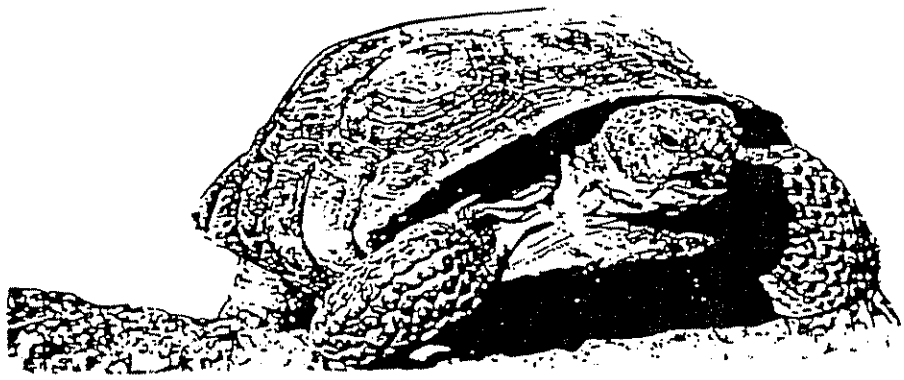
Washington County, Utah
Habitat Conservation Plan

Submitted by
Washington County Commission
Washington County, Utah

Submitted to
U.S. Fish and Wildlife Service

Prepared by
Washington County HCP Steering Committee
and
SWCA, Inc. Environmental Consultants

December 1995



Habitat Conservation Plan
Washington County, Utah

Submitted by:

Washington County Commission
197 East Tabernacle
St. George. Utah 84770
(801) 634-5700

Submitted to:

U.S. Fish and Wildlife Service
Utah Field Office
Lincoln Plaza. Suite 404
145 East 1300 South
Salt Lake City. Utah 84115
801-524-5001

Prepared by:

Washington County HCP Steering Committee

and

SWCA. Inc. Environmental Consultants
114 North San Francisco Street, Suite 100
Flagstaff, Arizona 86001
(800) 224-4234

December 1995

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EXECUTIVE SUMMARY

Washington County, in the southwestern corner of Utah, is located on Interstate 15 between Salt Lake City (320 miles to the north) and Las Vegas, Nevada (125 miles to the south). This is one of the nation's fastest growing counties, with new residents attracted to the scenic red rock areas directly north of St. George and Washington City, home of the highest density of Mojave desert tortoises in the United States. To allow continued development while complying with the requirements of the Endangered Species Act (Act), Washington County is applying to the U.S. Fish and Wildlife Service (USFWS) for a Section 10(a)(1)(B) Incidental Take Permit for Mojave desert tortoise, a Federally listed species.

The current status of desert tortoise habitat in Washington County is presented in Table ES1. None of these lands are specifically managed for desert tortoise, and their fragmentation creates non-contiguous habitat blocks. While Section 9 enforcement provisions of the Act apply to all State and private lands, and Section 7 consultation provisions apply to all Federal undertakings,

Table ES1. Current Desert Tortoise Habitat and Land Ownership.

	Desert Tortoise Density Classification[1]			
Ownership	Low (acres)	Medium (acres)	High (acres)	Total (acres)
Private/Municipal	11,521	1,704	5,828	19,053
State School Trust[2]	12,511	3,137	4,472	20,120
BLM	72,139	1,975	4,195	78,359
Zion National Park	2	0	0	2
Dixie National Forest	83	0	0	83
Paiute Indian Tribal Lands	2,521	2	47	2,570
Snow Canyon State Park	2,603	0	151	2,754
Total	101,380	6,818	14,693	122,891

[1] The classification of density is based upon transect field studies which the Washington County Commission believes includes large areas with no actual desert tortoise involvement and no constituent habitat. The Commission is willing, however, to use these classifications—although they believe them to be erroneous and/or unsubstantiated—in order to facilitate creation of a reserve that will benefit many species.

[2] 212 acres of State School Trust lands are within the Paiute Indian Tribal Lands.

desert tortoise habitat in Washington County is becoming increasingly fragmented due to urban development. If current trends continue, it may be difficult for the USFWS to adequately protect the species and its habitat, as few or no proactive actions would likely be implemented as a result of Section 7 consultations or Section 9 enforcement measures.

Washington County has prepared this Habitat Conservation Plan (HCP) anticipating that it will provide a comprehensive approach to preserving and protecting Mojave desert tortoise habitat in Washington County, while at the same time allowing controlled growth and development in those portions of desert tortoise habitat which are less essential to the species. This HCP is part of Washington County's application for an incidental take permit for 1,169 animals and 12,264 acres of desert tortoise habitat and 31,282 acres of potential habitat (geographically isolated areas with no documented desert tortoise sign).

A Steering Committee was established in 1990 which included representatives from government agencies, livestock interests, environmental organizations, recreation interests, land developers, and landowners to formulate this HCP. The Steering Committee was charged with creating a plan which allows development in certain areas of desert tortoise habitat while increasing the likelihood of recovery of the listed species.

The HCP proposes the establishment of a wildlife reserve of 61,022 acres, including 38,787 acres of Mojave desert tortoise habitat. This reserve extends from the Paiute Indian Tribal Lands on the west to the City of Hurricane on the east. Within this area, uses will be carefully controlled and all management actions will place the desert tortoise as the highest priority. Outside the reserve, development of desert tortoise habitat will be allowed in designated take areas. Federal habitat areas outside of the proposed reserve will be subject to Section 7 consultations with the USFWS. A summary of the status of the disposition of the desert tortoise habitat following HCP implementation is provided in Table ES2. The reserve also provides habitat for numerous Federal candidate and State sensitive species.

Table ES2. Summary of Disposition of Desert Tortoise Habitat Following HCP Implementation.

	Desert Tortoise Density Classification[1]		
	Low (acres)	Medium (acres)	High (acres)
Reserve	20,447	5,437	12,903
Non-Take	71,597	65	177
Incidental Take	9,336	1,316	1,612
Total	101,380	6,818	14,692

[1] The classification of density is based upon transect field studies which the Washington County Commission believes includes large areas with no actual desert tortoise involvement and no constituent habitat. The Commission is willing, however, to use these classifications, although believed to be erroneous and/or unsubstantiated, in order to facilitate creation of a reserve that will benefit many species.

The plan will be funded by collection of county-wide fees for building permits and land clearing. Acquisition of habitat, fencing, enforcement, education, and removal of competing uses will comprise the mitigation for the proposed take. The HCP creates an ongoing administration for the purpose of minimizing, mitigating, and monitoring impacts on the desert tortoise, as well as a framework for working with candidate and sensitive species which may be listed in the future.

This document details the impacts of the proposed take and how it will be monitored, minimized, and mitigated. It also catalogs State sensitive and Federal candidate species within the County and describes alternatives, ranging from total preservation to unlimited development, considered during the development of the HCP. The plan enhances the survival of the desert tortoise and other species, while providing for continued community development. The Steering Committee believes that this plan represents the best possible compromise to an extremely difficult problem.

CHAPTER 1.0
INTRODUCTION

1.1 THE NEED FOR AN HCP IN WASHINGTON COUNTY

Washington County, one of the fastest growing retirement and recreational areas in the nation, is the fastest growing county in the State of Utah. From 1980 to 1990, the population of the County increased 86 percent from 26,125 to 48,560 (Washington County Water Conservancy District 1991). Three growth projections have been made for the population of the County by the year 2010. The first, by the State of Utah, projects a population of 101,400, an increase of 109 percent. The second, by the Five County Association of Governments, projects a population of 80,543, an increase of 66 percent. The third is by the Washington County Water Conservancy District which forecasts a population of 138,692, an increase of 186 percent.

The County also contains habitat for nine species which are listed as threatened or endangered pursuant to the Endangered Species Act of 1973 (Act). These nine species are listed in Table 1.1.

Table 1.1. Federally Listed Threatened and Endangered Species in Washington County.

Common Name	Scientific Name	Category
Mojave Desert Tortoise	*Gopherus agassizii*	Threatened
Bald Eagle	*Haliaeetus leucocephalus*	Threatened
Peregrine Falcon	*Falco peregrinus*	Endangered
Mexican Spotted Owl	*Strix occidentalis lucida*	Threatened
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Endangered
Woundfin Minnow	*Plagopterus argentissimus*	Endangered
Virgin River Chub	*Gila robusta seminuda*	Endangered
Dwarf Bear-Claw Poppy	*Arctomecon humilis*	Endangered
Siler Pincushion Cactus	*Pediocactus sileri*	Threatened

Conflicts have arisen between growth and development of particular areas in the County and protection afforded the Mojave desert tortoise under the Act. To provide a comprehensive solution to these conflicts, and to provide greater protection for the desert tortoise, Washington County assembled a Steering Committee to develop a comprehensive Habitat Conservation Plan (HCP) and obtain a Section 10(a)(1)(B) Incidental Take Permit from the U.S. Fish and Wildlife Service (USFWS). An incidental take permit is authorization under Section 10(a) of the Act to allow for "take" of a species listed under the Act. As defined in the ESA, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct with regard to federally listed species. The term "harm" is further defined to include activities that would modify or degrade habitat in a way that significantly impairs essential behavior patterns. The HCP process is designed to allow for take of species listed

under the Act as long as the species is protected, habitat is conserved, and the permitted incidental take will not jeopardize the ultimate survival of the species. Further, the take permit applicants must demonstrate that they have minimized, mitigated, and monitored the proposed take to the maximum extent practicable.

This HCP is seeking an incidental take permit only for the Mojave desert tortoise. No take is being considered for the bald eagle, peregrine falcon, spotted owl, southwestern willow flycatcher, woundfin, or Virgin River chub, and take permits are not required for plant species on non-Federal lands. However, all nine Federally listed species are being addressed in this document, as well as all current Federal candidate and State sensitive species.

1.2 PLAN AREA AND PROPOSED ACTIVITIES

To provide a comprehensive analysis, the Steering Committee directed that the HCP planning area include all of Washington County as presented in Figure 1.1. This area includes habitat for all nine threatened and endangered species. Land ownership in Washington County is predominantly Federal as depicted in Table 1.2.

Table 1.2. Land Ownership in Washington County.

Land Status	Acres	Percent
Federal	1,176,289	76%
State	94,747	6%
Private/Other	280,964	18%
Total	1,552,000	100%

Proposed activities identified in Washington County needing an incidental take permit include those associated with growth and development, as well as mining, farming, road building, and utility corridors. A comprehensive list of permitted activities is presented in Chapter 6.

The permit length is proposed to be 20 years, from 1994 to 2014. This HCP is open for amendment, if the amendments do not violate the spirit or compromise the integrity of this HCP.

1.3 THE HCP PLANNING PROCESS

Washington County initiated its HCP planning process in late 1990 with the formation of a committee to evaluate various options and recommend a course of action to the Washington County Commission. This committee concluded that it would be in the best interest of the County and its citizens to proceed with development of an HCP and to obtain a Section 10(a)(1)(B) permit.

WASHINGTON COUNTY, UTAH
DESERT TORTOISE INCIDENTAL TAKE PERMIT APPLICATION/DOCUMENTS
Part II

Washington County, Utah
Habitat Conservation Plan

Submitted by

Washington County Commission
Washington County, Utah

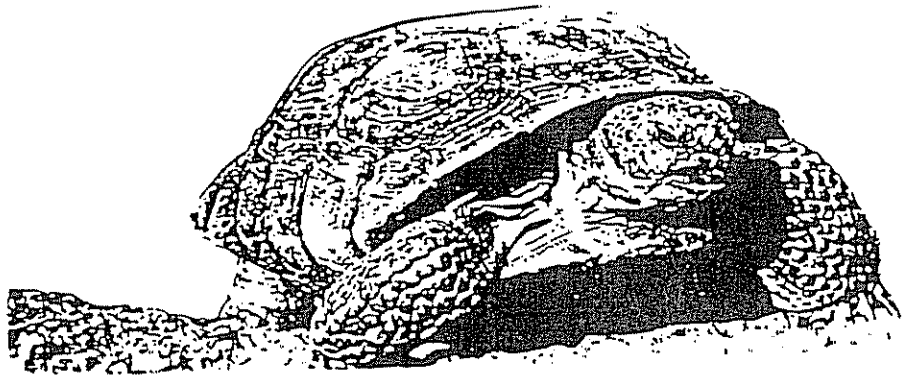
Submitted to

U.S. Fish and Wildlife Service

Prepared by

Washington County HCP Steering Committee
and
SWCA, Inc. Environmental Consultants

December 1995



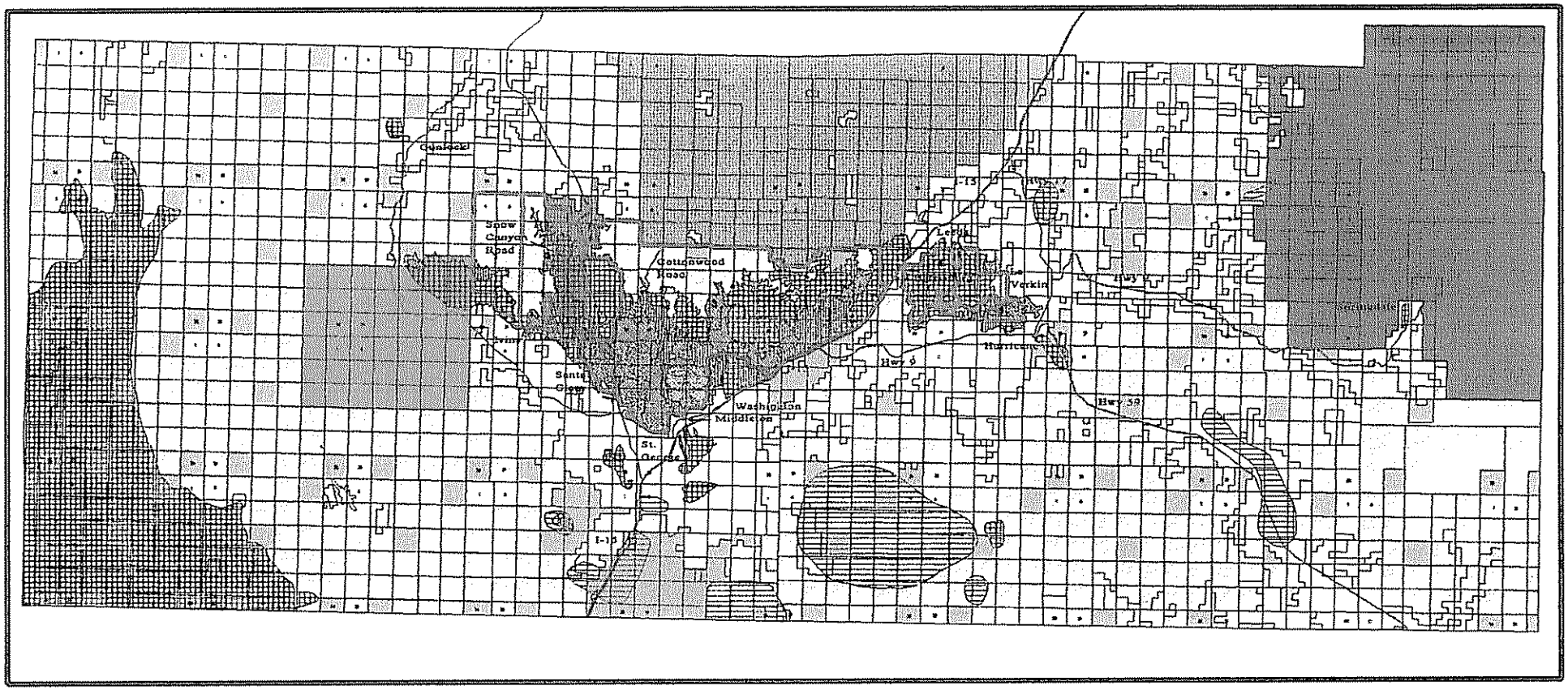


Figure 1.1. Washington County Tortoise Habitat

In January 1991, Washington County organized an HCP Steering Committee, with representation as presented in Table 1.3. Scott Hirschi served as chairman and facilitator of the Steering Committee. Washington County was selected as the permit applicant as it was the logical entity for a county-wide HCP. The Steering Committee assumed responsibility for deciding the content of and making the decisions for the HCP. A technical consultant was retained to fulfill the tasks of conducting biological inventories, developing a computerized database of land ownership and reserve boundaries, and preparing the HCP and accompanying NEPA documents.

It was a challenge for the Steering Committee to include all those with an interest in the HCP process while keeping the number of participants at a manageable level. Washington County attempted to balance conflicting objectives by establishing a 15-member Steering Committee. Representation included all levels of government, including the Bureau of Land Management Dixie Resource Area Office, Utah Division of Wildlife Resources, Washington County, the local Water Conservancy District, and the incorporated cities within the County. Environmental groups were represented by the Nature Conservancy and Southern Utah Wilderness Alliance/Humane Society of the United States. Grazing, recreation, and real estate/development interests, as well as Federal Congressional representatives, were included on the Steering Committee. Because large areas of school and other institutional trust lands are populated by the desert tortoise, the Utah Division of State Lands and Forestry, as Trustee, also served on the Steering Committee. This wide array of interests provided the Steering Committee with all possible viewpoints for a thorough evaluation of planning considerations. The USFWS was also included as a non-voting member of the Committee to help guide the Steering Committee through the consensus-making and HCP approval processes.

Initially, the Steering Committee formed three subcommittees. The funding committee, chaired by Ron Thompson, was charged with obtaining the necessary funding for the development of the HCP. The Technical Advisory Committee, chaired by the BLM representative, was charged with determining the quality and adequacy of the existing biological information, deciding what additional biological information needed to be collected, and evaluating the quality of the new information. The education committee, chaired by Milo McCowan, was charged with developing and disseminating a brochure and video about the HCP. The Steering Committee also solicited proposals and selected a consultant to assist in the biological studies and preparation of the HCP.

1.3.1 Funding Committee

Funding for the development of the Washington County HCP was contributed by a variety of sources (see Table 1.4). Funds previously earmarked for implementation of the HCP come from compensation paid by Kern River Pipeline and Utah Associated Municipal Power Systems (UAMPS) for impacts to desert tortoise habitat.

Table 1.3. Membership and Affiliation on the Washington County HCP Steering Committee.

Chairman:	
Mr. Steve Snow	Snow, Nuffer, Engstrom, & Drake
Previous Chairman:	
Mr. Scott Hirschi	Washington County Commissioner
Voting Members:	
Mr. Scott Belfit	Bureau of Land Management
Mr. Christopher Blake	Washington County Mayor's Association
Mr. Duane Blake	Washington County Cattlemen's Association
Mr. Jim Doyle	Rocky Mountain Ventures
Mr. Russell Gallian	Washington County Commission
Mr. Steve Johnson	Southern Utah Wilderness Alliance/Humane Society of the United States
Mr. Milo McCowan	Development
Mr. Chris Montague	The Nature Conservancy
Mr. Ted Stewart	Utah Department of Natural Resources
Mr. Ron Thompson	Washington County Water Conservancy District
Non-Voting Members:	
Mr. Rick Arial	Congressman Jim Hansen
Mr. Darin Bird	Senator Robert Bennett
Ms. Jeannine Holt	Senator Orrin Hatch and Senator Jake Garn (term ended 12/92)
Mr. Robert Williams	U.S. Fish and Wildlife Service
Executive Assistants:	
Ms. Georgette Kent	
Ms. Linda Sappington	
Others who served on the committee were:	
Ms. Bette Arial	Congressman Jim Hansen/BLM
Mr. Robert Benton	U.S. Fish and Wildlife Service
Mr. Mike Coffeen	Utah Division of Wildlife Resources
Mr. Bob Douglas	Bureau of Land Management
Mr. Rick Fridell	Utah Division of Wildlife Resources
Mr. Doug McKnight	Recreation
Mr. John Payne	Bureau of Land Management
Ms. Debbie Pietrzak	Bureau of Land Management
Mr. Ed Storey	Utah Division of State Lands and Forestry
Ms. Marilet Zablan	U.S. Fish and Wildlife Service

Table 1.4. Sources of Funding for the Preparation of the HCP.

Source	Amount
State of Utah:	
Land Grant Maintenance	$50,000.00
General Funds	21,000.00
Community Impact Board	200,000.00[1]
Washington County:	52,000.00
Cities:	
Hurricane	3,871.00
Enterprise	920.00
Leeds	164.00
Rockville	181.00
Santa Clara	2,281.00
Springdale	309.00
Toquerville	488.00
Washington	4,171.00
Virgin	217.00
St. George	27,913.00
Ivins ($1,179.00)[2]	00.00
LaVerkin	1,740.00
Hildale ($969.00)[2]	00.00
New Harmony ($102.00)[2]	00.00
Washington County Water Conservancy District	5,000.00
U.S. Fish and Wildlife Service	70,000.00
The Nature Conservancy	1,000.00
Washington County Cattlemen	500.00
R.C. Tolman Development	300.00
Jim Doyle	140,000.00
Kern River Gas (Incl. 1991 Interest)	174,424.00
Washington County Realtors	4,143.00
Subtotal	760,622.00
1991 Interest	5,089.00
Total	$765,711.00

[1] Grant to the Water District from the Community Impact Board for HCP development.
[2] Amount pledged.

1.3.2 Technical Advisory Committee

The Technical Advisory Committee (TAC) initially reviewed the existing biological data for Washington County and determined there was insufficient information upon which to make sound biological judgments for the HCP. As a result, over 920 new one-mile transects were surveyed in the County in order to better define desert tortoise habitat boundaries and densities. Combined with existing transect data from the BLM and the Utah Division of Wildlife Resources (UDWR), a density classification and distribution map of the County was prepared. This map was modified by the TAC using soil types, physical geographic features, and vegetative communities. By basing the map on these data, the map depicts desert tortoise distribution and habitat quality in the County with sufficient accuracy for planning purposes. For the Siler pincushion cactus and dwarf bear-claw poppy, approximately 100 one-mile transects were surveyed to better define habitat boundaries. The TAC determined that existing information on the other six listed species was sufficient and no further studies were warranted for the purposes of this HCP.

1.3.3 Education Committee

The education committee prepared a brochure about the HCP process and the Act which was widely circulated throughout the County, targeting school children in grades 6–12. One hundred copies of a 20-minute video were also prepared and distributed throughout the County and State, as well as to the media, in order to increase public understanding of the Act and its impact on Washington County.

1.3.4 Technical Consultant

Through a competitive process, SWCA, Inc. Environmental Consultants of Flagstaff, Arizona, was selected to conduct biological surveys of transects under the direction of the TAC. The Steering Committee decided to retain SWCA to serve as its technical staff in developing the HCP.

1.3.5 Submission of the December 1992 HCP and USFWS Response

Through almost 30 meetings of the Steering Committee, an HCP was developed and submitted to the USFWS on December 16, 1992. This HCP had a proposed reserve of approximately 27,000 acres and a request for incidental take on approximately 12,000 acres of private and State land. Mitigation measures included reserve acquisition through land exchange, fencing, law enforcement, and acquisition of grazing permits. Although the HCP Steering Committee voted unanimously to submit the HCP to the USFWS, and the plan represented a balance of the interests, it did not receive the unanimous endorsement of the Steering Committee.

In March 1993, the USFWS expressed significant concern with the HCP submitted and suggested that the Steering Committee go back to the drawing board and create a larger reserve with increased mitigation. It was suggested that the Steering Committee refer to the recently

released Draft Desert Tortoise Recovery Plan (DDTRP) (USFWS 1993c) and utilize the TAC's biological expertise in a more productive way. The USFWS also suggested that Land and Water Conservation Fund (L&WCF) monies might be available to fund additional habitat acquisition.

1.3.6 Development of the Revised Washington County HCP

The Steering Committee worked closely with the USFWS through the remainder of 1993 and early 1994 to create an HCP which provided greater protection to the Mojave desert tortoise as well as the other listed and candidate species. During this time, Chairman Hirschi accepted the position of Director of the Division of State Lands and Forestry, and the Steering Committee selected attorney Steve Snow to become Chairman. Numerous subcommittees were established, including ones for fencing, translocation, monitoring, grazing, budget, implementation, boundaries, interlocal agreements, and land exchange. This document represents the combined efforts of the entire Steering Committee.

1.4 COORDINATION WITH THE DESERT TORTOISE RECOVERY PLAN (DTRP)

The Desert Tortoise Recovery Plan (DTRP) identifies six recovery units throughout the range of the Mojave desert tortoise, and two of these units are represented in Utah (USFWS 1994). Within each recovery unit, individual reserves are identified as Desert Wildlife Management Areas (DWMAs). The Beaver Dam Slope population is identified as a DWMA in the Northeastern Mojave Recovery Unit, and the Upper Virgin River DWMA is identified as the only DWMA within the Upper Virgin River Recovery Unit. All the desert tortoise habitat discussed for reserve and non-reserve within this HCP is part of the Upper Virgin River Recovery Unit. The Beaver Dam Slope, while identified in this HCP as desert tortoise habitat within Washington County, is not considered for a change in reserve status or for incidental take in this HCP. The Steering Committee has included, to the best of their ability, all of the DTRP's recommendations for this DWMA with the exception of closing Skyline Drive.

Recovery Plans for the Siler pincushion cactus and dwarf bear-claw poppy, which call for the development of a reserve, have been consulted. The Siler pincushion cactus was recommended for downlisting to threatened by the USFWS in March of 1993 (USFWS 1993a). This change occurred in September, 1995.

1.5 HCP GOALS AND OBJECTIVES

The goal of the Washington County HCP is to provide a mechanism to allow orderly growth and development in Washington County without further jeopardizing the status of Federally listed or candidate species, focusing on protection of the desert tortoise. In order to attain this goal, four objectives have been established:

- Provide adequate protection for the desert tortoise by implementing aspects of the DTRP through the creation and management of the Upper Virgin River Desert Wildlife Management Area.

- Provide protection for other listed and candidate species and their habitats.

- Meet the growth and development needs of the County.

- Create a framework within the County to deal with current and future listed species.

1.6 PROPOSED PROGRAM

The HCP proposes a seven-pronged approach for habitat conservation in Washington County:

- Place in Federal and State ownership and management a reserve including 38,787 acres of Mojave desert tortoise habitat and an additional 22,235 acres as buffer and other species habitat. This reserve would be bordered on the west by the Paiute Indian Tribal Lands; on the north by the Dixie National Forest; on the east by the City of Hurricane; and on the south by Skyline Drive, the northern portions of St. George and Washington City, and Interstate 15. Currently, less than two-thirds of this area is under Federal management. Part of the proposed reserve would be managed as an extension of Snow Canyon State Park.

- Remove competing and other consumptive uses within the reserve which may potentially adversely impact the Mojave desert tortoise and other Mojave Desert species. This includes fencing the reserve to eliminate the need for a buffer outside of the proposed reserve.

- Develop controls for minimizing take through county-wide ordinances, fees, environmental education, and enforcement, and develop a translocation program to attempt to preserve individuals which otherwise would be killed.

- Seek Congressional support for establishment of a National Conservation Area (NCA) with line-item management funding and establishment by year five of the plan.

- Assist the BLM and Utah Department of Natural Resources (UDNR) in reserve management until NCA status can be obtained.

- Establish a monitoring program in the reserve to determine desert tortoise population trends.

- Fund surveys and other actions to help gather information and identify and implement actions to help other listed and candidate species.

These activities will serve as the primary mitigation for an estimated level of incidental take of 12,264 acres of primarily low-density habitat in the County. This proposed level of incidental

take has been determined based on criteria including those areas likely to be developed within the next 20 years and areas which could be developed without significantly impacting the desert tortoise.

Although the total amount of desert tortoise habitat in the Upper Virgin River Recovery Unit will be reduced, the enhanced quality of the remaining habitat through removal of threats from development and other sources should more than compensate for this loss. When combined with the proposed mitigation, the proposed level of take should not adversely impact the Upper Virgin River Recovery Unit population of the desert tortoise. On the contrary, it is expected that implementation of this HCP should improve the quality of habitat and long-term survivability for the Mojave desert tortoise in this Recovery Unit.

1.7 IS THE DESERT TORTOISE NATIVE TO THE ST. GEORGE AREA?

There is debate between long-time residents of Washington County and the scientific community over the origin of the desert tortoise in Washington County. Many residents claim that no desert tortoises existed in the area prior to their introduction by humans. Based on numerous reports of scores of desert tortoises being brought to St. George, the Washington County Commission has concluded that the populations of desert tortoise have been at least significantly enhanced by human introduction. Scientists who have studied the region have argued that the occurrence of associated species in the area (such as Gila monsters and sidewinders) and the diverse age structure of the population make it likely that desert tortoises have been in this area for centuries. The TAC reviewed the various opinions and concluded it would be impossible to prove the origin of desert tortoises in the St. George area one way or the other. Whatever their origin, the desert tortoises in Washington County belong to a Federally listed species. As required by Section 9, USFWS considers the Washington County populations of desert tortoises protected under the Act. The Washington County Commission recognizes the position of the USFWS and desires to cooperate in the preservation of the desert tortoise.

CHAPTER 2.0
BIOLOGICAL PROGRAM

The purpose of the HCP is to provide, to the maximum extent practicable, for the perpetual protection of the Mojave desert tortoise in the Upper Virgin River Recovery Unit and conserve other listed, candidate, and sensitive species as much as possible, irrespective of the incidental take of the desert tortoises authorized by the permit. Further, it must be shown that such take will not jeopardize any of the other eight Federally listed species. To achieve this purpose, the HCP must be founded on an adequate understanding of the ecology of these protected and candidate species and the biological processes which affect the area as a whole. It is the opinion of the Steering Committee and the TAC that the biological studies which have been used to develop this HCP represent the best available information about the desert tortoise within Washington County.

2.1 SPECIES OF CONCERN

The Federally listed species in Washington County are the Mojave desert tortoise, bald eagle, peregrine falcon. Mexican spotted owl, southwestern willow flycatcher, woundfin minnow, Virgin River chub, dwarf bear-claw poppy, and Siler pincushion cactus.

2.1.1 Mojave Desert Tortoise

The species of primary concern is the Mojave desert tortoise due to its widespread distribution in potential development areas. The Mojave desert tortoise is distributed throughout the southwestern United States (see Figure 2.1). Desert tortoises exist in Washington County in areas where they can find adequate food and protection from temperature extremes. Figure 1.1 presents the range of the desert tortoise in Washington County and the relative densities of desert tortoise sign found. These data were based on intensive biological studies undertaken in 1991 to assess habitat areas and populations of the endangered, threatened, proposed threatened, and candidate species known to live in Washington County. Field studies consisted of one-mile transect surveys on habitat considered suitable or potentially suitable for the Mojave desert tortoise.

Results from approximately 1,000 of these transects were combined with UDWR and BLM field data to create a map of desert tortoise sign, which included burrows, scat, carcasses, or specific individuals. Areas of low, medium, and high tortoise density were then drawn around groups of transects that reflected low, medium, or high quantities of desert tortoise sign. Because a high correlation exists between the existence of desert tortoise sign and the presence of live desert tortoises. this information provided the basis for determining the quality of desert tortoise habitat and estimating population densities. Boundaries of these areas were then modified to reflect soil and vegetation conditions. A map of desert tortoise density, using the best available information. was produced and used in the HCP process. The amount of acreage, by desert tortoise density classification and general landownership, as well as an estimated desert tortoise population. is presented in Table 2.1.

Figure 2.1. Range of the Mojave Desert Tortoise

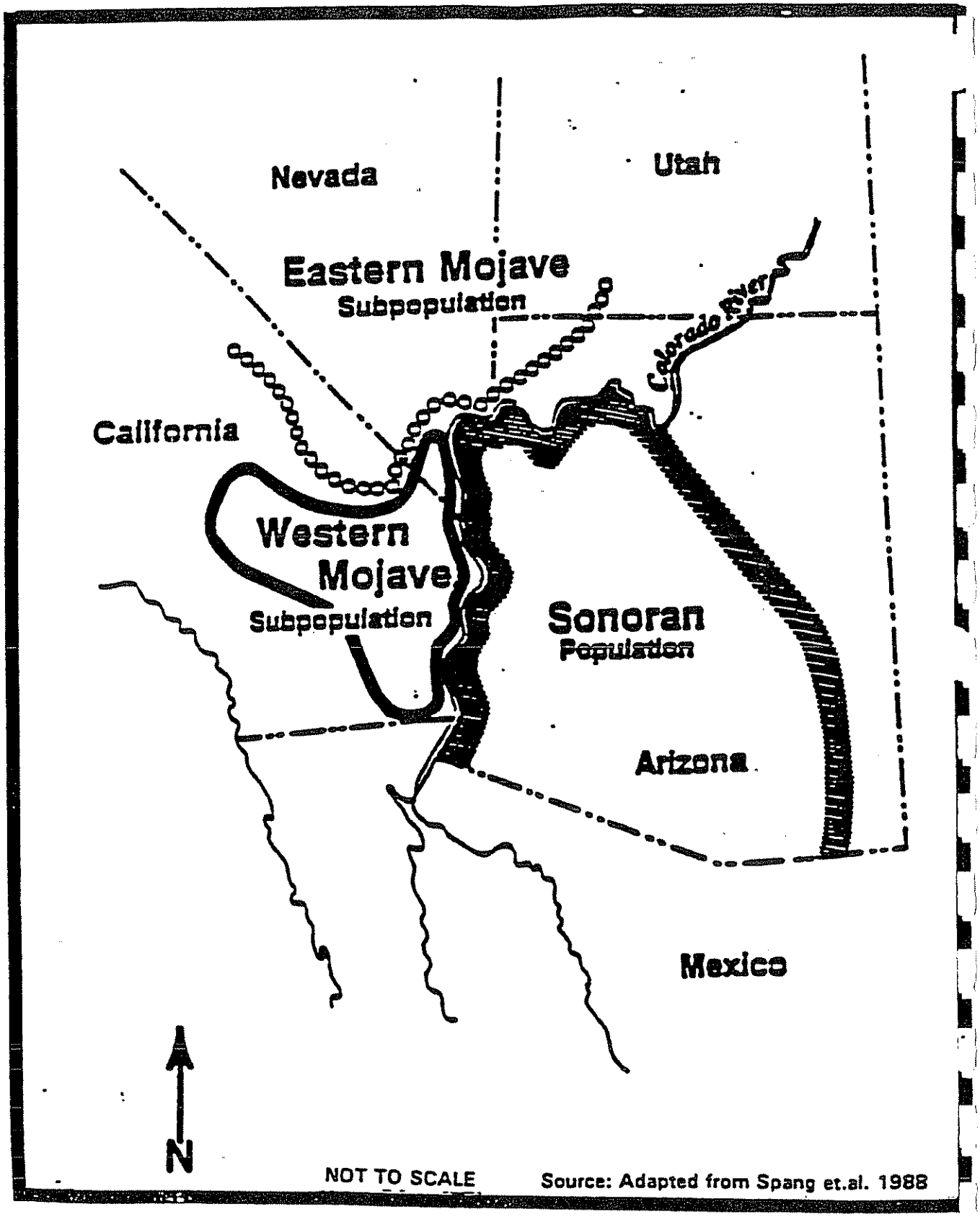


Table 2.1. Estimated Desert Tortoise Habitat Acreage and Number of Animals in the Upper Virgin River Recovery Unit.

Ownership	Desert tortoise Density Classification: Low (acres)	Medium (acres)	High (acres)	Total (acres)
Private/Municipal	9,463	1,704	5,828	16,975
State School Trust*	5,212	3,137	4,472	12,821
BLM	14,552	1,975	4,195	20,722
Zion National Park	2	0	0	2
Dixie National Forest	83	0	0	83
Paiute Indian Tribal Lands	2,251	2	47	2,570
Snow Canyon State Park	2,603	0	151	2,754
Total	34,436	6,818	14,693	55,947

Classification	Acreage	Number of Animals
High Density	14,693	5,739
Medium Density	6,818	799
Low Density	34,436	1,345
Total	55,947	7,883

	Range	Average
High Density:	101–400/square mile	250 animals/square mile
Medium Density:	51–100/square mile	75 animals/square mile
Low Density:	0–50/square mile	25 animals/square mile

* 212 acres of State School Trust lands are within the Paiute Indian Tribal Lands.

Desert tortoise populations in Washington County were estimated by conducting an intensive study of a one-mile plot near St. George in the summer of 1988. At the end of the summer, sign transects were completed within that plot and a correlation was established between corrected sign density and desert tortoise density. A multiplier was calculated to identify density per sign (in this case, 389 desert tortoises divided by 29.1 sign per one-mile transect equals 13.37 desert tortoises per square mile for each sign encountered on a one-mile transect). This multiplier was then used to identify areas of low density (1–50 desert tortoises per square mile), medium density (51–100 desert tortoises per square mile), and high density (101–400 desert tortoises per square mile).

Much of the desert tortoise population throughout the range appears to be suffering from an upper respiratory tract disease (URTD), causing their numbers in the Mojave Desert to decline

so rapidly as to have prompted their emergency listing as a threatened species by the USFWS. The spread of this disease is suspected by some to be linked to pressures on the desert tortoise by human incursions into desert tortoise habitat; however, there is debate within the scientific community as to the exact nature of URTD and its origins or causes. Within or adjacent to populated areas of Washington County, it is speculated that desert tortoise populations have declined due to road kills, predation by dogs, and degradation of habitat, but the extent of URTD in Washington County remains unclear. Apparently one individual tortoise was documented with the disease by UDWR. Translocation efforts provided by the HCP include examinations for URTD, which should generate the information needed to understand how common this disease is in Washington County.

2.1.2 Bald Eagle

In Washington County, most observations of bald eagles are along the Virgin and Santa Clara Rivers and bodies of water associated with these rivers. Special use areas include Quail Creek Reservoir, Hurricane sewer ponds, Baker Dam Reservoir, Sand Cove Reservoir, Gunlock Reservoir, Ivins Reservoir, and Ash Creek Reservoir (BLM 1990; Jensen 1991). Foraging areas for the bald eagle have been documented by wildlife management officials. An approved Recovery Plan exists for the bald eagle.

2.1.3 Peregrine Falcon

Peregrine falcons are found in Washington County in Zion National Park, at Welcome Spring, near the south end of the Beaver Dam Mountains, and at the Red Cliffs Recreation Area in the high cliffs which provide nest and roost sites for the falcons (Jensen 1991). A Recovery Plan has been approved for the peregrine falcon.

2.1.4 Mexican Spotted Owl

Eleven mating pairs and three individuals of Mexican spotted owls have been found in Zion National Park, and sightings have been recorded from northeastern Washington County on BLM lands near Zion National Park (pers. comm., S. Rinkevich [USFWS], 1992; pers. comm., R. Douglas [BLM], 1992). Surveys on the Dixie National Forest have yet to positively confirm any Mexican spotted owls. A draft Recovery Plan for the Mexican spotted owl has been prepared and work is beginning on a final plan; however, management guidelines have been issued by the USFWS (pers. comm., M. Zablan [USFWS], 1992).

2.1.5 Southwestern Willow Flycatcher

The southwestern willow flycatcher was listed as endangered in March 1995. The species is also considered a State sensitive species. The flycatcher is a small, brownish-olive bird with a pale olive breast and a pale yellow belly, whose spring and summer range is the southwestern United States (Unitt 1987). This species uses low to mid-elevation and stream habitats, generally nesting among willow or reed thickets, but inhabiting forested, wetlands, and

rangeland during other parts of the year. Flycatchers feed primarily on insects, seeds, and berries. Their winter range is from southern Mexico to Panama (Ehrlich et al. 1988). Southwestern willow flycatchers have been recorded along the Virgin and Santa Clara Rivers. While habitat with vegetation similar to that in known breeding areas exists along these rivers, no breeding populations or nests have been documented (pers. comm., R. Fridell [UDWR], 1992). However, summer records of this species imply the possibility of breeding in the area.

2.1.6 Woundfin and Virgin River Chub

The use areas of the woundfin and Virgin River chub are restricted to the Virgin River from LaVerkin Springs to Lake Mead. Many in-depth surveys have been conducted concerning the Virgin River fishes. Locations of known habitat for these species are presented in Figure 2.2. A Recovery Plan for the Virgin River fishes has been prepared (USFWS 1995), and a Conservation Agreement (UDWR/USFWS 1995) has been signed for the Virgin Spinedace.

2.1.7 Dwarf Bear-Claw Poppy and Siler Pincushion Cactus

Two plant species, one endangered and one threatened, also inhabit Washington County: the dwarf bear-claw poppy and the Siler pincushion cactus. The known habitat of these plants, clay soils in the Moenkopi Formation, lies south and west of St. George (Figure 2.2). Approximately 90 percent of the habitat of the two species is on BLM and Utah State School Trust lands. These plants are currently imperiled by off-highway vehicle (OHV) use. A transect study was carried out by Dr. Arthur Phillips, a botanist who aided in the preparation of the Recovery Plan for the Siler pincushion cactus (Phillips et al. 1979). Information from this study correlates with previous USFWS studies and surveys undertaken by BLM. Table 2.2 presents land ownership for all known locations within Washington County for these two listed plant species.

Table 2.2. Land Ownership Acreages for the Two Listed Plant Species.

Ownership	Siler Cactus (acres)	Dwarf Bear-Claw Poppy (acres)	Both Species (acres)	Total (acres)
Private	35	273	0	308
State	0	2,675	274	2,949
BLM	811	4,962	903	6,676
BIA	0	185	0	185
Totals	846	8,095	1,177	10,118

2.1.8 Candidate Species

Over 40 species occurring in Washington County are considered candidates for Federal listing and many others are State sensitive. Six additional species are likely to be considered for listing in the near future. These include the spotted bat, Shem milk-vetch, Holmgren milk-vetch,

Bonneville cutthroat trout (an introduced species), wet rock physa (also known as the Zion Canyon snail), and Virgin Spinedace. The Virgin spinedace, a proposed threatened species, will be downlisted to a candidate species pursuant to a Conservation Agreement with the Washington County Water District and the State of Utah. None of these six species are known or thought to occur in the areas identified for incidental take. While the shem milk-vetch, a Candidate 2 species recommended for a Federal status change to Candidate 1, will not be affected by the HCP. it is of great concern as more than 50% of its population has been destroyed in the past year. There are four remaining populations of shem milk-vetch in Washington County, all of them extremely small. None of the populations fall within the proposed HCP reserve or take areas. and hence, will not be affected, either adversely or beneficially, by the HCP. Some protection is offered to the two populations that occur on BLM lands through Federal management strategies while the population on the Paiute Tribal Lands and the one on State lands will receive no protection. Candidate and State sensitive species are discussed in greater detail in Chapter 8.

In addition to the Mojave desert tortoise and the peregrine falcon, the following Federal candidate and State sensitive species are expected to benefit from the creation and management of the proposed reserve: Merriam's kangaroo rat, pygmy rabbit, ferruginous hawk, loggerhead shrike. chuckwalla. Gila monster, Utah banded gecko, lyre snake, western blind snake, and sidewinder.

2.2 GUIDING PRINCIPLES

The application of habitat conservation strategies to the Washington County area, in concert with a limited amount of development, will be guided by a broad set of conservation and planning principles. defined herein. These principles are formulated to maximize the probability of this HCP's success in conserving threatened and endangered as well as candidate species of interest and the overall ecological fabric of the County. Each specific conservation technique applied to the areas affected by the HCP will be in accordance with these principles.

Preservation of existing ecological values is one of the foremost objectives of the HCP. The ecological values to be preserved comprise all of the features of the HCP areas which result from their unusual climate, varied topography, and relative freedom from urban development. These values include the endangered, threatened, and candidate species of concern; the Mojave Desert vegetation which provides food and cover for these and many other species; and the relatively untrammeled areas which provide scenic splendor for Washington County inhabitants and visitors. Since many areas have recently experienced the increasing effects of human activity. such as livestock grazing, roads, OHV use, and other urban activities, the ecological value of the area has been reduced from its "pristine" condition. Nonetheless, since it is extremely difficult to theoretically reconstruct what this ancestral condition would have been, and virtually impossible to recreate it. a realistic and much more workable goal is to attempt to preserve the existing known values of present-day Mojave Desert habitat in Washington County.

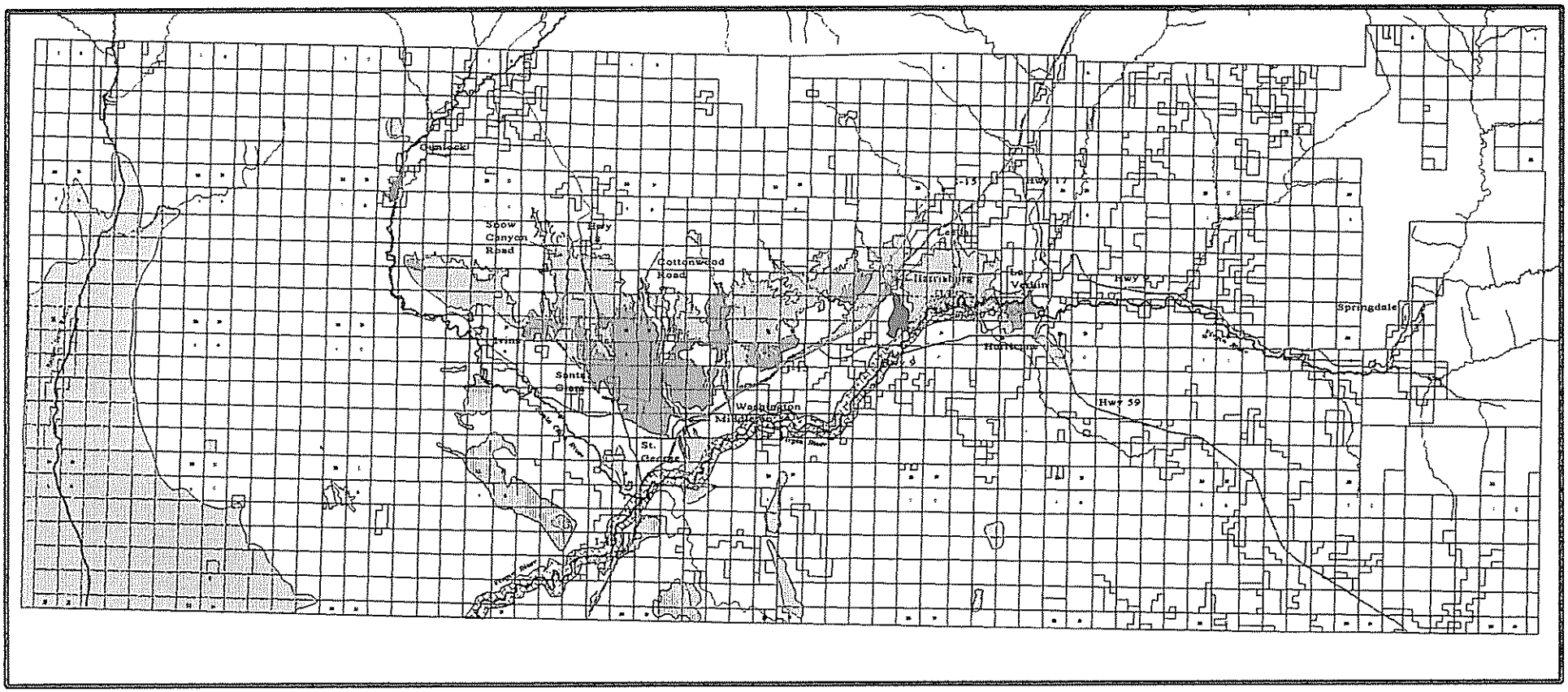


Figure 2.2. Distribution of Threatened and Endangered Species in Washington County.

A second guiding principle is to preserve existing biodiversity. Part of the ecological value is the multitude of species of animals, birds, fishes, and plants making the County their home. This diversity is reflected in the very occurrence of the numerous species of special concern. Diversity is also related to stability in ecological systems. The role of diversity in ecosystem stability is one of the basic principles reflected in the Act itself. In a broad sense, part of the purpose of the Washington County HCP is to reserve the stability of biological systems by offsetting a tendency toward loss of diversity. Humans are part of the biological system and derive from it not only their existence, but—in varying degrees—some quality of life as well. At times, this quality of life is based on the mere knowledge that the natural community exists.

The principle of reliance on preservation (as opposed to manipulation or restoration) is also important. Preservation of existing ecological conditions is preferable to attempting to recreate these conditions after disturbance for several reasons. Preservation is less expensive than restoration. Additionally, it is always uncertain whether a restoration or habitat enhancement effort will produce the desired result or whether it will adversely affect another species. Preservation also maintains areas which draw human visitors by maintaining aesthetic values. Enhancement of existing habitat is justified in some areas, when it can be shown that the enhancement reverses past disturbance and/or accelerates the rate of natural recovery from disturbance. Thus in reserved areas impacted by grazing, roads, OHV trails and other disturbances, enhancement can improve the chances for a species' survival in perpetuity. Habitat enhancement measures currently considered viable include the fencing of desert tortoise reserve areas to allow for natural healing and revegetation. It also includes the purchase and retirement of grazing permits to eliminate any potential adverse impact from livestock, the restriction or elimination of other competing uses, and the creation of reserves where protection of other Federally listed species is a primary management objective.

CHAPTER 3.0
RESERVE

3.1 INTRODUCTION

The central element of this HCP is the creation of a Mojave Desert habitat reserve in Washington County. This proposed reserve will be 61,022 acres in size and will be managed for the protection of the Mojave desert tortoise and other listed, candidate, and sensitive species found in these same habitat areas. The proposed reserve is consistent with that recommended in the DTRP, and its boundaries have been drawn with generally accepted reserve design criteria (see Chapter 7 for an in-depth analysis of the reserve boundaries against these criteria). The proposed boundaries of the reserve are presented in Figure 3.1, and current land ownership and desert tortoise habitat within the proposed reserve are enumerated in Table 3.1. This Chapter details the acquisition strategy for the proposed reserve and identifies management strategies for each unit of the reserve and current landowners.[1]

Table 3.1. Land Ownership and Desert Tortoise Habitat in the Proposed Reserve.

Desert tortoise Density	Private/ Municipal/ Roads (acres)	School Trust (acres)	BLM (acres)	Snow Canyon State Park (acres)	Total (acres)
High	4,299	4,236	4,164	204	12,903
Medium	1,023	2,501	1,913	0	5,437
Low	1,727	3,357	12,621	2,742	20,447
None	622	844	19,336	1,433	22,235
Total	7,671	10,938	38,034	4,379	61,022

3.2 ACQUISITION STRATEGY

As illustrated in Table 3.1, approximately two-thirds of the proposed reserve is under BLM or State Park ownership. The remaining third comprises parcels currently under State or private ownership that are needed to make the reserve contiguous and effective. Three acquisition strategies have been identified to facilitate the acquisition of these necessary private and State School Trust lands. Due to the long time frame for their completion, all three have been initiated and are being pursued simultaneously. Land will be acquired or exchanged upon the principle of a willing seller and willing buyer. Landowners have been consulted throughout the

[1] Parcel data and land ownership information were obtained from a variety of sources, including the Washington County Assessor's Office, the BLM, and the Division of State Lands and Forestry. While every effort has been made to make the lists contained herein as accurate and as current as possible, land ownership information is a dynamic process and the Washington County Commission does not guarantee the accuracy of any of the land ownership information in this document.

HCP process and have been encouraged to participate in these land exchanges. In the event they do not, the HCP will have no legal effect on their property and the HCP will place no restrictions on land use within the reserve. However, such lands will not participate in the benefits and protections inherent in an incidental take permit issued as a part of this HCP, and therefore the landowner will be subject to the Section 9 enforcement provisions under the Act. For those landowners that do participate, three acquisition processes will be used. These are briefly described below.

3.2.1 State School Trust–BLM Land Exchange

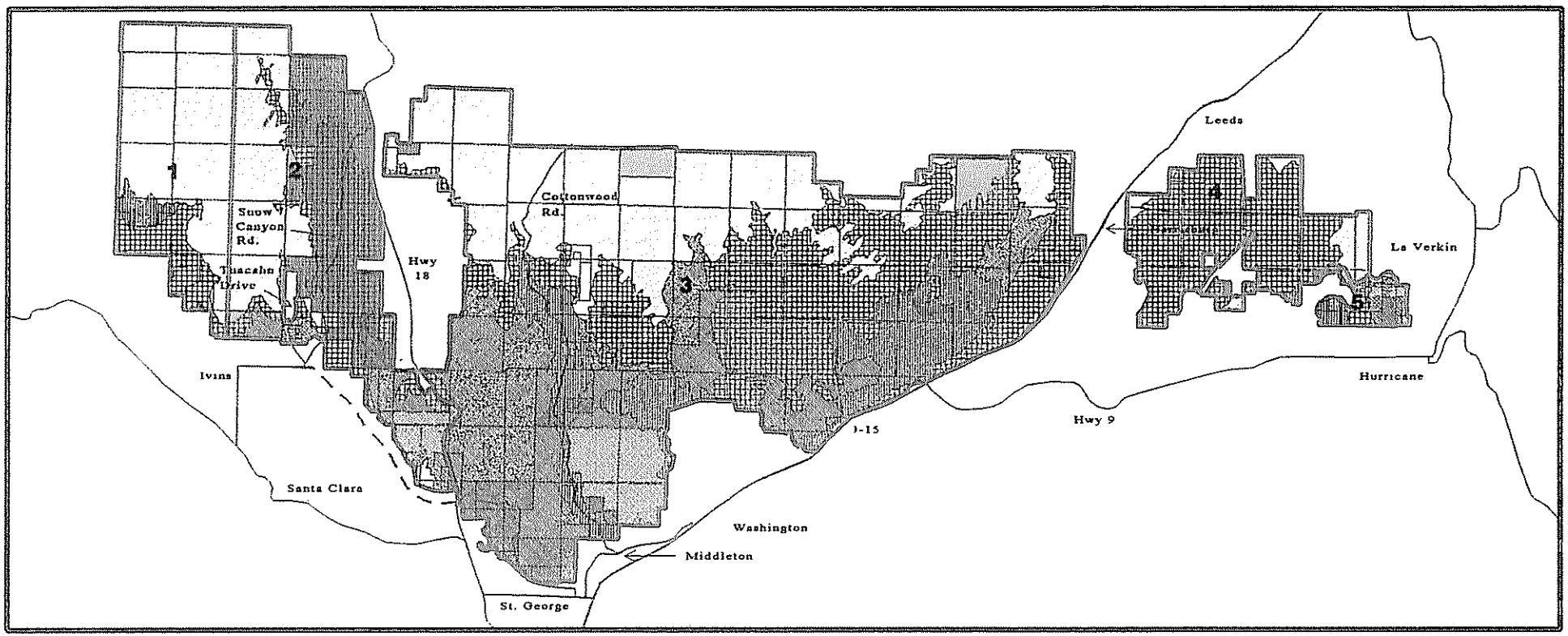
The Division of State Lands and Forestry (Division) has entered into an Memorandum of Understanding (MOU) with the BLM to guide the exchange of lands within the proposed reserve boundaries for BLM lands elsewhere in the State of Utah. Currently, the respective agencies have prepared lists of desired properties and are completing appraisal instructions. It is possible that the Division may desire to retain title to some lands within the reserve, and discussions are being held between the agencies regarding conservation easements or other protective measures which could achieve similar objectives to land exchange. State School Trust lands are also encumbered with various leases and easements. Land acquisition is encouraged, but conservation easements for fulfillment of the permit are acceptable if entered into in perpetuity or as long as such protection is required by the ESA, whichever is less. Through the land exchange process conservation. easements which are incompatible with reserve management objectives will have to be reconciled.

3.2.2 Private-BLM Land Exchange

Most of the larger private landowners within the proposed reserve have agreed to enter into a land exchange with the BLM for lands elsewhere in the Southwest. Unlike the land exchange discussed above, this private–BLM land exchange is envisioned as one large transaction. The HCP Steering Committee has retained both real estate and legal consultants to facilitate the exchange. Currently most of the private landowners within the proposed reserve boundaries have agreed to participate in this acquisition program. Congressional, State and local government and environmental group support has also been sought and received for this exchange.

3.2.3 Land and Water Conservation Fund

The Land and Water Conservation Fund (L&WCF) is a dedicated Federal trust fund whose monies can be used for acquisition of private and municipal lands for outdoor recreation, wildlife habitat. and threatened and endangered species preservation. The Steering Committee. in concert with the BLM and USFWS. submitted a joint funding request for fiscal year 1995 for $7.000.000 for land acquisition. The HCP budget includes a matching grant of $1,000,000 for land acquisition. To our knowledge. this is the first matching grant ever proposed to the L&WCF. If the majority of the lands can be acquired through land exchange, substantially less money from the fund would be necessary. If, on the other hand, the private–BLM land



Private/Other
State of Utah
BLM
Snow Canyon State Park
Highway/Road ROW
Municipal

Proposed DWMA Boundary
Proposed Skyline Drive
Low Tortoise Density
Medium Tortoise Density
High Tortoise Density

10/02/95

N

3000 0 3000 6000 meters

Figure 3.1. Proposed Reserve Boundaries

exchange were to prove unsuccessful, these monies would help to acquire some of the proposed reserve. The fund probably would not be sufficient to acquire all the private parcels, and additional requests to L&WCF would be made in subsequent years.

3.3 DESCRIPTION AND MANAGEMENT OF RESERVE ZONES

The proposed reserve is divided into five zones based on management goals. These zones are depicted in Figure 3.1. The five zones are described, parcel information is identified, and management recommendations are illustrated in the following paragraphs, figures, and tables. In all management zones, free-roaming dogs or feral animals would not be allowed in any of the reserve areas.

3.3.1 Zone 1: Paiute Indian Tribal Lands to Ivins

3.3.1.1 Description

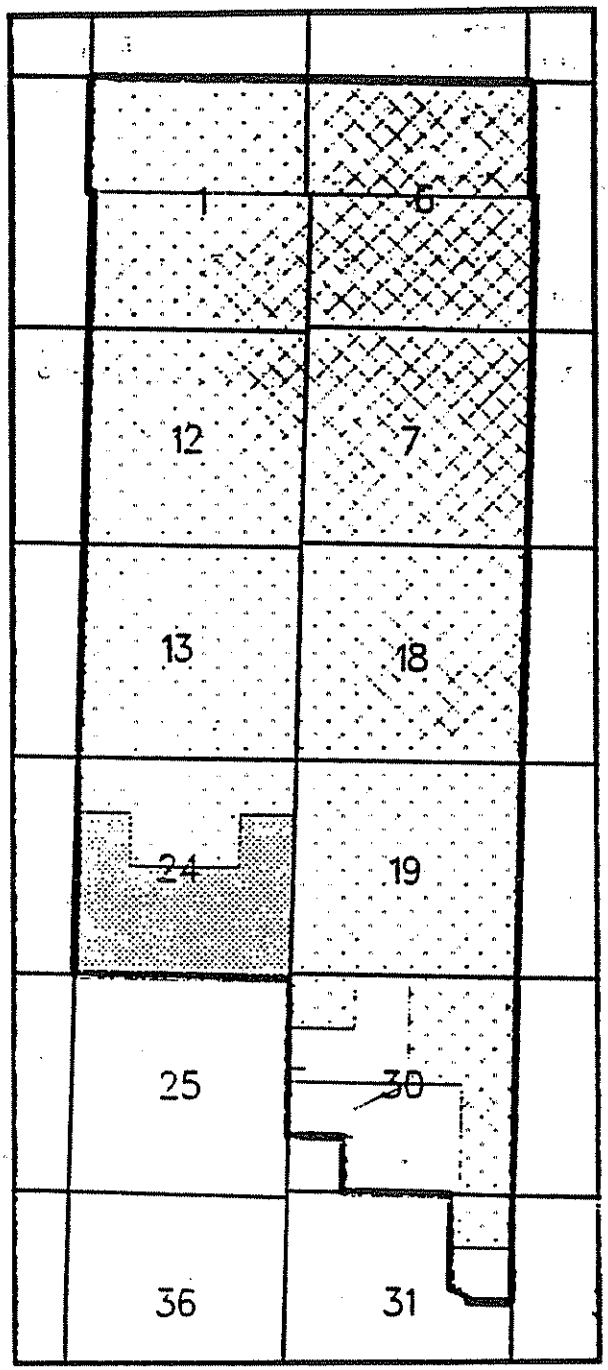
Zone 1 covers the area from the Paiute Indian Tribal Lands to Ivins, which is predominantly within the incorporated boundaries of the Town of Ivins. This area entails approximately 6,146 acres of land predominantly managed by the BLM. Figure 3.2 illustrates the general land ownership within this zone, while Table 3.2 details the land ownership information.

3.3.1.2 Management

The management goal for Zone 1 is to allow for low-density development consistent with habitat protection. Management of Zone 1 will be the responsibility of the Town of Ivins and where applicable, BLM. Management of resources on BLM administered public lands not directly related to desert tortoise objectives, including management of wilderness values on Red Mountain will remain with BLM. Prescriptions on public lands must conform to Federal laws and regulations. Management will primarily entail land use restrictions which have been developed to preserve and enhance Mojave desert tortoise habitat. These restrictions will include the following:

- A maximum overall density of one unit per acre.
- Minimized surface disturbance during development.
- Retention of native vegetation and restrictions on exotic plant materials.
- Firefighting should be allowed.
- No grazing will be allowed in desert tortoise habitat.

The existing Kayenta Development in this area follows these restrictions and is a graphic example of actual development which may co-exist with desert tortoises in this zone.



Private

Private/Developed

Bureau of Land Management

09/27/

Figure 3.2. Zone 1: Paiute Indian Reservation to Ivins

Table 3.2. Parcel Information for Zone 1 of the Proposed Reserve.

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.16W.	06	BLM	BUREAU OF LAND MANAGEMENT	413.19
T.41S.	R.16W.	06	BLM	BUREAU OF LAND MANAGEMENT	348.81
T.41S.	R.16W.	07	BLM	BUREAU OF LAND MANAGEMENT	668.44
T.41S.	R.16W.	18	BLM	BUREAU OF LAND MANAGEMENT	674.97
T.41S.	R.16W.	19	BLM	BUREAU OF LAND MANAGEMENT	662.10
T.41S.	R.16W.	30	7276-A-NP	R.T. MARTIN	118.13
T.41S.	R.16W.	30	7276-B-NP	R.T. MARTIN	9.13
T.41S.	R.16W.	30	7276-C-NP	R.C. & ARLEEN ANN TOLMAN	148.11
T.41S.	R.16W.	30	7276-D	ST. GEORGE & S.C. BENCH IRRIG. Co.	6.10
T.41S.	R.16W.	30	7276-D-NP	IVINS TOWN INC.	3.73
T.41S.	R.16W.	30	7276-E	R.T. MARTIN	57.54
T.41S.	R.16W.	30	BLM	BUREAU OF LAND MANAGEMENT	240.28
T.41S.	R.16W.	30	BLM	BUREAU OF LAND MANAGEMENT	47.72
T.41S.	R.16W.	31	7277-A	WILLIAMS CARMA & ASSOCIATION INC.	5.76
T.41S.	R.16W.	31	7278-N	IVINS TOWN INC.	42.73
T.41S.	R.16W.	31	BLM	BUREAU OF LAND MANAGEMENT	38.77
T.41S.	R.17W.	01	BLM	BUREAU OF LAND MANAGEMENT	410.35
T.41S.	R.17W.	01	BLM	BUREAU OF LAND MANAGEMENT	334.78
T.41S.	R.17W.	12	BLM	BUREAU OF LAND MANAGEMENT	639.80
T.41S.	R.17W.	13	BLM	BUREAU OF LAND MANAGEMENT	633.90
T.41S.	R.17W.	24	BLM	BUREAU OF LAND MANAGEMENT	242.01
T.41S.	R.17W.	24	KAYENTA	TERRY MARTIN	400.57

3.3.2 Zone 2: Ivins to Highway 18

3.3.2.1 Description

Zone 2 covers the area from Ivins to Highway 18, which is predominantly within unincorporated areas of the County as well as incorporated areas in the City of St. George. This area includes 10,372 acres, of which 4,326 are within Snow Canyon State Park and 3,787 are managed by the BLM. Figure 3.3 illustrates the general land ownership within this Zone, while Table 3.3 details the land ownership information.

3.3.2.2 Management

The management goal for Zone 2 is desert tortoise habitat protection and environmental education. It is envisioned that private and State School Trust lands within Zone 2 would be acquired by the BLM through exchange; however, it is the intention of the State, County, and cities that the exchange legislation require the BLM to transfer the land to the UDNR for management as an extension of Snow Canyon State Park and/or to support a regional education center. Mitigation measures applicable to this zone will include land acquisition, fencing of Highway 18, law enforcement, and environmental education. The following management regulations are recommended for Zone 2:

- Hiking, equestrian use, and hunting including other non-consumptive recreational activities should be restricted to designated trails.
- The BLM should be requested to apply for mineral withdrawal for Federal minerals.
- Non-intrusive monitoring of desert tortoise population dynamics should be allowed.
- Maintenance of existing utilities including roads should be allowed.
- Speed restrictions on the Tuacahn Road should be enforced.
- Organized or competitive sporting or recreational events should not be allowed, although guided or controlled tours to enhance education may be permissible.[2]
- Desert tortoise translocation should not be permitted except as authorized under approved translocation projects.
- Existing governmental uses within Zone 2 may continue.
- Firefighting should be allowed.
- No grazing will be allowed in desert tortoise habitat.

The Education Committee, in searching for a location for the Education Center that is removed from any tortoise populations, has discussed the southern part of Paradise Canyon as a tentative location. Paradise Canyon has received attention as a potential site for the Education Center because the County seriously committed to building the Center in this canyon as a result of multiple city concurrence that the reserve be extended west of Hwy 18. This point was a major incentive to making the reserve significantly larger in this general area and likely would not have happened without the intent of an Education Center in Paradise Canyon.

Also, critical to the proposed establishment of a Center in Paradise Canyon is the exchange of this privately-held property to the BLM. The property is largely owned by Amsco Windows. Any land exchange realistically is one to three years away, assuming it occurs. Other sites that have also been raised as alternatives include Snow Canyon State Park and Cottonwood Springs

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[2] An organized recreational activity is any scheduled event with a specific planned purpose. Those organized recreational activities which conflict with the intended protection of the desert tortoise or, due to the nature of the event, are unable to provide the degree of supervision necessary to prevent harm to desert tortoises or prevent damage to habitat will not be permitted within the reserve area. The reserve manager will be the entity authorized to determine the suitability of organized activities within the reserve area. Any entity denied permission to use the reserve area can appeal the decision to the HCAC. The HCP recognizes the proposed Tuacahn project in Zone 2, including use of the entrance road. The prohibition against organized recreational activities does not apply to use on existing, improved roads within the reserve.

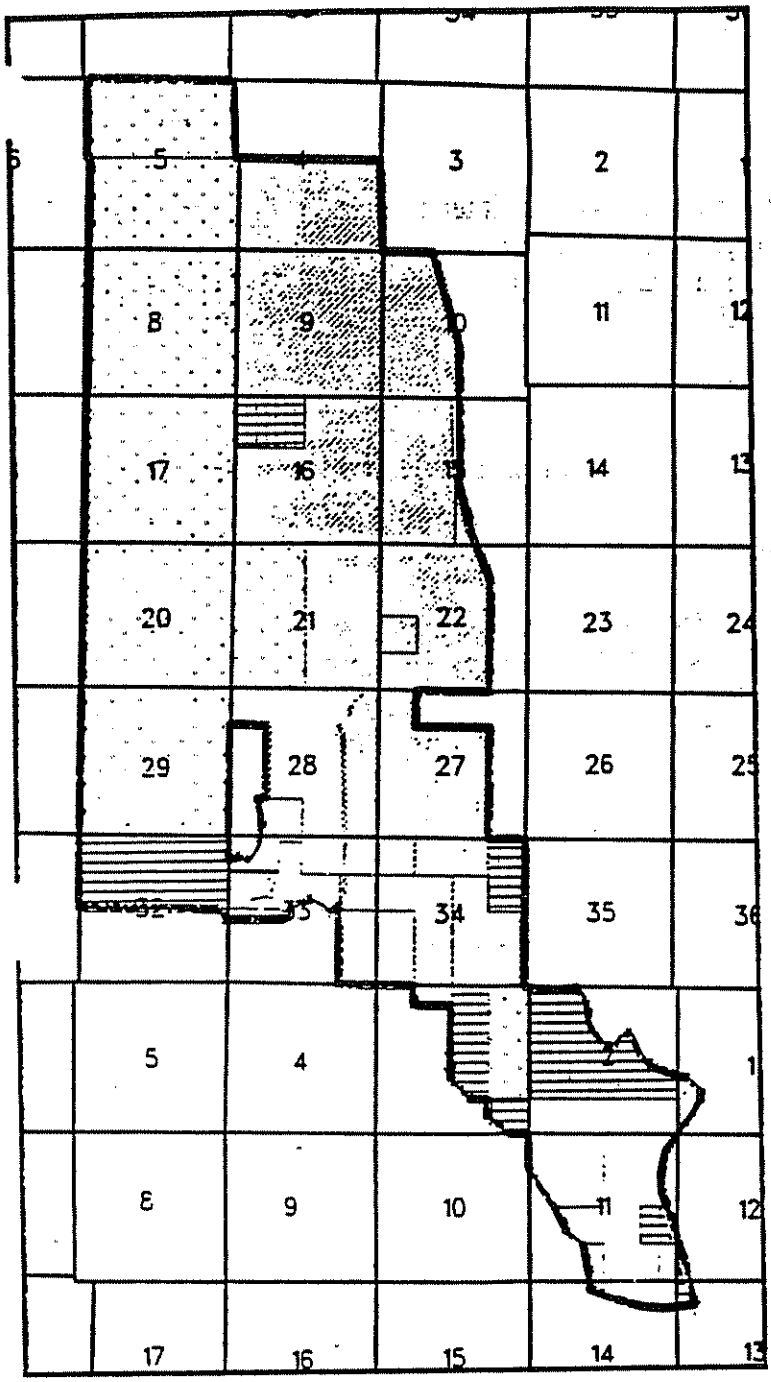
(at I-15 and Hwy 9 junction). At this time, it is uncertain where the Education Center will be built. The Education Committee and the County strongly feel that the Center and its location be designed and built not only in an ecologically acceptable manner, but that it not impact the reproduction or mortality of tortoises which may be in close proximity. If an Education Center is established at one of the above sites, it may be prudent not to designate such a site as a "drop-off" point for tortoises recovered by the public on the basis that such animals could be diseased and might inadvertently infect nearby, wild populations. The County is exploring establishing a "drop-off" point directly with a qualified veterinarian.

Table 3.3. Parcel Information for Zone 2 of the Proposed Reserve.

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.16W.	04	SNOW	SNOW CANYON STATE PARK	387.89
T.41S.	R.16W.	05	BLM	BUREAU OF LAND MANAGEMENT	399.41
T.41S.	R.16W.	05	BLM	BUREAU OF LAND MANAGEMENT	328.28
T.41S.	R.16W.	08	BLM	BUREAU OF LAND MANAGEMENT	644.92
T.41S.	R.16W.	09	SNOW	SNOW CANYON STATE PARK	635.23
T.41S.	R.16W.	10	SNOW	SNOW CANYON STATE PARK	293.68
T.41S.	R.16W.	15	7257-A	UTAH STATE PARK & RECREATION	14.27
T.41S.	R.16W.	15	ROW	HIGHWAY/ROAD ROW	30.41
T.41S.	R.16W.	15	SNOW	SNOW CANYON STATE PARK	305.54
T.41S.	R.16W.	16	SNOW	SNOW CANYON STATE PARK	529.01
T.41S.	R.16W.	16	STATE	STATE OF UTAH	107.07
T.41S.	R.16W.	17	BLM	BUREAU OF LAND MANAGEMENT	646.44
T.41S.	R.16W.	20	BLM	BUREAU OF LAND MANAGEMENT	636.53
T.41S.	R.16W.	21	BLM	BUREAU OF LAND MANAGEMENT	318.95
T.41S.	R.16W.	21	SNOW	SNOW CANYON STATE PARK	318.17
T.41S.	R.16W.	22	7259-C	UTAH STATE PARK & RECREATION	420.92
T.41S.	R.16W.	22	7259-NP	UTAH STATE PARK & RECREATION	39.69
T.41S.	R.16W.	22	ROW	HIGHWAY/ROAD ROW	6.96
T.41S.	R.16W.	27	SNOW	SNOW CANYON STATE PARK	397.82
T.41S.	R.16W.	28	7275-NP	UTAH STATE PARK & RECREATION	133.53
T.41S.	R.16W.	28	7275-NP	UTAH STATE PARK & RECREATION	342.80
T.41S.	R.16W.	28	I-6-1-28-3000	HYRUM SMITH	46.38
T.41S.	R.16W.	28	ROW	HIGHWAY/ROAD ROW	9.76
T.41S.	R.16W.	29	BLM	BUREAU OF LAND MANAGEMENT	649.68
T.41S.	R.16W.	32	7279-TR	UTAH STATE	319.22
T.41S.	R.16W.	32	I-SB-19-A	WESTON HAFEN FAMILY PRTNRSHP	0.95
T.41S.	R.16W.	32	I-SB-19-A	WESTON HAFEN FAMILY PRTNRSHP	0.58
T.41S.	R.16W.	32	ROW	HIGHWAY/ROAD ROW	0.60
T.41S.	R.16W.	33	7282-A-1	SNOW CANYON STATE PARK	2.33
T.41S.	R.16W.	33	7282-A-1	SNOW CANYON STATE PARK	33.84
T.41S.	R.16W.	33	7282-A-2	WOODRUFF D. & PENNIE SPROUL TR	33.45
T.41S.	R.16W.	33	7282-A-2	WOODRUFF D. & PENNIE SPROUL TR	46.71
T.41S.	R.16W.	33	7282-A-3	THORLEY CATTLE COMPANY	80.15
T.41S.	R.16W.	33	I-6-1-33-13001	CARROLL KUNTZ	82.46
T.41S.	R.16W.	33	I-6-1-33-2401	ROBERT AND BEVERLEE MURRAY	1.38
T.41S.	R.16W.	33	I-6-1-33-3300	ROBERT AND BEVERLEE MURRAY	12.95
T.41S.	R.16W.	33	I-6-1-33-4000	HYRUM SMITH	36.70

Table 3.3 (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.16W.	33	I-6-1-33-4001	ROBERT AND BEVERLEE MURRAY	2.79
T.41S.	R.16W.	33	I-6-1-33-4200	ROBERT AND BEVERLEE MURRAY	2.94
T.41S.	R.16W.	33	I-6-1-33-4200	ROBERT AND BEVERLEE MURRAY	38.60
T.41S.	R.16W.	33	I-6-1-33-4202	ROBERT AND BEVERLEE MURRAY	0.65
T.41S.	R.16W.	33	I-6-1-33-4203	ROBERT AND BEVERLEE MURRAY	4.13
T.41S.	R.16W.	33	I-6-1-33-4204	ROBERT AND BEVERLEE MURRAY	4.06
T.41S.	R.16W.	33	I-6-1-33-4400	ROBERT AND BEVERLEE MURRAY	3.89
T.41S.	R.16W.	33	ROW	HIGHWAY/ROAD ROW	1.05
T.41S.	R.16W.	33	ROW	HIGHWAY/ROAD ROW	2.31
T.41S.	R.16W.	33	ROW	HIGHWAY/ROAD ROW	1.82
T.41S.	R.16W.	34	7253-NP	UTAH STATE PARK & RECREATION	194.39
T.41S.	R.16W.	34	7253-NP	UTAH STATE PARK & RECREATION	40.07
T.41S.	R.16W.	34	7283	SNOW CANYON STATE PARK	158.11
T.41S.	R.16W.	34	7283-B	THORLEY CATTLE COMPANY	79.75
T.41S.	R.16W.	34	7283-NP	UTAH STATE PARKS & RECREATION	79.87
T.41S.	R.16W.	34	STATE	STATE OF UTAH	77.74
T.42S.	R.16W.	01	BLM	BUREAU OF LAND MANAGEMENT	27.31
T.42S.	R.16W.	02	ROW	HIGHWAY/ROAD ROW	7.05
T.42S.	R.16W.	02	SG-6-2-2-110	STATE OF UTAH	313.70
T.42S.	R.16W.	02	SG-6-2-2-221	AMSCO WINDOWS	154.90
T.42S.	R.16W.	03	7288-A	A H GUBLER (HOLDINGS)	21.80
T.42S.	R.16W.	03	BLM	BUREAU OF LAND MANAGEMENT	135.26
T.42S.	R.16W.	03	STATE	STATE OF UTAH	115.31
T.42S.	R.16W.	03	STATE	STATE OF UTAH	37.27
T.42S.	R.16W.	11	ROW	HIGHWAY/ROAD ROW	7.35
T.42S.	R.16W.	11	ROW	HIGHWAY/ROAD ROW	7.70
T.42S.	R.16W.	11	SG-6-2-11-110	AMSCO WINDOWS	264.61
T.42S.	R.16W.	11	SG-6-2-11-220	SANTA FE LAND DEV CORP.	19.88
T.42S.	R.16W.	11	SG-6-2-11-312	AMSCO WINDOWS	3.69
T.42S.	R.16W.	11	SG-6-2-11-313	AMSCO WINDOWS	17.55
T.42S.	R.16W.	11	SG-6-2-11-410	AMSCO WINDOWS	147.46
T.42S.	R.16W.	11	STATE	STATE OF UTAH	28.93
T.42S.	R.16W.	12	BLM	BUREAU OF LAND MANAGEMENT	<0.01
T.42S.	R.16W.	12	ROW	HIGHWAY/ROAD ROW	7.70
T.42S.	R.16W.	12	STATE	STATE OF UTAH	2.70
T.42S.	R.16W.	13	ROW	HIGHWAY/ROAD ROW	4.25
T.42S.	R.16W.	13	STATE	STATE OF UTAH	8.80
T.42S.	R.16W.	14	SG-6-2-11-110	AMSCO WINDOWS	20.93
T.42S.	R.16W.	14	SG-6-2-14-111	AMSCO WINDOWS	14.21
T.42S.	R.16W.	14	SG-6-2-14-112	SANTA FE LAND DEV CORP.	14.26
T.42S.	R.16W.	14	SG-6-2-14-411	AMSCO WINDOWS	3.92



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Snow Canyon State Park

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Figure 3.3. Zone 2: Ivins to Highway 18

3.3.3 Zone 3: Core Zone

3.3.3.1 Description

Zone 3 covers the area from Highway 18 on the west to Interstate 15 on the east. Table 3.4 presents detailed land ownership information for Zone 3, and Figure 3.4 presents zone boundaries and general ownership. This area entails 38,541 acres, of which 23,571 are managed by the BLM and 9,927 are managed by the Division of State Lands and Forestry.

3.3.3.2 Management

Zone 3 will be managed by the Dixie Resource Area of the BLM for the preservation and enhancement of the Mojave desert tortoise. The BLM will prepare a management plan for this area. Grazing permits will be acquired and retired on a willing buyer-willing seller basis.

Mitigation measures applicable to this zone include land acquisition; fencing Highway 18, Interstate 15, Skyline Drive, the area around North Washington City, and portions of the area around North St. George; acquisition of grazing permits; law enforcement; HCP financial assistance to the BLM for management purposes; and environmental education. The following management principles are recommended for Zone 3:

- Hiking, equestrian, and camping should be restricted to designated areas.
- The BLM should be requested to apply for mineral withdrawal for Federal minerals.
- No organized or competitive sporting or recreational events should be allowed.
- Grazing permits should be acquired and retired.
- New utility development should be encouraged to be conducted during the winter months when the desert tortoise is not active.
- Hunting should be restricted to big game or upland birds during official seasons.
- Existing governmental uses, such as the City of St. George's pistol range, the debris basin behind City Creek dam, and Pioneer Park should be allowed to continue. Expansion of use of Pioneer Park outside of the existing developed area will be subject to HCAC approval of a desert tortoise management plan.
- Vehicles should be restricted to designated roads.
- Continuation of present activities associated with the Moroni Feeds Turkey Farm should be permitted but new actions, which the reserve manager reasonably believes may harm the desert tortoise, should not be allowed.

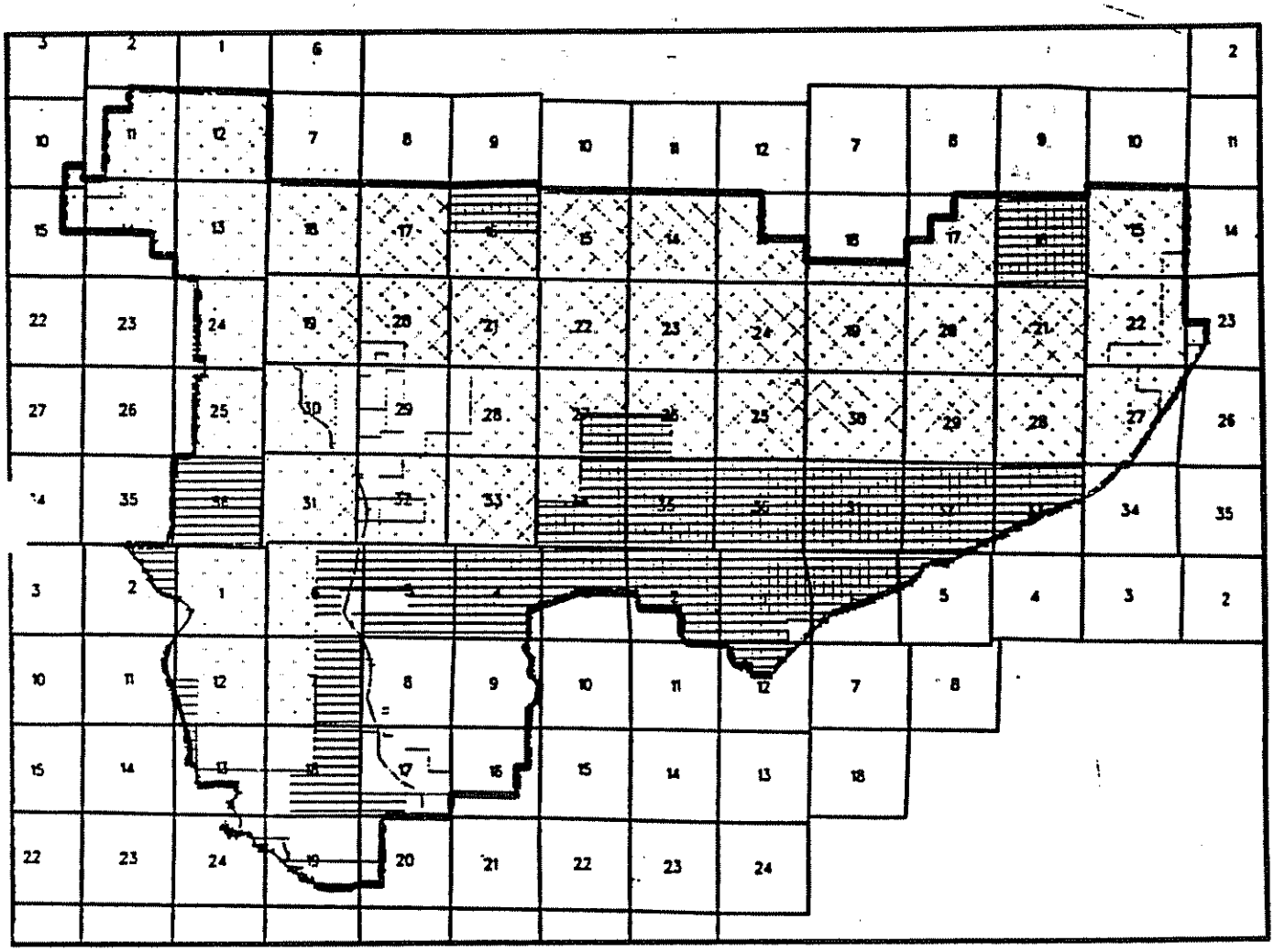

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Figure 3.4. Zone 3: Highway 18 to Interstate 15

Table 3.4. Parcel Information for Zone 3 of the Proposed Reserve.

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.14W.	15	BLM	BUREAU OF LAND MANAGEMENT	649.73
T.41S.	R.14W.	15	BLM	BUREAU OF LAND MANAGEMENT	44.86
T.41S.	R.14W.	16	STATE	STATE OF UTAH	654.12
T.41S.	R.14W.	17	BLM	BUREAU OF LAND MANAGEMENT	514.09
T.41S.	R.14W.	18	BLM	BUREAU OF LAND MANAGEMENT	175.33
T.41S.	R.14W.	19	BLM	BUREAU OF LAND MANAGEMENT	697.60
T.41S.	R.14W.	20	BLM	BUREAU OF LAND MANAGEMENT	630.70
T.41S.	R.14W.	21	BLM	BUREAU OF LAND MANAGEMENT	639.52
T.41S.	R.14W.	22	BLM	BUREAU OF LAND MANAGEMENT	259.48
T.41S.	R.14W.	22	BLM	BUREAU OF LAND MANAGEMENT	435.78
T.41S.	R.14W.	23	4060-A	UNITED STATES OF AMERICA	39.51
T.41S.	R.14W.	23	BLM	BUREAU OF LAND MANAGEMENT	23.57
T.41S.	R.14W.	26	BLM	BUREAU OF LAND MANAGEMENT	3.69
T.41S.	R.14W.	27	4065-A	UNITED STATES OF AMERICA	108.03
T.41S.	R.14W.	27	BLM	BUREAU OF LAND MANAGEMENT	483.48
T.41S.	R.14W.	28	BLM	BUREAU OF LAND MANAGEMENT	635.12
T.41S.	R.14W.	29	BLM	BUREAU OF LAND MANAGEMENT	644.14
T.41S.	R.14W.	30	BLM	BUREAU OF LAND MANAGEMENT	694.84
T.41S.	R.14W.	31	STATE	STATE OF UTAH	700.61
T.41S.	R.14W.	32	STATE	STATE OF UTAH	629.17
T.41S.	R.14W.	33	STATE	STATE OF UTAH	381.13
T.41S.	R.14W.	34	BLM	BUREAU OF LAND MANAGEMENT	63.28
T.41S.	R.14W.	34	ROW	HIGHWAY/ROAD ROW	<0.01
T.41S.	R.14W.	34	ROW	HIGHWAY/ROAD ROW	0.01
T.41S.	R.15W.	13	BLM	BUREAU OF LAND MANAGEMENT	480.33
T.41S.	R.15W.	14	BLM	BUREAU OF LAND MANAGEMENT	639.38
T.41S.	R.15W.	15	BLM	BUREAU OF LAND MANAGEMENT	652.60
T.41S.	R.15W.	16	BLM	BUREAU OF LAND MANAGEMENT	331.73
T.41S.	R.15W.	16	STATE	STATE OF UTAH	344.14
T.41S.	R.15W.	17	BLM	BUREAU OF LAND MANAGEMENT	656.63
T.41S.	R.15W.	18	BLM	BUREAU OF LAND MANAGEMENT	664.39
T.41S.	R.15W.	19	BLM	BUREAU OF LAND MANAGEMENT	664.84
T.41S.	R.15W.	20	6206	MORONI FEED CO.	10.71
T.41S.	R.15W.	20	6210-B-NP	NORMAN L. BLAKE	70.45
T.41S.	R.15W.	20	BLM	BUREAU OF LAND MANAGEMENT	557.94
T.41S.	R.15W.	21	BLM	BUREAU OF LAND MANAGEMENT	640.78
T.41S.	R.15W.	22	BLM	BUREAU OF LAND MANAGEMENT	636.10
T.41S.	R.15W.	23	BLM	BUREAU OF LAND MANAGEMENT	642.75
T.41S.	R.15W.	24	BLM	BUREAU OF LAND MANAGEMENT	638.03
T.41S.	R.15W.	25	BLM	BUREAU OF LAND MANAGEMENT	628.90
T.41S.	R.15W.	26	BLM	BUREAU OF LAND MANAGEMENT	484.18
T.41S.	R.15W.	26	STATE	STATE OF UTAH	158.10
T.41S.	R.15W.	27	BLM	BUREAU OF LAND MANAGEMENT	472.35
T.41S.	R.15W.	27	STATE	STATE OF UTAH	160.96
T.41S.	R.15W.	28	6207	TOM/DORA, NORM&EILEEN, BLAKE	119.11
T.41S.	R.15W.	28	BLM	BUREAU OF LAND MANAGEMENT	520.19
T.41S.	R.15W.	29	6206	MORONI FEED CO.	88.85

Table 3.4. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.15W.	29	6208	TOM/DORA, NORM&EILEEN, BLAKE	351.90
T.41S.	R.15W.	29	6209-A	TOM/DORA, NORM&EILEEN, BLAKE	59.99
T.41S.	R.15W.	29	6210-A-NP	TOM/DORA, NORM&EILEEN, BLAKE	83.67
T.41S.	R.15W.	29	6210-B-NP	NORMAN L. BLAKE	10.14
T.41S.	R.15W.	29	6210-B-NP	NORMAN L. BLAKE	7.75
T.41S.	R.15W.	29	BLM	BUREAU OF LAND MANAGEMENT	39.21
T.41S.	R.15W.	30	6211	THOMAS & DORA BLAKE	0.07
T.41S.	R.15W.	30	6211	THOMAS & DORA BLAKE	160.42
T.41S.	R.15W.	30	BLM	BUREAU OF LAND MANAGEMENT	158.71
T.41S.	R.15W.	30	BLM	BUREAU OF LAND MANAGEMENT	336.93
T.41S.	R.15W.	30	ROW	HIGHWAY/ROAD ROW	11.26
T.41S.	R.15W.	30	ROW	HIGHWAY/ROAD ROW	0.46
T.41S.	R.15W.	31	BLM	BUREAU OF LAND MANAGEMENT	665.43
T.41S.	R.15W.	32	6211-NP	DE-MAR LTD.	39.83
T.41S.	R.15W.	32	6212-C	SHAMROCK FINANCIAL SERVICES CO	12.47
T.41S.	R.15W.	32	6212-C	SHAMROCK FINANCIAL SERVICES CO.	25.61
T.41S.	R.15W.	32	6212-D	BUREAU OF LAND MANAGEMENT	0.99
T.41S.	R.15W.	32	6212-NP	DE-MAR LTD.	6.37
T.41S.	R.15W.	32	6212-NP	DE-MAR LTD.	79.80
T.41S.	R.15W.	32	6212-NP	DE-MAR LTD.	109.77
T.41S.	R.15W.	32	BLM	BUREAU OF LAND MANAGEMENT	16.17
T.41S.	R.15W.	32	BLM	BUREAU OF LAND MANAGEMENT	21.38
T.41S.	R.15W.	32	BLM	BUREAU OF LAND MANAGEMENT	318.74
T.41S.	R.15W.	32	ROW	HIGHWAY/ROAD ROW	2.54
T.41S.	R.15W.	32	ROW	HIGHWAY/ROAD ROW	2.13
T.41S.	R.15W.	32	ROW	HIGHWAY/ROAD ROW	2.33
T.41S.	R.15W.	33	BLM	BUREAU OF LAND MANAGEMENT	636.96
T.41S.	R.15W.	34	BLM	BUREAU OF LAND MANAGEMENT	153.68
T.41S.	R.15W.	34	STATE	STATE OF UTAH	483.15
T.41S.	R.15W.	35	STATE	STATE OF UTAH	646.00
T.41S.	R.15W.	36	STATE	STATE OF UTAH	643.61
T.41S.	R.16W.	10	BLM	BUREAU OF LAND MANAGEMENT	33.69
T.41S.	R.16W.	11	BLM	BUREAU OF LAND MANAGEMENT	462.71
T.41S.	R.16W.	12	BLM	BUREAU OF LAND MANAGEMENT	658.49
T.41S.	R.16W.	13	BLM	BUREAU OF LAND MANAGEMENT	703.68
T.41S.	R.16W.	14	BLM	BUREAU OF LAND MANAGEMENT	364.78
T.41S.	R.16W.	14	SNOW	SNOW CANYON STATE PARK	52.55
T.41S.	R.16W.	15	BLM	BUREAU OF LAND MANAGEMENT	77.71
T.41S.	R.16W.	24	BLM	BUREAU OF LAND MANAGEMENT	477.32
T.41S.	R.16W.	25	7266-A	DEMAR LTD.	2.23
T.41S.	R.16W.	25	BLM	BUREAU OF LAND MANAGEMENT	473.21
T.41S.	R.16W.	35	7284	JEL DEVELOPMENT LTD.	6.04
T.41S.	R.16W.	36	STATE	STATE OF UTAH	629.66
T.42S.	R.14W.	05	STATE	STATE OF UTAH	82.33
T.42S.	R.14W.	06	STATE	STATE OF UTAH	380.01
T.42S.	R.14W.	06	W-4-2-6-321	SULLIVAN FAMILY PRTNRSHP	5.54
T.42S.	R.15W.	01	STATE	STATE OF UTAH	606.62

Table 3.4. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.42S.	R.15W.	01	W-5-2-1-121	LOLA SULLIVAN, TR	38.27
T.42S.	R.15W.	02	STATE	STATE OF UTAH	535.20
T.42S.	R.15W.	03	6213-TR	STATE OF UTAH	321.80
T.42S.	R.15W.	04	STATE	STATE OF UTAH	611.55
T.42S.	R.15W.	05	6001-NP	UTAH STATE	168.11
T.42S.	R.15W.	05	6100-NP	ST. GEORGE CITY	84.06
T.42S.	R.15W.	05	6213-TR	STATE OF UTAH	84.65
T.42S.	R.15W.	05	6213-TR	STATE OF UTAH	336.11
T.42S.	R.15W.	06	6200-NP	UTAH STATE	181.62
T.42S.	R.15W.	06	6200-NP	UTAH STATE	29.42
T.42S.	R.15W.	06	6250-NP	ST. GEORGE CITY	32.54
T.42S.	R.15W.	06	6250-NP	ST. GEORGE CITY	28.58
T.42S.	R.15W.	06	6251	ST. GEORGE CITY	41.67
T.42S.	R.15W.	06	6252	ST. GEORGE CITY	15.04
T.42S.	R.15W.	06	6252	ST. GEORGE CITY	4.49
T.42S.	R.15W.	06	BLM	BUREAU OF LAND MANAGEMENT	366.27
T.42S.	R.15W.	06	ROW	HIGHWAY/ROAD ROW	1.49
T.42S.	R.15W.	06	ROW	HIGHWAY/ROAD ROW	3.96
T.42S.	R.15W.	06	ROW	HIGHWAY/ROAD ROW	4.70
T.42S.	R.15W.	07	6400-NP	UTAH STATE	328.99
T.42S.	R.15W.	07	BLM	BUREAU OF LAND MANAGEMENT	343.31
T.42S.	R.15W.	08	6600-NP-1	TERRA TITLE CO. TR	49.38
T.42S.	R.15W.	08	6600-NP-1	TERRA TITLE CO. TR	580.15
T.42S.	R.15W.	08	6600-NP-2	ST. GEORGE CITY	1.02
T.42S.	R.15W.	08	6600-NP-2	ST. GEORGE CITY	1.40
T.42S.	R.15W.	08	6600-NP-3	PACIFIC CORP.	2.07
T.42S.	R.15W.	08	ROW	HIGHWAY/ROAD ROW	0.57
T.42S.	R.15W.	08	ROW	HIGHWAY/ROAD ROW	6.41
T.42S.	R.15W.	08	ROW	HIGHWAY/ROAD ROW	2.14
T.42S.	R.15W.	09	6810-D	TERRA TITLE CO. TR	565.98
T.42S.	R.15W.	11	6213-TR	STATE OF UTAH	0.08
T.42S.	R.15W.	11	6213-TR	STATE OF UTAH	1.45
T.42S.	R.15W.	12	STATE	STATE OF UTAH	126.07
T.42S.	R.15W.	16	6225-A	ST. GEORGE CITY	0.38
T.42S.	R.15W.	16	6225-TR	TERRA TITLE CO. TRUSTEE	388.93
T.42S.	R.15W.	17	ROW	HIGHWAY/ROAD ROW	1.79
T.42S.	R.15W.	17	ROW	HIGHWAY/ROAD ROW	2.41
T.42S.	R.15W.	17	ROW	HIGHWAY/ROAD ROW	6.57
T.42S.	R.15W.	17	SG-5-2-17-2000	CITY OF ST. GEORGE	6.10
T.42S.	R.15W.	17	SG-5-2-17-2000	CITY OF ST. GEORGE	113.69
T.42S.	R.15W.	17	SG-5-2-17-2001	TERRA TITLE CO. TRUSTEE	211.81
T.42S.	R.15W.	17	SG-5-2-17-2001	TERRA TITLE CO. TRUSTEE	6.91
T.42S.	R.15W.	17	SG-5-2-17-2002	UAMPS	5.48
T.42S.	R.15W.	17	SG-5-2-17-230	THE NATURE CONSERVANCY	30.47
T.42S.	R.15W.	17	SG-5-2-17-230	THE NATURE CONSERVANCY	50.04
T.42S.	R.15W.	17	SG-5-2-17-300	THE NATURE CONSERVANCY	133.10
T.42S.	R.15W.	17	STATE	STATE OF UTAH	81.68

Table 3.4. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.42S.	R.15W.	18	6226-NP	ST. GEORGE CITY	90.87
T.42S.	R.15W.	18	6229-NP	ST. GEORGE CITY	171.79
T.42S.	R.15W.	18	6230-NP	STATE OF UTAH	413.13
T.42S.	R.15W.	19	6226-NP	ST. GEORGE CITY	41.07
T.42S.	R.15W.	19	6229-NP	ST. GEORGE CITY	248.82
T.42S.	R.15W.	19	MUNICIPAL	MUNICIPAL	1.85
T.42S.	R.15W.	19	MUNICIPAL	MUNICIPAL	22.67
T.42S.	R.15W.	19	MUNICIPAL	MUNICIPAL	5.67
T.42S.	R.15W.	19	ROW	HIGHWAY/ROAD ROW	2.94
T.42S.	R.15W.	19	SG-1344	CITY OF ST. GEORGE	2.19
T.42S.	R.15W.	19	SG-1660-A	ST. GEORGE CITY	3.30
T.42S.	R.15W.	19	SG-1734-A-1-B-1	CITY OF ST. GEORGE	2.56
T.42S.	R.15W.	19	SG-1743-A	TANA & WARREN COX	4.23
T.42S.	R.15W.	19	SG-1743-A	TANA & WARREN COX	22.29
T.42S.	R.15W.	19	SG-1743-B	DALE & FERN GIBSON	3.97
T.42S.	R.15W.	19	SG-1744-A	CITY OF ST. GEORGE	0.16
T.42S.	R.15W.	19	SG-1744-B	JOHN LAMB	0.17
T.42S.	R.15W.	19	SG-1744-C	CITY OF ST. GEORGE	0.16
T.42S.	R.15W.	19	SG-1763	CITY OF ST. GEORGE	1.48
T.42S.	R.15W.	19	SG-5-2-19-21	ST. GEORGE CITY	83.96
T.42S.	R.15W.	20	6229-NP	ST. GEORGE CITY	82.66
T.42S.	R.15W.	20	BLM	BUREAU OF LAND MANAGEMENT	40.59
T.42S.	R.16W.	01	BLM	BUREAU OF LAND MANAGEMENT	607.26
T.42S.	R.16W.	02	ROW	HIGHWAY/ROAD ROW	4.79
T.42S.	R.16W.	02	SG-6-2-2-110	STATE OF UTAH	121.47
T.42S.	R.16W.	11	ROW	HIGHWAY/ROAD ROW	2.75
T.42S.	R.16W.	11	ROW	HIGHWAY/ROAD ROW	4.12
T.42S.	R.16W.	11	SG-6-2-11-110	AMSCO WINDOWS	22.22
T.42S.	R.16W.	11	STATE	STATE OF UTAH	1.08
T.42S.	R.16W.	12	BLM	BUREAU OF LAND MANAGEMENT	559.92
T.42S.	R.16W.	12	ROW	HIGHWAY/ROAD ROW	7.10
T.42S.	R.16W.	12	STATE	STATE OF UTAH	63.43
T.42S.	R.16W.	12	STATE	STATE OF UTAH	0.10
T.42S.	R.16W.	13	MUNICIPAL	MUNICIPAL	15.35
T.42S.	R.16W.	13	ROW	HIGHWAY/ROAD ROW	9.12
T.42S.	R.16W.	13	SG-6-2-13-1100	CITY OF ST. GEORGE	162.69
T.42S.	R.16W.	13	SG-6-2-13-1100	CITY OF ST. GEORGE	81.79
T.42S.	R.16W.	13	SG-6-2-13-3100	CITY OF ST. GEORGE	28.03
T.42S.	R.16W.	13	SG-6-2-13-3100	CITY OF ST. GEORGE	111.72
T.42S.	R.16W.	13	STATE	STATE OF UTAH	3.84
T.42S.	R.16W.	13	STATE	STATE OF UTAH	17.06
T.42S.	R.16W.	24	SG-1752-A	SANDSTONE TERRACE	7.91
T.42S.	R.16W.	24	SG-6-2-13-3100	CITY OF ST. GEORGE	48.07

- Water development should be allowed consistent with the HCP protocol.[3]
- Firefighting should be allowed.
- Research which will not negatively influence the desert tortoise should be allowed.
- Non-consumptive recreation (e.g., hiking, birdwatching) should be allowed.
- Maintenance of existing utilities including roads should be allowed.
- Desert tortoise translocation should not be permitted except as authorized under approved translocation projects.
- The eventual reconstruction of Skyline Drive should follow the existing alignment as near as possible except where engineering and/or safety considerations require deviations. Biological review under this HCP will be necessary when deviating from the current alignment. From Skyline Drive, no general public access will be permitted into the reserve, except on designated trails. However, access to Skyline Drive will be available for private landowners until their property is acquired.

3.3.4 Zone 4: Babylon

3.3.4.1 Description

Zone 4 covers the area known as Babylon, bounded on the west by Interstate 15 and Quail Creek Reservoir, on the south by the Virgin River, and on the north and east by approximate limits of desert tortoise habitat. Table 3.5 presents land ownership information, and Figure 3.5 presents boundaries and general land ownership. This area includes 5,191 acres of BLM land and 6 acres of private land.

3.3.4.2 Management

Management of Zone 4 would be similar to the other zones of the reserve. Zone 4 will be evaluated as a possible translocation site. If it is determined that Zone 4 is a suitable translocation site then it would be managed accordingly. The following management regulations are recommended for Zone 4:

- Hiking, equestrian use, and camping should be allowed.

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[3] The HCP is aware that the City of St. George is considering permanently storing water behind City Creek Dam and constructing a pipeline from the dam to deliver the water. Should this proposal be formally submitted, it will be reviewed according to the protocols contained in this HCP as further explained in the Appendix.

- Grazing. hunting and mining should be allowed.
- Landowner activities associated with the private residence in the vicinity of "Babylon" should be permitted. However, ground disturbance in the reserve will require clearance prior to occurrence.
- Utility and road corridor maintenance should be allowed.
- New utility easements should be allowed and follow the HCP protocol.
- Vehicles should be restricted to designated roads.
- Firefighting should be allowed.
- Research including non-intrusive monitoring of desert tortoise population dynamics, should be allowed.
- Non-consumptive recreation (e.g., hiking, birdwatching, photography, casual horseback riding) should be allowed.
- Desert tortoise translocation would not be permitted except as authorized under approved translocation projects.

Table 3.5. Parcel Information for Zone 4 of the Proposed Reserve.

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.13W.	17	BLM	BUREAU OF LAND MANAGEMENT	569.29
T.41S.	R.13W.	18	BLM	BUREAU OF LAND MANAGEMENT	660.46
T.41S.	R.13W.	19	BLM	BUREAU OF LAND MANAGEMENT	601.99
T.41S.	R.13W.	20	BLM	BUREAU OF LAND MANAGEMENT	636.62
T.41S.	R.13W.	21	BLM	BUREAU OF LAND MANAGEMENT	610.28
T.41S.	R.13W.	22	BLM	BUREAU OF LAND MANAGEMENT	173.18
T.41S.	R.13W.	27	BLM	BUREAU OF LAND MANAGEMENT	24.99
T.41S.	R.13W.	28	3305-B	AR SPILSBURY F.E.	3.26
T.41S.	R.13W.	28	3305-B	AR SPILSBURY F.E.	2.80
T.41S.	R.13W.	28	3305-TR	UNITED STATES OF AMERICA	39.36
T.41S.	R.13W.	28	3305-TR	UNITED STATES OF AMERICA	16.66
T.41S.	R.13W.	29	BLM	BUREAU OF LAND MANAGEMENT	257.74
T.41S.	R.13W.	30	BLM	BUREAU OF LAND MANAGEMENT	260.33
T.41S.	R.14W.	13	BLM	BUREAU OF LAND MANAGEMENT	38.49
T.41S.	R.14W.	13	BLM	BUREAU OF LAND MANAGEMENT	220.48
T.41S.	R.14W.	24	BLM	BUREAU OF LAND MANAGEMENT	639.62
T.41S.	R.14W.	25	BLM	BUREAU OF LAND MANAGEMENT	440.75

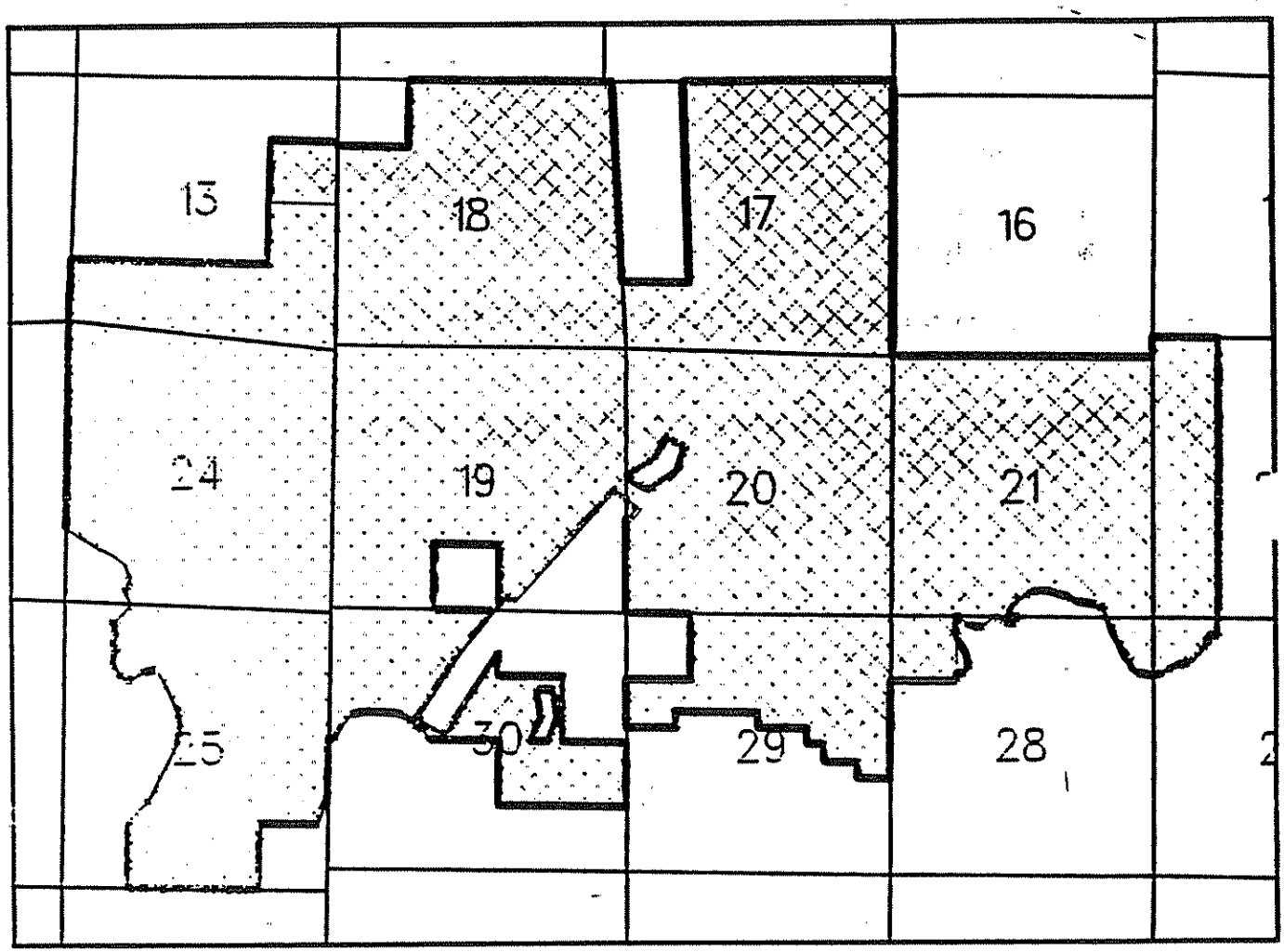

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Figure 3.5. Zone 4: Babylon

3.3.5 Zone 5: Hurricane

3.3.5.1 Description

Zone 5 covers the area bounded on the north by the Virgin River and on the south by the City of Hurricane, including the two cinder knolls. Table 3.6 presents land ownership information for Zone 5, and Figure 3.6 presents boundaries and general land ownership. This area is approximately 766 acres in size, of which 130 are managed by the BLM.

The reserve boundary in the vicinity of the Hurricane Cinder Knolls has been arrived at through a cooperative agreement with the landowner. The boundary in this area closely corresponds to the creosote bush community, which in turn is usually representative of moderate to dense desert tortoise populations. In some instances, because of landowner constraints, this habitat could not be included within the boundary. However, in such situations, the landowner has agreed to a "Kayenta" style of house development that leaves approximately 75 percent of the impacted habitat in an unaltered state. Additionally, fencing will be done to help deter pets. Exactly where this will be done will be finalized upon completion of the landowner's development plans. This kind of pragmatic development is thought to be highly conducive to maintaining desert tortoise populations. Additionally, it leaves desirable habitat between the two Cinder Knolls to facilitate gene flow.

Hurricane City has expressed the need to turn Route 600 north, at the southern boundary of the Reserve, into a major road through the city. This expansion is of significant concern as it could include the development of homes and commercial areas in an area previously identified as part of the Reserve. The County has discussed the matter with Hurricane and is currently exploring alternatives that would keep the Reserve at its present size and not biologically impair tortoises or other species in this area. Any proposals for this expansion would be put to the HCAC, County commissioners, and the USFWS through established amendment protocols.

3.3.5.2 Management

Zone 5 will be managed as a desert tortoise reserve by the BLM. The following management regulations are recommended for Zone 5:

- Hiking and equestrian use should be restricted to designated trails.
- Utility and road corridor maintenance should be allowed and follow the HCP protocol.
- New utility easements should be allowed and follow the HCP protocol.
- Vehicles should be restricted to designated roads.
- Firefighting should be allowed.

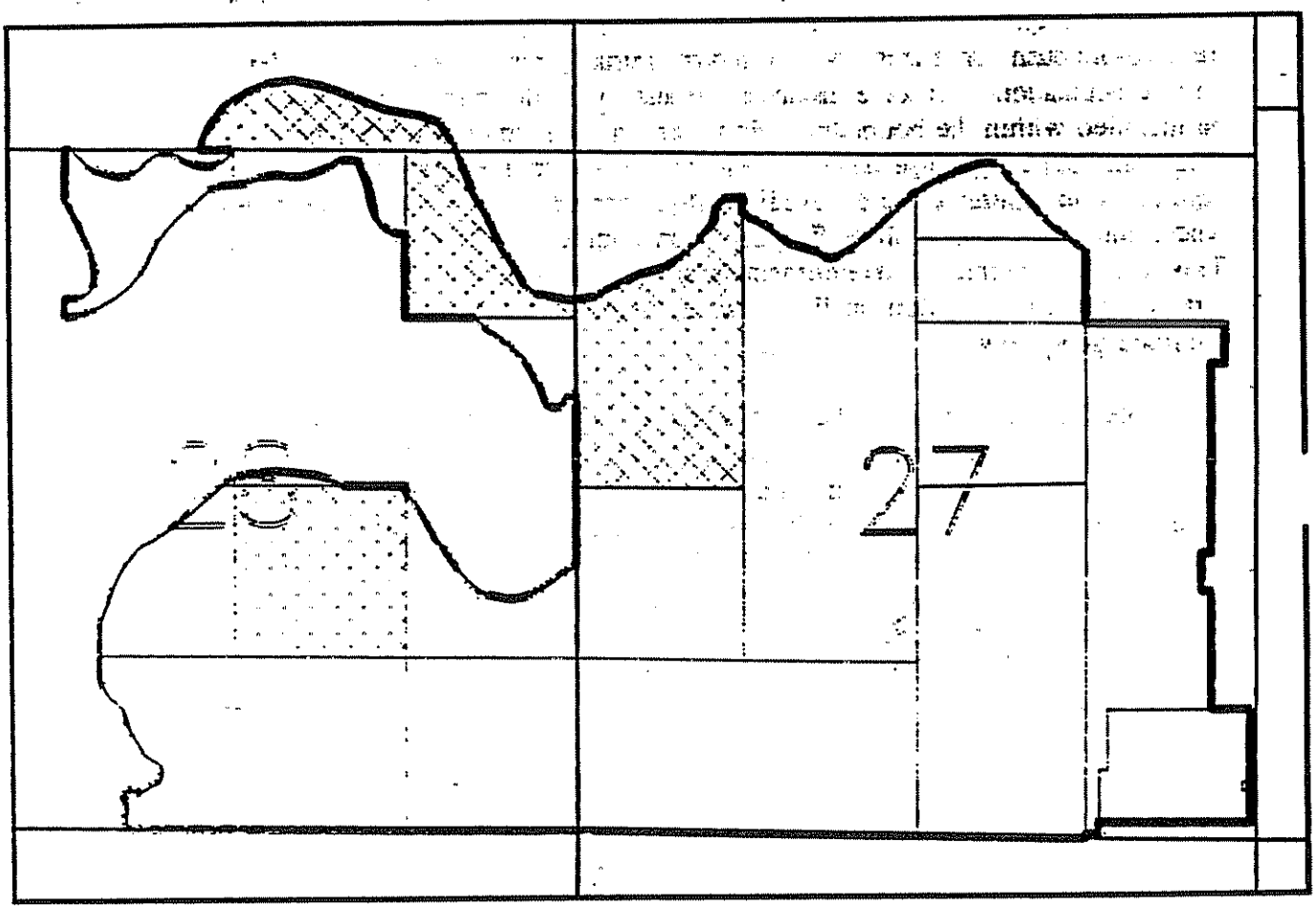

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Figure 3.6. Zone 5: Hurricane

- Research, including non-intrusive monitoring of desert tortoise population dynamics should be allowed.
- Non-consumptive recreation should be allowed.
- Desert tortoise translocation would not be permitted except as authorized under approved translocation projects.
- No grazing will be allowed in desert tortoise habitat.

Table 3.6. Parcel Information for Zone 5 of the Proposed Reserve.

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.13W.	21	BLM	BUREAU OF LAND MANAGEMENT	16.67
T.41S.	R.13W.	27	BLM	BUREAU OF LAND MANAGEMENT	52.92
T.41S.	R.13W.	27	H-3-1-27-1200	GRANT & MARGARET BEATTY	68.00
T.41S.	R.13W.	27	H-3-1-27-1400	KENNETH ANDERSON	10.79
T.41S.	R.13W.	27	H-3-1-27-1402	KENNETH ANDERSON	19.35
T.41S.	R.13W.	27	H-3-1-27-2201	CITY OF HURRICANE	22.24
T.41S.	R.13W.	27	H-3-1-27-2203	MOUNTAIN FUEL SUPPLY COMPANY	0.05
T.41S.	R.13W.	27	H-3-1-27-2401	CITY OF HURRICANE	79.88
T.41S.	R.13W.	27	H-3-1-27-310-SA	MTN. STATES TELEGRAPH & TELEPHONE	0.22
T.41S.	R.13W.	27	H-3-1-27-3201	CALVIN & MONA LOWE TRUSTEES	79.31
T.41S.	R.13W.	27	H-3-1-27-3401	CALVIN & MONA LOWE TRUSTEES	39.13
T.41S.	R.13W.	27	H-3-1-27-4201	CALVIN & MONA LOWE TRUSTEES	37.24
T.41S.	R.13W.	27	H-3-1-27-4201	CALVIN & MONA LOWE TRUSTEES	98.25
T.41S.	R.13W.	28	3305-TR	UNITED STATES OF AMERICA	22.09
T.41S.	R.13W.	28	BLM	BUREAU OF LAND MANAGEMENT	39.17
T.41S.	R.13W.	28	H-3-1-28-1201	AR SPILSBURY F.E.	6.66
T.41S.	R.13W.	28	H-3-1-28-1301	AR SPILSBURY F.E.	1.51
T.41S.	R.13W.	28	H-3-1-28-1401	AR SPILSBURY F.E.	7.93
T.41S.	R.13W.	28	H-3-1-28-2101	AR SPILSBURY F.E.	20.27
T.41S.	R.13W.	28	H-3-1-28-2201	AR SPILSBURY F.E.	40.06
T.41S.	R.13W.	28	H-3-1-28-2301	AR SPILSBURY F.E.	39.61
T.41S.	R.13W.	28	H-3-1-28-3101	AR SPILSBURY F.E.	22.22
T.41S.	R.13W.	28	H-3-1-28-3201	AR SPILSBURY F.E.	25.27
T.41S.	R.13W.	28	H-3-1-28-4101	AR SPILSBURY F.E.	18.63
T.41S.	R.13W.	28	H-3-1-28-4201	AR SPILSBURY F.E.	0.06

3.4 WATER DEVELOPMENT, FLOOD CONTROL, AND OTHER UTILITY CORRIDOR DEVELOPMENT AND MAINTENANCE

Of critical importance to the residents of Washington County is the ability to maintain existing utility corridors and facilities within the proposed reserve as well as having the option to construct new utility corridors and flood control projects consistent with reserve management guidelines. This section outlines some of the anticipated future projects as well as protocols for their implementation (see also Appendix A). Figure 3.7 represents a sampling of current and future utility corridors within and adjacent to the proposed reserve. All existing utility corridors are approved and recognized as existing uses, whether or not they are shown on Figure 3.7.

3.4.1 Water Development

The importance of water development to the residents and local governments in Washington County cannot be overemphasized. Much of the water development potential exists in the aquifers beneath desert tortoise habitat on State School Trust lands. There is serious concern that the ability of the cities to pursue water development may be seriously curtailed should this HCP be implemented. Of particular concern is how the Section 10(a)(1)(B) permit is treated once State School Trust lands are exchanged to the BLM. To alleviate this concern, the Steering Committee has developed a protocol for water development in non-take areas and within the HCP reserve. This protocol (contained in Appendix A) is designed to comply with the Act for water development and maintenance of water facilities on BLM and non-Federal lands, and was developed primarily to avoid take of desert tortoise. This protocol will apply to future Section 7 consultations for utility projects in the Upper Virgin River Recovery Unit.

3.4.2 Flood Control

This HCP recognizes the need for flood control and other water retention structures in the reserve. Where these structures require other Federal permits, separate Section 7 consultation will be required. The Washington County Water Conservancy District has identified the need for flood control structures on Cottonwood and Quail Creeks, and a de-silting pond near the Virgin River, within the reserve. The HCAC will review said proposals.

3.4.3 Other Utility Corridor Construction and Maintenance

Numerous utility corridors exist throughout the proposed reserve. While some of these are new, others are much older and will require replacement and upgrading in the future. Two utility protocols are contained in Appendix A: one for water exploration, construction, operation, and maintenance and another for electric distribution line construction and maintenance. These protocols will be followed for utility corridor work within the proposed reserve.

3.5 ROAD PROTOCOL

Within the proposed reserve are five paved roadways: Snow Canyon, Tuacahn, Highway 18, Cottonwood, and Skyline Drive. Tuacahn and Skyline are currently fenced. Highway 18 will be fenced on both sides, enclosing a right-of-way between 200 and 300 feet. The following activities will be permitted within the fenced Highway 18 right-of-way: road maintenance, reconstruction, and widening; utility maintenance and installation; and bicycle paths construction and maintenance. Agreed upon protocols will have to be followed to minimize potential impacts to the Mojave desert tortoise. Existing tortoise fencing along Skyline Drive will be upgraded within the reserve boundaries, with the same right-of-way restrictions that apply to Highway 18. Snow Canyon, Cottonwood, and unpaved roads in Ivins and Babylon within the reserve have not been identified for fencing. However, improvements or maintenance to these roads should also follow the HCP protocol.

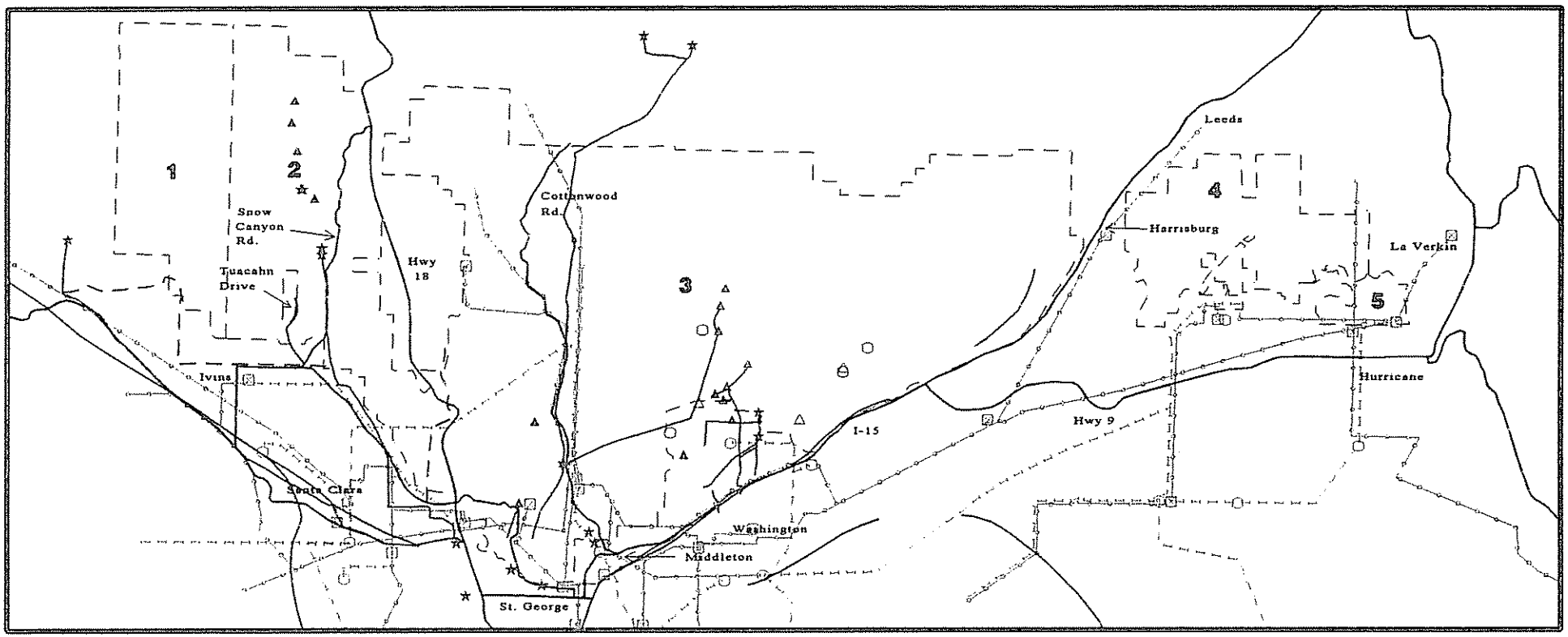

Figure 3.7. Current and Future Utility Corridors

CHAPTER 4.0
NON-RESERVE

4.1 INTRODUCTION

Lands in Washington County outside the proposed reserve boundaries (non-reserve lands) are shown in Figure 4.1. These properties are currently managed by the BLM, Dixie National Forest, Zion National Park, Utah Division of State Lands and Forestry, and private and municipal interests. All non-reserve State and private lands are included in this request for a Section 10(a)(1)(B) Incidental Take Permit—with the exception of Beaver Dam Slope in the northeastern Mojave Recovery Unit—and fall into one of three categories: identified desert tortoise habitat (take areas), potential desert tortoise habitat, and non-habitat.

Non-reserve, *identified desert tortoise habitat* consists of areas within the known range of the Mojave desert tortoise in Washington County where tortoises or other evidence of tortoise occupation have been found. Take is likely to occur in these areas. This Chapter describes the location of such lands and identifies the landowners and assessor number of each parcel (see footnote 1 on page 23).

Non-reserve, *potential desert tortoise habitat* consists of areas that theoretically could support desert tortoises but have shown no evidence of tortoise occupation. This habitat will not count against incremental take acreage; however, if tortoises should be discovered and removed from these areas because of proposed development or other changes in land use, the removed animals would count against the incidental take total of the permit.

Non-reserve, *non-habitat* areas are lands unlikely to support desert tortoises. While the probability of finding endemic tortoises in non-habitat areas is very low, these areas are included under the incidental take permit because the County recognizes that a desert tortoise may be found anywhere. This possibility exists because of the historical use of the desert tortoise as pets and the ease of transporting the animal. The take permit is therefore necessary in all non-reserve areas to resolve the potential for conflict.

Accordingly, the permit provides for incidental take of Mojave desert tortoise on an estimated 350,000 acres of private and state school trust lands in Washington County, Utah. These 350,000 acres consist of all the private and state school trust lands in the County outside of the proposed reserve and outside areas of the Beaver Dam Slope designated as Mojave desert tortoise habitat in Figure 1.1. Part of these 350,000 acres (precisely 12,264) will be managed by a release program as described in this HCP. The remaining acres (approximately 338,000) will be automatically released as incidental take upon issuance of the permit, provided, however, that any tortoise taken from that acreage will apply against the 1,169 tortoise incidental take allowance.

The HCP administrator may amend the HCP to change the boundaries of the non-reserve habitat areas (take areas) to either include newly designated acreage or remove previously designated acreage. This means that designated take areas will be managed dynamically in the best interest

of desert tortoise safety by minimizing the chances of accidental death resulting from development. For example, if a desert tortoise population previously thought to reside over 500 acres is found to actually reside over 700 acres, biological surveys and translocation would be required across the entire 700 acres, and the boundaries of the designated take area so modified. This would ensure that desert tortoises in the "additional 200 acres" are translocated and "saved." By contrast, an area previously thought to contain desert tortoises, but later found not to, would be eliminated from the habitat category; the boundaries would be adjusted; and the acres in question would not be counted as take.

4.2 FEDERAL NON-RESERVE HABITAT AREAS

As depicted in Figure 4.1 and in Table 4.1, there are 4,681 acres of Federal lands (BLM, National Park, National Forest) and Indian Tribal lands that are known desert tortoise habitat but are not included within the proposed reserve boundaries. As these are Federal and Indian lands, they can not be identified for incidental take under a Section 10(a)(1)(B) permit, and therefore are only identified as non-reserve for purposes of this HCP. Any actions that these agencies may undertake for these lands that may affect the Mojave desert tortoise or other Federally listed species will be subject to the Section 7 consultation process.

Table 4.1. Amount of Desert Tortoise Habitat in Federal Non-Reserve Areas.

	Desert Tortoise Density Classification			
Ownership	Low	Medium	High	Total
BLM	1,931	63	32	2,026
USFS	83	0	0	83
NPS	2	0	0	2
BIA	2,521	2	47	2,570
State*	114	0	98	212
Total	4,651	65	177	4,893

* These State lands are part of the Paiute Indian Tribal Lands.

4.3 INCIDENTAL TAKE AREAS

The incidental take permit is a county-wide take permit for desert tortoises, so take may occur anywhere in the County outside the reserve (excluding the Beaver Dam Slope) where a city has passed the HCP Impact Fees Ordinance. The HCP process has identified areas where incidental take is most likely to occur, totaling 12,264 acres. Defining take areas has been the result of balancing the conflicting needs of habitat preservation with growth and development in Washington County, without significantly impacting the desert tortoise population. Take areas are primarily low-density habitat adjacent to existing development. Most of these areas are within the boundaries of the incorporated cities of Washington County and have already been adversely impacted by urban development and human activities. Specifically, habitat in the areas proposed for take has been impacted by dumping, OHV use, vandalism, vehicle traffic, and

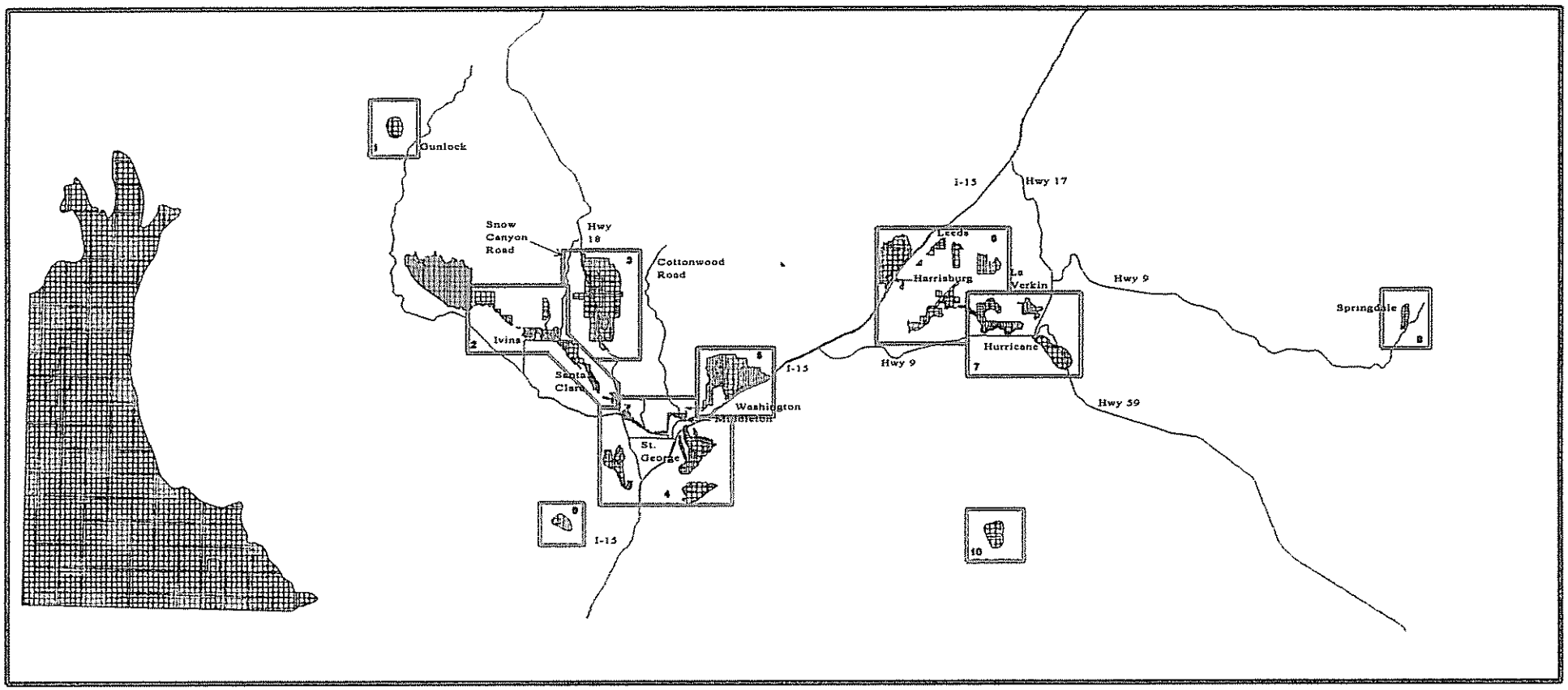

Figure 4.1. Proposed Non-Reserve Areas

grazing. Take areas of medium or high density have only been included where necessary to accommodate specific concerns or issues associated with private property. A summary of the acreage identified for incidental take is presented in Table 4.2.

Table 4.2. Amount of Desert Tortoise Habitat in Incidental Take Areas

Area Zone/Name	State Lands*			Private Lands*			Total
	Low	Med	High	Low	Med	High	
1/Gunlock	0	0	0	196	0	0	196
2/Ivins/Padre/Paradise	17	0	85	1,073	0	356	1,531
3/Winchester Hills	656	0	10	2,181	0	245	3,092
4/St. George	0	0	0	1,852	62	223	2,137
5/North Washington	554	597	42	204	295	313	2,005
6/Harrisburg/Leeds/ Babylon	307	0	0	1,226	7	0	1,540
7/Hurricane	54	0	0	703	316	338	1,411
8/Springdale	0	0	0	159	0	0	159
9 Bloomington Hill	67	39	0	0	0	0	106
10/South Hurricane Cliffs	87	0	0	0	0	0	87
Total	1,742	636	137	7,594	680	1,475	12,264

* Private includes lands owned by Washington County, municipalities, highway right-of-way, as well as private owners. State includes only State School Trust lands.

4.3.1 Gunlock Take Area

The Gunlock area is located approximately one mile north of Gunlock Reservoir and contains approximately 196 acres of low-density desert tortoise habitat on private land. Land ownership and a general legal description are presented in Table 4.3 and graphically depicted in Figure 4.2. While this desert tortoise population is isolated, small, and difficult to manage, and development has not been slated for this area, inclusion as a take area allows the owners to pursue development options.

Table 4.3. Parcel Information for Gunlock Take Area.

Township	Range	Section	Parcel #	Owner	Acres
T.40S.	R.17W.	20	8206-NP	HYRUM W. & A. GAIL SMITH	195.70

4.3.2 Ivins/Padre Canyon/Paradise Canyon Take Area

The Ivins/Padre Canyon/Paradise Canyon area is east of the Paiute Indian Tribal Lands, west of Highway 18, north of the proposed extension of Skyline Drive, and south of Snow Canyon State Park and the proposed BLM Wilderness Area on top of Red Mountain. This area is graphically depicted in Figure 4.3, and land ownership and legal descriptions are provided in Table 4.4.

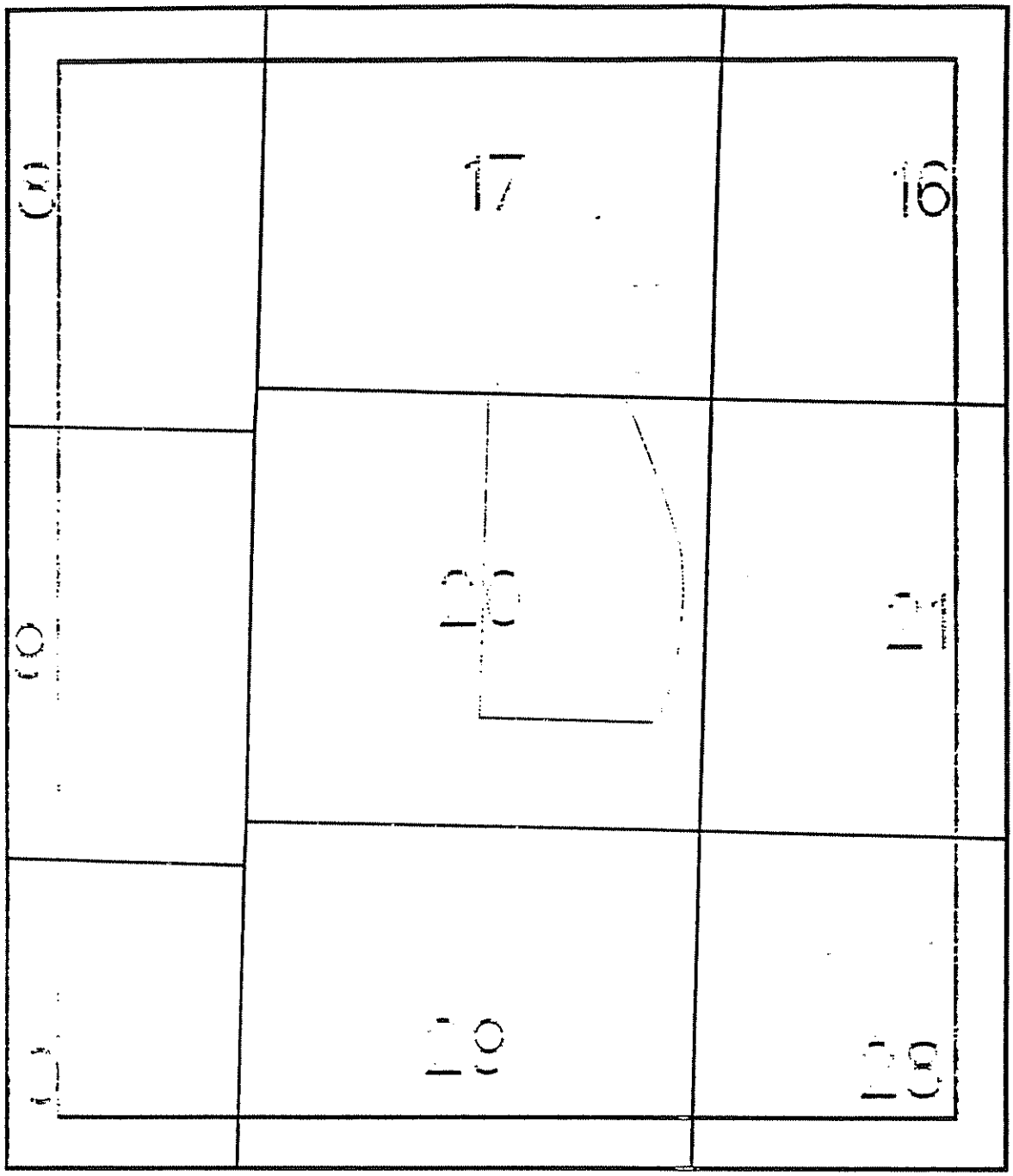

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Figure 4.2. Gunlock Take Area

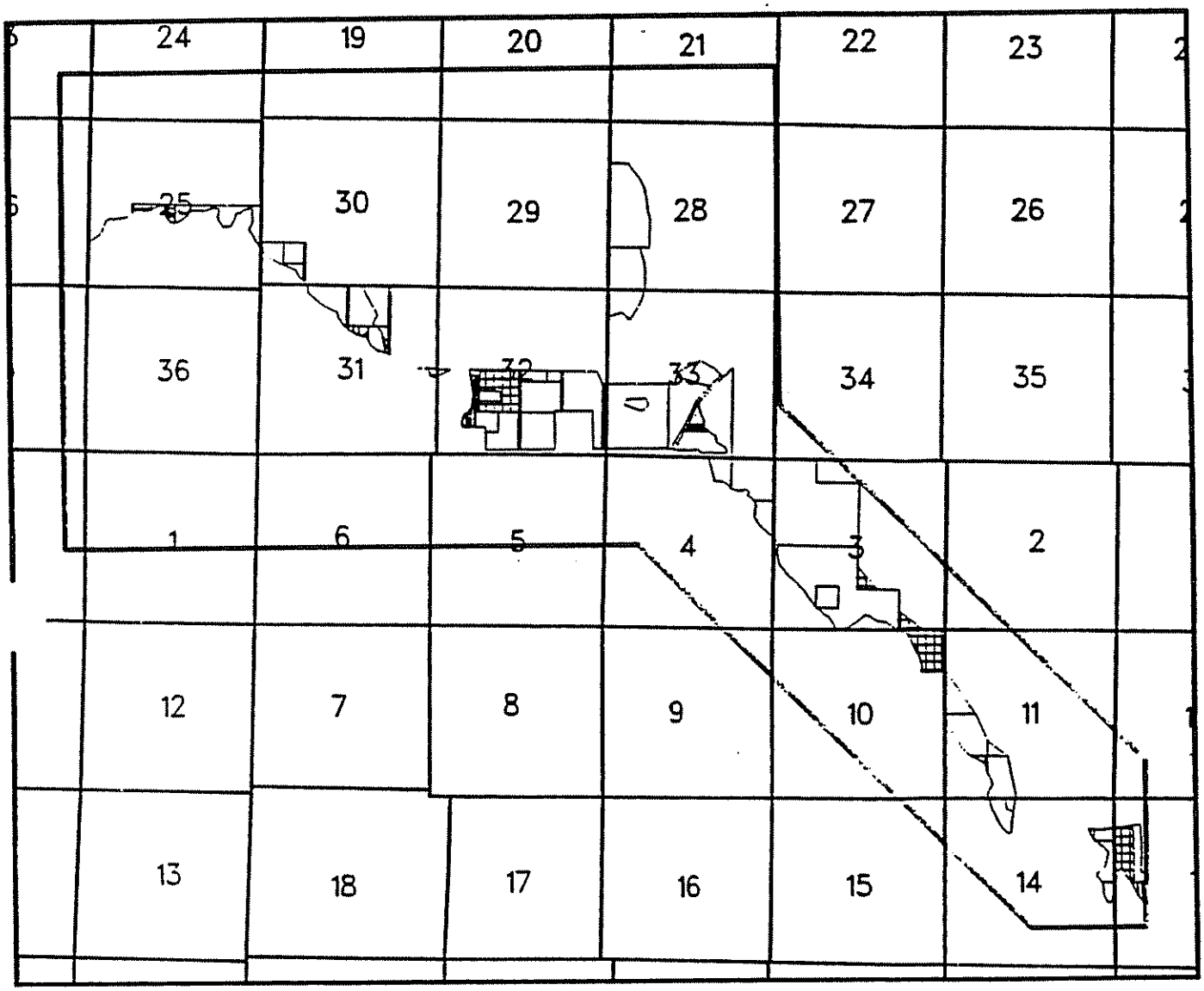


Figure 4.3. Ivins/Padre Canyon/Paradise Canyon Take Area

Table 4.4. Parcel Information for Ivins/Padre Canyon/Paradise Canyon Take Area.

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.16W.	28	I-6-1-28-3000	HYRUM SMITH	36.10
T.41S.	R.16W.	28	I-6-1-28-34401	HERITAGE ARTS FOUNDATION	71.36
T.41S.	R.16W.	30	I-6-1-30-3310	ELDON AND LINDA LEE MOHLER, TR	9.59
T.41S.	R.16W.	30	I-6-1-30-3321	JEAN CASTLETON	11.10
T.41S.	R.16W.	30	ROW	HIGHWAY/ROAD ROW	1.75
T.41S.	R.16W.	30	ROW	HIGHWAY/ROAD ROW	0.17
T.41S.	R.16W.	31	7277-A	WILLIAMS CARMA & ASSOCIATION INC.	15.90
T.41S.	R.16W.	31	7277-B	R.C. & ARLEEN ANN TOLMAN	20.10
T.41S.	R.16W.	31	I-6-1-31-1330	IRVIN AND KAY ROBERT ENCE	0.07
T.41S.	R.16W.	31	I-6-1-31-1333	VINCENT AND CARMON MESSNER	<0.01
T.41S.	R.16W.	31	I-6-1-31-1334	KAY ENCE, TR	0.56
T.41S.	R.16W.	31	I-6-1-31-1336	JAY AND JEAN RENEE' SMITH	0.92
T.41S.	R.16W.	31	I-6-1-31-1338	CHALLEN KELKER	0.36
T.41S.	R.16W.	31	I-6-1-31-1342	MARCIA FIESTAL	1.96
T.41S.	R.16W.	31	I-6-1-31-32-2000	TOWN OF IVINS	1.42
T.41S.	R.16W.	31	I-6-1-31-32-2000	TOWN OF IVINS	0.02
T.41S.	R.16W.	31	I-6-1-31-41010	IRVIN ENCE, TR	19.51
T.41S.	R.16W.	31	I-6-1-31-4102	PETER CHESNEY & SANDRA HUGHES	0.04
T.41S.	R.16W.	31	ROW	HIGHWAY/ROAD ROW	7.14
T.41S.	R.16W.	31	ROW	HIGHWAY/ROAD ROW	0.24
T.41S.	R.16W.	31	SB-6-B-1	FLOYD ENCE, TR	7.03
T.41S.	R.16W.	31	SB-6-B-1	FLOYD ENCE, TR	0.59
T.41S.	R.16W.	31	SB-6-C-1	TOWN OF IVINS	2.84
T.41S.	R.16W.	32	CIRCLE CLIFF	SUBDIVISION	0.02
T.41S.	R.16W.	32	I-11-F-1	CRAIG FLOWERS	0.15
T.41S.	R.16W.	32	I-11-F-10	RAY E. FLOWERS, TR	0.20
T.41S.	R.16W.	32	I-11-F-12	RICHARD DUFFY	0.18
T.41S.	R.16W.	32	I-11-F-2	RAYBORN S. AND BONNIE STOKES	0.15
T.41S.	R.16W.	32	I-11-F-3-A	HENRIETTA BOSS	0.26
T.41S.	R.16W.	32	I-11-F-5	HENRY AND MEKA BAKER	0.21
T.41S.	R.16W.	32	I-11-F-6	EDWARD NELSON & CAROLE SPENCER	0.21
T.41S.	R.16W.	32	I-11-F-7	RONALD AND GLORIA TUNBRIDGE	0.25
T.41S.	R.16W.	32	I-11-F-8	KEVIN AND NADINE HANCEY	0.20
T.41S.	R.16W.	32	I-11-F-9	SCHOLZEN PRODUCTS CO.	0.17
T.41S.	R.16W.	32	I-65-A-1-A-1-A	WILFORD AND JOANNE HAFEN	0.79
T.41S.	R.16W.	32	I-65-A-1-A-1-C	STEPHEN AND HOPE ESAUK	0.01
T.41S.	R.16W.	32	I-65-A-1-A-1-E	DARREL LEE AND CHARLENE CHILD	0.17
T.41S.	R.16W.	32	I-65-A-1-A-2	TODD AND CLEMENTINA SAHLEEN	0.08
T.41S.	R.16W.	32	I-65-A-1-A-3	KEVIN AND DEANNA LAW	0.04
T.41S.	R.16W.	32	I-65-A-1-B-1	KENT SORENSEN	0.30
T.41S.	R.16W.	32	I-65-A-1-B-2	LARRY WILSON & SHARYN MUSGRAVE	0.29
T.41S.	R.16W.	32	I-65-A-1-B-3	PERRY AND ANDREA COOPER	0.30
T.41S.	R.16W.	32	I-66-A-2-A	RAYMOND AND TRUDY HINDES	0.04
T.41S.	R.16W.	32	I-66-B-1	GARNA STEVENS	0.36
T.41S.	R.16W.	32	I-66-B-2	SAVA MALETICH	0.07
T.41S.	R.16W.	32	I-75-A-1-A-10	RUSSELL PREECE, TR	0.17
T.41S.	R.16W.	32	I-75-A-1-A-11	RUSSEL PREECE, TR	0.18
T.41S.	R.16W.	32	I-75-A-1-A-13	RAYMOND AND DOROTHY SCHICK	0.18

Table 4.4. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.16W.	32	I-75-A-1-A-14	MARY FORESTIER	0.17
T.41S.	R.16W.	32	I-75-A-1-A-3	TOWN OF IVINS	0.08
T.41S.	R.16W.	32	I-75-A-1-A-3	TOWN OF IVINS	0.27
T.41S.	R.16W.	32	I-75-A-1-A-4	LOLA FLOWERS	0.15
T.41S.	R.16W.	32	I-75-A-1-A-5	ROVERT AND CHRISTIE BEST	0.21
T.41S.	R.16W.	32	I-75-A-1-A-6	CAREY AND ELAINE BRINKERHOFF	0.20
T.41S.	R.16W.	32	I-75-A-1-A-7	DEBRA ANDERSON	0.14
T.41S.	R.16W.	32	I-75-A-1-A-9	CHARLES & BRENDA STANKOWSKY	0.16
T.41S.	R.16W.	32	I-SB-16-A	ALAN & KAY BLOOD FAMILY PARTNERSHIP	22.63
T.41S.	R.16W.	32	I-SB-16-B	TOWN OF IVINS	9.24
T.41S.	R.16W.	32	I-SB-16-C	STATE OF UTAH	32.86
T.41S.	R.16W.	32	I-SB-16-D-1	CRAIG AND LINDA FLOWERS	5.01
T.41S.	R.16W.	32	I-SB-17	ALAN & KAY BLOOD FAMILY PARTNERSHIP	27.81
T.41S.	R.16W.	32	I-SB-18-A	WESTON HAFEN FAMILY PARTNERSHIP	27.08
T.41S.	R.16W.	32	I-SB-18-B	NORMAN AND MARGARET DRAEGER	3.53
T.41S.	R.16W.	32	I-SB-18-C	ARTHUR AND JENNIFER BENDER	6.31
T.41S.	R.16W.	32	I-SB-19-A	WESTON HAFEN FAMILY PARTNERSHIP	3.10
T.41S.	R.16W.	32	I-SB-19-A	WESTON HAFEN FAMILY PARTNERSHIP	42.75
T.41S.	R.16W.	32	MUNICIPAL	MUNICIPAL	1.13
T.41S.	R.16W.	32	MUNICIPAL	MUNICIPAL	1.34
T.41S.	R.16W.	32	ROW	HIGHWAY/ROAD ROW	3.04
T.41S.	R.16W.	32	ROW	HIGHWAY/ROAD ROW	3.57
T.41S.	R.16W.	32	ROW	HIGHWAY/ROAD ROW	4.09
T.41S.	R.16W.	32	ROW	HIGHWAY/ROAD ROW	1.91
T.41S.	R.16W.	32	ROW	HIGHWAY/ROAD ROW	0.02
T.41S.	R.16W.	33	I-6-1-33-13001	CARROLL KUNTZ	14.84
T.41S.	R.16W.	33	I-6-1-33-230-A	NATIONAL INSTITUTE OF FITNESS	4.05
T.41S.	R.16W.	33	I-6-1-33-231	MARCUS AND VICKI SORENSON	0.96
T.41S.	R.16W.	33	I-6-1-33-231	MARCUS AND VICKI SORENSON	0.85
T.41S.	R.16W.	33	I-6-1-33-232	NATIONAL INSTITUTE OF FITNESS	1.04
T.41S.	R.16W.	33	I-6-1-33-2400	ALLAN VAN PELT	0.90
T.41S.	R.16W.	33	I-6-1-33-2400	ALLAN VAN PELT	42.82
T.41S.	R.16W.	33	I-6-1-33-2401	ROBERT & BEVERLEE MURRAY	33.37
T.41S.	R.16W.	33	I-6-1-33-2402	NATIONAL INSTITUTE OF FITNESS	17.52
T.41S.	R.16W.	33	I-6-1-33-3300	ROBERT AND BEVERLEE MURRAY, TRS	88.21
T.41S.	R.16W.	33	I-6-1-33-3302	ROBERT AND BEVERLEE MURRAY	4.77
T.41S.	R.16W.	33	I-6-1-33-4000	HYRUM SMITH	19.49
T.41S.	R.16W.	33	ROW	HIGHWAY/ROAD ROW	5.81
T.41S.	R.17W.	25	KAYENTA	TERRY MARTIN	24.68
T.41S.	R.17W.	25	KAYENTA	TERRY MARTIN	343.39
T.41S.	R.17W.	25	STATE	STATE OF UTAH	7.02
T.42S.	R.16W.	03	7288-A	A H GUBLER (HOLDINGS)	141.36
T.42S.	R.16W.	03	SG-6-2-3-30001	MAE LYTLE (TRUST)	120.26
T.42S.	R.16W.	03	SG-6-2-3-3240	MAE LYTLE (TRUST)	10.56
T.42S.	R.16W.	03	STATE	STATE OF UTAH	5.02
T.42S.	R.16W.	03	STATE	STATE OF UTAH	5.19
T.42S.	R.16W.	04	7288-C	THORLEY CATTLE CO.	35.80
T.42S.	R.16W.	04	7288-N	A H GUBLER (HOLDINGS)	11.79

Table 4.4. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.42S.	R.16W.	04	I-6-2-4-1400	BEVERLEE & ROBERT MURRAY TRUST	11.23
T.42S.	R.16W.	10	SG-6-2-10-1400	WASHINGTON COUNTY	0.05
T.42S.	R.16W.	10	STATE	STATE OF UTAH	29.18
T.42S.	R.16W.	11	SG-6-2-11-311	WASHINGTON COUNTY	3.34
T.42S.	R.16W.	11	SG-6-2-11-411	WASHINGTON COUNTY	14.86
T.42S.	R.16W.	11	STATE	STATE OF UTAH	1.77
T.42S.	R.16W.	11	WACO	WASHINGTON COUNTY	22.10
T.42S.	R.16W.	11	WACO	WASHINGTON COUNTY	27.39
T.42S.	R.16W.	13	ROW	HIGHWAY/ROAD ROW	11.43
T.42S.	R.16W.	13	ROW	HIGHWAY/ROAD ROW	2.56
T.42S.	R.16W.	13	SG-6-2-13-3412	LENORA PHILLIPS	0.12
T.42S.	R.16W.	13	SG-6-2-13-3412	LENORA PHILLIPS	0.82
T.42S.	R.16W.	13	STATE	STATE OF UTAH	20.84
T.42S.	R.16W.	14	BOWLER, ENCE & MARSH SUBDIVISION		4.49
T.42S.	R.16W.	14	SG-6-2-14-111	AMSCO WINDOWS	0.67
T.42S.	R.16W.	14	SG-6-2-14-112	SANTA FE LAND DEV CORP.	5.46
T.42S.	R.16W.	14	SG-6-2-14-122	AMSCO WINDOWS	11.16
T.42S.	R.16W.	14	SG-6-2-14-412	THORLEY CATTLE CO.	10.77
T.42S.	R.16W.	14	SG-6-2-14-413	WA. COUNTY	2.07

This area consists of approximately 1,531 acres, of which 1,090 acres are primarily low-density habitat and approximately 441 acres are high-density desert tortoise habitat. The UDWR has conducted transects in the Padre Canyon area and has found a high number of desert tortoise sign showing it to be a high-density area. The Padre Canyon take area has been reduced to the minimum amount possible to reserve as much of this high-quality habitat as possible. This area has been designated a take area due to its close proximity to urban development, its generally low density of desert tortoises, and its geographic separation from the main high-density core area. An 80-acre area known as Tuacahn is also designated for incidental take. The road to Tuacahn goes through the reserve, and mitigation measures applicable to it are detailed in Chapter 3. Areas to the south of Paradise Canyon are also identified for take and are generally within 1,000 feet of the right-of-way boundary of the proposed extension of Skyline Drive west of Highway 18.

The final "boundaries" for the Padre Canyon area will be developed and approved by Ivins City, after comment by the HCP administrator and the USFWS during the preparation of the Ivins City Master Plan. Recent surveys conducted for the Heritage Arts Foundation show the importance and use of this high-density area by desert tortoises. The mayor of Ivins has agreed to work with the USFWS and Washington County in developing measures that reduce impacts to this population, which is bisected by the Tuacahn Road. The Master Plan would allow for a level of development that maintains the ecological integrity of the area where reasonably possible. It is envisioned that fencing, compatible with development and protecting desert tortoises, will need to be included in certain, yet-to-be identified areas of the Master Plan.

Washington County has dedicated $10,000 for the installation of a road culvert in Padre Canyon and will dedicate an additional $5,000 of the tortoise research money towards the study of

tortoise population dynamics in this area. The study design and principal investigator will be determined by the HCP administrator in cooperation with the UDWR and the USFWS.

No request for incidental take has been made for Snow Canyon State Park. The Park is currently preparing a Master Plan which may recommend the construction of additional facilities. Any need for incidental take in Snow Canyon State Park will be done by amendment to this HCP. Further, the development of a desert tortoise plan for the Park, funded by the HCP, should identify ways to avoid and minimize take within Park boundaries.

4.3.3 Winchester Hills Take Area

The Winchester Hills Take Area consists of approximately 3,092 acres of land north of Paradise Canyon and east of Snow Canyon State Park at 3,500 to 4,000 feet in elevation. The area is graphically depicted in Figure 4.4, and a list of property owners and legal descriptions are presented in Table 4.5.

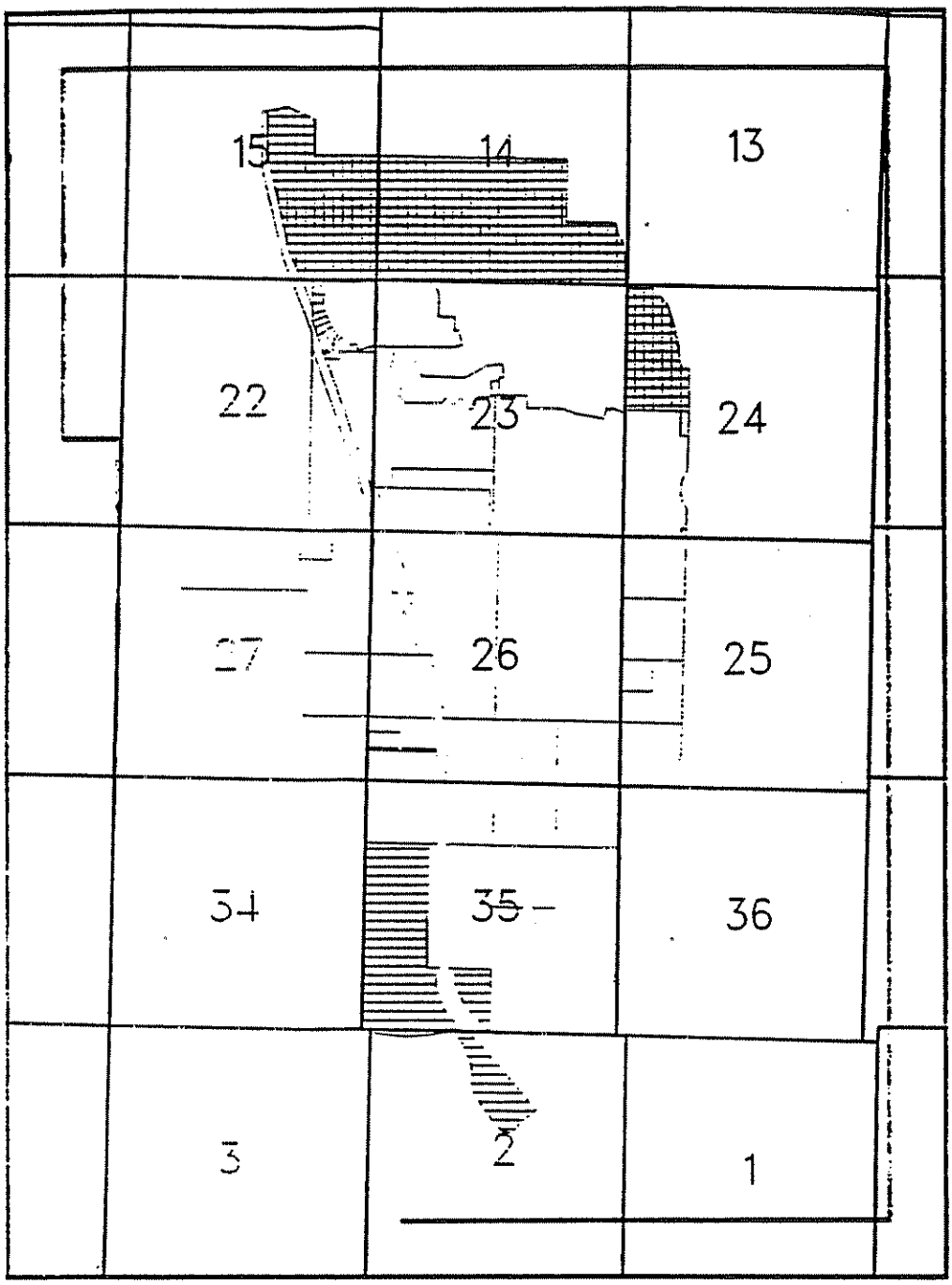
The Winchester Hills area is currently undergoing residential development. This area is characterized as low density, with a pocket of high-density habitat in the southern portion of the property. It has been included in the take area due to its generally low density of desert tortoises, high potential for development, and marginal benefit of acquisition. Private property in Section 35, bounded by a line 20 feet west of the west rim of Buckskin Canyon, has been included in the reserve due to habitat characteristics and to preserve a desert tortoise movement corridor.

Table 4.5. Parcel Information for the Winchester Hills Take Area.

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.16W.	14	STATE	STATE OF UTAH	277.77
T.41S.	R.16W.	15	ROW	HIGHWAY/ROAD ROW	13.08
T.41S.	R.16W.	15	STATE	STATE OF UTAH	140.08
T.41S.	R.16W.	22	7259-A	SHAD INVESTMENT & DEVELOPMENT CORP.	60.93
T.41S.	R.16W.	22	7259-B	SHAD INVESTMENT & DEVELOPMENT CO.	3.80
T.41S.	R.16W.	22	7259-C	UTAH STATE PARK & RECREATION	1.58
T.41S.	R.16W.	22	7261-A-1-B	SHAD INVESTMENT & DEVELOPMENT CORP.	34.98
T.41S.	R.16W.	22	7261-B-1	FIRST INTERSTATE BANK OF UTAH	1.13
T.41S.	R.16W.	22	7261-B-2	FIRST INTERSTATE BANK OF UTAH	0.97
T.41S.	R.16W.	22	7261-B-3	FIRST INTERSTATE BANK OF UTAH	1.04
T.41S.	R.16W.	22	7261-B-4	FIRST INTERSTATE BANK OF UTAH	0.91
T.41S.	R.16W.	22	7261-B-5	FRANK W. & THELMA L. DOWNING	1.02
T.41S.	R.16W.	22	7261-B-6	ROY D. & LAVONNA K. CORDER	1.12
T.41S.	R.16W.	22	7261-B-7	WHITE CLIFFS INVESTMENT CO.	1.23
T.41S.	R.16W.	22	7261-B-8	EAGLEBROOK CORP.	1.59
T.41S.	R.16W.	22	ROW	HIGHWAY/ROAD ROW	21.91
T.41S.	R.16W.	22	WINCHESTER HILLS SUBDIVISION		31.50
T.41S.	R.16W.	23	7261-A-1-A	SHAD INVESTMENT & DEVELOPMENT CORP.	21.60
T.41S.	R.16W.	23	7261-A-1-B	SHAD INVESTMENT & DEVELOPMENT CORP.	96.22
T.41S.	R.16W.	23	7261-A-1-C	CANYON VIEW INC.	47.26
T.41S.	R.16W.	23	7261-A-1-D	JOSEPH C. JR & MARY LOU PEARSON	1.12
T.41S.	R.16W.	23	7265-B-1	EAGLEBROOK CORP.	170.00
T.41S.	R.16W.	23	ROW	HIGHWAY/ROAD ROW	5.08
T.41S.	R.16W.	23	WINCHESTER HILLS SUBDIVISION		47.89
T.41S.	R.16W.	23	WINCHESTER HILLS 2 SUBDIVISION		219.55
T.41S.	R.16W.	23	WINCHESTER HILLS 3 SUBDIVISION		34.84
T.41S.	R.16W.	24	7265-A	WHITE CLIFFS INVESTMENT CO.	0.44
T.41S.	R.16W.	24	7265-B-1	EAGLEBROOK CORP.	77.03
T.41S.	R.16W.	24	7265-C	PACIFIC CORP.	1.99
T.41S.	R.16W.	24	STATE	STATE OF UTAH	64.71
T.41S.	R.16W.	25	7266-A	DEMAR LTD.	36.69
T.41S.	R.16W.	25	7266-B	WHITE CLIFFS INVESTMENT CO.	39.59
T.41S.	R.16W.	25	7270-A-1	WHITE CLIFFS INVESTMENT CO.	38.88
T.41S.	R.16W.	25	7270-A-1	WHITE CLIFFS INVESTMENT CO.	28.96
T.41S.	R.16W.	25	7270-B	J & J MILL & LUMBER CO.	9.99
T.41S.	R.16W.	26	7267-A	DEMAR LTD.	31.76
T.41S.	R.16W.	26	7267-B	WHITE CLIFFS INVESTMENT CO.	146.37
T.41S.	R.16W.	26	7267-B	WHITE CLIFFS INVESTMENT CO.	30.17
T.41S.	R.16W.	26	7270-A-2	DEMAR LTD.	31.22
T.41S.	R.16W.	26	7270-A-2	DEMAR LTD.	0.14
T.41S.	R.16W.	26	7270-A-3	R. LYNN & JANECE GARDNER TR	2.57
T.41S.	R.16W.	26	7270-A-4	DEMAR LTD.	40.15
T.41S.	R.16W.	26	7270-A-5	DEMAR LTD.	40.74
T.41S.	R.16W.	26	7270-A-6	C. JUDD & JANICE B. BURGESS	5.02
T.41S.	R.16W.	26	7270-A-7	CLIVE M. & JOAN P. BURGESS	4.80
T.41S.	R.16W.	26	7270-A-8	JOE & DORIS HUTCHINGS	6.21
T.41S.	R.16W.	26	7270-C	TONY & CINDY CANNON	4.94
T.41S.	R.16W.	26	7270-D	MICHAEL J. & MICHAELA B.	5.08
T.41S.	R.16W.	26	7270-E	JUDD & JANICE BURGESS	5.05

Table 4.5. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.16W.	26	7270-F	JAY W. & BRENDA B. MCALLISTER	4.98
T.41S.	R.16W.	26	7270-G	GARY D. & LANCE B. ALLRED	5.14
T.41S.	R.16W.	26	7271-B	WHITE CLIFFS INVESTMENT CO.	238.48
T.41S.	R.16W.	26	ROW	HIGHWAY/ROAD ROW	18.36
T.41S.	R.16W.	26	ROW	HIGHWAY/ROAD ROW	19.07
T.41S.	R.16W.	27	7273-A-1	WHITE CLIFFS INVESTMENT CO.	146.01
T.41S.	R.16W.	27	7273-A-2	EAGLEBROOK CORP.	9.29
T.41S.	R.16W.	27	7273-B-1	DEMAR LTD.	40.10
T.41S.	R.16W.	27	7273-B-2	DEMAR LTD.	39.64
T.41S.	R.16W.	35	7284	JEL DEVELOPMENT LTD.	13.51
T.41S.	R.16W.	35	7284	JEL DEVELOPMENT LTD.	248.63
T.41S.	R.16W.	35	7284-A-1-NP	DEMAR LTD.	39.83
T.41S.	R.16W.	35	7284-A-1-NP	DEMAR LTD.	26.15
T.41S.	R.16W.	35	7284-A-2-NP	JEL DEVELOPMENT LTD.	39.37
T.41S.	R.16W.	35	7284-A-3	DEMAR LTD.	39.32
T.41S.	R.16W.	35	7284-B	LOWELL & JULIE FREI	0.67
T.41S.	R.16W.	35	7284-C	LEE E. & VALORIE H. SNOW	0.83
T.41S.	R.16W.	35	JEL RANCH	SUBDIVISION	41.41
T.41S.	R.16W.	35	ROW	HIGHWAY/ROAD ROW	38.23
T.41S.	R.16W.	35	STATE	STATE OF UTAH	15.51
T.41S.	R.16W.	35	STATE	STATE OF UTAH	131.88
T.42S.	R.16W.	02	ROW	HIGHWAY/ROAD ROW	9.53
T.42S.	R.16W.	02	SG-6-2-2-110	STATE OF UTAH	36.62



Private

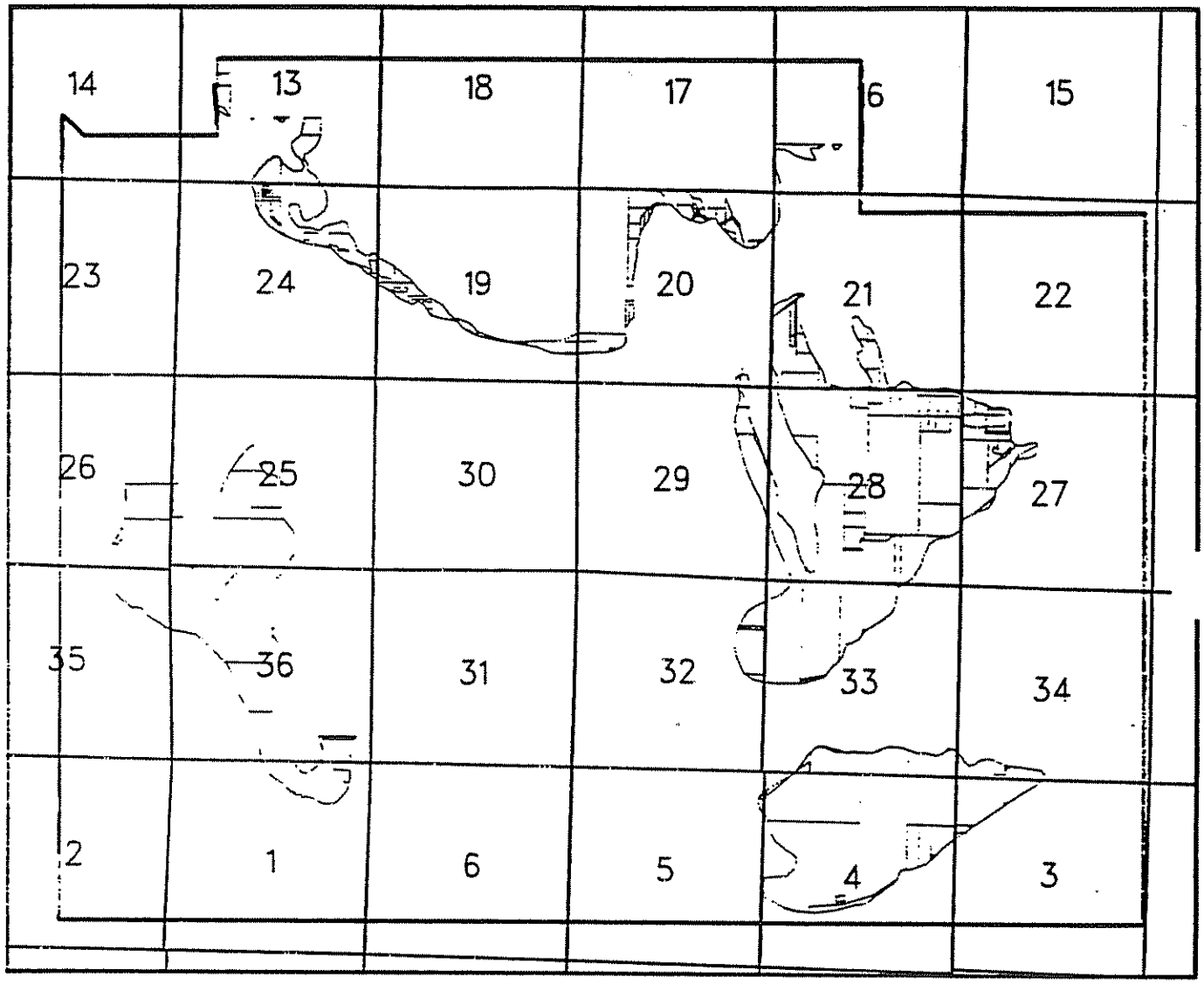
State of Utah

09/27/95

Figure 4.4. Winchester Hills Take Area

4.3.4 St. George Take Areas

Several areas adjacent to the proposed reserve on the north side of the City of St. George between Highway 18 and the Washington City boundary are proposed for incidental take under this HCP. They are not included in the proposed reserve due to their proximity to urban development and existing urban impacts. There are also three small populations of desert tortoises south of the City of St. George which are designated for take due to their isolation from the reserve, their proximity to urban development, and the inability to manage these areas effectively. In total, these areas comprise 2,137 acres of primarily low-density habitat. They are depicted in Figure 4.5, and land ownership information is presented in Table 4.6.



Private

12/15/95

Figure 4.5. St. George Take Areas

Table 4.6. Parcel Information for the St. George Take Area.

Township	Range	Section	Parcel #	Owner	Acres
T.42S.	R.15W.	16	SG-5-2-16-32	GERALD BLAKE TRUSTEE	0.47
T.42S.	R.15W.	16	SG-5-2-16-33	BONNIE & LOUIS M. MICKELSON	7.02
T.42S.	R.15W.	16	SG-5-2-16-33	BONNIE & LOUIS M. MICKELSON	1.95
T.42S.	R.15W.	16	SG-5-2-16-34	CITY OF ST. GEORGE	0.21
T.42S.	R.15W.	19	BALI HI 2	SUBDIVISION	1.49
T.42S.	R.15W.	19	BALI HI 2	SUBDIVISION	1.25
T.42S.	R.15W.	19	MUNICIPAL	MUNICIPAL	2.28
T.42S.	R.15W.	19	MUNICIPAL	MUNICIPAL	1.68
T.42S.	R.15W.	19	MUNICIPAL	MUNICIPAL	5.00
T.42S.	R.15W.	19	RED BLUFF	SUBDIVISION	0.00
T.42S.	R.15W.	19	ROW	HIGHWAY/ROAD ROW	0.22
T.42S.	R.15W.	19	ROW	HIGHWAY/ROAD ROW	2.53
T.42S.	R.15W.	19	SG-1344	CITY OF ST. GEORGE	2.35
T.42S.	R.15W.	19	SG-1361-B-1	J AND J MILL AND LUMBER COMPANY	0.01
T.42S.	R.15W.	19	SG-1361-B-3	J AND J MILL AND LUMBER COMPANY	0.09
T.42S.	R.15W.	19	SG-1660-A	ST. GEORGE CITY	3.32
T.42S.	R.15W.	19	SG-1661-A-1	KAY WILKINSON AND DAVID WOODBURY	0.27
T.42S.	R.15W.	19	SG-1661-A-2-A	WALTER AND CAROL PALMER	0.05
T.42S.	R.15W.	19	SG-1665-A	CITY OF ST. GEORGE	0.77
T.42S.	R.15W.	19	SG-1666-A	LARRY BLAKE, TR	0.39
T.42S.	R.15W.	19	SG-1666-B	LAURA MOODY THOMAS	0.86
T.42S.	R.15W.	19	SG-1669-A-2-B	ANDREW AND HILMA HOLT	0.01
T.42S.	R.15W.	19	SG-1669-A-2-E	LAURA BLAIR	0.01
T.42S.	R.15W.	19	SG-1715-1-B-N-1	D.K. AND ALENE ADAMS	0.49
T.42S.	R.15W.	19	SG-1715-A-3	LDS CORPORATION OF PRES. OF CHURCH	0.15
T.42S.	R.15W.	19	SG-1715-A-6	CARL AND COLLEEN ODEKIRK, TRS	0.18
T.42S.	R.15W.	19	SG-1715-A-C-N	D.K. ADAMS	1.17
T.42S.	R.15W.	19	SG-1715-B	ROBERT AND BEVERLY BULLOCK	0.02
T.42S.	R.15W.	19	SG-1734-A-1-B-1	CITY OF ST. GEORGE	4.23
T.42S.	R.15W.	19	SG-1734-A-3-B-1	WASHINGTON COUNTY	2.36
T.42S.	R.15W.	19	SG-1743-A	TANA & WARREN COX	2.66
T.42S.	R.15W.	19	SG-1743-B	DALE & FERN GIBSON	4.73
T.42S.	R.15W.	19	SG-1763	CITY OF ST. GEORGE	0.79
T.42S.	R.15W.	19	SG-5-2-19-21	ST. GEORGE CITY	0.01
T.42S.	R.15W.	20	BIG WHEEL	SUBDIVISION	0.55
T.42S.	R.15W.	20	BIG WHEEL 2	SUBDIVISION	1.42
T.42S.	R.15W.	20	MUNICIPAL	MUNICIPAL	0.26
T.42S.	R.15W.	20	MUNICIPAL	MUNICIPAL	1.29
T.42S.	R.15W.	20	MUNICIPAL	MUNICIPAL	1.47
T.42S.	R.15W.	20	MUNICIPAL	MUNICIPAL	10.48
T.42S.	R.15W.	20	ROW	HIGHWAY/ROAD ROW	0.68
T.42S.	R.15W.	20	ROW	HIGHWAY/ROAD ROW	0.80
T.42S.	R.15W.	20	ROW	HIGHWAY/ROAD ROW	0.24
T.42S.	R.15W.	20	ROW	HIGHWAY/ROAD ROW	0.04
T.42S.	R.15W.	20	ROW	HIGHWAY/ROAD ROW	1.66
T.42S.	R.15W.	20	ROW	HIGHWAY/ROAD ROW	0.07
T.42S.	R.15W.	20	SG-1734-A-3-B-1	WASHINGTON COUNTY	3.55

Table 4.6. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.42S.	R.15W.	20	SG-1745-A	DIXIE MOBILE ESTATES LTD	6.39
T.42S.	R.15W.	20	SG-5-2-20-1100	STOUT INVESTMENT LTD	33.73
T.42S.	R.15W.	20	SG-5-2-20-1101	DONA NAD LONEVA RUESCH	3.98
T.42S.	R.15W.	20	SG-5-2-20-1102	STOUT INVESTMENTS	1.54
T.42S.	R.15W.	20	SG-5-2-20-1103	KSSST CORPORATION	0.92
T.42S.	R.15W.	20	SG-5-2-20-1210	TWIN LAKES RESORT INC.	0.16
T.42S.	R.15W.	20	SG-5-2-20-1210	TWIN LAKES RESORT INC.	0.04
T.42S.	R.15W.	20	SG-5-2-20-12110	CLEO R. ATKIN TR	1.09
T.42S.	R.15W.	20	SG-5-2-20-1212	TWIN LAKES RESORT INC.	0.13
T.42S.	R.15W.	20	SG-5-2-20-1410	SUN CAPITAL BANK	5.45
T.42S.	R.15W.	20	SG-5-2-20-1411	CITY OF ST. GEORGE	5.15
T.42S.	R.15W.	20	SG-5-2-20-14120	RANDALL DISTRIBUTING INC	2.38
T.42S.	R.15W.	20	SG-5-2-20-1421	ROCKY MOUNTAIN CO.	1.07
T.42S.	R.15W.	20	SG-5-2-20-1422	KSSST CORP	0.43
T.42S.	R.15W.	20	SG-5-2-20-14341	PACIFIC COAST BUILDING PRODUCTS INC.	3.27
T.42S.	R.15W.	20	SG-5-2-20-1444	ARDELLA CARPENTER	0.46
T.42S.	R.15W.	20	SG-5-2-20-14451	G.M. ALDRED AND SONS CORP.	3.90
T.42S.	R.15W.	20	SG-5-2-20-205	ZION FACTORY STORES 2	0.59
T.42S.	R.15W.	20	SG-5-2-20-4115	E, L, & S BLAKE;D & C TERRY; A CARTER	8.60
T.42S.	R.15W.	20	SG-5-2-20-4118	GERABLINE & RUKR HUFF	0.87
T.42S.	R.15W.	20	SG-5-2-20-4119	RED ROCK INDUSTRIAL COMPLEX	4.14
T.42S.	R.15W.	20	SG-5-2-20-4122	A. KENT & LAURA COTTAM	0.04
T.42S.	R.15W.	20	SG-5-2-20-4123	RED ROCK IND. COMPLEX	3.14
T.42S.	R.15W.	20	SG-5-2-20-4124	CONNIE JACKSON	0.48
T.42S.	R.15W.	20	SG-5-2-20-4125	RUSSELL LIMB	1.38
T.42S.	R.15W.	20	SG-5-2-20-4126	RUSSELL LIMB	1.04
T.42S.	R.15W.	20	SG-5-2-20-4127	A.KENT & LAVEA COTTAM	0.24
T.42S.	R.15W.	20	SG-5-2-20-41281	WESTERN ROCK PROD.	4.10
T.42S.	R.15W.	20	SG-5-2-21-33031	D. SCOTT HOUSTON	0.03
T.42S.	R.15W.	20	SG-5-2-29-11010	SCOTT HUSTON	1.92
T.42S.	R.15W.	20	WACO	WASHINGTON COUNTY	0.23
T.42S.	R.15W.	21	CIMARRON AT RED CL C SUBDIVISION		1.24
T.42S.	R.15W.	21	CIMARRON AT RED CL D SUBDIVISION		5.51
T.42S.	R.15W.	21	CIMARRON AT RED CL E SUBDIVISION		3.13
T.42S.	R.15W.	21	COTTON ACRES 4 SUBDIVISION		0.96
T.42S.	R.15W.	21	COTTON ACRES 4 SUBDIVISION		0.10
T.42S.	R.15W.	21	COTTON ACRES 4 SUBDIVISION		0.05
T.42S.	R.15W.	21	ROW	HIGHWAY/ROAD ROW	3.64
T.42S.	R.15W.	21	ROW	HIGHWAY/ROAD ROW	0.56
T.42S.	R.15W.	21	ROW	HIGHWAY/ROAD ROW	0.12
T.42S.	R.15W.	21	ROW	HIGHWAY/ROAD ROW	0.04
T.42S.	R.15W.	21	SANTA FE AT RED CL 2 SUBDIVISION		0.19
T.42S.	R.15W.	21	SANTA FE AT RED CL 2 SUBDIVISION		0.02
T.42S.	R.15W.	21	SG-5-2-21-2206	GOLF VENTURES INC.	0.09
T.42S.	R.15W.	21	SG-5-2-21-2302	WASHINGTON COUNTY BOARD OF EDUCATION	1.70
T.42S.	R.15W.	21	SG-5-2-21-2303	WASHINGTON COUNTY BOARD OF EDUCATION	3.45
T.42S.	R.15W.	21	SG-5-2-21-3102	ROCKY MOUNTAIN PRODUCE COMPANY	4.21

Table 4.6. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.42S.	R.15W.	21	SG-5-2-21-3103	RED CLIFFS MALL LTD	2.74
T.42S.	R.15W.	21	SG-5-2-21-3200	ROCKY MOUNTAIN PRODUCE COMPANY	0.73
T.42S.	R.15W.	21	SG-5-2-21-3200	ROCKY MOUNTAIN PRODUCE COMPANY	3.66
T.42S.	R.15W.	21	SG-5-2-21-3201	ROCKY MOUNTAIN CO.	1.94
T.42S.	R.15W.	21	SG-5-2-21-3201	ROCKY MOUNTAIN CO.	0.52
T.42S.	R.15W.	21	SG-5-2-21-3301	ROCKY MOUNTAIN PRODUCE COMPANY	6.91
T.42S.	R.15W.	21	SG-5-2-21-3302	ROCKY MOUNTAIN PRODUCE COMPANY	10.00
T.42S.	R.15W.	21	SG-5-2-21-33031	D. SCOTT HOUSTON	23.47
T.42S.	R.15W.	21	SG-5-2-21-3304	ALLPRO INC.	3.71
T.42S.	R.15W.	21	SG-5-2-21-343	H. CLARK HOUSTON & WARREN L. HANNIG	1.07
T.42S.	R.15W.	21	SG-5-2-21-344	SCOTT HOUSTON	0.92
T.42S.	R.15W.	21	SG-5-2-21-422	FIRST SECURITY BANK OF UTAH	2.97
T.42S.	R.15W.	21	SGM-21-2	WILLIAM AND ARLENE MICKELSEN	2.82
T.42S.	R.15W.	27	OTHER	OTHER (RIVER BED)	2.45
T.42S.	R.15W.	27	OTHER	OTHER (RIVER BED)	1.08
T.42S.	R.15W.	27	RIO DEL SOL	SUBDIVISION	0.04
T.42S.	R.15W.	27	RIVER BEND PLAT B	SUBDIVISION	4.72
T.42S.	R.15W.	27	RIVER BEND PLAT B	SUBDIVISION	0.24
T.42S.	R.15W.	27	RIVER BEND PLAT B	SUBDIVISION	12.36
T.42S.	R.15W.	27	RIVER RIDGE 1	SUBDIVISION	2.95
T.42S.	R.15W.	27	ROW	HIGHWAY/ROAD ROW	0.51
T.42S.	R.15W.	27	ROW	HIGHWAY/ROAD ROW	2.67
T.42S.	R.15W.	27	SG-5-2-27-3440	J & S FARMS	12.42
T.42S.	R.15W.	27	SG-5-2-27-41	WANDA I S KURT LTD	4.06
T.42S.	R.15W.	27	SG-5-2-27-420	EDMUND AND JENIEL HOWELL, TRS	0.69
T.42S.	R.15W.	27	SG-5-2-27-420	EDMUND AND JENIEL HOWELL, TRS	0.02
T.42S.	R.15W.	27	SG-5-2-27-4301	GROUP MANAGEMENT INC., TR	21.76
T.42S.	R.15W.	27	SG-5-2-27-43021	T S RAINBOW INC	9.15
T.42S.	R.15W.	27	SG-5-2-27-4303	VERN PETTY	4.14
T.42S.	R.15W.	27	SUNFLOWER GARDEN 1	SUBDIVISION	4.70
T.42S.	R.15W.	27	SUNFLOWER GARDEN 2	SUBDIVISION	1.94
T.42S.	R.15W.	27	WALTERS	SUBDIVISION	3.67
T.42S.	R.15W.	28	COTTON ACRES 1	SUBDIVISION	3.50
T.42S.	R.15W.	28	COTTON ACRES 2	SUBDIVISION	3.32
T.42S.	R.15W.	28	COTTON ACRES 3	SUBDIVISION	3.59
T.42S.	R.15W.	28	COTTON ACRES 4	SUBDIVISION	3.66
T.42S.	R.15W.	28	COTTON ACRES 4	SUBDIVISION	0.03
T.42S.	R.15W.	28	COTTON ACRES 5	SUBDIVISION	3.44
T.42S.	R.15W.	28	COTTON ACRES 6	SUBDIVISION	2.25
T.42S.	R.15W.	28	FOSTER HILLS 1	SUBDIVISION	6.00
T.42S.	R.15W.	28	FOSTER HILLS 2	SUBDIVISION	3.99
T.42S.	R.15W.	28	RIVER BEND PLAT B	SUBDIVISION	2.03
T.42S.	R.15W.	28	SG-5-2-21-3200	ROCKY MOUNTAIN PRODUCE COMPANY	0.60
T.42S.	R.15W.	28	SG-5-2-21-33031	D. SCOTT HOUSTON	1.00
T.42S.	R.15W.	28	SG-5-2-28-1120	R AND R PARTNERSHIP	1.00
T.42S.	R.15W.	28	SG-5-2-28-1121	LDS CORP OF PRES OF CHURCH	2.16
T.42S.	R.15W.	28	SG-5-2-28-1122	RULON A FOSTER, TR	3.00
T.42S.	R.15W.	28	SG-5-2-28-1123	LDS CORP OF PRES OF CHURCH	1.93

Table 4.6. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.42S.	R.15W.	28	SG-5-2-28-1201	GROUP MANAGEMENT INC., TR	55.31
T.42S.	R.15W.	28	SG-5-2-28-1301	PAM HUMPHRIES	108.47
T.42S.	R.15W.	28	SG-5-2-28-140	ROCKY MOUNTAIN PRODUCE COMPANY	3.00
T.42S.	R.15W.	28	SG-5-2-28-142	JKR DEVELOPMENT	6.72
T.42S.	R.15W.	28	SG-5-2-28-2101	J AND S FARMS LTD	23.02
T.42S.	R.15W.	28	SG-5-2-28-2200	J AND S FARMS	18.54
T.42S.	R.15W.	28	SG-5-2-28-2302	J AND S FARMS	5.06
T.42S.	R.15W.	28	SG-5-2-28-2303	ANTHONY FOREMASTER LTD	3.05
T.42S.	R.15W.	28	SG-5-2-28-3101	J.O.E. INC.	7.95
T.42S.	R.15W.	28	SG-5-2-28-3102	ZIONS COOP. MERC. INSTITUTION	6.91
T.42S.	R.15W.	28	SG-5-2-28-3103	ORVIN NIELSEN	5.09
T.42S.	R.15W.	28	SG-5-2-28-3104	OLVIN NIELSON	9.90
T.42S.	R.15W.	28	SG-5-2-28-3105	DOWN TO DIXIE, INC.	0.50
T.42S.	R.15W.	28	SG-5-2-28-3106	JUNE MITCHELL, TR	47.93
T.42S.	R.15W.	28	SG-5-2-28-3301	FOREMASTER FAMILY LIMITED PARTNERSHIP	26.96
T.42S.	R.15W.	28	SG-5-2-28-4100	ROCKY MOUNTAIN PRODUCE COMPANY	5.56
T.42S.	R.15W.	28	SG-5-2-28-4103	ROCKY MOUNTAIN PRODUCE COMPANY	104.92
T.42S.	R.15W.	28	SG-5-2-28-411	CLEAR CREEK DEVELOPMENT	0.04
T.42S.	R.15W.	28	SG-5-2-28-411	CLEAR CREEK DEVELOPMENT	0.10
T.42S.	R.15W.	28	SG-5-2-28-430	CLEAR CREEK DEVELOPMENT	0.05
T.42S.	R.15W.	28	SG-5-2-33-423	ANTHONY FOREMASTER LTD	35.50
T.42S.	R.15W.	29	SG-1738-A	SETTLER'S RV PARK INC.	7.45
T.42S.	R.15W.	29	SG-5-2-20-205	ZION FACTORY STORES 2	0.17
T.42S.	R.15W.	29	SG-5-2-28-430	CLEAR CREEK DEVELOPMENT	0.90
T.42S.	R.15W.	29	SG-5-2-29-1101	TRIPLE H	0.04
T.42S.	R.15W.	29	SG-5-2-29-11010	SCOTT HUSTON	2.38
T.42S.	R.15W.	29	SG-5-2-29-1102	EAST RIDGE MOTEL COMPANY	1.31
T.42S.	R.15W.	29	SG-5-2-29-1200	FOREMASTER FAMILY LIMITED PARTNERSHIP	21.74
T.42S.	R.15W.	32	ROW	HIGHWAY/ROAD ROW	1.47
T.42S.	R.15W.	32	SG-5-2-32-1101	LLOYD JENNINGS AND ANNIE MCARCHUR, TRS	7.72
T.42S.	R.15W.	32	SG-5-2-32-1102	ANTHONY FOREMASTER, LTD	22.21
T.42S.	R.15W.	32	SG-5-2-32-2101	LEON AND ANNIE JENNINGS	1.65
T.42S.	R.15W.	33	ROW	HIGHWAY/ROAD ROW	1.12
T.42S.	R.15W.	33	ROW	HIGHWAY/ROAD ROW	0.04
T.42S.	R.15W.	33	ROW	HIGHWAY/ROAD ROW	0.06
T.42S.	R.15W.	33	ROW	HIGHWAY/ROAD ROW	0.11
T.42S.	R.15W.	33	ROW	HIGHWAY/ROAD ROW	0.70
T.42S.	R.15W.	33	SG-5-2-28-2302	J AND S FARMS	0.15
T.42S.	R.15W.	33	SG-5-2-32-2200	SHELCO LTD	1.42
T.42S.	R.15W.	33	SG-5-2-33-1301	J & S FARMS	0.04
T.42S.	R.15W.	33	SG-5-2-33-1303	J & S FARMS	0.10
T.42S.	R.15W.	33	SG-5-2-33-2203	CLIFF STONE	20.09
T.42S.	R.15W.	33	SG-5-2-33-2300	SCHMUTZ RANCH LTD	21.07
T.42S.	R.15W.	33	SG-5-2-33-3200	RAY S SCHMUTX FAMILY PARTNERSHIP	19.48
T.42S.	R.15W.	33	SG-5-2-33-4102	JUNE MITCHELL	0.17
T.42S.	R.15W.	33	SG-5-2-33-4102	JUNE MITCHELL	60.71
T.42S.	R.15W.	33	SG-5-2-33-423	ANTHONY FOREMASTER LTD	47.25
T.42S.	R.15W.	33	SG-5-2-33-4301	FOREMASTER FAMILY LIMITED PARTNERSHIP	58.89

Table 4.6. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.42S.	R.15W.	33	SG-5-3-4-4102	CLIFF STONE	1.42
T.42S.	R.15W.	34	ROW	HIGHWAY/ROAD ROW	0.60
T.42S.	R.15W.	34	SG-5-2-34-3200	DON AND MERLENE SCMUTZ	9.58
T.42S.	R.15W.	34	SG-5-2-34-3200	DON AND MERLENE SCMUTZ	6.39
T.42S.	R.15W.	34	SG-5-2-34-3301	SCOTT AND SHERRY TRUMAN	2.22
T.42S.	R.15W.	34	SG-5-2-34-3303	CLIFF STONE	2.84
T.42S.	R.16W.	13	MUNICIPAL	MUNICIPAL	17.07
T.42S.	R.16W.	13	RED CLIFF	SUBDIVISION	0.95
T.42S.	R.16W.	13	SG-6-2-13-3100	CITY OF ST. GEORGE	5.26
T.42S.	R.16W.	13	SG-6-2-13-3100	CITY OF ST. GEORGE	0.27
T.42S.	R.16W.	13	SG-6-2-13-3100	CITY OF ST. GEORGE	0.29
T.42S.	R.16W.	13	SG-6-2-13-3100	CITY OF ST. GEORGE	0.01
T.42S.	R.16W.	13	SG-6-2-13-3100	CITY OF ST. GEORGE	9.08
T.42S.	R.16W.	13	SG-6-2-13-3410	CHARLES & GERALDINE PHILLIPS	6.01
T.42S.	R.16W.	13	SG-6-2-13-4300	ELTON & VERLYN STOUT	2.50
T.42S.	R.16W.	24	CORAL COVE	SUBDIVISION	2.24
T.42S.	R.16W.	24	HIDDEN COVE	SUBDIVISION	0.05
T.42S.	R.16W.	24	PARKVUE A	SUBDIVISION	0.01
T.42S.	R.16W.	24	RED HILLS	SUBDIVISION	4.53
T.42S.	R.16W.	24	ROW	HIGHWAY/ROAD ROW	2.98
T.42S.	R.16W.	24	ROW	HIGHWAY/ROAD ROW	1.20
T.42S.	R.16W.	24	SANDSTONE TERRACE	SUBDIVISION	1.11
T.42S.	R.16W.	24	SG-1709	SUSAN PATTEN	0.29
T.42S.	R.16W.	24	SG-1713-A-1-B	LEO AND MAGDALENE DEAN	0.16
T.42S.	R.16W.	24	SG-1713-A-4	EDWIN AND SOON HWA REBER	0.03
T.42S.	R.16W.	24	SG-1714-A	LEE DOYLE M. & VIRGINIA	2.43
T.42S.	R.16W.	24	SG-1715-A-3	LDS CORPORATION OF PRES. OF CHURCH	0.00
T.42S.	R.16W.	24	SG-1735	WASHINGTON COUNTY	2.21
T.42S.	R.16W.	24	SG-1746-C-1-A	CITY OF ST. GEORGE	2.09
T.42S.	R.16W.	24	SG-1746-C-1-B	HOGAN AND TINGEY CONTRACTORS	0.30
T.42S.	R.16W.	24	SG-1746-C-2	CALVERT AND NORMA WHITEHEAD	0.35
T.42S.	R.16W.	24	SG-1746-C-3	CRAIG AND DEBRA HAMMER	0.37
T.42S.	R.16W.	24	SG-1746-C-5-A	PENN H. SMITH, TR	0.22
T.42S.	R.16W.	24	SG-1746-C-5-B-1-A	DOUGLAS SORENSON	0.23
T.42S.	R.16W.	24	SG-1746-C-5-B-2	FENTON AND CLAIRE MOSS	0.20
T.42S.	R.16W.	24	SG-1746-C-5-C	KIMBERLY PETTIT	0.08
T.42S.	R.16W.	24	SG-1746-C-5-D	KIMBERLY PETTIT	0.20
T.42S.	R.16W.	24	SG-1751-A-1-B	ROSS AND JULIE HURST	0.08
T.42S.	R.16W.	24	SG-1751-F	ALFRED AND ANNETTE UNREIN	3.16
T.42S.	R.16W.	24	SG-1751-F	ALFRED AND ANNETTE UNREIN	0.20
T.42S.	R.16W.	24	SG-1752-A	SANDSTONE TERRACE	9.07
T.42S.	R.16W.	24	SG-1752-B	KAY SMITH	0.69
T.42S.	R.16W.	24	SG-1752-C-1	JERRY & TRUDY J. VIDER	1.62
T.42S.	R.16W.	24	SG-6-2-13-3100	CITY OF ST. GEORGE	37.08
T.42S.	R.16W.	24	SUN STONE 1	SUBDIVISION	1.54
T.42S.	R.16W.	25	SG-1759-N	CITY OF ST. GEORGE	15.25
T.42S.	R.16W.	25	SG-6-2-24-3002	GARRICK INVESTMENT COMPANY	3.11
T.42S.	R.16W.	25	SG-6-2-25-4001	RUDGER ATKIN	1.26

Table 4.6. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.42S.	R.16W.	25	SG-6-2-25-4001	RUDGER ATKIN	2.12
T.42S.	R.16W.	25	SG-711-C-1	RUDGER C ATKIN INC	35.53
T.42S.	R.16W.	25	SG-711-C-3	CITY OF ST. GEORGE	5.80
T.42S.	R.16W.	25	SG-711-C-4	CITY OF ST. GEORGE	3.05
T.42S.	R.16W.	25	SG-711-F	ERF ENTERPRISES LTD	7.72
T.42S.	R.16W.	26	ROW	HIGHWAY/ROAD ROW	0.22
T.42S.	R.16W.	26	SG-6-2-26-1001	RUDGER C. ATKIN INC.	27.84
T.42S.	R.16W.	26	SG-6-2-26-2300	CECIL BLAKE	4.12
T.42S.	R.16W.	26	SG-6-2-26-2300	CECIL BLAKE	0.45
T.42S.	R.16W.	26	SG-6-2-26-2312	DARRELL AND KATHLEEN BLAKE	0.67
T.42S.	R.16W.	35	SG-6-2-35-1100	GARY AND BETTY CARTER	41.99
T.42S.	R.16W.	36	ROW	HIGHWAY/ROAD ROW	0.08
T.42S.	R.16W.	36	ROW	HIGHWAY/ROAD ROW	0.03
T.42S.	R.16W.	36	ROW	HIGHWAY/ROAD ROW	0.03
T.42S.	R.16W.	36	ROW	HIGHWAY/ROAD ROW	0.09
T.42S.	R.16W.	36	ROW	HIGHWAY/ROAD ROW	0.09
T.42S.	R.16W.	36	SG-6-2-36-1400	CITY OF ST. GEORGE	5.71
T.42S.	R.16W.	36	SG-6-2-36-1400	CITY OF ST. GEORGE	0.07
T.42S.	R.16W.	36	SG-6-2-36-1400	CITY OF ST. GEORGE	45.26
T.42S.	R.16W.	36	SG-6-2-36-1400	CITY OF ST. GEORGE	0.51
T.42S.	R.16W.	36	SG-6-2-36-201	TONAQUINT INC.	11.44
T.42S.	R.16W.	36	SG-6-2-36-216	C.E.C. INDUSTRIES CORP	1.31
T.42S.	R.16W.	36	SG-6-2-36-223	ST. GEORGE INN	0.22
T.42S.	R.16W.	36	SG-6-2-36-3100	CARY AND BETTY CARTER	29.08
T.42S.	R.16W.	36	SG-6-2-36-4000	GARY AND BETTY CARTER	137.61
T.42S.	R.16W.	36	SG-6-2-36-4001	CITY OF ST. GEORGE	7.68
T.43S.	R.15W.	03	SG-5-3-3-41001	CLIFF STONE	43.78
T.43S.	R.15W.	03	SG-5-3-3-4103	M. GALE LARSEN & HAROLD B. SCHMUTZ	0.10
T.43S.	R.15W.	03	SG-5-3-3-4300	OWEN & ANNA LOU BUNDY TRUSTEES	0.12
T.43S.	R.15W.	03	SG-5-3-3-4300	OWEN & ANNA LOU BUNDY TRUSTEES	0.47
T.43S.	R.15W.	03	SG-5-3-3-4301	RUSSELL AND MYRNA BATEMENT	1.78
T.43S.	R.15W.	04	SG-5-3-4-1100	DAVID AND VERNA SCHMUTZ	6.50
T.43S.	R.15W.	04	SG-5-3-4-1200	HAROLD AND TERESA PAYTON	9.09
T.43S.	R.15W.	04	SG-5-3-4-1201	HAROLD PAYTON	8.11
T.43S.	R.15W.	04	SG-5-3-4-1202	FRANCES E. W. SHAFFER	0.25
T.43S.	R.15W.	04	SG-5-3-4-2100	CLIFF STONE	9.50
T.43S.	R.15W.	04	SG-5-3-4-3101	WASHINGTON COUNTY	0.94
T.43S.	R.15W.	04	SG-5-3-4-4100	SHELCO LTD	1.33
T.43S.	R.15W.	04	SG-5-3-4-41011	EDWARD AND DIXIE COTTAM	251.10
T.43S.	R.15W.	04	SG-5-3-4-4102	CLIFF STONE	73.80
T.43S.	R.15W.	04	SG-5-3-5-11001	SUN RIVER DEVELOPMENT	0.26
T.43S.	R.15W.	05	QUAIL VALLEY	SUBDIVISION	1.15
T.43S.	R.15W.	05	SG-5-3-5-11001	SUN RIVER DEVELOPMENT	0.37
T.43S.	R.16W.	01	ROW	HIGHWAY/ROAD ROW	0.42
T.43S.	R.16W.	01	ROW	HIGHWAY/ROAD ROW	0.01
T.43S.	R.16W.	01	SG-6-3-1-1112	TONAQUINT INC.	1.21
T.43S.	R.16W.	01	SG-6-3-1-1113	CECIL BLAKE TR.	0.16
T.43S.	R.16W.	01	SG-6-3-1-1130	TONAQUINT INC.	19.37

Table 4.6. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.43S.	R.16W.	01	SG-6-3-1-1141	TONAQUINT, INC.	2.45
T.43S.	R.16W.	01	SG-6-3-1-1431	TONAQUINT INC.	7.90
T.43S.	R.16W.	01	SG-6-3-1-1441	TONAQUINT INC	3.38
T.43S.	R.16W.	01	SG-6-3-1-1442	TONAQUINT INC.	7.20

4.3.5 North Washington City Take Area

The North Washington City take area is north of Interstate 15 within a basin surrounded on three sides by the proposed reserve. This is an area where Washington City has constructed significant infrastructure anticipating growth and at the request of the Division of State Lands and Forestry. This area consists of approximately 2,005 acres of desert tortoise habitat on private and State School Trust lands. Information on parcels and legal descriptions are provided in Table 4.7 and depicted in Figure 4.6. Infrastructure already in place includes water, sewer, and power lines, as well as an 18-hole championship golf course, roadways, wells, and water storage tanks. A large development of 1,500–2,000 homes has been planned around the golf course and is ready for construction. In addition, a school site has been identified in the area as well as the need for additional water development. The take area has been designed to ensure that growth can occur to support the golf course and infrastructure commitment while preserving a maximum amount of undisturbed desert tortoise habitat. This area has been designated for take due to impending development, the need for Washington City to support its golf course and infrastructure, the needs of the State School Trust program to obtain revenue from its most developable land, and the ability to develop this area without compromising the integrity of the reserve.

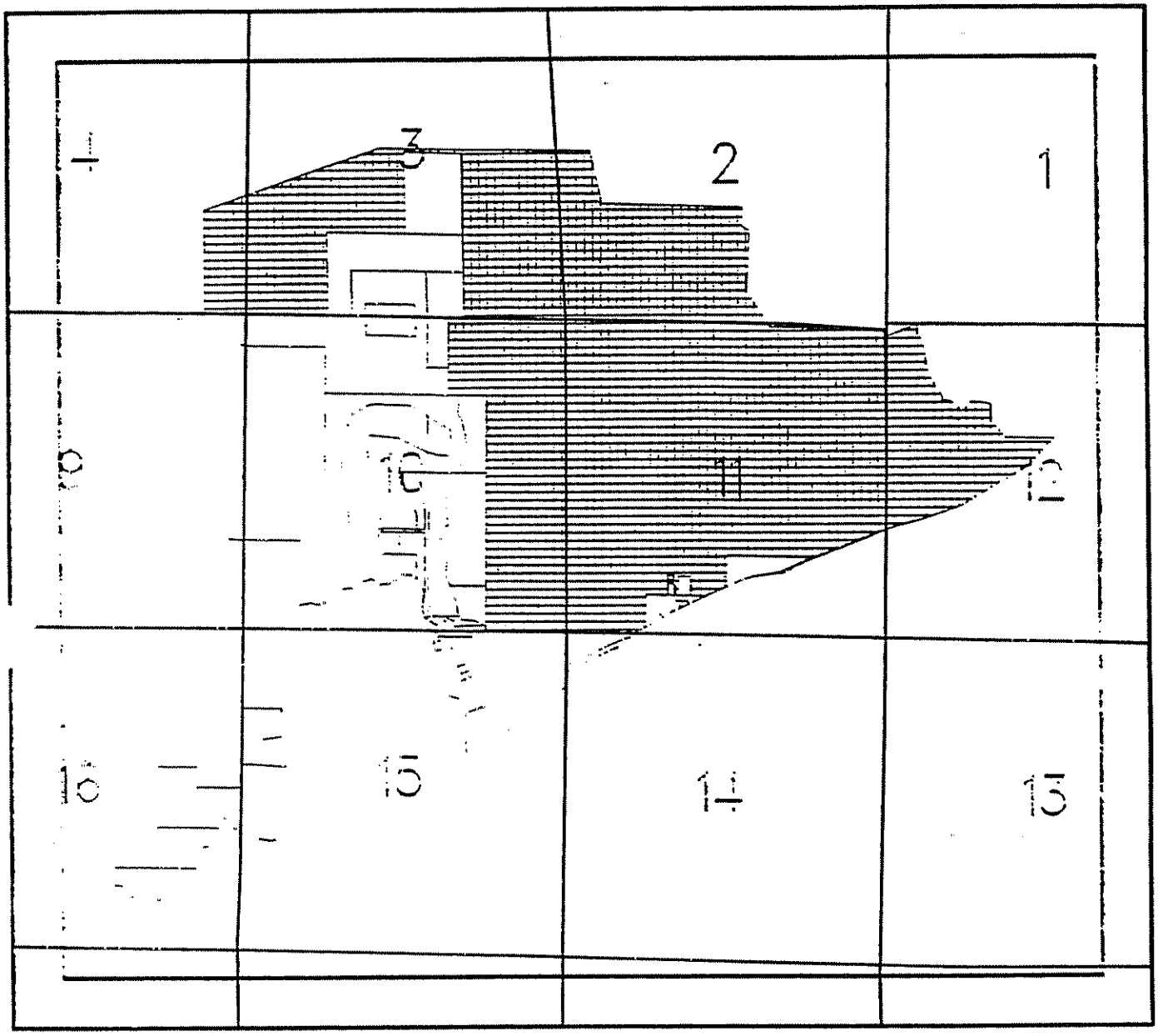


Figure 4.6. North Washington City Take Area

Table 4.7. Parcel Information for North Washington City Take Area.

Township	Range	Section	Parcel #	Owner	Acres
T.42S.	R.15W.	02	STATE	STATE OF UTAH	150.63
T.42S.	R.15W.	03	6213-TR	STATE OF UTAH	211.23
T.42S.	R.15W.	03	W-5-2-3-230	CITY OF WASHINGTON	38.28
T.42S.	R.15W.	03	W-5-2-3-231	DESERET MUTUAL BENEFIT ASSOC.	17.46
T.42S.	R.15W.	03	W-5-2-3-232	FIRST SECURITY BANK OF UTAH	10.74
T.42S.	R.15W.	03	W-5-2-3-233	WASHINGTON COUNTY BOARD OF ED.	3.81
T.42S.	R.15W.	03	W-5-2-3-240	CITY OF WASHINGTON	29.62
T.42S.	R.15W.	04	STATE	STATE OF UTAH	29.28
T.42S.	R.15W.	09	W-5-2-9-110	DESERET MUTUAL INSURANCE CO.	4.31
T.42S.	R.15W.	09	W-5-2-9-111	DESERET MUTUAL INSURANCE CO.	3.36
T.42S.	R.15W.	09	W-5-2-9-111	DESERET MUTUAL INSURANCE CO.	31.44
T.42S.	R.15W.	09	W-5-2-9-210	DESERET MUTUAL INSURANCE CO.	22.08
T.42S.	R.15W.	10	6213-TR	STATE OF UTAH	177.10
T.42S.	R.15W.	10	BUENA VISTA 4	SUBDIVISION	0.51
T.42S.	R.15W.	10	BUENA VISTA 4	SUBDIVISION	18.58
T.42S.	R.15W.	10	BUENA VISTA 4	SUBDIVISION	2.66
T.42S.	R.15W.	10	BUENA VISTA 4	SUBDIVISION	3.75
T.42S.	R.15W.	10	MUNICIPAL	MUNICIPAL	0.73
T.42S.	R.15W.	10	QUAIL RIDGE	SUBDIVISION	1.38
T.42S.	R.15W.	10	ROW	HIGHWAY/ROAD ROW	3.83
T.42S.	R.15W.	10	W-5-2-10-1310	FIRST SEC. BANK OF UTAH	12.85
T.42S.	R.15W.	10	W-5-2-10-1320	CITY OF WASHINGTON	11.92
T.42S.	R.15W.	10	W-5-2-10-1330	CITY OF WASHINGTON	4.46
T.42S.	R.15W.	10	W-5-2-10-140	NELSON CLAYTON, TR	3.71
T.42S.	R.15W.	10	W-5-2-10-231	MARGARET & PAUL JENSEN	28.96
T.42S.	R.15W.	10	W-5-2-10-232	KEITH BEHUNIN	6.76
T.42S.	R.15W.	10	W-5-2-10-233	WAYNE AND ISABELLE BROOKS	0.13
T.42S.	R.15W.	10	W-5-2-10-234	DOROTHY ANDERSON	1.35
T.42S.	R.15W.	10	W-5-2-10-235	RICHARD AND BERNITA BUCKWALTER	<0.01
T.42S.	R.15W.	10	W-5-2-10-235	RICHARD AND BERNITA BUCKWALTER	<0.01
T.42S.	R.15W.	10	W-5-2-10-236	ROBERT AND MATILDA STEVENS	1.00
T.42S.	R.15W.	10	W-5-2-10-3100	DESERET MUTUAL BENEFIT ASSOC.	30.99
T.42S.	R.15W.	10	W-5-2-10-3100	DESERET MUTUAL BENEFIT ASSOC.	30.10
T.42S.	R.15W.	10	W-5-2-10-3102	LDS CORP OF PRES OF CHURCH	2.27
T.42S.	R.15W.	10	W-5-2-10-3103	LDS CORP OF PRES OF CHURCH	2.44
T.42S.	R.15W.	10	W-5-2-10-3110	WA. CITY	45.05
T.42S.	R.15W.	10	W-5-2-10-312	CITY OF WASHINGTON	0.04
T.42S.	R.15W.	10	W-5-2-10-330	DESERET MUTUAL INSURANCE CO.	107.55
T.42S.	R.15W.	10	W-5-2-10-331	DESERET MUTUAL INSURANCE CO.	30.04
T.42S.	R.15W.	10	W-5-2-10-410	DESERET MUTUAL INSURANCE CO.	59.57
T.42S.	R.15W.	10	W-5-2-3-232	FIRST SECURITY BANK OF UTAH	6.76
T.42S.	R.15W.	10	W-5-2-3-233	WASHINGTON COUNTY BOARD OF ED.	6.02
T.42S.	R.15W.	11	6213-TR	STATE OF UTAH	521.60
T.42S.	R.15W.	11	MUNICIPAL	MUNICIPAL	8.91
T.42S.	R.15W.	11	ROW	HIGHWAY/ROAD ROW	0.53
T.42S.	R.15W.	11	ROW	HIGHWAY/ROAD ROW	<0.01
T.42S.	R.15W.	11	W-194-A-1-NP	PHIL RAY & LYNETTE O. BAKER	0.14
T.42S.	R.15W.	11	W-194-A-3-NP	RICHARD HUNTER, TR	0.01

Table 4.7. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.42S.	R.15W.	11	W-194-A-5	JOHN SIME	0.38
T.42S.	R.15W.	11	W-194-A-6	JOHN SIME	0.31
T.42S.	R.15W.	11	W-194-B-NP	RICHARD HUNTER, TR	0.58
T.42S.	R.15W.	11	W-194-C-NP	RALPH AND LOIS SULLIVAN	3.58
T.42S.	R.15W.	11	W-194-F	M.R. AND C LIMITED PARTNERSHIP	0.86
T.42S.	R.15W.	11	W-208	MORONI FEED COMPANY	0.11
T.42S.	R.15W.	11	WARMS SPRINGS 1 SUBDIVISION		0.17
T.42S.	R.15W.	11	WARMS SPRINGS 1 SUBDIVISION		0.47
T.42S.	R.15W.	11	WARMS SPRINGS 1 SUBDIVISION		1.44
T.42S.	R.15W.	12	STATE	STATE OF UTAH	103.94
T.42S.	R.15W.	14	ROW	HIGHWAY/ROAD ROW	2.14
T.42S.	R.15W.	14	W-168-A-1-A	CITY OF WASHINGTON	7.22
T.42S.	R.15W.	14	W-168-A-1-A	CITY OF WASHINGTON	2.37
T.42S.	R.15W.	15	BUENA VISTA SUBDIVISION		2.78
T.42S.	R.15W.	15	BUENA VISTA 2 SUBDIVISION		5.24
T.42S.	R.15W.	15	BUENA VISTA 3 SUBDIVISION		8.61
T.42S.	R.15W.	15	GREEN SPRING COVE 1 SUBDIVISION		0.02
T.42S.	R.15W.	15	GREEN SPRING COVE 2 SUBDIVISION		8.67
T.42S.	R.15W.	15	QUAIL RIDGE SUBDIVISION		0.41
T.42S.	R.15W.	15	ROW	HIGHWAY/ROAD ROW	0.15
T.42S.	R.15W.	15	W-207-A-1-A	RED LANDS COMPANY	16.43
T.42S.	R.15W.	15	W-207-A-120	CITY OF WASHINGTON	5.56
T.42S.	R.15W.	15	W-207-A-18	HOWARD BARLOW, TR	3.55
T.42S.	R.15W.	15	W-5-2-10-235	RICHARD AND BERNITA BUCKWALTER	0.02
T.42S.	R.15W.	15	W-5-2-10-236	ROBERT AND MATILDA STEVENS	0.67
T.42S.	R.15W.	15	W-5-2-15-11011	BUENA VISTA PROPERTIES LTD	50.45
T.42S.	R.15W.	15	W-5-2-15-1411	ELVA JANE ROUNDY	0.38
T.42S.	R.15W.	15	W-5-2-15-1412	ERNESTINE VASQUEZ	0.28
T.42S.	R.15W.	15	W-5-2-15-1443	DONALD SPURRIER	0.32
T.42S.	R.15W.	15	W-5-2-15-1444	NEIL AND RUBY PACE	0.23
T.42S.	R.15W.	15	W-5-2-15-433	CITY OF WASHINGTON	0.29
T.42S.	R.15W.	16	6225-B	BEAR WEST COMPANY	10.34
T.42S.	R.15W.	16	6225-C	RICHARD J. ROONEY	0.01
T.42S.	R.15W.	16	6225-C	RICHARD J. ROONEY	2.11
T.42S.	R.15W.	16	6225-D	JAMES F. TREES	10.39
T.42S.	R.15W.	16	6225-TR	TERRA TITLE CO. TRUSTEE	14.68
T.42S.	R.15W.	16	SG-5-2-16-2304	TERRA TITLE COMPANY, TR	8.65
T.42S.	R.15W.	16	W-5-2-16-2202	NORMAN & DONNA ESCHLER	0.26
T.42S.	R.15W.	16	W-5-2-16-2206	ROBERT ELLIOTT ET AL.	3.84
T.42S.	R.15W.	16	W-5-2-16-2207	SHERRY ANN DECKER	0.05
T.42S.	R.15W.	16	W-5-2-9-210	DESERET MUTUAL INSURANCE CO.	43.95

4.3.6 Harrisburg/Leeds/Babylon Take Areas

The Harrisburg/Leeds/Babylon take areas include private and State School Trust parcels adjacent to the proposed reserve but outside of its boundaries (see Figure 4.7). These include a parcel of private land on the east edge of the reserve along the Red Cliffs Campground Road as well as parcels adjacent to I-15 in the Leeds area and areas outside of the proposed translocation area in the Babylon area. These areas, totaling 1,540 acres, are depicted in Figure 4.7 and land owners and legal descriptions are identified in Table 4.8.

Table 4.8. Parcel Information for the Harrisburg/Leeds/Babylon Take Area.

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.13W.	07	3273-A	WARREN & JACKELETTA PULSIPITER TR	17.15
T.41S.	R.13W.	07	L-3-1-7-2100	CARLYLE AND GERALDINE STIRLING	0.72
T.41S.	R.13W.	07	L-3-1-7-2102	JACKIE WRIGHT	0.03
T.41S.	R.13W.	07	L-3-1-7-2102	JACKIE WRIGHT	0.70
T.41S.	R.13W.	07	L-3-1-7-2103	JACKIE WRIGHT	1.40
T.41S.	R.13W.	07	L-3-1-7-212	WILLIAM AND KATHERINE STIRLING	0.19
T.41S.	R.13W.	07	L-3-1-7-2410	EDWARD AND IDONNA SNOW	15.79
T.41S.	R.13W.	07	L-3-1-7-2430	MACK AND DIXIE STIRLING	7.41
T.41S.	R.13W.	07	L-3-1-7-321	EDWARD AND IDONNA SNOW	20.06
T.41S.	R.13W.	07	L-89	WARREN & JACKLETTA PULSIPHER, TRS	5.45
T.41S.	R.13W.	07	L-89	WARREN & JACKLETTA PULSIPHER, TRS	2.73
T.41S.	R.13W.	08	L-3-1-8-340	HERMAN CARLYLE STIRLING	2.34
T.41S.	R.13W.	16	3290	5-M INC.	25.25
T.41S.	R.13W.	16	3290	5-M INC.	1.13
T.41S.	R.13W.	16	3290	5-M INC.	3.17
T.41S.	R.13W.	16	3290-NP	STATE OF UTAH	207.89
T.41S.	R.13W.	16	3291	RUTH W. CHRISTIANSEN ET AL.	133.41
T.41S.	R.13W.	17	3292	WILLIAM & CATHERINE STERLING TRS	131.66
T.41S.	R.13W.	18	L-3-1-18-4410	NED & GERALDINE SULLIVAN	27.55
T.41S.	R.13W.	18	L-3-1-18-4411	MERLIN AND TANA SULLIVAN	5.28
T.41S.	R.13W.	19	3294-SA	DIXIE POWER CO.	39.77
T.41S.	R.13W.	19	C-N-04	5M INC.	17.44
T.41S.	R.13W.	19	C1-136	5M INC.	18.57
T.41S.	R.13W.	19	C3-348	PAUL LAMOREUAX	1.80
T.41S.	R.13W.	19	C436-723	5M INC.	5.53
T.41S.	R.13W.	20	C-N-04	5M INC.	1.17
T.41S.	R.13W.	20	C5-259	FOREST COMPANY	12.70
T.41S.	R.13W.	29	3306-A-NP	RICHARD & LUCILLE STOWE TRUST	40.48
T.41S.	R.13W.	30	3306-B-NP	RICHARD & LUCILLE STOWE	91.30
T.41S.	R.13W.	30	3306-C	JOHN R. VOUGHT	8.05
T.41S.	R.13W.	30	C1-136	5M INC.	0.59
T.41S.	R.13W.	30	C3-348	PAUL LAMOREUAX	18.92
T.41S.	R.13W.	30	C4-014	5M INC.	21.64
T.41S.	R.13W.	30	C436-723	5M INC.	12.36
T.41S.	R.13W.	30	H-3-1-30-2201	CHARLES L. APPLEBY, JR	0.76
T.41S.	R.13W.	30	H-3-1-30-3101	WINDING RIVER ASSOCIATES	24.11
T.41S.	R.13W.	30	H-3-1-30-3102	STRATTON BROTHERS	127.68

Table 4.8. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.13W.	31	H-3-1-30-3102	STRATTON BROTHERS	9.23
T.41S.	R.14W.	12	SILVER VALLEY 2 SUBDIVISION		1.27
T.41S.	R.14W.	12	SILVER VALLEY 2 SUBDIVISION		0.18
T.41S.	R.14W.	13	4044-A-1	HAROLD H. & DOROTHY FURROW TR	36.72
T.41S.	R.14W.	13	4046-A-1	DALLAS & JUDITH K. MANGUM	10.27
T.41S.	R.14W.	13	4046-A-5	LAWRENCE E. & VICKY I.	8.29
T.41S.	R.14W.	13	L-3-1-18-4410	NED & GERALDINE SULLIVAN	0.59
T.41S.	R.14W.	13	L-4-1-13-130	JOSEPH AND CONNIE BURNS	0.21
T.41S.	R.14W.	13	L-6-A	NED AND GERALDINE SULLIVAN	0.40
T.41S.	R.14W.	13	ROW	HIGHWAY/ROAD ROW	8.70
T.41S.	R.14W.	13	ROW	HIGHWAY/ROAD ROW	2.68
T.41S.	R.14W.	14	4054-B-1-A	DIXIE COVE ESTATE PARTNERSHIP	57.10
T.41S.	R.14W.	14	ROW	HIGHWAY/ROAD ROW	3.41
T.41S.	R.14W.	23	4058-A	DIXIE COVE EST. PART.	71.25
T.41S.	R.14W.	23	4059-A	DIXIE COVE EST. PART.	58.34
T.41S.	R.14W.	23	HARRISBURG ESTATES 1 SUBDIVISION		33.33
T.41S.	R.14W.	23	ROW	HIGHWAY/ROAD ROW	4.95
T.41S.	R.14W.	25	H-4-1-25-2201	STRATTONN BROTHERS	28.23
T.41S.	R.14W.	25	H-4-1-25-2202	JOYCE CHRISTENSEN	10.38
T.41S.	R.14W.	25	H-4-1-25-2203	STRATTON BROTHERS	2.84
T.41S.	R.14W.	25	H-4-1-25-330-DC	WASH. CO. WATER CONSER. DISTRICT	1.83
T.41S.	R.14W.	36	H-4-1-36-100	STATE OF UTAH	35.50
T.41S.	R.14W.	36	H-4-1-36-100	STATE OF UTAH	63.89
T.41S.	R.14W.	36	H-4-1-36-101	WASH. CO. WATER CONSER. DISTRICT	1.19
T.41S.	R.14W.	36	H-4-1-36-2000	STRATTON BROTHERS	9.83
T.41S.	R.14W.	36	H-4-1-36-420-DC	WASH. CO. WATER CONSER. DISTRICT	14.02
T.41S.	R.14W.	36	H-4-1-36-420-DC	WASH. CO. WATER CONSER. DISTRICT	2.52
T.41S.	R.14W.	36	OTHER	OTHER (RIVER BED)	7.45
T.41S.	R.14W.	36	OTHER	OTHER (RIVER BED)	3.80

4.3.7 Hurricane Take Areas

The Hurricane take areas occur on three sides of the Hurricane reserve area (Zone 5): (1) from the western cinder knoll to the western edge of desert tortoise habitat; (2) south of the Quail Creek hydro/UAMPS power line; and (3) east of the eastern cinder knoll. An isolated area, also identified for incidental take, is located just southeast of the town of Hurricane. Most of these areas are already impacted by urban development, including an 80-acre farm, and therefore are designated for take. The Hurricane take areas total 1,411 acres and are depicted in Figure 4.8. Information on land ownership and legal descriptions are provided in Table 4.9.

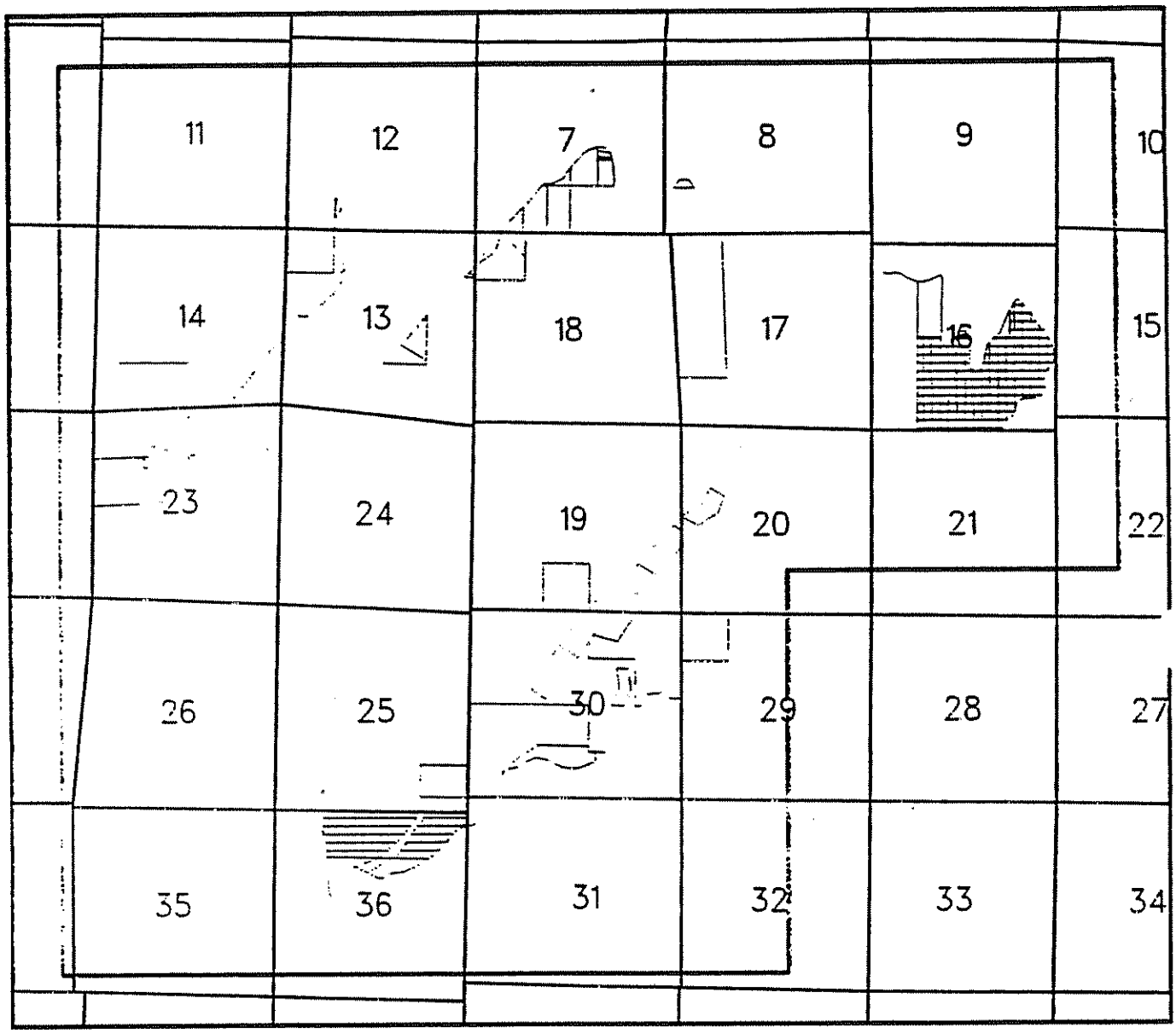


Figure 4.7. Harrisburg/Leeds/Babylon Take Area

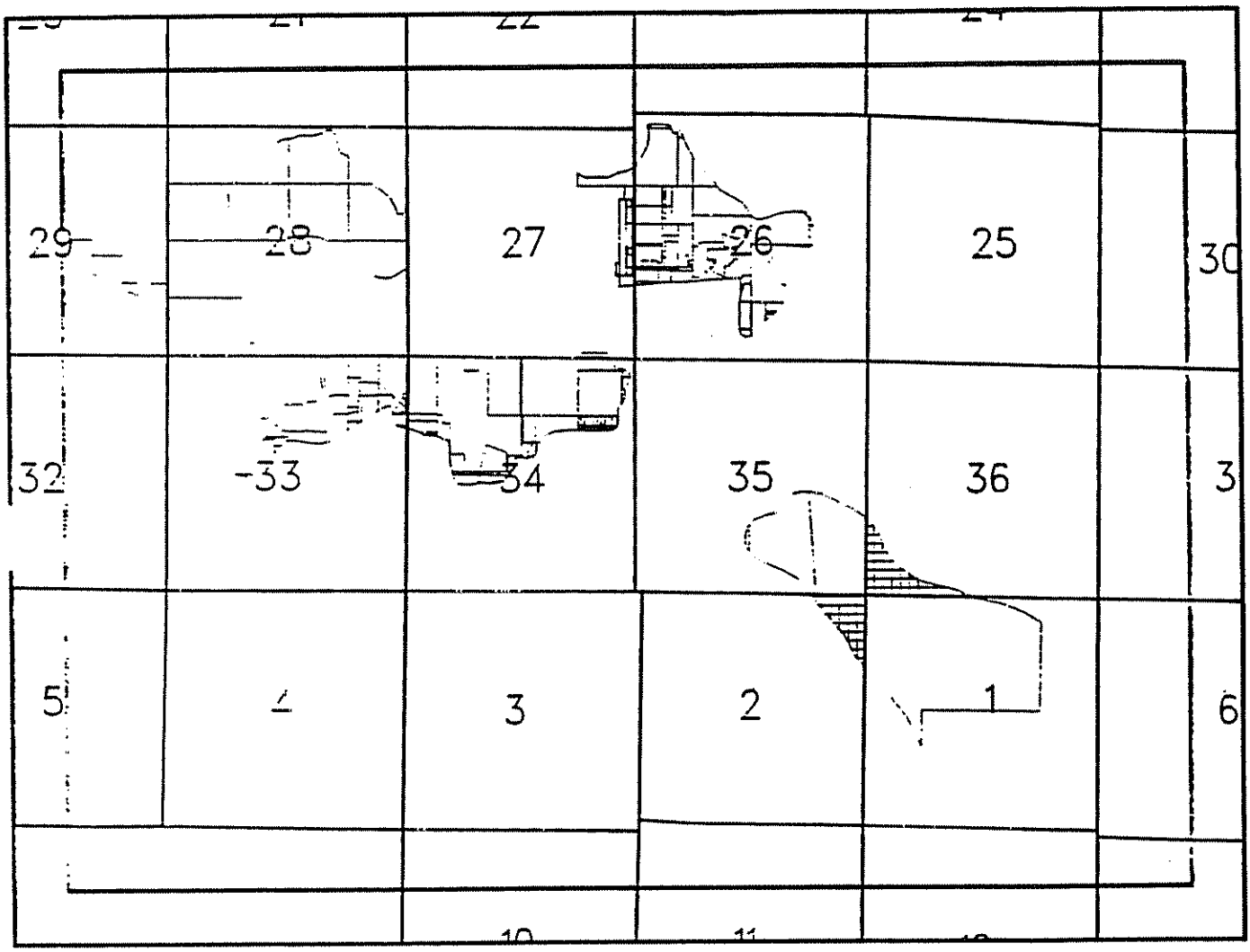


Figure 4.8. Hurricane Take Area

Table 4.9. Parcel Information for the Hurricane Take Areas

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.13W.	26	3301	STERLING D. & RANDI C. NELSON	16.12
T.41S.	R.13W.	26	BALLARD HEIGHTS SUBDIVISION		4.66
T.41S.	R.13W.	26	GREEN ACRES NORTHVIE SUBDIVISION		2.93
T.41S.	R.13W.	26	H-3-1-26-31101	JAMES A. TESTA INC.	9.45
T.41S.	R.13W.	26	H-3-1-26-31401	JOSEPH R. & FRANCES T. RICE	7.84
T.41S.	R.13W.	26	H-3-1-26-4100	KENNETH R. ANDERSON	4.27
T.41S.	R.13W.	26	H-3-1-26-42001	JOSEPH R. & FRANCES T. RICE	7.89
T.41S.	R.13W.	26	H-3-1-26-4201	KENNETH R. ANDERSON	15.50
T.41S.	R.13W.	26	H-3-1-26-4202	KENNETH R. ANDERSON	8.86
T.41S.	R.13W.	26	H-3-1-26-4301	BEVERLY BARRICK	7.04
T.41S.	R.13W.	26	H-3-1-26-4302	W. WARD & ANTOINETTE D. HALL	1.41
T.41S.	R.13W.	26	H-3-1-26-4302	W. WARD & ANTOINETTE D. HALL	6.16
T.41S.	R.13W.	26	H-3-1-26-4303	EARL D. & L. LOUISE THOMAS	6.73
T.41S.	R.13W.	26	H-3-1-26-4304	FRED G. & RHEAN H. PENDLETON	9.51
T.41S.	R.13W.	26	H-3-1-26-4305	IRIS CROSBY TR	1.73
T.41S.	R.13W.	26	H-3-1-26-4306	PHILLIP M. & DEBRA R. JENSEN	0.93
T.41S.	R.13W.	26	H-3-1-26-4307	KENNETH R. ANDERSON	1.61
T.41S.	R.13W.	26	H-3-1-26-4400	KENNETH R. ANDERSON	0.98
T.41S.	R.13W.	26	H-3-1-26-4401	KENNETH R. ANDERSON	0.33
T.41S.	R.13W.	26	H-3-1-26-4402	KENNETH R. ANDERSON	7.68
T.41S.	R.13W.	26	H-3-1-26-4403	KENNETH R. ANDERSON	25.12
T.41S.	R.13W.	26	H-307-A-1	CITY OF HURRICANE	0.01
T.41S.	R.13W.	26	H-307-A-2	CITY OF HURRICANE	0.01
T.41S.	R.13W.	26	H-307-B	CITY OF HURRICANE	3.64
T.41S.	R.13W.	26	H-307-C	CITY OF HURRICANE, CEMETERY	0.81
T.41S.	R.13W.	26	H-311-A	AMERICAN LEGION S. RUSSELL POST 100	3.54
T.41S.	R.13W.	26	H-311-B-23	GEORGE AND GERALDINE OWEN	0.18
T.41S.	R.13W.	26	H-311-C-1-A	ROY AND IRIS ROACH	7.06
T.41S.	R.13W.	26	H-311-C-1-C	ROLAND AND THELMA HALL	6.02
T.41S.	R.13W.	26	H-311-C-1-D	GEORGE AND VIRGINIA GUBLER	0.23
T.41S.	R.13W.	26	H-311-C-1-E	LARON AND LINDA HALL	0.50
T.41S.	R.13W.	26	H-311-C-1-F	ROBERT AND YOVONDA HALL	0.50
T.41S.	R.13W.	26	H-311-C-2	GEORGE AND GERALDINE OWENS	0.21
T.41S.	R.13W.	26	H-311-C-3	CITY OF HURRICANE	0.03
T.41S.	R.13W.	26	H-311-C-5	KEVIN JONES	3.96
T.41S.	R.13W.	26	H-316-A-1-A	JAMES BALLARD	1.58
T.41S.	R.13W.	26	H-317-A-1-A-1	JAMES BALLARD	0.30
T.41S.	R.13W.	26	H-318-A-1	STERLING RUSSELL	0.71
T.41S.	R.13W.	26	H-318-A-3	KENNETH AND WANDA STEVENS	1.90
T.41S.	R.13W.	26	LV-166-A-SA	UTAH POWER AND LIGHT COMPANY	20.79
T.41S.	R.13W.	26	LV-166-B	GORDON AND DONNA WOOD	0.22
T.41S.	R.13W.	26	LV-42-A-2-1	WAYNE AND AMELIA WILSON	0.03
T.41S.	R.13W.	26	LV-42-A-3	STERLING AND RANDI NELSON	2.42
T.41S.	R.13W.	26	LV-45-B	GORDON AND DONNA WOOD	0.19
T.41S.	R.13W.	26	LV-45-C	GORDON AND DONNA WOOD	1.07
T.41S.	R.13W.	26	RIVER VIEW 2	SUBDIVISION	7.77
T.41S.	R.13W.	26	RIVER VIEW 3	SUBDIVISION	1.19
T.41S.	R.13W.	26	RIVER VIEW ESTATES SUBDIVISION		2.25
T.41S.	R.13W.	26	RIVER VIEW ESTATES SUBDIVISION		2.05

Table 4.9. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.13W.	26	ROW	HIGHWAY/ROAD ROW	2.56
T.41S.	R.13W.	26	ROW	HIGHWAY/ROAD ROW	2.02
T.41S.	R.13W.	26	ROW	HIGHWAY/ROAD ROW	0.13
T.41S.	R.13W.	26	ROW	HIGHWAY/ROAD ROW	0.21
T.41S.	R.13W.	26	ROW	HIGHWAY/ROAD ROW	0.58
T.41S.	R.13W.	27	H-3-1-27-1201	MART LYNN & JANICE SANDERS	6.18
T.41S.	R.13W.	27	H-3-1-27-1202	RICHARD M. & ROSEMARY S. LEE	0.46
T.41S.	R.13W.	27	H-3-1-27-1203	WILLIAM D. & EVELYN S. WRIGHT	1.92
T.41S.	R.13W.	27	H-3-1-27-1204	MACK W. & BARBARA P. SANDERS TR	0.52
T.41S.	R.13W.	27	H-3-1-27-1402	KENNETH ANDERSON	7.73
T.41S.	R.13W.	27	H-3-1-27-2100	CALVIN & MONA LOWE	5.27
T.41S.	R.13W.	27	H-3-1-27-2101	G. DENNIS AND MARGARET BEATTY	0.50
T.41S.	R.13W.	27	H-3-1-27-2102	MACK AND BARBARA SANDERS,TRS	1.12
T.41S.	R.13W.	27	H-3-1-27-2103	LARRY AND SUSAN HUTCHINGS	1.27
T.41S.	R.13W.	27	H-3-1-27-2104	MACK AND BARBARA SANDERS, TRS	0.52
T.41S.	R.13W.	27	H-3-1-27-2202	CALVIN AND MONA LOWE	1.19
T.41S.	R.13W.	27	MUNICIPAL	MUNICIPAL	0.06
T.41S.	R.13W.	27	ROW	HIGHWAY/ROAD ROW	0.56
T.41S.	R.13W.	28	H-3-1-28-1201	AR SPILSBURY F.E.	32.26
T.41S.	R.13W.	28	H-3-1-28-1301	AR SPILSBURY F.E.	37.26
T.41S.	R.13W.	28	H-3-1-28-1401	AR SPILSBURY F.E.	31.02
T.41S.	R.13W.	28	H-3-1-28-2101	AR SPILSBURY F.E.	19.26
T.41S.	R.13W.	28	H-3-1-28-3101	AR SPILSBURY F.E.	17.13
T.41S.	R.13W.	28	H-3-1-28-3201	AR SPILSBURY F.E.	14.76
T.41S.	R.13W.	28	H-3-1-28-3301	AR SPILSBURY F.E.	36.64
T.41S.	R.13W.	28	H-3-1-28-3401	AR SPILSBURY F.E.	39.77
T.41S.	R.13W.	28	H-3-1-28-4101	AR SPILSBURY F.E.	14.43
T.41S.	R.13W.	28	H-3-1-28-4201	AR SPILSBURY F.E.	38.89
T.41S.	R.13W.	28	H-3-1-28-4301	AR SPILSBURY F.E.	39.20
T.41S.	R.13W.	29	H-3-1-29-211-DC-RD	CITY OF HURRICANE	14.95
T.41S.	R.13W.	29	H-3-1-29-211-DC-RD	CITY OF HURRICANE	4.79
T.41S.	R.13W.	33	COTTONWOOD ESTATES SUBDIVISION		7.99
T.41S.	R.13W.	33	H-3-1-33-1110	THOMAS AND CAROL COLEMERE	13.61
T.41S.	R.13W.	33	H-3-1-33-1111-SA	UTAH POWER AND LIGHT CO.	0.26
T.41S.	R.13W.	33	H-3-1-33-1121	GEORGE AND IRENE SHAMO	0.96
T.41S.	R.13W.	33	H-3-1-33-1121	GEORGE AND IRENE SHAMO	1.22
T.41S.	R.13W.	33	H-3-1-33-1130	RAYMOND DEE AND CHERYL ADAMS	0.59
T.41S.	R.13W.	33	H-3-1-33-11401	KENNETH ANDERSON	3.75
T.41S.	R.13W.	33	H-3-1-33-1142	GARY AND JANET BRATTON, TRS	5.58
T.41S.	R.13W.	33	H-3-1-33-1143	GARY AND JANET BRATTON, TRS	2.79
T.41S.	R.13W.	33	H-3-1-33-1210	GEORGE HARRY SHAMO	1.78
T.41S.	R.13W.	33	H-3-1-33-1211	GEORGE AND HELENE EDWARDS	0.18
T.41S.	R.13W.	33	H-3-1-33-1230	GEORGE HARRY SHAMO	2.93
T.41S.	R.13W.	33	H-3-1-33-12310	LOA MECHAM	3.92
T.41S.	R.13W.	33	H-3-1-33-1240	LOA MEACHAM	1.02
T.41S.	R.13W.	33	H-3-1-33-1244	LOA MECHAM	0.59
T.41S.	R.13W.	33	H-3-1-33-1320	DARWIN AND LARENE SLACK	5.58
T.41S.	R.13W.	33	H-3-1-33-1443	EULA YORK	2.94
T.41S.	R.13W.	33	H-3-1-33-2446	KENNETH ANDERSON	51.31

Table 4.9. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.13W.	33	H-3-1-33-2446	KENNETH ANDERSON	10.09
T.41S.	R.13W.	33	H-3-1-33-3141	CARLON & VERNA HINTON TRUSTEES	6.24
T.41S.	R.13W.	33	H-3-1-33-3142	CARLON AND VERNA HINTON, TRS	0.28
T.41S.	R.13W.	33	H-3-1-33-4221	CARLON AND VERNA HINTON	1.96
T.41S.	R.13W.	33	H-3-1-33-4223	HUGH AND CARMA RICHENS, TR	0.27
T.41S.	R.13W.	33	H-3-1-33-4224	HUGH AND CARMA RICHENS, TR	0.74
T.41S.	R.13W.	33	H-3-1-33-4225	GERRY G AND JO LIN ZOBRIST	0.44
T.41S.	R.13W.	33	H-3-1-33-44001	EARL AND LUCILE MURIE, TR	50.21
T.41S.	R.13W.	33	H-3-1-33-4440	VERNON DICKMAN	0.01
T.41S.	R.13W.	33	HURRICANE GARDEN 1 SUBDIVISION		21.81
T.41S.	R.13W.	33	MUNICIPAL	MUNICIPAL	0.30
T.41S.	R.13W.	33	MUNICIPAL	MUNICIPAL	0.28
T.41S.	R.13W.	33	ROW	HIGHWAY/ROAD ROW	1.01
T.41S.	R.13W.	33	ROW	HIGHWAY/ROAD ROW	0.13
T.41S.	R.13W.	34	H-3-1-34-1111	HALL RENTAL AND DEVELOPMENT INC.	0.57
T.41S.	R.13W.	34	H-3-1-34-11121	WASHINGTON COUNTY BOARD OF EDUCATION	23.29
T.41S.	R.13W.	34	H-3-1-34-11121	WASHINGTON COUNTY BOARD OF EDUCATION	0.04
T.41S.	R.13W.	34	H-3-1-34-1400	CALVIN AND MONA LOWE	44.24
T.41S.	R.13W.	34	H-3-1-34-3110	MARY HALL	0.05
T.41S.	R.13W.	34	H-3-1-34-3110	MARY HALL	0.05
T.41S.	R.13W.	34	H-3-1-34-3116	CARLON AND VERNA HINTON	0.06
T.41S.	R.13W.	34	H-3-1-34-3117	GORDON H. JR AND ARLENE CAMPBELL	0.30
T.41S.	R.13W.	34	H-3-1-34-3118	CLAIR HALL	0.36
T.41S.	R.13W.	34	H-3-1-34-3119	CLAYTON AND BARBARA STRATTON	0.33
T.41S.	R.13W.	34	H-3-1-34-3121	ABRAHAM AND JANET BURCIAGA	0.03
T.41S.	R.13W.	34	H-3-1-34-31401	CONRAD H. CAMPOS, TR	1.35
T.41S.	R.13W.	34	H-3-1-34-3410	WILLIAM AND NINA STRATTON, TRS	2.70
T.41S.	R.13W.	34	H-3-1-34-410	EMMA H. AND LYNDON BRADSHAW	22.58
T.41S.	R.13W.	34	H-3-1-34-4100	MILTON AND HELEN HALL	2.25
T.41S.	R.13W.	34	H-3-1-34-4111	HURRICANE CANAL CO	0.87
T.41S.	R.13W.	34	H-3-1-34-4200	BOYD CLARENCE AND DORIS HALL	70.69
T.41S.	R.13W.	34	H-3-1-34-4220	RONN MUNFORD	1.17
T.41S.	R.13W.	34	H-3-1-34-4230	STERLING AND RANDI NELSON	6.80
T.41S.	R.13W.	34	H-3-1-34-4315	LAWRENCE AND GERALDENE BAILEY	2.97
T.41S.	R.13W.	34	H-3-1-34-4316	STEVEN AND DOLORES SCOTT	0.16
T.41S.	R.13W.	34	H-3-1-34-4320	ELWIN DAVID AND RUTH DEMILLE, TRS	2.98
T.41S.	R.13W.	34	H-3-1-34-43401	LAWRENCE AND GERALDENE BAILEY	1.72
T.41S.	R.13W.	34	H-3-1-34-4341	INTERTROPIC INVESTORS INC.	2.36
T.41S.	R.13W.	34	H-3-1-34-4345	EDGAR C. JR. AND ETHELYN PETERSON	0.73
T.41S.	R.13W.	34	H-3-1-34-4346	LAWRENCE AND GERALDENE BAILEY	0.36
T.41S.	R.13W.	34	H-3-1-34-4347	EUGENE AND KRISTINE HUGHES, TRS	1.41
T.41S.	R.13W.	34	H-3-1-34-4400	STERLING AND RANDI NELSON	19.85
T.41S.	R.13W.	34	H-322	ALINE LAFORGE	0.65
T.41S.	R.13W.	34	H-324	RUTH RAGOZZINE	0.61
T.41S.	R.13W.	34	H-325	JOSEPH AND GEORGIA HOUSTON, TRS	1.28
T.41S.	R.13W.	34	H-326-A-1-N	SCHOLZEN INVESTMENT COMPANY	9.19
T.41S.	R.13W.	34	H-326-A-3	DANIEL IRVIN AND LAVON BARNEY, TRS	4.13
T.41S.	R.13W.	34	H-327-B	WILLIAM AND MARIDON CROSBY	0.15

Table 4.9. (Continued)

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.13W.	34	H-328-B	ROSE FRAZIER, TR	0.65
T.41S.	R.13W.	34	H-334-10	LDS CORPORATION OF PRES. OF CHURCH	0.44
T.41S.	R.13W.	34	H-334-11	WARD STRATTON, ET UX	0.09
T.41S.	R.13W.	34	H-334-12-A	JOHN WILLY & PEGGY JOAN ANDERSON, TRS	0.09
T.41S.	R.13W.	34	H-334-12-C	EARL H. AND LORRAINE WOOD	0.12
T.41S.	R.13W.	34	H-334-13	EDWARD LAKE, ET UX	0.12
T.41S.	R.13W.	34	H-334-14	CLINTON ISOM, ET UX	0.11
T.41S.	R.13W.	34	H-334-15	WILLIAM AND HELEN ISOM	0.13
T.41S.	R.13W.	34	H-334-16	DALMAR AND VERONICA ANGELL	0.13
T.41S.	R.13W.	34	H-334-17	DONALD LEE AND KLEA BEATTY	0.32
T.41S.	R.13W.	34	H-334-2	W.B. AND RUBY BANDLEY, TRS	0.40
T.41S.	R.13W.	34	H-334-3	WARD STRATTON AND LAUREL PRINCE	0.35
T.41S.	R.13W.	34	H-334-4	ROBERT AND BEVERLY HERRICK	0.40
T.41S.	R.13W.	34	H-334-5	LUNT MOTOR COMPANY	0.35
T.41S.	R.13W.	34	H-334-6	WASHINGTON COUNTY BOARD OF EDUCATION	0.42
T.41S.	R.13W.	34	H-334-7	FRANCE AND DOROTHY SPENDLOVE	0.42
T.41S.	R.13W.	34	H-334-8-A	DONALD LEE AND KLEA BEATTY	0.17
T.41S.	R.13W.	34	H-334-8-B-1	DONALD LEE AND KLEA BEATTY	0.31
T.41S.	R.13W.	34	H-334-9	DONALD LEE AND KLEA BEATTY	0.42
T.41S.	R.13W.	34	H-335-A	DONALD LEE AND KLEA BEATTY	0.34
T.41S.	R.13W.	34	H-335-B	EDWARD BOWLER	0.07
T.41S.	R.13W.	34	H-337	ANDREW AND ELLENE HYER	0.11
T.41S.	R.13W.	34	H-338-A-1-A	PHIL AND JUDY OLSEN	0.09
T.41S.	R.13W.	34	H-338-A-2	B.C. AND MARGARET CHAUDHURI	0.00
T.41S.	R.13W.	34	H-347-A-1	WASHINGTON COUNTY BOARD OF EDUCATION	0.09
T.41S.	R.13W.	34	H-347-B-2	DEAN WARRICK	0.00
T.41S.	R.13W.	34	H-375-A	HALL RENTAL AND DEVELOPMENT INC.	1.18
T.41S.	R.13W.	34	MUNICIPAL	MUNICIPAL	0.48
T.41S.	R.13W.	34	ROW	HIGHWAY/ROAD ROW	2.14
T.41S.	R.13W.	34	ROW	HIGHWAY/ROAD ROW	0.27
T.41S.	R.13W.	34	ROW	HIGHWAY/ROAD ROW	0.91
T.41S.	R.13W.	35	H-351-A-N	ELWIN DAVID AND RUTH DEMILLE, TRS	48.35
T.41S.	R.13W.	35	H-352-N	WAYNE KENT WILSON	57.81
T.41S.	R.13W.	35	NONE-01	HURRICANE CANAL CO.	0.79
T.41S.	R.13W.	36	STATE	STATE OF UTAH	31.34
T.42S	R.13W.	01	3313-A-NP	DELL STANWORTH TRELAL	223.43
T.42S	R.13W.	02	STATE	STATE OF UTAH	22.50

4.3.8 Springdale Take Area

Desert tortoises are known to occur in the Springdale area immediately adjacent to Zion National Park in an area of approximately 159 acres of private land. This take area is presented in Figure 4.9. and land ownership and legal information are presented in Table 4.10. It is suspected that desert tortoises here were introduced and were not native to the area. This small parcel has been designated a take area due to its proximity to urban development and its isolation from the main desert tortoise population in the County.

Table 4.10. Parcel Information for Springdale Take Area.

Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.10W.	29	ROW	HIGHWAY/ROAD ROW	1.96
T.41S.	R.10W.	29	S-128-A-NP	UTAH BOARD OF EDUCATION	54.98
T.41S.	R.10W.	29	S-128-B-NP	TOWN OF SPRINGDALE	11.67
T.41S.	R.10W.	29	S-13-B	OSCAR AND FRANCES JOHNSON	0.73
T.41S.	R.10W.	29	S-13-C	J & J AUTOMOTIVE ENTERPRISES	0.23
T.41S.	R.10W.	29	S-13-D	OSCAR AND DENNIS JOHNSON	0.76
T.41S.	R.10W.	29	S-14-A	PATRICIA MOORE	0.51
T.41S.	R.10W.	29	S-14-B-1	JANICE LEE PARKER	<0.01
T.41S.	R.10W.	29	S-160-A-1	GALE AND BARBARA GIFFORD, TRS	23.18
T.41S.	R.10W.	29	S-160-A-2-SA	UTAH POWER AND LIGHT COMPANY	0.05
T.41S.	R.10W.	29	S-160-A-3	HELEN WINDER	0.28
T.41S.	R.10W.	29	S-160-B	TOWN OF SPRINGDALE	1.14
T.41S.	R.10W.	29	S-160-NP	TOWN OF SPRINGDALE	36.94
T.41S.	R.10W.	29	S-21-A-SA	MOUNTAIN STATES TELEGRAPH & TELEPHONE	0.19
T.41S.	R.10W.	29	S-21-B	ROBERT AND VIOLET RALSTON	2.09
T.41S.	R.10W.	29	S-21-C	ROBERT AND VIOLET RALSTON	0.34
T.41S.	R.10W.	29	S-21-D	RICHARD AND MICHELLE O'TOOLE	0.11
T.41S.	R.10W.	29	S-22	RICHARD AND MICHELLE O'TOOLE	0.14
T.41S.	R.10W.	29	S-23-A-1	ALFRED AND MARY BENNETT	0.11
T.41S.	R.10W.	29	S-23-A-2	JOHN AND MARLENE FARRAND	0.72
T.41S.	R.10W.	29	S-23-B	DALE AND KATHLEEN WILKERSON	0.06
T.41S.	R.10W.	29	S-26-A	DALE & KATHLEEN WILKERSON	0.47
T.41S.	R.10W.	29	S-29-B	RICHARD AND JACQUE BELL	0.20
T.41S.	R.10W.	29	S-30-A	ROBERT MCMAHON	0.50
T.41S.	R.10W.	29	S-30-D	ROBERT JOHN MCMAHON	0.46
T.41S.	R.10W.	29	S-31-B	EULA BRUCE, TR	0.53
T.41S.	R.10W.	29	S-32-A	JULIUS AND MAVIS MADSEN	0.32
T.41S.	R.10W.	29	S-32-B	EDWIN AND ZETTA PETERSON	0.30
T.41S.	R.10W.	29	S-35	LANCE AND KIRK GIFFORD	0.02
T.41S.	R.10W.	29	S-42-A-1	STEPHEN AND ROSALIND ROTH	0.01
T.41S.	R.10W.	29	S-42-B	DEWITT JONES III	0.27
T.41S.	R.10W.	29	S-44	GERALD AND HELEN PLAYER, TRS	0.56
T.41S.	R.10W.	29	S-45	FRANK AND CAROL ZMUDA	0.37
T.41S.	R.10W.	29	S-46	FRANK, CAROL & MONTY ZMUDA	1.51
T.41S.	R.10W.	29	S-47-A	NORENE AND MINOR YEAGLEY	0.20
T.41S.	R.10W.	29	S-48	DEWITT JONES III	0.38
T.41S.	R.10W.	29	S-49	CRAIG CROCKETT	0.19

Table 4.10. (Continued)

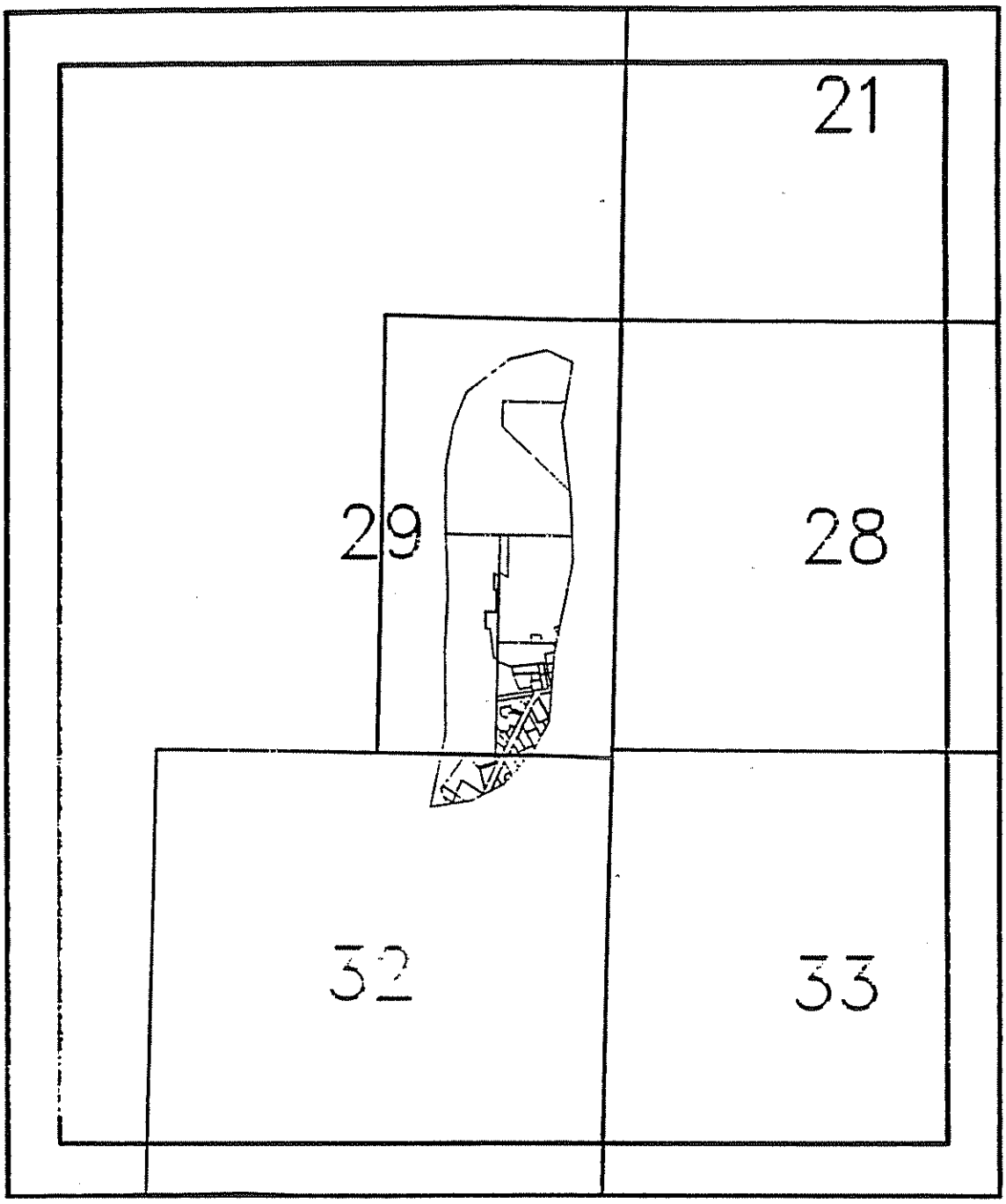
Township	Range	Section	Parcel #	Owner	Acres
T.41S.	R.10W.	29	S-53	GRACE TANNER FIRM	0.29
T.41S.	R.10W.	29	S-54	J & J AUTOMOTIVE ENTERPRISES	0.35
T.41S.	R.10W.	29	S-55	JOHN AND WINIFRED LEES	0.28
T.41S.	R.10W.	29	S-56	JERALD AND LAWANA HATCH	0.20
T.41S.	R.10W.	29	S-57-A	DAVID AND TOVY FERBER	0.13
T.41S.	R.10W.	29	S-58-B	ELMER L. HIGLEY & DELLA CRAWFORD,TR	0.17
T.41S.	R.10W.	29	S-60	WASHINGTON CO. BOARD OF EDUCATION	0.01
T.41S.	R.10W.	29	WINDERLAND 1-A SUBDIVISION		3.88
T.41S.	R.10W.	32	ROW	HIGHWAY/ROAD ROW	0.89
T.41S.	R.10W.	32	S-161-A-1-A	OTHELL GIFFORD	2.52
T.41S.	R.10W.	32	S-169	DENNIS AND PEARL ANN JOHNSON	0.11
T.41S.	R.10W.	32	S-29-B	RICHARD AND JACQUE BELL	0.27
T.41S.	R.10W.	32	S-32-A	JULIUS AND MAVIS MADSEN	0.12
T.41S.	R.10W.	32	S-35	LANCE AND KIRK GIFFORD	0.53
T.41S.	R.10W.	32	S-38	ZION PARK RESORT LTD. PARTNERSHIP	0.19
T.41S.	R.10W.	32	S-40-A	ZION PARK RESORT LTD. PARTNERSHIP	0.47
T.41S.	R.10W.	32	S-40-B	TOWN OF SPRINGDALE	0.11
T.41S.	R.10W.	32	S-42-A-1	STEPHEN AND ROSALIND ROTH	0.06
T.41S.	R.10W.	32	S-42-B	DEWITT JONES III	0.02
T.41S.	R.10W.	32	S-87	ZION PARK RESORT LTD. PARTNERSHIP	0.58
T.41S.	R.10W.	32	S-89-A-1	PATSY WARNER	2.75
T.41S.	R.10W.	32	S-89-A-2	STEVEN SANDSTROM	0.41
T.41S.	R.10W.	32	S-89-A-4	BIT AND SPUR ASSOCIATES INC.	0.21
T.41S.	R.10W.	32	S-89-A-5	HARRIET BLAS	1.04
T.41S.	R.10W.	32	S-89-B	BIT AND SPUR ASSOCIATES INC.	0.09
T.41S.	R.10W.	32	S-90	STEPHEN AND ROSALIND ROTH	0.77

4.3.9 Bloomington Hill Take Area

The Bloomington Hill take area is presented in Figure 4.10, and land ownership information is presented in Table 4.11. It consists of approximately 106 acres of State School Trust lands southwest of St. George. It is designated for incidental take due to its isolation.

Table 4.11. Parcel Information for Bloomington Hill Take Area.

Township	Range	Section	Parcel #	Owner	Acres
T.43S.	R.16W.	10	STATE	STATE OF UTAH	105.26



Private

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Figure 4.9. Springdale Take Area

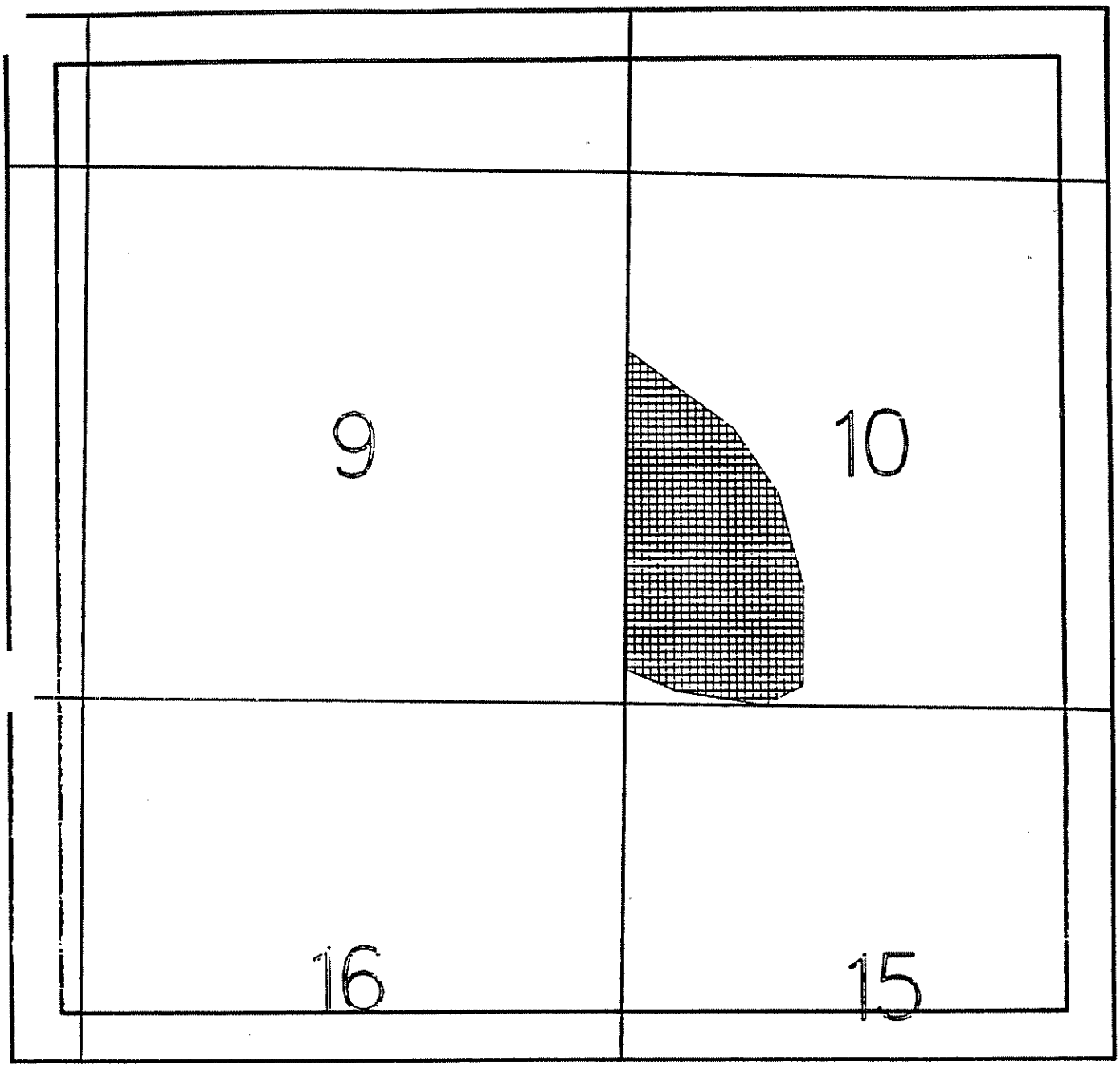


Figure 4.10. Bloomington Hill Take Area

4.3.10 South Hurricane Cliffs Take Area

The South Hurricane Cliffs take area is presented in Figure 4.11, and land ownership information is presented in Table 4.12. It consists of approximately 87 acres of State School Trust lands southeast of St. George. It is designated for incidental take due to its isolation.

Table 4.12. Parcel Information for South Hurricane Cliffs Area.

Township	Range	Section	Parcel #	Owner	Acres
T.43S.	R.13W.	16	STATE	STATE OF UTAH	86.83

4.4 SUBDIVISION POLICY

There are numerous subdivisions within the designated take areas. These subdivisions are in various phases of development. Once the Section 10(a)(1)(B) permit is issued, the HCP biologist will conduct field reconnaissance of all subdivisions to determine habitat suitability. This will be done prior to notifying all landowners of the permit requirements in the incidental take areas. For those subdivisions which do not contain desert tortoise habitat, they will be brought to the attention of the HCAC for potential removal from designated habitat. For subdivisions which are in desert tortoise habitat, name and addresses of affected lot owners will be obtained and landowners notified of the permit requirements.

4.5 POTENTIAL HABITAT AREAS

Current USFWS desert tortoise survey protocol requires desert tortoise surveys in all areas of Washington County below 4,000 feet in elevation. For this HCP, extensive surveys were conducted throughout Washington County in order to identify all portions of the County which may be Mojave desert tortoise habitat. However, due to the large size of the County and the inability for the HCP to afford 100 percent survey coverage, it is possible that population pockets or individuals may reside in areas that have not been designated as desert tortoise habitat on the maps created for this HCP. The County, based on the advice of its TAC Committee, has designated potential habitat areas (see Figure 4.12) in which desert tortoises may exist by virtue of the habitat characteristics but which are thought not to have desert tortoises.

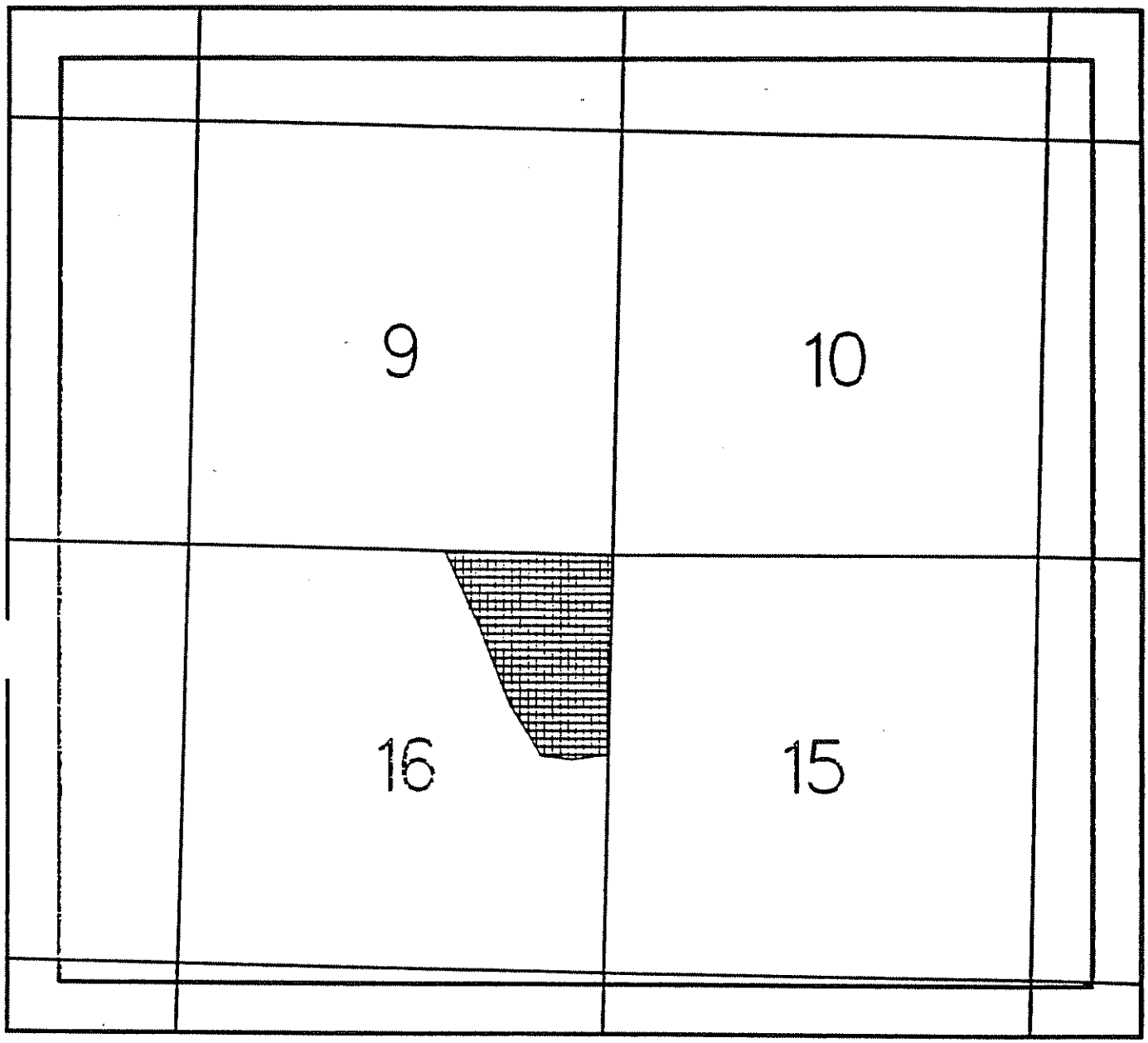


Figure 4.11. South Hurricane Cliffs Take Area

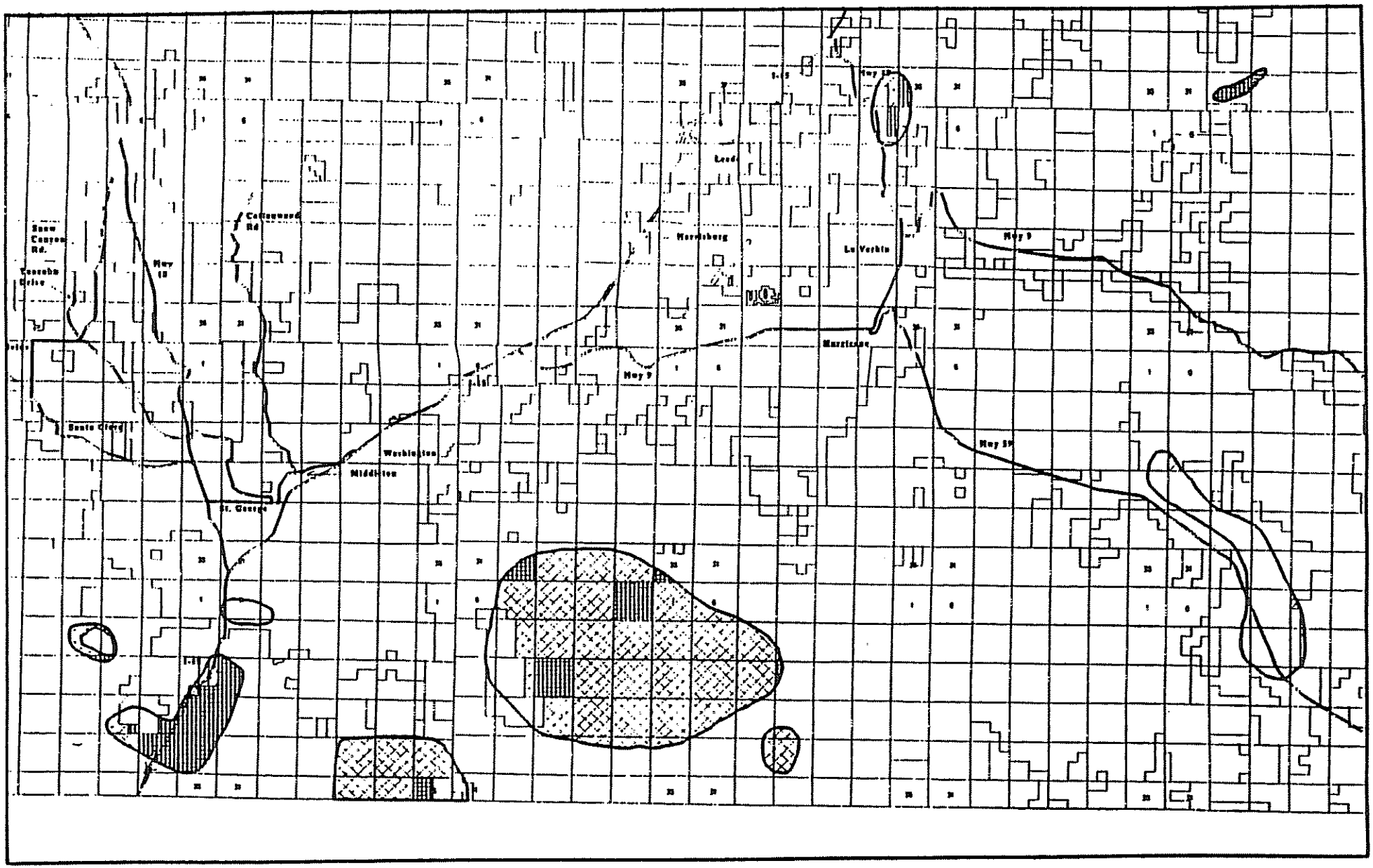


Figure 4.. *Potential Habitat Areas*

Areas of potential habitat and their associated boundaries are identified in Figure 4.12. It is possible that isolated desert tortoises could be found inside and outside these potential areas and elsewhere in the County. The USFWS has accordingly recognized that the County's take permit is county-wide outside of the proposed reserve except such areas included in cities that have not signed the HCP/Impact Fee Ordinance. The amount of potential habitat area included in this category is 31,282 acres, of which 4,803 acres are State School Trust lands, 19,380 are BLM lands, 7,029 acres are private lands, and 70 acres are in Zion National Park. Many of these areas are not likely to be developed. Landowners wishing to develop or change the use of lands in these areas will have to consult with the HCP administrator, who shall determine if further survey and removal is necessary. However, if desert tortoises are present, and they need to be removed, these potential habitat areas will not count against incremental take acreage, but the removed animals will count against the incidental take total of the permit. A list of landowners and addresses has not been completed at this time.

CHAPTER 5.0
MEASURES TO MINIMIZE AND MITIGATE INCIDENTAL TAKE

5.1 INTRODUCTION

This chapter details measures to minimize and mitigate the incidental take proposed in this HCP. Methods to minimize incidental take include fencing, law enforcement, education, and translocation. Methods to mitigate incidental take include acquisition, management, and monitoring of a tortoise reserve, and acquisition of grazing permits. Monitoring of incidental take is discussed in Chapter 6.

5.2 MINIMIZE INCIDENTAL TAKE

Incidental take has been minimized through the design of the largest reserve practicable for the Mojave desert tortoise, thus minimizing the amount of incidental take. Other methods to minimize incidental take include fencing, law enforcement, education, and translocation.

5.2.1 Fencing

The primary objective of fencing boundaries of the reserve is to reduce desert tortoise mortality, which can result from adverse human impacts, diseased desert tortoises from outside of the reserve infecting desert tortoises within the reserve, and desert tortoises leaving the reserve and being killed. Adverse human impacts that can be reduced or eliminated by fencing include indiscriminate garbage dumping, the establishment of additional unimproved roadways, damage caused by OHV use, and predation by dogs. Fencing also mitigates take by allowing impacted areas to revegetate and heal naturally, thus enhancing desert tortoise habitat.

Fencing, an important component of the mitigation program, is estimated to cost $2,000,000. Of this total, it is estimated that the portion of the fencing program attributable to the HCP is $500,000, with the remainder attributable to developers adjacent to the reserve and the Utah Department of Transportation/Federal Highway Administration, and possibly to the Five County Association of Governments through grant acquisition. The fencing plan is presented in Figure 5.1 and consists of constructing approximately 70 miles of three types of fence along roadways, reserve boundaries, and plant reserves. The final design of each of these three fence types will be reviewed by the HCAC and approved by the Washington County Commission. Fence construction will be reported by the HCP administrator in quarterly and annual reports, as detailed in Chapter 6.

The first fence type is a barrier which keeps human activities and pets out and keeps desert tortoises in. Approximately 26.2 miles of this type will be installed in the following areas where geographic features are not adequate barriers:

- Ivins through Padre Canyon to Snow Canyon Road, on the southern reserve line.
- Paradise Canyon: both northern and southern reserve lines.

- Winchester Hills: southern and eastern portions, where cliffs would not prevent incursion into the reserve from the west by humans and pets.
- Middleton to the North Washington reserve line.
- North Washington reserve line.
- Eastern boundary at property line west of Red Cliffs Road.

The second fence type would be a desert tortoise-proof fence, which would be constructed along 18.9 miles in the following areas, again in areas where geographic features are not adequate:

- Reserve Boundary from Snow Canyon Road to Paradise Canyon.
- Skyline Drive (both sides).
- Utah Highway 18 (both sides).
- West side of Interstate 15.

The third fence type would be a range fence to protect endangered plant areas, totaling 26.1 miles.

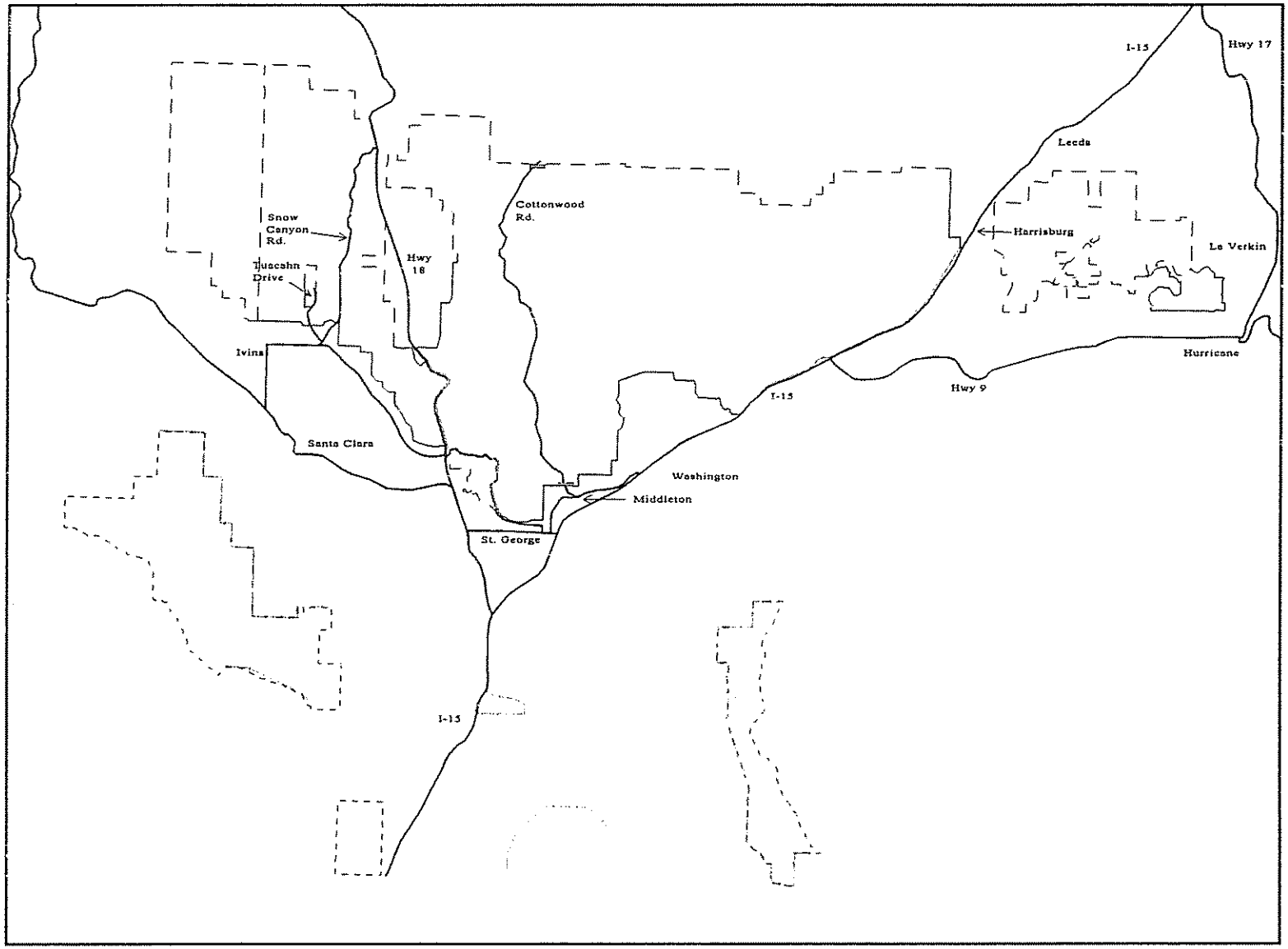
In addition to fencing, vehicle barriers are proposed for the following locations (these are not shown on Figure 5.1).

- Gate to remain on dirt road off Snow Canyon Road (above the Tuacahn Road) for utilities access.
- Gate roads off Skyline Drive, east of I-18, which provide utility access.
- Gate two utility access roads off the north end of the North Washington reserve line.
- Gate road off Interstate 15, heading west, about 1.5 miles south of the Red Cliffs Road.
- Cottonwood Road will either be gated where it crosses the northern and southern boundary of the reserve, or it will be fenced.

5.2.2 Law Enforcement

Law enforcement can help protect the desert tortoise from adverse impacts and is recognized as a very important mitigation measure. Habitat may be degraded and desert tortoises harmed or killed by OHV use, free-roaming (or unleashed) domestic dogs, and hiking, camping, shooting and other unpermitted uses. Effective law enforcement can help prevent these kinds of impacts.

The law enforcement responsibilities discussed above are split between two agencies: the UDWR and the BLM. The UDWR has primary responsibility for enforcing wildlife laws in the State of Utah (as well as overseeing auditing clearance under the HCP), while the BLM is a land management agency which has been granted law enforcement authority by Congress. The HCP proposes to provide for two full-time law enforcement agents, one for each agency, to enforce Federal, State, and local regulations within the proposed desert tortoise and plant reserves. The funding level for each agency is $65,000 per year, for a combined total over five years of $650,000. It is anticipated that after five years a National Conservation Area (NCA) will be established for the reserve and law enforcement funding will be available to the BLM.



Human, Pet, and Desert Tortoise Fence
Desert Tortoise Fence
Vehicle Barrier
Plant Protective Fence
DWMA Boundary
Plant Preserve Boundary
Roads

10/02/95

Figure 5.1. Fencing Plan

Assuming Congress enacts legislation establishing the proposed NCA, the BLM may enter into a cooperative agreement with UDWR to provide law enforcement for the NCA. In the event that the NCA is not established within five years, the County and UDWR will provide the requisite law enforcement for as long as such enforcement is required by the terms of the permit. The County's assistance will be in the form of existing law enforcement resources (i.e,. sheriff's office) and by cross-training the HCP administrator and his staff to handle enforcement duties. The Section 10(a) permit shall not be jeopardized by these actions. Law enforcement reports will be provided by BLM and UDWR to the HCP administrator for inclusion in quarterly and annual reports.

5.2.3 Education

Education is an important component of the HCP program. An education committee has been established to work on developing an environmental education center in the County. The mission statement of the education committee is "to foster cooperation between the education community; local, State and Federal governments; and private interests with respect to the establishment of a nature education center. The center would provide opportunity for people of all ages and backgrounds to gain a greater understanding of the unique and varied ecosystems found in Washington County."

At this stage, numerous ideas are being considered and different alliances with other organizations and other funding sources are being explored. The preferred site for the nature center is Paradise Canyon. The HCP has committed $500,000 over the permit period towards this effort, and progress will be reported in quarterly and annual reports by the HCP administrator. The County will also prepare an education plan specific to the HCP.

5.2.4 Translocation

5.2.4.1 Five-year Translocation Research Experiment

Translocation of taken desert tortoises is considered a critical aspect in implementing the HCP. To date, the translocation of "taken" desert tortoises in other regions of the Mojave Desert has met with limited success. To further the scientific knowledge of translocation and in an effort to provide the greatest opportunity possible for the survival of taken animals, the USFWS has agreed to fund a five-year translocation study in Washington County (estimated to cost $750,000). Animals to be used in the translocation study will come from Washington County, Utah only. The County and USFWS will cooperate with the principal investigator in identifying possible translocation sites, research design, animal care and facility needed for the five-year research period. Translocation site selection will be mutually agreed upon by USFWS, the principal investigator, BLM, UDWR, and the County, based on the best scientific information available. It is anticipated that the research needed for translocated animals will be accommodated through the clearing program developed for the County's "incidental take" permit. Specifically, the County will be responsible for surveying desert tortoise habitat, removing individuals, and temporary care of desert tortoises. Washington County's responsibility for taken desert tortoises to be used in this translocation research will cease once

they are turned over to USFWS's designated agent in Washington County. However, if cleared animals run in excess of research needs, the County will translocate desert tortoises in a manner determined after consultation with USFWS and UDWR. Released desert tortoises will not be the responsibility of the County. USFWS understands the County will use its best efforts to preserve the life of "taken" desert tortoises but that the County is not responsible for the ultimate disposition of these "taken" individuals.

5.2.4.2 Translocation other than Five-Year Research Experiment

The HCP has established a fund of $1,000 per month to handle temporary desert tortoise care for the entire 20-year HCP period, for a total budget of $240,000. This care would include a facility for temporarily holding animals cleared from take areas as needed. For cost-effective reasons, the County agrees with the USFWS that it would be useful if such a facility, if possible, also served research needs. Should the translocation study prove successful, then a translocation program will likely be instituted for the remainder of the permit period to be funded by the HCP and other sources (which might necessitate a reallocation of the HCP budget). UDWR is expected to receive a permit from the USFWS to facilitate the removal and relocation of tortoises in conjunction with the County. Translocation efforts will be reported by the USFWS and/or the principal investigator to the HCP administrator for inclusion in quarterly entities, the development of a translocation/holding facility in conjunction with the development of the desert wildlife education center. Several possible sites have been identified that could serve as both a holding facility and education center. Such a facility would provide educational opportunities for the citizens of Washington County and protection for several of the sensitive desert species in addition to the desert tortoise.

5.3 MITIGATE INCIDENTAL TAKE

The primary mitigation for the proposed level of incidental take will be the acquisition and management of a reserve encompassing 38,787 acres of desert tortoise habitat and an additional 22,254 acres. This section details how this reserve will be acquired, managed, and monitored. It will also discuss the acquisition of grazing permits.

5.3.1 Reserve Acquisition

The objective of the reserve acquisition program is to consolidate desert tortoise habitat into public ownership and management. Acquisition of private, municipal, and State School Trust lands within the proposed reserve will be accomplished through land exchange and purchase. These programs are considered the most important and expensive mitigation provided for the protection of the desert tortoise, and their implementation will be a key assignment of the HCP administrator. An exchange budget has been created with $500,000 to pay for appraisals, inventories, title work, legal consultation, and other necessary expenses.

5.3.2 Reserve Management

Figure 3.1 presents the boundaries of the proposed reserve. The Steering Committee has sought and obtained the support of the Utah State BLM as well as the Congressional delegation for designating the reserve an NCA to be managed by the BLM. This designation is important as it allows both management funding and enhanced opportunities to receive L&WCF monies for the purchase of additional lands within the boundaries.

Until such time as an NCA designation is obtained and additional Federal monies are allocated for its management, the BLM will manage the reserve to benefit the Mojave desert tortoise in perpetuity. It is anticipated that a management plan will be completed by BLM within two years following permit issuance. The HCP will provide interim funding to the BLM for reserve management in ten semi-annual installments of $25,000, for a total of $250,000 over five years. It is anticipated that private and State School Trust lands within Zone 2 will be acquired by the BLM, but it is the intent of the State, County, and cities that Zone 2 be managed as part of Snow Canyon State Park, and it is anticipated that the exchange legislation will fulfill this intent. UDNR will have the responsibility to develop a desert tortoise management plan for the entire Park, also within two years of permit issuance. The HCP will provide $50,000 to UDNR to assist in management efforts. In all, the HCP will provide $300,000 to land management agencies for desert tortoise reserve management. Management efforts will be reported by the respective agencies (Town of Ivins, BLM, and UDNR) in quarterly and annual reports.

The BLM will take the necessary steps to accomplish the withdrawal of the lands from mineral location. Such withdrawal will bar the location of new mining claims but will not affect valid existing rights.

It is acknowledged that no mitigation credit will be attributed to this HCP for establishment of an NCA. Mitigation credit will be granted for lands within the NCA once the lands are acquired and uses incompatible with the purposes of the NCA are eliminated. Further, since no mitigation credit will be allowed for its establishment, issuance of the incidental take permit and implementation of the provisions of this HCP will not be delayed until such time as the NCA is officially designated.

5.3.3 Reserve Monitoring

An ongoing study will be funded throughout the permit period to monitor the status of the desert tortoise population. A monitoring plan will be developed by UDWR in consultation with the USFWS and the Recovery Team. Reserve monitoring of desert tortoises will emphasize research aimed at understanding whether the population is increasing or declining and the causal factors for the identified trend. This can include surveys, demographic information, the determination of reproductive success, etc. The HCP will provide funding in the amount of $1,000,000 during the permit period to help fund monitoring efforts. The UDWR is expected to spend approximately $250,000, which includes Section 6 funding, over the next 20 years for desert tortoise monitoring. They have agreed to combine these funds with the HCP monitoring budget to create a fund of $1,250,000 over the life of the permit period.

5.3.4 Grazing Permit Acquisition

The objective of acquiring grazing permits is to eliminate any potential adverse impact from grazing on the Mojave desert tortoise. BLM has been consulting with the USFWS since 1990 on grazing in desert tortoise habitat. Figure 5.2 presents all of the grazing allotments that extend into the proposed reserve. Portions of allotments that extend into Zone 3 will be purchased. Grazing allotments that extend into Zones 1 and 2 do not include desert tortoise habitat and will not be purchased. There are no federal grazing allotments in Zone 5, and grazing allotments within Zone 4 are not identified for purchase by the County. Table 5.1 presents information on grazing allotments on public and State trust lands in the reserve. Acquisition costs are estimated at approximately $75.00/AUM, with a total estimated cost of approximately $175,000. It is believed that most of the grazing permittees listed in Table 5.1 are willing sellers; however, no permits will be purchased unless a "willing seller–willing buyer" arrangement exists.

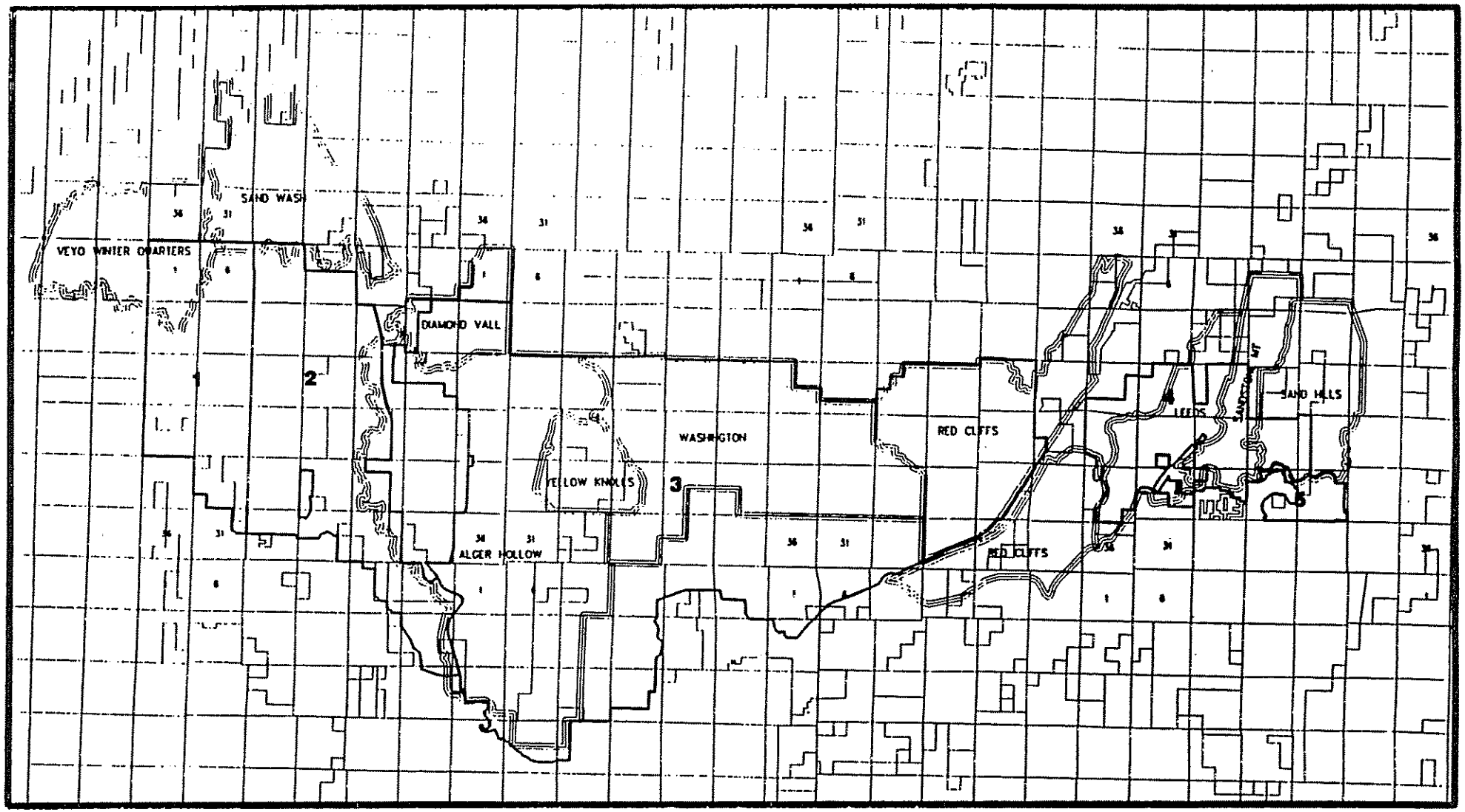
Table 5.1. Grazing Allotments to be Acquired.

Name	Total Acreage	Acreage Within Reserve Boundaries	Federal AUM's	State AUM's
Alger Hollow	16,878	12,700	741	124
Yellow Knolls	2,053	1,863	16	0
Washington	20,563	10,143	256	870
Red Cliffs	19,022	5,325	425	0

Once these grazing permits have been acquired, annual non-use will be applied for according to BLM requirements. The BLM will authorize non-use for conservation and protection purposes for grazing privileges in the identified habitat areas. Grazing will not be permitted during the non-use period on acquired allotments until a definitive study of livestock/desert tortoise interrelationships has been completed, which demonstrates that livestock grazing is consistent with reserve management objectives.

5.4 PROGRAMS FOR OTHER THREATENED AND ENDANGERED SPECIES IN WASHINGTON COUNTY

The HCP has allocated $1,950,000 for other species enhancement. Within one year of permit issuance, the Technical Committee will draft an "Other Species" plan for review by the HCAC, which will outline a broad range of possible programs, however individual efforts will be identified within the annual work plans. One high priority program described below is for protection of several areas which contain one or both of the endangered plants considered in this HCP. A preliminary program for fencing has been presented in the fencing map (Figure 5.1), and it is anticipated that HCP law enforcement personnel will conduct regular patrols and the HCP will help facilitate land acquisitions. It should be noted that these plant reserves would be managed by BLM, and therefore their designation and management would



Grazing Allotment Boundary

Proposed DWMA Boundary

Figure 5.2. Grazing Allotment Boundaries Within the Proposed Preserve **10/02/95**

be subject to Section 7, NEPA, and evaluation and approval through BLM's resource management planning process. At this time, the following management prescriptions are recommended:

- Use of existing roadways and utilities would be allowed to continue.
- No OHV vehicles; non-motorized bikes may be allowed in designated areas.
- No organized or competitive sporting or recreational events should be allowed.
- Non-consumptive, recreational uses should be allowed.
- BLM would request mineral withdrawal for these areas.
- BLM would manage these areas as Oil and Gas Category 3.
- The areas would be closed to mineral material sales.
- Utilities and other rights-of-way would be allowed based upon affirmative Section 7 consultations.
- Impacts from livestock grazing on T&E plants would be evaluated through monitoring studies, and management prescriptions would be applied as appropriate.
- Approximately 26.1 miles of proposed fencing to be constructed by the HCP may result in adverse impacts to livestock grazing. These activities will be conducted consistent with BLM regulations.
- Research would be allowed which is compatible with the protection of T&E plants.
- The areas would be closed to vegetation sales.
- Hunting would be allowed only during regulated seasons.

CHAPTER 6.0
PERMIT ADMINISTRATION

6.1 OVERVIEW OF PERMIT ADMINISTRATION

The Washington County Habitat Conservation Plan (HCP) will be administered by the Washington County Commission (Commission). The Commission has selected an HCP administrator who would be responsible to implement the Plan under the terms of the Section 10(a)(1)(B) permit. The administrator will work with a Habitat Conservation Advisory Committee (HCAC) and be assisted by a full-time County biologist and a Technical Committee (TC). Monies will be collected county-wide and disbursed by the HCP administrator according to an annual work plan to implement this HCP.

6.2 ROLE OF HCP PERSONNEL AND COMMITTEES

6.2.1 HCP Administrator

The HCP administrator is a Washington County employee in charge of a new County department. He will review all endangered species issues relevant to the Washington County HCP and make recommendations on how to proceed to the Commission. While the HCP administrator will be directly supervised by a Commission member, he will work closely with the HCAC, and all recommendations made and significant actions taken by the HCP administrator must be reviewed by the HCAC. The HCP administrator will also supervise a full-time biologist and serve as the County's liaison between the public and all entities concerned with implementation of the HCP. An organizational chart depicting the information flow between the various individuals, agencies, and commissions is presented in Figure 6.1.

On an annual basis, the HCP administrator will prepare an annual work plan and a report detailing how well the previous year's work plan was accomplished. The annual work plan is discussed in greater detail later in this chapter.

On a day-to-day basis, the HCP administrator will process applications for incidental take; direct the activities of the HCP biologist; meet regularly with the HCAC; facilitate the acquisition of grazing permits; facilitate the acquisition of private and State lands into the reserve; coordinate with the HCP law enforcement personnel; oversee the monitoring of the reserve; and supervise the expenditures for other mitigation measures, such as fencing, in keeping with all local, State, and Federal laws.

The HCP administrator is funded for the entire 20-year permit period, at a rate of $54,000 per year, for a total funding amount of $1,080,000. At a fringe rate of approximately 35 percent, this would allow for an annual salary of $40,000. Office, travel, and secretarial support is funded at a level of $20,000 per year, for a total of $400,000 over the permit period.

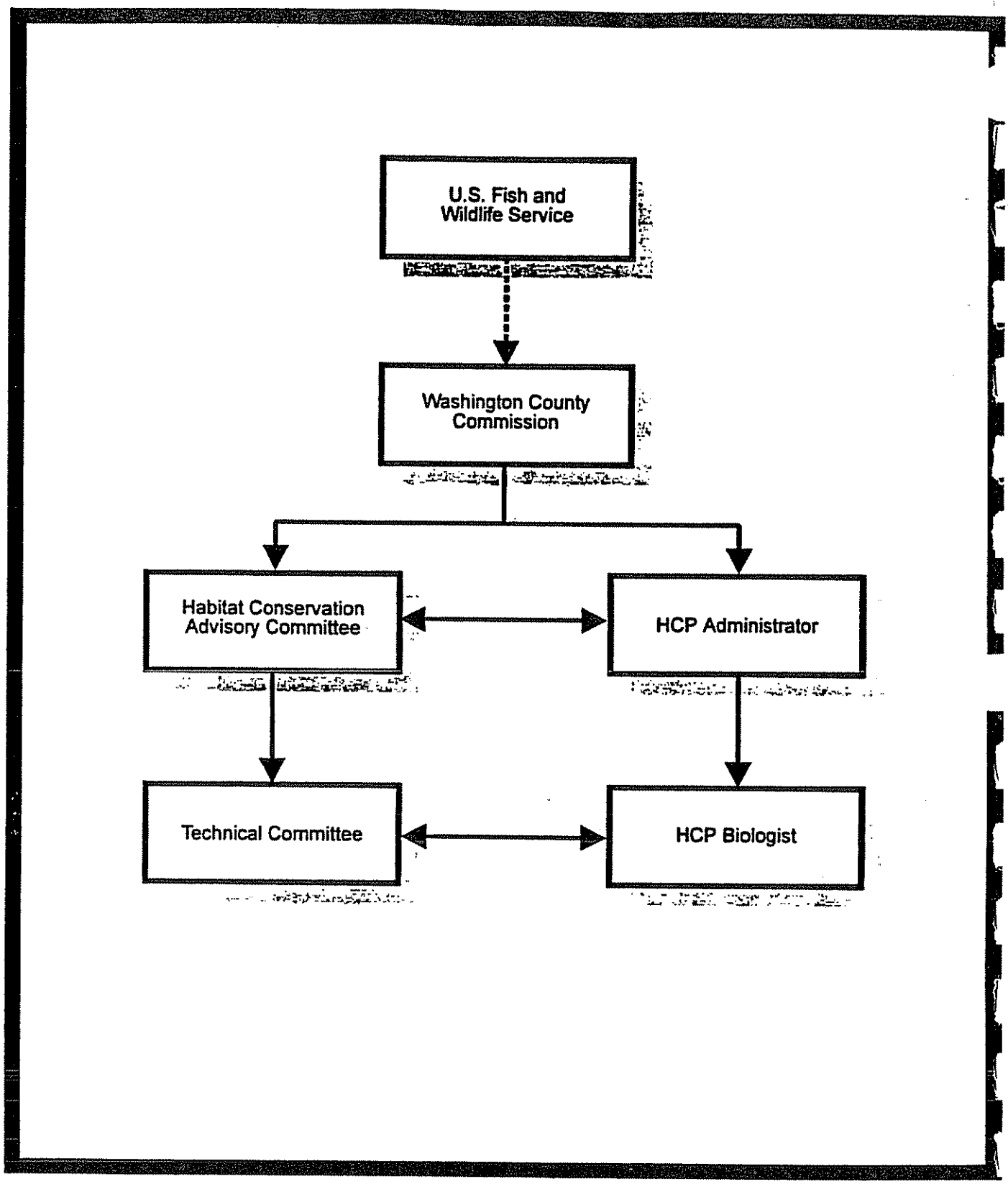


Figure 6.1. HCP Information Cross Flow

6.2.2 HCP Biologist

The HCP biologist will be a full-time position with the following responsibilities:

- Conduct desert tortoise surveys and removals, intensively during a four-month period and occasionally during the other eight months of the year.
- Coordinate the activities of the Technical Committee.
- Assist the HCP administrator on an as-needed basis, including preparation of the annual work plan items specific to desert tortoise recovery. The annual work plan should include the development of protection and recovery activities for other Federally listed, candidate, and State sensitive species.
- Monitor the incidental take permit activities and produce quarterly reports on the quantity and location of incidental take.
- Document and report illegal activities to law enforcement personnel.
- Develop a working relationship with UDWR and Federal agencies regarding conservation planning for Washington County.
- Attend and participate in appropriate professional conferences and workshops.

The HCP biologist has been funded at an annual rate of $38,000 per year, which should allow for an annual salary of approximately $28,500 per year, for a total of $760,000 over the permit period. Travel, office, and secretarial support are included in the $20,000 annual budget discussed under the HCP administrator duties above.

6.2.3 Habitat Conservation Advisory Committee (HCAC)

The HCAC would oversee the administration of the HCP and would serve in an advisory capacity to the Commission regarding county-wide threatened, endangered, and candidate species matters. When necessary, the HCAC will function as interpreters of the HCP document and, as such, give direction to the HCP administrator (subject to the final review of the Commission). They will direct the activities of the administrator and review and approve the annual work plan and quarterly and annual reports on the quantity of take and mitigation implemented prior to submission of the documents to the County Commission. All deficiencies in the reports identified by the HCAC will be corrected or completed by the HCP administrator. The HCAC will also oversee the expenditure of mitigation monies, review and make recommendations regarding the appropriateness of proposed amendments to the HCP, and provide problem-solving and advice to the HCP administrator.

The HCAC will include representation from the UDNR, BLM, USFWS, an environmental organization (representative designated by the Commission), local government (designated

by the Washington County Mayors' Association), local development (designated by the Commission), and a citizen at large (selected from the largest contributing municipality after recommendation from that municipality's governing board). Agency representatives will be nominated to the Commission by their respective agencies. Only the four non-agency members will rotate positions, with two positions serving two-year terms and two serving three-year terms. The HCAC will meet at least once a month and operate by consensus. The chairperson of the committee will be determined by the committee members and rotate annually.

6.2.4 Technical Committee (TC)

Members of the TC shall serve at the discretion of the Washington County Commission and will include the HCP biologist; a local biologist; and representatives from the UDWR, BLM, USFWS, and NBS (National Biological Service). The agency representatives will be nominated to the committee by their respective agencies and approved by the Commission. The TC will be available to the HCP administrator and the HCAC on an as-needed basis to provide biological information on endangered, threatened, and candidate species. The TC will participate in the initial development of the annual work plan by recommending how the amount of money allocated annually for mitigation should be expended. They will involve other specialists as necessary; however, all expenditures identified by the TC must be approved by the HCAC. The chairperson of the TC will be determined by the committee members and rotate annually.

6.3 REPORTS

6.3.1 Annual Work Plan

Annual planning and budgeting will be an important component of implementing the HCP. The process of developing the annual work plan is itemized in Table 6.1. This plan will specifically detail what is to be accomplished that year in terms of fulfilling HCP mitigation requirements. The annual work plan will include details of the work to be accomplished, the target dates for completion and report submission, who will do the work, and how it will be funded. It will also contain a review of the accomplishments and progress towards implementing the previous annual work plan (see number 3 below). It will be written by the HCP administrator by October 1 of the preceding year and reviewed by the HCAC during October. The annual work plan and report will be submitted to the Commission by November 15 under a cover memo which makes a consensus recommendation for or against approval. If no consensus is reached in the HCAC, that information will be forwarded to the Commission with the work plan. The Commission would then either approve the document, make changes, or refer it back to the HCAC for additional work. The approved document shall then be submitted to the USFWS.

Table 6.1. Annual Work Plan Tasks

Task #	Task Responsibility	Task
1	HCP Administrator	Establish budget
2	HCP Administrator	Identify non-discretionary budget items
3	HCP Administrator	Provide TC with discretionary budget amount
4	TC	Identify mitigation priorities based on budget and recommend to HCP Administrator
5	HCP Administrator	Prepare preliminary budget for HCAC review
6	HCAC	Review/revise preliminary budget
7	HCP Administrator	Prepare draft annual work plan
8	HCAC	Review draft and comment
9	HCP Administrator	Prepare final plan
10	HCAC	Review final plan and sign
11	HCP Administrator	Present final plan to County Commission
12	Commission	Approve final plan (or return to #9 if changes are necessary)
13	HCP Administrator	Forward final plan to USFWS

6.3.2 Quarterly Reports

On a quarterly basis, the HCP administrator will prepare a report detailing all actions taken during the quarter. Quarterly reports will be presented to the HCAC at their monthly meetings in January, April, July, and October of each year. The following information will be included in each quarterly report:

Clearances Requested:	Owner, Number of Acres, Legal Description, General Location.
Surveys Conducted:	Owner, Number of Acres, Results, Who Conducted Survey.
Audits Performed by UDWR:	Owner, Number of Acres, Person Conducting Survey, Discrepancies Noted.
Removals Conducted:	Owner, Acres, Number of Passes, Number of Desert Tortoises Expected, Number of Desert Tortoises Removed.
Blood Work:	Number of Desert Tortoises Processed, Whether the Desert Tortoise was Euthanized, Number of Days in Temporary Care.
Translocation Efforts:	Number of Desert Tortoises Transferred to USFWS (first five years of plan).
Law Enforcement:	Report by UDWR and BLM.
Fencing:	Fence Construction and Maintenance Actions Conducted.
Education:	Education Efforts.
Reserve Acquisition:	Summary of Acquisitions Made, Progress to Date, Problems Encountered.
Reserve Management:	Reports by Town of Ivins, BLM, and UDNR.
Reserve Monitoring:	Report by UDWR.
Other Species Efforts:	Report by HCP Biologist.

6.3.3 Annual Report

Submitted with the annual work plan will be a report by the HCP administrator detailing the accomplishments of the previous year and how well the goals and objectives of the previous year's work plan were met. The annual report will combine and summarize all of the information contained in the quarterly reports for the year, review each stated goal in the annual work plan, and discuss how well each goal was met. For mitigation measures, the annual report will discuss what was implemented, how well budget targets were met, the effectiveness of the implementation, and other aspects of mitigation implementation. The annual report will detail any particular problems encountered in implementation and make recommendations to the HCAC for changes in procedures or mitigation elements. This annual report will be filed with the USFWS following approval by the HCAC and Commission.

6.4 FUNDING COLLECTION AND DISBURSEMENT

A basic element of an HCP is the creation of a funding mechanism to support monitoring and mitigation elements for permanent habitat conservation. An Endangered Species Trust Fund has been established that will work like other dedicated trust funds in the County. All monies collected will be deposited in this fund, and all expenditures will come out of this fund. Procurements sought by the HCP administrator will have to be recommended by the HCAC and approved by the Commission. Annual budgeting and accounting oversight will be handled similarly to other departments within the Washington County government, and budget and expenditure reports will be available to the HCAC prior to each scheduled meeting. Sources of permanent funding will include the following:

- A county-wide fee will be assessed when a building construction permit is issued. This fee will be 0.2 percent of construction costs, and will apply to all new residential, commercial, and industrial construction in Washington County.

- A county-wide fee of $250.00/acre for plotted subdivisions, condominiums, town homes, or PUD's.

- Funding may also be available through desert tortoise compensation fees collected by the BLM; however, these monies will need to be accounted for separately according to the terms and conditions of the Biological Opinion under which they were collected. These monies will be collected by the individual cities and BLM and transferred to the County Treasurer on a quarterly basis. The cities will be authorized to charge a handling fee over-and-above that amount required under this HCP. Based on Utah State growth projections, the committee believes projected revenues over the 20-year period should exceed $9,000,000 (see Table 6.2). Any excess monies above $7,000,000 may be expended on either the desert tortoise or

Table 6.2. Revenue Projection

YEAR	POP.	INC.	RES. PERMITS	SEC. PERMITS	TOTAL RES.	VALUE OF RESIDENTIAL	RESIDENTIAL ESA FEES	COMMERCIAL ESA FEES	CUMULATIVE ESA FEES	DEV. ACRES	DEVELOPMENT FEES@$250/AC	CUMULATIVE DEV. FEE	TOTAL FEES GENERATED
1993	59,079												
1994	61,657	2,578	806	226	1032	$103,176,535	$206,353	$41,271	$247,624	344	$85,980	$85,980	$333,604
1995	64,766	3,109	972	273	1244	$124,428,180	$248,856	$49,771	$546,251	415	$103,690	$189,671	$735,922
1996	67,830	3,064	958	269	1226	$122,627,193	$245,254	$49,051	$840,557	409	$102,189	$291,860	$1,132,417
1997	71,170	3,340	1044	293	1337	$133,673,246	$267,346	$53,469	$1,161,372	446	$111,394	$403,254	$1,564,627
1998	74,146	2,976	930	261	1191	$119,105,263	$238,211	$47,642	$1,447,225	397	$99,254	$502,509	$1,949,734
1999	78,138	3,992	1248	350	1598	$159,767,544	$319,535	$63,907	$1,830,667	533	$133,140	$635,648	$2,466,315
2000	81,845	3,707	1158	325	1484	$148,361,294	$296,723	$59,345	$2,186,734	495	$123,634	$759,283	$2,946,017
2001	86,006	4,161	1300	365	1665	$166,531,250	$333,063	$66,613	$2,586,409	555	$138,776	$898,059	$3,484,468
2002	89,187	3,181	994	279	1273	$127,309,759	$254,620	$50,924	$2,891,953	424	$106,091	$1,004,150	$3,896,103
2003	92,421	3,234	1011	284	1294	$129,430,921	$258,862	$51,772	$3,202,587	431	$107,859	$1,112,009	$4,314,596
2004	95,707	3,286	1027	288	1315	$131,512,061	$263,024	$52,605	$3,518,216	438	$109,593	$1,221,603	$4,739,818
2005	99,023	3,316	1036	291	1327	$132,712,719	$265,425	$53,085	$3,836,726	442	$110,594	$1,332,197	$5,168,923
2006	102,848	3,825	1195	336	1531	$153,083,882	$306,168	$61,234	$4,204,128	510	$127,570	$1,459,767	$5,663,894
2007	106,242	3,394	1061	298	1358	$135,834,430	$271,669	$54,334	$4,530,130	453	$113,195	$1,572,962	$6,103,092
2008	110,762	4,520	1413	396	1809	$180,899,123	$361,798	$72,360	$4,964,288	603	$150,749	$1,723,711	$6,687,999
2009	115,118	4,356	1361	382	1743	$174,335,526	$348,671	$69,734	$5,382,693	581	$145,280	$1,868,991	$7,251,684
2010	118,934	3,816	1193	335	1527	$152,723,684	$305,447	$61,089	$5,749,230	509	$127,270	$1,996,261	$7,745,491
2011	122,294	3,360	1050	295	1345	$134,473,684	$268,947	$53,789	$6,071,967	448	$112,061	$2,108,322	$8,180,289
2012	125,493	3,199	1000	281	1280	$128,030,154	$256,060	$51,212	$6,379,239	427	$106,692	$2,215,014	$8,594,253
2013	128,648	3,155	986	277	1263	$126,269,189	$252,538	$50,508	$6,682,286	421	$105,224	$2,320,238	$9,002,524
2014	131,803	3,155	986	277	1263	$126,269,189	$252,538	$50,508	$6,985,332	421	$105,224	$2,425,462	$9,410,794

NOTES

POPULATION PROJECTION BY UTAH STATE PLANNING OFFICE
ASSUMES THE VALUE OF A RESIDENTIAL PERMIT WILL BE $100,000
ASSUMES A RESIDENTIAL PERMIT FOR EVERY 3.2 NEW PEOPLE
ASSUMES A SECONDARY RESIDENTIAL PERMIT FOR EVERY 11.4 NEW PEOPLE
ASSUMES COMMERCIAL WILL BE 20% OF RESIDENTIAL
ASSUMES ONE ACRE OF DEVELOPMENT FOR EVERY 3 RESIDENTIAL PERMITS

other T&E species at a ratio recommended by the HCAC and HCP administrator and approved by the Commission. However, it is the current intention of the Commission to limit funding for the desert tortoise to $7,000,000 so that other funding can eventually be made available for other species.

6.5 FUNDING

A budget is presented in Table 6.3. Where cost sharing is proposed, the Commission will work diligently to secure these commitments from the other parties. Although it would be preferable to be able to fund all the mitigation measures in year one of the plan, the reality is that mitigation monies will flow into the endangered species trust fund over the course of the 20-year permit period. The Steering Committee is investigating sources of funding to be able to provide substantial start-up monies. Table 6.4 presents discretionary and non-discretionary spending over the 20-year permit period. Non-discretionary spending includes funding for the HCP administrator, HCP biologist, office and travel expenses, grants to agencies for management, temporary shelter for dislocated desert tortoises, land exchange facilitation, and law enforcement. Discretionary spending included habitat acquisition, fencing, purchase of grazing permits, reserve monitoring, and education. All monetary amounts discussed in this document are in 1994 dollars. It is anticipated that inflation will increase the cost of the mitigation measures described in the HCP as well as the value of building permits.

6.6 INCIDENTAL TAKE PROCESS

The incidental take process is presented in Figure 6.2 and described below. All private and State School Trust lands in Washington County have been delineated into four categories. *Reserve lands* are those State and private parcels located within the proposed reserve boundary presented in this HCP. No incidental take of desert tortoises will be allowed on reserve lands. *Incidental take areas* are those State and private lands which are designated as desert tortoise habitat for purposes of this HCP and are not located within the proposed reserve boundary. Incidental take will be allowed on these lands according to the process shown in Figure 6.2 and detailed below. *Potential habitat areas* are those State and private lands which may contain desert tortoises, and therefore desert tortoise surveys and removals are required. However, landowners in these areas will not have to comply with the other aspects of the incidental take process. *Exclusion areas* are all remaining State and private lands which are not believed to be desert tortoise habitat and for which no surveys are required.

Table 6.3. HCP Budget Items

Budget Item	Total Cost	Washington Cty.	Other Entity
HCP Administrator @ $54,000/year for 20 years	$ 1,080,000	$ 1,080,000	$ 0
HCP Biologist @ $38,000/year for 20 years	760,000	760,000	0
Office and Travel Expenses @ $20,000/year for 20 years	400,000	400,000	0
Facilitate Land Exchanges	500,000	500,000	0
Habitat Acquisition	1,000,000	1,000,000	0
BLM Reserve Management @ $50,000/year for 5 years	250,000	250,000	0
SCSP Management Plan Preparation	50,000	50,000	0
Fencing	2,000,000	500,000	1,500,000[1]
Purchase Grazing Permits	175,000	175,000	0
Reserve Monitoring (i.e., research)	1,250,000	1,000,000	250,000[2]
Law Enforcement @ $130,000/year for 5 years	650,000	650,000	0[3]
Translocation			
a) Temporary Tortoise Care @ @ $1,000/month for 20 years	240,000	240,000	0
b) Translocation Experiment @ $150,000/year for 5 years	750,000	0	750,000[4]
Education	500,000	500,000	0[5]
Other Species	1,950,000	1,950,000	0
Total	$ 11,555,000	$ 9,055,000	$ 2,500,000

[1] The HCP will work with UDOT to construct desert tortoise fencing along Highway 18 and Interstate 15. Developers along the perimeter of the reserve will construct fencing at their expense.

[2] The UDWR currently spends approximately $60,000 every five years, including Section 6 funding from the USFWS, and this funding level is expected to continue through the permit period.

[3] Two law enforcement positions will be funded for the first five years of the plan, one with UDWR to handle wildlife enforcement issues, and one with the BLM to handle reserve management issues.

[4] Translocation research will be funded by the USFWS.

[5] The education center will be part of a larger organization, which as of yet is undefined.

Table 6.4. Non-Discretionary Budget Items

All dollar amounts in thousands, constant 1994 dollars

Funding Item	Budget	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Non-Discretionary Spending																					
Administrator	$1,080	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54	$54
Biologist	$760	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38	$38
Office/Travel	$400	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20	$20
BLM Reserve Mgt	$250	$50	$50	$50	$50	$50	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
SCSP Reserve Mgt	$50	$10	$10	$10	$10	$10	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Temp tortoise Care	$240	$12	$12	$12	$12	$12	$12	$12	$12	$12	$12	$12	$12	$12	$12	$12	$12	$12	$12	$12	$12
Land Exchange Fac.	$500	$250	$250	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Law Enforce-BLM	$325	$65	$65	$65	$65	$65	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Law Enforce-UDWR	$325	$65	$65	$65	$65	$65	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Non-Discretionary Spending	$3,930	$564	$564	$314	$314	$314	$124	$124	$124	$124	$124	$124	$124	$124	$124	$124	$124	$124	$124	$124	$124
Budget	$9,000	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450
Start-Up	$400	$200	$200	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Available	$9,400	$650	$650	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450
Amount Available For Discretionary Spending	$5,470	$86	$86	$136	$136	$136	$326	$326	$326	$326	$326	$326	$326	$326	$326	$326	$326	$326	$326	$326	$326

All landowners within the incidental take and potential habitat areas will be notified by mail of the Section 10(a)(1)(B) permit requirements within the first three months following permit approval. Landowners may appeal the classification of their land to the HCAC. The following procedures will apply to the incidental take areas:

- A landowner whose land partially or entirely falls within the incidental take area must notify the HCP administrator prior to site grading to have the property surveyed for desert tortoises. The HCP biologist would then schedule the survey and removal of desert tortoises from the property, at no additional cost to the landowner. Desert tortoise surveys and removals will be scheduled for March 15 through May 15, and from August 20 through October 20. As the biologist's schedule may become quite busy, a landowner would have the option of hiring a consultant to conduct the work at a more expeditious rate. All consultants, including the HCP biologist, will be required to possess valid State and Federal desert tortoise handling and collecting permits. The HCP administrator will maintain a list of qualified biologists, which will be periodically reviewed by the USFWS. At a future date, the USFWS may develop certification criteria for the list. As a landowner may desire to conduct surveys and removals at times outside of these specified windows, the HCAC may recommend to the Commission that a fee be charged to cover the additional costs of processing and temporary desert tortoise shelter.

- Forms, to be developed by the HCP administrator and approved by the HCAC, will document survey results, removal actions, and provide official clearance to proceed. Completed survey forms will be submitted to the HCP administrator for review and approval. UDWR will also receive copies of survey and removal forms. Presence/absence survey results will be considered valid for a period of 90 days, while removal results will be considered valid for 60 days.

- Presence/absence surveys will follow current USFWS protocol with the exception that zone-of-influence surveys will only be necessary at the 100- and 300-foot boundary. If the presence/absence survey indicates that desert tortoises are on the property, the HCP biologist (or consultant retained by the landowner) will remove the desert tortoises from the property. Although removal results are only valid for 60 days, once the removal process is complete, any desert tortoises found on the property shall also be collected. UDWR will conduct periodic audits of survey and removal actions.

- UDWR will have one week following completion of surveys and availability of survey results in which to conduct an audit. During this period, a seven-day working hold is placed on the property. The TC will recommend criteria to the HCAC to determine audit failure. However, should an audit fail, then the landowner will have to hire another consultant who will conduct the survey in the presence of the UDWR, and at a time suitable to the UDWR.

- Following removal (if desert tortoises were present), or a finding of no desert tortoises, then the property may be processed for incremental implementation (see Section 6.7).

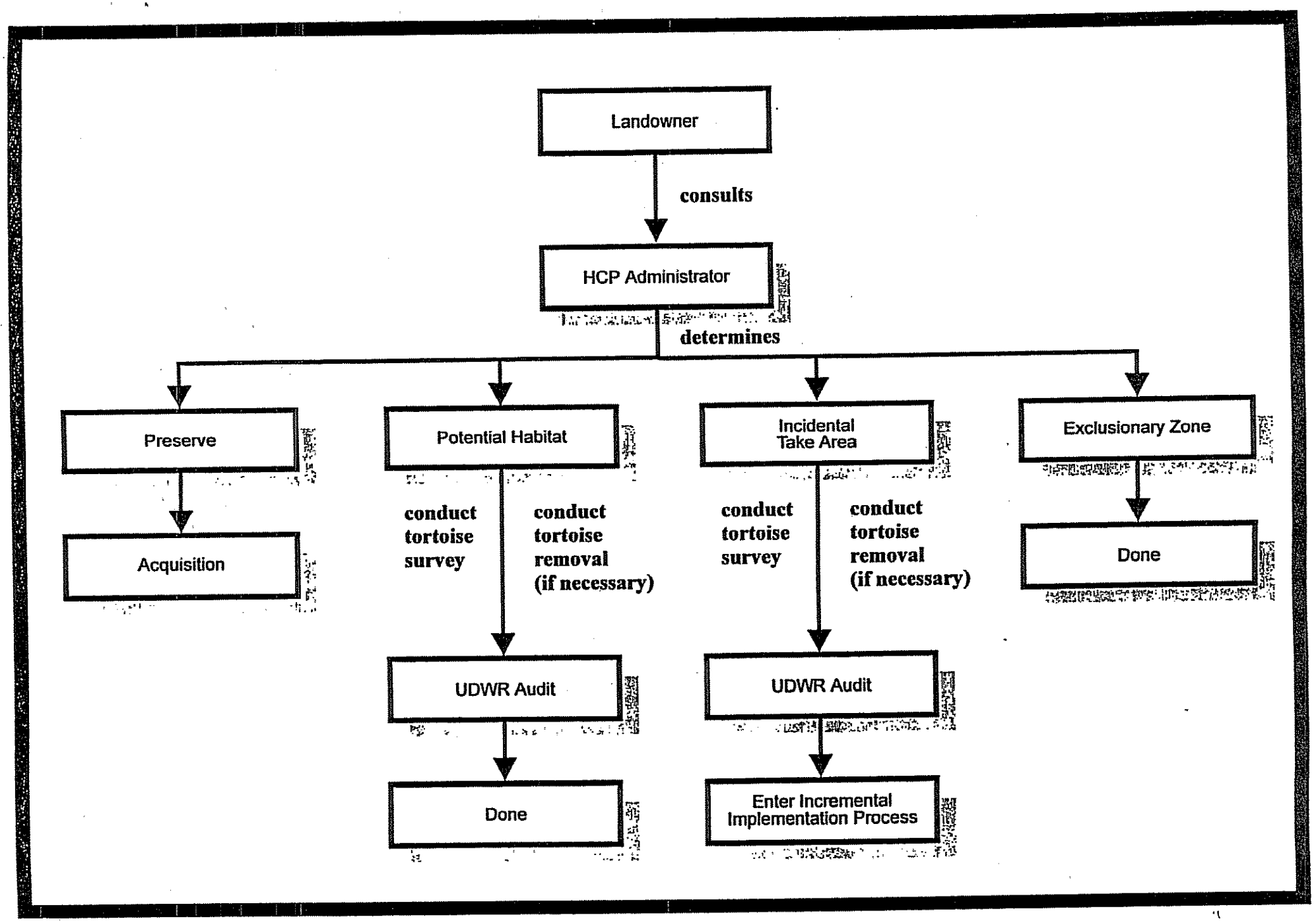


Figure 6.2. Incidental Take Process

- All desert tortoises removed from the property will be taken to a temmporary tortooise facility. Desert tortoises will be delivered to the USFWS principal investigator or his/her agent for translocation during the first five years of the plan. Diseased desert tortoises may be euthanized by a veterinarian if deemed prudent.

- City and County ordinances will be amended to state that a landowner who does not ensure that a desert tortoise survey is performed prior to development in areas where surveys are required will have committed a Class B misdemeanor.

The following procedures will apply to potential habitat areas:

- A landowner or the authorized agent of any such owner wishing to undertake grading or any other disturbance of the lands under such owner or agent's ownership or control will notify the HCP administrator and schedule a desert tortoise survey by the HCP biologist. Forms similar to those used for the incidental take area will document survey results. Presence/absence surveys will be subject to audit by UDWR for a period of seven days following survey completion. If the survey results indicate that there are no desert tortoises present on the property, then the survey requirements for those lands will be deemed "fulfilled." If the survey indicates desert tortoises are present, then the HCP biologist will schedule the removal of the desert tortoises. Upon completion of the seven-day working hold, the tortoise survey requirements will be deemed complete and permitting process for those lands may proceed.

Other than the payment of development fees, the HCP stipulates no additional procedures for landowners located within the exclusion zone, and landowners who follow these procedures are exempt from the incremental implementation process.

6.7 INCREMENTAL IMPLEMENTATION

Incremental implementation is the concept that lands will only be released for take when other lands are acquired for the reserve and mitigation monies are expended. Incidental take will be allowed according to the schedule presented in Table 6.5, based on expenditures in various categories and acquisition of certain reserve habitats. Release of an acre of incidental take will result from an expenditure as low as $1,000 for an activity that directly benefits the desert tortoise (such as fencing or law enforcement), or as high as $10,000 for administration. The purpose of the sliding scale is to reward expenditures that directly benefit the desert tortoise. For habitat acquisition, an acre of take will be released for every 2.3 acres acquired within the reserve. It is important to help ensure optimal release of incidental take lands as a result of both expenditure of mitigation monies and acquisition of reserve lands. To this end, the HCP administrator and HCAC will monitor take and reserve acreage on an annual basis. This approach is designed to meet the objectives of the HCP.

While these formulas define the amount of take allowed as mitigation measures are implemented, it does not address the issue of who is allowed to benefit from the incidental take within each zone. This issue is left to the Commission, as they are the administrators

of the permit. To clarify, the amount of incidental take allowed incrementally is based on this HCP, while who is allowed the take is decided by the County. The administration and tracking of the incremental implementation process will be the responsibility of the HCP administrator.

6.8 PLAN AMENDMENTS

Changes to the HCP are anticipated to fall into one of two categories: minor or major. Minor changes, such as corrections in land ownership, minor revisions to the utility protocols, minor modifications in fencing needs due to topography, or minor changes to the reserve boundaries or its configuration that result in no net loss of reserve land or in viability of the reserve, are proposed to be adopted by unanimous consent of the HCAC and approved by the Commission and are not considered to be an amendment to the HCP. Material major changes, such as significant alterations in funding or schedule, or significant boundary revisions, would have to be accomplished by formal amendment. These amendments would be reviewed by the HCAC; formally proposed to the USFWS by the Commission; and ultimately approved, modified, or rejected by the USFWS. Of critical concern in evaluating any proposed amendment is the potential for adverse effect to any threatened or endangered species. The HCAC will be charged with evaluating any potential HCP amendment and will do this at least once a year in their June meeting. At the July meeting of the HCAC, public input will be allowed on the proposed amendments, and at the August meeting, the HCAC will make their recommendations regarding the proposed amendments to the Commission. If amendments are required at other times, a similar process will be followed. Any amendments approved by the Commission will be submitted to the USFWS. The USFWS will then determine whether a public hearing will be necessary for permit amendment. If the permit is not amended, the Commission may request an administrative or judicial review of the USFWS decision. (continued on next pg.)

Table 6.5. Incremental Implementation Release Schedule

Increment Per Acre Released	Category	Total Budget	Total Acres Released
$1,000 ($1,500)	Law Enforcement	$650,000	650
	Habitat Acquisition/Facilitation	$1,000,000	1,000
	Fencing	$500,000	500
	Monitoring	$1,000,000	1,000
	Habitat Acquisition for Other Species	?	?*
	HCP Biologist	$760,000	760
$5,000	Grazing Permits	$175,000	35
	Education	$500,000	100
	Translocation	$240,000	48
$10,000	Reserve and HCP Administration	$1,780,000	178
Acquisition of 2.3 acres Reserve Lands		18,428 acres	7,993
Total Released for Incidental Take			12,264

* If habitat is acquired for other species, it is possible that the number of acres which could be released under this incremental implementation schedule could exceed the number allowed under the HCP. It should be made clear that the only way the number of acres released for incidental take would exceed the number requested in the permit would be by amendment.

Any boundary adjustment determined to be significant by the HCAC will require an amendment of the HCP. No significant reduction or loss of habitat shall occur as a result of amendments. Any amendment to the HCP that affects conserved habitat or potentially lessens the mitigation to be provided for the benefit of any threatened and endangered species will require an amendment to the Section 10(a)(1)(B) permit. In this event, the proponent of the amendment will have to incure the expense of a consultant if the HCAC determines that further study is required. Such a consultant who will conduct a study and provide a biological assessment to determine the anticipated impact of the amendment on threatened and endangered species habitat and species individuals, as well as on other species of concern. No amendment to the HCP will be made that, in the opinion of the USFWS, would likely jeopardize any threatened or endangered species.

6.9 UNFORESEEN CIRCUMSTANCES

In response to unforeseen circumstances, any Party to the Implementation Agreement may request the HCAC to meet to discuss appropriate amendments to the HCP.

6.10 ACTIVITIES WHICH ARE PERMITTED FOR THE INCIDENTAL TAKE AREAS

The following activities will be covered by this incidental take permit:

- Grazing will be allowed.
- Utility easements will be maintained and new easements may be allowed for all utilities, including but not limited to roads; power, telephone, and cable television lines; and water, sewer, and natural gas pipelines.
- Land clearing will be authorized when in compliance with city or County zoning and building permitting procedures.
- Building construction will be allowed in compliance with city or County zoning and when authorized by the appropriate permitting entity.
- Hiking, sightseeing, camping, and equestrian activities, including competitive and recreational events, will be permitted throughout the area.
- Pets may be allowed when under the control of the owner as specified by the appropriate city or County ordinance.
- Vehicular use of the area will be allowed as regulated by city or County ordinance or State law.
- Agricultural land treatments such as plowing, disking, mowing, swathing, and harrowing will be allowed.
- Mining will be allowed when done in accordance with city, County, or State regulations.
- Drilling for resources, including but not limited to petroleum, natural gas, other hydrocarbons, and water, will be allowed for exploration or production purposes.
- Irrigation of areas for agriculture, landscaping, horticulture, or domestic purposes will be allowed.
- Use of herbicides and pesticides will be authorized when done according to State and Federal law.
- Firefighting will be allowed and required to abate the public nuisance and protect life and property.
- Military maneuvers will be allowed as authorized by the landowner and regulated by City. County and State regulations.

- Clearing for landfill exploration or production purposes as authorized by the appropriate licensing and approving entities.

- Harvest of vegetation, native or introduced, will be allowed with permission of the landowner, and with appropriate permits, if required.

- Collection of biological or mineral specimens will be allowed by authorization of the landowner and with the approval of the appropriate entity.

- Occupation of the area by residents, agriculture, commercial and\or industrial businesses is expected and may, on occasion, cause the demise of desert tortoises in the take area.

- Any other lawful activity will be allowed.

- Water management and conservation projects will be allowed when done in accordance with local, State, and Federal regulations.

6.11 IMPLEMENTATION AGREEMENT

The Implementation Agreement specifies the responsibilities of each of the participating cities and the parties. Ivins is the only city which is signatory to the Implementation Agreement between the County, BLM, UDNR, and USFWS. The Final Implementation Agreement will be subject to agreement by the parties and their respective counsel. Each of the participating cities must enter into a binding interlocal agreement with the County regarding the city's role in the implementation of this HCP. Most of the cities within the County have entered into such agreements. Cities which elect not to execute the interlocal agreement with the County will not be entitled to the benefits of the permit.

CHAPTER 7.0
IMPACT ON SURVIVAL OF LISTED SPECIES

Impacts of the HCP to the following Federally listed species are considered in this chapter: Mojave desert tortoise, bald eagle, peregrine falcon, Mexican spotted owl, southwestern willow flycatcher, woundfin minnow, Virgin River chub, dwarf bear-claw poppy, and Siler pincushion cactus. Impacts to a species are considered throughout its geographic range and to local, individual populations. Each species has been studied to a greater or lesser degree throughout its current and, in some cases, historical range. A summary life history of each species is presented; potential impacts to habitats and individuals are discussed; and measures to maintain, enhance and protect the species are detailed. Priorities for addressing these measures shall be established through the procedure set forth by the HCP.

7.1 MOJAVE DESERT TORTOISE (*GOPHERUS AGASSIZII*)

7.1.1 Description

The Mojave Desert population of the desert tortoise is listed as a threatened species by the USFWS. Desert tortoises are found in several areas of Washington County, and potential habitat for the species includes developable land in the County. The distribution of the desert tortoise, including both Mojave and Sonoran subspecies, extends throughout Arizona, Southern California, Southern Nevada, Southwestern Utah, and into Northern Mexico.

Rapid population decreases, attributed to many factors including an upper respiratory tract disease (URTD), prompted listing of the desert tortoise as a threatened species. The USFWS estimates populations have declined at rates of 10 percent or more per year for the last six to eight years (USFWS 1989). Growth rates calculated for 16 monitoring plots in California, Nevada, and Arizona indicate some local populations may be decreasing by as much as 20 percent a year (Gilpin 1990). The USFWS released the Recovery Plan for the Desert Tortoise (Mojave Population) in August 1994 (USFWS 1994).

An adult desert tortoise has a domed carapace or upper shell and relatively flat plastron or bottom shell. Color of the shell is light to dark brown, with the plastron light brown to buff-colored. The front legs are adapted for burrowing, with laterally extended limbs and flattened feet, enlarged and horny scales, and broad nail-like claws. The rear legs are rounded and elephantine. The head is rounded in the front and has a blunt, horny beak; eyes have greenish irises. Skin, unprotected by horny plates, is thin and easily penetrated. Adult desert tortoises range in size from 9.25 to 14.5 inches long (23.5 to 36.8 cm). Hatchlings are about the size of a silver dollar, 1.4 to 1.8 inches long (36 to 45 mm). Although it has not been possible to verify in the wild, the life span of an adult desert tortoise has been estimated at 50 to 100 years. One captive female desert tortoise lived to be over 80 years old (Glenn 1983). Mortality is highest in young desert tortoises due to their soft shell, and decreases with growth and shell ossification.

To escape extremes of hot and cold during the day and night, desert tortoises rely on burrows and other forms of cover to regulate body heat. They dig by scraping alternately with their front feet. When the hole becomes deep enough, the desert tortoise may turn around and push the dirt out with its forelimbs (Ernst and Barbour 1972). In areas with sandy-loamy soil, a burrow the length of the desert tortoise can be completed in little more than an hour (Marlow 1979). Desert tortoises generally use three types of cover: burrows the approximate width of a desert tortoise and at least as long as the desert tortoise, pallets or soil depressions with no soil cover, and large openings in rock or caliche which can accommodate several desert tortoises.

Burrow construction occurs on flats and sloping bajadas, as well as on the relief provided by wash banks, berms, hillsides, and mountain slopes (Karl 1983). Desert tortoises generally are found in areas where soil is suitable for burrow construction, such as loamy sand. The soil must be sufficiently free from rocks to permit digging and compact enough to maintain a strong archway over the burrow (Woodbury and Hardy 1948).

Desert tortoises are active only during the warmer months of the year, with the greatest amount of activity in the spring. Their active season begins in early March and ends in late October or early November, when they retreat to burrows and usually remain dormant through the winter. Desert tortoises also are relatively inactive during the peak of summer, except during cool spells or storms. Daily activity during their active season is dictated largely by temperature. Desert tortoises are active between ambient temperatures of 65 to 105 degrees Fahrenheit. They are active in the morning shortly after daylight, retreating to burrows when ambient temperatures rise above 105 degrees Fahrenheit, and become active again in the late afternoon. Nocturnal activity is rare.

The diet of desert tortoises is composed mainly of forbs (small annual flowering plants) and annual grasses. These plants generally bloom from March to May and, depending on rainfall, in early fall. Other forage includes perennial grasses, woody shrubs and cacti (Esque et al. 1990).

The characteristics of the habitat occupied by the desert tortoise reflect the species' burrowing and foraging behavior and physiological climatic constraints. Conditions include, but are not limited to, an appropriate mix of vegetation and soils, together with access to seasonal food and water sources. Perennial vegetation is essential to the desert tortoise for cover and also protects some types of annuals found in the understory. The roots of perennials also provide stability to soils, thereby improving the suitability of burrow sites.

Creosote bush is the dominant perennial shrub in the Mojave Desert and is an indicator of desert tortoise habitat (Karl 1983). In Nevada, California, and Utah, desert tortoises are found in low densities in creosote bush–blackbrush ecotones and in creosote bush–saltbush communities, but rarely where creosote bush is entirely absent from the surrounding community.

Desert tortoises are generally found between 1,300 and 4,000 feet elevations, although they have been found as high as 4,800 feet in Nevada (Karl 1983); at 7,000 feet in the Providence Mountains of California; and below mean sea level in Death Valley National Monument.

7.1.2 Potential Impacts to Desert Tortoise

7.1.2.1 Quantitative Impact to the Number of Desert Tortoises and the Quantity of Habitat

To depict accurately what impacts might occur to the Mojave desert tortoise under the terms of this HCP, a worst case scenario would be development of the entire take area during the permit period. The estimated number of desert tortoises in the Upper Virgin River Recovery Unit is 7,883. The proposed take is estimated to be 1,169 animals, which represents almost 16 percent of the total estimated Upper Virgin River Recovery Unit population. In terms of habitat, 12,264 acres will be removed out of a total of 55,947 acres in the Upper Virgin River Recovery Unit, a reduction of approximately 22 percent.

7.1.2.2 Qualitative Assessment of the Effectiveness of the Proposed Reserve

Washington County, in coordination with USFWS and UDWR, has reviewed the criteria for establishing a desert tortoise habitat reserve and designed, to the maximum extent practical, a reserve that is thought to significantly increase the chances of maintaining a viable, self-sustaining population of desert tortoises in the Upper Virgin River Recovery Unit and thereby meet the recovery plan goal. It is very difficult to predict how effective a proposed reserve will be for any target species. Because the future is unknown and existing ecological relationships are poorly understood, any quantitative predictive estimate is speculative. However, to provide guidance to land management agencies in designing reserves which utilize the best current information, the DTRP has identified seven criteria to be considered in reserve design. This section presents these reserve design criteria and evaluates the proposed reserve against these guidelines.

The seven criteria for reserve design are as follows: (USFWS 1994, pp. 62-63)

(1) Reserves that are well distributed across a species' native range will be more successful in preventing extinction than reserves confined to small portions of a species' range.
(2) Large blocks of habitat, containing large populations of the target species, are superior to small blocks of habitat containing small populations.
(3) Blocks of habitat that are close together are better than blocks far apart.
(4) Habitat that occurs in less fragmented, contiguous blocks is preferable to habitat that is fragmented.
(5) Habitat patches that minimize edge to area ratios are superior to those that do not.
(6) Interconnected blocks of habitat are better than isolated blocks, and corridors or linkages function better when the habitat within them is represented by protected, preferred habitat for the target species.

(7) Blocks of habitat that are roadless or otherwise inaccessible to humans are better than roaded and accessible habitat blocks.

The purpose of this section is to examine the biological implications of the proposed Washington County reserve on the Upper Virgin River Recovery Unit of Mojave desert tortoise with respect to these reserve design criteria. In order to accomplish this, an objective evaluation of these factors against the reserve zones is presented. First, a general analysis of the overall reserve against the seven criteria is conducted and then a more specific analysis of each of the zones against the criteria is presented.

7.1.2.3 Overall Analysis

The reserve as described within this HCP is similar to that proposed in the DTRP and meets all of the criteria identified in the DTRP as important (USFWS 1994):

- includes the best examples of desert tortoise habitat in specific vegetation regions;
- provides protection for the ecosystems upon which entire high-density, healthy desert tortoise populations depend;
- includes heterogeneous terrain and vegetation; and
- includes small and isolated healthy populations.

A specific analysis of each of the seven reserve design criteria follows.

(1) Reserves that are well distributed across a species' native range will be more successful in preventing extinction than reserves confined to small portions of a species' range.

While there has been debate as to whether the desert tortoise is native in the St. George area, for purposes of this discussion, it is assumed they are native to the area, although, it is the position of the Commission that they are largely not native to the area. Mojave desert tortoises occur in patches in Washington County. Whereas it is reasonable to assume the desert tortoise might have occurred in more areas prior to development and settlement of this area, it is unknown whether desert tortoises were substantially more abundant than they are today. What currently remains is a contiguous area of occupied Mojave desert tortoise habitat from Ivins to Hurricane, with only a few isolated populations scattered throughout the rest of the Upper Virgin River Recovery Unit. While desert tortoise dispersal between the isolated populations and this primary area is understandable, the habitat connection linking this area with the Beaver Dam Slope is still unknown. In summary, the reserve as designed is well distributed across the desert tortoise's native range in this Recovery Unit, to the extent of our current knowledge and represents the only reasonable potential for establishing a viable reserve in this Recovery Unit.

(2) Large blocks of habitat, containing large populations of the target species, are superior to small blocks of habitat containing small populations.

The densest populations of desert tortoises in the Upper Virgin River Recovery Unit are found in the City Creek area, which is near the center of the proposed reserve. Other desert tortoise population centers are found in the Paradise Canyon area, in the area east of the Cottonwood Road, and in the Hurricane area. Each of these areas is included within the reserve boundaries. Small, isolated blocks of habitat which are either not contiguous with the reserve or impacted by urban development are not included within the reserve boundary. The largest blocks of habitat with the largest and densest desert tortoise populations have been included in the reserve.

(3) Blocks of habitat that are close together are better than blocks far apart.

The reserve boundaries include blocks of habitat that are close together to facilitate dispersal of desert tortoises between habitat patches. In some areas, corridors of habitat have been provided to facilitate dispersal. In one area (at the northwestern corner of the Washington City take area), the corridor connecting two habitat blocks is one-half mile in width, while in areas where roads are present, such as Highway 18, the only type of corridor which will be available is one underground culvert located at Twist Hollow, as both sides of this Highway are proposed for desert tortoise-proof fencing (which may be removed in the future if warranted). Desert tortoise movement within the reserve is further impeded by Interstate 15, providing a barrier between Zones 3 and 4; the Virgin River, providing a barrier between Zones 4 and 5, and the Town of Ivins and a narrow drainage structure between Zones 1 and 2. While there is no empirical data suggesting minimum effective width of a corridor, most biologists agree that bigger is better, and the DTRP suggests that corridors should be the width of at least one home range. While none of these barriers represents a permanent barrier to genetic exchange, some of them may present an obstacle for desert tortoise movement in the short term. Long-term management of dispersal, recolonization, and gene flow may involve physical movement of individual desert tortoises by the management agencies. The evaluation of corridor viability and the need for management intervention will be addressed through monitoring and the reserve management plan.

(4) Habitat that occurs in less fragmented, contiguous blocks is preferable to habitat that is fragmented.

Whereas the reserve does have some man-made and natural obstacles to desert tortoise movement within its boundaries, much habitat within the reserve is contiguous and fragmentation has been minimized to the maximum extent practicable. Because the reserve encompasses all of the known primary habitat blocks in the Upper Virgin River Recovery Unit, there is no way in which fragmentation could be further reduced, or other contiguous blocks included. In addition, the extent of habitat fragmentation will be significantly reduced by proposed management actions (e.g., fencing highways and roads). Further, managed dispersal can reduce the negative genetic consequences of habitat fragmentation if this occurs.

(5) Habitat patches that minimize edge-to-area ratios are superior to those that do not.

Overall, the edge-to-area ratio is similar to that proposed for this DWMA in the DTRP. While the edge-to-area ratio varies substantially between different zones of the reserve (this is discussed in greater detail in the next section), it is not as high as it could have been under different reserve designs. This design takes into account the practical reality of existing topography, development, and availability of land.

(6) Interconnected blocks of habitat are better than isolated blocks, and corridors or linkages function better when the habitat within them is represented by protected, preferred habitat for the target species.

The entire reserve represents interconnected blocks of habitat, and all corridors and linkages represent existing habitat for the species. As mentioned in the DTRP, a result of this criteria is that the spread of infectious diseases like URTD is not obstructed. However, the DTRP states that once URTD has run its course, the advantage of dispersal may outweigh any disadvantages (USFWS 1994). The only significant man-made barriers fragmenting the reserve are roads and the Virgin River. Many of these roads will be fenced to minimize desert tortoise mortality and culverts underneath these roads should facilitate desert tortoise movement and mitigate potential barriers.

(7) Blocks of habitat that are roadless or otherwise inaccessible to humans are better than roaded and accessible habitat blocks.

Unfortunately, there are few roadless areas of any size within desert tortoise habitat in the Upper Virgin River Recovery Unit. To the maximum extent practicable, interior roads will be closed within the reserve boundaries. Paved highways such as Interstate 15, Highway 18, Snow Canyon Road, and Skyline Drive will remain open to vehicular traffic. Desert tortoise mortality along Highway 18, Interstate 15, and Skyline Drive will be minimized through fencing. The largest block of habitat which will remain roadless is within Zone 3 of the reserve which is between the Cottonwood Road, Interstate 15, the Dixie National Forest, and Red Cliffs, an area of approximately 28,147 acres. The next largest block is also within Zone 3, and it is between Highway 18 and the Cottonwood Road north of Skyline Drive, an area of approximately 10,155 acres. These two blocks would constitute an almost roadless reserve area if the Cottonwood Road was gated and only local traffic allowed. Another roadless area will exist in Zone 2, west of Highway 18 to Snow Canyon Road, an area of approximately 3,675 acres. An area of 758 acres near Hurricane (Zone 5) will be roadless. The closing, gating, and fencing of roads and installation of culverts for dispersal greatly reduces the extent of habitat fragmentation caused by roads and significantly enhances the viability of the reserve.

7.1.2.4 Zone Analysis

Desert tortoise habitat by varying densities and land ownership within the proposed reserve is presented in Table 7.1. Low-density habitat carries 25 desert tortoises per square mile;

medium-density habitat carries 75 desert tortoises per square mile; and high-density habitat carries 250 desert tortoises per square mile.

Zone 1. Zone 1 is the area between the Town of Ivins and the Paiute Indian Tribal Lands. It contains approximately 1,374 acres of desert tortoise habitat, with an estimated desert tortoise population of 77 animals. Development in this area is low density with maintenance of native vegetation. An undeveloped strip of varying width exists at the base of the cliffs, within which desert tortoises may persist. This may provide for movement and genetic exchange between desert tortoise populations on the Indian Tribal Lands and those to the east of Ivins. Because this area will be occupied by human habitation, none of the reserve design criteria directly apply. However, it is the opinion of the TAC that this proposed treatment is appropriate here because it is located on the fringe of desert tortoise habitat in this Recovery Unit, the potential ability for genetic exchange is maintained, and the nature of already completed development here might allow desert tortoise movement and maintenance of home ranges.

Table 7.1. Zone by Zone Analysis of the Reserve

Landowner/ Habitat Density	Zone 1 (acres)	Zone 2 (acres)	Zone 3 (acres)	Zone 4 (acres)	Zone 5 (acres)
Private					
None	15	143	411	0	34
Low	732	367	488	0	142
Medium	44	0	835	0	156
High	0	738	3,256	0	257
Total	791	1,248	4,990	0	589
State					
None	0	62	782	0	0
Low	0	475	2,882	0	0
Medium	0	0	2,501	0	0
High	0	474	3,762	0	0
Total	0	1011	9,927	0	0
BLM					
None	4,757	3,294	10,601	655	29
Low	337	320	7,427	4,488	49
Medium	261	0	1,553	48	51
High	0	173	3,990	0	1
Total	5,355	3,787	23,571	5,191	130
Snow Canyon S.P.					
None	0	1,380	53	0	0
Low	0	2,742	0	0	0
Medium	0	0	0	0	0
High	0	204	0	0	0
Total	0	4,326	53	0	0
Grand Total	6,146	10,372	38,541	5,191	719

Zone 2. Zone 2 represents an area which contains a large number of desert tortoises in some high quality habitats. It contains approximately 5,493 acres of desert tortoise habitat, with an estimated desert tortoise population of 773 animals. Zone 2 presents two problems when analyzed using the reserve design criteria. The first is that it is crossed by two roads: The Tuacahn Road and Snow Canyon Road. The second problem is that the amount of habitat protected within Zone 2 west of Snow Canyon Road is approximately ¼ mile in width. This corridor will be defined by a cliff and fencing to the north and a desert tortoise proof fence to the south. While ¼ mile of undisturbed open space is certainly sufficient to allow for genetic exchange over the long term, its size may be inadequate to provide for the entirety of a home range for an adult desert tortoise. This area may require a higher level of management, such as the physical movement of individual desert tortoises, to enhance dispersal and gene flow. This issue will be addressed in the reserve management plan for this area.

On its eastern edge, Zone 2 is bounded by Highway 18, which is slated to be desert tortoise-proof fenced on both sides. Desert tortoise fencing is considered essential to minimize direct mortality of desert tortoises along the highway; however, it might restrict all movement and genetic exchange. Only one culvert exists underneath Highway 18 at Twist Hollow and desert tortoise use of this culvert has not been documented. In summary, Zone 2's reserve design problems focus around animal movement within the Zone, and between Zones 1, 2, and 3. This problem will be addressed through management of gene flow with culverts or assisted dispersal and elimination of road traffic mortality. The other aspect of Zone 2 which might improve its reserve design would be to widen the ¼ mile corridor west of Snow Canyon Road. However, to the west of this narrow corridor is an even narrower corridor. Between the Town of Ivins and the base of the Red Hill is a 25-foot wide strip which cannot practically be widened. So, although the ¼ mile corridor may be a restriction, an even greater restriction occurs slightly to the west. Zone 2 represents a practical compromise between current conditions and what biologically might be optimum for desert tortoise well-being. Some might argue that Zone 2 should not be a reserve at all, given these inherent reserve design constraints. However, including this area in the reserve provides protection for a substantial block of habitat and provides a corridor for a variety of other special-interest species. For these reasons, it is better to include this area in the reserve, even with its current problems.

Zone 3. Zone 3 represents a contiguous block of habitat between Highway 18 and Interstate 15, and substantially meets all of the reserve design criteria. It is a large, contiguous block with 26,694 acres of desert tortoise habitat and an estimated 5,295 desert tortoises occupying high quality habitat connected by lower-density corridors. However, there are two potential obstructions to the contiguity of habitat within Zone 3. The first is the Cottonwood Road, which does not receive much traffic. As this is a high-density area, many desert tortoises cross the road and forage along the roadside. This road will be gated or fenced, thus minimizing conflicts between roadway use and desert tortoises. The second possible obstruction is a one-half mile wide corridor at the northwest portion of the Washington City Take Area. This corridor will lie between eventual fenced development and a cliff. This corridor is considered to be adequate to maintain unimpeded desert tortoise

movement and genetic exchange. Difficulties in desert tortoise movement between Zone 3 and Zone 2 have been discussed previously. Within Zone 3, the existing use of the Turkey Farm is expected to continue, although all other private property around this farm will be acquired into the reserve. Its continued use is expected to have little impact on desert tortoise populations. The eastern boundary to Zone 3 will be a private property line which will be fenced to reduce negative impacts on the reserve. The TAC has maintained that the eastern reserve boundary should be the Red Cliffs Road rather than the private property boundary, as it is believed that the road represents a more manageable boundary. Changing the boundary from the property line to the road would add approximately 160 acres of desert tortoise habitat to Zone 3. The boundary was left at the property line due to conflicts with the landowner. It is unlikely that a substantial adverse impact or benefit would occur to desert tortoise in Zone 3 as a result of either boundary line, assuming appropriate fencing and law enforcement.

Zone 4. Zone 4 includes approximately 5,191 acres of BLM land and six privately-held acres east of Interstate 15 and north of the Virgin River. To date, live desert tortoises have not been found in this area, although it does appear to contain potentially suitable habitat. Zone 4, as currently depicted, violates reserve design criteria because it apparently lacks the target species, as well as having a number of inholdings substantially increasing the edge to area ratio. Zone 4 has been included within the reserve boundaries as a potential area for translocation of desert tortoises removed from the take areas. Therefore the reserve design criteria would only logically apply to the actual area planned for translocation, which would likely be a small, contiguous block of BLM land on the order of one or two square miles. This area is preferable for translocation for the very reasons that it violates an important reserve design criteria: it is isolated from Zone 3 by Interstate 15 and from Zone 5 by the Virgin River and it does not currently appear to contain desert tortoises. Should translocation succeed and a new population is established here, then the overall viability of the Recovery Unit will be enhanced.

Zone 5. Zone 5 is an area of 656 acres of desert tortoise habitat wedged between the Virgin River and the city of Hurricane. It is estimated to contain 133 desert tortoises. There are two cinder knolls in Zone 5, and much of the highest quality habitats are found on and adjacent to these knolls. Zone 5 represents a contiguous, non-fragmented block of habitat; however, there is concern due to its small size. Whereas the DTRP suggests (USFWS 1994) that small, isolated populations should be included as they may be valuable in reducing potential catastrophic effects of URTD or other diseases, the concern for Zone 5 is that it may be too small. While there are no empirical data to suggest a minimum viable population size, the TAC has expressed concern that this zone is likely too small for long-term survival of this population. Biologists examining Zone 5 would prefer a larger reserve area; however, given current land uses, the entire Zone is constrained on all sides. There was a disagreement over 300 acres adjacent to the western boundary of Zone 5, as its deletion from this Zone may have reduced the Zone's viability as a reserve. This deletion represents a decrease in size of almost 30 percent. As stated earlier, there are no data to indicate whether the Zone as currently configured, or the Zone with this 300-acre area

included, is sufficient over the long term. Accordingly, this area will require a higher level of management and this will be addressed in the reserve management plan.

7.1.3 Desert Tortoise Habitat Maintenance, Enhancement, and Protection

Desert tortoise habitat in Washington County will be significantly enhanced by a combination of reserve establishment, habitat acquisition, habitat protection, and long-term species management. The proposed reserve will include the vast majority of high- and medium-density desert tortoise habitat in the Upper Virgin River DWMA. It will be connected with lower-density habitats for movement corridors and foraging areas which should result in permanent protection of desert tortoise populations in the Upper Virgin River DWMA. Land acquisition between the State of Utah, private individuals and the BLM through exchanges and purchases will ensure the contiguity of desert tortoise habitat. The DTRP has assigned threat ratings to each of the 14 DWMAs on a scale of 1 to 5, with 5 being the highest. The Upper Virgin River DWMA has a threat rating of 5 because of conflicts with development. Although the total amount of desert tortoise habitat in the North St. George area will be reduced as a result of incidental take, development threats to the population should be virtually eliminated as a result of this plan. Exchanging these lands to the BLM removes the development potential and fencing the reserve protects these lands from adverse urban impacts such as OHVs, dogs, and equestrian uses. Grazing permits within the reserve will be purchased and retired by the HCP to eliminate potential conflicts between desert tortoises and livestock. Public use of the area will be restricted to the extent necessary, and law enforcement personnel will conduct regular patrols. Most reserve boundaries will be fenced to minimize human impacts to the desert tortoises. Therefore the incidental take in the Upper Virgin River Recovery Unit should not adversely impact the continued existence of the desert tortoise in the area, and, in fact, implementation of the HCP should substantially enhance the long-term survival of the desert tortoise in this Recovery Unit. Further, without this plan there is very little prospect for long-term survival or recovery of desert tortoise populations in this Recovery Unit.

7.2 BALD EAGLE (*HALIAEETUS LEUCOCEPHALUS*)

7.2.1 Description

The bald eagle recently has been downlisted by the USFWS to a threatened species. Most observations of bald eagles are along the Virgin River, Santa Clara River, and bodies of water associated with these rivers. Other use areas include Quail Creek reservoir, Hurricane sewer ponds, Baker Dam reservoir, Sand Cove reservoirs, Gunlock reservoir, Ivins reservoir and Ash Creek reservoir (BLM 1990, Jensen 1991).

Adult bald eagles have a white tail, tail coverts, throat, chin, nape and head. The rest of the body is dark brown to black, with mostly yellow eyes. Juveniles are marked by brown rather than white feathering on the head and tail, while subadults (2–4 years old) have mottled white and brown head and tail feathers. These eagles are noted for their size, with adult bird wingspans ranging from 45 to 55 inches (114–140 cm). Bald eagles are found

from the Bering Strait south to Florida and Baja, Mexico, preferring areas where fish (their primary food) is abundant, including coasts and inland waterways (Johnsgard 1990).

Winter concentrations require the presence of suitable roosting sites as well as food supplies. In Utah, bald eagles favor side canyons with bowl-shaped ravines offering environmental protection, and selectively perch in large and open trees located near the tops of ridges, thereby allowing easy access to valleys (Edwards 1969). Bald eagles mature rather slowly for bird species, not attaining breeding maturity until their fourth or fifth year. Most studies show bald eagles mate for life, commonly nesting in the same location for many years.

7.2.2 Potential Impacts to Bald Eagle

Current impacts to the bald eagle in Washington County include increased recreational use of the reservoirs where the eagles winter and OHV use in mammalian forage areas. The number of bald eagles wintering in Washington County varies from year to year, based upon climate, reproductive success and forage availability. Impacts of the HCP to the bald eagle will be indirect, such as development of areas serving as foraging grounds and water development projects occurring to meet growth anticipated by the HCP. Land which can be developed in the permit area will not include any habitat used by bald eagles for roosting. Known roosting sites within one mile of take areas include Ivins reservoir, the City of Hurricane sewer ponds, and the Virgin and Santa Clara Rivers. It is anticipated that the primary food base of the eagles, medium to large-sized fish, will not be affected by implementation of this plan.

7.2.3 Bald Eagle Habitat Maintenance, Enhancement, and Protection

This HCP does not provide specific habitat enhancement measures for the bald eagle, as impacts in Washington County are expected to be insignificant. However, the HCP has allocated almost two million dollars for other species concerns, which could be used for habitat maintenance, enhancement, and protection for bald eagle should a project be identified.

7.3 PEREGRINE FALCON (*FALCO PEREGRINUS*)

7.3.1 Description

The peregrine falcon is currently listed as an endangered species by the USFWS. It was listed as endangered in 1970 (35 *FR* 16047) because DDT and its metabolites were having a direct impact on the falcon's survival. Subsequent banning of DDT and institution of protective measures has resulted in apparent recovery of the species. Peregrine falcons are now known to be present in numbers greater than the goal postulated in the Recovery Plan (Skaggs et al. 1988), and it is possible that the species may be delisted.

Known nesting sites in Washington County include approximately 12 nest sites in Zion National Park, one at Welcome Spring near the south end of the Beaver Dam Mountains, and one at Red Cliffs Recreation Area (Jensen 1991). Only the nesting site at Red Cliffs is near enough to the project area to be considered potentially impacted by implementation of this plan, and specifically, development along the Red Cliffs Road. It is important to note that this eyrie is adjacent to the Red Cliffs Recreation Area, an area managed by the BLM which receives a substantial amount of recreational use.

Peregrine falcons are large, quick, specialized raptors which roost and nest on steep cliffs and feed primarily upon smaller birds. Peregrines fly with extreme power and speed, often attacking their prey with a vertical dive from great heights, as well as sometimes engaging in direct pursuit. A typical adult has a black head, white cheek and throat, and a readily distinguishable wide, dark mustache mark. Back and upperwing coverts are dark slate with blue-gray bars and feather fringing; uppertail coverts are blue-gray with black barring. The white belly is barred with black. White leg feathers have black barring; the tail is back with eight or more gray bands and a thick white terminal band (Clark and Wheeler 1987).

Peregrine falcons are found from Alaska south throughout the western United States to southern Baja, Mexico. In the Southwest, Breeding sites are generally associated with high sheer cliffs at least 250 feet in height at an altitude between 4,000 and 7,000 feet. A source of water (river, lake, marsh, etc.) is almost always close to the nest site, probably in conjunction with a localized and adequate prey base of small to medium-sized birds (or sometimes mammals), which is the other major habitat need (Johnsgard 1990).

7.3.2 Potential Impacts to Peregrine Falcon

Falcon eyries at Welcome Spring and in Zion National Park will not be impacted by implementation of the HCP because of their distance from proposed development areas. The eyrie at the Red Cliffs Recreation Area lies within the reserve area. Prime hunting habitat for the falcons at this eyrie includes areas protected within the reserve, where populations of the small birds provide forage for the falcons. If the private lands along the road below the eyrie were to develop more substantially, human activities in the area may increase. Indirect effects of increased development of the general area may be either positive or negative. Positive indirect effects expected would include an increase of food resources for peregrine falcons.

Adverse indirect effects might include increased recreational use of the the areas outside the reserve and to the north (i.e., Red Cliffs Recreation Area). However increased use of the Red Cliffs Recreation Area may be unrelated to whether the private lands along the road are developed. It remains unclear what overall net indirect effects will occur by implementing the HCP, but it is clear that the reserve enhances the protection of the falcons.

7.3.3 Peregrine Falcon Habitat Maintenance, Enhancement, and Protection

Increased protection to the eyrie at Red Cliffs is expected due to reserve establishment. Other potential eyrie sites will also be protected within the reserve boundaries, such as those in Paradise Canyon and along the cliffs on the Virgin River west of Hurricane.

The HCP administrator and or county biologist will monitor the Red Cliffs nest on a periodic basis to determine reproductive status and the effect, if any, human intrusion from outside the reserve, may be having on the nest. This will include monitoring impacts arising from activities on or associated with the BLM Red Cliffs recreation area. In the unlikely event of take, discussion will concurrently occur with the USFWS, UDWR, BLM, and the County and any additional managment actions necessary will be identified.

7.4 MEXICAN SPOTTED OWL (*STRIX OCCIDENTALIS LUCIDA*)

7.4.1 Description

The Mexican spotted owl was listed as a threatened species by the USFWS in March 1993. The Mexican spotted owl was listed in response to apparent threats by human impacts to species survival. Its range includes portions of Utah, Arizona, New Mexico, and Colorado. While they utilize a variety of habitats in southern Arizona and New Mexico—including mixed-conifer forests and steep canyons—in southern Utah, nesting presence has only been confirmed in canyon habitat or canyon/mesa topography (Willey 1991, Gutierrez and Rinkevich 1991, Rinkevich 1991, SWCA 1992, Ligon 1926, Kertell 1977). Elsewhere along its range the species is associated with canyons and north-facing slopes.

Eleven Mexican spotted owl mating pairs and three individuals are found in Zion National Park, and sightings have been recorded from northern Washington County on BLM lands near Zion National Park (pers. comm., S. Rinkevich [USFWS], 1992; pers. comm., R. Douglas [BLM], 1992). Survey results on the Dixie National Forest indicate that although a spotted owl was detected in the Cedar City Ranger District, no owl locations were confirmed.

7.4.2 Impacts to Mexican Spotted Owls

No potential habitat for Mexican spotted owls exists within the proposed development and reserve areas under this Plan. The only known habitat for this bird in Washington County is in Zion National Park. Potential habitat for Mexican spotted owl may exist in the Dixie National Forest. It is anticipated there will be no impacts to Mexican spotted owls or their habitat under this HCP.

7.4.3 Mexican Spotted Owl Habitat Maintenance, Enhancement, and Protection

No habitat maintenance, enhancement, or protective measures are specifically included within the HCP. However, monies are available from the 'other species' budget should high-priority projects for the Mexican spotted owl be identified.

7.5 SOUTHWESTERN WILLOW FLYCATCHER (*EMPIDONAX TRAILLII EXTIMUS*)

7.5.1 Description

The southwestern willow flycatcher was listed as endangered in March 1995. It is a State sensitive species. This flycatcher uses low to mid elevation and stream habitats, generally nesting among willow or reed thickets, but inhabiting forests, wetlands, and rangeland during other parts of the year. It feeds upon insects, berries, and seeds and winters from southern Mexico to Panama (Ehrlich et al. 1988). Southwestern willow flycatchers have been recorded along the Virgin and Santa Clara Rivers. While habitat with vegetation similar to that in known breeding areas exists along these waterways, no breeding populations or nests have been documented (pers. comm., R. Fridell [UDWR], 1992). However, summer records of this species imply the possibility of breeding in these areas.

7.5.2 Impacts to Southwestern Willow Flycatchers

The HCP should not impact waterways or riparian habitats. The effects of water development associated with increased land development on willow flycatchers are unknown. It may alter existing riparian areas adversely impacting suitable habitat. Conversely, it could create larger zones of suitable habitat along reservoir edges.

7.5.3 Southwestern Willow Flycatcher Habitat Maintenance, Enhancement, and Protection

It would be useful to conduct a comprehensive inventory of distribution and status needs to be conducted for this species, as it has been 5–6 years since the last surveys were conducted for this species in Washington County (pers. comm., S. Hedges [BLM-Cedar City], 1992). Additionally, the protection and enhancement of riparian areas, particularly along the Virgin and Santa Clara Rivers, may be beneficial to the species. This could possibly mean purchasing grazing permits along the rivers. Cattle grazing not only directly impacts this species and habitat (trampling and eating willows and riparian vegetation, knocking down nests that are situated low to the ground) but also indirectly impacts this species by attracting brown-headed cowbirds which parasitize their nests.

7.6 WOUNDFIN (*PLAGOPTERUS ARGENTISSIMUS*) AND VIRGIN RIVER CHUB (*GILA ROBUSTA SEMINUDA*) *(These two species are being considered together due to their similarity of habitat and impacts.)*

7.6.1 Description

Woundfin are listed as an endangered species by the USFWS. Woundfins prefer runs and quiet waters adjacent to shallow riffles with a depth of less than 20 inches (0.5 meters) and sand or gravel bottoms. They are found in the mainstream of the Virgin River from Lake Mead upstream to La Verkin Creek (USFWS 1991).

The woundfin historically was found throughout several tributaries of the Lower Colorado River and the mainstem. It was historically found near the confluence of the Salt and Verde Rivers to the mouth of the Gila River near Yuma, Arizona (Gilbert and Scofield 1898). With impoundment, introduction of non-native fishes, water depletions, and overall habitat loss, the woundfin has been diminished so that it is found in the mainstem of the Virgin River only in northeastern Nevada and southwestern Utah (Miller and Hubbs 1960, Minckley and Deacon 1968). The species has declined dramatically in the last decade (USFWS 1991), and critically low population levels have been monitored in recent years by the Virgin River Fishes Recovery Team (USFWS, unpublished data). Presently, the woundfin is occasionally found below the Washington Fields Diversion, Utah, but is most abundant above this withdrawal structure. All attempts to re-establish this fish in other parts of its native range have failed (Arizona Game and Fish, unpublished data). The Virgin River Fishes Recovery Plan (USFWS 1995) identifies limiting factors for the woundfin, Virgin River chub, and other native fish species as the loss of habitat and the introduction and establishment of nonnative fish, particularly the red shiner. Loss and degradation of habitat has occurred through the building of dams and associated reservoirs, water diversion structures, canals, laterals, aqueducts, and the dewatering of streams. The decline in both species' range and population numbers is due to the physical reduction in available habitats within the various river systems caused by these water projects. This loss of habitat has been exacerbated due to the introduction and establishment of exotic species, further reducing the suitability of remaining habitats for woundfin and Virgin River chub.

The Virgin River chub is currently listed as an endangered species by the USFWS. Within its habitat, this species is most common in deeper areas where water is swift but not turbulent, and is generally associated with boulders or other cover (Hardy et al.1989). Individuals generally are found over sand or gravel substrates in water with temperatures less than 90 degrees fahrenheit (32 degrees celsius), and is very tolerant to high salinity and turbidity. Present distribution of the Virgin River chub includes the mainstream of the Virgin River from Lake Mead upstream to La Verkin Springs, near the town of Hurricane, Utah.

The Virgin River chub historically inhabited the entire Virgin River upstream to La Verkin Springs near Hurricane, Utah (Cope and Yarrow 1875). The species now inhabits less than half of its original range in areas of perennial flow and usually composes less than five

percent of the fish community. Not more than a few individuals have been collected below the Mesquite Diversion, in Arizona, since the late 1970s (USFWS, unpublished data).

7.6.2 Potential Impacts to Woundfin and Virgin River Chub

It is anticipated there will be no adverse impacts to the population of woundfin and Virgin River chub in Washington County, thus producing no additional threats to the survival of these species. Several development areas exist near or adjacent to these rivers, but development activities are not expected to have a negative impact on waterborne insects, the primary food base of these fishes. Growth and development of Washington County will put additional demands on the water supply of the area, thus potentially affecting the flow of the Virgin River. Although there are conflicting opinions on the effect groundwater pumping has on the flow of the Virgin River, these potential impacts are not considered a result of implementation because the HCP is primarily concerned with where growth could occur, not whether growth can occur. This is further analyzed in the accompanying NEPA document. Further, development of additional water supplies is subject to its own environmental analyses and consultations with the USFWS.

7.6.3 Woundfin and Virgin River Chub Habitat Maintenance, Enhancement, and Protection

The Virgin River Fishes Recovery Plan (USFWS 1992) has numerous recommendations for recovery of these species. Monies could be made available from the other species budget for these projects. The proposed Virgin River Basin Integrated Resource Management and Recovery Plan will also address actions to help protect these and other riparian species. It is outlined in greater detail in Chapter 9.

7.7 DWARF BEAR-CLAW POPPY (*ARCTOMECON HUMILIS*)

7.7.1 Description

The dwarf bear-claw poppy is listed as an endangered species by the USFWS. It is restricted to the Shinarump Formation and the upper members of the Moenkopi Formation. It has also been described as being found on rolling low hills and bluffs in warm, open desert scrub communities (Utah TES plant guide 1991). This plant seems to be restricted to an elevation range of 2,700 feet to 3,300 feet, with most plants occurring from 2,800 to 3000 feet (USFWS 1985, Utah TES plant guide 1991).

This poppy is known only from Washington County, Utah (Welsh and Chatterley 1985). Bands of Moenkopi Formation around St. George correspond to the preferred elevational range for this plant. Dwarf bear-claw poppy distribution is apparently limited to an area north of the Arizona State line, west of Warner Valley, east of the Beaver Dam Mountains, and south of the Santa Clara River and the portion of the Virgin River running east of St. George (USFWS 1985). Legal locations given for this plant in Washington County are Township 43 South, Range 17 West; Township 42 South, Range 15 West; Township 43

South, Range 15 West; and Township 43 South, Range 16 West (Welsh and Chatterley 1985).

7.7.2 Potential Impacts to Dwarf Bear-Claw Poppy

The dwarf bear-claw poppy does not occur in areas designated for incidental take. However, continuing adverse impacts are occurring to this species primarily due to off-highway vehicle activity. Commercial and residential development and associated road construction could potentially impact this species due to fragmentation and loss of habitat.

7.7.3 Dwarf Bear-Claw Poppy Habitat Maintenance, Enhancement, and Protection

The current population of dwarf bear-claw poppy in Washington County will be substantially improved when fencing and law enforcement assistance is provided by the HCP. Further, implementation by the BLM of the proposed management prescriptions contained within this document would further stabilize and enhance this endangered species.

7.8 SILER PINCUSHION CACTUS (*PEDIOCACTUS SILERI*)

7.8.1 Description

The Siler pincushion cactus, recently downlisted from endangered to threatened by the USFWS, is found on the various members of the Moenkopi Formation. It is sometimes found on the Shinarump, Chinle, and Kaibab Formations, above and below the Moenkopi. The known elevational range of this plant is from 2,800 to 5,400 feet (USFWS 1986, Utah TES plant guide 1991).

The known geographic distribution of the Siler pincushion cactus extends approximately three miles north into Utah in Washington and Kane Counties and about 22 miles south into Arizona in Mojave County (Gierisch 1980). An exposure of Moenkopi on the east end of Warner Valley contains this cactus (USFWS 1986). Legal locations given for this plant in Washington County are Township 43 South, Range 15 West; Township 43 South, Range 11 West; and Township 43 South, Range 14 West (Welsh and Chatterley 1985).

7.8.2 Potential Impacts to Siler Pincushion Cactus

Although this species has currently been downlisted to threatened, adverse impacts continue to occur to its habitat. As in the case of the bear-claw poppy, however, incidental take is not being requested for areas in which the species occurs.

7.8.3 Siler Pincushion Cactus Habitat Maintenance, Enhancement, and Protection

Same as for dwarf bear-claw poppy.

CHAPTER 8.0
CANDIDATE AND STATE SENSITIVE SPECIES

8.1 INTRODUCTION

Washington County supports 38 candidates currently under consideration by the USFWS for listing as threatened or endangered species, as well as an additional 19 species which are only State-listed. Six of these species are considered quite likely to be Federally listed during the permit period. The purpose of this chapter is to provide an overview of these Federal candidate and State sensitive species. For each species, information is presented regarding the species status on State and Federal lists, habitat requirements, known or suspected locations in Washington County, and potential impacts to the species related to implementation of the HCP. Lastly, proposed management recommendations (PMR) for each species are provided. The proposed recommendations are tentative and will be updated based on the availability of additional biological information. Priorities and recommendations for candidate species funding will be formulated by the TC in the first year following permit issuance. This report will be reviewed by the HCAC and ultimately approved by the Commission. Programs identified within the report will be included in annual work plans as expenditures of the other species budget. Efforts will concentrate on broad-based activities benefitting communities and ecosystems and proactive actions alleviating the need for listing or resulting in a lower priority listing of candidate species.

8.2 SPECIES OVERVIEW

8.2.1 Species which may be Listed as Threatened or Endangered within the Foreseeable Future

Virgin Spinedace (*Lepidomeda mollispinis mollispinis*)

Status: Federal: Proposed Threatened, likely to be downlisted to Category 3c
State: Endangered

Range: Virgin River, Santa Clara River, Beaver Dam Wash

Habitat: Preferred feeding areas are in slower pools or riffles. Not found on sandy bottoms, but usually on a more solid substrate. It is hypothesized the spinedace use clear water tributaries when the mainstream is turbulent and clouded. Feeds primarily on aquatic insects.

Locations: Found in the upper reaches of the Virgin River below Zion Canyon Narrows and nine of its tributaries, including Santa Clara River, Beaver Dam Wash, Ash Creek, La Verkin Creek, North Creek, North Fork Virgin River, and East Fork Virgin River (and Shunes Creek). Valdez et al. (1991) reported that the original range had decreased by 40 percent, and that existing and impending water developments, water degradation, and non-native species threaten to further reduce the abundance and distribution of the fish. Of thirteen known populations, none are considered secure, three are considered strong with existing threats, six are declining with persistent threats, and one (Santa Clara River) is rapidly declining and in

danger of extirpation. Populations in Magotsu Creek, Quail Creek, and Leeds Creek are extirpated (Valdez et al. 1991).

HCP Impacts: Similar to woundfin and Virgin River chub

PMR: Follow guidance provided by Valdez et al. (1991), and by the Washington County Water Conservancy District and the UDWR in their draft report on the status and distribution of the Virgin spinedace. The recently signed Conservation Agreement and Strategy on the Virgin spinedace calls for seven actions: establish existing conditions as a baseline; re-establish population maintenance flows; enhance and maintain habitat; selectively control non-indigenous fish; maintain genetic viability; monitor populations and habitat; and develop a mitigation plan and protocol for future activities.

Spotted Bat (*Euderma maculatum*)

Status: Federal: Category 2
State: Sensitive (S1)

Range: Southwestern United States

Habitat: Preferred habitat for this species remains somewhat unclear, but is thought to include uneven rocky cliffs within a mile of riparian areas (Findley et al. 1975) and related to water availability (pers. comm., R. Fridell [UDWR], 1992).

Locations: Seven spotted bats were netted in 1974 and 1975 along Fort Pierce Wash, approximately 13 kilometers southeast of St. George (Ruffner et al. 1979). Spotted bats were again netted in August 1992 (pers. comm., R. Fridell [UDWR], 1992). Bats were found in a riparian area with creosote bush, mesquite, tamarisk, and desert willow (Ruffner et al. 1979).

HCP Impacts: The Fort Pierce Wash area is primarily owned by BLM with some isolated parcels of State trust lands not considered developable during the timeframe of the HCP. No development is anticipated in this area within the permit period due to its isolation, lack of water, and apparently undevelopable mineral resources. It is anticipated that the population of spotted bats along Fort Pierce Wash will be unaffected by the HCP.

PMR: Due to the elusive nature of this species, not much information has been gathered. Additional surveys should be conducted to determine such things as what limiting factors have affected its success, what can be done to ensure its survivability, to determine whether previous surveys were done appropriately, and how far away from water can roosts be located.

Shem Milk-vetch (*Astragalus eremiticus* var. *ampullarioides*)

Status: Federal: Category 2
State: Sensitive (S1)

Range: Washington County, Utah

Habitat: Endemic to the Chinle formation in scattered juniper and desertscrub communities at 3,450 feet (Utah TES plant guide 1991). This very rare species is highly restricted and only found in locations where human

impacts are already present (pers. comm, K. Harper, [BYU Dept. of Botany], 1992).

Locations: Endemic to the shem area in the southwest corner of Washington County, Utah (Utah TES plant guide 1991).

HCP Impacts: None expected.

PMR: A plant reserve should be set aside for this species.

Holmgren Milk-vetch (*Astragalus holmgrenorium*)

Status: Federal: Category 1
State: Sensitive (S1)

Range: Washington County, Utah; Mojave County, Arizona

Habitat: Warm Desert Scrub communities at approximately 2,690 to 2,780 feet elevation. (Utah TES plant guide 1991).

Locations: Habitat area is approximately six miles southwest of St. George, in all or parts of Township 43 South; Range 16 West; Sections 22, 27, 26, 33, and 34 (BLM, St. George Office). A Virgin-Mojave endemic (Utah TES plant guide 1991).

HCP Impacts: This species is highly restricted and only found in locations where human impacts are already present (i.e., along I-15, near a water well that pumps water for cattle grazing, as well as along the proposed alignment for a transmission line). It is possible this species is a young endemic and therefore highly restricted to a geologic formation because it has not been around long enough to broaden its range. However, it is not extremely reproductive. Dr. Harper (a botanist at BYU) noted that recent studies show only 10 percent of potential ovules were fertilized and also their very hard seed coat needs to be scarified before germination can occur. Dr. Harper feels that any proposed project that would alter water flow patterns within this species range would have a detrimental impact on the survival of this species. However, Dr. Stanley Welsh Stated that he cannot see any threat because he foresees no development occurring in this area and any conservation measures would only be an exercise in futility. Areas in which the species is found are primarily owned by the BLM and not planned for development. Current grazing and other multiple use management activities will continue on these lands, with an undetermined effect on populations of Holmgren milk-vetch.

PMR: The primary population of Holmgren milk-vetch lies in several sections at Township 43 South, Range 16 West (Red Bluff), within similar habitat areas as other endangered plants. The development of a plant reserve would benefit this species, as well as restricting and/or eliminating OHV and grazing use on these habitats. A listing package for this species has been prepared by the USFWS.

Wet Rock Physa (Zion Canyon Snail) (*Physella zionis*)

Status: Federal: Category 2
State: Sensitive (S2)

Range: Virgin River in Zion National Park

Habitat: This snail is found along seeplines, canyons, and hanging gardens. As an algal feeder, it relies upon permanent though often very small water sources.

Locations: Found from the North Fork of the Virgin River south to the Gateway to the Narrows Trail, in Orderville Canyon, and in isolated hanging gardens, south through Zion National Park.

HCP Impacts: The Zion Canyon snail is known to occur only in Zion National Park. Protected not only by its affinity for hanging gardens on sheer cliff walls but also by the regulations of the National Park Service, the current population of these snails is not expected to be affected by this HCP.

PMR: None at this time.

Bonneville Cutthroat Trout (*Oncorhynchus clarki utah*)

Status: Federal: Category 2
State: Sensitive (S1)

Range: Rivers and watersheds of southwest Utah

Habitat: The Bonneville cutthroat trout prefers clear, cold streams and lakes; generally found near the headwaters of river systems where they find the best quality food insects.

Locations: Found in the headwaters of the Virgin River (Deacon et al. 1987).

HCP Impacts: None expected.

PMR: None at this time.

8.2.2 Other Species

8.2.2.1 Mammals

Merriam's Kangaroo Rat (*Dipodomys merriami frenatus*)

Status: Federal: Category 2
State: Sensitive (S2)

Range: Southwestern Utah, southern Nevada, southern California, and the southern and western parts of Arizona.

Habitat: Preferred habitat for this species includes sagebrush and saltbush/creosote rangeland as well as transitional areas and sandy areas other than beaches. This species feeds mostly on seeds but on green vegetation as well (Burt and Grossenheider 1976).

Locations: Merriam's kangaroo rats have been recorded on the Beaver Dam Slope and in areas just north of St. George (pers. comm., R. Fridell [UDWR], 1992).

HCP Impacts: Habitat exists within the proposed reserve boundaries for this species.

PMR: Surveys are needed to determine status in Washington County.

Pygmy Rabbit (*Brachylagus idahoensis*)

Status: Federal: Category 2
State: None

Range: Utah, Nevada, Idaho, Oregon

Habitat: The pygmy rabbit is nocturnal and crepuscular, living in simple burrows and seldom traveling more than 30 yards of burrow or other home site. Lives in tall sagebrush growing in clumps (Burt and Grossenheider 1976). They live in burrows, with trenchlike trails radiating out from the burrow.

Locations: The pygmy rabbit has been reported from 10 miles SW of Cedar City, Iron County, Utah. In 1993, pygmy rabbits were recorded at three sites within Washington County (pers. comm., R. Fridell [UDWR], 1992).

HCP Impacts: Habitat may exist within the proposed reserve for this species.

PMR: Surveys are needed to determine status in Washington County.

Virgin River Montane Vole (*Microtus montanus rivularis*)

Status: Federal: Category 2
State: Sensitive (S1S2)

Range: Southwestern Utah and northwestern Arizona

Habitat: This species is generally found in riparian habitats, from low elevations with ponderosa pine to high forests of spruce and aspen (Jensen 1991). Montane voles captured in Arizona and Nevada were found in damp to wet places, living in thick grass with conspicuous runways (Hoffmeister 1986).

Locations: Unknown.

HCP Impacts: Unknown.

PMR: Surveys are needed to determine status in Washington County.

8.2.2.2 Birds

Northern Goshawk (*Accipiter gentilis*)

Status: Federal: Category 2
State: Sensitive (S1)

Range: Rocky Mountains south to Mexico, west to northern California; Alaska and Canada

Habitat: Goshawk nests are usually found within dense stands in mature forests. Marginal areas between forested and open areas are thought to provide the best forage for these birds. The goshawk is seldom found in logged areas.

Locations: Over 50 individuals in North Kaibab Ranger District, Kaibab National Forest; over 10 individuals located in Cedar City and Pine Valley Ranger Districts, Dixie National Forest (Crocker-Bedford and Chaney 1986; pers. comm., R. Rodriguez [Dixie National Forest], 1992; pers. comm., Reynolds [NAU], 1992).

HCP Impacts: None expected.

PMR: Habitat for this species in Washington County would likely exist on the Dixie National Forest and Zion National Park, and other forested areas. The Dixie National Forest has a goshawk survey program, and has implemented the Forest Service goshawk guidelines. Goshawks may use lower valleys during winter and migration.

White-faced Ibis (*Plegadis chihi*)

Status: Federal: Category 2
State: None

Range: Western United States to Argentina

Habitat: The white-faced ibis resides in large marshes, with nesting colonies hidden in inaccessible reed-bed or willow-covered areas (Peterson 1990). Prefers mostly freshwater habitats, including marshes, swamps, ponds and rivers. It feeds upon aquatic invertebrates (esp. crayfish), insects, earthworms, fish, small vertebrates. Migratory; winters in South America.

Locations: White-faced ibis have been observed in the Washington Fields area during spring and summer.

HCP Impacts: None expected.

PMR: Identify potential habitats within Washington County and conduct surveys during the appropriate time of year.

Mountain Plover (*Charadrius montanus*)

Status: Federal: Category 1
State: Sensitive (S2)

Range: Rocky Mountains area

Habitat: The mountain plover inhabits drier grasslands, prairies, and plateaus (Peterson 1990). Plovers may selectively inhabit prairie dog towns in some regions. Diet can include grasshoppers, crickets, beetles and flies. Winters south to Mexico.

Locations: Unknown.

HCP Impacts: None expected.

PMR: May want to identify potential habitats within Washington County and conduct surveys during the appropriate time of year.

Ferruginous Hawk (*Buteo regalis*)

Status: Federal: Category 2
State: Threatened

Range: Western United States

Habitat: Arid, semi-arid, and grassland regions of western North America. Level and rolling terrain and foothills. Avoids high elevations, forest interiors, narrow canyons, and cliff areas (Palmer 1988). Feeds almost exclusively on small mammals, especially ground squirrels and jackrabbits. Winters in south to central Mexico (Ehrlich et al. 1988).

Locations: Ferruginous hawks have been documented throughout Washington County.

HCP Impacts: May benefit from reserve establishment.

PMR: Conduct surveys during the appropriate time of year to determine status and distribution in Washington County.

Black Tern (*Chlidonias niger*)

Status: Federal: Category 2
State: Sensitive (S1)

Range: Temperate North America

Habitat: Inhabits freshwater marshes, sloughs, and wet meadows. Largely insectivorous, but eats crayfish and fish plucked from the water's surface. Winters from Panama south to Peru (Ehrlich et al. 1988).

Locations: Unknown.

HCP Impacts: None expected.

PMR: Identify potential habitats within Washington County and conduct surveys during the appropriate time of year.

Western Least Bittern (*Ixobrychus exilis hesperis*)

Status: Federal: Category 2
State: None

Range: Occasional in Utah, Nevada, Arizona

Habitat: Feeds and nests in freshwater marshes and reedy ponds, feeding on small fish, aquatic invertebrates, insects, amphibians and small mammals (Peterson 1990). Winters south to Costa Rica (Ehrlich et al. 1988).

Locations: Unknown.

HCP Impacts: None

PMR: Identify potential habitats within Washington County and conduct surveys during the appropriate time of year.

Yellow-billed Cuckoo (*Coccyzus americanus*)

Status: Federal: None
State: Threatened

Range: Scattered through central and southern United States, and winters in South America.

Habitat: Nests in localized riparian valleys in cottonwood-willow thickets.

Locations: There is a single breeding record from Beaver Dam Wash; however, other suitable habitat probably occurs near streams, rivers, and springs in Washington County.

HCP Impacts: Projected impacts are similar to southwestern willow flycatchers.

PMR: No concerted survey efforts have been conducted for this species. An inventory of species and habitat distributions for this species is needed. Preservation and enhancement of riparian areas is strongly suggested. Grazing can eliminate understory vegetation and inhibit cottonwood regeneration. Purchasing of grazing permits and fencing in riparian zones could reduce grazing pressure. In urban areas and areas impacted by heavy human usage, large blocks of riparian can be protected by signing or fencing and encouraging recreational activities in areas away from riparian zones. Major recreational developments such as golf courses should be designed to maintain or enhance existing riparian and wetland values. Water development projects inundate riparian areas above dams and would require mitigation. Natural water regimes should be mimicked to prevent depletion of water from riparian areas downstream of control structures and provide periodic flooding which rejuvenates riparian

understories. Road developments should be avoided in riparian areas. Riparian areas should be reestablished by planting and protecting willows and other native shrubs and ground cover. Water regimes should be manipulated to enhance re-establishment of riparian plantings.

Common Yellowthroat (*Geothlypis trichas*)

Status:	Federal: None State: Sensitive (S1)
Range:	From Canada to southern Mexico and winters in southern United States to West Indies.
Habitat:	The species depends heavily on marsh vegetation and riparian understories.
Locations:	Nests in riparian and wetland habitats in Washington County and Statewide. Suitable habitat is likely to exist along the Virgin River and its tributaries as well as at perennial springs in Washington County.
HCP Impacts:	Impacts are likely similar to those of the southwestern willow flycatcher.
PMR:	Survey efforts have been limited to the Santa Clara River near Gunlock Reservoir. An inventory of species and habitat distributions for this species is needed. Preservation and enhancement of riparian and wetland areas is suggested (see above discussion for yellow-billed cuckoo).

Yellow-breasted Chat (*Icteria virens*)

Status:	Federal: None State: Sensitive (S1)
Range:	From Canada to southern Mexico and winters in southern United States to Panama.
Habitat:	Nests in dense, mature riparian thickets of lower valleys and canyons.
Locations:	Breeding records from Washington County include Beaver Dam Wash, Santa Clara and Virgin Rivers.
HCP Impacts:	Unknown
PMR:	Same as yellow-billed cuckoo and common yellowthroat.

Bell's Vireo (*Vireo bellii*)

Status:	Federal: None State: Sensitive (S1S2)
Range:	Central to southwest United States and northern Mexico, and winters in Mexico to Nicaragua.
Habitat:	Riparian areas with willows and along streamsides.
Locations:	Nests in streamside willows of the Virgin River and Beaver Dam Wash in southwestern Utah. Breeding records from Washington County are the only known in the State.
HCP Impacts:	Unknown
PMR:	Same as yellow-billed cuckoo.

8.2.2.3 Fish

Flannelmouth Sucker (*Catostomous latipinnis*)

Status: Federal: Category 2
State: None

Range: Virgin River, Colorado River, and Gila River drainages

Habitat: The flannelmouth sucker is found in a wide variety of habitats, from riffles to backwater areas, in larger rivers and streams. Preferred temperature of these fish in the Virgin River is 80 degrees Fahrenheit, though they tolerate a range of 50 to 85 degrees (Deacon et al. 1987).

Locations: Virgin River and tributaries.

HCP Impacts: Similar to woundfin and Virgin River chub

PMR: Same as other native fish species.

8.2.2.4 Amphibians

Arizona Toad (*Bufo microscaphus microscaphus*)

Status: Federal: Category 2
State: Sensitive (S1)

Range: Arizona, southern Utah

Habitat: This species is found in or near wetlands in several different types of areas, including shrub steppes, pinyon-juniper woodlands, and pine-oak forests. This toad inhabits shallow permanent or intermittently flowing water over sand or rocky substrates. The Arizona toad is probably the most common toad in the riparian zone within the Mohave Desert ecosystem in Utah (pers. comm., J. Legler [Univ. of Utah], 1993). Anthropogenic alterations to habitat formerly occupied solely by *B. microscaphus* has allowed Woodhouse's toad (*B. woodhousii*) to use such habitat. Hybridization with *B. woodhousii* is a threat to the long-term viability of this species (Sullivan 1991) in Washington County. Where lotic habitats adjoin lentic (i.e., reservoir) habitats, hybridization of the two species can occur (pers. comm. B. Sullivan [ASU],1991,1992).

Locations: Records of this species have come from St. George, Bellevue, and Zion National Park. Museum specimens exist from Hwy. 15/17 at La Verkin (ASU); Beaver Dam Slope Terry's Ranch (MPM); 2 miles south of St. George (Tulane Univ.); Springdale (Cornell Univ.); 3 miles south of Leeds (MSU); Lytle Ranch 30 miles west of St. George (Univ. of Utah; 100 meters west of Santa Clara River bridge on Santa Clara Littlefield Road, 4.5 kilometers north of the Virgin River junction of Route 91 and Gunlock Road (Univ. Kansas); 3 miles northeast of Virgin (AMNH).

HCP Impacts: Concern should be given to construction of reservoirs which eliminate lotic conditions, required breeding habitat for *B. microscaphus*. Elimination of herbaceous and shrub growth along the Virgin River and its tributaries is of equal concern. Alterations to water quality should be monitored as development pressures increase.

PMR: Surveys documenting the population status, distribution, and status of hybridization with Woodhouse's toad should be conducted on an annual basis as dictated by governmental listings, human development pressures, and knowledge of the status of the species changes.

Lowland Leopard Frog (*Rana yavapaiensis*)

Status: Federal: Category 2
State: Sensitive (S1)

Range: Arizona south to Mexico, southern California, southwest Utah

Habitat: This leopard frog prefers foothill streams, overflows and stock tanks in areas of desert grass, oak or oak-pine habitat types. Generally found at an altitude of about 3,500 feet, although found at elevations below 2,000 feet (pers. comm., J. Wynes, 1992). Most populations occupy ponds and stream and river pools below 3,280.8 feet in elevation.

Locations: This species was described in 1984 (Platz and Frost 1984), and the only published record from Utah is from near St. George. This species was observed along the Virgin River downstream from St. George in 1992, and several ranid frogs were observed on the Virgin River near the Utah/Arizona border (pers. comm., R. Fridell [UDWR],1992). Presently, Randy Jennings (Univ. Nevada, Las Vegas) is determining the status of leopard frogs (*Rana pipiens* complex) along the Virgin River.

HCP Impacts: Nothing is known of the distribution and status of this amphibian in Utah.

PMR: Surveys supplementing those conducted by Randy Jennings are necessary prior to suggesting any detailed management schemes. Protection of water quality, springs, riverine pools, and riparian shrub and herbaceous communities along the Virgin River corridor would likely benefit potential habitat for this species.

Relict Leopard Frog (*Rana onca*)

Status: Federal: Category 3a
State: Extinct

Range: Dr. Jennings at UNLV may have rediscovered the relict leopard frog in Nevada; however, range and status in Utah is unknown (pers. comm., R. Jennings [Barrick Museum of Natural History, Univ. of Las Vegas], 1993).

Habitat: In Utah, this ranid frog is restricted in habitat to creeks, springs, and seeps in the Virgin River Valley (pers. comm., R. Jennings [Barrick Museum of Natural History, Univ. of Las Vegas], 1993).

Locations: This species (described by Cope 1875), whose type-locality was judged by to be along the Virgin River in Washington County, Utah, was believed extinct by the USFWS (56 *FR* 58814). The relict frog occurred in "Berry Springs" and "6 miles east of St. George." Specimens from these localities are represented in Brigham Young University and University of Michigan museum collections, respectively. Berry Springs was drained in 1973, and the original spring is now a swimming area. Field surveys in 1983 and 1984 revealed no relict frog populations in Utah. However, surveys in

1984 were conducted after severe flooding in the St. George area. In 1992, *onca-yavapaiensis*-like specimens were discovered in springs within Lake Mead National Recreation Area in Nevada. Recent evidence suggests that this species may be synonymous with *R. yavapaiensis* (R. Jennings, Barrick Museum of Natural History, Univ. of Las Vegas, pers. comm. 1993). Conclusive analyses of speciation within this ranid frog complex have not been completed. Also see lowland leopard frog account.

HCP Impacts: None expected, as the species is not known to occur within Washington County.

PMR: Same as for the lowland leopard frog.

Boreal Toad (*Bufo boreas boreas*)

Status: Federal: Proposed to be listed
State: Sensitive (S1)

Range: Southern Alaska to northern Baja California; Rocky Mountains to the Pacific Coast.

Habitat: This toad frequents a great variety of habitats: desert streams and springs, as well as grassland, woodland, and mountain meadows with nearby ponds, lakes, reservoirs, rivers, and streams. In low-lying areas, the toad is active at night, and at higher elevations it is diurnal (Stebbins 1985).

Locations: This toad occurred in the canyons and mountains of Utah (Tanner 1931), and one record exists from Washington County (Pine Valley Reservoir) (BYU Museum). Although there are no recent records from the County, individuals may occur in areas of higher elevation (above 1800 m). In 1993, several adults were observed at one site south of Tropic Reservoir in northwestern Kane County (pers. comm., R. Fridell [UDWR], 1992). There are no other occupied sites known in southern Utah in recent years. Populations of this species have been disappearing in Colorado (Carey 1993).

HCP Impacts: None known at this time. Concern should occur if development pressure occurs in habitats greater than 6,000 feet in elevation

PMR: Surveys are necessary to document the distribution and status of this toad in Washington County.

8.2.2.5 Reptiles

Western Chuckwalla (*Sauromalus obesus obesus*)

Status: Federal: Category 2
State: Threatened

Range: Sonoran and Mojave Deserts

Habitat: Rocks and rocky crevices are used for night and day shelter, sunning stations, and hibernation; scattered rocks are used for temporary shelter during diurnal foraging away from home crevices (Lowe 1964). *Sauromalus obesus* is a herbivorous, large lizard, slow to mature, single-

brooded, with repeated reproductions. Most of the members of populations are adults, with few or often no juveniles added each year (Berry 1974).

Locations: The western chuckwalla is known to occur in rocky outcrops and boulder fields of lower hills in Washington County (Woodbury 1931). Recent records exist from Quail Lake, Red Cliffs, Ft. Pierce Wash, Sandstone Mountain, Padre Canyon, Paradise Canyon, the Hurricane Cliffs east of Hurricane (pers. comm., R. Fridell [UDWR], 1992), the Gunlock area, Cottonwood Wash north of Washington, east side of Interstate 15 in the Leeds area, Guttner property north of Red Cliff (pers. comm. S. Belfit, [BLM]), and Bloomington Hills (pers. comm., D. Kay [UDWR], 1992). Historic records include Rockville, Leeds, St. George, and Santa Clara. Museum collections include specimens from St. George Black Ridge, St. George, south of St. George near Virgin River, Red Hill north of St. George, Chuckwalla Canyon north of Shivwits Indian Tribal Lands (Dixie College), Santa Clara Canyon (National Museum of Natural History), Zion National Park, 21 miles northeast of St. George, 4.6 miles south southwest of St. Gorge (Univ. Calif., Berkeley), 1 mile west of St. George, Snow Canyon State Park, 1 mile north of St. George, and the Beaver Dam Desert tortoise Area (Univ. Utah). Little is known regarding the status of this large lizard in the County.

HCP Impacts: There are numerous locations where chuckwallas probably occur along with Gila monsters and desert tortoises. Protection of boulder fields along the base of cliffs and slopes should be a priority.

PMR: Implementation of annual surveys would help determine the population status and distribution of this species in the County. Navajo Sandstone and cinder fields are occupied by desert tortoises, Gila monsters, and chuckwallas. Species associations should be mapped out, and those areas valuable to many species should receive priority for preservation.

Gila Monster (*Heloderma suspectum*)

Status: Federal: Category 2
State: Endangered

Range: South of San Bernardino, California, to southwestern Utah to southwestern New Mexico into Mexico.

Habitat: This poisonous lizard occurs in basaltic lava slopes or flows, and loose Navajo Sandstone boulder fields (Beck 1990) that have an abundance of vegetation.

Locations: Bureau of Land Management Red Cliffs Recreation Area, Lava Hills Golf Course, Snow Canyon, Paradise Canyon, Padre Canyon, Beaver Dam Slope, Cedar Pockets Wash, Santa Clara Bench, Shivwitz, Bloomington, Black Hill west of St. George, Dixie Red Hill, Millcreek, Buckskin Hollow, Black Gulch, Cottonwood Creek, Quail Creek, Ft. Pearce Wash in Warner Valley (Beck 1985), and Webb and Schmutz Hills (pers. comm., R. Fridell [UDWR], 1992). Gila monsters are inactive for long periods,

and populations are spottily distributed even in areas of excellent habitat (Beck 1985).

HCP Impacts: Elimination of several population pockets of this unique lizard is expected to occur as a result of the HCP implementation. However, the species is expected to benefit from reserve establishment in areas such as Paradise Canyon.

PMR: Beck (1985) predicted the extirpation of Gila monsters from Utah by the year 2000 if habitat preservation measures are not implemented. All of the populations as identified by Beck (1985) should be mapped out, and those areas of dense populations or suitable habitat should be protected. Again, in concert with changing development needs, species listings, and species population needs, these management recommendations should be updated on an annual basis.

Desert Night Lizard (*Xantusia vigilis*)

Status: Federal: None
State: Sensitive (S2)

Range: The Mojave Desert and inner Coast Ranges of California, southern Nevada and Utah, and central Arizona.

Habitat: This diurnal and crepuscular lizard of arid land lives chiefly beneath fallen branches of Joshua trees, and under dead clumps of various other species of yucca, nolina, agava, and cardons (Stebbin 1985).

Locations: In Washington County, this species is limited to Mojave Desert habitat where yucca and joshua tree plants occur (Bezy 1984). This lizard has been known to occur at the following locations: the Beaver Dam Slope, St. George, Terry's Ranch 10 miles west of Castle Cliff, Washington 2.9 miles west of Castle Cliff (Univ. Utah), 5 miles west of Castle Cliff (AMNH), 6 miles east of Castle Cliff Beaver Dam Slope (MPM), on US Hwy. 91 near AZ line, 11.9 road miles southwest of Shivwits (vic. Castle Cliff)(LACM), 9.5 miles from Santa Clara Littlefield road turnoff on Snow's Ranch Road (MVZ).

HCP Impacts: The reserve design and location should incorporate some key areas to secure populations and quality habitat for this lizard. These needs may need to be updated annually as new knowledge of the species habitat is gained.

PMR: Surveys documenting the distribution and status of this secretive lizard should be coordinated on an annual basis. The distribution and density of those plants comprising its essential cover (i.e., Joshua trees, yucca, agave) should be mapped.

Glossy Snake (*Arizona elegans*)

Status: Federal: None
State: Sensitive (S2)

Range: From southern California, Arizona, New Mexico, and from Kansas south into Mexico.

Habitat: This snake occurs in a variety of habitats; chaparral-covered slopes, grassland, light brushy to barren desert, sagebrush flats, and woodlands (Stebbins 1985). In general it prefers open areas.

Locations: This species is restricted to extreme southwestern Washington County in the Mojave Desert. Museum records exist from Watercress Springs, St. George near Watercress Springs, near Bloomington (LACM), 3–4 miles SE St. George, Beaver Dam Slope, St. George, Terry's Ranch 10 miles W. Castle Cliff, 2.9 miles West Castle Cliff (Univ. Utah), and on road between Santa Clara and St. George (Dixie College). Little is known regarding the habitat requirements and distribution of this species in the County.

HCP Impacts: Elimination of open habitats will reduce populations of this snake. As more life history, distribution, and habitat information is acquired regarding this species, more its habitat needs should be integrated into the HCP.

PMR: Annual surveys documenting the distribution and status of this poorly known reptile would help identify important habitat areas.

Utah Mountain Kingsnake (*Lampropeltis pyromelana infralabialis*)

Status: Federal: None
State: Sensitive (S1)

Range: In central Utah with isolated population in eastern Nevada and northern Arizona.

Habitat: This snake is a mountain dweller, ranging from pinyon-juniper woodland and chaparral to the pine-fir belt. It frequents both brushland and coniferous forest, often near water (Stebbins 1985).

Locations: This snake occurs in mountains and forests from 5,400 to 7,000 feet in elevation (Woodbury 1931) in northern Washington County. Museum specimens exist from New Harmony, Oak Grove, Pine Valley, and Santa Clara (BYU). Field observations exist from right fork Beaver Dam Wash, Browse Canyon, near Central, Enterprise Reservoir, Kolob Canyon (Zion National Park), Leeds Creek, Oak Grove Campground, Pine Grove campground, Wildcat Mountain, and Ash Creek Reservoir (pers. comm., B. Bartholomew, 1992). Field observations indicate that this montane snake frequently uses riparian habitats with an abundance of boulders (pers. comm., B. Bartholomew, 1992). There are two records from pinyon-juniper areas distant from riparian habitats.

HCP Impacts: If development commences above 5400 feet in elevation, then consideration should be given to protecting brushland and forested areas in areas in and near riparian habitats having an abundance of boulders. As more life

history and distribution information is acquired regarding this species, integration of its habitat needs

PMR: Surveys documenting denning areas and population status of this secretive snake would be beneficial.

Utah Milk Snake (*Lampropeltis triangulum taylori*)

Status: Federal: None
State: Sensitive (S1)

Range: Central and southern Utah and into western Colorado.

Habitat: Field observations indicate that it uses a variety of habitats from riparian, agricultural, meadows, sagebrush, pinyon-juniper, and coniferous forests in Utah (pers. comm., B. Bartholomew, 1992). Little is known regarding the status and habitat requirements of this species.

Locations: This species is only known from Pine Valley (BYU) in Washington County.

HCP Impacts: As more knowledge is acquired regarding its distribution, status, and habitat needs, these requirements should be integrated into the HCP.

PMR: Surveys documenting the den sites and population status of this snake would be beneficial.

Utah Banded Gecko (*Coleonyx variegatus utahensis*)

Status: Federal: None
State: Sensitive (S2)

Range: Southern Nevada, northwestern corner of Arizona and southwestern Utah.

Habitat: This lizard is limited to the Mojave Desert habitat and is most often found in slabs of red sandstone rock. South-facing slopes usually hold the highest densities.

Locations: Records exist from St. George, Gunlock, Zion National Park (Woodbury 1931), Beaver Dam Mountains, near Watercross Springs, Indian Farm, near St. George (UMMZ), Beaver Dam Wash at Terry's Ranch, Ivin's Sands above Santa Clara, Beaver Dam Slope, St. George Black Ridge, Chuckwalla Canyon near Gunlock, Warner Valley, Veyo, 5 miles north of St. George, Ft. Pierce, 0.5 mile north of St. George (Dixie College), Snow Canyon State Park, 3 miles SE of St. George, Bloomington, near West Spring St. George, Terry's Ranch 10 miles West Castle Cliff (Univ. Utah), Shivwitz Indian Farm, Watercress Springs, Diamond Valley (LACM), and 6 miles west of Castle Cliff Beaver Dam Slope (MPM).

HCP Impacts: Integration of key habitat needs for this poorly known lizard should be planned. Those areas containing south-facing Navajo Sandstone rock within the species range should be protected within the HCP. As new populations of this species are discovered, they should be prioritized for management needs.

PMR: Surveys documenting the distribution and status of this secretive lizard on an annual basis would be beneficial.

Desert Iguana (*Dipsosaurus dorsalis*)

Status: Federal: None
State: Sensitive (S2)

Range: From southern Nevada to tip of Baja California, and from the desert side of mountains in southern California to central Arizona.

Habitat: Typical habitat for this lizard consists of creosote bush desert with hummocks of loose sand and patches of firm ground with scattered rocks (Stebbins 1985).

Locations: This species is limited to a few square miles of the sandy Mojave Desert where scattered shrubs occur. In Washington County, this lizard is only known from immediately north of the Arizona border. Specimens exist in museums from Beaver Dam Wash (LACM). This lizard is probably not common in the County.

HCP Impacts: None expected

PMR: Surveys documenting the distribution and status of this large lizard in Washington County would be beneficial.

Zebra-tailed Lizard (*Callisaurus draconoides*)

Status: Federal: None
State: Sensitive (S2)

Range: Central Nevada down into southern California, southwestern corner of Utah and central and southern Arizona.

Habitat: This lizard is most common in desert washes, although it does occur on open plains.

Locations: It occurs from the Beaver Dam Slope north to Zion National Park. This lizard is quite common in washes on the Beaver Dam Slope. Published records include Leeds, Virgin, and Santa Clara (Woodbury 1931). Museum records exist from Terry's Ranch on Beaver Dam Wash, Warner Valley, 0.5 mile east of St. George, Red Hill North of St. George, St. George 700 East 100 North, St. George North 500 West, and Bulldog Wash at desert tortoise den area (Dixie College). This lizard is common in suitable habitats in Washington County.

HCP Impacts: Protection of sandy washes will be a key component to retain viable populations of this Mojave-associate for the future.

PMR: Surveys would help document the distribution and status of this lizard in the County. These surveys should be updated as development pressures change and more knowledge of this species status and distribution is acquired.

Lyre Snake (*Trimorphodon biscutatus lambda*)

Status: Federal: None
State: Sensitive (S2)

Range: From southern California, southern Nevada, southwestern Utah, and central and southern Arizona.

Habitat: Rocks and rock crevices in the Mojave Desert system comprise the habitat for this snake (Klauber 1940).

Locations: This snake has been collected from Zion Canyon (Woodbury 1931), 1 mile East of Springdale (Univ. Mich.), Red Hill north of St. George, Red Hill Sugarloaf, 3 miles southeast of St. George (Dixie College), Zion National Park 1 mile north of Springdale, and St. George. Little is known regarding the distribution and status of this species in the County.

HCP Impacts: Rocky areas, such as those proposed to be included in the reserve area, would be better protected under implementation of this HCP. Some areas identified for incidental take may contain potential habitat for this species.

PMR: Annual surveys would help ascertain the status and distribution of this snake.

Western Blind Snake (*Leptotyphlops humilis*)

Status: Federal: None
State: Sensitive (S2)

Range: Southern California, southern Nevada, southwestern Utah, southern New Mexico, and western and southern Arizona.

Habitat: This burrowing species occurs in rocky areas with sandy soils where the sub-soil is moist (Stebbins 1985).

Locations: Museum collections exist from St. George (LACM), Washington Red Hill, St. George (Univ. Utah), and Snow Canyon area of Sand Dunes (Dixie College). Very little is known regarding the distribution and status of this species in the County.

HCP Impacts: The proposed reserve likely contains potential habitat for this species. Some of the areas designated for incidental take may also contain potential habitat for this species.

PMR: As new knowledge regarding the distribution and status of this burrowing snake become available, this information should be integrated into the HCP.

Mojave Patchnose Snake (*Salvadora hexalepis mojavensis*)

Status: Federal: None
State: Sensitive (S2)

Range: Southern California, southern Nevada, southern Utah, and northwestern Arizona

Habitat: This snake is an active diurnal resident of grasslands, chaparral, sagebrush plains, and desert scrub. Also found in both sandy and rocky areas on the lower slopes of mountains and on low, dry creosote bush plains in the most extreme parts of the desert (Stebbins 1985).

Locations: Little is known of the distribution or status of this snake in the County. Museum records of this snake exist from Beaver Dam Slope 22 miles SW St. George, Oak Grove Recreation area north of Leeds 3 miles south of campground, Beaver Dam Mountains on US Hwy. 91,and about 10 miles

N. St. George on Cottonwood Road. This species has been reported from the dry, sandy foothills west of St. George.

HCP Impacts: Unknown at this time; however, potential habitat may exist in the reserve. Integration of management considerations for this species should occur as new ecological information becomes available.

PMR: Surveys to determine the population status and distribution of this species would be beneficial.

Speckled Rattlesnake (*Crotalus mitchellii*)

Status: Federal: None
State: Sensitive (S2)

Range: Southern California, southeastern corner of Nevada, southwestern corner of Utah, and western Arizona

Habitat: This species occupies the driest, hottest rocky areas such as canyons and foothills (Ernst 1992).

Locations: In Utah, this rattlesnake is limited to the Beaver Dam Slope. Little ecological data exist for this species in Utah.

HCP Impacts: The HCP does not identify any areas for incidental take on the Beaver Dam Slope, nor does it change the current management practices. This is because the Beaver Dam Slope is in a different Recovery Unit. Therefore the HCP will have no impact on this species.

PMR: Surveys documenting the distribution, status, and den sites would be beneficial to an understanding of this species.

Mojave Rattlesnake (*Crotalus scutulatus*)

Status: Federal: None
State: Sensitive (S2)

Range: South Nevada to southern edge of Mexican plateau, from western edge of Mohave Desert to extreme western Texas

Habitat: A desert brushy grassland species. This snake spends a large portion of time in animal burrows or under rocks (Ernst 1992).

Locations: Restricted in Utah to the Beaver Dam Slope. Little is known of the status of this species in Utah (Woodbury and Hardy 1948).

HCP Impacts: Same as for the speckled rattlesnake.

PMR: Same as for the speckled rattlesnake.

Sidewinder (*Crotalus cerastes*)

Status: Federal: None
State: Sensitive (S2)

Range: Southeastern California, southern Nevada, southwestern corner of Utah, and extreme western Arizona

Habitat: Occurs in sandy areas in low-lying areas and infrequently occurs in rocky or gravelly sites in desert habitat (Ernst 1992).

Locations: In Utah, restricted to the Mojave Desert association from the St. George area south to the Arizona border. This snake has been recorded from St. George and Hurricane (Woodbury 1931), and Paradise Canyon.

HCP Impacts: The proposed reserve likely contains habitat for this species, and some incidental take areas may contain potential habitat.

PMR: Surveys need to be implemented to determine population status, distribution, and den sites of this Mojave Desert dweller. As new information becomes available regarding this snakes distribution, density, status, and habitat requirements, it should be integrated into the HCP.

8.2.2.6 Plants

Virgin River Thistle (*Cirsium virginensis*)

Status: Federal: Category 2
State: Sensitive (S1)

Range: Washington County, Utah; Mojave County, Arizona; and Clark County, Nevada.

Habitat: The Virgin River thistle occurs in saline seeps and stream terraces in shadscale, creosote bush, mesquite, and hanging garden communities. Elevation ranges from approximately 2,800 to 3,100 feet (Welsh 1982; Utah TES plant guide 1991).

Locations: Known to occur near St. George, Utah, and Mojave County, Arizona. Legal locations given in Washington County are Township 42 South, Range 15 West and Township 43 South, Range 17 West (Welsh 1982; Welsh and Chatterley 1985).

HCP Impacts: None expected.

PMR: Additional surveys need to be completed for this species.

Pink Egg Milk-vetch (*Astragalus oophorus* var. *lonchocalyx*)

Status: Federal: Category 2
State: Sensitive (S1S2)

Range: Western Iron and Beaver Counties, Utah

Habitat: This milk-vetch is found in pinyon-juniper, sagebrush, and mixed desert shrub communities at 5,800 to 7,545 feet elevation (Utah TES plant guide 1991).

HCP Impacts: None expected.

PMR: Additional surveys need to be conducted for this species.

Zion Tansy (*Sphaeromeria ruthiae*)

Status: Federal: Category 2
State: Sensitive (S2)

Range: Zion National Park, Utah

Habitat: This plant inhabits the crevices and canyon walls of the Navajo Sandstone formation, and its preferred elevation is approximately 4,800 feet (Welsh

and Chatterley 1985; Welsh and Thorne 1979; Utah TES plant guide 1991).

Locations: The Zion tansy is known only from Zion National Park where it is located on vertical sandstone cliffs. It blooms very late in the season, therefore escaping the attention of most people visiting the park. Legal locations given in Washington County are Township 41 South, Range 10 West and Township 40 South, Range 10 West (Welsh and Chatterley 1985).

HCP Impacts: Due to it location with Zion National Park and its biological cycle, no impacts are expected.

PMR: None

Pinyon Penstemon (*Penstemon pinorum*)

Status: Federal: Category 2
State: Sensitive (S1)

Range: Iron County, Utah

Habitat: Pinyon-juniper community between 5,600 and 5,800 feet (Utah TES plant guide 1991).

Locations: Endemic to the Pine Valley Mountains, Iron County, Utah (Utah TES plant guide 1991)

HCP Impacts: None expected.

PMR: Additional surveys need to be completed, as very little survey work has been conducted on this species.

Canaan Mountain Beardtongue (*Penstemon ammophilus*)

Status: Federal: Category 2
State: Sensitive (S2?)

Range: Washington, Kane, Garfield Counties, Utah

Habitat: Found in blowsand derived from Navajo Sandstone, in ponderosa pine, and in mixed shrub communities at 5,400 to 6,600 feet (Utah TES plant guide 1991).

Locations: Species individuals are located in the extreme southeastern corner of Washington County. Known only from Garfield, Kane, and Washington Counties, Utah (Utah TES plant guide 1991).

HCP Impacts: None expected.

PMR: Additional surveys need to be completed for this species. Mr. Stan Welsh is currently conducting surveys on this species near the White Cliffs area. He sees no threats from development to this species.

Nevada Willowherb (*Epilobium nevadense*)

Status: Federal: Category 2
State: Sensitive (S1)

Range: Washington, Millard Counties, Utah; Clark County, Nevada

Habitat: This plant inhabits rocky limestone outcrops and talus slopes in pine duff of the ponderosa-aspen community. Elevation ranges from 7,500 to 9,200 feet (Welsh and Thorne 1979; Welsh and Chatterley 1985). Also described

as being found in creosote bush and pinyon-juniper communities between 2,985 and 8,800 feet elevation (Utah TES plant guide 1991).

Locations: Clark County, Nevada, and Washington and Millard Counties, Utah. Legal locations given for Washington County are Township 42 South, Range 18 West and Township 38 South, Range 19 West (Welsh and Chatterley 1985).

HCP Impacts: None expected.

PMR: Additional surveys need to be completed for this species. Dr. Cromquist has been working with this species. Dr. Welsh does not see any threats to this species as development is not likely to occur where this species exists.

Canaan Daisy (*Erigeron canaani*)

Status: Federal: Category 2
State: Sensitive (S1)

Range: Washington County, Utah

Habitat: Ponderosa pine community at 5,200 to 6,800 feet (Utah TES plant guide 1991).

Locations: Endemic to eastern Washington County, Utah (Utah TES plant guide 1991).

HCP Impacts: None expected.

PMR: Primarily located within the boundaries of Zion National Park and receives protection within those boundaries.

Pine Valley Goldenbush (*Haplopappus crispus*)

Status: Federal: Category 2
State: Sensitive (S2)

Range: Washington and Millard Counties, Utah

Habitat: Ponderosa pine, fir, manzanita, and aspen communities between 5,970 to 9,200 feet (Utah TES plant guide 1991).

Locations: Endemic in Washington and Millard Counties, Utah (Utah TES plant guide 1991).

HCP Impacts: None expected.

PMR: Additional surveys need to be completed, as very little survey work has been conducted on this species. Mr. Franklin feels surveys for this species should be of high priority. However, Dr. Welsh feels that this species occurs all over Pine Mountain and development would have to cover the entire mountain to endanger this species.

Cedar Breaks Goldenbush (*Haplopappus zionis*)

Status: Federal: Category 2
State: Sensitive (S2)

Range: Garfield, Iron, Kane Counties, Utah

Habitat: Spruce-fir and ponderosa pine communities mostly on the Cedar Breaks limestone formation (Wasatch) between 8,000 and 10,000 feet (Utah TES plant guide 1991).

Locations: Endemic to Garfield, Iron, and Kane Counties, Utah (Utah TES plant guide 1991).

HCP Impacts: None expected.

PMR: Additional surveys need to be completed, as very little survey work has been conducted on this species. Mr. Franklin also feels surveys for this species should be of high priority.

Gumbo Milk-vetch (*Astragalus ampullarius*)

Status: Federal: Category 2
State: Sensitive (S2)

Range: Southern Utah, Northern Arizona

Habitat: This plant grows on the Chinle and Tropic Shale formations in a mixed desert shrub and scattered juniper community type. Elevational range extends from 3,200 to 5,400 feet (Welsh and Chatterley 1985, Welsh and Thorne 1979, Utah TES plant guide 1991).

Locations: Gumbo milk-vetch is known only from southern Utah and adjacent Arizona, where it occurs near the Cockscomb to the west of Kanab in Kane County and southeast of Motoqua in Washington County. Legal locations given for Washington County are Township 43 South, Range 15 West; Township 42 South, Range 11 West; and Township 41 South, Range 17 West (Welsh and Chatterley 1985).

HCP Impacts: Areas in which the gumbo milk-vetch are found are generally on BLM and State lands. These lands are not likely to be developed in the foreseeable future, but current grazing and other multiple use management activities will continue, with an undetermined effect on populations of gumbo milk-vetch.

PMR: None, as surveys have revealed that this species is more abundant than originally thought, and the species could be proposed for delisting to Federal Category 3-C in the near future (pers. comm., B. Franklin [UNHP], 1993).

Zion Daisy (*Erigeron zionis*)

Status: Federal: Category 2
State: Sensitive (S2)

Range: Washington, Kane counties, Utah

Habitat: This species inhabits rock crevices of the Navajo Sandstone formation in the ponderosa pine community. Ranges in elevation from 4,400 to 7,500 feet (Welsh and Chatterley 1985). Also described as inhabiting seeps and hanging gardens in ponderosa pine and riparian communities in Navajo and Wingate Sandstones at 4,420 to 5,250 feet (Utah TES plant guide 1991).

Locations: Washington and Kane Counties, Utah. Legal locations given for Washington County are Township 40 South, Range 10 West; Township 42 South, Range 9 West; and Township 41South, Range 10 West.

HCP Impacts: None expected.

PMR: None.

8.2.2.7 Insects

Utah Chaetarthrian Water Scavenger Beetle (*Chaetarthria utahensis*)

Status:	Federal: Category 2
	State: Sensitive (S2?)
Range:	Washington County, Utah
Habitat:	Unknown
Location:	This beetle is limited to Santa Clara Creek in Washington County (Miller 1974).
HCP Impacts:	None expected.
PMR:	Unknown.

Spotted Warner Valley Dunes June Beetle (*Polyphylla avittata*)

Status:	Federal: Category 2
	State: Sensitive (S2?)
Range:	Warner Valley Dunes, Washington County.
Habitat:	Vegetation on the dunes is primarily *Artemesia filiformis*.
Location:	This species was collected at blacklights placed upon the Warner Valley Dunes.
HCP Impacts:	None expected.
PMR:	Unknown.

MacNeill Sooty Wing Skipper (*Hesperopsis gracielae*)

Status:	Federal: Category 2
	State: Sensitive (S1)
Range:	Lower Colorado River as far north as Washington County, Utah.
Habitat:	This butterfly lives in clumps of quailbrush (*Atriplex lentiformis*) along the Lower Colorado River. Larvae eat the quailbrush and adults fly from April to October in several broods.
Locations:	Unknown.
HCP Impacts:	None expected.
PMR:	Unknown.

Table 8.1 presents a summary of information for all candidate species discussed in this chapter.

Table 8.1. Summary of Candidate Species Information

Common Name	Scientific Name	Status		Surveyed	Acquire/Reserve	Need Other Protection
		Fed	State			
Virgin Spinedace	*Lepidomeda mollispinis mollispinis*	C2	Endangered	Y	N	Y
Spotted Bat	*Euderma Maculatum*	C2	S1	Y	Y	Y
Shem Milk-vetch	*Astragalus eremiticus* var. *ampullariodies*	C2	S1	N	Y	Y
Holmgren Milk-vetch	*Astragalus homgreniorium*	C1	S1	N	N	Y
Wet Rock Physa	*Physelia zionis*	C2	S2	N	N	N
Bonneville Cutthroat Trout	*Oncorhynchus clarki utah*	C2	S1	N	N	N
Merriam's Kangaroo Rat	*Dipodomys merriami frenatus*	C2	S2	Y	N	N
Pygmy Rabbit	*Brachylagus idohoensis*	C2	-	Y	Y	N
Virgin River Montane Vole	*Microtus montanus rivularis*	C2	S1S2	Y	Y	N
Northern Goshawk	*Accipiter gentilis*	C2	S1	N	N	N
White-faced Ibis	*Plegadis chihi*	C2	-	Y	Y	N
Mountain Plover	*Charadrius montanus*	C1	S2	Y	N	N
Ferruginous Hawk	*Buteo regalis*	C2	Threatened	Y	N	Y
Black Tern	*Chlidonias niger*	C2	S1	Y	Y	N
Western Least Bittern	*Ixobrychus exilis hesperis*	C2	-	Y	Y	N
Yellow-billed Cuckoo	*Coccyzus americanus*	-	Threatened	Y	Y	Y
Common Yellowthroat	*Geothlypis trichas*	-	S1	Y	Y	Y
Yellow-breasted Chat	*Icteria virens*	-	S1	Y	Y	Y
Bell's Vireo	*Vireo bellii*	-	S1S2	Y	Y	Y
Flannelmouth Sucker	*Catostomous latipinnis*	C2	-	N	N	N
Arizona Southwestern Toad	*Bufo microscaphus microscaphus*	C2	S1	Y	Y	N
Lowland Leopard Frog	*Rana yavapaiensis*	C2	S1	Y	Y	N
Relic Leopard Frog	*Rana onca*	C3a	Extinct	Y	Y	N
Boreal toad	*Bufo boreas boreas*	Proposed	S1	Y	Y	N
Chuckwalla	*Sauromalus obesus obesus*	C2	Threatened	Y	N	Y
Gila Monster	*Heloderma suspectum*	C2	Endangered	N	N	Y
Desert Night Lizard	*Xantusia vigilis*	-	S2	Y	N	N
Glossy Snake	*Arizona elegans*	-	S2	Y	N	N
Utah Mountain Kingsnake	*Lampropeltis pyromelana infralabialis*	-	S1	Y	N	N
Utah Milk Snake	*Lampropeltis triangulum taylori*	-	S1	Y	N	Y
Utah Banded Gecko	*Coleonyx variegatus utahensis*	-	S2	Y	N	Y
Desert Iguana	*Dipsosaurus dorsalis*	-	S2	Y	N	N
Zebra-tailed Lizard	*Callisaurus draconoides*	-	S2	Y	N	N
Lyre Snake	*Trimorphodon biscutatus lambda*	-	S2	Y	N	Y
Western blind Snake	*Leptotyphlops humilis*	-	S2	Y	N	Y
Mojave Patchnose Snake	*Salvadora hexalepis mojavensis*	-	S2	Y	N	N
Speckled Rattlesnake	*Cotalus mitchellii*	-	S2	Y	N	N
Mojave Rattlesnake	*Crotalus scutalatus*	-	S2	Y	N	N
Sidewinder	*Crotalus cerastes*	-	S2	Y	N	Y
Virgin River Thistle	*Cirsium virginensis*	C2	S1	Y	Y	N
Pink Egg Milk-vetch	*Astragalus oophorus* var. *lonchocalyx*	C2	S1S2	Y	N	N
Zion Tansy	*Sphaeromeria ruthiae*	C2	S2	N	Y	N
Pinyon Penstemon	*Penstemon pinorum*	C2	S1	Y	N	N
Canaan Mountain Beardtongue	*Penstemon ommophilus*	C2	S2?	Y	N	N
Nevada Willowherb	*Epilobium nevadense*	C2	S1	Y	N	N
Canaan Daisy	*Erigeron Canaani*	C2	S1	N	N	N
Pine Valley Goldenbush	*Haplopappus crispus*	C2	S2	N	N	N
Cedar Breaks Goldenbush	*Haplopappus zionis*	C2	S2	Y	N	N

Table 8.1. (Continued)

Common Name	Scientific Name	Status		Surveyed	Acquire/Reserve	Need Other Protection
		Fed	State			
Gumbo Milk-vetch	*Astragalus ampullarius*	C2	S2	N	N	N
Zion Daisy	*Erigeron sionis*	C2	S2	N	N	N
Utah Chaetarthrian Water Scavenger Beetle	*Chaetarthria utahensis*	C2	S2?	?	Y	?
Spotted Warner Valley Dunes June Beetle	*Polyphylla avitata*	C2	S2?	?	N	N
MacNeill Sooty Wing Skipper	*Hesperopsis gracielae*	C2	S1	?	Y	N

KEY:

Category 1: Taxa for which the USFWS has sufficient (but not necessarily complete) information on vulnerability and threats to support a proposal to list them as threatened or endangered.

Category 2: Taxa for which the USFWS has insufficient information to support a proposed rule to add the species to the threatened or endangered species list. Further biological research and field study will usually be needed to change the status of taxa in category 2.

Category 3a: Taxa for which the USFWS has persuasive evidence of extinction.

Category 3c: Taxa that are more abundant or widespread than was previously believed and/or those that are not subject to any identifiable threat. Should further research or changes in land use indicate decline in any of these taxa, they may be re-evaluated for possible inclusion in category 1 or 2 or listed as threatened or endangered.

Sensitive: Any wildlife species which, although still occurring in numbers adequate for survival, whose population has been greatly depleted, is declining in numbers, distribution, and/or habitat (S1);occurs in limited areas and/or numbers due to a restricted or specialized habitat (S2); or both (S1S2).

Extinct: Any wildlife species that has disappeared in the world.

Endangered: Any wildlife species, subspecies, or population which is threatened with extirpation from Utah or extinction.

Threatened: Any wildlife species, subspecies, or population which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range in Utah or the world.

CHAPTER 9.0
DISCUSSION OF WATER IMPACTS ON ENDANGERED FISH

Washington County owns no water rights and provides no utilities (including water) to its residents. The Washington County Water Conservancy District (WCWCD) was created as a separate and distinct body to develop and protect the County's water supplies. The WCWCD owns substantial water rights and is charged with the responsibility of developing water and preserving water rights for the benefit of Washington County. To this end, the WCWCD is developing the Virgin River Basin Integrated Resource Management and Recovery Program (VRBIRM&RP).

On October 19, 1995 a memorandum was signed between BLM, USFWS, Washington County Water District and the State of Utah to establish the VRBIRM&RP. This program would be consistent with the HCP in duration, although commitments for instream flows and take, once identified, would be in perpetuity. The issuance of the incidental take permit for desert tortoise would not be withheld if the VRBIRM&RP is not finalized by the time a desert tortoise permit is ready for approval.

Washington County itself does not possess regulatory authority with respect to the issuance or management of water rights for instream flows or discharge permits with respect to water quality which may impact threatened or endangered fish or other species in the Virgin River. The desert tortoise, which is the primary focus of this HCP, is a terrestrial species, and its habitat needs lack any nexus to those of aquatic species which require instream flows or pools of water to survive.

Washington County is aware, however, that there are substantial issues surrounding habitat for endangered, threatened, and candidate fish species. Therefore, the County endorses the VRBIRM&RP as proposed by the Washington County Water Conservancy District and anticipates that Washington County will endorse and cooperate, as appropriate, in the final program.

The proposed VRBIRM&RP would protect and provide beneficially compatible uses for a large portion of the real property located along the river system within the 100-year floodplain. This floodplain is the habitat for many of the TE&S animal species located within Washington County. There are six native fish present: the woundfin minnow (endangered), the Virgin spinedace (Category 1), Virgin River chub (endangered), the speckled dace, flannelmouth sucker (Category 2), and the desert sucker. In addition, most of the riparian and wetland areas in Washington County occur within the Virgin River 100-year floodplain.

This program would be the focus of a cooperative effort to set aside the river habitat as an ecologically compatible parkway and provide for identification and protection of instream flows for native fish. Water conservation practices will be implemented to provide additional habitat in areas which have been previously dewatered. These goals are consistent with the Virgin River Fishes Recovery Plan (USFWS 1992) and supported by

seven years of biological studies paid for by the WCWCD, the State of Utah, and the USFWS.

The program would establish the mechanism needed to provide funds for compensating private property owners within the floodplain; enhancing wetlands; removing non-native fish that cause problems to native fish from the river system; and through water conservation, provide instream flows.

The VRBIRM&RP would also provide certainty in the development of the water resources to meet the needs of a growing Washington County, while providing for recovery of listed fish, and would allow incidental take that may occur as a result of the operation of existing diversion dams.

CHAPTER 10.0
ALTERNATIVES CONSIDERED

The proposed HCP described in this document includes a proposed reserve design which was developed through a process of (1) biological evaluation of original and literature data, as the plan must meet the needs of the species and present a reasonable prospect for conservation accomplishments; (2) acceptance of political reality, as the plan must have the support of the principal affected parties in order to succeed; and (3) determination of financial feasibility, as the plan must be affordable. These are three essential elements of any HCP, without which a plan cannot succeed. Each specific issue in this plan, including the proposed reserve design, was thoroughly debated by the Steering Committee, and the proposed plan contained within this document represents a compromise that reflects the above three elements. The process of compromise requires that the best reserve design from a biological standpoint must be politically acceptable and affordable, and that the most politically acceptable plan must also result in a biologically viable reserve. This process of compromise is unlikely to maximize any one of the essential elements. In the case of the proposed Washington County HCP, this process of compromise has resulted in a biologically viable reserve that is politically acceptable. This is the best that could be accomplished through this Steering Committee process and undoubtedly was the intent of Congress in providing for Section 10(a) permits.

Several viable alternatives were considered by the Steering Committee in development of this HCP; these are considered in detail in the accompanying Environmental Impact Statement (EIS). This chapter presents an overview of each of the five alternatives to the proposed action (the HCP described in the preceding chapters) that are considered within the EIS and the rationale for selecting the Proposed Alternative.

10.1 NO ACTION

The No Action Alternative would be a continuation of the current situation in Washington County without an HCP and Section 10(a)(1)(B) permit for incidental take of desert tortoises and without any effective conservation program implemented by local, State, or Federal agencies. Currently, several land development projects are underway and several projects are pending the outcome of this HCP process. Others do not directly impact desert tortoise habitat, but the cumulative impact will reduce the viability of this Recovery Unit. Under the No Action Alternative, loss of habitat is likely to continue, a regional HCP would not be developed, opportunities for habitat conservation on a county-wide or Recovery Unit scale would be lost, and adverse, indirect impacts to desert tortoises would continue without mitigation or compensation. Therefore this alternative was considered unacceptable by the Steering Committee.

10.2 NO DEVELOPMENT IN TORTOISE HABITAT

Less than 10 percent of Washington County is desert tortoise habitat. There is adequate land in the County, much of which is currently agricultural, that is not habitat and

developable without benefit of this HCP. However, growth in the County has been concentrated in desert tortoise habitat because of favorable soils and scenic resources. Significant financial, planning, and infrastructure resources have been invested by the County and cities to accommodate growth in these areas. This alternative is considered unacceptable due to previous infrastructure commitments, the growth in habitat areas, and the fact that many of these areas are not particularly important to the long-term survival of the Mojave desert tortoise in this Recovery Unit. Again, this alternative would not result in any effective conservation measures in this Recovery Unit, thereby not increasing the likelihood of recovery of the Mojave desert tortoise in southwesterrn Utah.

10.3 NO DEVELOPMENT IN TORTOISE HABITAT, BUT LANDOWNERS COMPENSATED

This alternative is similar to the one described above, but all landowners would be compensated for the loss of use of their land. There are approximately 39,750 acres of tortoise habitat currently in the North St. George DWMA which are not Federally owned or part of Snow Canyon State Park. To compensate these landowners at an estimated value of $5.000 per acre would require approximately $200 million. This is not considered feasible given current Federal budgetary constraints. Further, the proposed HCP includes compensation for landowners with important desert tortoise habitat through land exchange. Because the financial requirements of this alternative are unfeasible, it is unlikely to ever be implemented. Habitat would continue to be developed or degraded, and no conservation measures would be implemented in this Recovery Unit.

10.4 RESERVE CONSISTING ONLY OF ZONES 3, 4, AND 5

This reserve design would be similar to that proposed in the HCP for all areas east of Highway 18. West of Highway 18 would all be identified for incidental take. The rationale for this alternative is that tortoise habitat west of Highway 18 is fragmented by a number of roads and other existing developments which may already threaten its long-term biological viability for desert tortoises. As stated in Chapter 7, Zone 3 represents the portion of the reserve which best meets the reserve design criteria. Zones 1 and 2 present substantial barriers to tortoise movement which will require significant management actions to enhance viability. This alternative was not selected because it proposed a large amount of incidental take in comparison to the reserve size. Although Zones 1 and 2 partially compromise the reserve design criteria, it was the opinion of the TAC that Zones 1 and 2, with appropriate rehabilitation and management, should be included in the overall reserve design in order to enhance the prospects of reserve viability and ultimate recovery of the species.

10.5 A LARGER RESERVE (61,769 ACRES)

The TAC had recommended several changes in the proposed reserve design which they believed would create a more viable reserve. These changes would include the following:

Zone 2:	Including a 30-acre parcel east of the National Institute of Fitness.
Zone 3:	Making the northeast boundary the Red Cliffs Road rather than the western private property boundary.
Zone 4:	Including all the private property within the outer boundary.
Zone 5:	Including all the private land west of the western edge of the reserve to Gould's Wash.

These changes would increase the size of the reserve by an estimated 800 acres, increasing the amount of habitat within the reserve approximately 2 percent. None of the above changes in reserve design would significantly improve the viability of the reserve. All of the above changes would, however, involve significant political impediments to the plan since the landowners involved were unwilling to participate. The Steering Committee did not choose to adopt this alternative since it did not improve the viability of the reserve and would have incorporated unresolvable political conflicts.

The Proposed Alternative contained in this document represents the best efforts of the Steering Committee to develop a compromise plan that meets the essential needs of the affected parties and is biologically sound, politically acceptable, and financially feasible. It is the opinion of the Steering Committee that the proposed HCP represents the only realistic prospect for conservation and recovery of the Mojave desert tortoise in the Upper Virgin River Recovery Unit.

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APPENDIX A

UTILITY DEVELOPMENT PROTOCOLS

The following protocols have been developed to minimize potential adverse impacts to the Mojave desert tortoise in preserve areas from utility and road right-of-way projects, such as the installation and maintenance of water, sewer, and electric lines and roadway maintenance, while still enabling utilities to be placed within the preserve. These protocols apply only to the site preparation and construction phases of projects. Utility design and alignment will be developed through Section 7 consultations (public lands or federal nexus projects) and appropriate environmental review for projects on private lands. The reserve will be considered an avoidance area for the location of new utilities. This means new utilities will be encouraged to co-locate along existing infrastructure when practical. The HCAC will review other new utilities routes to assure minimum habitat disturbance.

I. WATER EXPLORATION, CONSTRUCTION, OPERATION, AND MAINTENANCE

New water development is critical to the continued economic growth of the communities in Washington County. New water development includes exploration, construction, operation, and maintenance for water tanks, wells, pumps, water pipelines, electric lines to serve pumps, and access roads. Access roads must be maintained in primitive condition. The following terms are established to protect the desert tortoise during groundwater development in non-take areas:

1. A contact person from the entity performing the construction shall act as the contact representative to the Service (under a Section 7 consultation) or the HCP Administrator (under a non-federal action). He/she will be responsible for overseeing compliance with the protective stipulations as stated in this protocol.

2. Prior to any construction activity within the preserve, the contact person will meet with the HCP Biologist to review the plans for the project. The HCP Biologist, in consultation with the TC, will review alignment, pole spacing, clearing limits, burrow locations, and other project specific details which have the potential to affect the desert tortoise. The HCP Biologist may recommend modifications to the contact person in order to further avoid or minimize potential impacts to Mojave desert tortoise and to better meet this protocol. If there are unresolvable conflicts between the HCP Biologist and the contact person, then the matter will be arbitrated by the HCAC and, if necessary, by the Washington County Commission.

3. All pre-construction activities which could take tortoises in any manner (e.g., driving off an established road, clearing vegetation, etc.) shall occur under the overall supervision of a qualified biologist. Any hazards to tortoises that may be created by this activity, such as drill holes or any steep-sided depressions, shall be checked three times a day for desert tortoises. These hazards shall be eliminated each day prior to the work crew leaving the site, which may include installing a barrier that will preclude entry by tortoises.

    A. A qualified biologist shall conduct pre-construction clearance surveys of all areas potentially disturbed by the proposed project. Any winter dens discovered during

the pre-construction survey shall be avoided or mitigated. The survey shall be submitted to the HCP Biologist as part of plan review.

B. All site mitigation criteria shall be determined in the pre-construction phase, including but not limited to seeding, barrier fences, leveling, laydown/staging areas, and will be reviewed by the HCP Biologist, in consultation with the TC, prior to implementation.

4. The entity shall ensure that during construction their contractors comply with the mitigation measures contained within this protocol. These measures are:

A. A qualified biologist shall oversee construction activities to ensure compliance with the protective stipulations for the desert tortoise, and a biological monitor will be assigned to each group of construction equipment.

B. Any desert tortoises found within the project area during construction shall be moved by a qualified biologist out of harm's-way (at a distance no greater than 250 feet).

C. Open trenches will be backfilled within 72 hours, whenever possible. All open trenches shall be checked three times a day for trapped desert tortoises. If a desert tortoise is found in the trench, the biological monitor shall notify the qualified biologist who will remove the animal as soon as possible. A 3:1 slope shall be left at the end of every open trench to allow trapped desert tortoises to escape. Trenches not backfilled within 72 hours shall have a barrier installed around them to preclude entry by desert tortoises.

D. Desert tortoise burrows shall be avoided to the maximum extent feasible. A qualified biologist shall excavate any burrows which cannot be avoided and will be disturbed by construction. Burrow excavation shall be conducted with the use of hand tools only, unless a fibre-optic scope is used which reveals that the burrow is unoccupied immediately prior to burrow destruction.

E. All water pipes stored within desert tortoise habitat shall have both ends capped to prevent entry by desert tortoises. During construction, all open ended pipeline segments that are welded in place shall be capped during periods of construction inactivity to prevent entry by desert tortoises.

F. A worker education program shall be implemented prior to the onset of construction. All construction employees and visitors shall be required to read an educational brochure prepared by the HCP Administrator and attend a tortoise education class prior to the onset of construction or site entry. The class will describe the sensitive species which may be found in the area, the purpose of the preserve, and the appropriate measures to take upon discovery of a sensitive

species. It will also cover construction techniques to minimize potential adverse impacts. All project personnel shall sign an affidavit that they have read and understand the material presented in the brochure and class.

G. Topsoil removed during trenching shall be re-spread on the pipeline construction area following compaction of the backfill. The area shall be restored as determined during the environmental review.

H. All test pump water will be routed to the nearest wash or natural drainage. The route will be surveyed by the biological monitor. If tortoises are found in the drainage area the qualified biologist will remove the tortoises.

I. Equipment maintenance and staging areas, and storage areas for pipes, wires, etc. will be located outside of preserve areas.

5. The construction area shall be clearly fenced, marked, or flagged at the outer boundaries to define the limits of construction activities. The construction right-of-way shall normally not exceed 50 feet in width for standard pipeline corridors, and should be minimized to the maximum extent practicable. Other construction areas including well sites, storage tank sites, turnarounds, and laydown/staging sites which require larger areas will be determined in the pre-construction phase. All construction workers shall be instructed that their activities shall be confined to locations within the fenced, flagged, or marked areas.

6. Work areas shall be inspected for desert tortoises within 24 hours of the onset of construction. To facilitate implementation of this condition, burrow inspection and excavation may begin no more than seven (7) days in advance of construction activities, as long as a final check for desert tortoises is conducted at the time of construction.

7. Any burrows in the path of construction shall be checked for desert tortoise. Unoccupied burrows which can not be avoided shall be destroyed at that time. If the burrow is occupied and can not be avoided during construction, the burrow shall be excavated by hand and the desert tortoise moved up to 250 feet from where it was found and placed in a natural burrow of similar shape and size. If a natural burrow is unavailable, the desert tortoise shall be placed in a hand excavated burrow of the same size, shape, depth and orientation as the one in which it was found.

8. Only burrows within the limits of clearing and surface disturbance shall be excavated. Burrows outside these limits, but at risk from accidental crushing, shall be protected by the placement of deterrent fencing between the burrow and the construction area. The fencing shall be at least 20 feet long and shall be installed to direct the tortoise leaving the burrow away from the construction area. Installation and removal of such fencing shall be under the direction and supervision of the biological monitor.

9. Any tortoise found above ground and not near the mouth of its burrow shall be moved up to 250 feet from where it was found and placed in the shade of a shrub.

10. All trenches, pits, or other excavations shall be inspected for tortoises by the biological monitor prior to filling. These areas shall be inspected at least three times a day while they remain open. If any desert tortoises are found, they shall be carefully moved by the qualified biologists.

11. All trash and food items shall be promptly contained and regularly removed from the project site to reduce the attractiveness of the area to common ravens and other desert tortoise predators.

12. Construction activities which occur between dusk and dawn shall be limited to areas which have already been cleared of desert tortoises by the qualified biologist and graded. Construction activities shall not be permitted between dusk and dawn in areas not previously graded.

13. No handling of tortoises will occur when the air temperature at 15 centimeters above ground exceeds 90 degrees Fahrenheit.

14. Tortoises are not to be removed from burrows from November 1 through March 15 until appropriate action is determined by the Service with respect to the tortoises. The Service response shall be carried out within 72 hours.

15. If blasting is necessary for construction, all tortoises shall be removed from burrows within 100 feet of the blast area.

16. Powerlines associated with water development, such as to provide power for pumps, should be buried underground adjacent to the pipe. All above ground structures deemed to be necessary shall be equipped with functional anti-perching devices that would prevent their use by ravens and other predatory birds, and shall adhere to the electrical distribution protocol which follows.

17. In order to perform routine operation and maintenance of the water systems such as wells, pumps, water lines and storage tanks, etc., employees are to be trained in the area of desert tortoise education. This training will be performed on a regular basis by a qualified biologist for those personnel not previously trained. The training will include at a minimum the following: identification of tortoises, burrows, and other sign; and instructions on installing tortoise fencing. During the course of basic operation and maintenance desert tortoise will be avoided if at all possible. Non-trained employees shall not perform maintenance operations within the preserve areas.

II. ELECTRIC DISTRIBUTION LINES CONSTRUCTION AND MAINTENANCE

The following protocol are for the maintenance and construction of electric distribution lines. These protocol apply only to site preparation and construction phases of projects. Facilities covered as part of these protocols include above ground poles, transmission lines, substations, and access roads. Access roads must be maintained in primitive condition. The following terms are established to protect the desert tortoise during electrical distribution development in preserve areas:

1. A contact person from the entity performing the construction shall act as the contact representative to the Service (under a Section 7 consultation) or the HCP Administrator (under a non-federal action). He/she will be responsible for overseeing compliance with the protective stipulations as stated in this protocol.

2. Prior to any construction activity within the preserve, the contact person will meet with the HCP Biologist to review the plans for the project. The HCP Biologist, in consultation with the TC, will review alignment, pole spacing, clearing limits, burrow locations, and other project specific plans which have the potential to affect the desert tortoise. The HCP Biologist may recommend modifications to the contact person in order to further avoid or minimize potential impacts to Mojave desert tortoise and to better meet this protocol. If there are unresolvable conflicts between the HCP Biologist and the contact person, then the matter will be arbitrated by the HCAC and, if necessary, by the Washington County Commission.

3. All pre-construction activities which could take tortoises in any manner (e.g., driving off an established road, clearing vegetation, etc.) shall occur in the presence of a qualified biologist. Any hazards to tortoises created by this activity, such as drill holes or any steep-sided depressions, shall be checked three times a day for desert tortoises. These hazards shall be eliminated each day prior to the work crew leaving the site, which may include installing a barrier that will preclude entry by desert tortoises.

   A. A qualified biologist shall conduct pre-construction clearance surveys of all areas potentially disturbed by the proposed project. Any winter dens discovered during the pre-construction survey shall be avoided or mitigated. The survey shall be submitted to the HCP Biologist as part of plan review.

   B. All site mitigation criteria shall be determined in the pre-construction phase, including but not limited to seeding, barrier fences, leveling, laydown/staging areas, and will be reviewed by the HCP Biologist, in consultation with the TC, prior to implementation.

4. The entity shall ensure that during construction their contractors comply with the mitigation measures contained within this protocol. These measures are:

A. A qualified biologist shall oversee construction activities to ensure compliance with the protective stipulations for the desert tortoise, and a biological monitor will be assigned to each group of construction equipment.

B. Any desert tortoises which are found within the project area during construction shall be moved by a qualified biologist out of harm's-way (at a distance no greater than 250 feet).

C. Open pits for transmission poles will be backfilled within 72 hours, whenever possible. All open pits shall be checked three times a day for trapped desert tortoises. If a desert tortoise is found in the pit, the biological monitor shall notify the qualified biologist to have the animal removed. Pits that are not backfilled within 72 hours shall have a barrier installed around them that will preclude entry by desert tortoises.

D. Where an area will be cleared for installation of a larger pole or for a concrete pad, the disturbance area will be minimized to the maximum extent practicable, and temporary tortoise-proof fencing will be erected around the work area.

E. Desert tortoise burrows shall be avoided to the maximum extent feasible. A qualified biologist shall excavate any burrows which cannot be avoided and will be disturbed by construction. Burrow excavation shall be conducted with the use of hand tools only, unless a fibre-optic scope is used which reveals that the burrow is unoccupied immediately prior to burrow destruction.

F. Equipment maintenance and staging areas, and storage areas for poles, wire, etc., will be located outside of preserve areas.

G. A worker education program shall be implemented prior to the onset of construction. All construction employees and visitors shall be required to read an educational brochure prepared by the HCP Administrator and attend a tortoise education class prior to the onset of construction or site entry. The class will describe the sensitive species which may be found in the area, the purpose of the preserve, and the appropriate measures to take upon discovery of a sensitive species. It will also cover construction techniques to minimize potential adverse impacts. All project personnel shall sign an affidavit that they have read and understand the material presented in the brochure and class.

H. Areas impacted during the drilling of pole holes or construction of pads will be restored as determined during the pre-construction process.

5. The construction area shall be clearly fenced, marked, or flagged at the outer boundaries to define the limits of construction activities. The construction right-of-way shall normally not exceed 50 feet in width for standard access road and transmission corridors,

and should be further minimized to the maximum extent practicable. Existing access roads should be used to the maximum extent possible, and rights-of-way for new and existing access roads should normally not exceed 20 feet. Other construction areas including substation sites, storage/staging sites, and turnarounds which require larger areas will be determined in the pre-construction phase. All construction workers shall be instructed that their activities shall be confined to locations within the fenced, flagged, or marked areas.

6. Work areas shall be inspected for desert tortoises within 24 hours of the onset of construction. To facilitate implementation of this condition, burrow inspection and excavation may begin no more than seven (7) days in advance of construction activities, as long as a final check for desert tortoises is conducted at the time of construction.

7. Any burrows in the path of construction shall be checked for desert tortoise. Unoccupied burrows which can not be avoided shall be destroyed at that time. If the burrow is occupied and can not be avoided during construction, the burrow shall be excavated by hand and the desert tortoise moved up to 250 feet from where it was found and placed in a natural burrow of similar shape and size. If a natural burrow is unavailable, the desert tortoise shall be placed in a hand excavated burrow of the same size, shape, depth and orientation as the one in which it was found.

8. Only burrows within the right-of-way shall be excavated. Burrows outside the right-of-way, but which could be at risk from accidental crushing, shall be protected by the placement of deterrent fencing between the burrow and the right-of-way. The fencing shall be at least 20 feet long and shall be installed to direct the tortoise leaving the burrow away from the right-of-way. Installation and removal of such fencing shall be under the direction and supervision of the biological monitor.

9. Any tortoise found above ground, not near the mouth of its burrow, and in harm's-way, shall be moved up to 250 feet from where it was found and placed in the shade of a shrub.

10. All pits or other excavations shall be inspected for desert tortoises by the biological monitor prior to filling. These areas shall be inspected at least three times a day while they remain open. If any desert tortoises are found, they shall be carefully moved by the qualified biologists.

11. All trash and food items shall be promptly contained and regularly removed from the project site to reduce the attractiveness of the area to common ravens and other desert tortoise predators.

12. Construction activities which occur between dusk and dawn shall be limited to areas which have already been cleared of desert tortoises by the qualified biologist and graded.

Construction activities shall not be permitted between dusk and dawn in areas not previously graded.

13. No handling of tortoises will occur when the air temperature at 15 centimeters above ground exceeds 90 degrees Fahrenheit.

14. Tortoises are not to be removed from burrows from November 1 through March 15 until appropriate action is determined by the Service with respect to the tortoises. The Service response shall be carried out within 72 hours.

15. If blasting is necessary for construction, all tortoises shall be removed from burrows within 100 feet of the blast area.

16. Poles or other above ground structures necessary for electrical distribution development shall be minimized as much as possible. All above ground structures shall be equipped with functional anti-perching devices that would prevent their use by ravens and other predatory birds.

17. In order to perform routine operation and maintenance of the electrical distribution systems such as transmission lines and poles, substations, etc., employees are to be trained in the area of desert tortoise education. This training will be performed on a regular basis by a qualified biologist for those personnel not previously trained. The training will include at a minimum the following: identification of tortoises, burrows, and other sign; and instructions on installing tortoise fencing. During the course of basic operation and maintenance desert tortoise will be avoided if at all possible. Non trained employees shall not perform maintenance operations within the non-take areas.

III. ROADWAY MAINTENANCE AND IMPROVEMENTS

Roadway maintenance and improvements are allowed in preserve areas for the purposes of repairing and upgrading roadways within defined rights-of-way. Public access roadways within the proposed preserve include Highway 18, Snow Canyon Road, Tuacahn Road, and Skyline Drive. Highway 18 has a 200-foot right-of-way which will be fenced. Skyline Drive will also be fenced, while Snow Canyon Road and Tuacahn Road are not proposed for fencing.

The protocols contained in this section apply to these four roadways within their existing rights-of-way. However it is recognized that Skyline Drive may be re-aligned in the future, thus altering the location of its right-of-way from its current position. These protocol apply only to site preparation and construction phases of projects.

The following terms are established to protect the desert tortoise during road maintenance in non-take areas:

1. A contact person from the entity performing the construction shall act as the contact representative to the Service (under a Section 7 consultation) or the HCP Administrator (under a non-federal action). He/she will be responsible for overseeing compliance with the protective stipulations as stated in this protocol.

2. Prior to any construction activity within the preserve, the contact person will meet with the HCP Biologist to review the plans for the project. The HCP Biologist, in consultation with the TC, will review alignment, pole spacing, clearing limits, burrow locations, and other project specific plans which have the potential to affect the desert tortoise. The HCP Biologist may recommend modifications to the contact person in order to further avoid or minimize potential impacts to Mojave desert tortoise and to better meet this protocol. If there are unresolvable conflicts between the HCP Biologist and the contact person, then the matter will be arbitrated by the HCAC and, if necessary, by the Washington County Commission.

3. All pre-construction activities which could take tortoises in any manner (e.g., driving off an established road, clearing vegetation, etc.) shall occur under the overall supervision of a qualified biologist. Any hazards to tortoises that may be created by this activity, such as drill holes or any steep-sided depressions, shall be checked three times a day for desert tortoises. These hazards shall be eliminated each day prior to the work crew leaving the site, which may include installing a barrier that will preclude entry by tortoises.

   A. A qualified biologist shall conduct pre-construction clearance surveys of all areas potentially disturbed by the proposed project. Any winter dens discovered during the pre-construction survey shall be avoided or mitigated. The survey shall be submitted to the HCP Biologist as part of plan review.

   B. All site mitigation criteria shall be determined in the pre-construction phase, including but not limited to seeding, barrier fences, leveling, laydown/staging areas, and will be reviewed by the HCP Biologist, in consultation with the TC, prior to implementation.

4. The entity shall ensure that during construction their contractors comply with the mitigation measures contained within this protocol. These measures are:

   A. A qualified biologist shall oversee construction activities to ensure compliance with the protective stipulations for the desert tortoise, and a biological monitor will be assigned to each group of construction equipment if the project is not within a fenced right-of-way.

   B. Any desert tortoises which are found within the project area during construction shall be moved by a qualified biologist out of harm's-way.

C. If not within a fenced right-of-way, all open pits and trenches will be backfilled within 72 hours, whenever possible. All open pits and trenches shall be checked three times a day for trapped desert tortoises. If a desert tortoise is found in a pit or trench, the biological monitor shall notify the qualified biologist to have the animal removed. A 3:1 slope shall be left at the end of every open trench to allow trapped desert tortoises to escape. Pits or trenches not backfilled within 72 hours shall have a barrier installed around them to preclude entry by desert tortoises.

D. Desert tortoise burrows shall be avoided to the maximum extent feasible. A qualified biologist shall excavate any burrows which cannot be avoided and will be disturbed by construction. Burrow excavation shall be conducted with the use of hand tools only, unless a fibre-optic scope is used which reveals that the burrow is unoccupied immediately prior to burrow destruction.

E. All culvert or open pipes stored within desert tortoise habitat (and not within a fenced right-of-way) shall have both ends capped to prevent entry by desert tortoises. During construction, all open ended culvert or pipe segments that are welded in place shall be capped during periods of construction inactivity to prevent entry by desert tortoises.

F. A worker education program shall be implemented prior to the onset of construction. All construction employees and visitors shall be required to read an educational brochure prepared by the HCP Administrator and attend a tortoise education class prior to the onset of construction or site entry. The class will describe the sensitive species which may be found in the area, the purpose of the preserve, and the appropriate measures to take upon discovery of a sensitive species. It will also cover construction techniques to minimize potential adverse impacts. All project personnel shall sign an affidavit that they have read and understand the material presented in the brochure and class.

G. The area shall be restored as determined during the pre-construction process.

5. The construction area shall be clearly fenced, marked, or flagged at the outer boundaries to define the limits of construction activities. The construction right-of-way shall normally not exceed that specified above. In some cases, storage areas for materials and equipment, turnarounds, and staging sites which require larger areas will be determined in the pre-construction phase. All construction workers shall be instructed that their activities shall be confined to locations within the fences, flagged, or marked areas.

6. Work areas shall be inspected for desert tortoises within 24 hours of the onset of construction. To facilitate implementation of this condition, burrow inspection and excavation may begin no more than seven (7) days in advance of construction activities, as long as a final check for desert tortoises is conducted at the time of construction.

7. Any burrows in the within the construction area shall be checked for desert tortoise. Unoccupied burrows which can not be avoided shall be destroyed at that time. If the burrow is occupied and can not be avoided during construction, the burrow shall be excavated by hand and the desert tortoise moved up to 250 feet from where it was found and placed in a natural burrow of similar shape and size. If a natural burrow is unavailable, the desert tortoise shall be placed in a hand excavated burrow of the same size, shape, depth and orientation as the one in which it was found.

8. Only burrows within the right-of-way shall be excavated. Burrows outside the right-of-way, but which could be at risk from accidental crushing, shall be protected by the placement of deterrent fencing between the burrow and the right-of-way. The fencing shall be at least 20 feet long and shall be installed to direct the tortoise leaving the burrow away from the right-of-way. Installation and removal of such fencing shall be under the direction and supervision of the biological monitor.

9. Any tortoise found above ground, not near the mouth of its burrow, and in harm's-way, shall be moved up to 250 feet from where it was found and placed in the shade of a shrub.

10. All trenches, pits, or other excavations shall be inspected for desert tortoises by the biological monitor prior to filling. These areas shall be inspected at least three times a day while they remain open, if they are not within a fenced right-of-way. If any desert tortoises are found, they shall be carefully moved by the qualified biologists.

11. All trash and food items shall be promptly contained and regularly removed from the project site to reduce the attractiveness of the area to common ravens and other desert tortoise predators.

12. Construction activities which occur between dusk and dawn shall be limited to areas which have already been cleared of desert tortoises by the qualified biologist and graded, or are located within a fenced right-of-way. Construction activities shall not be permitted between dusk and dawn in areas not previously graded or fenced.

13. No handling of tortoises will occur when the air temperature at 15 centimeters above ground exceeds 90 degrees Fahrenheit.

14. Tortoises are not to be removed from burrows from November 1 through March 15 until appropriate action is determined by the Service with respect to the tortoises. The Service response shall be carried out within 72 hours.

15. If blasting is necessary for repairs, all tortoises shall be removed from burrows within 100 feet of the blast area.

IV. DISPOSITION OF SICK, INJURED, OR DEAD SPECIMENS

Upon locating dead, injured, or sick desert tortoises under any utility or road project, initial notification by the entity or its agent must be made to the USFWS and The Utah Division of Wildlife Resources within three working days of its finding. Written notification must be made within 5 calendar days with the following information: date; time; location of the carcass; photograph of the carcass; and any other pertinent information. Care must be taken in handling sick or injured animals to ensure effective treatment and care. Injured animals shall be taken care of by the qualified biologist. Should any treated tortoises survive, the USFWS and the Utah Division of Wildlife Resources should be contacted regarding the final disposition of the animals.

V. DEFINITIONS

A. Qualified biologist - As a general rule, a qualified desert tortoise biologist is defined as a person with a bachelors degree or graduate degree in biology, ecology, wildlife biology, herpetology, or related fields. He/she must have demonstrated prior field experience using accepted resource agency techniques to survey for desert tortoises. Field experience may mean a minimum of 60 days field experience searching for tortoises and tortoise sign. The qualified biologist is they only person that can handle the tortoises.

B. Biological monitor - The biological monitor has a specific training on the biology and habits of the desert tortoise. This person is not permitted to handle the tortoises. When a tortoise is identified for removal by the biological monitor he/she will call upon the qualified biologist to remove the tortoise. It is preferable that the biological monitor has some background in biology.

C. Barrier fence - A fence designed to protect the desert tortoise from harm.

D. Educational brochure - A brochure intended to explain to construction crews as well a visitors the desert tortoise and their habitat which are found within the area. The brochure will also explain the appropriate measures to take if a desert tortoise or burrow is located or accidently harmed.

E. Burrow - A temporary cover site in soil that the desert tortoise excavates.

F. Winter den - A permanent structure that is inhabited by desert tortoise during hibernation. The winter den is usually in solid rock or sometimes in soil. The winter dens are to be avoided or mitigated during the pre-construction phase.

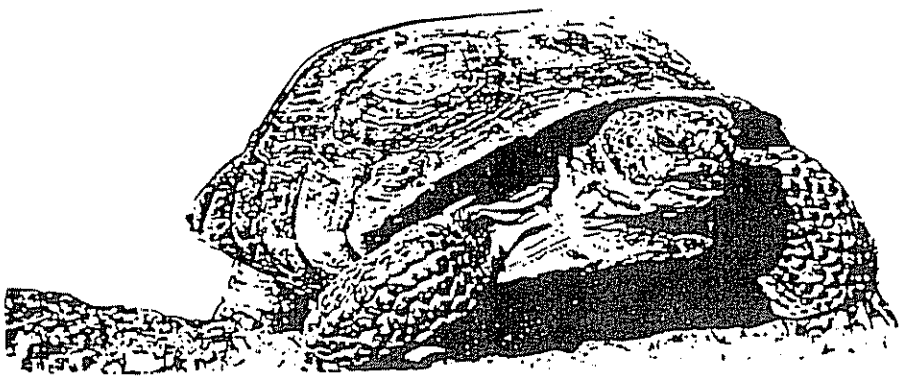
G. Acceptance criteria - Prior to construction of surface disturbances in non-take areas the Service will be notified of the new project. After the Service reviews the project an acceptance criteria will be issued. The acceptance criteria will be issued in accordance with the terms of the water development protocol.

WASHINGTON COUNTY, UTAH
DESERT TORTOISE INCIDENTAL TAKE PERMIT APPLICATION/DOCUMENTS
Part III

Final
Environmental Impact Statement
for
Incidental Take Permit Issuance for Desert Tortoise
Washington County, Utah

Prepared by
U.S. Fish and Wildlife Service

December 1995



WASHINGTON COUNTY, UTAH
DESERT TORTOISE INCIDENTAL TAKE PERMIT APPLICATION/DOCUMENTS
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Final
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December 1995

Final
Environmental Impact Statement for Incidental Take Permit Issuance for Desert Tortoise For Washington County, Utah

Lead Agency:

U.S. Department of the Interior
Fish and Wildlife Service - Region 6

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ABSTRACT: This Final Environmental Impact Statement documents the analysis of three alternatives that were developed for obtaining a section 10(a) permit under the Endangered Species Act for the incidental take of Mojave desert tortoise in Washington County, Utah. The alternatives are: (A) No Action, as required by the National Environmental Policy Act; (B) Issuance of a section 10(a) permit based on the proposed Habitat Conservation Plan with a reserve of 61,022 acres and 12,264 acres of take; or (C) Issuance of a section 10(a) permit based on a Habitat Conservation Plan with a reserve of 44,504 acres and 15,094 acres of take. The selected alternative will guide growth and development in Washington County for the next twenty years. as well as determine the extent of protection afforded the threatened Mojave desert tortoise in the Upper Virgin River Recovery Unit.

NOTE TO REVIEWERS: Reviewers should provide the U.S. Fish and Wildlife Service (USFWS) with their comments during the review period. This will enable USFWS to analyze and respond to comments at one time and to use the information to prepare the Final Environmental Impact Statement, thus avoiding undue delay in the decision-making process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and will alert the agency to reviewers' positions and contentions. Environmental objections that could have been raised at the draft stage may be waived if not raised until after the completion of the Final Environmental Impact Statement (*Wisconsin Heritages, Inc. v. Harris, 490 F, Supp. 1334, 1338 [E.D. Wis. 1980]*. Comments should be specific and should address the adequacy of the statement and merits of the alternatives discussed (40 *C.F.R* 1503.3).

December 1995

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LIST OF ACRONYMS

ACOE	Army Corps of Engineers
af	acre-foot
AMP	Allotment Management Plan
AUM	Animal Unit Month
BLM	Bureau of Land Management
cfs	cubic feet per second
CWA	Clean Water Act
DIVISION	Utah Division of State Lands and Forestry
DTRP	Desert Tortoise Recovery Plan
DWMA	Desert Wildlife Management Area
EIS	Environmental Impact Statement
ESA	Endangered Species Act
HCP	Habitat Conservation Plan
MFP	Management Framework Plan
MVP	Minimum Viable Population
NEPA	National Environmental Policy Act
NPS	National Park Service
OHV	Off-Highway Vehicle
RMP	Proposed Dixie Resource Management Plan
SRMA	Special Recreational Management Areas
TE&S	Threatened, Endangered, and Sensitive
UDNR	Utah Department of Natural Resources
UDWR	Utah Division of Wildlife Resources
URTD	Upper Respiratory Tract Disease
USFWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
USGS	U.S. Geological Service
USPR	Utah State Parks and Recreation
VRBIRM&RP	Virgin River Basin Integrated Resource Management and Resource Program
WCWCD	Washington County Water Conservancy District

EXECUTIVE SUMMARY

INTRODUCTION

Washington County, Utah, has developed a county-wide Habitat Conservation Plan (HCP) as part of the application process for a section 10(a) Incidental Take Permit for Mojave desert tortoise under the Endangered Species Act (ESA). The HCP provides for establishment of a desert tortoise reserve using Bureau of Land Management (BLM), State, and private lands. In order to comply with provisions of the National Environmental Policy Act (NEPA), the U.S. Fish and Wildlife Service (USFWS) has prepared this EIS to assess effects of the HCP and alternatives (including No Action) on relevant environmental resources.

PURPOSE OF AND NEED FOR ACTION

The purpose of the HCP and issuance of a section 10(a) permit is to resolve conflicts between economic growth in Washington County and the continued survival of the Mojave desert tortoise. A wildlife reserve would be established, a portion of which currently supports desert tortoises. This action would allow development to continue legally in desert tortoise habitat in the Upper Virgin River Recovery Unit in Washington County.

The need for a section 10(a) permit and HCP has come about because of rapid growth occurring in Washington County. The mild climate and scenic beauty of this region has attracted many people to the area. A large portion of this growth occurred in and around the cities of St. George, Washington, Ivins, Hurricane, and Springdale. The human population in Washington County is expected to increase with rates between 66 and 186 percent by the year 2010.

The unique geography of the area provides habitat for a variety of plant and animal life, including nine species currently listed as threatened or endangered by USFWS. Among these species is the Mojave desert tortoise. The desert tortoise was officially listed as threatened in April 1990 because of an alarming decline in monitored populations. The decline was felt to be a result of a number of factors, including habitat degradation, direct mortality resulting from human contact, predation, and an upper respiratory tract disease (URTD) (USFWS 1994a). As a result of the listing, desert tortoises are protected from "take." The definition of "take" in the ESA includes the term "harm," which has been further defined to include activities that would modify or degrade habitat in a way that significantly impairs essential behavior patterns (50 C.F.R. § 17.3). Therefore, any activity that may result in the take of desert tortoises or their habitat is prohibited under provisions of the ESA.

In 1982, the ESA was amended to help resolve conflicts between private land use for economic development and protection of threatened or endangered species. Section 10(a)(1)(B) of the ESA allows USFWS to issue a permit to private landowners (including city, County and State lands) that allows take of a listed species provided that such take is incidental to and not the purpose of carrying out an otherwise lawful activity. Washington County is applying for a section 10(a) permit for the Mojave desert tortoise. No other listed species would be included on the permit.

DECISION TO BE MADE

A decision must be made as to which of the following three alternatives would most benefit the survival of the desert tortoise, yet allow continued growth in Washington County:

- Alternative A – No Action, as required by NEPA.
- Alternative B (Proposed Action) – Issuance of a section 10(a) permit based on the proposed HCP.
- Alternative C – Issuance of a section 10(a) permit based on an HCP with a smaller reserve and greater area of take.

Table ES1 compares the impacts to desert tortoise habitat and individual animals under each of the alternatives.

Table ES1. Comparison of Effects of Alternatives on Desert Tortoise.

Alternative	Reserve Acres	Take Acres	Potential Habitat Acres	Estimated # Tortoises Taken
A	0	0	0	0
B	61,022	12,264	11,832	1,169
C	44,504	15,094	11,832	1,709

PUBLIC SCOPING SUMMARY

In December 1991, five public meetings were held in Washington County to provide an opportunity for the public to learn about and comment on the Proposed Action and alternatives. Attendance at all public scoping meetings totalled 84 people. Public input ranged from support of the HCP and protection of the desert tortoise to expressions of anti-government feelings and a belief that desert tortoises are not native to the St. George area. Eight major issues, concerns, and ideas were raised during the public scoping meetings. An additional comment period, including a public open house, occurred in February 1995 to update the public on changes made to the proposed HCP since the last public meetings. No new concerns were raised during this comment period.

ISSUES ELIMINATED FROM FURTHER ANALYSIS

The issue of whether desert tortoises are native to the St. George area was eliminated from further analysis because desert tortoises in Washington County are part of the Mojave Desert population and are therefore protected under section 9 of the ESA regardless of their origin. The constitutionality of the ESA was eliminated from further analysis because it is beyond the scope of this analysis.

MAJOR ISSUES TO BE ANALYZED

Based on input from the public, government agencies, and the HCP Steering Committee, seven major issues have been identified for further analysis: 1) Impacts on Washington County's economy; 2) Impacts on threatened, endangered, and sensitive species in Washington County; 3) Impacts on multiple-use activities in non-take areas; 4) Impacts on State School Trust Lands; 5) Impacts on private landowners; 6) Impacts on livestock grazing and other agricultural practices; and 7) Impacts on Virgin River flow.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

Three alternatives have been developed for analysis in this EIS. These alternatives include the NEPA-required No Action Alternative and two action alternatives based on issuance of a section 10(a) permit. The first of these is the Proposed Action Alternative. Five other alternatives were eliminated from further analysis due to their lack of feasibility.

Under the No Action Alternative (Alternative A), no HCP would be prepared, and Washington County would not pursue a section 10(a) permit. Current project-by-project enforcement of the ESA would continue, resulting in individual section 7 and 10(a) permits and section 9 enforcement. No privately funded, large-scale implementation of the Desert Tortoise Recovery Plan (DTRP) would be undertaken, and State and Federal agencies would be responsible for implementing the proposed Upper Virgin River Desert Wildlife Management Area (DWMA).

Under the Proposed Action Alternative (Alternative B), a section 10(a) permit would be issued subject to terms and conditions of the HCP that has been developed by Washington County. The incidental take estimated for this alternative is 12,264 acres of desert tortoise habitat and 11,832 acres of potential habitat. Primary mitigation for take of desert tortoise habitat would be acquisition and management of lands that would be made into a reserve. The reserve would encompass 61,022 acres of land, over half of which would be desert tortoise habitat. The remaining acreage within the reserve would provide habitat for other wildlife species. The reserve lands would be acquired through land purchases and exchanges. Management of the reserve would include fencing reserve boundaries; prohibiting specific activities in areas of high sensitivity; acquiring all grazing permits and prohibiting further grazing at critical times of the year; managing all free-roaming dogs and feral animals within the reserve; and enforcing all Federal, State and local regulations within the reserve.

Also under the Proposed Action, Washington County would be responsible for conducting desert tortoise surveys in take areas prior to development. If desert tortoises were found in these areas, a number of them would be translocated by USFWS. In addition, an environmental education center would be created to help inform people about the values of ecosystems found within the County.

Sources of permanent funding for the HCP would include a county-wide fee assessed when building permits are issued. The fee would be equal to 0.2 percent of total construction costs. A second county-wide fee of $250.00 per acre would be assessed to developers of subdivisions,

condominiums, town homes, or planned unit developments. It is estimated that over the 20-year period of the section 10(a) permit, revenues from these fees would exceed $9 million. Of this total, approximately $7 million would be expended on desert tortoise preservation. The balance would be expended on other threatened, endangered, and sensitive species within the County. Washington County expects to enter into cost sharing agreements with the Utah Department of Transportation, Utah Department of Wildlife Resources, and USFWS for additional funding of the HCP. It is estimated that total cost of the HCP would be $11,555,000.

Alternative C is similar to the Proposed Action; however, the expected incidental take of desert tortoise habitat would be greater and the size of the reserve would be reduced. The area of incidental take of desert tortoise habitat would be 15,094 acres, and size of the reserve would be 44,504 acres. This smaller reserve may not meet all requirements outlined in the DTRP for the Upper Virgin River DWMA. The proposed DWMA (which would be larger than the 44,483-acre reserve) is considered to be: "...too small to ensure adequate probability of population persistence without careful management" (USFWS 1994a). The reserve would be managed following guidelines of the DTRP; however, more intensive management would be required to ensure desert tortoise population persistence within the reserve.

AFFECTED ENVIRONMENT

The following resources may be impacted by one or more of the alternatives.

Socioeconomics

Southern Washington County is experiencing higher growth rates than other areas of Utah because of its favorable climate and living conditions. The human population of the County increased by 83 percent between 1980 and 1990. This population growth has influenced development of the area in terms of housing, education, and industry.

Land Ownership, Use, and Management

Table ES2 presents the acreage and percentage of lands in Washington County owned by the Federal government, State of Utah, and private individuals (including lands owned by municipalities).

The majority of Federal lands in Washington County are managed by the BLM. Primary multiple uses of these public lands are mining, grazing, and recreation. All BLM lands which have not been withdrawn are generally subject to mineral entry. There are currently 1,192 registered mining claims on approximately 22,800 acres of BLM-managed lands in the County.

Commercial cutting of timber is not permitted on BLM lands. However, cutting of dead-and-down woody material by private individuals is allowed if permits are obtained. Cutting of live green trees is not allowed except for management purposes.

Table ES2. Land Ownership in Washington County.

Land Status	Acres	Percent
Federal	1,176,289	76%
State	94,747	6%
Private	280,964	18%
Total	1,552,000	100%

Recreational opportunities are an important aspect of BLM lands in the County, partly because of the scenic beauty of lands adjacent to Zion National Park. For this reason, off-highway vehicle (OHV) use is restricted in areas adjacent to the national park. Five special recreation management areas (SRMAs) have been proposed on BLM lands within Washington County. Each of these SRMAs will be managed to optimize recreational opportunities specific to that area.

All State lands in the County are managed by the Utah Division of State Lands and Forestry (Division), except for Snow Canyon State Park. State lands are available for a variety of recreational opportunities; however, some recreational activities such as OHV use and hunting are restricted in Snow Canyon State Park. A limited amount of mining and woodcutting are permitted on State lands.

Privately owned lands are not subject to use restrictions as long as Federal, State, and local laws, regulations, and ordinances are not being violated.

Agricultural Resources

Currently, BLM lands in Washington County include 110 grazing allotments that support cattle, sheep, and horses. The BLM is responsible for preparing Allotment Management Plans (AMPs) for all grazing allotments. Four grazing allotments, listed in Table ES3, would be impacted by the action alternatives. No farmlands would be impacted by the Proposed Action or other alternatives.

Threatened, Endangered, Candidate, and Sensitive Species

Nine Federally listed threatened or endangered species found in Washington County are expected to be affected by one or more of the three alternatives. They are the Mojave desert tortoise, Mexican spotted owl, bald eagle, peregrine falcon, woundfin, Virgin River chub, dwarf bear-poppy, Siler pincushion cactus, and southwestern willow flycatcher. In addition, 25 candidate species currently under consideration by USFWS for listing as threatened or endangered may be affected.

Table ES3. Grazing Allotments That Could Be Impacted by the Action Alternatives.

Name	Total Acreage	Federal AUMs	State AUMs
Alger Hollow	16,878	741	124
Yellow Knolls	2,053	16	0
Washington	20,563	256	870
Red Cliffs	19,022	425	0

Water Resources

Water resources have been a valuable commodity in Washington County since early settlement began in the 1800s. Seven topics must be addressed in order to understand current and future trends that may affect this resource: surface water, groundwater, water quality, water rights, water budgets, present water use, and potential water development.

The Virgin River is the largest watercourse in Washington County. Fed by numerous tributaries, it carries run-off from rain and snowmelt into Lake Mead in Nevada, although frequently sinking into the desert before reaching Lake Mead.

Residents and industry rely heavily on groundwater supplies. Groundwater occurs in both consolidated and unconsolidated rock within the Virgin River Basin. Perched groundwater aquifers are also found within the Basin where underlying strata are impervious to water above aquifers.

Water quality can be affected by several determinants, including biological contaminants, dissolved solids, and suspended solids. Although biological contamination is not a serious problem in the Virgin River Basin, a water treatment plant was built to ensure that clean water is available to human residents of the area. Dissolved solids are the main water quality problem in the Virgin River, with highest concentrations in the reach between La Verkin Springs and St. George. The majority of suspended solids, or sediments, are carried through the Virgin River Basin during high flow periods in spring and summer. High concentrations of sediment increase treatment costs for municipal water supplies.

The diversion and use of water for municipal/industrial and agricultural purposes requires an approved water right application. The Utah Division of Water Rights State Engineer administers water rights within the State. Two issues have the potential of affecting water rights in the Virgin River Basin: adjudication and Federal reserved water rights.

Water budgets have been prepared for 11 areas in Washington County to account for all water flows and uses each year. Water budgets include average water diverted, canal losses due to seepage, run-off and deep percolation, and consumptive use by crops.

Municipal and industrial water is primarily supplied through groundwater wells and springs. Agricultural water is mostly obtained from surface water.

Future water development will be required with the rapid human population increase anticipated for Washington County. Water conservation measures will also likely be required.

Visual Resources

Visual resources in Washington County are varied, and in many cases, spectacular. Zion National Park, on the eastern edge of the County, exhibits exceptional visual resources, particularly in the white cliffs, red rocks, and riparian areas of the Virgin River.

The BLM divided its lands into four inventory classes, with Class I being the highest visual quality ranking and Class IV being the lowest. Within Washington County, only the Beaver Dam Mountains Wilderness Area has received a Class I rating, which is reserved for wilderness areas or similar Congressional designations. About 132,000 acres have received Class II ratings; 333,000 acres have received Class III ratings; and 160,000 acres have received Class IV ratings. Desert tortoise habitat on BLM lands north of Washington City and over to Hurricane are rated Class II, while lands north of St. George are rated Class IV. These classifications apply only to BLM lands.

Wildlife Resources

Due to its location, topography, and climate, Washington County contains a variety of habitats and, in addition to threatened, endangered, and sensitive species, numerous non-sensitive wildlife species. The majority of reserve and take areas are located in the Warm Desert Scrub, while areas higher than 1,200 feet above sea level are located in the Cool Desert Scrub. Additionally, riparian areas, primarily along the Virgin and Santa Clara Rivers, provide habitat for a variety of wildlife species.

ENVIRONMENTAL CONSEQUENCES: ALTERNATIVE A (NO ACTION)

Socioeconomics (Alternative A)

Alternative A would require no additional funds from the County; however, no grading or building permit fees would be collected to fund conservation and mitigation measures for the desert tortoise or other species of concern. Further, no county-wide permit would be issued for incidental take of desert tortoise, leaving land-users to fund their own permits, plans, and mitigation measures as necessary.

When considering the economic impact of the Proposed Action on Washington County it is important to keep in mind the continuing opportunity costs of lands set aside before the HCP is implemented. Opportunity costs are defined as the highest value alternative foregone before making a decision to use a resource in a particular manner. Lands that are to be set aside for the reserve create economic losses to the community equivalent to the social opportunity cost

of the lands. In this sense, the proposed HCP does not create positive net effects on Washington County, rather it reduces the level of economic costs imposed upon the County. However, because avoided costs can be viewed as a benefit, the value of this cost savings should be calculated. The "benefit" of the HCP will be the difference between the economic cost without the HCP and the lower economic costs with the HCP.

The No Action Alternative would deny the County both aesthetic and monetary benefits of the Proposed Action Alternative. Residents would not enjoy the open space, visual quality and protection to wildlife that the reserve would offer, and the County would not gain from increased tourism due to the draw of the reserve and the nature education center. No benefits from the increase in property values of lands adjacent to the reserve would be realized by either the local government or private individuals.

Table ES4 lists the impacts under Alternative A for the following scenarios: 1) Retained Annual Long-run Benefits; 2) Lost Annual Long-run Benefits; 3) Total Lost Construction and Development Values; and 4) Likely Annual Development of Take Areas in the Short Run. All monetary data assume base year values and are expressed in millions of dollars (base year=1996). For purposes of the analysis, it is assumed that all growth and development is stopped on lands identified as containing desert tortoise habitat. However, it is likely that some of the lands would be developed, either with or without a USFWS incidental take permit. It is impossible to quantify what percentage of lands that are desert tortoise habitat would be developed under no action, and which would not. Hence, the assumption that none are developed is made.

Table ES4. Economic Evaluation of the No Action Alternative.

Scenario	1996 MM$* Total Industry Output	Jobs Created	Population Supported	Percent Increase in Constrained Long-run Economy
Retained Annual Long-run Benefits	0.00	0.00	0	0.00
Lost Annual Long-run Benefits	-$1,472.98	-38,349.59	-95,291	16.92
Total Lost Construction and Development Values	-$34,002.54	N/A	N/A	N/A
Likely Annual Development Benefits of Take Areas	0.00	0.00	0	0.00

* millions of dollars (base year=1996)

Land Ownership, Use, and Management (Alternative A)

Under Alternative A, there would be no changes to land use on BLM lands. If development were to continue on State and private lands, USFWS may have to be consulted concerning threatened and endangered species.

Agricultural Resources (Alternative A)

There would be no change to agricultural resources under Alternative A.

Threatened, Endangered, Candidate, and Sensitive Species (Alternative A)

Under Alternative A, impacts to Federally listed species on State and private lands would be subject to case-by-case evaluation and consultation with USFWS. Candidate and sensitive species would not be afforded protection under the ESA. However, if some of those species become threatened or endangered in the future, they would then be protected under the ESA.

Water Resources (Alternative A)

Water demand would be expected to increase in Washington County with continued population increase. Conservation measures may be implemented to reduce the amount of additional water necessary for the growing human population.

Visual Resources (Alternative A)

Visual quality may be impacted on State and private lands as a result of maximizing monetary benefit from these lands. BLM lands would continue to be managed according to visual resource management guidelines.

Wildlife Resources (Alternative A)

Continued development of State and private lands would be expected to adversely modify wildlife habitat and eliminate or displace wildlife species. BLM lands would be managed under guidelines outlined in the Dixie Resource Management Plan which is expected to be finalized in the near future.

ENVIRONMENTAL CONSEQUENCES: ALTERNATIVE B (PROPOSED ACTION)

Socioeconomics (Alternative B)

Table ES5 outlines economic impacts of the Proposed Action. Under Alternative B, lost construction and development values and lost annual, long-run benefits are substantially decreased as compared to Alternative A.

Land Ownership, Use, and Management (Alternative B)

Under this alternative, BLM would contribute 38,034 acres of land to the reserve. Eventually, BLM would manage the majority of reserve lands. No mining or wood cutting would be allowed within the reserve, and certain types of recreation activities would be restricted.

Table ES5 Economic Evaluation of Alternative B.

Scenario	1996 MM$ Total Industry Output	Jobs Created	Population Supported	Percent Increase in Constrained Long-run Economy
Retained Annual Long-run Benefits	$590.48	15,373.48	38,200	8.17
Lost Annual Long-run Benefits	-$882.52	-22,976.73	-57,092	10.14
Total Lost Construction and Development Values	-$18,883.36	N/A	N/A	N/A
Likely Annual Development Benefits of Take Areas	$16.13	289.00	720	1.16

* millions of dollars (base year=1996)

Approximately 10,938 acres of State School Trust lands would be contributed to the reserve. In exchange, the State would receive lands of equal value outside the reserve. It is likely that exchange lands which the State would acquire from BLM would have lower development potential; however, they would not be encumbered with ESA compliance requirements. In addition, 4,379 acres of Snow Canyon will be considered part of the reserve. Approximately 2,515 acres of State lands would be in incidental take areas and could be developed.

It is estimated that 7,618 acres of private lands would be incorporated into the reserve. The lands would be exchanged on a value-for-value basis, and private landowners should suffer no net loss of land value. Approximately 9,783 acres of privately-owned lands would be in incidental take areas, and could be developed.

Agricultural Resources (Alternative B)

Under Alternative B, all current grazing permit holders within the proposed reserve would receive offers to sell their permits according to terms listed in the HCP. The permits would be purchased for both summer and winter areas at an estimated cost of $120.00 per AUM. The purchase of permits and retirement of grazing from the proposed reserve is expected to benefit the desert tortoise by reducing potential for trampling of individual animals and reducing competition for forage.

Grazing occurs on some portions of BLM land in desert tortoise habitat in Zone 4 north of Hurricane. Grazing in this area is operating under an ESA section 7 permit and would continue to undergo section 7 review under the ESA. It would not be affected by Alternative B.

Grazing on Paiute Tribal Lands would not be affected by Alternative B.

There would be no impacts to farming under this alternative.

Threatened, Endangered, Candidate, and Sensitive Species (Alternative B)

This alternative represents the Proposed Action, which would implement the Washington County HCP under authority of a section 10(a) Incidental Take Permit from USFWS for the Mojave desert tortoise. Under this alternative, a large reserve would be established in desert tortoise habitat west, north, and east of St. George. The reserve would total 61,022 acres, consisting of five distinct zones. The desert tortoise would be protected within the reserve by active management specifically oriented toward protection of the desert tortoise and its habitat and fencing and access and use restrictions, which vary by zone.

Ten incidental take areas are proposed under this alternative, totaling 12,264 acres. Many of the take areas occur in the vicinity of existing rural or urban development. These areas would be subject to take of desert tortoises and/or their habitat through habitat alteration, displacement of individuals, or mortality resulting from development. Multiple use management on BLM lands that are found within take or non-reserve areas would continue to be subject to ESA section 7 consultation with USFWS.

Other TE&S species would benefit from the reserve as well. Negative impacts to other TE&S species as a result of this alternative are insignificant or unknown.

Water Resources (Alternative B)

Any changes in water usage over the next 20 years is considered to be independent actions under the alternatives, including Alternative B. This is because water use is a function of human population, and the population of Washington County is anticipated to increase at the same rate, regardless which alternative is implemented. The alternatives considered in this EIS primarily are concerned with patterns of growth, rather than amount.

Visual Resources (Alternative B)

If Alternative B is adopted, change to visual quality would occur only in take areas. Take areas are, for the most part, adjacent to current population concentrations. Additional development in these areas is not expected to significantly impact visual quality. Exemption of the reserve from development would ensure that visual quality would be maintained and preserved in these areas.

Wildlife Resources (Alternative B)

The reserve established under this alternative would reduce adverse impacts on wildlife and wildlife habitat resulting from development and OHV use. Hiking, horseback riding, and camping would be restricted to designated areas or trails, vehicles would be restricted to designated roads on much of the reserve, and hunting would be limited to big game and upland bird species during official seasons.

In "take" areas, wildlife may be significantly affected. If development occurs, wildlife may be displaced and existing habitat would likely be modified. Only part of one of the proposed take areas, #8 with 159 acres, lies within priority habitat for big game as delineated by the BLM's proposed Dixie RMP. All other take areas are outside defined big game habitat.

ENVIRONMENTAL CONSEQUENCES: ALTERNATIVE C

Socioeconomics (Alternative C)

Adverse economic impacts of this alternative would be lower than those of Alternative B. Table ES6 outlines the economic impacts of this alternative.

Table ES6. Economic Evaluation of Alternative C.

Scenario	1996 MM$ Total Industry Output	Jobs Created	Population Supported	Percent Increase in Constrained Long-run Economy
Retained Annual Long-run Benefits	$732.83	19,079.55	47,409	10.13
Lost Annual Long-run Benefits	-$732.81	-19,078.93	047,407	8.42
Total Lost Construction and Development Values	-$15,771.88	N/A	N/A	N/A
Likely Annual Development Benefits of Take Areas	$16.13	289.00	720	1.16

* millions of dollars (base year = 1996)

Land Ownership, Use, and Management (Alternative C)

Impacts to land ownership would be similar to those under Alternative B, except that reserve acreage would be smaller.

Agricultural Resources (Alternative C)

This alternative would have the same impacts as those described for Alternative B.

Threatened, Endangered, Candidate, and Sensitive Species (Alternative C)

This alternative is a modification of Alternative B, with less total acreage designated as reserve and more acreage designated as "take" areas. The reserve would total 44,504 acres in size, and take areas would total 15,094 acres of State and private lands. Desert tortoises present on these 15,094 acres would be subject to take through habitat alteration, displacement of individuals, or mortality resulting from development. All management of TE&S species in the reserve would be the same as for Alternative B.

Water Resources (Alternative C)

Water usage for Alternative C would be the same as for Alternative B.

Visual Resources (Alternative C)

The impacts to visual quality as a result of this alternative are expected to be worse than under Alternative B. The majority of areas that would be available for development are in desert tortoise population concentration areas with low visual sensitivity; however, more visually sensitive areas, such as Padre and Paradise Canyons, could be developed under this alternative, thus potentially compromising their visual quality.

Wildlife Resources (Alternative C)

Under this alternative, less wildlife habitat would be protected through establishment of a smaller reserve (approximately 27 percent less than under Alternative B). Impacts of the take areas for this alternative on wildlife would be the same as for Alternative B, with the exception of an additional 2,830 take acres, some of which lie within designated priority big game habitat.

CHAPTER 1.0
PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

In 1991, Washington County (County), Utah appointed a Steering Committee to develop a county-wide section 10(a) Incidental Take Permit application under the Endangered Species Act (ESA) (16 *U.S.C.* §§ 1531 *et seq.*, as amended) for the Mojave desert tortoise. The purpose of seeking this permit from the U.S. Fish and Wildlife Service (USFWS) is to allow continued growth and development within the County while providing protection for the desert tortoise. The Steering Committee consisted of fifteen members, each representing an interest group or a government agency. Over the last four years, the Steering Committee has developed a county-wide Habitat Conservation Plan (HCP), a required part of the ESA section 10(a) permit application.

In addition to an HCP, section 10(a) of the ESA requires an Implementation Agreement that legally binds the parties, and compliance with the National Environmental Policy Act (NEPA) (42 *U.S.C.* §§ 4321, *et seq.*, as amended) through preparation of an Environmental Assessment or Environmental Impact Statement (EIS), as appropriate. NEPA review of the Washington County permit application includes this EIS, which analyzes environmental impacts of the proposed Washington County HCP and issuance of the ESA section 10(a) Incidental Take Permit. The EIS has been prepared following Council on Environmental Quality NEPA guidelines, as amended, (40 *C.F.R* 1500-1508) and the Draft Handbook for HCP Planning and Incidental Take Permit Processing (USFWS 1994b).

1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of this action is to resolve conflicts between economic growth in Washington County and the continued survival of the Mojave desert tortoise. Completion of the HCP and issuance of an ESA section 10(a) permit would allow development to continue legally in desert tortoise habitat in Washington County. A 61,022-acre wildlife reserve would be established that would include 38,787 acres of habitat currently supporting desert tortoises. Habitat would also be available for other Federally listed, candidate, and State sensitive species.

The need for an ESA section 10(a) permit for "take" of the Mojave desert tortoise has come about because of rapid human population growth occurring in Washington County, which is located in southwestern Utah (Figure 1.1). The mild climate and scenic beauty of this region has attracted many people. Between 1980 and 1990 the human population grew by 86.3 percent, from 26,125 to 48,560 residents. From 1981 to 1992, annual building permit applications increased 166 percent. Most building permits were for single-family residences.

A large portion of this growth occurred in and around the cities of St. George, Washington, Ivins, Hurricane, and Springdale. The Washington County Water Conservancy District (WCWCD) expects population growth in the County to continue with rates between 66 and 186 percent by the year 2010. In addition to new permanent residents, Washington County has been

the destination for many tourists wishing to explore the nearby national and State parks and forests. These visitors have created an increased demand for service-oriented businesses that contribute significantly to the economy of Washington County. Additional residential, commercial, and industrial developments will be needed as the County's population continues to grow.

Washington County is located in an area where the Great Basin, Mojave Desert, and Colorado Plateau converge. The unique geography of the area provides habitat for a variety of plant and animal life, including nine species currently listed as threatened or endangered by USFWS. These species are the Mojave desert tortoise, bald eagle, peregrine falcon, woundfin, Virgin River chub, dwarf bear-poppy, Siler pincushion cactus, southwestern willow flycatcher, and Mexican spotted owl. The ESA authorizes USFWS to list a species as endangered if the species is in danger of extinction throughout all or a significant portion of its range. A species may be listed as threatened if it is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Growth and development in Washington County have increasingly come into conflict with one listed species in particular: the Mojave desert tortoise. Figure 1.2 shows the extent of desert tortoise habitat within the County. The Mojave desert tortoise was officially listed as threatened on April 2, 1990 because of an alarming decline in numerous study plots. This decline was due to a number of factors, including habitat degradation, direct mortality resulting from human contact, predation, and an upper respiratory tract disease (URTD) (USFWS 1994a). Because the Mojave desert tortoise is Federally listed as a threatened species, it is protected from "take," which is defined by the ESA to mean harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. The term "harm" has been further defined to include activities that would modify or degrade habitat in a way that significantly impairs essential behavior patterns. Any activity that may result in the take of desert tortoises or their habitat is prohibited by the ESA.

In 1982, the ESA was amended to provide a permit process to help resolve conflicts between private land use for economic development and species protection. According to section 10(a)(1)(B) of the ESA, the Secretary of the Interior may issue a permit that allows take of a listed species if the take is incidental to, and not the purpose of, carrying out an otherwise lawful activity. In order to obtain an ESA section 10(a) permit, the applicant must prepare a conservation plan that specifies the following: (1) what impacts may result from the take; (2) how take will be minimized and mitigated to the greatest extent practicable; and (3) what other alternatives were considered and why those alternatives were not used. In order for a section 10(a) permit to be issued, the following criteria must be met by the permit applicant and addressed in the HCP according to section 10(a)(2)(B) of the ESA: (1) the taking will be incidental; (2) the applicant will to the maximum extent practicable, minimize and mitigate the impacts of such taking; (3) the applicant will ensure that adequate funding for the plan will be provided; (4) the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and (5) any other measures required by USFWS will be met.

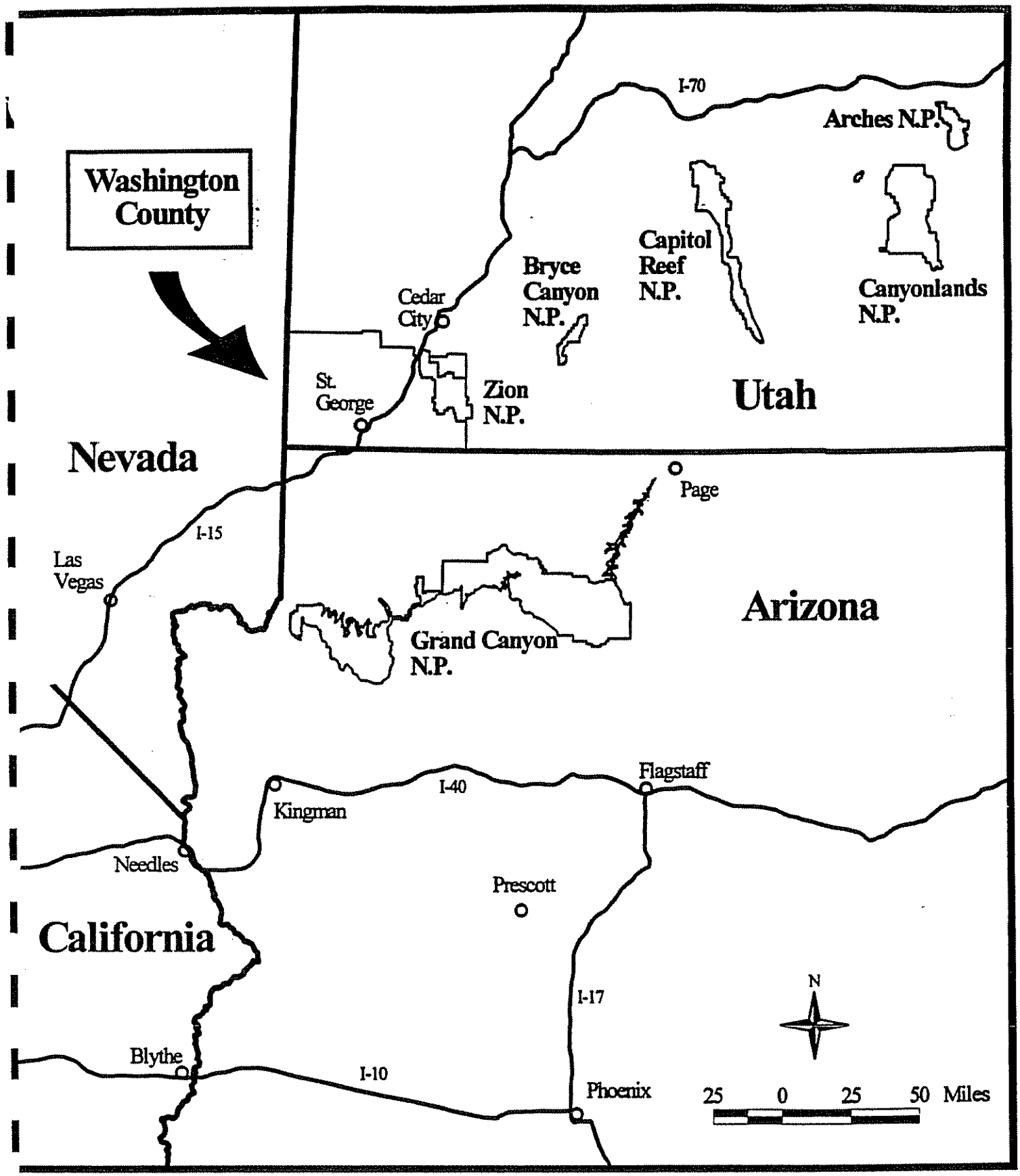


Figure 1.1 Project Location

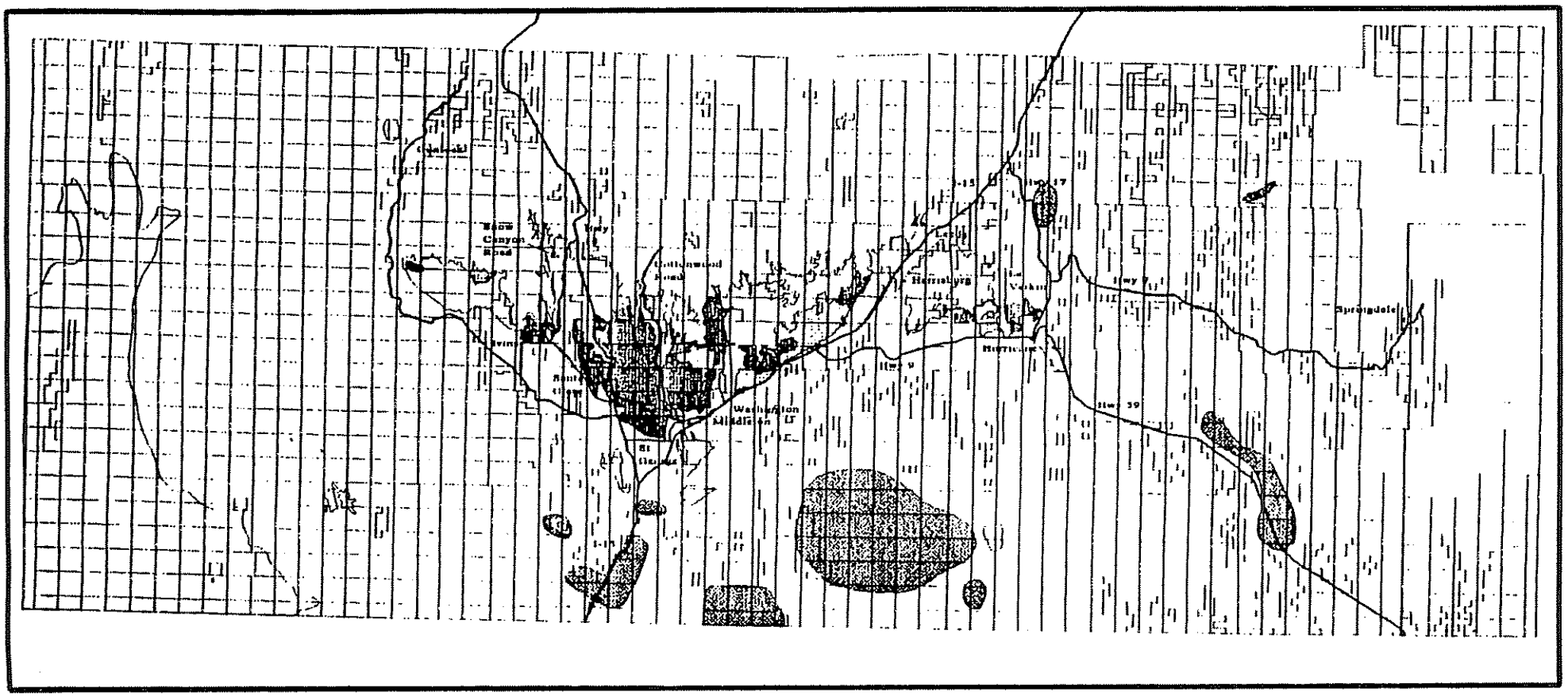


Figure 1.2 Tortoise Habitat Within Washington County

Under the proposed Washington County HCP, an ESA section 10(a) permit would be issued only for the Mojave desert tortoise, and not for any other listed species. Permits are not required for endangered plant species on State or private lands, and no take is expected for the other listed animal species in Washington County. The permit would allow the otherwise lawful activity of development to continue without violating the ESA. The section 10(a) permit would be for an estimated maximum 1,169 desert tortoises, 12,264 acres of desert tortoise habitat, and 11,832 acres of potential habitat (geographically isolated areas with no documented desert tortoise sign). As partial mitigation for take, the HCP proposes the establishment of a 61,022-acre reserve, including 38,787 acres of habitat currently supporting desert tortoises. The reserve will extend from the Paiute Tribal Lands on the west, to the City of Hurricane on the east. Management within the reserve will focus on the Mojave desert tortoise; however, habitat would also be provided for other Federally listed, candidate, and State sensitive species. Further mitigation for take would include habitat acquisition, fencing, law enforcement, education, and elimination of land uses that compromise desert tortoise survival. Development of desert tortoise habitat would be allowed in designated take areas outside the reserve. Funding for the HCP would be provided through collection of county-wide fees for building and grading permits.

1.3 DECISION TO BE MADE

A decision must be made as to which of three alternatives would most benefit the survival of the desert tortoise, yet still allow Washington County to grow. Alternatives include: (A) No Action, as required by the NEPA; (B) Proposed Action - Issuance of an ESA section 10(a) permit based on the proposed HCP; or (C) Issuance of an ESA section 10(a) permit based on an HCP with a smaller reserve and greater area of take. Table 1.1 compares the impacts to desert tortoise habitat and individual animals under each alternative.

Table 1.1. Comparison of Effects of Alternatives on the Desert Tortoise.

Alternative	Reserve Acres	Take Acres	Potential Habitat Acres	Estimated # Tortoises Taken
A	0	0	0	0
B	61,022	12,264	11,832	1,169
C	44,504	15,094	11,832	1,709

1.4 PUBLIC SCOPING SUMMARY

In December 1991, five public meetings were held in Washington County to provide an opportunity for the public to learn about and comment on the proposed HCP and alternatives. The meetings were held in Springdale, Hurricane, Washington, Ivins, and St. George. Public service announcements aired on local radio stations and appeared in newspapers, and 242 mailers were sent out to inform interested parties of the impending meetings.

The total attendance at the public scoping meetings was 84 people, with an additional 4 individuals commenting through letters. Public input ranged from support of the HCP and protection of the desert tortoise to anti-government feelings and a belief that desert tortoises are not native to the area in question. Concerns, ideas, and issues that were raised during public scoping are summarized below.

1) Some participants pointed out that much of the HCP planning has been oriented towards residential and commercial land development. They wanted to know what effect the HCP and take provisions would have on other activities in the County, such as farming, grazing, mining, and recreation.

2) A number of individuals stated that funding of the HCP should be fair and equitable. While developers should certainly pay their fair share, all residents of Washington County should help pay for implementation of the HCP because previous development of the County has contributed to the current threatened condition of the Mojave desert tortoise population.

3) Many participants expressed their concern regarding the lack of equity in the situation, and spoke about the need for all U.S. citizens to share in the costs of mitigating for loss of desert tortoise habitat, rather than having the burden put solely on the shoulders of Washington County citizens.

4) A number of participants at the public meetings relayed historical anecdotes indicating that the desert tortoise has been introduced to this area and is not native in Washington County.

5) Several members of the public expressed concern that the area around St. George is at the northern extreme of the desert tortoise's range and that slight climatic changes may seriously influence distribution and densities of desert tortoises. Concern has been expressed regarding long-term viability of a population on a reserve or refuge at the extremes of the species' range because population fluctuations may be more common at the extremes than in the center of the range.

6) Some individuals wondered what was going to happen to the two listed plant species in the area (dwarf bear-poppy and Siler pincushion cactus). The dwarf bear-poppy, in particular, is found in the Bloomington area and is currently being severely impacted by off-highway vehicle (OHV) activities.

7) An individual questioned how desert tortoise habitat boundaries were verified. Several participants indicated that their properties are designated as habitat on maps but they have never seen a desert tortoise on their land.

8) Concern was expressed regarding compensation for lands to be included in the reserve. There is a significant amount of private and State School Trust lands within the reserve.

Participants at the meetings wondered if the Federal government would condemn land if the landowners are unwilling to sell their property. Participants also emphasized that compensation for land must be at fair market value.

9) A number of individuals expressed concerns about relinquishing local control. While some people liked the idea of the Federal government managing a desert tortoise refuge, many expressed concern that increased Federal ownership of lands and management responsibilities would reduce local control and therefore, not be advantageous to the County.

10) Concern was expressed over effects of groundwater depletion on Virgin River flow and on threatened, endangered, and sensitive species in that ecosystem.

An additional public open house and comment period was held on February 22, 1995. The purpose of this meeting was to update the public on changes made to the previous draft of the proposed HCP. The open house was announced in local newspapers, and mailers were sent out to inform interested parties. A total of 32 people attended this meeting. The majority of time was spent speaking with attendees on an individual basis and attempting to answer their questions. A presentation was then given describing progress in the HCP and EIS processes and announcing when an HCP and draft EIS would be available for public review. The attendees were provided with comment sheets if they chose to offer comments in writing. No additional issues were brought up during this public meeting.

Comments received during the public scoping period and through discussions with government agencies and interested organizations were developed into seven significant issues to be further analyzed in this document. Two issues were eliminated from further analysis and are described below.

1.5 ISSUES ELIMINATED FROM FURTHER ANALYSIS

1.5.1 Is the Desert Tortoise Native to the St. George Area?

The scientific community and long-time residents of Washington County disagree over the origin of the desert tortoise in the area. Many residents claim that no desert tortoises existed in the area prior to their being introduced by humans relatively recently. These residents cite anecdotal reports of scores of desert tortoises being brought to St. George. Scientists who have studied the region contend that the occurrence of associated species, such as Gila monsters (*Heloderma suspectum*) and sidewinders (*Crotalus cerastes cerastes*), and the diverse age structure of the population make it likely that desert tortoises have been in the area for centuries. The Steering Committee Technical Advisory Committee reviewed the various opinions and concluded that it would be impossible to prove the origin of desert tortoises in the St. George area. The USFWS considers the debate to be moot because the Washington County desert tortoises are part of the Mojave desert tortoise population and are protected under section 9 of the ESA regardless of their origin.

1.5.2 The ESA is Unconstitutional in that it Permits the Taking of Private Property without Compensation.

Several commentors noted that the enforcement of the ESA can result in the taking of private property without compensation. The issue of private property taking is highly debated and its constitutionality is beyond the scope of this analysis.

1.6 MAJOR ISSUES TO BE ANALYZED

Based upon input from the public, government agencies, and the Steering Committee, the following issues have been identified as the primary topics for analysis in this EIS.

1) What will the impacts be on Washington County's economy?

- Protection of desert tortoise habitat may reduce the amount of developable land available in the County. Potential effects of the different alternatives will be estimated in number of acres available for development.

- Desert tortoise preservation could be expensive for the responsible parties. Potential effects of the alternatives will be estimated in terms of amount of money spent on, and the parties responsible for, the funding of desert tortoise preservation.

- There could be financial or other benefits to the reserve. Such a reserve could increase property value of adjacent lands and might also draw people to the area.

2) How will threatened, endangered, and sensitive species in Washington County be impacted?

- Growth and development could reduce viability of the Mojave desert tortoise population in Washington County. Potential effects of the different alternatives will be estimated by the amount and configuration of acreage of desert tortoise habitat lost due to development.

- Growth and development in Washington County could pose a threat to the continued existence of dwarf bear-poppy and Siler pincushion cactus. Potential effects of the alternatives on these Federally-listed plants will be estimated in light of the number of acres of bear-claw poppy and Siler pincushion cactus habitat likely to be subject to impact.

3) What will be the impacts on multiple-use activities in non-take areas?

- Activities that could potentially impact desert tortoise habitat would either be restricted to specific areas, or prohibited entirely. Potential effects of the alternatives

will be estimated as acres of land that exclude multiple-use activities that are currently allowed.

4) What will impacts be on State School Trust lands?

- Some State School Trust lands may be excluded from development. Potential effects of the different alternatives will be estimated as acres of State School Trust lands not available for development.

5) How will private landowners be impacted?

- Private landowners with property in desert tortoise habitat may lose the opportunity to develop all or part of those lands. Impacts to landowners will be estimated by net acres of land lost due to desert tortoise preservation.

6) How will livestock grazing and other agricultural practices be impacted?

- Desert tortoise preservation could reduce or eliminate certain lands from grazing. Potential effects of the alternatives will be estimated as number of allotments no longer available for grazing.

7) What will impacts be on flow in the Virgin River?

- Continued growth and development in the County may result in increased water needs that could reduce the flow of the Virgin River and its tributaries. The potential impact from the alternatives will be estimated by acre-feet of water used per year.

1.7 PLANS, LAWS AND POLICIES

The area affected by the proposed HCP includes the jurisdiction of numerous cities and unincorporated areas within Washington County and is subject to regulations of numerous State and Federal agencies. This section lists and discusses the primary plans, ordinances, and policies that may affect issuance of an ESA section 10(a) permit and implementation of the HCP.

1.7.1 Federal

1.7.1.1 U.S. Fish and Wildlife Service

The USFWS is responsible for administration of the ESA. When a species is listed as threatened or endangered (such as the threatened Mojave desert tortoise), protection of the species is offered partly through section 9 of the ESA, which stipulates that "take" of the species is prohibited (see definition of "take" on page 2). The process provided in section 7 of the ESA (16 U.S.C.A. § 1536), "Interagency Cooperation," also affords protection to listed species because Federal agencies must utilize their authorities in furtherance of species conservation, and

are also required to enter into consultation with the FWS concerning all actions authorized, funded, or carried out by Federal agencies which may affect listed species. Penalties for violations are identified. Section 4 of the ESA states that a recovery plan shall be developed with the objective of delisting the species once specific measurable criteria are met [*ESA* § 4(f)]. In June 1994, the Desert Tortoise (Mojave Population) Recovery Plan (DTRP) was approved by USFWS (USFWS 1994a). Six distinct population segments or recovery units are presented in the DTRP. The delisting criteria outlined in the plan for each of the recovery units are described below.

Criterion 1: As determined by a scientifically credible monitoring plan, the population within a recovery unit must exhibit a statistically significant upward trend or remain stationary for at least 25 years (one desert tortoise generation).

Criterion 2: Enough habitat must be protected within a recovery unit, or the habitat and desert tortoise populations must be managed intensively enough, to ensure long-term viability.

Criterion 3: Provisions must be made for population management within each recovery unit so that discrete population growth rates are maintained at or above 1.0 (i.e., birthrates are equal to or greater than death rates).

Criterion 4: Regulatory mechanisms or land management commitments must be implemented that provide for long-term protection of desert tortoises and their habitat.

Criterion 5: The population in the recovery unit is unlikely to need protection under the ESA in the foreseeable future.

The basic premise to achieve recovery of the species is through establishment of 14 Desert Wildlife Management Areas (DWMAs) in six Recovery Units (USFWS 1994a). Each DWMA is managed for the desert tortoise, with specific desert tortoise population targets. Reaching target goals within DWMAs will be a primary consideration in determining recovery of the species. It is estimated that delisting of the desert tortoise could be initiated in the year 2019 if the above criteria have been met in all the recovery units.

The DTRP includes maps depicting the general location for the DWMAs, and then provides the following seven guidelines for reserve design to help land managers determine exact boundaries:

(1) Reserves that are well-distributed across a species' native range will be more successful in preventing extinction than reserves confined to small portions of a species' range.

(2) Large blocks of habitat, containing large populations of the target species, are superior to small blocks of habitat containing small populations.

(3) Blocks of habitat that are close together are better than blocks far apart.

(4) Habitat that occurs in less fragmented, contiguous blocks is preferable to habitat that is fragmented.

(5) Habitat patches that minimize edge-to-area ratios are superior to those that do not.

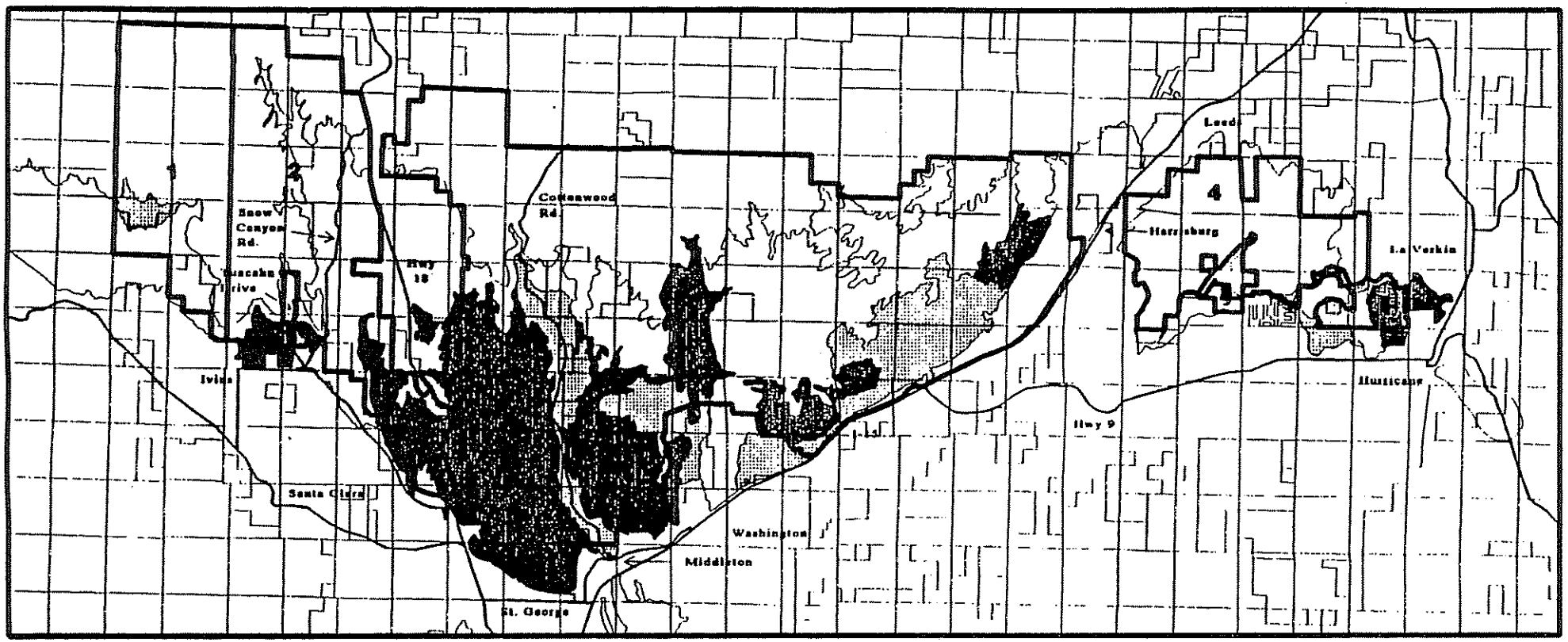
(6) Interconnected blocks of habitat are better than isolated blocks, and linkages function better when the habitat within them is represented by protected, preferred habitat for the target species.

(7) Blocks of habitat that are roadless or otherwise inaccessible to humans are better than blocks containing roads and habitat blocks easily accessible to humans.

It is not necessarily the responsibility of an applicant for incidental take [under either section 7 or 10(a) of the ESA] to effect recovery or implement recovery plans for the affected species, but it is a responsibility not to preclude recovery. The delineation of DWMAs within the desert tortoise recovery plan, however, is of particular concern for the proposed Washington County HCP because the HCP's desert tortoise reserve (Figure 1.3) encompasses the entire Upper Virgin River DWMA (which coincides with the Upper Virgin River Recovery Unit). Consequently, any reserve established as part of the HCP necessarily becomes the recovery plan's DWMA for that area. The USFWS, working with the Steering Committee, has strived to create as effective a DWMA as possible, based both on reserve design criteria and the general criteria for species recovery described above.

The Desert Tortoise Recovery Plan describes activities that should be prohibited within a DWMA, and activities that are appropriate. Appendix F of the plan offers specific management actions for each of the DWMAs. The Washington County HCP would adopt those developed for the Upper Virgin River DWMA (USFWS 1994a, Appendix F). They are as follows:

> *This is the only DWMA proposed for the Upper Virgin River Recovery Unit. Because of the small size of the this proposed DWMA, management will need to be intensive and promptly implemented if this desert tortoise population is to be given a reasonable chance of long-term persistence. Acquisition of private inholdings (or development of conservation easements in perpetuity) is imperative for recovery, particularly for non-Federal and private lands north and northeast of St. George, Paradise and Padre canyons, and north of Hurricane. In addition to the management actions recommended for all DWMA's (Section II.E.2), the following specific actions should be implemented in the Upper Virgin River DWMA:*
>
> *(1) Remove livestock grazing from the DWMA.*



High Tortoise Density
Medium Tortoise Density
Low Tortoise Density
DWMA Boundary
Roads

10/02/95

N

2 0 2 4 miles

Figure 1.3 Proposed Upper Virgin River DWMA

(2) *Construct and maintain desert tortoise barrier fencing along Interstate 15, Highway 18, and the road to the turkey farm.*

(3) *Install underpasses for desert tortoises along Highway 18 between Paradise Canyon and Twist Hollow, and the road to the turkey farm.*

(4) *Close the debris dam road north of St. George or restrict access through installation of a locked gate.*

(5) *Establish a visitor center outside the DWMA which would educate the public about the desert tortoise and serve as a drop-off site for unwanted captive desert tortoises. Develop a program to make these animals available for educational and research purposes.*

(6) *Consolidate ownership and management of the entire DWMA, primarily for desert tortoise, under Federal management as a National Conservation Area.*

The USFWS has also developed recovery plans for the two listed plant species within the HCP planning area: dwarf bear-poppy and Siler pincushion cactus. These plans call for establishment of reserves (USFWS 1985, USFWS 1986). The Siler pincushion cactus was upgraded to threatened by USFWS on December 27, 1993 (USFWS 1993).

1.7.1.2 Bureau of Land Management

Approximately 75 percent of the land in Washington County is publicly owned through the Federal government, and most of this is managed by the Bureau of Land Management (BLM). The BLM has been included in HCP discussions since the beginning, participating as a voting member of the Steering Committee because of its large stake in the process. BLM's current management plan, the Virgin River Management Framework Plan (MFP), was approved in 1981 (BLM 1981). In 1990, the Cedar City District of BLM released a new plan, the Proposed Dixie Resource Management Plan/Final EIS (RMP), whose selected alternative called for resource retention (BLM 1990a). This plan, which was intended to guide the resource management of the BLM for the remainder of the decade, has been under litigation since 1990. The BLM is currently redrafting the RMP which is currently undergoing public review. If the HCP is approved before the revised RMP goes into effect, then the existing MFP will be amended.

1.7.2 State

The Utah Department of Natural Resources (UDNR) has been the umbrella agency for State involvement in Washington County HCP planning. UDNR represents the Division of State Lands and Forestry (Division), Utah State Parks and Recreation (USPR), and Utah Division of Wildlife Resources (UDWR). Among the state's concerns in Washington County are 20,635 acres of State School Trust Lands that may be affected by the proposed HCP. These lands are

managed for the benefit of a trust that was created to aid public education. While there is no overall management plan for these School Trust Lands, by statute, the Division seeks to maximize revenues. As a large landowner of desert tortoise habitat, the Division, through UDNR, has been an active voting member of the Steering Committee.

Snow Canyon State Park, another State responsibility in Washington County, is managed by the USPR. Currently, Snow Canyon is developing a management plan to guide use and development of the Park. As with many scenic attractions in southwestern Utah, its use has increased substantially over the last decade. In order to resolve potential conflicts between the desert tortoise and recreational use of the Park, the USPR has been actively involved in the HCP planning process.

UDWR has responsibility for wildlife management in Utah. They manage ESA section 6 programs for desert tortoise, and have served on the Technical Advisory Committee for the HCP. UDWR also has law enforcement responsibilities with respect to enforcing State and Federal wildlife laws.

1.7.3 County

Washington County has administrative responsibility for all unincorporated lands in the County, and is the governmental entity proposing the HCP. Due to increasing conflicts between development and the desert tortoise, the County initiated HCP planning in late 1990 by forming a committee to evaluate options and recommend a course of action to the Washington County Commission. The committee recommended the preparation of an HCP and application for a section 10(a) permit. In January 1991, Washington County organized an HCP Steering Committee to assume responsibility for deciding the content of and making the decisions for the HCP. These efforts have resulted in the proposed Washington County HCP, which is the subject of this EIS.

1.7.3.1 Washington County Water Conservancy District

The Washington County Water Conservancy District (WCWCD) is dedicated to the develoopment of a reliable water supply for the growing population of Washington County through the development and conservation of the water resources in an environmentally sound manner. They are currently preparing a draft management plan for the Virgin River. This Resource Management and Recovery Plan would acquire and set aside riparian, wetlands, and riverine habitat within the Virgin River drainage 100-year floodplain, provide adequate water resources for the economic and growth needs of the County and provide for recovery of endangered species and habitat protection for wildlife and plant species. A Memorandum of Understanding for the *Virgin River Basin Integrated Resource Management and Recovery Program* was signed in October 1995 by BLM, USFWS, UDNR, and WCWCD.

1.7.4 Local

Numerous cities and towns are located in the HCP planning area. Municipalities that were most involved in the HCP planning process were those with the greatest conflicts between development and desert tortoise conservation. These include the Town of Ivins, the City of St. George, Washington City, and Hurricane City. Unincorporated areas were represented by the County.

1.7.4.1 Town of Ivins

The Town of Ivins (Town) is currently preparing a Master Plan that will guide the Town's land use decisions. In developing the Master Plan, the Town is paying careful attention to the habitat requirements of the desert tortoise, and is consulting regularly with USFWS. This Master Plan, which has been reviewed by the Mayor and Planning Committee, will in effect dictate the reserve boundaries within the Town's limits by designating and putting aside desert tortoise habitat. The HCP has incorporated the anticipated boundaries.

1.7.4.2 City of St. George

Concurrent with preparation of the HCP, St. George has developed a Draft General Plan that, when finalized, will guide the community in making land use decisions. Although the General Plan is not a regulatory document, it will influence future development of the City of St. George. The General Plan has adopted two endangered species policies: 1) The City of St. George will support and assist the implementation of the HCP for the desert tortoise and for other endangered or threatened species in the area; and 2) Land use proposals that could have adverse impacts on critical wildlife or plant habitats shall be modified to eliminate or adequately mitigate such adverse impacts.

1.7.4.3 Washington City

Prior to listing of the desert tortoise as a threatened species, Washington City had expended greater public resources for development in desert tortoise habitat areas than any of the other communities mentioned. This placed Washington City in a critical position with respect to relief in the form of areas released for additional development. While there is no general plan for the City, municipal staff worked with the Technical Advisory Committee to identify areas in northern Washington City which could be developed while maintaining reserve integrity.

1.7.4.4 Hurricane City

Hurricane City is responsible for planning and zoning within its jurisdiction. A draft master plan has been prepared, but a final master plan has not been approved or implemented at this time.

1.8 PREVIEW OF THE REMAINING CHAPTERS

Chapter 2.0 describes the alternatives that are analyzed in this EIS. The chapter will also briefly describe alternatives which were eliminated from further analysis, and will summarize the environmental consequences of each alternative in a matrix.

Chapter 3.0 describes those resources and issues that may be impacted by the Proposed Action or alternatives. This description of the affected environment is necessary so that the decision maker and other readers of this document understand how the existing environment may be changed by the action alternatives, and a determination may be made as to the significance of those changes.

Chapter 4.0 addresses the environmental consequences of each of the alternatives on the affected environment. This will allow the decision maker and other readers to compare the environmental consequences of the alternatives and determine which alternative may have the least significant impact on the existing environment.

The remaining chapters reference the sources of information used in the preparation of this EIS. Chapter 5.0 lists those individuals involved in preparation of the document, along with those agencies, organizations, and individuals involved in review of this EIS.

CHAPTER 2.0
ALTERNATIVES INCLUDING THE PROPOSED ACTION

Taking into consideration the scope of the Proposed Action and the major issues discussed in Chapter 1.0, three alternatives have been developed for analysis in this EIS. The alternatives include the NEPA-required No Action Alternative and two action alternatives based on issuance of an ESA section 10(a) permit. Under the first action alternative, the Proposed Action, an ESA section 10(a) permit would be issued based on an HCP with a reserve area of 61,022 acres and proposed take of an estimated 1,169 desert tortoises; 12,264 acres of desert tortoise habitat; and 11,832 acres of potential habitat. The other alternative is based on a similar conservation program, but the size of the reserve would be smaller (44,504 acres) and the take areas would be larger (15,094 acres of desert tortoise habitat). These alternatives were developed through discussions between USFWS and the Steering Committee, and are felt to cover the range of issues elicited from public scoping meetings. Other alternatives were considered but eliminated from further analysis due to their lack of feasibility. These are briefly described in Section 2.1. Alternatives that are further analyzed in this EIS are described in detail in Section 2.2. A summary matrix of environmental consequences is provided in Section 2.3.

2.1 ALTERNATIVES ELIMINATED FROM FURTHER ANALYSIS

2.1.1 Special Legislation by Congress

This alternative would specifically exempt Washington County from complying with the ESA with respect to desert tortoise. Special legislation is considered unlikely as it is extremely rare and usually implemented only for selected projects and not on a regional level.

2.1.2 Short-term Habitat Conservation Plan

A short-term/interim HCP would involve issuance of a permit allowing incidental take of desert tortoises on non-Federal lands for a period of one to three years. This alternative would allow development projects to proceed which were in progress at the time the desert tortoise was listed. An appropriate compensation plan would mitigate biological impacts to the desert tortoise. Following completion of a short-term HCP, a long-term HCP would likely be prepared to cover future development actions on non-Federal lands.

A short-term HCP was considered by the Steering Committee as other regions of the country completed short-term plans prior to preparation of long-term plans. While a short-term HCP would allow continued growth in some areas, mitigation measures set forth in a short-term HCP would not constitute a comprehensive solution. Further, the planning and permitting process for a short-term HCP is often comparable to that for a long-term plan. The HCP planning process was initiated by Washington County in advance of heightened development pressure, allowing time to complete the long-term plan. Therefore, a short-term plan was not developed.

2.1.3 No Development in Desert Tortoise Habitat

Under this alternative, no development would be allowed on private or State lands designated as desert tortoise habitat. This would restrict development activities on 29,796 acres, or approximately 47 square miles. Landowners would not be compensated for their inability to develop this property.

This alternative has been eliminated from further consideration for several reasons. First, landowners are not likely to willingly refrain from developing their lands to protect the desert tortoise, particularly without fair compensation. Second, governmental entities in this part of Utah do not support restrictive zoning on desert tortoise habitat held by private parties and the Division to protect the desert tortoise, thus violating the wishes of their constituents. Finally, even if restrictive zoning were accomplished, simply setting aside habitat is not considered enough to achieve recovery of the desert tortoise, according to the Desert Tortoise Recovery Plan. Active management is also required, something this alternative does not offer (USFWS 1994a). Therefore, this alternative was eliminated from further consideration.

2.1.4 No Development in Desert Tortoise Habitat/Landowners Compensated

This alternative is similar to the alternative above, except that all landowners would be compensated for loss of use of their land. There are approximately 29,796 acres of private and State School Trust lands designated as desert tortoise habitat in the Upper Virgin River DWMA. To compensate these landowners at an estimated value of $5,000 per acre would require approximately $150 million. Even at half of that estimated price per acre, it would require $75 million. While compensation would likely sway many landowners to sell their lands, it may not be successful in convincing landowners with key developable pieces to sell, for they may make much higher profits from development than from selling. The primary reason for elimination of this alternative from further consideration is that sufficient money is not available for implementation. Additionally, while this alternative may make it possible to acquire desert tortoise habitat, it does not implement a plan for their protection, nor provide for necessary active management.

2.1.5 Issuance of a Section 10(a) Permit Based on an HCP with a 61,769-Acre Reserve

This alternative is similar to the Proposed Action (Section 2.2.2 below) except that the expected incidental take of desert tortoise habitat would be somewhat smaller and the size of the reserve would be slightly larger. This alternative proposes that private lands be added to the reserve outlined in the Proposed Action, thereby increasing the area of the reserve by approximately 1,000 acres. These 1,000 acres are in areas which would likely aid the biological success of the reserve. This alternative was eliminated from further analysis because the additional private lands are owned by individuals who are unwilling to sell or exchange their lands, and the local governmental entities are unwilling or unable to force them to sell. Acquisition of the additional 1,000 acres by the Federal government would create unresolvable political conflicts. It was strongly believed by most members of the Steering Committee that, although the

additional acreage may improve the viability of the reserve, it was not a significant increase over the Proposed Action. Therefore this alternative was eliminated from further consideration.

2.2 ALTERNATIVES CONSIDERED

2.2.1 Alternative A: No Action

Under the No Action Alternative an HCP would not be prepared, and an ESA section 10(a) incidental take permit would not be pursued by Washington County. If this alternative were selected, current project-by-project enforcement of the ESA would continue by USFWS, resulting in individual ESA section 7 and 10(a) permits, or section 9 enforcement.

No large-scale implementation effort for the DTRP would be undertaken, and USFWS and other State and Federal agencies would be required to implement the proposed Upper Virgin River DWMA to effect recovery of the desert tortoise through ESA sections 6 and 7.

2.2.2 Alternative B: Issuance of Section 10(a) Permit Based on Proposed HCP

The Proposed Action would involve issuance by USFWS of an ESA section 10(a) incidental take permit for Mojave desert tortoise in Washington County. The permit would be subject to the terms and conditions specified in the HCP for Washington County, Utah, and associated Implementing Agreements.

2.2.2.1 The Proposed HCP

If the ESA section 10(a) permit is issued and the HCP is implemented, take would be permitted on 12,264 acres of desert tortoise habitat on State and private land. Principal mitigation for this take would be a 61,022-acre reserve composed of what are now Federal, State, and private lands. The HCP also provides for creation of plant reserves to protect endangered plant species habitat.

The proposed HCP was developed by the Steering Committee, whose members included all levels of government: BLM Dixie Resource Area, Utah Department of Natural Resources (for UDWR, USPR, and the Division), Washington County, Washington County Water Conservancy District (WCWCD), and the incorporated cities in the County. Environmental groups were represented by The Nature Conservancy and Southern Utah Wilderness Alliance/Humane Society of the United States. Grazing, recreation, and real estate/development interests, as well as Congressional representatives, were also represented on the Steering Committee. The proposed HCP represents the results of an effort to resolve the distinct and often conflicting interests of the members on the Steering Committee while recognizing that compliance with the ESA is required.

During preparation of the HCP, USFWS released a draft and final DTRP. The HCP developed by the Steering Committee sought to implement as many of the recommendations of the recovery

plan as possible. General actions recommended by the DTRP for Desert Wildlife Management Areas (DWMAs) include developing of a management plan, developing of an education program, securing desert tortoise habitat, and signing and fencing DWMA boundaries. More specific actions for the Upper Virgin River DWMA are listed in Section 1.7.1 of this document (USFWS 1994a). All of these recommendations have been incorporated to some degree into the proposed HCP.

In order for an ESA section 10(a) permit to be issued, the following criteria must be met by the permit applicant and addressed in the HCP according to section 10(a)(2)(B) of the ESA:

- The taking will be incidental.
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking.
- The applicant will ensure that adequate funding for the plan will be provided.
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild.
- Any other measures required by USFWS will be met.

In the following sections, the Proposed Action is described based on these five evaluation criteria.

2.2.2.2 Will the Taking be Incidental?

The Incidental Take Permit would be a county-wide permit within desert tortoise habitat; therefore, take may occur anywhere in the County outside the established reserve. The HCP process has identified 12,264 acres of desert tortoise habitat where incidental take would likely occur. Take areas were defined by balancing the need for habitat preservation with economic growth and development. Take areas are primarily low-density desert tortoise habitat adjacent to existing development. Table 2.1 shows the amount and type of desert tortoise habitat in incidental take areas.

The term "incidental" implies that take is anticipated by the activity, but is not the purpose of the activity. It is the intent of Washington County that all taking of desert tortoises and desert tortoise habitat would be incidental to the otherwise lawful activity of land development regulated by government authority.

In addition to the 12,264 acres of desert tortoise habitat in incidental take areas, 11,832 acres of potential habitat are expected to be used for growth and development purposes. Potential habitat is defined as areas in which desert tortoises may exist by virtue of the habitat characteristics, but which are generally thought to be devoid of desert tortoises at present. If desert tortoises are found to be present on these lands prior to development, they would need to be removed. These desert tortoises will count towards take authorization.

Table 2.1. Amount of Desert Tortoise Habitat in Incidental Take Areas.

Incidental Take Area	Tortoise Density State Lands*			Tortoise Density Private Lands*			
	Low	*Med*	*High*	*Low*	*Med*	*High*	*Total*
Gunlock	0	0	0	196	0	0	196
Ivins/Padre/Paradise	17	0	85	1,073	0	356	1,531
Winchester Hills	656	0	10	2,181	0	245	3,093
St. George	0	0	0	1,852	62	223	2,137
North Washington	554	597	42	204	295	313	2,005
Harrisburg/Leeds/Babylon	307	0	0	1,226	7	0	1,540
Hurricane	54	0	0	703	316	338	1,411
Springdale	0	0	0	159	0	0	159
Bloomington Hill	67	39	0	0	0	0	105
South Hurricane Cliffs	87	0	0	0	0	0	87
Total	1,742	636	137	7,594	680	1,475	12,264

* State includes only State School Trust lands. Private includes lands owned by Washington County, municipalities, highway right-of-way, as well as private owners.

2.2.2.3 How Will Take be Minimized and Mitigated to the Greatest Extent Practicable?

Primary mitigation and minimization, as outlined in the HCP, would be the acquisition and management of a reserve encompassing 61,022 acres of land. Over one-half of the reserve lands (38,787 acres) would consist of desert tortoise habitat. The additional 22,235 acres would provide habitat for other wildlife, including other threatened, endangered, and candidate species. Reserve lands would be acquired through land exchanges and purchase of private, municipal, and State School Trust lands. The HCP divides the proposed reserve into five zones based on management goals. The zones are depicted in Figure 2.1, and approximate locations and acreage of each zone are listed in Table 2.2. The Steering Committee has obtained the support of BLM and the Utah Congressional delegation for designating the reserve as a National Conservation Area. BLM Dixie Resource Area expects to develop a management plan for the portions of the reserve under its management (parts of Zone 2 and all of 3,4, and 5) within two years of issuance of the ESA section 10(a) permit. The Town of Ivins and USPR will also have management responsibilities within Zone 2, and a consistent, cooperative management program between these entities and the BLM is anticipated.

Table 2.2 HCP Reserve Management Zone Locations and Acreage.

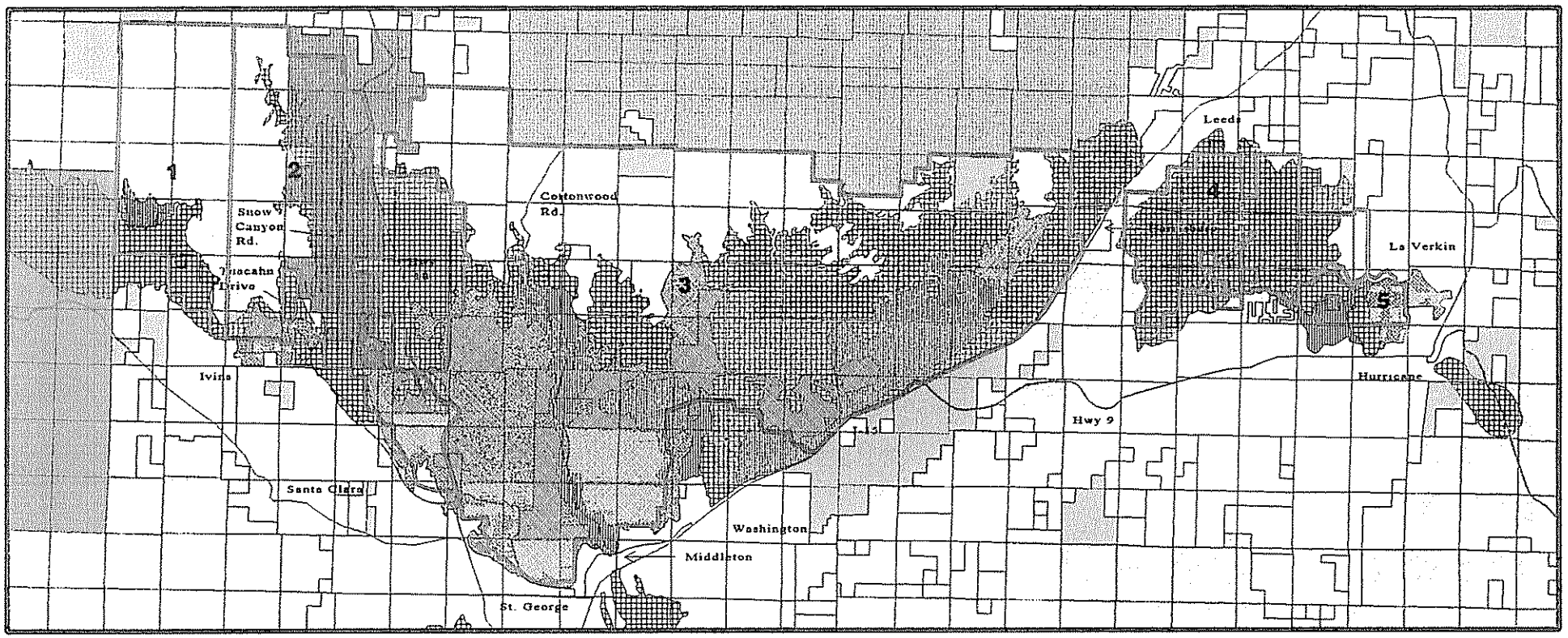
Zone	Name/Approximate Location	Acres
1	Paiute Tribal Land boundary to Ivins	6,146
2	Ivins to Highway 18	10, 372
3	Core Zone/Highway 18 to Interstate 15	38,541
4	Babylon/Interstate 15	5,197
5	Hurricane/Between Virgin River and City of Hurricane	766

Zone 1: Paiute Tribal Land Boundary to Ivins. Currently, this 6,146-acre parcel is predominantly managed by BLM, but for the most part it lies within the incorporated boundaries of the Town of Ivins. If the HCP were implemented, management of Zone 1 would be the responsibility of the Town of Ivins. The management goal would be to allow low-density housing development consistent with habitat protection; land use restrictions would include the following:

- A maximum overall density of 1 unit per acre.
- Minimized surface disturbance during development.
- Retention of native vegetation and restrictions on exotic plant materials.
- Firefighting should be allowed.
- No grazing will be allowed in desert tortoise habitat.

Zone 2: Ivins to Highway 18. Of this 10,372-acre parcel, 4,326 acres fall within Snow Canyon State Park, and 3,787 are managed by BLM. Some acreage also falls within the incorporated limits of the City of St. George and the Town of Ivins. It is envisioned that private and State School Trust lands within Zone 2 would be acquired by BLM and/or USPR through exchange. USPR would manage any lands it acquires as an extension of Snow Canyon State Park. The management goal for Zone 2 would be desert tortoise habitat protection and environmental education. Mitigation measures would include land acquisition, fencing of Highway 18, law enforcement, and environmental education. The following management regulations are recommended for Zone 2:

- Hiking, equestrian use, and hunting including other non-consumptive recreational activities should be restricted to designated trails.
- BLM should be requested to apply for mineral withdrawal for Federal minerals.
- Non-intrusive monitoring of desert tortoise population dynamics should be allowed.
- Maintenance of existing utilities including roads should be allowed.
- Speed restrictions on Tuacahn Road should be enforced.
- Organized or competitive sporting or recreational events should not be allowed, although guided or controlled tours to enhance education may be permissible.
- Desert tortoise translocation should not be permitted except as authorized under approved translocation projects.



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Private/Other
State of Utah
BLM
Dixie National Forest
Paiute Indian Reservation
Snow Canyon State Park

DWMA Boundary
Roads
Low Tortoise Density
Medium Tortoise Density
High Tortoise Density

N

2 0 2 4 miles

Figure 2.1 Alternative B Preserve Management Zones

- Existing governmental uses within Zone 2 may continue.
- Firefighting should be allowed.
- No grazing will be allowed in desert tortoise habitat.

Zone 3: Core Zone. Spanning the area from Utah State Route 18 to Interstate Highway 15, this 38,541-acre parcel currently includes 23,571 acres managed by BLM and 9,927 acres managed by the State of Utah. Zone 3 would be managed by BLM for preservation and enhancement of the Mojave desert tortoise. Mitigation measures would include land acquisition; fencing Highway 18, Interstate 15, Skyline Drive, the area around northern Washington City and portions of the area around northern St. George; law enforcement; and environmental education. The following management regulations are recommended for Zone 3:

- Hiking, equestrian, and camping should be restricted to designated areas.
- The BLM should be requested to apply for mineral withdrawal for Federal minerals.
- No organized or competitive sporting or recreational events should be allowed.
- Grazing permits should be acquired and retired.
- New utility development should be encouraged to be conducted during the winter months when the desert tortoise is not active.
- Hunting should be restricted to big game or upland birds during official seasons.
- Existing governmental uses, such as the City of St. George pistol range, the debris basin behind City Creek dam, and Pioneer Park should be allowed to continue. Expansion of use of Pioneer Park outside of the existing developed area will be subject to HCAC approval of a desert tortoise management plan.
- Vehicles should be restricted to designated roads.
- Continuation of present activities associated with the Moroni Feeds Turkey Farm should be permitted but new actions, which the reserve manager reasonably believes may harm the desert tortoise, should not be allowed.
- Water development should be allowed consistent with the HCP protocol.
- Firefighting should be allowed.
- Research which will not negatively influence the desert tortoise should be allowed.
- Non-consumptive recreation (e.g., hiking, birdwatching) should be allowed.
- Maintenance of existing utilities including roads should be allowed.
- Desert tortoise translocation should not be permitted except as authorized under approved translocation projects.
- The eventual reconstruction of Skyline Drive should follow the existing alignment as near as possible except where engineering and/or safety considerations require deviations. Biological review under the HCP will be necessary when deviating from the current alignment. From Skyline Drive, no general public access would be permitted into the reserve, except on designated trails. However, access to Skyline Drive will be available for private landowners until their property is acquired.

Zone 4: Babylon. This area currently encompasses 5,197 acres of primarily BLM land. The following management regulations are recommended for Zone 4:

- Hiking, equestrian use, and camping should be allowed.
- Grazing, hunting, and mining should be allowed.
- Landowner activities associated with the private residence in the vicinity of "Babylon" should be permitted. However, ground disturbance in the reserve will require clearance prior to occurrence.
- Utility and road corridor maintenance should be allowed.
- New utility easements should be allowed and follow the HCP protocol.
- Vehicles should be restricted to designated roads.
- Firefighting should be allowed.
- Research, including non-intrusive monitoring of desert tortoise population dynamics, should be allowed.
- Non-consumptive recreation (e.g., hiking, birdwatching, photography, casual horseback riding) should be allowed.
- Desert tortoise translocation would not be permitted except as authorized under approved translocation projects.

Zone 5: Hurricane. This area is approximately 766 acres in size, of which 130 are currently managed by BLM. Zone 5 would be managed as a desert tortoise reserve by BLM, with the exception of some private land that could be developed for housing. That development would have to leave approximately 75 percent of the impacted habitat in an unaltered state. The following management regulations are recommended for Zone 5:

- Hiking and equestrian use should be restricted to designated trails.
- Utility and road corridor maintenance should be allowed and follow the HCP protocol.
- New utility easements should be allowed and follow the HCP protocol.
- Vehicles should be restricted to designated roads.
- Firefighting should be allowed.
- Research, including non-intrusive monitoring of desert tortoise population dynamics should be allowed.
- Non-consumptive recreation should be allowed.
- Desert tortoise translocation would not be permitted except as authorized under approved translocation projects.
- No grazing will be allowed in desert tortoise habitat.

An HCP requires that measures are taken to minimize and mitigate impacts and to monitor species of concern. Measures to minimize take of desert tortoise are as follows:

- The County would acquire all grazing permits for grazing allotments that overlap the reserve area. Acquisition of permits would be on a "willing buyer/willing seller" basis. Once permits were acquired, annual non-use would be applied for according to BLM requirements. Grazing would not be permitted during the non-use period on acquired allotments until a definitive study of livestock/desert tortoise inter-relationships has been completed that demonstrates that livestock grazing is consistent with reserve management objectives.

- Fencing would be installed along major roads, along portions of the reserve that are most vulnerable to intrusion, and along the proposed endangered plant reserves. It is estimated that 68 miles of fence would be installed.

- In all management zones, free-roaming dogs or feral animals would not be allowed in any reserve areas.

- Two law enforcement agents, one from BLM and one from UDWR, would be responsible for enforcing Federal, State, and local regulations within the desert tortoise reserve and plant reserves. Law enforcement would help protect the desert tortoise from adverse impacts such as OHV use, free-roaming domestic dogs, hikers, campers, shooting and other unpermitted uses.

- Washington County will be responsible for conducting desert tortoise surveys on lands to be developed. Desert tortoises will be collected by the County and housed in a temporary desert tortoise facility, and then turned over to USFWS only during the first five years for permanent translocation. The USFWS will fund a five-year translocation study at their expense. Should translocation prove successful, a long-term translocation program will be developed for implementation by the County.

Mitigation measures for the reserve are as follows:

- Consolidate desert tortoise habitat by forming a reserve, or Upper Virgin River DWMA, for the long-term survival and recovery of the Mojave desert tortoise.

- An environmental education center would be created to provide an opportunity for people to gain a greater understanding of the varied ecosystems found in Washington County. Education of the public concerning the reserve and the desert tortoise in particular is felt to be an important component of minimizing incidental take.

Monitoring measures include:

- Desert tortoise populations within the reserve would be monitored during the lifetime of the permit. A monitoring plan would be developed by UDWR, emphasizing biologically sound and defensible techniques for population estimation and trend analysis.

2.2.2.4 Will Adequate Funding be Provided for the Plan?

A funding mechanism has been devised that would support the mitigation and monitoring elements of the HCP. Washington County has established an Endangered Species Trust Fund. All desert tortoise fees collected would be deposited in the fund, and all HCP-related expenses would come out of the fund. Sources of permanent funding would include:

- A county-wide fee, assessed when building construction permits are issued. This fee would be 0.2 percent of construction costs, and would apply to all new residential, commercial, and industrial construction.

- A county-wide fee of $250.00 per acre for platted subdivisions, condominiums, town homes, or planned unit developments.

- Funding may also be available through desert tortoise compensation fees collected by BLM. These monies would be transferred to the County Treasurer on a quarterly basis if appropriate.

It is estimated that over the 20-year period, revenues from these fees would exceed $9,000,000. (Approximately $7,000,000 would be expended on desert tortoise preservation, and the remaining amount would be expended on conservation of other threatened, endangered, or candidate species in the County.)

The HCP contains a proposed budget, in constant 1994 dollars, for the 20-year period of the ESA section 10(a) permit. It is estimated that the total cost of the HCP would be $11,555,000. Of this total cost, $9,055,000 is expected to come from Washington County. Cost sharing with the Utah Department of Transportation, UDWR, and USFWS is proposed for the balance. It is also anticipated that as inflation increases so will the fees associated with the HCP. Table 2.3 provides a break-down of the 20-year HCP budget.

2.2.2.5 Does the HCP Ensure Likelihood of Survival and Recovery of Tortoises in the Wild?

The Mojave desert tortoise has been listed as a Federally threatened species due in part to habitat loss and fragmentation, human contact and direct mortality, predation, and disease (specifically URTD). The concern for this species is that if these conditions continue unabated they could bring about extinction of the desert tortoise.

Assuming that the entire take area in the County would be developed over the 20-year permit period, an estimated take of 1,169 desert tortoises, representing 15 percent of the total estimated desert tortoise population in Washington County (excluding the Beaver Dam Slope) would occur. Development of the entire take area would result in the loss of 12,264 acres of desert tortoise habitat or potential desert tortoise habitat, or approximately 22 percent of the entire desert tortoise habitat within the County.

All remaining desert tortoises and optimum habitat in Washington County would be protected by acquisition and management of a 61,022-acre reserve. The reserve would be designed and managed following the guidelines of the DTRP. The reserve would meet the following important DTRP criteria: 1) the reserve would include the best examples of desert tortoise habitat in the Upper Virgin River Recovery Unit; 2) the reserve would provide protection for the ecosystems upon which entire high-density, healthy desert tortoise populations depend; and 3) the reserve would include heterogeneous terrain and vegetation.

Table 2.3. HCP Budget Items.

Budget Item	Total Cost	Washington County	Other Entity
HCP Administrator @ $54,000/year for 20 years	$1,080,000	$1,080,000	$ 0
HCP Biologist @ $38,000/year for 20 years	760,000	760,000	0
Office and Travel Expenses @ $20,000/year for 20 years	400,000	400,000	0
Facilitate Land Exchanges	500,000	500,000	0
Habitat Acquisition	1,000,000	1,000,000	0
BLM Reserve Management @ $50,000/year for 5 years	250,000	250,000	0
SCSP Management Plan Preparation	50,000	50,000	0
Fencing	2,000,000	500,000	1,500,000[1]
Purchase Grazing Permits	175,000	175,000	0
Reserve Monitoring (i.e., research)	1,250,000	1,000,000	250,000[2]
Enforcement @ $130,000/year for 5 yrs.	650,000	650,000	0[3]
Translocation			
a) Temporary Desert Tortoise Care @ $1,000/month for 20 years	240,000	240,000	0
b) Translocation Experiment @ $150,000/year for 5 years	750,000	0	750,000[4]
Education	500,000	500,000	0[5]
Other Species	1,950,000	1,950,000	0
Total	$11,555,000	$9,055,000	$2,500,000

[1] The HCP will work with UDOT to construct desert tortoise fencing along Highway 18 and Interstate 15. Developers along the perimeter of the reserve will construct fencing at their expense.

[2] The UDWR currently spends approximately $60,000 every five years, including ESA section 6 funding from USFWS, and this funding level is expected to continue through the permit period.

[3] Two law enforcement positions will be funded for the first five years of the plan, one with UDWR to handle wildlife enforcement issues, and one with the BLM to handle reserve management issues.

[4] Translocation research will be funded by USFWS.

[5] The education center will be part of a larger organization, which is yet to be undefined.

2.2.2.6 Will Other Measures Required by USFWS Be Met?

USFWS would require that an Implementation Agreement be prepared that legally binds both the Federal government and Washington County to the terms and conditions of the HCP and the ESA section 10(a) permit. Additionally, USFWS would require that a reserve management plan and a desert tortoise translocation plan be developed. Because Snow Canyon State Park would be within reserve boundaries, a management plan would need to be developed for the Park.

2.2.3 Alternative C: Issuance of Section 10(a) Permit Based on HCP with Smaller Reserve

This alternative is similar to the Proposed Action except that the expected incidental take of desert tortoise habitat would be greater and size of the reserve would be reduced. This alternative proposes that the reserve areas identified as Zones 1 and 2 in the Proposed Action be excluded from the reserve, because they are relatively isolated from the rest of the reserve by existing roads and developments. Excluding the two zones would reduce the size of the reserve to 44,504 acres, and the area of incidental take would increase to 15,094 acres.

2.2.3.1 Will the Taking be Incidental?

All taking of desert tortoises and desert tortoise habitat would be incidental to the otherwise lawful activity of land development regulated by government authority. The Incidental Take Permit would be a county-wide permit. The worst-case scenario for this alternative would be the incidental take of 15,094 acres of desert tortoise habitat. Also, 11,832 acres of potential habitat are expected to be used for growth and development purposes. If desert tortoises are found to be present on these lands prior to development they would be removed. However, these potential habitat areas would not count towards incidental take or incremental take formulas, and other incidental take procedures, as outlined in the HCP, would not have to be followed. Table 2.4 shows the amount and type of desert tortoise habitat in the incidental take areas.

2.2.3.2 How Will Take be Minimized and Mitigated to the Greatest Extent Possible?

Mitigation and minimization would be similar to that described for the Proposed Action, except the ratio of reserve lands to desert tortoise habitat take areas would be smaller (almost 5:1 for the Proposed Action and less than 3:1 for this alternative). Private and State lands for the reserve would be acquired by BLM through land exchanges and purchase. The reserve would be managed by BLM and desert tortoise populations within the reserve would be monitored as described for Alternative B. Grazing permits within the reserve area would be acquired by BLM on a "willing seller/willing buyer basis" and they would be retired. The acreage of each management zone is listed in Table 2.5, and the approximate location of the zones are depicted in Figure 2.2.

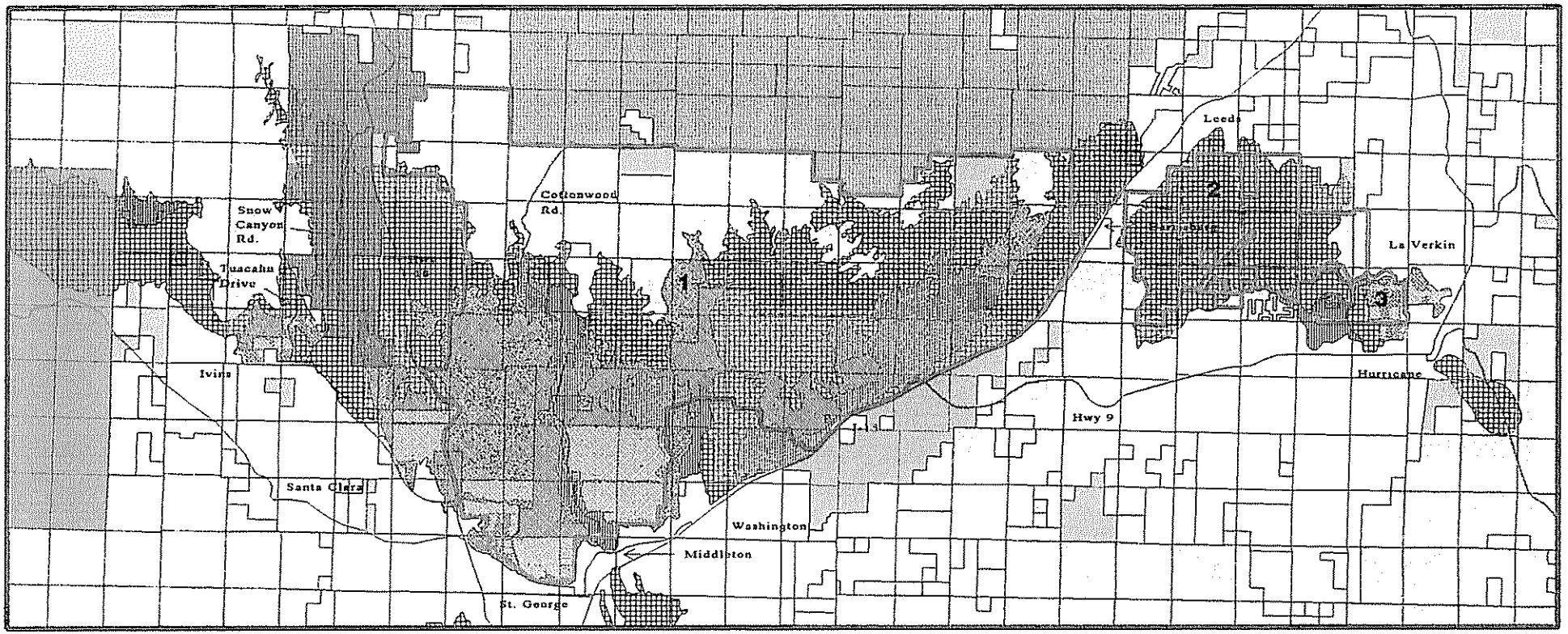


Figure 2.2 Alternative C Preserve Management Zones

Table 2.4. Amount of Desert Tortoise Habitat in Incidental Take Areas.

Incidental Take Area	Tortoise Density State Lands*			Tortoise Density Private Lands*			
	Low	*Med*	*High*	*Low*	*Med*	*High*	*Total*
Gunlock	0	0	0	196	0	0	196
Ivins/Padre/Paradise	492	0	559	2,172	44	1,094	4,361
Winchester Hills	656	0	10	2,181	0	245	3,092
St. George	0	0	0	1,852	62	223	2,137
North Washington	554	597	42	204	295	313	2,005
Harrisburg/Leeds/Babylon	307	0	0	1,226	7	0	1,540
Hurricane	54	0	0	703	316	338	1,411
Springdale	0	0	0	159	0	0	159
Bloomington Hill	67	39	0	0	0	0	106
South Hurricane Cliffs	87	0	0	0	0	0	87
Total	2,217	636	611	8,691	712	2,261	15,094

* State includes only State School Trust lands. Private includes lands owned by Washington County, municipalities, highway right-of-way, as well as private owners.

Incidental take would also be minimized by fencing, law enforcement, desert tortoise surveys prior to development, and education of the public concerning the desert tortoise.

Table 2.5. HCP Reserve Management Zone Locations and Acreage.

Zone	Name/Approximate Location	Acres
3	Core Zone/Highway 18 to Interstate 15	38,541
4	Babylon/Interstate 15	5,197
5	Hurricane/Between Virgin River and City of Hurricane	766

2.2.3.3 Will Adequate Funding Be Provided for the Plan?

The funding mechanism for this alternative would be the same as that for the Proposed Action. Washington County would establish an Endangered Species Trust Fund. All desert tortoise fees collected would be deposited into the fund, and all HCP-related expenses would come out of the fund. Revenues for this alternative would be similar to those for the Proposed Action. Revenue projections are based on expected human population growth in Washington County over the next 20 years. The rate of growth is not expected to increase as a result of an additional 3,071 acres of developable land. Therefore, revenues from fees associated with development would not be

expected to increase. Similarly, the proposed budget for this alternative would be similar to that proposed for Alterative B, the Proposed Action.

2.2.3.4 Does the HCP Ensure the Likelihood of Survival and Recovery of Tortoises in the Wild?

Under this alternative, a worst-case HCP scenario has been considered in which the entire take area in the County would be developed over the 20-year permit period. If this were to happen, an estimated 1,709 desert tortoises would be taken (1,169 desert tortoises from take areas of the Proposed Action plus at least 540 individuals from Zones 1 and 2). This represents 22 percent of the total estimated Washington County desert tortoise population (excluding the Beaver Dam Slope). Development of the entire take area would result in the loss of 15,094 acres of desert tortoise habitat, or approximately 27 percent of the entire desert tortoise habitat within the County.

All remaining desert tortoises and habitat in Washington County would be protected by the acquisition and management of a 44,483-acre reserve. This smaller reserve does not meet all of the requirements that are outlined in the DTRP for the Upper Virgin River DWMA. The proposed DWMA (which would be larger than the 44,483-acre reserve) is considered to be: "...too small to ensure adequate probability of population persistence without careful management." (USFWS 1994). The reserve would be managed following the guidelines of the DTRP. However, even with more intensive management, desert tortoise population persistence within the reserve would be unlikely.

2.2.3.5 Will Other Requirements of USFWS Be Met?

USFWS would require that an Implementation Agreement be prepared that would legally bind both the Federal government and Washington County to the terms and conditions of the HCP and the ESA section 10(a) permit. Additionally, USFWS would require that a reserve management plan and desert tortoise translocation plan be developed.

2.3 COMPARISON OF ALTERNATIVES MATRIX

ISSUES (concerning where growth occurs, not how much growth)	ALTERNATIVES		
	A	B	C
Socioeconomics	Short-term and long-term costs could be substantial due to individual compliance requirements.	No short-term impacts are expected as a result of the Proposed Action. Long-term impacts are considered to be substantial and adverse, although positive benefits do occur. Increase in development fees.	Similar to Alternative B, yet adverse economic impacts are slightly decreased.
Land Ownership, Use, and Management	There would be no change in the ownership, use, or management of Federal, State, and private lands.	18,698 acres of BLM lands, 10,938 acres of State lands, and 7,618 acres of private lands would be incorporated into a reserve. 2,515 acres of State lands, and 9,785 acres of private lands would be available for development. State and private lands for the reserve would be acquired through land exchanges. Land use within the reserve would be dictated by a management plan.	17,607 acres of BLM lands, 9,145 acres of State lands, and 5,134 acres of private lands would be incorporated into a reserve. 3,464 acres of State lands, and 11,664 acres of private lands would be available for development. State and private lands for the reserve would be acquired through land exchanges. Land use within the reserve would be dictated by a management plan.
Agricultural Resources	No impact would be expected.	Four grazing permits would be acquired by the County on a "willing seller-willing buyer" basis, and grazing would be retired from Zone 3 of the proposed reserve. There would be no impacts to farm lands.	Same as Alternative B.
Threatened, Endangered, Candidate, and Sensitive Species	Impacts to Federally listed species on State and private lands would be subject to case-by-case ESA section 10(a) permitting or section 7 consultation. Candidate and sensitive species would not be afforded any protection	A 61,022-acre reserve would be established to preserve Mojave desert tortoise populations as well as other threatened, endangered, candidate, and sensitive species. An incidental take of 12,264 acres of desert tortoise habitat is expected.	A 44,504-acre reserve would be established in an attempt to preserve Mojave desert tortoise populations as well as other threatened, endangered, candidate, and sensitive species. An incidental take of 15,094 acres of desert tortoise habitat is expected.
Water Resources	Water usage will increase as the population increases	Same as Alternative A	Same as Alternative A
Visual Resources	Visual quality may be impacted as a result of maximizing monetary benefit from these lands	Impacts to visual quality would occur only in incidental take areas Visual quality of reserve lands would receive protection	Same as Alternative B
Wildlife Resources	Management of wildlife resources would be dictated by resource management plans on Federal lands There would be minimal management of wildlife resources on State and private lands.	The reserve would reduce adverse impacts to wildlife resources. However, wildlife resources in the incidental take areas may be displaced if development occurs in these areas.	Same as Alternative B.

CHAPTER 3.0
AFFECTED ENVIRONMENT

3.1 GENERAL ENVIRONMENTAL SETTING

Washington County is located in the southwestern corner of Utah where the Great Basin Desert, Mojave Desert, and Colorado Plateau converge. Elevations range from 2,200 feet above sea level near the Arizona/Utah border to over 10,375 feet at Pine Peak. Temperatures in the region vary greatly depending on elevation. At higher elevations the temperature is generally cooler and the precipitation greater than at lower elevations. Precipitation ranges from 7.5 to 35 inches annually, and between 40 and 205 days are frost-free per year.

3.2 RESOURCES ELIMINATED FROM FURTHER CONSIDERATION

The following elements of the human environment should not be significantly affected by the Proposed Action or other alternatives in this EIS:

- Air Quality
- Floodplains
- Cultural Resources
- Native American Cultural and Religious Sites
- Hazardous Materials
- Wetlands/Riparian Zones
- Wild and Scenic Rivers
- Wilderness
- Geology and Soils
- Topography
- Vegetation

A description of existing conditions for resources present is provided below, with rationale for their exclusion from detailed analysis. The resources that would potentially be affected by the Proposed Action and/or the alternatives are addressed in the remaining sections of this chapter.

3.2.1 Air Quality

Air quality in Washington County is generally excellent and is rated as Category I under Federal clean air standards in and near St. George. Air quality is predominantly affected near urban areas by vehicle emissions, use of fireplaces and wood-burning stoves in winter months, wind blown dust, and regional sources of pollutants from metropolitan areas such as Los Angeles and Las Vegas (City of St. George 1994).

Air quality can be expected to deteriorate with increasing population size and a correlated increase in vehicle emissions and wood-burning. Because levels of growth or development

would be similar under all alternatives, air quality would not be differentially affected under any of the alternatives.

3.2.2 Floodplains

In the overall project area, major floodplains are associated with the Virgin and Santa Clara Rivers (City of St. George 1994). Portions of some of the take areas, particularly Take Areas 4 and 6, fall within the floodplain of the Santa Clara and/or the Virgin River.

3.2.3 Cultural Resources

The cultural resources of Washington County include archaeological resources (any material remains of past human life or activities which are at least 100 years old) and historic resources associated with more recent settlement in the area.

No cultural resources surveys were conducted as part of this analysis because no potential adverse impacts would occur under any of the alternatives considered. Private and State lands, whether they remain as is under Alternative A or are designated as take areas under Alternatives B and C, would be subject to regulation set forth by the State of Utah regarding the protection of cultural resources, and the National Historic Preservation Act, which is the process (ordinarily delagated to States by the National Park Service) to determine whether sites eligible for listing on the National Register of Historic Places shall in fact be so listed. Private and State lands within the proposed reserve would be subject to Federal regulations once they are exchanged to BLM. Archaeological or historic resources that may be present on these lands would therefore be afforded greater protection under Alternatives B and C than under Alternative A. All BLM lands would continue to be subject to Federal regulations regarding protection of cultural resources.

3.2.4 Native American Cultural and Religious Sites

No comprehensive ethnographic or cultural survey was conducted as a part of this analysis, and it is not known whether such resources exist within the project area (both the proposed reserve and the areas identified for take).

3.2.5 Hazardous Materials

All lands which may be acquired by the Federal Government, whether by purchase, donation, or exchange will be subject to survey for hazardous substances and hazardous wastes, as defined by EPA regulations implementing the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA) and hazardous waste management laws adopted by the State of Utah pursuant to its RCRA program delegation from EPA. It is expected that property owners whose lands may be exchanged for Federal lands will also require hazardous waste surveys prior to accepting title to such lands from the United States.

3.2.6 Wetlands/Riparian Zones

Wetlands and riparian zones within the project area are primarily restricted to the Virgin and Santa Clara Rivers. Because human population growth would not be expected to be greater under any particular alternative, impacts to these resources are largely unrelated to any of the alternatives analyzed in this document. Wetlands and riparian areas on private lands along the Santa Clara and Virgin Rivers would likely fall under the jurisdiction of the ACOE and any development would be subject to compliance with the CWA, regardless of whether they occur in designated take areas (Alternatives B or C) or not (Alternative A).

3.2.7 Wild and Scenic Rivers

BLM has identified Deep Creek, the North Fork of the Virgin River, and the Virgin River through the gorge as potentially eligible for designation as wild and scenic rivers, although they have not yet been designated as such. Neither the Proposed Action nor the other alternatives would impact those reaches of any of the streams identified as potentially eligible for inclusion in the National Wild and Scenic Rivers System.

3.2.8 Wilderness

Existing wilderness areas within Washington County are restricted to the BLM-administered Beaver Dam Mountains Wilderness Area southwest of St. George and a wilderness area administered by the Dixie National Forest in the Pine Valley Mountains (U.S. Soil Conservation Service 1990). Neither wilderness area is located within proposed reserve or take areas, and therefore would not be impacted under any of the alternatives.

3.2.9 Geology and Soils

The project area falls within the Colorado Plateau Province and includes primarily sedimentary rocks, and to a lesser degree volcanics, basalts, and eolian and alluvial deposits (U.S. Soil Conservation Service 1990). Because the primary geologic features of interest are generally associated with Zion National Park, neither the Proposed Action nor its alternatives would be expected to significantly impact this resource.

The Virgin River Basin-Utah Cooperative Study (U.S. Soil Conservation Service 1990) identified areas within the Basin which are subject to accelerated erosion and sedimentation. These areas occur throughout the County, but several areas of critically eroding soils occur within the reserve proposed under Alternatives B and C. Because increased erosion in these (and other) areas has been attributed to poor range condition (U.S. Soil Conservation Service 1990), restriction of access and elimination of livestock grazing in the reserve proposed under Alternatives B and C would likely help reduce excessive erosion in these areas.

3.2.10 Topography

Potential development on State and private lands, under any of the alternatives, would not be expected to significantly alter either local or regional topography.

3.2.11 Vegetation

Vegetation types within the project area include creosote, blackbrush, desert shrub, grass, and pinyon-juniper associations. Development under any of the alternatives would result in removal of some native vegetation. Removal of vegetation as a result of development would occur in or near areas with existing urban or rural development. No vegetation types unique to the region or State would be impacted under any of the alternatives. Listed plant species are addressed elsewhere in this EIS.

3.3 SOCIOECONOMICS

The Washington County/St. George area is experiencing greater human population growth than other areas of Utah. This has resulted from a favorable climate, a high level of tourism, college environment, family-oriented lifestyle, desirable amenities for retired people, and a positive environment for industry (WCWCD 1994).

During the early 1980s, area growth was neither fully planned or anticipated. Projections of population growth and demand for real estate were therefore conservative and inaccurate. Despite efforts of State and Federal agencies to develop an accurate model to predict human population growth, real growth has consistently exceeded projections (WCWCD 1994). This strong growth has coincided with marketing efforts for development projects considered substantial by Washington County standards.

3.3.1 County Population Growth and Trends

Growth in Washington County has been strong, with human population increasing by 83 percent from 1980 to 1990 (WCWCD 1994). St. George had the greatest small-community growth in the State during this period, with population growing from 13,146 to 28,502, or 117 percent. This growth included the annexation of Bloomington and Bloomington Hills, causing some distortion of actual growth figures. Population figures for St. George and Washington County are presented in Figure 3.1 (WCWCD 1994).

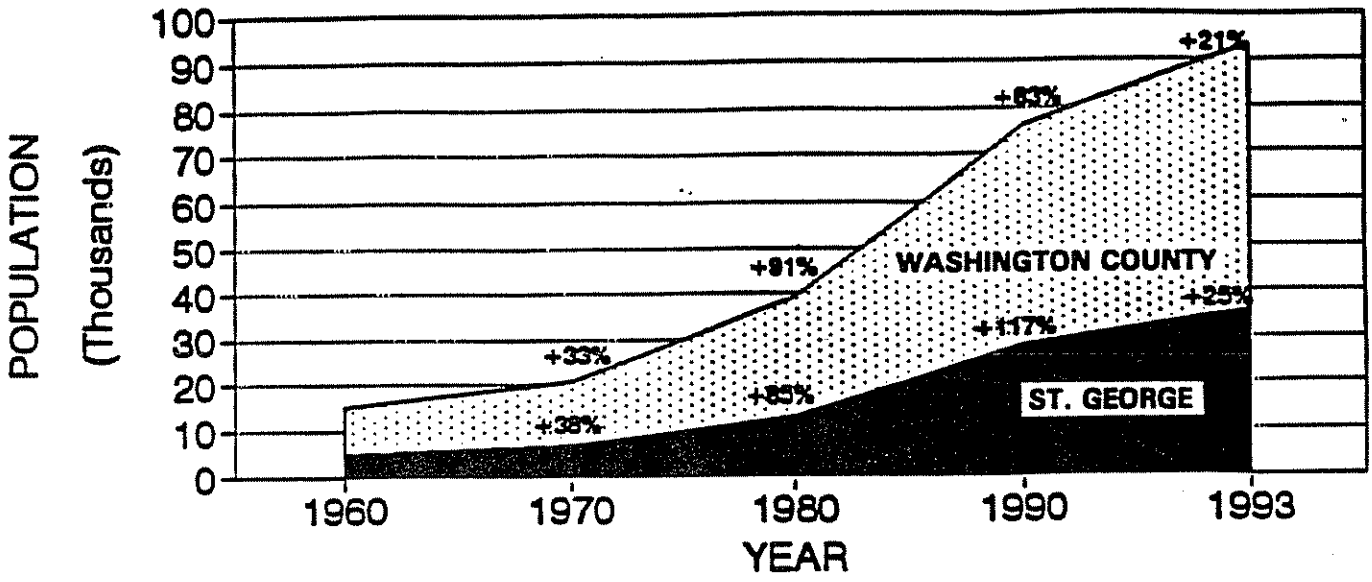


Figure 3.1 Population Growth in Washington County and St. George City: 1960 - 1993

3.3.2 St. George and Washington County Dwelling Unit Growth

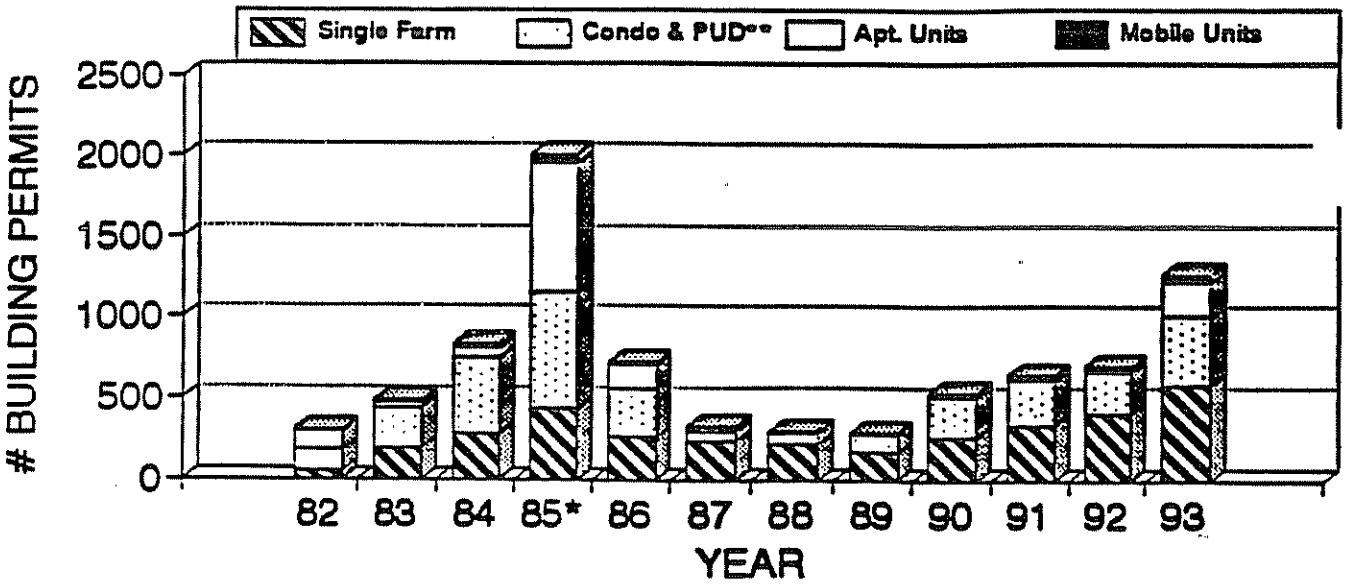
Dwelling unit growth trends in Washington County are reflected in the number of building permits issued and real estate tax notices sent out in recent years. These data indicate strong growth for both the City of St. George and Washington County as a whole. Data also show a faster growth rate for secondary homes than for primary homes. Figure 3.2 presents an 11-year history of building permit activity in St. George (for residential building only). Figure 3.3 presents complete annual building permit data and value for Washington County.

Table 3.1 reports the number of real estate tax notices sent out each year since 1982 by the Washington County Assessor's Office. These notices reflect the number of new lots or Planned Unit Developments, showing individual ownerships that required separate tax notices.

Every lot owner and developer with a separately described and legally recorded lot in a new subdivision receives a tax notice for each described lot, although the lots may still be under one ownership. Apartment or twin home-type projects having a single owner are recorded as one parcel. The 1990 real estate tax notices for dwelling units (not unimproved lots or acreage) were sent to 12,896 owners. The census that year indicated a population of 47,825, indicating 3.7 people per dwelling unit. It must be noted, however, that apartment buildings are counted as one ownership even though there may be 200 people living in that unit.

Table 3.1. Real Estate Tax Notices Mailed by the County Assessor.

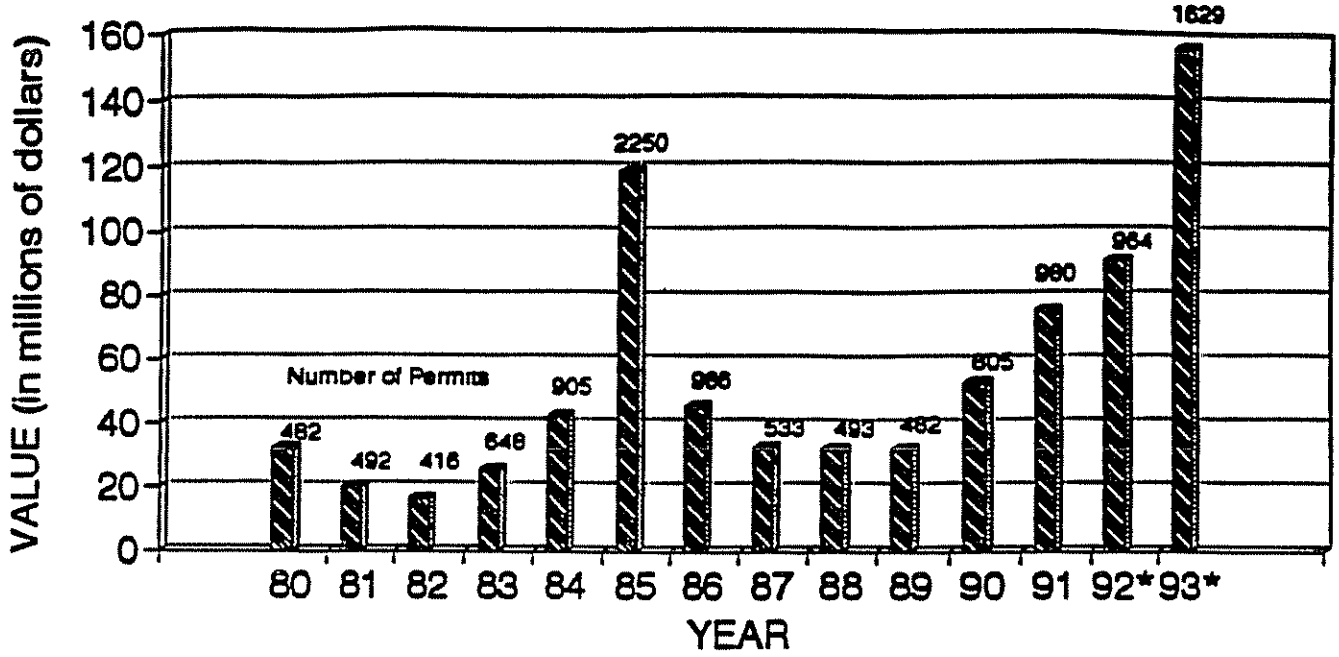
Year	Number of Tax Notices Mailed	Increase Over Previous Year
1982	25,363	
1983	25,979	616
1984	26,636	657
1985	27,407	771
1986	30,487	3,080
1987	31,707	1,220
1988	32,993	1,286
1989	33,691	698
1990	34,588	897
1991	35,395	807
1992	36,287	892
1993	38,002	1,715



* In 1985 the City of St. George announced an increase in building permit fees of approximately 100 percent, resulting in a decrease in numbers of permits issued during the 1986 to 1989 period. Builders who obtained prior approval on subdivision plots and purchased building permits in 1985 were exempt from these increased rates. These advance purchases distort permit data for at least the following four years.

** PUD = Planned Unit Development.

Figure 3.2 St. George City Building Permits from 1982 to 1993



* This number of permits reflects only St. George City and the unincorporated portions of Washington County, effectively understating the total number of permits in the County for these two years.

Figure 3.3 Building Permit Data for Washington County

The purchase of second homes in St. George is an aspect of growth not normally found in other communities. The benefit of second homes is reflected in lower costs to the community. Owners do not send their children to school, while police, garbage removal, and other public service needs also diminish. Property taxes for second homes are based on 95 percent of market or assessed value, rather on 67 percent as are primary residences. Part-time residents of the City usually consider their official place of residence to be elsewhere, and are not included in typical methods of determining population.

The Washington County Assessor's office supplied the information presented in Tables 3.2 and 3.3 regarding primary and secondary homes in the St. George area. These figures were obtained by the assessor from requests sent to property owners with their tax notices. From 1985 to 1992, the percentage of non-resident owners has increased from 14 to 17 percent, indicating an average growth of 8.7 percent per year for seven years.

Table 3.2. Percentages of Primary and Secondary Homes, 1985, 1990, and 1993.

Year	Total	Primary Homes		Secondary Homes	
1985	10,673	9,172	86%	1,501	14%
1990	15,424	12,896	84%	2,528	16%
1993	18,251	15,301	84%	2,950	16%

Table 3.3. Primary and Secondary Housing in Washington County by Type.

Type of Housing	Percent Primary	Percent Secondary
Single Family	96.0-97.0	3.0-4.0
Condominiums	65.0	35.0
Mobile Homes	80.0	20.0
Apartment/Multi-Family*	100.0	0.0
Total	85.2	14.8

* Apartment and multi-family structures are assumed by the Assessor to be primary residences. However, they are counted as one parcel since only one tax notice is sent to the owner of an apartment or mobile home rental park.

3.3.3 School Population Growth

The student increase rate suggests strong growth in young families. Thus, in a so-called "retirement community," bi-modal population growth may be assumed, split between young families and retirees. Growth in young families has been a product of the demand for workers in service and other area industries. Future growth in the retirement segment of the community will be followed by growth in young families as workers move into the area to meet the demand for additional services. Figure 3.4 presents Washington County school enrollment, which has doubled over the last ten years. Growth in enrollment has also occurred at Dixie College in St. George.

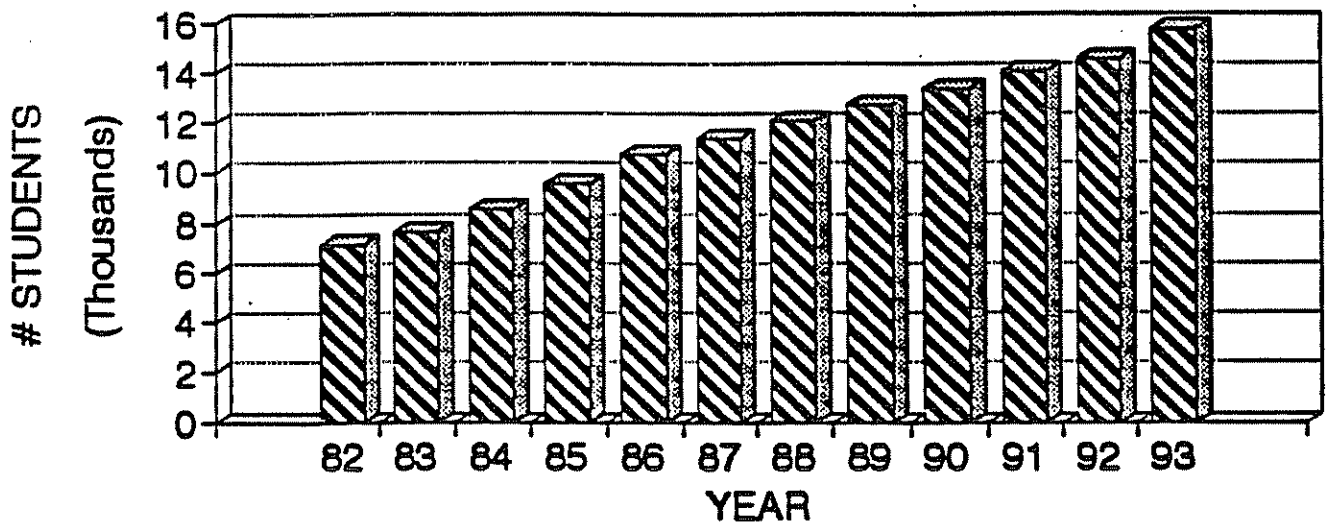


Figure 3.4 Washington County School Enrollment

3.3.4 Regional Impact

Growth in Washington County has impacted other communities in the area. For example, with the heavy population growth of retired people and second home owners, an increase in jobs has been created in Mesquite, Nevada, 36 miles southwest of St. George. Mesquite has over 1,500 motel rooms used in combination with the gaming industry. Washington County provides housing and schools to approximately 25 percent of the employees of the recreation and gaming business establishments in Mesquite.

Washington County experienced an average annual compounded growth rate of 6.34 percent from 1980 through 1993 (Utah Division of State Lands and Forestry 1994). Marketing of major projects will further enhance growth, causing that figure to grow. Development within the community, such as shopping facilities, professional services, better land planning, increased tourism, and recreational and tourist facilities, should further enhance growth prospects.

3.3.5 Opportunity Costs

The following is paraphrased from a report entitled "The Economic Impact of Alternative Desert Tortoise Habitat Plans for Washington County, Utah" (Groesbeck 1995).

Opportunity costs are formally defined as the highest valued alternative foregone by making a decision to use a resource in a particular manner. The very definition of "economic impact," therefore, must include the full opportunity costs of any policy. The opportunity cost of a decision to set aside a natural resource for one use is the lost value associated with the highest valued alternative use of that resource.

An important dimension of opportunity cost is that these costs persist and change over time as the highest valued alternative use changes, due to the dynamic nature of markets. Further, artificial barriers, such as government policies restricting the use of a resource, do not eliminate the opportunity costs of that resource at a social or individual level. When lands are initially set aside by government to protect a listed species, the opportunity costs of the land persist, despite a policy barrier against alternative uses. Further, as time passes and the resource continues to have legal constraints on alternative uses, the annual opportunity costs will rise as the resource in general becomes more scarce.

Such is the case of lands proposed to be managed intensively for desert tortoise habitat in Washington County. While the listing process has complicated economic development of affected lands via the force of law, the opportunity cost of the land continues to persist. Further, as Washington County continues to grow, and prime developable land becomes increasingly scarce, the opportunity costs of habitat lands continue to grow.

When considering the economic impact of the proposed HCP for Washington County it is important to keep in mind the continuing opportunity costs of lands set aside before the HCP is to be implemented. To the extent that the HCP allows for the development of some of the lands

that were previously set aside, this mitigates the negative impact of setting aside valuable land resources for protected desert tortoise habitat. However, the lands that continue to be set aside create economic losses to the community equivalent to the social opportunity cost of those lands.

In this sense, the HCP does not create positive net effects on Washington County, rather it reduces the level of economic costs imposed upon the County. However, because avoided costs can be viewed as a benefit, the value of this cost savings (benefit) should be calculated. This simply means that economic costs should be calculated for all possible scenarios for setting aside land. The "benefit" of the HCP will be the difference between the economic cost without the HCP versus the lower economic costs with the HCP.

3.3.5.1 Method and Assumptions of Economic Impact Estimation

Before estimating the economic cost of removing lands from development in a region, it is essential to determine a) the annual rate at which the affected lands would have been developed; b) the proportions of land use between residential versus commercial/industrial; and c) the 1996 economic value of developed commercial and residential property (land, structures, and commercial sales). Once these factors are estimated on a per-acre basis, then an input-output model of Washington County can be used to assess the annual impact of removing a number of acres from development in the County.

The potential annual rate of development of the lands in question is primarily a function of human population growth and the quantity of equivalent alternative development sites in the County. The Utah Division of State Lands and Forestry (Division) estimated the average annual rate of absorption for all uses in Washington County at around 500 acres for the period between 1994 and 2000 (Utah Division of State Lands and Forestry 1994). This estimated absorption rate is primarily driven by population growth in the region. Therefore, if population growth rises or falls, the absorption rate will vary in the same direction.

The other factor that drives absorption of the lands in the incidental take areas is the number of acres available in equivalent alternative areas. At this time, there is no shortage of equivalent alternative development sites (WCWCD 1994). Estimates of unconstrained prime developable land in Washington County currently exceed 80,000 acres, which implies that increasing the number of developable acres in the take areas will simply shift the existing development pattern geographically in the short run, but will not necessarily increase the overall level of economic activity in the County. In fact, if lands in incidental take areas were instantaneously and simultaneously made available for development, overall land values would fall in Washington County in the short run. It is unlikely that this will occur to any great extent, however, as the inaccessibility of many of these lands will act as a natural barrier to their effectively entering the land development market for several years, until roads and utilities are developed in those areas.

As Washington County is built out and prime lands are fully absorbed, the lands in the take areas will provide unique opportunities for economic growth in the region, and the remaining

lands in the desert habitat reserve will experience rapidly increasing opportunity costs. Therefore, the economic costs and benefits of the entire reserve, and the take areas in particular, will change dramatically over time, making it necessary to provide impacts reported in both the short and long run. Long-run impacts are estimated using the 1996 value of all potential construction and development activities that could be sustained on non-Federal lands in the reserve, as well as the consumer demand that would be generated by households living on the affected lands. This means that long-run impact estimates show the lost economic opportunity (in 1996 dollars) of reserve, non-take lands, as if they were fully built-out, based on the development pattern currently existing in St. George. Further, the long-run reclaimed opportunities (avoided costs) associated with incidental-take area lands are estimated as the 1996 value of the property as if it were fully developed according to the St. George development pattern. Estimates of lost or reclaimed economic opportunities also include the one-year effect of consumption expenditures of new households that would have or will occupy the new residential units, once again in 1996 dollars. Short-run impacts of the HCP are assumed to be zero in all alternatives because of the adequate supply of equivalent development sites in the County.

The second major factor in determining potential economic impact of the HCP is the proportion of land to be used as residential versus commercial and industrial. The current ratio of households to business firms in the County is approximately 12 to 1 (derived from IMPLAN [a computer input-output model which determines economic impacts], assuming an average household size of three persons with two adults and a labor force participation rate of 60 percent). In the Division study cited previously, it was estimated that the annual rate of absorption will be 405 acres for residential lands and 95 acres for commercial/industrial lands. Further, data provided in that study make it possible to derive that total land use per residential unit, including utility and road requirements, is currently .30925 acres (probability weighted between single family, townhome/condos, and apartments). Given this information, the number of housing units per acre will be 3.2336, for a total number of housing units of 1,309.61 = (3.2336 x 405). If the ratio of residences per business holds at 12 to 1, this implies that the number of new firms established annually will be 109.13. This being the case, each business will require an average of .8705 acres, or that each acre of commercial/industrial land will support 1.1487 firms.

The value of new construction per residential unit (probability-adjusted for types of housing) in 1996 is assumed as $93,994. The value of new commercial construction per building per firm is assumed to be $168,730. These numbers were extrapolated from building permit data for the years 1991-93, and assumed a 4 percent annual inflation rate. Developed land value per residence for 1993 was estimated as $27,441 in the study previously cited by the Division. Assuming an annual inflation rate for lands equal to the 16-year average (7.9 percent), the value of developed lands for single family residential units will be $34,471, generating a probability-adjusted value for all residential units of $23,689. Using the IMPLAN data set, road construction value per residential unit is assumed to be $4,866, and utility construction value is assumed to be $12,167. Therefore, raw land value per residential unit, the net of developed value minus development cost, is assumed to be $6,656, or $21,522 per acre of undeveloped

prime land. It is further assumed that of the total lands available, one-third of the lands will be used for public domain uses such as parks, utility access, schools, etc. The economic impact of public domain uses is not calculated in this study.

Gross household income for 1996 is assumed to be $36,676. This number was derived from Utah Tax Commission data for return year 1993, assuming a 4 percent inflation rate and a 2 percent growth rate in real income annually. It is assumed that there will be a 50 percent net leakage of gross income, accounting for the probability of part-time residences, net State and Federal tax payments[1], savings rates, charitable contributions to entities outside the County, and purchases of out-of-county goods. Therefore, the amount of initially captured income will be $18,338 per household. Using this number to shock the input-output model will probably create conservative estimates of retained benefits associated with incidental take areas. This is true because net tax payments may actually be a negative number due to the large amounts of Federal and State spending that occur in Washington County caused by relatively high retiree populations and extensive Federal land holdings in the County.

A further assumption that is made is that all Federal lands are completely constrained as far as development is concerned. Further, no attempt has been made to account for lost grazing values beyond the $183,000 value that current permit holders are estimated to sell those permits for.

These data are used in Chapter 4 to compute the economic impact of the alternatives.

3.4 LAND OWNERSHIP, USE, AND MANAGEMENT

3.4.1 Land Ownership

Land ownership in Washington County is composed of Federally owned lands, State of Utah lands. and privately owned lands. Table 3.4 defines the acreage and percentage of lands owned by each of these entities.

Federal lands in Washington County are managed by several agencies. The Bureau of Land Management (BLM) manages over half of the Federal lands in the County (53 percent). The U.S. Forest Service (USFS) manages 33 percent, the National Park Service (NPS) manages approximately 11 percent, and the remaining 3 percent is managed by the Paiute Indian Tribe. BLM lands are the only Federal lands that would be affected by the Proposed Action or alternatives. Therefore, Federal lands managed by the other agencies will not be discussed further in this EIS.

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[1] Net State and Federal tax payments equal State plus Federal tax payments, minus State plus Federal spending in the County.

Table 3.4. Land Ownership in Washington County.

Land Status	Acres	Percent
Federal	1,176,289	76%
State	94,747	6%
Private	280,964	18%
Total	1,552,000	100%

Lands owned by the State of Utah consist primarily of Federally granted School Trust lands. As specified in Utah's State Enabling Act, these lands were transferred into State Trust lands for the benefit of the public school system (Utah Division of State Lands and Forestry 1986).

Approximately 90 percent of the privately owned lands in Washington County are currently used for agriculture. However, as the population in the County continues to grow, private landowners are increasingly considering commercial development rather than agriculture. Land uses that are being pursued increasingly by private landowners include resort and golf course development, service-related business development, and residential development.

3.4.2 Land Use and Management

3.4.2.1 BLM Lands

Mining and Minerals. All BLM lands which have not been withdrawn are generally subject to mineral entry. There are currently 1,192 mining claims registered with the BLM in Washington County on approximately 22,800 acres of land (BLM 1990a). Gold and silver have been mined throughout the area in the past. The area has also been explored for uranium but no extraction has occurred to date. The Apex mine, located west of St. George, is the only open gallium and germanium mine in the United States. These rare minerals are mined for use in semiconductors and optical equipment (BLM 1990a). One mine site is located near the town of Hurricane in desert tortoise habitat, and is operating under an ESA section 7 consultation.

Sand and gravel operations are located on BLM lands at the base of the Beaver Dam Mountains southwest of St. George, along Fort Pearce Wash, and along the Santa Clara River. Cinder operations are primarily located east of St. George, and decorative flagstone is extracted by permit only from several locations in southern Washington County (BLM 1990a).

Timber. BLM lands in Washington County are dominated by pinyon and juniper trees. No commercial cutting is permitted; however, private cutting of dead and down materials is allowed with a permit. Cutting of green trees is permitted for management purposes only (BLM 1990a).

Recreation. BLM lands contain areas of scenic beauty, including those lands adjacent to Zion National Park. The BLM has stated in their Dixie Resource Management Plan (1990a) that the

scenic value of the area will be protected by restricting OHV use on lands adjacent to the national park.

Five Special Recreation Management Areas (SRMAs) have been proposed on BLM lands in Washington County. Two of these, the 87,900-acre Red Cliffs/Sand Mountain SRMA and the 24,000-acre Red Mountain/Santa Clara Creek SRMA, are partially located on lands that would be impacted by the action alternatives. Recreational activities currently permitted in the Red Cliffs/Sand Mountain area include OHV riding, learning natural history, reservoir- and stream-based recreation, picnicking, camping, viewing scenery, scenic driving, primitive recreation, viewing historical and paleontological sites, and horseback riding. Recreational activities currently permitted in the Red Mountain/Santa Clara Creek area include primitive recreation, hiking, viewing scenery, stream-based recreation, picnicking, camping, horseback riding, small game hunting, scenic driving, and viewing archaeological sites (BLM 1990a).

3.4.2.2 State Lands

The Division is responsible for administration of all State School Trust lands. Management is based on multiple-use/sustained-yield principles, except where State law directs otherwise. The only other State lands in Washington County are within Snow Canyon State Park. The park is administered by the USPR to promote recreation, wildlife, and scenic value.

Mining and Minerals. Two leases for sand and gravel operations currently exist on State School Trust lands. Both leases are north and east of St. George, outside the area that would be impacted by the action alternatives.

Timber. Woodcutting is permitted on State lands, except within Snow Canyon State Park. No commercial cutting of timber occurs on State lands.

Recreation. Recreational opportunities within Snow Canyon State Park include camping, picnicking, scenic driving, horseback riding, hiking, and wildlife viewing. The park includes one established campground and is accessible by two paved highways. Recreational opportunities on State Trust lands are less restricted than they are within the State park. Activities on State Trust lands include those listed above, as well as OHV use, hunting, and stream-based recreation.

3.4.2.3 Private Lands

Mining and Minerals. Individual landowners are not required to file mining claims with any government agency. Therefore, the extent of mining on private property cannot be determined. No mining is known to occur on city lands within Washington County.

Timber. Woodcutting occurs frequently on private lands. Currently there is no large scale commercial cutting taking place on private or city lands.

Recreation. There are no restrictions for recreational opportunities on privately owned lands, provided the activities are in compliance with city and county ordinances.

3.5 AGRICULTURAL RESOURCES

3.5.1 Rangeland

There are currently 110 grazing allotments in Washington County, encompassing approximately 539,705 acres of BLM-administered lands, 73,975 acres of State lands, and 54,596 acres of private lands. Some allotments also encompass Paiute Indian Tribal lands, NPS lands, and USFS lands. Livestock grazed on these lands includes cattle, sheep, and horses. Because grazing occurs predominantly on BLM lands, Allotment Management Plans (AMPs) have been prepared by BLM for each allotment, and management is dictated by AMPs. Grazing allotments are managed under one of three categories: 1) Improve, 2) Maintain, and 3) Custodial. The improvement category is applied to allotments with resource management problems that need to be resolved. The maintain category is applied to allotments in favorable condition and management efforts are directed towards maintaining those conditions. The custodial category is applied to those allotments where returns for intensive management are not expected to be great; therefore, minimal management is applied.

Four grazing allotments occur in areas which would be impacted by the action alternatives. The HCP proposes to purchase and retire these allotments. Table 3.5 lists the allotments, total acreage of each allotment, and number of Federal and State Animal Unit Months (AUMs) for each allotment.

Table 3.5. Grazing Allotments That Could be Impacted by the Action Alternatives.

Name	Total Acreage	Federal AUMs	State AUMs
Alger Hollow	16,878	741	124
Yellow Knolls	2,053	16	0
Washington	20,563	256	870
Red Cliffs	19,022	425	0

3.5.2 Farmland

No Federal or State land is leased as farmland in Washington County. Farming does occur on private lands in the County, but none of the farmed lands occur in areas that would be impacted by the action alternatives. Crops grown in the area include alfalfa, corn, apples, apricots, and melons.

3.6 THREATENED, ENDANGERED, CANDIDATE, AND SENSITIVE SPECIES

Nine Federally listed threatened or endangered species are found in Washington County. They are: Mojave desert tortoise, bald eagle, and Siler pincushion cactus (all threatened), peregrine falcon, woundfin, Virgin River chub, dwarf bear-poppy, Mexican spotted owl, and southwestern willow flycatcher (all endangered). Eight of these may be affected by one or more of the alternatives. Habitats for these species within Washington County are shown in Figure 3.5. In addition, 24 candidate species may be affected (Table 3.6). Habitat information for all 33 affected species is provided below, and the species are analyzed for impacts under each alternative in Chapter 4. Table 3.7, which is provided at the end of this section, lists Federally listed/candidate and State sensitive species present in Washington County that would not be affected. (For additional information and sources, see Chapter 7 of the HCP.)

3.6.1 Mojave Desert Tortoise (*Gopherus agassizii*)

The Mojave desert tortoise is listed as threatened by USFWS. Desert tortoises occur in areas throughout Washington County, and potential habitat for the species includes developable land in the County. The distribution of the Mojave desert tortoise extends from southern California into southern Nevada, northwestern Arizona, and southwestern Utah (see Figure 2.1 of HCP).

A rapid decline in the population led to the emergency listing of desert tortoises north and west of the Colorado River (excluding the Beaver Dam Slope population) as endangered in 1989 (USFWS 1989). The entire Mojave desert tortoise population was listed as threatened on April 2, 1990. Primary reasons for listing included deterioration and loss of habitat, collection for pets or other purposes, elevated levels of predation and, loss of desert tortoises from disease (USFWS 1994a). The USFWS released the final Recovery Plan for the Desert Tortoise (Mojave Population) in August 1994.

An adult desert tortoise has a domed carapace, or upper shell, and relatively flat plastron, or bottom shell. Carapace color is generally light to dark brown, while the color of the plastron is cream and is often mottled. The front legs are adapted for burrowing, with laterally extended limbs and flattened feet, enlarged horny scales, and broad claws. The rear legs are rounded and elephantine. Desert tortoises have rounded heads and blunt, horny beaks. Their unprotected skin is thin and easily penetrated. Adult desert tortoises range in size from 9.25 to 14.5 inches long, while hatchlings are about the size of a silver dollar (approximately 1.4 to 1.8 inches long). The life span of desert tortoises has been estimated at 50 to 100 years. Mortality is highest in juvenile desert tortoises due to their small size and soft shell.

In order to escape extreme desert temperatures, desert tortoises rely on burrows and other forms of cover to regulate body heat. Desert tortoises will excavate burrows using their front legs to scrape away dirt. Once the burrow is deep enough, a desert tortoise may turn around to face the entrance and continue to push dirt out of the burrow with its forelimbs (Ernst and Barbour 1972). In areas with sandy-loamy soil, a desert tortoise can complete a burrow in little more than an hour (Marlow 1979). Burrow construction occurs on flats and sloping bajadas, as well

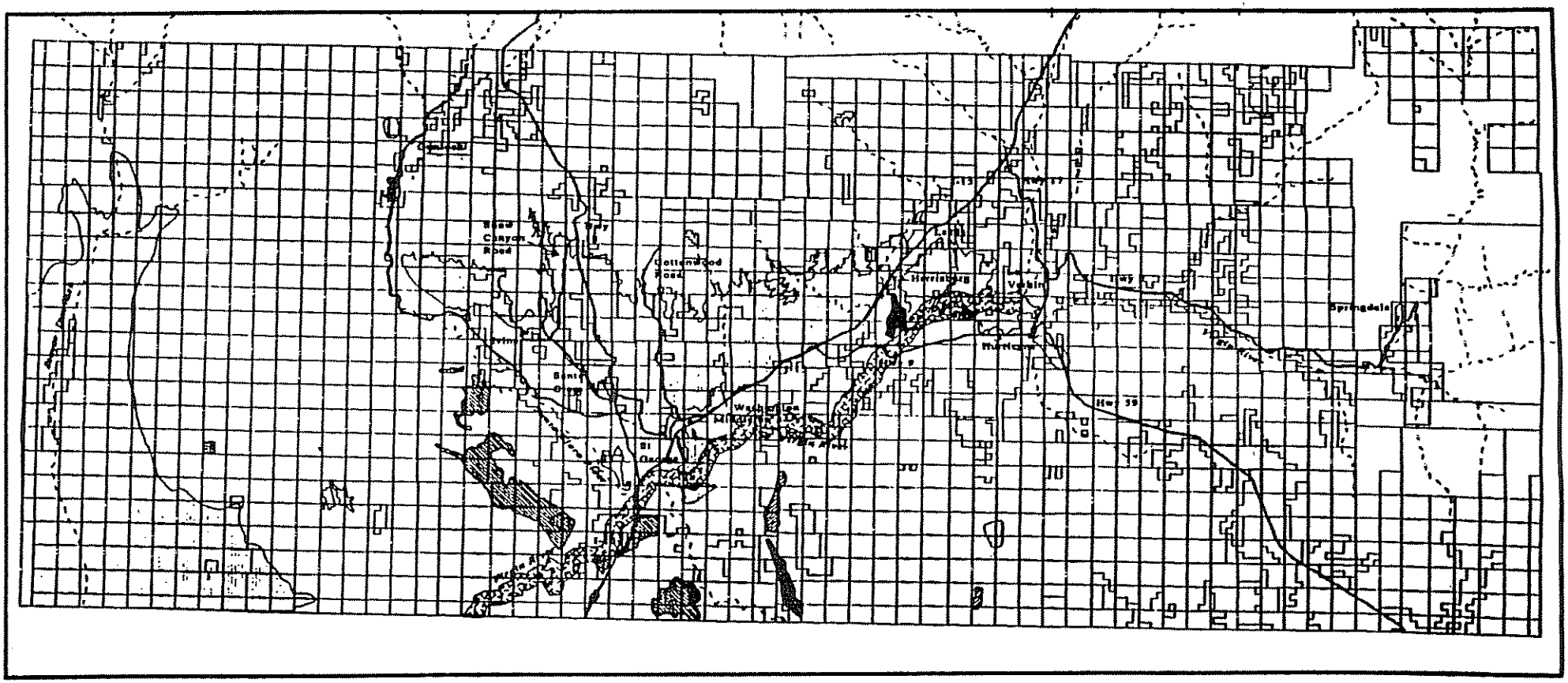
Table 3.6. Threatened, Endangered, Candidate, and Sensitive Species Potentially Affected by the Alternatives.

Common Name	Scientific Name	Federal Status	State Status
Mojave Desert Tortoise	*Gopherus agassizii*	Threatened	Endangered
Bald Eagle	*Haliaeetus leucocephalus*	Threatened	Endangered
Peregrine Falcon	*Falco peregrinus*	Endangered	Endangered
Woundfin	*Plagopterus argentissimus*	Endangered	Endangered
Virgin River Chub	*Gila robusta seminuda*	Endangered	Endangered
Dwarf Bear-Poppy	*Arctomecon humilis*	Endangered	S1
Siler Pincushion Cactus	*Pediocactus sileri*	Threatened	LT
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Endangered	S1/S2
Merriam's Kangaroo Rat	*Dipodomys merriami frenatus*	Category 2	S2
Pygmy Rabbit	*Brachylagus idahoensis*	Category 2	-
Ferruginous Hawk	*Buteo regalis*	Category 2	Threatened
Western Chuckwalla	*Sauromalus obesus obesus*	Category 2	Threatened
Gila Monster	*Heloderma suspectum*	Category 2	Endangered
Desert Night Lizard	*Xantusia vigilis*	Category 2	S2
Glossy Snake	*Arizona elegans*	Category 2	S2
Utah Banded Gecko	*Coleonyx variegatus utahensis*	Category 2	S2
Zebra-tailed Lizard	*Callisaurus draconoides*	Category 2	S2
Lyre Snake	*Trimorphodon biscatus lambda*	Category 2	S2
Western Blind Snake	*Leptotyphlops humilis*	Category 2	S2
Sidewinder	*Crotalus cerastes*	Category 2	S2
Holmgren Milk-vetch	*Astragalus holmgreniorum*	Category 1	S1
Gumbo Milk-vetch	*Astragalus ampullarius*	Category 2	S2
Virgin Spinedace	*Lepidomeda mollispinis mollispinis*	Category 1	Endangered
Yellow-billed Cuckoo	*Coccyzus americanus*	Category 3	Threatened
Common Yellowthroat	*Geothlypis trichas*	Category 2	S1
Yellow-breasted Chat	*Icteria virens*	Category 2	S1
Bell's Vireo	*Vireo bellii*	Category 2	S1/S2
Flannelmouth Sucker	*Catostomous latipinnis*	Category 2	-
Arizona Toad	*Bufo microscaphus microscaphus*	Category 2	S1
Lowland Leopard Frog	*Rana yavapaiensis*	Category 2	S1
Northern Leopard Frog	*Rana pipiens*	Category 2	-
Mojave Patchnose Snake	*Salvadora hexalepis mojavensis*	Category 2	S2

Key:

S1: Any wildlife species which, although still occurring in numbers adequate for survival, whose population has been greatly depleted, is declining in numbers, distribution, and/or habitat.

S2: Any wildlife species which, although stilloccuring in numbers adequate for survival, occurs in limited areas and/or numbers due to a restricted or specialized habitat.



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- Mojave Desert Tortoise
- Bald Eagle
- Peregrine Falcon
- Woundfin Minnow and Virgin River Chub
- Dwarf Bear-Claw Poppy
- Siler Pincushion Cactus

N

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as on the relief provided by wash banks, berms, hillsides, and mountain slopes (Karl 1983). Desert tortoises are generally found in areas where soil is suitable for burrow construction. Soil must be sufficiently free from rocks to permit digging and compact enough to maintain a strong archway over the burrow (Woodbury and Hardy 1948).

Desert tortoises generally use four types of cover: burrows approximating the width of the desert tortoise and at least as long as the desert tortoise, pallets or soil depressions with no soil cover, shrubs high enough to provide shade, and openings in rock or caliche that can hold one or more desert tortoises. Desert tortoises are active during temperate times of the year, such as the spring and fall. Their active season begins in early March and ends in late October or early November. Desert tortoises will usually remain dormant through the winter months, and are relatively inactive during the hottest summer months. Desert tortoises will emerge from their burrows during inactive seasons if the temperature is mild or water is available. Daily activity during their active season is dictated mainly by temperature. Desert tortoises are active between ambient temperatures of 65 to 105 degrees Fahrenheit. This temperature range generally occurs in the morning, shortly after daylight, and again in the late afternoon. Nocturnal activity is rare.

Diet of desert tortoises is composed mainly of forbs (small annual flowering plants) and annual grasses. These plants generally bloom from March to May and, depending on rainfall, in early fall. Other forage includes perennial grasses, woody shrubs, and cacti (Esque 1992).

Characteristics of habitat occupied by the desert tortoise reflect the species' burrowing and foraging behavior as well as physiological constraints associated with climate. Conditions include, but are not limited to, an appropriate mix of vegetation and soils, together with access to seasonal food and water sources. Perennial vegetation is essential to the desert tortoise for cover and also protects some types of annuals found in the understory. Roots of perennials also provide stability to soils, thereby improving suitability of burrow sites.

Creosote bush is the dominant perennial shrub in the Mojave Desert and is an indicator of desert tortoise habitat (Karl 1983). In Nevada, California, and Utah, desert tortoises are found in low densities in creosote-blackbrush ecotones and in creosote-saltbush communities, but rarely where creosote is entirely absent from the surrounding community.

3.6.2 Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle was listed by USFWS as an endangered species, but has been recently upgraded to threatened (final rule effective July 12, 1995). Adult bald eagles have a white tail, tail coverts, throat, chin, nape, and head. The rest of the body is dark brown to black. Eagle eyes, bill, and talons are mostly yellow. Juveniles are marked by brown rather than white feathering on the head and tail, while subadults (2-4 years old) have mottled white and brown head and tail feathers. These birds mature rather slowly, not attaining breeding maturity until their fourth or fifth year. A number of studies have shown that eagles mate for life, and commonly nest in the

same location for many years. Bald eagles are noted for their size; adult bird wingspans range from 45 to 55 inches (Johnsgard 1990).

Bald eagles are found from the Bering Strait south to Florida and Baja California, Mexico. Because fish is their primary food, eagles tend to inhabit areas such as coasts and inland waterways where fish are abundant. During winter months, eagle populations require suitable roosting sites as well as food supplies (Johnsgard 1990).

In Utah, bald eagles favor side canyons with bowl-shaped ravines that offer environmental protection, and selectively perch in large and open trees located near tops of ridges, thereby allowing easy access to valleys (Edwards 1969). Most observations of bald eagles in Washington County are along the Virgin and Santa Clara Rivers, and bodies of water associated with these rivers. Other areas used by bald eagles include the sewage ponds in Hurricane, and the Quail Creek, Baker Dam, Sand Cove, Gunlock, Ivins, and Ash Creek reservoirs (BLM 1990b, UDWR 1991).

3.6.3 Peregrine Falcon (*Falco peregrinus*)

The peregrine falcon is currently listed as an endangered species by USFWS. It was listed as endangered in 1970 when it was discovered that the pesticide DDT and its metabolites were having direct impact on the falcon's survival. Subsequent banning of DDT in the United States and institution of protective measures has resulted in the apparent recovery of the species. Peregrine falcons are now known to be present in numbers greater than the goal postulated in the Recovery Plan (Skaggs et al. 1988). A proposed rule to remove the Peregrine Falcon from listed status was published in the Federal Register on June 30, 1995.

Peregrine falcons are raptors specialized in hunting and killing their prey in mid-air. These birds inhabit open wetlands near cliffs, and prey chiefly on waterfowl and shore birds. Peregrines fly with extreme power and speed, often attacking their prey with a vertical dive from great heights, as well as sometimes engaging in direct pursuit. Adults may be identified by their black crown and nape and the black wedge extending below the eye to form a distinctive "helmet" which is absent in other falcons. Back and upper wing coverts are dark slate with blue-gray bars and feather fringing and upper tail coverts are blue-gray with black barring. The white belly is barred with black. White leg feathers have black barring and the tail is black with eight or more gray bands and a thick, white terminal band (National Geographic 1987, Clark and Wheeler 1987).

Peregrine falcons are found from Alaska south throughout the western United States to southern Baja California, Mexico. In the southwestern U.S., breeding sites are generally associated with high sheer cliffs (at least 200 feet). Some type of wetland is almost always associated with the nest site so that abundant prey is available to the adult birds (Johnsgard 1990).

Known nesting sites in Washington County include approximately 12 nest sites in Zion National Park, one at Welcome Spring near the south end of the Beaver Dam Mountains, one at Snow Canyon State Park, and one at the Red Cliffs Recreation Area (UDWR 1991).

3.6.4 Woundfin (*Plagopterus argentissimus*)

The Woundfin has been listed as endangered by USFWS, and critical habitat has been identified in the main channel of the Virgin River below La Verkin Springs (USFWS 1992). The Woundfin is a streamlined silvery minnow with a flat head and a conspicuous, sharp dorsal spine, from which its common name was derived. The only breeding color noted has been a wash of light-yellow at the bases of the pectoral and pelvic fins. The species rarely achieves a standard length of more than three inches (USFWS 1992).

The Woundfin was historically found throughout several tributaries of the lower Colorado River as well as in the mainstream of the Colorado. This fish species was found at the confluence of the Salt and Verde Rivers at Tempe, Arizona, to the mouth of the Gila River near Yuma, Arizona (Gilbert and Scofield 1898). Because of impoundment, introduction of non-native fishes, water depletions, and overall habitat loss, range of the Woundfin has been diminished to the mainstream of the Virgin River and the lower portion of La Verkin Creek, downstream to Lake Mead (Miller and Hubbs 1960, Minckley and Deacon 1968). On April 5, 1995 USFWS proposed that the area from the confluence of Ash and La Verkin creeks to Lake Mead be listed as critical habitat for the Woundfin.

All attempts to re-establish this fish in other parts of its native range have failed (unpublished data, Arizona Game and Fish Department). The Virgin River Fishes Recovery Plan (USFWS 1995) identifies major limiting factors for the woundfin, Virgin River chub, and other native fish species as loss of habitat and introduction and establishment of nonnative fish, particularly red shiner. Loss and degradation of habitat has occurred through building of dams and associated reservoirs, water diversion structures, canals, laterals, aqueducts, and dewatering of streams. The decline in both species' range and population numbers is due to the physical reduction in available habitats within the various river systems caused by these water projects. This loss of habitat has been exacerbated due to introduction and establishment of exotic species, further reducing the suitability of remaining habitats for woundfin and Virgin River chub.

3.6.5 Virgin River Chub (*Gila robusta seminuda*)

The Virgin River chub is currently listed as endangered by USFWS. This fish is a very silvery medium-sized minnow that averages 8 inches in total length, although it can grow to a length of 18 inches. The Virgin River chub can be distinguished from other subspecies of *G. robusta* by the number of rays (9-10) in the dorsal, anal, and pelvic fins, and the number of gill rakers (24-31). The back, breast, and part of the belly have small, deeply embedded scales that are difficult to see and may be absent in some individuals (USFWS 1992).

The Virgin River chub historically occurred within the mainstem Virgin River from Pah Tempe Springs, Utah downstream to the confluence with the Colorado River (Cope and Yarrow 1875, Cross 1975). At present this species occurs within the mainstem Virgin River from Pah Tempe Springs downstream to the Mesquite Diversion and in Muddy River, Nevada (USFWS 1992). The major limiting factors for this species are the same as for the woundfin.

3.6.6 Dwarf Bear-Poppy (*Arctomecon humilis*)

The dwarf bear-poppy was listed as endangered by USFWS on November 6, 1979 (USFWS 1985). The most severe threat to the poppy, other than the continued rapid expansion of St. George, is OHV use associated with recreation and mineral exploration. The poppy is characterized by several unique features including stature, leaf morphology, and floral parts. Its short leafy stems are only 12-15 cm tall, and the white flowers appear to float above the clusters of leaves, thereby accentuating the plant's low stature. The dwarf bear-poppy usually has four petals and the leaves are slightly lannate with deeply three-toothed leaves at the apex (USFWS 1985).

A. humilis is the easternmost species of the genus. It occurs at the eastern edge of the Mojave Desert in Washington County, in the vicinity of St. George. The poppy grows on select gypsiferous slopes of the Moenkopi Formation. South of St. George, the poppy grows on low hills at three sites: between Webb Hill and the Price City Hills, at White Dome, and near the ghost town of Atkinville. There are large populations at the base of Red Bluff just west of Bloomington and at the base of the north side of Santa Clara Butte. Low-density groups occur at the base of Boomer Hill, the White Hills, and near Val Spring. On the east, a healthy population occurs at the base of Warner Ridge from Punchbowl Dome south to Warner Valley Road. A small outlying colony also occurs at the south end of Warner Ridge on Beehive Dome less than a mile from the State line. A colony of a few dozen plants also occurs at the base of the south side of Shinob Kibe, a small butte across the Virgin River from the City of Washington (USFWS 1985).

3.6.7 Siler Pincushion Cactus (*Pediocactus sileri*)

The Siler pincushion cactus was listed as endangered by USFWS on November 26, 1979, and downlisted to threatened on December 27, 1993. The cactus is threatened by adverse impacts of its habitat due to mining activities, extensive OHV use, trampling by grazing livestock, and direct loss of plants due to collecting (USFWS 1986).

The Siler pincushion cactus is a small, solitary or occasionally clustered, globose cactus about four inches tall. Each aereole contains three to seven brownish-black straight or slightly curved central spines, becoming pale gray or nearly white with age. Additionally, there are 11-16 whitish radial spines per aereole. The central spines are about one inch long and the radials are slightly shorter. Flowers are about one inch in diameter, with yellowish marginally scarious petals with maroon veins, and fruits are greenish-yellow (USFWS 1986).

The present and historical ranges of the Siler pincushion cactus are assumed to be similar, although limited historical data is available on the species. The cactus grows on low hills with outcrops of gray or red clay from several geologic formations. Its distribution is mainly associated with the Great Basin desert scrub biotic community. The eastern range of the cactus is southeast of Fredonia in Coconino County, Arizona. Its western boundary is in north-central Mojave County, Arizona. The range extends north into Kane and Washington Counties, Utah, and south into Mojave County, Arizona (USFWS 1986).

3.6.8 Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

The southwestern willow flycatcher has recently been Federally listed as endangered (March 1995). The species is also considered a State sensitive species. The flycatcher is a small, brownish-olive bird with a pale olive breast and a pale yellow belly, whose spring and summer range is the southwestern United States (Unitt 1987). This species uses low to mid elevation and stream habitats, generally nesting among willow or reed thickets, but inhabiting forested, wetlands, and rangeland during other parts of the year. Flycatchers feed primarily on insects, seeds, and berries. Their winter range is from southern Mexico to Panama (Ehrlich et al. 1988). Southwestern willow flycatchers have been recorded along the Virgin and Santa Clara Rivers. While suitable breeding habitat exists along these rivers, no perennial populations or nests have been documented (pers. commun., R. Fridell, 1992). However, summer records of this species imply potential breeding in the area.

3.6.9 Merriam's Kangaroo Rat (*Dipodomys merriami frenatus*)

The Merriam's kangaroo rat is a Federal Category 2 species and is also considered a State sensitive species. The preferred habitat of this rodent includes sagebrush and saltbush/creosote communities. Its range includes southwestern Utah, southern Nevada, southern California, and parts of southern and western Arizona (Burt and Grossenheider 1976). In Utah, this species has been recorded on the Beaver Dam Slope and in areas directly north of St. George (pers. commun., R. Fridell, 1993).

3.6.10 Pygmy Rabbit (*Brachylagus idahoensis*)

This species is a Federal Category 2 species. The pygmy rabbit is the smallest cottontail rabbit. It inhabits tall sagebrush communities throughout Oregon, Idaho, Nevada, and Utah. Although pygmy rabbits have been seen in the day, they are primarily nocturnal. These rabbits inhabit burrows within dense sagebrush and rarely travel more than 30 yards from their homesite (Burt and Grossenheider 1976). In 1992, pygmy rabbits were recorded at three sites in Washington County (pers. commun., R. Fridell, 1993)

3.6.11 Ferruginous Hawk (*Buteo regalis*)

The ferruginous hawk is a Federal Category 2 species, and is State-designated as threatened. This hawk inhabits arid and semi-arid grasslands in the western United States. Ferruginous

hawks avoid high elevations, forest interiors, narrow canyons, and cliff areas (Palmer 1988). This species has been recorded throughout Washington County.

3.6.12 Western Chuckwalla (*Sauromalus obesus obesus*)

The western chuckwalla, a Federal Category 2 and State threatened species, may be found near rocks and rocky crevices at the base of cliffs and slopes throughout the Sonoran and Mojave Deserts (Berry 1974). This species is known to occur in rocky outcrops and boulder fields of lower hills in Washington County. Chuckwallas have been recorded throughout those portions of Washington County that may be impacted by the action alternatives.

3.6.13 Gila Monster (*Heloderma suspectum*)

This large reptile, a Federal Category 2 species, ranges from south of San Bernardino, California, to southwestern Utah, to southwestern New Mexico, and into Mexico (Stebbins 1985). In Utah, this species typically inhabits basaltic lava substrates and loose Navajo Sandstone boulder fields. It is believed to be declining in the State and is listed as State endangered. It has been recorded in a number of locations in Washington County, including those portions of Washington County that may be impacted by the action alternatives (pers. commun., R. Fridell, 1992; Beck 1985).

3.6.14 Desert Night Lizard (*Xantusia vigilis*)

This predominantly diurnal and crepuscular lizard occurs in the Mojave Desert and coast ranges of California, as well as southern Nevada, Utah, and central Arizona. It lives primarily under fallen branches of Joshua trees and in dead clumps of various other species including yucca, nolina, and agaves (Stebbins 1985). In Washington County, desert night lizards have been recorded from the Beaver Dam Slope, St. George, Washington, and the Castle Cliffs area. It is believed that the distribution of this secretive lizard may be limited by the presence of the plant species described above, which provide essential cover. Because it is seldom found in the open away from cover, this species was once considered rare, but is now known to be one of the most abundant lizard species in its range (Stebbins 1985). The status and distribution of this species within Washington County is poorly known, as a result of incomplete survey data and likely difficulties in making density or abundance estimates due to its secretive nature. It is a State sensitive species (pers. commun., R. Fridell, 1992).

3.6.15 Glossy Snake (*Arizona elegans*)

This snake occurs in open areas in a variety of habitats including chaparral, grassland, desert scrub, sagebrush flats and woodlands from southern California through Arizona and New Mexico and from Kansas south into Mexico (Stebbins 1985). Within Washington County, it appears to be restricted to Mojave Desert Scrub and has been recorded in St. George, near Bloomington, on the Beaver Dam Slope, near Castle Cliffs, and between Santa Clara and St.

George. Distribution and abundance of this species within the County is poorly understood at this time. This species is designated as State sensitive.

3.6.16 Utah Banded Gecko (*Coleonyx variegatus utahensis*)

This lizard occurs in Mojave Desert Scrub in southern Nevada, northwestern Arizona, and southwestern Utah, where it is found on red sandstone. Records for this species exist throughout Washington County including areas in and near St. George, Santa Clara, Bloomington, Gunlock, the Beaver Dam Mountains, and Zion National Park. Status of populations within Washington County is not well known at this time. The Utah banded gecko is designated as State sensitive.

3.6.17 Zebra-Tailed Lizard (*Callisaurus draconoides*)

This lizard occurs in desert washes in Mojave and Sonoran Desert Scrub habitats from central Nevada to southern California and from the southwestern corner of Utah into central and southern Arizona (Stebbins 1985). In Washington County, zebra-tailed lizards are common in Mojave Desert Scrub habitats from the Beaver Dam Slope to Zion National Park. Records of this species exist for Leeds, Virgin, Santa Clara, and St. George. The zebra-tailed lizard is a State sensitive species.

3.6.18 Lyre Snake (*Trimorphodon biscutatus lambda*)

This snake ranges from southern California to southern Nevada and southwestern Utah, and into central and southern Arizona, where it inhabits rocks and crevices in Mojave or Sonoran Desert Scrub habitats. Relatively little is known about distribution and abundance of this snake in Washington County, where it has been recorded from Zion National Park and areas near Springdale and St. George. The lyre snake is designated as State sensitive.

3.6.19 Western Blind Snake (*Leptotyphlops humilis*)

This species ranges from southern California, southern Nevada, and southwestern Utah into southern New Mexico and western and southern Arizona, where it appears to prefer sandy soils with relatively moist subsoils (Stebbins 1985). Within Washington County, it has been recorded in and near St. George, Washington, and in Snow Canyon State Park. This species is designated as State sensitive.

3.6.20 Sidewinder (*Crotalus cerastes*)

This species is restricted to Mojave Desert Scrub habitats in southeastern California, southern Nevada, southwestern Utah, and western Arizona, where it occurs on rocky, gravelly, or sandy substrates (Stebbins 1985). It is known to occur in or near St. George, Hurricane, and Paradise Canyon, and is designated as a State sensitive species.

3.6.21 Holmgren Milk-Vetch (*Astragalus holmgreniorum*)

This Virgin-Mojave endemic occurs in Warm Desert Scrub communities, and known populations exist south of St. George (Utah TES Plant Guide 1991). This plant is thought to be a young endemic and is found only in areas where human impacts already exist. Specificity to a particular geologic formation and low reproductive output are likely to predispose this species to decline. It is also believed that alteration of water flow patterns in the range of this species could have adverse effects (pers. comm., K. Harper, 1993). The Holmgren milk-vetch is a Federal Category 1 species, and is currently considered for listing by USFWS. It is designated by the State as a sensitive species.

3.6.22 Gumbo Milk-Vetch (*Astragalus ampullarius*)

This plant occurs in mixed desert scrub and scattered juniper community types. In Washington County it has been recorded in areas east and southeast of St. George and near Washington, on silt and sand substrates of the Chinle Formation. Most of the known populations occur on BLM lands (Welsh and Chatterley 1985). This species is Federal Category 2 and State sensitive.

3.6.23 Virgin Spinedace (*Lepidomeda mollispinis mollispinis*)

The Virgin spinedace was proposed for listing as threatened in May 1994. Critical habitat was proposed in April 1995. The Virgin spinedace is also a State endangered species. On November 8, 1995 both the Virgin spinedace listing and critical habitat proposals were withdrawn by USFWS due to a signed conservation agreement that, when implemented, will provide for long-term conservation of the species. Virgin spinedace have been found in the upper reaches of the Virgin River below Zion Canyon Narrows as well as in nine of its tributaries including the Santa Clara River, Beaver Dam Wash, Ash Creek, La Verkin Creek, North Creek, North Fork Virgin River, East Fork Virgin River, and Shunes Creek. It is generally found in areas of these systems with solid substrate rather than sandy bottoms. The spinedace prefers to forage in slow moving pools or riffles, where it feeds primarily on aquatic insects.

3.6.24 Yellow-Billed Cuckoo (*Coccyzus americanus*)

This bird species typically nests in riparian cottonwood-willow habitats. There is a single breeding record from Beaver Dam Wash. There are no nesting records from either the Santa Clara or the Virgin Rivers, but it could potentially occur in suitable riparian habitat along these waterways. The yellow-billed cuckoo is listed as a State threatened species.

3.6.25 Common Yellowthroat (*Geothlypis trichas*)

This species typically nests in riparian habitats in marsh or emergent vegetation. Potential habitat occurs along the perennial waterways in Washington County. It is a State sensitive species.

3.6.26 Yellow-Breasted Chat (*Icteria virens*)

This species nests in dense riparian habitats and has been recorded from Beaver Dam Wash and the Santa Clara and Virgin Rivers.

3.6.27 Bell's Vireo (*Vireo bellii*)

This species nests in streamside willows along the Virgin River and Beaver Dam Wash, which largely comprise the extent of its distribution within the State. It is a State sensitive species.

3.6.28 Flannelmouth Sucker (*Catostomous latipinnis*)

The flannelmouth sucker is a Federal Category 2 species, with a range including the Colorado, Virgin, and Gila Rivers. This species is found in a variety of habitats, from riffles to backwater areas, in large rivers and streams.

3.6.29 Arizona Toad (*Bufo microscaphus microscaphus*)

The Arizona toad is a Federal Category 2 species. This species is found near wetlands associated with shrub steppes, pinyon-juniper woodlands, and pine-oak forests in Arizona and southern Utah. The Arizona toad inhabits shallow permanent or intermittently flowing water over sand or rocky substrates (Sullivan and Price 1988). Anthropogenic alterations of habitat have allowed the Woodhouse's toad (*Bufo woodhousii*) to invade habitat formerly occupied solely by the Arizona toad. Hybridization between these two species is a serious threat to long-term viability of the Arizona toad (Sullivan 1991).

3.6.30 Lowland Leopard Frog (*Rana yavapaiensis*)

This frog is often found in foothill streams and stock tanks in desert grassland, oak, and oak-pine habitats. It has been recorded in the Virgin River near St. George and is a Federal Category 2 and State sensitive species.

3.6.31 Northern Leopard Frog (*Rana pipiens*)

This frog ranges from Canada to central Arizona, and has been recorded near St. George, Leeds, Santa Clara, and Hurricane. It is thought to be relatively common in Washington County, as suitable habitat occurs along the Virgin River.

3.6.32 Mojave Patchnose Snake (*Salvadora hexalepis mojavensis*)

This species ranges from southern California, southern Nevada, and southwestern Utah, into northwestern Arizona. It occurs in a variety of habitats including grasslands, chaparral, sagebrush plains, and desert scrub. It is a State sensitive species. Its status and distribution

within Washington County are not well known, but it has been recorded from the Beaver Dam Slope, near Leeds, and north and west of St. George.

3.6.33 Listed Species Not Expected to be Impacted by the HCP

Table 3.7 lists all Federal listed/candidate and State sensitive species likely to be found in Washington County but which are not expected to be affected by any of the alternatives. This is because their habitats are absent from the reserve and take areas, no species records exist, or insufficient distribution data is available to determine impacts of the proposed alternatives. While the shem milk-vetch, a Candidate 2 species recommended for a Federal status change to Candidate 1, will not be affected by the HCP, it is of great concern as more than 50% of its population has been destroyed in the past year. There are four remaining populations of shem milk-vetch in Washington County, all of them extremely small (USFWS 1995). None of the populations fall within the proposed HCP reserve or take areas, and hence, will not be affected, either adversely or beneficially, by the HCP. Some protection is offered to the two populations that occur on BLM lands through Federal management strategies while the population on Paiute Tribal Lands and the one on State lands will receive no protection from the HCP.

A summary of existing data for these species, including habitat and known distribution, can be found in Chapter 8 of the HCP.

3.7 WATER RESOURCES

Water resources have been a valuable commodity in Washington County since early settlement began in the 1800s. Settlers expended much of their time searching for and developing ways to use water supplies. The search for additional water resources continues today as Washington County human populations continue to increase.

Seven categories of water resources will be discussed in order to understand current and future trends that may affect this resource. The categories include surface water, groundwater, water quality, water rights, water budgets, present water use, and potential water development.

3.7.1 Surface Water and Runoff

The Virgin River is the largest river in Washington County and is fed by many tributaries, including North Creek, La Verkin Creek, Ash Creek, Quail Creek, Santa Clara River, and Beaver Dam Wash (UDWR 1983, U.S. Soil Conservation Service et al. 1990). Prior to construction of Hoover Dam, the Virgin River was itself a tributary to the Colorado River. Presently, the Virgin River drains into Lake Mead in Nevada, although frequently sinking into the desert before reaching Lake Mead. Surface water running into the Virgin River and its tributaries is influenced by surface run-off and groundwater entering channels from springs.

Run-off in the Virgin River Basin is the result of rainfall and snowmelt. Melting snowpack contributes the largest amount of water from run-off and greatly increases flow during April and May. Years of above-average snowpack correlate with high flows in the spring. Rainstorms

Table 3.7. Federal and/or State Listed or Candidate/Sensitive Species Unaffected by the Alternatives.

Common Name	Scientific Name	Federal Status	State Status
Mexican Spotted Owl	*Strix occidentalis lucida*	Threatened	Threatened
Spotted Bat	*Euderma maculatum*	Category 2	S1
Shem Milk-vetch	*Astragalus eremiticus* var. *ampullarioides*	Category 2	S1
Wet Rock Physa	*Physella zionis*	Category 2	S2
Bonneville Cutthroat Trout	*Oncorhynchus clarki utah*	Category 2	S1
Virgin River Montane Vole	*Microtus montanus rivularis*	Category 2	S1/S2
Northern Goshawk	*Accipiter gentilis*	Category 2	S1
White-faced Ibis	*Plegadis chihi*	Category 2	-
Mountain Plover	*Charadrius montanus*	Category 1	S2
Black Tern	*Chlidonias niger*	Category 2	S1
Western Least Bittern	*Ixobrychus exilis hesperis*	Category 2	-
Relict Leopard Frog	*Rana onca*	Category 3a	Extinct
Boreal Toad	*Bufo boreas boreas*	Proposed	S1
Utah Mountain Kingsnake	*Lampropeltis pyromelana infralabialis*	Category 2	S1
Utah Milk Snake	*Lampropeltis triangulum taylori*	Category 2	S2
Desert Iguana	*Dipsosaurus dorsalis*	Category 2	S2
Speckled Rattlesnake	*Crotalus mitchellii*	Category 2	S2
Mojave Rattlesnake	*Crotalus scutalatus*	Category 2	S2
Sanderson's Ambrosia	*Ambrosia sandersonii*	Category 2	-
Pink Egg Milk-vetch	*Astragalus oophorous* var. *lonchocalyx*	Category 2	S1S2
Guard Milk-vetch	*Astragalus zionis vigulus*	Category 2	S1
Baird's Evening Primrose	*Camissonia bairdii*	Category 2	-
Gould's Evening Primrose	*Camissonia gouldii*	Category 2	S1
Zion Tansy	*Sphaeromeria ruthiae*	Category 2	S2
Pinyon Penstemon	*Penstemon pinorum*	Category 2	S1
Canaan Mountain Beardtongue	*Penstemon ammophilus*	Category 2	S2?
Nevada Willowherb	*Epilobium nevadense*	Category 2	S1
Canaan Daisy	*Erigeron canaani*	Category 3	S2?
Pine Valley Goldenbush	*Haplopappus crispus*	Category 2	S2
Cedar Breaks Goldenbush	*Haplopappus zionis*	Category 2	S2
no common name	*Haplopappus leverichii*	Category 2	-
Zion Canyon Violet	*Viola clauseniana*	Category 2	-
Zion Daisy	*Erigeron zionis*	Category 2	S2
Virgin River Thistle	*Cirsium virginensis*	Category 2	S1
Utah Chaetarthrian Water Scavenger Beetle	*Chaetarthria utahensis*	Category 2	S2?
Spotted Warner Valley Dunes June Beetle	*Polyphylla avinata*	Category 2	S2?
MacNeill Sooty Wing Skipper	*Hesperopsis gracilae*	Category 2	S1

Key:

Sensitive: Any wildlife species which, although still occurring in numbers adequate for survival, whose population has been greatly depleted, is declining in numbers, distribution, and/or habitat (S1); or occurs in limited areas and/or numbers due to a restricted or specialized habitat (S2); or both (S1S2).

also contribute to run-off. Certain parts of the Virgin River Basin are susceptible to flash flooding from summer thunderstorms. Peak flows from flash floods can be very high and cause extreme erosion and property damage. The peak flow of a flash flood that occurred in December of 1966 was recorded as 35,200 cubic feet per second (cfs) near Littlefield, Arizona.

3.7.2 Groundwater

Residents and industry rely heavily upon groundwater supplies. The Draft Utah State Water Plan states that, in 1990, 7,666 acre-feet (af) of water was withdrawn by wells in Washington County. This number is up 66 af from the 1968-1970 average of 7,600 af, an increase of less than one percent. Recharge of groundwater has been estimated at 155,000 af per year (U.S. Soil Conservation Service et al. 1990).

Groundwater occurs in both consolidated and unconsolidated rock within the Virgin River Basin. Additionally, perched groundwater aquifers are found within the basin where underlying strata are impervious to water above aquifers. Approximately 80 percent of the water withdrawn by wells in the Virgin River Basin is supplied by unconsolidated aquifers consisting of alluvial fans and channel fill deposits. Consolidated aquifers supply approximately 30 percent of the area wells and springs, and originate from Navajo, Moenkopi, Chinle, Moenave, Kayenta, and Basalt Formations, in addition to tertiary igneous rocks from the Pine Valley Mountains. Consolidated aquifers are able to store greater amounts of groundwater than unconsolidated aquifers, although quality of water tends to be poor in lower elevations due to soluble mineral-leaching from rock formations (UDWR 1983, U.S. Soil Conservation Service et al. 1990).

3.7.3 Water Quality

Water quality can be affected by several determinants including biological contaminants, dissolved solids, and suspended solids.

3.7.3.1 Biological Contaminants

Biological pollution is not a serious problem in the Virgin River Basin, although the East Fork of the Virgin River and La Verkin Creek received significant contributions of coliform from animal waste (UDWR 1983, U.S. Soil Conservation Service et al. 1990).

In 1986, St. George began planning a split stream water treatment plant to be served by Quail Creek Reservoir and the Virgin River. The plant was completed in July of 1989 and proved to be very useful after the 1989 flood event while the reservoir was out of commission. During 1989-1990, the water treatment plant processed 830 million gallons of water. Currently, it delivers two to six million gallons of water per day to St. George. The treatment plant has the potential to increase its output to ten million gallons per day (City of St. George 1992).

3.7.3.2 Dissolved Solids

Soluble minerals in soils and rock formations along with high evaporation rates increase concentrations of dissolved solids in the Virgin River and are the main water quality problem of the Virgin River Basin. La Verkin Springs is a major point source of dissolved solids, carrying an average of 0.2 million tons of dissolved solids per year at concentrations of 9,800 mg/l. Additional point sources that increase dissolved solid concentrations are groundwater inflow from Fort Pierce drainage area and return flows from cultivated land. Dissolved solid concentrations are at their greatest from La Verkin Springs to St. George and dissolved solid concentrations decrease from St. George to Littlefield (U.S. Soil Conservation Service et al. 1990).

3.7.3.3 Suspended Solids

Natural erosion rates are high in this area due to low vegetative cover, steep gradients, and unstable substrates. The majority of suspended solids, or sediment, are carried through the Virgin River Basin during high flow periods in spring and summer. High concentrations of sediment causes water quality problems. The U.S. Geological Survey (USGS) has recorded data on suspended solids near Virgin, Hurricane, and Littlefield (Table 3.8).

3.7.4 Water Rights

Diversion and use of water for municipal/industrial and agricultural uses requires a water right permit. The Utah Division of Water Rights State Engineer administers the water rights of Utah. Two water rights issues have the potential of affecting water rights in the Virgin River Basin: 1) adjudication; and 2) Federal reserved water rights (UDWR 1983, U.S. Soil Conservation Service et al. 1990, City of St. George 1992).

Table 3.8. Suspended Solids near Virgin, Hurricane, and Littlefield.*

Recording Gage	Virgin	Hurricane	Littlefield
Years of Record	1963-70	1968-73	1949-68
Flows (cfs/day)	77,034	86,559	67,055
Suspended Solids Load (tons)	1,705,544	2,373,144	2,443,112
Suspended Solids Concentration (mg/l)	9,603	11,964	13,403

* Source: Utah Natural Resources and Energy 1983 (data based on USGS records)

3.7.4.1 Adjudication

An adjudication order directs the State Engineer to prepare a proposed determination of water rights in a River basin. Recorded rights are checked against actual usage. Water rights may be reduced if it is shown that the irrigated acres corresponding to water rights are no longer

irrigated. Irrigated lands are mapped and records are researched to correlate water rights with irrigated lands. Approval from the State Engineer is needed before irrigated lands can be expanded on a water right.

3.7.4.2 Federal Reserved Water Rights

Reserved water rights are claimed by the Federal government and are allocated with a priority date based on when the reserve was created. The amount of water claimed is based on the amount required to carry out the purposes of the reserve. Reserved water rights within Washington County have been claimed by the Federal government for USFS, Zion National Park, and the Paiute Tribal Lands. Water rights claimed by BLM are appropriative, not reserved, and are obtained pursuant to State law. The Forest Service has reserved claims to maintain instream channel and fisheries maintenance flow. Zion National Park has reserved all surface and groundwater needs to maintain the Park, and the Paiute Tribal Lands has claimed 11,355 af annually for tribal needs (U.S. Soil Conservation Service et al. 1990).

3.7.5 Water Budgets

Water budgets have been prepared to account for all of the water flows and uses within an area each year. They include average water diverted, canal losses due to seepage, run-off and deep percolation, and consumptive use by crops. Water budgets have been prepared for 11 areas in Washington County. Table 3.9 outlines the water budget for 1989. Shortages occur when potential consumptive use of a cropland area is not met. Gunlock has the worst shortage of any of these areas in Washington County (UDWR 1983, U.S. Soil Conservation Service et al. 1990).

3.7.6 Present Water Use

Municipal and industrial (M&I) water is primarily supplied through groundwater wells and springs, whereas agricultural water is supplied mostly from surface waters.

3.7.6.1 Public Water Use

M&I water is used in homes, businesses, and for irrigating lawns and gardens. M&I water demands vary greatly from day to day depending upon how much water is used to irrigate lawns and gardens (U.S. Soil Conservation Service et al. 1990, City of St. George 1992). The Quail Creek Water Treatment Plant currently supplies between two and six million gallons of water per day to portions of St. George, although they could increase this capacity to ten million gallons per day.

3.7.6.2 Agricultural Water Use

Agricultural water for the most part is diverted from the Santa Clara and Virgin Rivers. Storage reservoirs, such as Quail Creek Reservoir, store water supplies during periods of high flow to

Table 3.9. Water Budget for Washington County in 1989*

Irrigation Company	Average Water Diverted (af)	Canal Losses (af)	Run-off and Deep Percolation (af)	Consumptive Use by Crops (af)	Possible Consumptive Use (per year)	Possible Acres Irrigated
Glendale	2,940	294	1,323	1,323	26.9	590
Orderville	1,460	365	657	438	24.8	212
Mt. Carmel East/West	2,704	1,352	811	541	27.4	237
Virgin	1,497	180	856	461	45.1	123
Seep Ditch	971	97	524	350	44.1	95
Hurricane/Bench Lake	12,759	3,828	5,356	3,572	45.0	953
St. George/Wash. Fields	37,022	11,107	17,363	8,552	45.0	2,281
La Verkin Bench Canal	3,696	111	1,793	1,792	36.3	593
Bloomington Canal	1,457	146	590	721	44.8	193
Central	2,395	96	805	1,494	37.3	481
Gunlock	1,335	53	769	512	36.3	169
Ivins	2,220	133	730	1,356	39.9	408
New Santa Clara Fields	4,060	1,015	1,827	1,218	42.7	342
Pine Valley	2,360	354	1,504	501	21.9	275
St George/Clara Fields	6,023	301	3,719	2,002	45.5	528
Veyo	2,240	90	1,398	752	36.0	251
Total	85,139	19,522	40,025	25,585	599.0	7,731

* Source: U.S. Department of Agriculture, Soil Conservation Service, Utah Division of Natural Resources, Division of Water Resources 1990 (data from Murray and Preswich 1989)

allow for irrigation during low flow periods (U.S. Soil Conservation Service et al. 1990, City of St. George 1992).

3.7.7 Water Development Potential

Future water development will be required with the rapid human population increase anticipated for Washington County. Potential sources for additional water supplies include developing existing surface and groundwater rights that have not been totally appropriated, operating reservoirs at higher yields, building new reservoirs, lowering the instream flow requirement below Quail Creek Reservoir, and converting agricultural water to public use (UDWR 1983, U.S. Soil Conservation Service et al. 1990). In addition to these measures, water conservation measures such as the use of water meters, increasing the cost of water usage, and xeriscaping are expected to be considered in future water development plans.

3.7.7.1 Existing Water Rights

All surface and groundwater rights have been appropriated with the exception of groundwater permits in Hurricane south of the Virgin River, and the area tributary to the Beaver Dam Wash. However, the potential exists to approve short-term, fixed-time applications for small amounts of surface water in areas where prior water rights would not be impacted and beneficial use could be established.

3.7.7.2 High Yield Reservoirs

Quail Creek Reservoir was built in the mid-1980s by WCWCD in anticipation of rapid human population growth in the County. Planning began for the 40,000-af reservoir in 1982, and it was half full in 1987. The reservoir was built primarily to supply water for municipal and industrial growth. Water from the reservoir is also used to irrigate farmland in Hurricane, La Verkin, St. George, and Washington. Other facilities served by the reservoir include the St. George water treatment plant, and the Hurricane and Quail Creek Hydroelectric Power Plants (WCWCD 1992).

Computer modeling is currently used on the Quail Creek Reservoir to monitor instream flow requirements below the dam. Modeling has also been used for studies of the proposed North Creek Reservoir. The use of computer models has allowed WCWCD to maximize available water for use and minimize problems associated with changing flow regimes. Simulations are used to determine reservoir yields, hydropower production, water shortages, and impacts to rivers as more reservoirs become operational.

3.7.7.3 New Reservoirs

WCWCD is completing site inventories for nine potential reservoirs with storage capacities above 20,000 af. As future water demands increase, these sites would be studied further to determine which site would best provide for future water demands.

Work done by WCWCD on the proposed North Creek Reservoir Project shows that with a 25,000-af reservoir, 5,530 af of yield can be developed over and above the current yield of the Quail Creek Project. A 20,000-af reservoir would increase yield of the system by 4,620 af.

3.7.7.4 Instream Flow Requirements

Instream flows are determined primarily by: 1) existing water rights and historical depletions, and 2) operations of Quail Creek Reservoir. The Washington County Water Conservancy District, Utah Division of Wildlife Resources, BLM, and USFWS have been cooperating on physical feature and biological studies to better understand instream flow needs of the endangered fish species, as well as the native fish community.

Washington County has maintained that there will be no adverse impact to the endangered fish as a result of issuance of the incidental take permit. While this issue continues to be a point of discussion with USFWS, as called for in Chapter 9 of the HCP, USFWS and others are in the process of developing the *Virgin River Basin Integrated Resource Management and Recovery Program*. A Memorandum of Understanding was signed on October 19, 1995, in which BLM, USFWS, UDNR, and WCWCD agreed to develop a program within six months that will provide for recovery of Virgin River fish and meet future human water needs. The Recovery Program timeframe will not affect issuance of permitted actions under the Washington County HCP, but is intended to address water development needs and Virgin River Basin conservation.

3.7.7.5 Conversion of Agricultural Water

A considerable quantity of irrigation water currently being used within the corporate boundaries of Washington County cities would eventually be displaced as irrigated croplands are bought and converted to developments. Water rights appropriated to these areas would become available and could be used for irrigation of new lands, conversion for public uses, or could remain in streams or reservoirs for aesthetics and recreation.

3.8 VISUAL RESOURCES

Visual resources in Washington County are varied and in many cases spectacular. Zion National Park, on the eastern edge of the County, exhibits exceptional visual resources, particularly in the white cliffs, red rocks, and riparian areas of the Virgin River. Other spectacular visual resources include Snow Canyon State Park, Vermilion Cliffs, Hurricane Cliffs, and the Virgin River gorge. These visual resources are primarily unusual due to their geology. However, the County also has a variety of visual vegetation resources, from the Joshua tree forests on the Beaver Dam slope to the pine forests on Pine Valley Mountain. The combination of these resources, depicting the Colorado Plateau and the Basin and Range Physiographic Provinces, make Washington County an outstanding visual resource.

BLM has inventoried visual values for the Dixie Resource Area, which includes the BLM lands in the County. BLM measures scenic quality, visual sensitivity, and distance zone units in an attempt to delineate relative value units. Scenic quality is rated on an A, B, and C scale, with A being the most scenic. The inventory showed that BLM possessed almost 118,000 acres of A-rated lands, and approximately 330,000 acres of B-rated lands. Visual sensitivity measures the degree of public concern for maintenance of scenic quality, rated on a scale of high, medium, and low. For BLM lands, approximately 155,000 acres were rated high; 260,000 acres medium; and 205,000 acres as low. Distance zone units refers to the distance from key observation points, such as major highways and overlook areas. Zero to 2 miles is considered foreground, 2 to 5 miles is middleground, 5-15 miles as background, and over 15 miles is seldom seen. For BLM lands, approximately 90,000 acres are in the foreground; 183,000 acres in the middleground; 51,000 acres in the background; and 303,000 acres in the seldom-seen distance zone.

Using these three criteria, in addition to any Congressional designations such as wilderness, the BLM divided its lands into four inventory classes, with Class I as the highest, and Class IV as the lowest. Class I is reserved for wilderness areas or similar Congressional designations. Therefore only the Beaver Dam Mountains Wilderness Area received a Class I rating. Class II ratings were assigned to approximately 132,000 acres, 333,000 acres received Class III ratings, and 160,000 received Class IV ratings. Desert tortoise habitat on BLM lands north of Washington City and east to Hurricane are rated Class II, while lands north of St. George are rated Class IV. Again, these classifications only apply to BLM lands. Many of the State School Trust lands north of Washington City and Harrisburg would probably also classify as Class II, as would Paradise Canyon.

3.9 WILDLIFE RESOURCES

Due to its location, topography, and climate, Washington County contains a variety of habitats that support numerous non-sensitive wildlife species. A majority of the reserve and take areas are located in the Warm Desert Scrub; other areas higher than 1,200 feet above sea level are located in the Cool Desert Scrub (Brown 1982, Welsh et al. 1987).

Some common wildlife species found in desert scrub habitat within Washington County are listed in Table 3.10 (BLM 1987). These species could occur in the reserve or take areas. Those mammals, reptiles, birds and amphibians occurring within proposed take areas could potentially be impacted by loss of habitat. Species occurring within the proposed reserve may be afforded some level of protection through measures taken to protect the desert tortoise.

BLM has delineated big game habitat in the proposed Dixie Resource Management Plan/Final EIS (RMP). Big game includes all of the following: mule deer, desert bighorn sheep, and elk. Defined priority big game habitat lies north of St. George and in the Red Mountains southeast of Gunlock. Critical big game habitat has been delineated near Lava Ridge north and east of Snow Canyon State Park. Other wildlife species specifically identified by BLM for management as game in Washington County include turkey, band-tailed pigeon, cougar, Gambel's quail, and trout.

The proposed Dixie RMP would manage habitat to provide biological diversity of plant and animal species. It should be noted, however, that the plan has not been finalized and is currently undergoing public review.

Table 3.10 Non-sensitive Species with Potential to Occur Within Reserve or Take Areas.

Common Name	Scientific Name
MAMMALS	
Badger	*Taxidea taxus*
Coyote	*Canis latrans*
Gray Fox	*Urocyon cinereoargenteus*
White-tailed Antelope	*Ammospermophilus leucurus*
Golden-mantled Ground Squirrel	*Spermophilus lateralis*
Little Pocket Mouse	*Perognathus longimembris*
Long-tailed Pocket Mouse	*Perognathus formosus*
Ord Kangaroo Rat	*Dipodomys ordii*
Chisel-toothed Kangaroo	*Dipodomys microps*
Western Harvest Mouse	*Reithrodontomys megalotis*
Canyon Mouse	*Peromyscus crinitus*
Deer Mouse	*Peromyscus maniculatus*
Brush Mouse	*Peromyscus boylii*
Desert Woodrat	*Neotoma lepida*
House Mouse	*Mus musculus*
Black-tailed Jackrabbit	*Lepus californicus*
Desert Cottontail	*Sylvilagus auduboni*
Mule Deer	*Odocoileus hemionus*

Table 3.10. (Continued)

Common Name	Scientific Name
BIRDS	
Turkey Vulture	*Cathartes aura*
Red-tailed Hawk	*Buteo jamaicensis*
Golden Eagle	*Aquila chrysaetos*
American Kestrel	*Falco sparverius*
Gambel's Quail	*Lophortyx gambelii*
Mourning Dove	*Zenaida macroura*
Poorwill	*Phalaenoptilus nuttallii*
Common Nighthawk	*Chordeiles minor*
Lesser Nighthawk	*Chordeiles acutipennis*
Ladder-backed Woodpecker	*Picoides scalaris*
Say's Phoebe	*Sayornis saya*
Horned Lark	*Eremophila alpestris*
Bewick's Wren	*Thryomanes bewickii*
Northern Mockingbird	*Mimus polyglottos*
Brewer's Blackbird	*Euphagus cyanocephalus*
Brown-headed Cowbird	*Molothrus ater*
House Finch	*Carpodacus mexicanus*
Savannah Sparrow	*Passerculus sandwichensis*
Black-throated Sparrow	*Amphispiza bilineata*
Sage Sparrow	*Amphispiza belli*
Dark-eyed Junco	*Junco hyemalis*
White-crowned Sparrow	*Zonotrichia leucophrys*
REPTILES	
Collared Lizard	*Crotaphytus collaris*
Desert Spiny Lizard	*Sceloporus magister*
Eastern Fence Lizard	*Sceloporus undulatus*
Side-blotched Lizard	*Uta stansburiana*
Desert Horned Lizard	*Phrynosoma platyrhinos*
Western Whiptail	*Cnemidophorus tigris*
Striped Whipsnake	*Masticophis taeniatus*
Gopher Snake	*Pituophis melanoleucus*
Desert Glossy Snake	*Arizona elegans eburnata*
Utah Blind Snake	*Leptotypholops humilis utahensis*
Western Rattlesnake	*Crotalus viridis*
AMPHIBIANS	
Woodhouse Toad	*Bufo woodhousei*
Red-spotted Toad	*Bufo punctatus*

CHAPTER 4.0
ENVIRONMENTAL CONSEQUENCES

4.1 ALTERNATIVE A: NO ACTION

4.1.1 Socioeconomics

If this alternative were adopted, present restrictions on construction and habitat alterations would continue to apply in those areas with desert tortoise habitat. This means that, although the human population of Washington County would continue to grow, development of businesses, residences, or recreational facilities in certain areas could risk prosecution under section 9 of the ESA unless individual property owners obtained section 10(a) incidental take permits or, if a Federal nexus existed, section 7 consultations with USFWS. Of particular concern would be approximately 12,609 acres of State School Trust lands located within desert tortoise habitat. These lands were given to the State of Utah by the Federal government to support the public school system in exchange for not assessing a State tax on Federal lands. Individual ESA section 7 or 10(a) permitting processes may be relatively expensive and time consuming costs that many small developers may not choose to bear. In addition, individual ESA section 7 permits would result in piecemeal development of threatened or endangered species habitat without benefit of a comprehensive conservation plan. Habitat fragmentation would likely be exacerbated. Further degradation of habitat would occur if some landowners in desert tortoise habitat would be willing to risk prosecution under the ESA rather than incur the expense of seeking a permit.

Alternative A would cost the County no additional money; however, no grading or building permit fees would be collected to fund conservation and mitigation measures for the desert tortoise or other species of concern.

In order to estimate the economic impact of each alternative, Groesbeck (1995) evaluated each alternative using three scenarios: 1) Retained Annual Long-run Benefits; 2) Lost Annual Long-run Benefits; and 3) Total Lost Construction and Development Values. An additional scenario estimates likely annual construction and development values plus annual additions to demand for goods and services by households in incidental take areas (Likely Annual Development of Take Areas in the Short Run). All monetary data assume base year values and are expressed in millions of dollars (base year=1996). Table 4.1 lists these scenarios for the No Action Alternative. For this alternative, the assumption was made that no desert tortoise habitat would be developed. As discussed earlier, it is likely that some landowners would pursue individual incidental take permits, while others may develop their lands without ESA section 9 exemption. However, it is impossible to reasonably estimate which landowner will choose to develop under either scenario, and what the outcome would be. Therefore, a worst-case (economic) scenario of no development in desert tortoise habitat under no action was used.

Table 4.1. Economic Evaluation of the No Action Alternative.

Scenario	1996 MMS* Total Industry Output	Jobs Created	Population Supported	Percent Increase in Constrained Long-run Economy
Retained Annual Long-run Benefits	0.00	0.00	0.00	0.00
Lost Annual Long-run Benefits	-$1,472.98	-38,349.59	-95,291.00	16.92
Total Lost Construction and Development Values	-$34,002.54	N/A	N/A	N/A
Likely Annual Development Benefits of Take Areas	0.00	0.00	0.00	0.00

* Millions of dollars (base year=1996)

4.1.1.1 Lost Property Tax Revenues

Lost property tax values per acre of private land lost can be estimated using assumptions listed in the previous section. Assuming that average residential unit value is $117,683, and average commercial unit value is $235,412, both including land and buildings, the market value of developed property per acre can be established. Assuming the 12 to 1 mix between commercial and residential units, the assumed value of property per acre becomes $409,548. If it is assumed that current assessed to market value ratio is 85 percent and property tax rate is 1.33 percent of assessed value,[2] then property tax losses per developed acre equal $4,630.

Property tax losses per acre of undeveloped land can be estimated assuming that the 1996 value per acre is $21,522, as derived in the previous paragraph. Applying the same assessed to market value ratio of 85 percent, and a property tax rate of 1.33 percent, property tax losses become $243.31 per acre. Property tax losses for developed and undeveloped land scenarios for the No Action Alternative are as follows:

- Acres of Land Converted - 17,612.00
- Revenues Lost (Developed Land) - $81,543,560.00
- Revenues Lost (Undeveloped Land) - $4,285,176.00

[2] Utah State Tax Commission: Annual Report, July 1991 - June 1992.

These results can be viewed as short-run impacts (undeveloped) versus long-run impacts (developed). Further, these results may be somewhat overstated because a small portion of lands in the category "Private Lands" are lands owned by County and municipal governments.

The No Action Alternative would deny the County benefits of the Proposed Action Alternative. Residents would not enjoy the aesthetic value of the reserve's open space and the added visual quality of the area, as well as the likely increase in property values of those privately-held lands adjacent to the reserve. Additionally, private individuals would have to undertake the time and expense of filing for individual ESA section 10(a) permits which would increase administrative costs for both Federal and local governments. The County would not benefit from the added tourism dollars gained from the draw of the reserve and the educational center and from the increased tax base likely resulting from construction of larger homes as a result of increased property values of private lands adjacent to the reserve.

4.1.2 Land Ownership, Use, and Management

4.1.2.1 BLM Lands

Under the No Action Alternative, lands currently managed by BLM would remain under that jurisdiction. Use and management of BLM lands would be subject to restrictions and guidelines of the proposed Dixie Resource Management Plan/Final EIS (RMP) once it is approved. Management actions by BLM in habitat for Federally listed species would continue to be subject to compliance under ESA, NEPA, and Federal Land Policy Management Act.

Should this alternative be adopted, recreational activities on Federal lands would continue to be governed by existing management policies and practices. Few restrictions currently apply to desert tortoise habitat; therefore, impacts from recreational use in this area would continue. Recreation in nearby parks, forests, and BLM lands is gaining popularity with both residents and visitors. Opportunities are expected to expand with continuing human population growth throughout Washington County, thereby increasing potential impacts to desert tortoise habitat.

4.1.2.2 State Lands

Under Alternative A, land use, management, and ownership would not change for Snow Canyon State Park. If development were proposed within the State Park on lands with desert tortoise habitat (12,609 acres), the State of Utah would continue to be required to obtain an incidental take permit under section 10(a). If State officials chose not to consult, they would risk violating provisions of the ESA.

4.1.2.3 Private Lands

Approximately 16,993 acres of private land are within desert tortoise habitat. If this alternative were implemented, private landowners with potential threatened and endangered species habitat would have to obtain clearance from USFWS before initiating any ground-disturbing activities

or risk possible prosecution for violating the ESA. It can be expected that some landowners will move forward with development activities without protection of an ESA section 10(a) incidental take permit.

4.1.3 Agricultural Resources

4.1.3.1 Rangeland

BLM will continue to conduct ESA section 7 consultation with USFWS on grazing permits as necessary.

4.1.3.2 Farmland

Agricultural production on private property and State lands would not be directly affected by the No Action Alternative. However, without benefit of an ESA section 10(a) incidental take permit, future agricultural production on private or State lands would not be protected from possible ESA section 9 violations. This is a particular concern for a turkey farm north of St. George and for agricultural fields near Ivins. These areas are within or near high-density desert tortoise habitat, and farming practices could affect this habitat.

Under this alternative, the trend in Washington County of converting agricultural land to residential uses may be accelerated. This is because little property other than farmland would be available for development without the necessity of ESA compliance requirements. Cultivated land in this area generally contains little or no threatened or endangered species habitat.

4.1.4 Threatened, Endangered, Candidate, and Sensitive Species

Under Alternative A, impacts to Federally listed threatened and endangered species on State and private lands would be subject to case-by-case ESA section 7 or 10(a) processes with USFWS. Candidate and State sensitive species are not afforded legal protection under the ESA. Some or all of these species, however, could become Federally listed as threatened or endangered in the future. No additional programs for threatened, endangered, candidate, and State sensitive species is anticipated under No Action.

The sections below address potential impacts under Alternative A on all threatened and endangered species that are known to occur, or potentially to occur, in areas affected by the no action alternative. The sections also discuss all candidate and sensitive species that would be directly, indirectly, or cumulatively affected. Candidate or sensitive species for which habitat does not occur, or for which impacts are highly speculative, are listed or discussed briefly.

4.1.4.1 Mojave Desert Tortoise

Implementation of the No Action Alternative would result in a case-by-case evaluation of development projects proposed for areas with Mojave desert tortoise habitat. ESA section 7

consultation or section 10(a) permit processes with USFWS would have a low probability of allowing take of desert tortoise habitat in the St. George area that would fragment the recovery unit and preclude survival and recovery. Such consultations may have a higher probability of allowing take in marginal habitats. Case-by-case evaluation of projects over the next 20 years or longer may make it difficult to effectively gauge the status and requirements of desert tortoise populations at any one time. This could result in cumulative impacts to the species through habitat degradation and fragmentation. It can reasonably be expected that some areas of currently unoccupied desert tortoise habitat would be developed without USFWS consultation.

This alternative would not involve the establishment, maintenance, monitoring, or funding of a desert tortoise reserve. Desert tortoise habitat in the Upper Virgin River DWMA would be managed by the BLM, USFWS, and the State of Utah under the guidelines of the DTRP, and would require complete funding by the Federal government. Practices permitted under BLM management that may have adverse impacts on desert tortoises, such as livestock grazing, OHV use, and other recreational activities, would be subject to ESA section 7 consultations with USFWS. Uncertainty regarding availability and allocation of Federal funds could compromise management and enforcement efforts, and could result in adverse impacts on desert tortoises from unauthorized uses.

4.1.4.2 Bald Eagle

Implementation of the No Action Alternative is not anticipated to adversely impact bald eagles in Washington County. Bald eagle use in the area is restricted to winter, and mainly occurs near Ivins Reservoir, the City of Hurricane sewer ponds, and the Virgin and Santa Clara Rivers. Potential development near winter foraging areas under this alternative could be subject to section 7 consultation under the ESA. Although residential development in the direct vicinity of Ivins Reservoir or the Hurricane sewer ponds could result in some disturbance to foraging eagles, such development probably would not adversely impact either prey availability or individuals of this species. Disturbance of eagles under all alternatives is more likely related to recreational activities.

4.1.4.3 Peregrine Falcon

Under Alternative A, a peregrine falcon eyrie located near Red Cliffs Recreational Area would continue to be subject to BLM multiple-use management policy and existing private lands along the entrance road could be developed. Multiple use of BLM lands, increased use of the area, and private development could result in increased human activity in the vicinity of this nesting site. Increased activity is not expected to negatively impact the prey base for this species, and may enhance local populations of potentially important prey species such as rock doves (pigeons). Higher use of the area may negatively affect peregrine falcon nesting success at this eyrie, although peregrine falcons have continued to occupy the site despite past recreational use.

Another eyrie has been active for the past six seasons in Snow Canyon State Park. The Park has enacted management plans to protect these falcons. This eyrie will continue to receive protection regardless which alternative is implemented.

4.1.4.4 Woundfin and Virgin River Chub

Potential impacts to these species are expected to be similar under Alternatives A, B, and C. Growth and development in Washington County, which would continue to occur under all the alternatives, would possibly increase pressures to reduce the instream flow requirement in the Virgin River. Under all alternatives, proposed water resource development, increased groundwater pumping, or other actions that would potentially affect threatened or endangered species would be subject to ESA section 7 or 10(a) consultations with USFWS.

To offset potential adverse impacts to the endangered Virgin River fish in the future and to provide a mechanism for meeting the continued growth of Washington County, the USFWS and others are in the process of developing a *Virgin River Basin Integrated Resource Management and Recovery Plan* (VRBIRM&RP). A memorandum was signed by BLM, USFWS, UDNR, and WCWCD to develop this program within six months.

4.1.4.5 Dwarf Bear-Poppy and Siler Pincushion Cactus

Management of these species would continue to be the responsibility of BLM, and the level of protection would be contingent on Federal funding allocated for this purpose. If Federal funding to better protect these species is not made available, impacts on dwarf bear-poppy and Siler pincushion cactus, including those caused by OHV use, would be expected to continue. BLM management activities in dwarf bear-poppy and Siler pincushion cactus habitat would be subject to section 7 of the ESA.

4.1.4.6 Southwestern Willow Flycatcher

This species has been recorded along the Virgin and Santa Clara Rivers in Washington County. No nesting records exist for willow flycatchers in this area, but breeding activity has been inferred from the species' presence in summer. Impacts of the No Action Alternative, as with the other alternatives, are related primarily to effects of projected population growth, increased water demands on instream flow in the Virgin and Santa Clara Rivers, and resultant effects on riparian vegetation. It is assumed that water demands will be equivalent under all alternatives.

For the purposes of this analysis, it was assumed that instream flow on the Virgin River would continue to be regulated by the Biological Opinion issued for Quail Creek Reservoir, instream flows in the Virgin River would not be reduced, and future water development projects would be subject to ESA section 7 and 10(a) consultations in order to protect habitat for endangered fishes and riparian habitat. Consequently, no impacts would be anticipated under this alternative.

4.1.4.7 Merriam's Kangaroo Rat

Potential habitat for this species exists in Washington County in creosote/saltbush rangeland. Merriam's kangaroo rats have been reported north of St. George. Because the status of this species is currently unclear, impacts of No Action are difficult to determine.

4.1.4.8 Pygmy Rabbit

Small areas of sagebrush north of Santa Clara and northeast of Snow Canyon State Park provide potential habitat for pygmy rabbits within Washington County. However, these areas are unlikely to be important due to their small size and isolation from more continuous sagebrush habitat. Because St. George and surrounding areas are located primarily in desert scrub rather than sagebrush habitats, implementing Alternative A would not be expected to significantly impact this species.

4.1.4.9 Ferruginous Hawk

Ferruginous hawks typically nest in semi-arid grassland types (Johnsgard 1990). Nesting within Washington County is likely restricted to these habitat types near Ivins and Santa Clara and in areas north of Washington City, although no known records of nesting ferruginous hawks exist for these areas. In winter and during migration, ferruginous hawks use a wider range of habitats and may be found foraging near agricultural fields at lower elevations. Under this alternative, potential habitat areas north of St. George would remain under BLM multiple-use management.

4.1.4.10 Western Chuckwalla

Because habitat for this species overlaps habitat for the desert tortoise, impacts are expected to be similar. Chuckwallas and their habitat may acquire some protection as a result of mitigation measures for the desert tortoise implemented as part of individual ESA section 7 or 10(a) permits, but possible additional protection has not been quantified in the HCP or this EIS.

4.1.4.11 Gila Monster

Although Gila monsters on BLM lands would less likely be affected than those on private and State land, multiple-use management and lack of enforcement could result in continued habitat degradation by OHV use, direct mortality through illegal shooting, and population decline by collection. Like chuckwallas, Gila monsters may acquire some protection as a result of desert tortoise protective measures, but possible additional protection has not been quantified in the HCP or this EIS.

4.1.4.12 Desert Night Lizard, Glossy Snake, Utah Banded Gecko, Zebra-Tailed Lizard, Lyre Snake, Western Blind Snake, Sidewinder

There is some overlap or similarity in habitat types used between these species and the desert tortoise, chuckwalla, and Gila monster. In contrast to the desert tortoise, status and distribution of most of these species within Washington County are largely unknown, although records exist for some species in both the reserve and take areas proposed under the action alternatives. Because occurrence and relative abundance of these species within particular areas identified in the HCP are not known, assessment of impacts under all three alternatives is difficult and somewhat speculative.

Under No Action, these species and their habitat would continue to be subject to recreational use, grazing, and other human-related activities, although current impacts of these activities on populations or individuals of these species are not known. Some habitat on State and private lands would likely benefit indirectly from protection afforded for desert tortoise through ESA section 7 or section 10(a) consultations. Habitat on BLM lands would be subject to continued impacts of multiple-use activities including OHV use. BLM management activities within habitat for Federally listed species would continue to be subject to ESA section 7 consultation with USFWS.

4.1.4.13 Holmgren Milk-Vetch

The primary population of Holmgren milk-vetch, which is found in this area, would continue to be subject to habitat degradation or direct mortality resulting from OHV use and livestock grazing.

4.1.4.14 Gumbo Milk-Vetch

Known populations of Gumbo milk-vetch near Washington would be impacted by development of State and/or private lands. If these populations occur in desert tortoise habitat, they may acquire some protection as a result of protection afforded the desert tortoise through other ESA section 7 or 10(a) measures.

4.1.4.15 Virgin Spinedace, Yellow-Billed Cuckoo, Common Yellowthroat, Yellow-Breasted Chat, Bell's Vireo, Flannelmouth Sucker, Arizona Toad, Lowland Leopard Frog, Northern Leopard Frog, Wet Rock Physa, Virgin River Thistle

Impacts on populations or individuals of these species are primarily related to maintenance of instream flow in the Santa Clara and Virgin Rivers, either directly through maintenance of habitat for fish species or indirectly through maintenance of riparian vegetation for bird and amphibian species. Instream flow in the Virgin River is currently regulated by the Biological Opinion issued by USFWS for Quail Creek Dam. Proposed changes in these requirements or other future proposed water developments would likely be subject to future section 7 consultations, but could result from increased growth in Washington County creating an

increased demand for water. Because development and growth in Washington County under Alternative A would also be contingent on numerous other factors, assessment of impacts to these aquatic and riparian species or their habitat may be unrelated to this particular alternative. Impacts are more directly related to potential future changes in instream flow regimes in the Santa Clara and Virgin Rivers and to management of riparian habitats along these waterways. The VRBIRM&RP is being developed to address future impacts to these resources.

4.1.5 Water Resources

Water usage is dependent on human population growth and land use. Growth and development in an area is a function of demand. The annual rate of development of lands within Washington County from 1994 to 2000 is estimated at 405 acres per year for residential development and 95 acres per year for commercial and industrial development (Utah Division of State Lands and Forestry 1994). At this rate of development, 10,000 acres of land will be developed in 20 years.

Currently, approximately 84,683 acres of land unencumbered by ESA compliance requirements are available for development in Washington County, although many of these acres are beset by other problems that complicate development. Over the next 20 years, development will occur at the same rate in the County regardless of whether or not the HCP is implemented and the take areas are made available for development. In fact, at this rate of development, the currently available lands would not be fully developed for 169 years. Therefore, increasing the number of developable acres with the take areas of the HCP will simply shift the existing development pattern geographically in the next 20 years, but will not necessarily increase the overall level of development in the County. Therefore, changes in water usage over the next twenty years are independent of the actions of any of the three alternatives as the amount of growth is likely to be equivalent under all alternatives.

WCWCD estimates a current annual water capacity of 63,000 af. If this capacity is not increased, by the year 2005 the County will have a shortage of 9,626 af/year, assuming growth occurs at a moderate rate for a population total of 118,016 and WCWCD achieves its conservation goal of reducing current usage of 365 gallons per person per day by 25 percent. By 2015, the County will have a shortage of 41,269 af, again estimated from a medium growth rate for a population total of 188,601.

The Utah Division of Water Resources has stated that, in all probability, any future water development for Washington County would be a major project on the Virgin River (Utah Division of Water Resources 1983). Many potential water development projects exist in Washington County, including: creating new reservoirs; allocating water rights not fully utilized; creating high-yield reservoirs using computer modeling; converting irrigation water to municipal and industrial water uses; and reducing the instream flow requirements of the Virgin River. These development potentials are described in Chapter 3. Any of these strategies could potentially impact the flow of the Virgin River, and therefore would be subject to consultation with USFWS.

4.1.6 Visual Resources

Visual quality is an important resource in Washington County. Under Alternative A, growth in the County would continue to increase within limitations of Federal, State, and local regulations and ordinances. Projects on Federal lands would be subject to public review under NEPA guidelines, and appropriate visual resource impact analyses would be conducted. BLM areas designated as Class II would receive the most protection from visual impacts, with a decreasing amount of protection being afforded Class III and Class IV areas. Impacts to visual resources as a result of actions on State School Trust lands would be dictated by the Division. Visual quality may be impacted as a result of maximizing monetary benefit from these lands. A similar situation may occur on privately owned lands, if maximizing revenues is the goal of landowners.

4.1.7 Wildlife Resources

Under Alternative A, local access to surrounding Federal and State lands in Washington County would not change. Hunting, grazing, OHV, and other recreational uses in the County would be expected to remain at current levels. Development would continue on private and State lands and would be expected to adversely modify wildlife habitat and eliminate or displace wildlife species or populations. On BLM lands, the proposed Dixie RMP, once approved, should detail general management guidelines and acquisitions of private parcels to reduce the possibility of adverse impacts to wildlife.

4.2 ALTERNATIVE B (PROPOSED ACTION): SECTION 10(a) PERMIT ISSUED BASED ON PROPOSED HCP

4.2.1 Socioeconomics

Groesbeck (1995) evaluated each alternative using three scenarios: 1) Retained Annual Long-run Benefits; 2) Lost Annual Long-run Benefits; and 3) Total Lost Construction and Development Values. An additional scenario estimates likely annual construction and development values plus annual additions to demand for goods and services by households in incidental take areas (Likely Annual Development of Take Areas in the Short Run). All monetary data assume base year values and are expressed in millions of dollars (base year=1996). Table 4.2 outlines the three scenarios for the Proposed Action.

The Proposed Action Alternative would result in approximately $19,000 loss in construction and development values, whereas the estimated loss for the No Action Alternative is $34,000. Furthermore, this alternative will create an estimated 15,000 jobs annually and support an additional 38,000 people over the No Action Alternative.

Table 4.2 Economic Evaluation of Alternative B.

Scenario	1996 MMS* Total Industry Output	Jobs Created	Population Supported	Percent Increase in Constrained Long-run Economy
Retained Annual Long-run Benefits	$590.48	15;373.48	38,200.00	8.17
Lost Annual Long-run Benefits	-$882.52	-22,976.73	-57,092.00	10.14
Total Lost Construction and Development Values	-$18,883.36	N/A	N/A	N/A
Likely Annual Development Benefits of Take Areas	$16.13	289.00	720.00	1.16

* Millions of dollars (base year=1996)

4.2.1.1 Lost Property Tax Revenues

Assuming the same economic parameters as for the No Action Alternative given in Section 4.1.1.1, property tax losses for developed and undeveloped land scenarios for the Proposed Action Alternative are as follows:

- Acres of Land Converted - 7,750.00
- Revenues Lost (Developed Land) - $35,882,500.00
- Revenues Lost (Undeveloped Land) - $1,384,191.00

These results can be viewed as short-run impacts (undeveloped) versus long-run impacts (developed). Further, these results may be somewhat overstated because a small portion of lands in the category "Private Lands" are lands owned by county and municipal governments.

While the proposed HCP creates substantial economic costs, it also creates many benefits. Unfortunately, many of the benefits are difficult or impossible to quantify. These benefits include aesthetic value of the open space that will be created due to the reserve which accrues to both local residents of Washington County and to visitors to the area.

Additional benefits that are not impossible to quantify, but are beyond the scope of this analysis, include the fact that private property values of lands adjacent to the reserve will likely increase substantially. This increase in real land value will likely generate additional construction expenditures for larger homes, as well as generating higher property taxes and increased local expenditures due to higher owner incomes necessary for the more expensive building lots.

Another benefit pertains to the visitor days accruing to the County due to the existence of the education center and the reserve. While it is impossible to accurately predict what the number of annual visitor days will be to the center and reserve, it is possible to provide a rough estimate of the impact of a single visitor day. Conservatively, if there is a $10.00 per visitor day expenditure, and the County multiplier is approximately 1.75, then that expenditure has a total county impact of $17.50. If the center generates 10,000 visitor days annually, then the annual economic impact could be $175,000.00 annually, based on the set of assumptions provided. With a state-of-the-art center drawing visitors from the region, visitor expenditure per day could be as high as $100.00, and visitation of 100,000 per day, then with the 1.75 multiplier, the annual economic impact could be as high as $17,500,000 annually.

Finally, if the Proposed Action is not the selected alternative, then a number of individual ESA section 10(a) permit applications would have to be filed with USFWS, which would greatly increase the cost of administration for the Federal government, local governments, and private individuals.

4.2.2 Land Ownership, Use, and Management

4.2.2.1 BLM Lands

Under this alternative, BLM would contribute 38,034 acres of land to a 61,022-acre reserve managed for protection of the Mojave desert tortoise. Eventually BLM would have jurisdiction over portions of Zone 2 and all of Zones 3, 4, and 5 of this reserve. Private property and State School Trust lands incorporated into the reserve would be exchanged for BLM lands or purchased.

At present, no mines are operating nor are any lease permits held for mining on BLM lands within the proposed reserve, however, there are three mining claims in Section 24, T. 41 S., R. 16 W. No minerals worth recovery costs have been documented within the reserve. Under Alternative B, access to these mining claims may be limited due to road closures within the reserve.

Mining-related activity outside the reserve and outside the ten proposed incidental take areas could proceed without ESA section 7 consultation with USFWS if no Federal action or permit, such as a right-of-way grant from a Federal agency, would be required for the activity to occur.

Under Alternative B, no woodcutting would be allowed within the proposed reserve. Areas outside the reserve or incidental take areas would not be affected as long as no desert tortoises were taken incidentally. This is true of Federal, State, and private lands.

Certain types of recreation would be affected by Alternative B. Activities such as hiking, camping, bicycle riding, and horseback riding would still be allowed within the reserve, although patterns of use may be affected by restricted vehicular access. The extent to which these activities could occur within the reserve may be further restricted once a management plan or

reserve during normal hunting seasons, although no OHV use would be permitted. Domestic animals would be allowed in the reserve only if leashed.

4.2.2.2 State Lands

Under this alternative, approximately 10,938 acres of State School Trust lands would be exchanged to BLM for inclusion in the reserve. The value of this property would be determined in advance and exchanged for lands outside the proposed reserve on a value-for-value basis. The School Trust system would suffer no net loss of land value; however, the State of Utah believes it is unlikely that land of equivalent development potential could be found for exchange. While this concern is valid, exchange lands with lower development potential would not be encumbered with ESA compliance requirements. In addition, 2,515 acres of State School Trust land in ten areas of incidental take would be available for development. Table 2.1 presents the breakdown of take areas for Alternative B.

Multiple use, including grazing, on State School Trust lands designated for exchange would continue to be managed by the State until the exchange was completed, but such activities would be subject to section 10(a) permitting if they occur within desert tortoise habitat. No mining claims are located on State lands that would be incorporated into the proposed reserve.

4.2.2.3 Private Lands

Implementing this alternative would require exchange of approximately 7,618 acres of private land to BLM to be incorporated into the reserve. As the exchange would be completed on a value-for-value basis, private landowners should suffer no net loss of land value. Like the situation for State lands, land of equivalent development potential may not be available for exchange; however, these BLM exchange lands would not be encumbered with ESA compliance requirements. Under Alternative B, 9,783 acres of private land in ten separate areas of incidental take would be available for development (see Table 2.1).

Mining activities would be permitted on private and State school trust lands in the incidental take areas under this alternative. On BLM lands, any proposed mining activity would have to go through ESA section 7 consultation with the USFWS. Within proposed reserve areas, any proposed mining activities would have to follow the HCP guidelines.

Under Alternative B, planned recreation, such as golf courses, could be built in incidental take areas. Recreational activities in State or Federal parks or the national forest would not be affected directly by adoption of the proposed HCP. However, as St. George and other nearby communities continued to grow, visitation to State parks, Dixie National Forest, and Zion National Park would be expected to rise.

4.2.3 Agricultural Resources

4.2.3.1 Rangeland

Under Alternative B, all current grazing permit holders within Zone 3 of the proposed reserve would receive offers to sell their permits according to terms of the HCP. The permits would be purchased for both summer and winter areas at an estimated cost of $75.00 per AUM. Although these grazing permits are operating under an existing ESA section 7 consultation, adverse impacts to desert tortoises and their habitat from livestock grazing (USFWS 1994a) may still occur. Purchase of permits and retirement of grazing from the proposed reserve is expected to benefit the desert tortoise by reduced potential for trampling of individual animals and reduced competition for forage, and is consistent with the DTRP.

Currently, four grazing permits are in effect in Zone 3, which are to be acquired. Permit holders graze their cattle throughout winter months on BLM lands, and in summer months on the Dixie National Forest. Three of these owners appear to be willing to relinquish their permits on both BLM and national forest lands. The fourth owner has not yet decided whether to sell. In the event that owner did not sell, the easternmost allotment within Zone 3 (Red Cliffs) would continue to be grazed under an ESA section 7 consultation. At present, no grazing takes place in designated take areas.

Grazing occurs on some portions of BLM, State, or private land in desert tortoise habitat in Zone 4 north of Hurricane. Grazing in this area is operating under an ESA section 7 permit and would continue to undergo section 7 review. It would not be affected by Alternative B.

Grazing on Paiute Tribal Lands would not be affected by Alternative B.

4.2.3.2 Farmland

The only private land where farming activity is being conducted within the proposed reserve is a turkey farm which consists of approximately 1.5 square miles. This farm is recognized as an existing use area, and the owners currently have no plans to join the reserve. The area where they are currently raising turkeys was impacted quite some time ago, and appears to no longer contain habitat for the desert tortoise.

Little, if any, farming is conducted on private lands on desert tortoise habitat outside the proposed reserve. Under this alternative, farming would be allowed in incidental take areas.

4.2.4 Threatened, Endangered, and Sensitive Species

This alternative represents the Proposed Action, which would implement the Washington County HCP under authority of an ESA section 10(a) incidental take permit from USFWS for the Mojave desert tortoise. Under this alternative, a reserve would be established in desert tortoise habitat north of St. George. The reserve would total 61,022 acres, consisting of five zones.

The desert tortoise would be protected within the reserve by active management specifically oriented towards protection of the desert tortoise and its habitat, and fencing and access and use restrictions, which vary by zone. Figure 2.1 depicts the location of Zones 1-5 in the reserve. Figure 5.1 of the HCP depicts locations for fencing.

The proposed reserve would protect desert tortoise habitat and individuals, as well as other threatened, endangered, and sensitive (TE&S) species, by restricting OHV use, livestock grazing, hunting, and other activities. Enforcement by BLM and UDWR would serve to control unauthorized uses of reserve lands, including illegal shooting and dumping.

Ten incidental take areas are proposed under this alternative, totaling 12,264 acres. The ten distinct areas are described in Chapter 2 and their locations are depicted in Figure 2.1. Many take areas occur in the vicinity of existing rural or urban development. These areas would be authorized for take of desert tortoises and/or habitat through habitat alteration, displacement of individuals, or mortality resulting from development. Multiple-use management on BLM lands that are found within take or non-reserve areas would continue to be subject to ESA section 7 consultation with USFWS.

Impacts to TE&S species under Alternative B are as follows.

4.2.4.1 Mojave Desert Tortoise

Alternative B would result in the establishment of a 61,022-acre reserve roughly north of St. George, and permit incidental take in ten areas in known desert tortoise habitat totalling 12,264 acres. Under the supposition that all incidental take areas will be fully developed, an estimated total of 1,612 acres of high-density, 1,316 acres of medium-density, and 9,336 acres of low-density desert tortoise habitat would be affected. These figures represent 12,264 acres of desert tortoise habitat out of 55,946 total acres (−22 percent) within Washington County (excluding the Beaver Dam Slope). The estimated take, in numbers of desert tortoises, is 1,169 out of an estimated total of 7,883 desert tortoises within the County (excluding the Beaver Dam Slope). Figures for desert tortoise numbers and acres of habitat were obtained by combining UDWR data for Washington County (using mean values for desert tortoise density within three categories: 25/sq. mile; 75/sq. mile; 250/sq. mile) with BLM desert tortoise density (acreage calculated from BLM Density and Distribution Maps using GIS and desert tortoise densities per category from USFWS Biological Opinion [6780 CA-063.50], page 14).

In addition, 11,832 acres of potential habitat for desert tortoise would be made available for development. Potential habitat is defined as areas considered suitable for this species based on habitat characteristics, but where desert tortoises are currently not known to occur.

The largest section of contiguous habitat containing the highest densities of desert tortoises is found within the proposed reserve north of St. George. This area would be protected under the proposed HCP from some detrimental uses (OHV and other public uses), domestic animals and pets, and disease through fencing, access restriction, and law enforcement by BLM and UDWR.

A public education/information program would be implemented to raise public awareness about the desert tortoise and impacts of human activities. An environmental education center would be established outside the reserve for this purpose. Enforcement by BLM and UDWR and enactment of local ordinances would prohibit the presence of unleashed pets, unauthorized discharge of firearms, and any OHV use within the reserve. Habitat enhancement within the reserve would be achieved by purchasing grazing rights and removing livestock from the premises, cleaning up abandoned dump sites, and restoring disturbed areas.

The majority of proposed take areas on the fringes of the proposed reserve are already impacted by urban development and human intrusion. Other proposed take areas are physically isolated from the reserve by geographical separation, existing urban development, the Virgin River, and/or Interstate 15. Although isolated pockets of habitat may support desert tortoises for an extended period of time, long-term survivability of the desert tortoise in Washington County is more likely achieved through preservation of a large reserve composed of contiguous, protected, and managed desert tortoise habitat.

Enforcement of the ESA with regard to take is difficult for many activities, such as recreational and OHV use, vandalism, dumping, and use of firearms, without physical restriction from the area and enforcement of regulations and ordinances.

Questions have been raised regarding Minimum Viable Population (MVP) size of desert tortoise and whether the proposed reserve represents an MVP. An MVP study for the Mojave population of the desert tortoise, based on computer-generated models, was completed as part of the Desert Tortoise Recovery Plan (DTRP). This study suggests that a minimum size for reserves for populations near minimal viable density (10 adults per square mile) should be at least 1,000 square miles. The study also suggests that for populations well above minimal viable density (30 or more adults per square mile), reserve size can be reduced, but should still support 10,000 to 20,000 desert tortoises. Examination of the Clark County HCP in Nevada reveals that the MVP for this area was estimated to be 20,000 desert tortoises at a density of 100 desert tortoises per square mile in an area of 250,000 acres (Clark County 1991, Gilpin 1990).

In all of Washington County, an estimated 10,498 desert tortoises exist on 122,890 acres of habitat at densities varying from 1 to over 400 per square mile. (These figures were developed by the HCP Technical Advisory Board [TAC] for this HCP.) This population falls well below the MVP for Clark County, but within the range proposed in the DTRP for a minimal viable population. However, the Beaver Dam Slope population, consisting of an estimated 2,615 desert tortoises on 66,944 acres, is geographically isolated from populations in the St. George area, resulting in an estimated population figure of 7,883. In addition, an estimated 315 desert tortoises on 5,221 acres of desert tortoise habitat are somewhat isolated from the main population north of St. George by the Virgin River, the Santa Clara River, and/or Interstate 15. This effectively reduces the main population north of St. George to an estimated 7,568 individuals on an estimated 50,725 acres of habitat. Under Alternative B, incidental take allowed in areas that are not isolated from the main population may reduce this population size below 7,000 individuals.

These figures suggest that desert tortoise population size under this alternative would fall below the MVP size recommended in the DTRP (10,000-20,000 individuals at a minimal density of 10/sq. mile). The DTRP also suggests, however, that 5,000 desert tortoises may be sufficient to maintain genetic diversity for long-term evolutionary potential, and that population sizes smaller than 10,000-20,000 individuals may be adequate if extrinsic causes of mortality can be controlled and the discrete growth rate of the population does not fall below 1.0 (USFWS 1994a). Before coming to any conclusions based on these figures, three important points regarding the determination of MVP size need to be considered. First, statistically reliable estimates of MVP are difficult to obtain due to high variance in both demographic (population) and environmental parameters; consequently, many years of data must be collected (Boyce 1992).

Second, estimates of MVP rest on certain assumptions. Researchers must assume that population trends observed in the past can be projected into the future. This can be a problem when available data date back a relatively short time, and may not be representative of population trends over the long term. Assumptions also need to be made about patterns or occurrences of stochastic factors in the future, and about threshold levels of genetic diversity that prevent inbreeding depression in populations. The set of assumptions about stochastic factors is always an unknown, and the set about genetic diversity is largely untested for the desert tortoise. MVP estimates are, in fact, estimates at best; the actual desert tortoise MVP size could be considerably lower or higher than the estimate in the DTRP, although the DTRP MVP size is expected to be conservatively large to handle a margin of error.

The third, and perhaps most important, point regarding determination of MVP is that active management and protection of populations and habitats may lower MVP by reducing adult mortality. Desert tortoises throughout their range experience mortality from a variety of direct and indirect causes, including collection for food and commercial trade, vandalism, disease, habitat destruction and fragmentation, dumping of trash (causing ingestion of foreign objects or entanglement), roadkill, mining and mineral exploration and development, military operations, utility corridors, OHV use, livestock grazing, invasion of non-native plant species, fire, removal of native vegetation, and predation either by native or feral domestic predators (USFWS 1994a).

Protective measures proposed under this alternative could significantly reduce desert tortoise mortality resulting from anthropogenic sources. Fencing of reserve boundaries near urban interfaces would help exclude both domestic predators (pets) and diseased desert tortoises that may be released near urban areas. Eliminating livestock grazing would reduce risk of direct mortality or burrow destruction by trampling. Restrictions on OHV use would reduce direct mortality by crushing and would eliminate habitat degradation often resulting from this activity. Restricting access and building underpasses along Highway 18 and Cottonwood Road may reduce incidences of roadkill. Enforcement by BLM and UDWR would help control vandalism and shooting, illegal dumping, and illegal collecting. USFWS recognizes the need for fire suppression and also supports the DTRP recommendation of aerial suppression as the primary method in DWMAs.

Although this alternative restricts a number of the more impact-causing uses in the reserve, it would allow activities such as camping, horseback riding, hiking, and hunting to occur in parts of the reserve. Research to date is not sufficient to determine precise levels of impacts from a given amount of human use; therefore, it is not known what the impacts of these activities would be on desert tortoises and/or their habitat other than to restate that these activities certainly are not beneficial to the desert tortoise, and could be detrimental. Determination of type and extent of other uses allowed would become a management decision for BLM or USPR, which would have to be based primarily on preservation, protection, and enhancement of the Mojave desert tortoise, and which would be subject to compliance with the ESA and terms of the section 10(a) permit.

Although a considerable amount of data has been collected on the Mojave desert tortoise and MVP estimates have been made, it is believed that this alternative and resulting population size would represent an MVP that would ensure the survival and persistence of the desert tortoise in the Upper Virgin River DWMA. Establishment of the proposed reserve would provide protective measures for a large portion of the desert tortoise population in this area against known or suspected adverse impacts described in the DTRP (USFWS 1994a).

4.2.4.2 Bald Eagle

Overall, implementing this alternative would not be expected to adversely impact wintering bald eagles in Washington County. Some disturbance effects to bald eagles roosting and/or foraging at Ivins Reservoir and the City of Hurricane sewer ponds may occur as a result of further development in the Ivins/Padre Canyon/Paradise Canyon Take Area and the Hurricane Take Area. However, these disturbance effects are not expected to result in adverse impacts to the species.

Both take areas are already impacted by urban development. Roads exist within one-quarter mile of the eastern, northern, and southwestern shores of Ivins Reservoir, and Highway 59 separates the City of Hurricane sewer ponds from the proposed Hurricane Take Area.

The effects of human disturbance on wintering bald eagles are thought to depend largely on the type of activity that takes place. Eagles can apparently become conditioned to automobile and airplane traffic (Krauss 1977), but may be displaced by activities such as boating and fishing (Ingram 1965, Steenhof 1976). Pedestrians are apparently more disturbing than automobile traffic but less disturbing than boat traffic (Stalmaster 1976). In the vicinity of Cedar City, wintering bald eagles are known to roost within several hundred yards of occupied buildings without apparent disturbance to the birds (pers. commun., Ken McDonald, 1993). In the Ivins/Padre Canyon/Paradise Canyon and Hurricane Take Areas, impacts to this species would be expected to occur primarily as a result of recreational use of these areas, which is largely unrelated to implementation of the HCP.

Neither potential roosting sites that may occur along the Santa Clara and Virgin Rivers nor foraging areas used by eagles are expected to be affected by implementation of this alternative.

4.2.4.3 Peregrine Falcon

Under Alternative B, the peregrine falcon eyrie located near the Red Cliffs Recreation Area would be included within the proposed reserve. Other areas that have been identified as potential peregrine falcon nesting habitat, including Paradise Canyon and Red Mountain, would also be included in the reserve. Although these areas are also identified as potential Areas of Critical Environmental Concern (ACECs) in the BLM's proposed Dixie RMP, the RMP and associated EIS have not been finalized and proposed designations and restrictions could change.

Another eyrie has been active for the past six seasons in Snow Canyon State Park. The Park has enacted management plans to protect these falcons. This eyrie will continue to receive protection regardless which alternative is implemented.

This alternative would allow development on private lands located along the entrance road to the area, which would result in more human activity in the area. The specific impacts of this increase in activity on peregrine falcons is not known. Increased human habitation is likely to increase populations of potential prey species, such as rock doves, which could be beneficial to peregrine falcons. Development along the entrance road may result in greater recreational use of the area which may occur regardless of whether or not development takes place along the road. Continued occupancy of this eyrie suggests that current recreational activities may not affect the peregrine falcons here. Additional protection would be afforded to peregrines during the nesting season by access restrictions and fencing.

4.2.4.4 Woundfin and Virgin River Chub

Maintenance and recovery of woundfin and Virgin River chub populations in Washington County are tied primarily to maintenance of instream flow regimes in the Virgin River. Washington County has maintained that there will be no adverse impact to fishes as a result of issuance of the incidental take permit. While this issue continues to be a point of discussion with USFWS, as called for in Chapter 9 of the HCP, USFWS and others are in the process of developing the *Virgin River Basin Integrated Resource Management and Recovery Program.* A Memorandum of Understanding was signed on October 19, 1995, in which parties agreed to develop a program within 6 months that will provide for recovery of Virgin River fishes and meet future human water needs. The Recovery Program timeframe will not affect issuance of permitted actions under the Washington County HCP, but is intended to address water development needs and Virgin River Basin conservation.

4.2.4.5 Dwarf Bear-Poppy and Siler Pincushion Cactus

Implementing Alternative B would provide funding from the proposed HCP to fence endangered plant reserves and enforce OHV restrictions imposed under this alternative. A total of 21.6

miles of fencing would be constructed in areas near the White Hills, Webb Hill, Warner Valley, and south of Pearce Wash. Beneficial effects to these species would be anticipated through a reduction of unauthorized OHV use and associated habitat degradation in these areas.

4.2.4.6 Southwestern Willow Flycatcher

Potential impacts of this alternative to southwestern willow flycatchers would be indirect and related to potential changes in instream flow requirements for the Virgin and Santa Clara Rivers, and changes to riparian habitats adjacent to these rivers. As no take areas have been identified in the riparian habitats, and no changes in the flow of these rivers are anticipated as a result of permit issuance, no adverse impacts are anticipated to the southwestern willow flycatcher.

4.2.4.7 Merriam's Kangaroo Rat

Establishment of a reserve under Alternative B would provide protection for an unknown number of individuals of this species, primarily through fencing and access and use restrictions in a large area of potentially suitable habitat. Distribution and status of this species in Washington County needs to be investigated further before impacts of this alternative can be determined specifically.

4.2.4.8 Pygmy Rabbit

Under this alternative, potential habitat for pygmy rabbits within the proposed reserve would be afforded protection through access and use restrictions. Because sagebrush habitat is limited within the reserve, it is questionable whether implementation of this alternative would have any measurable effect on this species.

4.2.4.9 Ferruginous Hawk

Alternative B may afford some protection to this species through establishment of the reserve north of St. George. Although ferruginous hawks have been recorded throughout Washington County, it is unknown how important areas within the proposed reserve are for this species. These birds typically nest in open prairie and grassland habitats, but occur at lower elevations in winter and are often observed in agricultural areas. On BLM lands, implementing this alternative could reduce impacts to nesting ferruginous hawks (if they occur) from multiple-use activities, including OHV use and grazing.

4.2.4.10 Western Chuckwalla

Alternative B would provide protection to individuals of this species that are found within the proposed reserve area. Although the distribution and density of chuckwallas within this area are largely unknown, distribution is expected to overlap somewhat with distribution of desert tortoise. Establishment of the reserve would afford protection to this species through access and use restrictions, and enforcement to control unauthorized OHV use, shooting, and collection.

Chuckwallas that may be found in the various take areas would be subject to disturbance, displacement, or direct mortality as a result of potential future development.

4.2.4.11 Gila Monster

This alternative would likely result in the elimination of this species from some of the take areas, including the Santa Clara Bench and Buckskin Hollow, through displacement or direct mortality resulting from development. Establishment of a reserve under this alternative would afford protection to known habitat areas within Zones 2, 3, and 4 of the reserve. Additionally, establishment of plant reserves under this alternative could afford protection to habitat areas outside the reserve as well. Fencing of these areas and imposition of restrictions on use would limit access and reduce impacts to the habitat that would likely result from continued OHV use. Enforcement would help control unauthorized OHV use, mortality caused by illegal shooting, and population declines due to illegal collection.

4.2.4.12 Desert Night Lizard, Glossy Snake, Utah Banded Gecko, Zebra-Tailed Lizard, Lyre Snake, Western Blind Snake, Sidewinder, Patchnose Snake

Implementing Alternative B would benefit at least some of these species through protection of their habitat by limiting access and use, and through enforcement efforts within the proposed desert tortoise and plant reserve areas. Based on the assumption that some or all these species occur in both take and reserve areas and that abundances are not disproportionately greater in take areas, a net beneficial effect would be expected under this alternative. Some potential loss of habitat and individuals in proposed take areas would be offset by protection of habitat and populations in reserve areas.

4.2.4.13 Holmgren Milk-Vetch

If the proposed HCP is implemented, fencing and maintenance of a plant reserve near Red Bluff, in addition to protecting Federally listed plant species, would also afford protection to the primary known population of Holmgren milk-vetch in Washington County. Access and use restrictions imposed and enforcement funded by this alternative would be expected to reduce habitat degradation and/or mortality resulting from OHV use and livestock grazing. However, this species also occurs on Federally held areas that are potentially developable and could be sought in an exchange proposal for State ownership should the HCP be implemented. This scenario would threaten the success of those individuals. It will be the responsibility of USFWS and BLM to assure that exchanges do not adversely impact this species.

4.2.4.14 Gumbo Milk-Vetch

Based on available data, it is unclear whether populations of Gumbo milk-vetch near Washington would fall within the reserve or take areas prescribed by this alternative. If they fall within the proposed desert tortoise reserve, they will be afforded protection through access and use restrictions and enforcement. If they fall within proposed take areas, these populations would

potentially be eliminated by development in these areas. Other known populations of this species fall outside proposed reserve and take areas, and would be largely unaffected by this alternative.

4.2.4.15 Virgin Spinedace, Yellow-Billed Cuckoo, Common Yellowthroat, Yellow-Breasted Chat, Bell's Vireo, Flannelmouth Sucker, Arizona Toad, Lowland Leopard Frog, Northern Leopard Frog, Wet Rock Physa, Virgin River Thistle

As discussed under the No Action Alternative, impacts to these species are related primarily to changes in instream flow in the Virgin and Santa Clara Rivers. As it has been assumed that amount of development of water usage will be equivalent regardless of which alternative will be selected, no additional adverse impacts are anticipated from this alternative. The VRBIRM&RP would still be developed, as discussed under Alternative A.

4.2.5 Water Resources

Effects of this alternative on water resources over the next 20 years are expected to be the same as those described under Alternative A. Please refer to section 4.1.5 Water Resources for Alternative A.

4.2.6 Visual Resources

If Alternative B is adopted, change to visual quality would occur only in take areas. Take areas are, for the most part, adjacent to current human population concentrations. Additional development in these areas is not be expected to significantly impact visual quality. The 61,022-acre reserve would contain lands designated as Class II, Class III, and Class IV by BLM. Exemption of the reserve from development would ensure that visual quality would be maintained and preserved in these areas.

4.2.7 Wildlife Resources

The reserve established under this alternative would reduce adverse impacts on wildlife and wildlife habitat resulting from development and OHV use. Hiking, horseback riding, and camping would be restricted to designated areas or trails, vehicles would be restricted to designated roads on much of the reserve, and hunting would be limited to big game and upland bird species during official seasons within the reserve.

The northern and western portions of reserve Zones 1, 2, and 3 would lie within priority or critical big game habitat, as delineated by BLM's proposed Dixie RMP. The northern boundary of Zone 3 would be adjacent to the Dixie National Forest, providing a large area of contiguous protected lands.

Fencing would be used on the reserve to protect wildlife and wildlife habitat. Tall, stout, fencing would be installed along the perimeter where the reserve would be in closest proximity to existing development, primarily along the southern and western sides. This fencing would

link naturally-occurring barriers to prevent unauthorized entry of humans, pets, feral domestic animals, and released captive desert tortoises, all of which can harm wildlife and/or wildlife habitat. The priority and critical big game habitats, which would be located in the northern and western portions of reserve Zones 1, 2, and 3, would not be affected by fencing, nor any known wildlife movement corridors. Within the reserve, short, half-buried, mesh fencing would be used to prevent desert tortoises from moving onto roads and other potentially harmful infrastructures.

With the decrease in OHV, human, feral animal, grazing, and mining impacts, the habitat value of the reserve lands should increase, especially with law enforcement and fencing to reduce habitat modification resulting from unauthorized land use. Vegetation in zones where domestic grazing would be restricted may be rejuvenated. This should improve habitat conditions for game and non-game bird species. The enhanced growth of vegetation should provide improved forage conditions for grazing species. There should be a decrease in wildlife mortality and displacement due to reduction of multiple-use impacts.

In take areas, wildlife may be significantly affected. If development occurs, wildlife may be displaced and existing habitat would likely be modified. Only part of one of the proposed take areas, #8 with 159 acres, lies within priority habitat for big game as delineated by BLM's proposed Dixie RMP. All other take areas are outside defined big game habitat.

4.3 ALTERNATIVE C: SECTION 10(a) PERMIT BASED ON HCP WITH A SMALLER RESERVE

4.3.1 Socioeconomics

Under this alternative, adverse economic impacts are eliminated for private and State lands located in Zones 1 and 2. For Zones 3, 4, and 5, economic impacts are identical to those described in Section 4.2.1 for Alternative B. These lands would be available for development under Alternative C, hence providing more freedom to State and private landowners for development of their lands than Alternative B.

Groesbeck (1995) evaluated each alternative using three scenarios: 1) Retained Annual Long-run Benefits; 2) Lost Annual Long-run Benefits; and 3) Total Lost Construction and Development Values. An additional scenario estimates likely annual construction and development values plus annual additions to demand for goods and services by households in incidental take areas (Likely Annual Development of Take Areas in the Short Run). All monetary data assume base year values and are expressed in millions of dollars (base year=1996).

Table 4.3 Economic Evaluation of Alternative C.

Scenario	1996 MMS* Total Industry Output	Jobs Created	Population Supported	Percent Increase in Constrained Long-run Economy
Retained Annual Long-run Benefits	$732.83	19,079.55	47,409.00	10.13
Lost Annual Long-run Benefits	-$732.81	-19,078.93	047,407.00	8.42
Total Lost Construction and Development Values	-$15,771.88	N/A	N/A	N/A
Likely Annual Development Benefits of Take Areas	$16.13	289.00	720.00	1.16

* Millions of dollars (base year=1996)

4.3.1.1 Lost Property Tax Revenues

Assuming the same economic parameters as for the No Action Alternative given in Section 4.1.1.1, property tax losses for developed and undeveloped land scenarios for Alternative C are as follows:

- Acres of Land Converted - 5,689.00
- Revenues Lost (Developed Land) - $26,340,070.00
- Revenues Lost (Undeveloped Land) - $1,384,191.00

These results can be viewed as short-run impacts (undeveloped) versus long-run impacts (developed). Further, these results may be somewhat overstated because a small portion of lands in the category "Private Lands" are lands owned by county and municipal governments.

4.3.2 Land Ownership, Use, and Management

4.3.2.1 BLM Lands

Impacts to land ownership, use, and management would be expected to be similar to those under Alternative B, although the amount of BLM land that would be incorporated into the reserve would decrease from 18,698 acres to 17,607 acres for a total decrease of 1,091 acres.

4.3.2.2 State Lands

Approximately 9,145 acres of School Trust land would be exchanged and incorporated into the reserve. Another 3,464 acres would be included in take areas and made available for economic development, 38 percent more than Alternative B.

4.3.2.3 Private Lands

Under this alternative, 5,134 acres of private land would be included within the reserve. The remaining private lands would be available for development and include approximately 11,664 acres, 16 percent more than Alternative B.

Little recreation currently occurs in take areas considered in Alternative C. Should this alternative be adopted, most of the areas considered would be developed by the City or private individuals. Development could include golf courses and other types of recreation, especially in areas surrounding St. George and Hurricane.

Recreation in other parts of Washington County would not be directly affected by this alternative. Certain types of recreation, such as OHV use, could eventually be eliminated on BLM and State lands if they are located in desert tortoise habitat; however, this would not be a direct result of the adoption of Alternative C. As stated under Alternative B, recreational use of State, local and national parks and forests is expected to rise with continued growth in Washington County.

4.3.3 Agricultural Resources

4.3.3.1 Rangeland

This alternative would have the same impacts as those described for Alternative B. Although the amount of the reserve is decreased under this alternative, the quality of BLM land apportioned to the reserve remains relatively unchanged.

4.3.3.2 Farmland

Implementing this alternative would have impacts similar to those of Alternative B.

4.3.4 Threatened, Endangered, Candidate, and Sensitive Species

This alternative is a modification of Alternative B, with less acreage dedicated as reserve, and more acreage dedicated as take areas. Under this alternative, Zones 1 and 2 (Paiute Tribal Lands to Ivins and Ivins to Highway 18) would be converted from reserve areas to take areas. This would result in a total of 44,504 acres of reserve and 15,094 acres of take. State and private lands in these and other take areas would be subject to take of desert tortoises and other TE&S species present through habitat alteration, displacement of individuals, or mortality

resulting from development. Desert tortoises on BLM lands within Zones 1 and 2 would still be legally protected under the ESA but could continue to be subject to potential habitat degradation resulting from multiple use activities including OHV use, livestock grazing, and other multiple use activities. Under this alternative, enforcement would not be extended to Zones 1 and 2 to control illegal activities such as shooting or dumping. This alternative, like Alternative B, would make funding available for the study and management of TE&S species in Washington County.

Impacts to TE&S species under Alternative C are as follows:

4.3.4.1 Mojave Desert Tortoise

Under this alternative, private and State lands within Zones 1 and 2 identified in Alternative B would be converted from reserve areas to take areas. This will effectively increase acreage of take from 12,264 acres to 15,094 acres, and will reduce acreage dedicated as reserve from 61,022 acres to 44,504 acres. It is estimated that 10,908 acres of low-, 1,348 acres of medium-, and 2,872 acres of high-density desert tortoise habitat currently exists on State and private lands within these take areas. This alternative would allow development on all State and private lands within these areas comprising a total of 15,094 acres out of 55,947 total acres (−27 percent) within Washington County (excluding the Beaver Dam Slope). Estimated take under this alternative, in numbers of desert tortoises, would be 1,709 out of an estimated total of 7,883 desert tortoises (22 percent reduction) within the County (excludes the Beaver Dam Slope). BLM lands within Zones 1 and 2 would not be included in the reserve, but would be subject to ESA section 7 consultation with USFWS regarding acceptable uses.

The DTRP states that conditions for extinction of desert tortoise populations include demographic stochasticity, social dysfunction, and genetic deterioration, which in turn are affected by extrinsic causes of mortality and the area occupied by a population (USFWS 1994a).

Under this alternative, mitigation measures are similar to those of Alternative B, but the amount of habitat which is protected is substantially decreased. The Alternative C reserve would be smaller by approximately 16,518 acres (27 percent) than the reserve proposed under Alternative B. Because of the reserve's smaller size, the relatively contiguous Zone 1 could contain at least 500 fewer tortoises than it would under Alternative B. Smaller populations are typically thought to be more vulnerable to decline because of more pronounced effects of negative demographic trends and stochastic fluctuation (USFWS 1994a). This smaller reserve is contiguous and not fragmented by paved roads; however, review by members of the HCP Technical Advisory Committee determined that this proposed reserve would likely preclude implementation of the DTRP and the long-term survival and recovery of this desert tortoise population.

4.3.4.2 Bald Eagle

Impacts to this alternative would be similar to those described for Alternative B. Elimination of reserve Zones 1 and 2 under Alternative C, and potential development of State and private lands within these zones would likely increase total amount of growth and development near

Ivins, but would not be expected to directly impact bald eagles. Additional growth in this area could increase recreational use of Ivins Reservoir, potentially resulting in some disturbance to wintering bald eagles.

4.3.4.3 Peregrine Falcon

Implementation of this alternative would have similar impacts as those described for Alternative B. Potential nesting habitat on BLM lands in Paradise Canyon and on Red Mountain, however, would continue to be subject to BLM multiple use activities. Although these areas have been proposed as ACECs with OHV and other restrictions in the proposed Dixie RMP, this document has not been finalized. Multiple use management on BLM lands within habitat for Federally listed species is subject to ESA section 7 consultation with USFWS. Potential development of private and State lands within Zones 1 and 2 could impact potential peregrine falcon habitat north of Ivins. No records of nesting falcons exist for this area, with the exception of an eyrie located in Snow Canyon State Park.

4.3.4.4 Woundfin and Virgin River Chub

See discussion under Section 4.2.4.4.

If such consultations are required, they would result in continued protection of these species and no adverse impacts to woundfin and Virgin River chub would result from implementation of this alternative. If instream flow requirements are reduced, elimination of Zones 1 and 2 from the reserve and conversion of State and private lands within these Zones to take areas would make more land available for development in Washington County, potentially impacting woundfin and Virgin River chub populations. Under this scenario, impacts to these species could be greater under this alternative than under Alternative B.

4.3.4.5 Dwarf Bear-Poppy and Siler Pincushion Cactus

Implementation of this alternative would have similar effects as those described for Alternative B. Funding would be available from the proposed HCP for fencing of endangered plant reserves and enforcement of OHV use restrictions on BLM lands. Populations of these species would be expected to benefit as a result of a reduction of unauthorized OHV use in these areas. No adverse impacts would be anticipated.

4.3.4.6 Southwestern Willow Flycatcher

Potential impacts of this alternative to southwestern willow flycatchers would be indirect and similar to those described under Alternatives A and B. The only impacts that might occur would be if the instream flow requirements to the Virgin River are reduced or if riparian habitats are developed (which are not identified under this alternative). Such changes in instream flow could adversely affect riparian vegetation along the Virgin and Santa Clara Rivers. Because there are currently no known nesting records for southwestern willow flycatchers in this area, impacts to this species are speculative. If instream flow requirements remain unchanged, this alternative

would be expected to have no adverse impacts to southwestern willow flycatchers that may be present in these areas.

4.3.4.7 Merriam's Kangaroo Rat

Elimination of Zones 1 and 2 from the reserve under this alternative would reduce the acreage which would be afforded protection by reserve establishment and maintenance. Because distribution and status of Merriam's kangaroo rats are largely unknown at this time, impacts of this reduced reserve acreage are somewhat speculative. Potentially suitable habitat on State and private lands within Zones 1 and 2 could be eliminated as a result of future development of these areas. BLM lands within these Zones would continue to be subject to impacts from multiple use activities.

4.3.4.8 Pygmy Rabbit

Under Alternative C, potential habitat for pygmy rabbits in Zones 1 and 2 would receive less protection than under Alternative B. Although State and private lands described for take under this alternative are unlikely to contain suitable habitat, potentially suitable habitat on BLM lands at the northern ends of these zones would continue to be subject to multiple use impacts such as OHV use and other activities.

4.3.4.9 Ferruginous Hawk

This alternative, through delineation of a smaller reserve, would potentially offer less protection to this species than the larger reserve size proposed under Alternative B. Although their use of desert scrub habitats is probably limited, some suitable habitat may exist in Zones 1 and 2. Because their use of these areas for nesting has not been established, however, determination of impacts is speculative. No adverse impacts to wintering or migrant ferruginous hawks would be expected from development of these areas.

4.3.4.10 Western Chuckwalla

The conversion of Zones 1 and 2 from reserve to take areas under this alternative would likely reduce acreage of chuckwalla habitat protected by fencing, access and use restrictions, and enforcement efforts. Although they are known to occur in these areas, the density or total numbers of chuckwallas that would be impacted by development of State and private lands in these areas is unknown. Chuckwallas on BLM lands in these areas would be less affected, but would continue to be subject to potential impacts resulting from multiple use activities and lack of enforcement. Effects of various multiple use activities on populations of this species are poorly understood at this time.

4.3.4.11 Gila Monster

This alternative would likely result in the elimination of this species from some take areas, including Snow Canyon, Padre Canyon, Paradise Canyon, Santa Clara Bench and Buckskin

Hollow, through displacement or direct mortality resulting from potential development in these areas. While establishment of a reserve under this alternative would afford protection to known habitat areas including Black Gulch, Cottonwood Creek, and Quail Creek, and establishment of plant reserves under this alternative would afford protection to habitat areas near Bloomington and Webb Hill, this alternative would likely cause extirpation of this species in Utah. Fencing areas and imposition of restrictions on use would limit access and reduce impacts to habitat that would likely result from continued OHV use. Enforcement would help control unauthorized OHV use and mortality caused by illegal shooting.

4.3.4.12 Desert Night Lizard, Glossy Snake, Utah Banded Gecko, Zebra-Tailed Lizard, Lyre Snake, Western Blind Snake, Sidewinder

Conversion of Zones 1 and 2 from reserve to take areas would reduce the area of potential habitat for these species that would be protected. This is based on the assumption that habitat for these species overlaps considerably that habitat identified for desert tortoise. BLM lands within these Zones would continue to be subject to some degree of habitat degradation resulting from OHV use, livestock grazing, and other authorized and unauthorized uses. Development of State and private lands within these areas could impact some or all of these species through habitat modification, displacement, or direct mortality.

4.3.4.13 Holmgren Milk-Vetch

Impacts of this alternative are similar to those described under Alternative B. Establishment of a protected plant reserve near Red Bluff would reduce habitat degradation caused by OHV use and livestock grazing and would help preserve the primary known population of this plant species in Washington County.

4.3.4.14 Gumbo Milk-Vetch

Because Zones 1 and 2 of the reserve proposed under Alternative B do not have known populations of Gumbo milk-vetch, impacts under this alternative are similar to those described under Alternative B and depend on whether populations recorded near Washington would be located in reserve or take areas.

4.3.4.15 Virgin Spinedace, Yellow-Billed Cuckoo, Common Yellowthroat, Yellow-Breasted Chat, Bell's Vireo, Flannelmouth Sucker, Arizona Toad, Lowland Leopard Frog, Northern Leopard Frog, Wet Rock Physa, Virgin River Thistle

Impacts to these species would be similar to those described under Alternative B. More lands would be designated as take under this alternative; however, the level of development and hence future water demand is expected to remain the same under all alternatives. The only potential impact would result from a decrease in the instream flow requirements, subject to approval by USFWS.

4.3.5 Water Resources

Effects of this alternative on water resources are expected to be similar to those described for Alternatives A and B. Please refer to section 4.1.5, Water Resources, under Alternative A.

4.3.6 Visual Resources

Impacts to visual quality as a result of this alternative are expected to be greater than under Alternative B. The majority of areas that would be available for development are in human population concentrations with low visual sensitivity; however, more visually sensitive areas, such as Padre and Paradise Canyons, could be developed under this alternative, thus potentially compromising their visual quality. The 44,504-acre reserve would consist of designated Class II through Class IV lands that would not be impacted by development. Development adjacent to Snow Canyon State park may obscure the view of the canyon as visitors approach the area. The impact to visual quality would be determined by the ultimate development of the adjacent lands in Padre and Paradise Canyons, in particular.

4.3.7 Wildlife Resources

Under this alternative, less wildlife habitat would be protected through establishment of a smaller reserve (approximately 27 percent smaller than Alternative B). Fencing would help exclude free-roaming dogs and feral animals from approximately 44,504 acres of wildlife habitat. Areas of priority and critical big game habitats included in the reserve would not be affected by fencing. Impacts of take areas under this alternative to wildlife would be the same as for Alternative B with the exception of an additional 2,830 take acres, some of which lie within designated priority big game habitat.

CHAPTER 5.0
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APPENDIX A

APPENDIX A

Response to Comments on the Washington County Incidental Take Permit DEIS

The U.S. Fish and Wildlife Service received comment letters from 18 parties, received or postmarked during the public comment period, which ended on August 28, 1995. One additional comment letter was postmarked after the closing date, but it stated no comments. These letters are reprinted below in the order in which letters were received; some commenters submitted more than one letter. Issues were identified in the letters and numbered in their order of appearance. Responses to the comments raised in the letters are presented in the order in which they occur in the letters. Some issues were raised in more than one letter. Where the issue has already been addressed, reference is made to the earlier response.

Many of the comment letters received by the USFWS on the incidental take permit application contained information specific to the HCP. In particular, wording changes and changes related to the proposed action (e.g. reserve boundaries or permitted activities) were suggested. As the HCP is a product of Washington County, comments relevant to the HCP were forwarded to Washington County for consideration in their revision of the HCP for this final document, and Washington County responses are also recorded below. The USFWS response is added only if the response prepared by Washington County affected the analysis contained in this NEPA environmental document.

Letters were received from:

1. Private party
2. Private party
3. Private party
4. Private party
5. Dr. Daniel D. Beck; Central Washington University
6. Private party
7. Mayor Gene VanWagoner; City of Hurricane
8. Private party
9. Laura A. Romin; Utah Department of Transportation
10. Dr. C. Richard Tracy and Eric T. Simandle; University of Nevada, Reno
11. Deputy State Director; U.S. Bureau of Land Management
12. Ronald W. Thompson; Washington County Water Conservancy District
13. Private party
14. Private party
15. Private party
16. David Nuffer; Snow, Nuffer, Engstrom, Drake, Wade, and Smart
17. Vyonne Spilsbury Mendenhall; A.R. Spilsbury Family Enterprises
18. Brad T. Barber; State of Utah, Governor's Office of Planning and Budget (late)

Through out the HCP process concessions have been made to ensure over-development in Washington County which may ultimately prove detrimental to the future of the desert tortoise and the desert ecosystem north of St. George. Even though the HCP states otherwise, it appears, that continued habitat fragmentation will be considered the norm in all reserve zones. For example, concession was made to the City of St. George to permanently store water behind City Creek Dam. Under the HCP, City Creek Dam, which is believed within Zone (3) Core Area, and considered part of "reserves lands" should be subject to the "no incidental take" provision. Undoubtedly there will be incidental take in filling the dam. What does "no incidental take" mean for other projects proposed in reserve zones such as wells, water tanks, and power lines, and any other project the County Commission deems appropriate.

1-2

It is recognized that consumptive or development projects within reserve zones may be subject to Habitat Conservation Advisory Committee (HCAC) and Technical Committee (TC) review. However, it appears that the County Commission has sole veto power over advisory committee recommendations. Believe the HCP is not clear as to FWS role in evaluating the appropriateness of projects within "reserve zones". Believe FWS should have ultimate project approval/disapproval of projects within reserve zones, not the County Commission. Believe the County Commission will be under too much local political pressure to ensure all projects go forward without concern for future consequences to reserve biological integrity.

In addition, it appears, the County Commission has also sole authority for approving committee representation. Granted the HCP designates committee makeup, but there is concern that committee makeup will be biased toward multiple-use (consumptive use) of reserve lands and, again, not necessarily favorable to reserve biological integrity. Believe such a concern is not without foundation, especially where County Commission approval of agency HCAC , agency TC and environmental representation are concerned. Unfortunately believe the County Commission is tied too closely to the so called "wise use"/"cowboy caucus" movement and is an active participant in an attempt to weaken the ESA.

1-3

Believe state and federal agencies will nominate individuals that may not be biologically sensitive to species viewed as of little or no value to society, but nominations will better coincide with the political view of consumptive use. Believe environmental representative may well come from an organization that professes to be a wildlife organization, but is more sympathetic toward the "wise use" view point. Therefore believe, agency HCAC, agency TC, and environmental committee representation should be selected by FWS based on biological qualifications, or an environmental committee representative selected based on environmental commitment, not on politically correct qualifications. Unless committee biologists are removed from County Commission approval, County Commission project approval will remain suspect.

Responses to Comments

1-2. Washington County has not requested incidental take of Mojave desert tortoise for storing water behind City Creek Dam. The HCP recognizes that this existing dam serves as a debris basin, and at times may store water for a short duration following large precipitation events. Permanently storing water behind the dam is not part of Washington County's HCP proposal. For other utility actions, such as water tanks, wells, and powerlines, a utility protocol has been proposed by Washington County to minimize potential adverse impacts to desert tortoises from these actions. Should these activities occur on federal lands in desert tortoise habitat areas, they will be subject to ESA section 7 consultation.

1-3. Committee representation was proposed by the permit applicant and not the USFWS. The USFWS has been invited as a member of the HCAC, and that committee is proposed to work by consensus.

As noted earlier, it appears, that fragmentation of desert tortoise habitat was considered appropriate in order to find a compromise solution somewhat acceptable to the County In an attempt at compromise, the North Washington City Take Area, consisting of over two thousand acres of high density desert tortoise habitat has to be considered a major concession to development It is recognized that Washington City has considerable development infrastructure in the area. However it is difficult to accept that development consisting of 1,500 to 2,000 homes plus a golf course in an area that is considered, not only excellent desert tortoise habitat, but is apparently within an aquifer supposedly critical to Washington City and St. George long term water planning, is good land use planning. 1-4

Now to accommodate water development, greater encroachment into Zone 3 Core Area will be of the highest priority for the County Commission at the appropriate time The potential for water development within Zone 3 1/2 mile desert tortoise corridor, may be further jeopardize the biological integrity of such a narrow corridor. To ensure that water development does not further jeopardize the desert tortoise, HCP advises a water development protocol in non-take areas was developed. However, this protocol apparently is not included as part of the permit application. Believe absence of such a critical document for public review prior to implementation, brings into question FWS oversight responsibility in regard to water projects and as well as other projects within reserve areas. 1-5

The Babylon reserve zone (Zone 4) is proposed as a potential desert tortoise translocation site. The Desert Tortoise Recovery Plan translocation guidelines recommends translocation sites "surrounded by desert tortoise-proof fence" The Recovery Plan suggests translocation of desert tortoise in unfenced areas is not a viable approach for successful translocation strategy. It appears , Zone 4 is not proposed for fencing. Therefore believe, as with some other recovery efforts, Zone 4 should be considered a cosmetic management strategy. A strategy giving the impression something is be done to ensure survival of moved desert tortoise, when chance of survival is at best considered numinal . Therefore it appears reasonable, that Zone 4 should be considered essentially a desert tortoise dumping ground without any expectation of establishing a viable desert tortoise population. As hideous and expensive as fencing is, without a HCP commitment to fencing Zone 4, do not understand how desert tortoise translocation into Zone 4 can be considered a viable desert tortoise management option. 1-6

It does not appear that the proposed HCP, provides an avenue for public oversight or participation in management of the reserve until appropriate land acquisitions are made. FWS should insist that procedures are included in the final approval of the Incidental Take Permit that allow for public participation in reserve management decisions until reserve lands are turned over to BLM or designated a NCA 1-7

Finally, the guiding principles for the HCP preparation "Preservation of existing ecological values , foremost objective of this HCP" and "preserving existing biodiversity" and the "principle of reliance on preservation are highly noble and believe achievable 1-8

Responses to Comments

1-4. The northern Washington City take area boundary was arrived at by representatives of both Washington City and the Technical Advisory Committee (TAC) for the HCP Steering Committee. It was viewed as a compromise by both sides.

1-5. The water development protocol is included as an appendix in the final HCP.

1-6. Should any portion of Zone 4 be used for desert tortoise translocation, actions will be consistent with the Desert Tortoise Recovery Plan and will undergo TC review. If this is not the case, Zone 4 will not be used for translocation.

1-7. Washington County does not propose any public participation in reserve management for those portions of the reserve which are privately held. Federal land management agencies have no jurisdiction over private lands within the reserve until such time that it is designated as an NCA (and only if the NCA legislation enables control of private lands within its boundaries) or until such time these private lands are acquired by the Federal government. In the meantime, activities on these private lands will be regulated by the law enforcement personnel assigned to the reserve as described in Washington County's HCP. Individuals interested in attending and/or participating in HCAC meetings should contact Washington County for inclusion.

1-8. To our knowledge, Washington County has made these commitments. The USFWS has committed to remain as active as possible in HCP implementation.

dl: wchcp/nepa(comments)

7/12

Marilet A. Zablan
U.S. Fish and Wildlife Service
Ecological Services
Utah Field Office
Salt Lake City, UT 84115

Dear Ms. Zabian:

First wish to thank the Service for letter of July 3, 1995 informing of the "Utah Desert Tortoise Incidental Take Permit Application/Documents" being made available for interested parties. I wish to added to the list to receive the document.

It is the belief that the future of Utah's non-consumptive wildlife depends on the success or failure of the Washington County Habitat Conservation Plan. Failure of the plan would mean no future in Utah for federal endangered or threatened species and there would definitely not be a future for State sensitive species. I-9

Would you please note zip code change in the above address.

Very respectfully,

Responses to Comments

I-9. Thank you for your comment.

Jul. 10 '95 13:32

dl: wchcp/nepa (comments) P. 1

7/19

To PWS,

First, please send me a copy of the draft of the "Proposed Habitat Conservation Habitat Plan",

Next, would you please answer the following questions:

1) Why are we creating a reserve for the Mojave Desert tortoise in southern Utah when it is not native of the area. (it was introduced by early settlers and boy scouts). 2-1

2) Why are we hurrying on with this project when some of the studies have been found in error. (a recent study has found that ravens are a major cause of the turtles deaths and not cattle). 2-2

3) Please give me a list of people and agencies that have validated the studies that have been done and are being used in support of this proposal. 2-3

My address is as follows:

Responses to Comments

2. Private party

2-1. The issue of whether the desert tortoise is or is not native to the area is discussed within Washington County's proposed HCP. Also see response 11-2.

2-2. Washington County has decided to pursue the HCP as a viable means of reconciling conflicts between growth/development and endangered species in Washington County.

2-3. A complete list summarizing individual, party, and agency participation in Washington County's HCP process can be found in the EIS.

08/10/05 09:35 ☎18010287186 KINKOS ST GEORGE ☑002

dt:wchcp/nepa (comments)

Regarding proposed HCP (Washington County)

U.S, FWS,

3-1 To set aside land anywhere in this area so that the plants and animals originally living there can live and not be murdered by the developement of people is so obviously the right thing to do, that it should never have been questioned. There are plenty of people, and we have already taken all the land we have a right to.

3-2 I hope you will preserve it to the full extent by outlawing anything ~~by~~ with a motor to be in the area and allowing no hunting. If it's going to be done, do it right

Sincerely,

10

AUG 2005 RECEIVED

Responses to Comments

3. **Private party**

3-1. Thank you for your review and concurrence with the proposed alternative.

3-2. Washington County has proposed restricting motorized activities within portions of the reserve, and hunting is restricted to the extent allowable by State law.

08/10/95 00:35 ☎18016287188 KINKOS ST GEORGE ☑001

dt:wchcp / nepa (comments)

To whom it may concern,

I wish to give my comments on the HCP to preserve the desert tortoise.

I think this plan is a really good thing. In fact, it may be the only thing to prevent our beautiful desert from becoming one solid subdivision. It will preserve the land and many other creatures in addition to the tortoise. 4-1

The outdoor education center is a good idea so long as it is not too large. Off road vehicles should certainly be banned. In fact, I would ban them everywhere if I could. Hiking and horse back riding are good, but I see no reason to allow hunting. 4-2 4-3

All of the people who worked so hard on this should be congratulated for their efforts.

Sincerely,

Responses to Comments

4. Private party

4-1. Thank you for your review and concurrence with the proposed alternative.

4-2. The size and extent of the outdoor education center is unknown at this time. In addition to location, the USFWS concurs that size is a serious factor.

4-3. Washington County has proposed that off-road vehicles be banned from the proposed reserve. Hunting is allowed in the reserve according to Utah State law.

dt: wchcp/nepa (comments)

CENTRAL WASHINGTON UNIVERSITY

Department of Biological Science

August 10, 1995

Robert D. Williams
U.S. Fish and Wildlife Service
Utah Field Office
145 East 1300 South, Suite 404
Salt Lake City, Utah 84115

Dear Mr. Williams,

Thank you for providing me with a copy of the Washington County, Utah Desert Tortoise Incidental Take Permit Application/Documents which outlines the Utah Habitat Conservation Plan for the Desert Tortoise in Washington County. I have reviewed the documents and find them to be a prudent and responsible compromise among some very difficult land use issues. As a former Utah resident and frequent visitor to Washington County, I commend all parties who have been involved in the long and difficult process of preparing the habitat conservation plan.

I have some specific comments in reference to the Proposed Habitat Conservation Plan. My comments are based on several years of field experience in Washington County, and, in particular, studies I conducted on Gila monsters and Desert tortoises between 1982 and 1985 in Paradise Canyon and Snow Canyon State Park, and in subsequent follow-up visits over the past decade. This region falls entirely within zone 2 of the Proposed Habitat Conservation Plan.

At the time of my studies, zone 2 contained the best habitat for Gila monsters that I could identify in Utah, and very high quality desert tortoise habitat. A decade later, an extremely important and highly significant portion of high tortoise density habitat still occurs within zone 2 as shown in Fig. 1.1 of the Proposed Habitat Conservation Plan document. Although some of the habitat within zone 2 has been altered by development over the past decade, the area still contains excellent tortoise habitat, and it still contains the best remaining Gila monster habitat in Utah.

Maintaining zone 2 as a reserve will have several positive long-term impacts on Washington County. First, it will help to maintain the biological integrity of Snow Canyon State Park, a strong source of pride and beauty for Washington County residents. Second, by including zone 2 in a reserve, Washington County protects other sensitive species in addition to the Desert tortoise, like the Gila monster, that share habitat with tortoises. This may help prevent the future listing of such species and save considerable expense in the years to come. By retaining the remarkable diversity of geology, plants and animals that make Washington County so special, Washington County residents, and the rest of us, can be very proud for generations to come.

5-1

Responses to Comments

5. **Dr. Daniel D. Beck; Central Washington University**

5-1. Thank you for your review and concurrence with the proposed alternative.

dt: wchcp/nepa (comments)

August 14, 1995

Robert D Williams
U S Fish and Wildlife Service
145 East 1300 South, Suite 404
Salt Lake City, Utah 84115

Dear Mr Williams;

Thank you for the opportunity to comment on the Washington County, Utah Desert Tortoise Incidental Take Permit Application/Documents.

I would like to make specific reference to the information contained in the Proposed Washington County, Utah, Habitat Conservation Plan, (HCP), Chapter 5.2.3, Education, on page 96. It has come to my attention by way of the Daily Spectrum Newspaper and by the above Chapter of the Proposed HCP that "The preferred site for the Nature Center is Paradise Canyon."

I strongly believe this location would be inconsistent with reserve management objectives and practices. As an important biological corridor in the reserve, Paradise Canyon is narrow, fragile and contains very high densities of tortoises. It is contradictory to work so hard to protect the valuable corridor and then locate an infrastructure that will increase the activity levels in that sensitive area. The impact/use of the available outdoor facility in this small canyon would have its load limits. A restriction of outdoor visitor numbers would ultimately jeopardize the financial success and the quality of the educational experience of the Nature Center. The incompatibility of two different desired activity levels must be resolved. 6-1

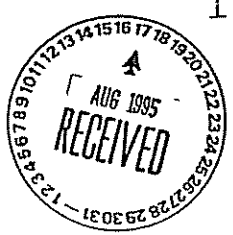
Respectfully, I would proposed that the United States Fish and Wildlife Service consider the need for, and benefits which will be derived from encouraging the Washington County HCP Steering Committee to arrange for a formal feasibility/comparative analysis study on other available sites. One site in particular, Cottonwood Springs site at I-15 and highway ⑨ junction, is located within the reserve and is a viable alternative that fits many of the necessary criteria for a successful Nature Center. This site will not place undue burdens into the more sensitive areas of the reserve and includes excellent opportunities for future expansion. 6-2

Sincerely,

Russell J Bezette

Russell J Bezette
P O. Box 668
LaVerkin, Utah 84745

RB/jb



Responses to Comments

6. Private party

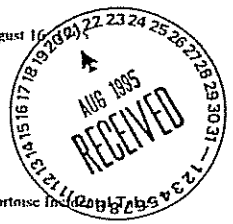
6-1. The HCP put forth by Washington County indicates that their preferred site is in Paradise Canyon. Until such time that a formal Nature Center proposal is put forth, which includes details about the Center, the USFWS is unable to determine potential impacts to desert tortoises and their habitat. The USFWS concurs that increasing human activity levels adjacent to and/or in the reserve would be inconsistent with the objectives of the reserve and inconsistent with desert tortoise recovery. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Washington County appreciates the concern regarding Paradise Canyon and recognizes the biological importance of it. However, politically the reserve boundaries were only able to be extended westward across Highway 18 through Paradise Canyon and into the mouth of Snow Canyon with the understanding that these additional reserve areas would be available to the public. The HCP Steering Committee attempted to reconcile conflicts between biological needs of the desert tortoise with these political realities. While uses within this area of the reserve are limited (See Zone 2 discussion in Chapter 3 of the HCP), one of the key selling points for this reserve extension was to have the education/nature center in Paradise Canyon. Washington County understands the concerns of the author and others who have expressed concern regarding its placement. However, at this time, Paradise Canyon is a preferred location, and Washington County requests that until a formal proposal for the education/nature center is put forth, that everyone withhold their judgement until it can be objectively evaluated.

6-2. As currently drafted in the HCP, the USFWS expects Washington County to put forth a formal proposal for the Nature Center in the near future. See response 6-1. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: See response 6-1.

dt: wchcp/nepa (comments)



August 16

Robert D Williams
U S Fish and Wildlife Service
145 East 1300 South, Suite 404
Salt Lake City, Utah 84115

Dear Mr Williams:

Once again, thank you for the opportunity to comment on the Washington County, Utah Desert Tortoise Incidental Take Permit Application/Documents.

I would like to make specific reference to the information contained in the Proposed Washington County, Utah, Habitat Conservation Plan, (HCP), Chapter 5.2.3, Education, on page 96. It has come to my attention by way of the Daily Spectrum Newspaper and by the above Chapter of the Proposed HCP that "The preferred site for the Nature Center is Paradise Canyon".

I strongly believe that placing the Nature Center in Paradise Canyon would hamper a primary goal of educational facilities, which is to educate as many people as possible for each and every dollar that is invested into the project. The fragile, narrow corridor of Paradise Canyon will have its visitor load limits. 6-3

The Nature Center is essentially a business venture. Function and location are two areas of development that must be thoroughly researched in the planning stage for a successful business.

① **Function:**
The primary focus of a Nature Center is to provide indoor and outdoor facilities for the life science educational potential. This relates to student educational effort, scientific research, instructional, general public interest purposes, and benefits to wildlife. The quality of the educational experience is largely determined by the site location.

② **Location:**
The Nature Center should become self-sustaining in the near future. To do this, the project location should be selected by a resolution of needs created from a ***predetermined*** clear definition of objectives. Appropriate site location is critical to the project, for the quality of the educational experience, for future growth and from a financial standpoint.

I strongly believe a feasibility study with full analysis of function and location should be undertaken considering Paradise Canyon, Cottonwood Springs, and Snow Canyon sites and other alternatives now available. The HCP Education Committee has done some preliminary investigation. To date there has not been a formal study which would also include new locations that are available.

Alternatives, such as Cottonwood Springs site at I-15 and highway ⑨ junction, the Gubler property at Snow Canyon, I-15 Port of Entry Information Center site, and the Dominguez Escalante property appear to offer workable situations upon which The Nature Center could be developed 6-4

To insure that the Nature Center meets the necessary criteria for success, I would respectively propose that the US Fish and Wildlife Service consider the need for, and the benefits that will be derived from encouraging the Washington County HCP Steering Committee to arrange for a formal feasibility/comparative analysis study on all available sites prior to location selection

Sincerely

Responses to Comments

6-3. See response 6-1. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: See response 6-1.

6-4. See response 6-1. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: See response 6-1.

dt: wchcp/nepa (comments)

CITY of HURRICANE
58 NORTH 200 EAST
HURRICANE, UTAH 84737
(801) 635-2811

August 18, 1995

Robert D. Williams
U.S. Fish & Wildlife Service
Utah Field Office
145 East 1300 South, Suite 404
Salt Lake City, Utah 84115

Dear Robert,

This letter is being written as the City of Hurricane's comments during the period provided, on the Washington County proposed Habitat Conservation Plan.
The City has been a part of the process to create this plan and as such has been in support of the effort to preserve the endangered and threatened species. The plan basically is acceptable to the City with one exception. We would like to see the boundary moved north about 300 feet along a section that we feel is essential to the City's present and future development. This section would run from the 1/2 section line of section 27 to the 1/2 section line of section 28. The City has had a major road planned along the section line for many years. This road is going to be a vital part of the City is moving traffic around the downtown area and avoiding a complete shut down due to traffic congestion. We already are experiencing the effects of traffic congestion and realize that the need for this road is coming soon. During the process of developing the HCP, the City and property owners within the City brought to the attention of the members of the HCP committee the need to move this boundary north to accommodate this road. 7-1
Already existing on the property for this road is a overhead power line used for both transmission and distribution and the Washington County Water Conservancy District's line to Quail Lake. During the construction of these lines, an easement for construction covered a 200 foot strip. This strip was disturbed and so much of this property is no longer in an undeveloped state.
The moving of the boundary would allow the City to pursue the road in a proper alignment, and have enough room to work during construction without encroachment into the habitat. The City has virtually no other corridors on the North in which to run this road. The property owners along the road are in support of the project and are willing to fund it through a Special Improvement

Responses to Comments

7. **Mayor Gene VanWagoner; City of Hurricane**

7-1. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: In discussions with the landowners, it appears that there are mixed views on this proposal. Therefore, Washington County has decided not to move the boundary north in Zone 5 as requested, but will consider amendments if they do not reduce the size of the reserve.

dt: wchcp/nepa (comments)

Mr. Robert Williams
U.S. Fish and Wildlife Service
Lincoln Plaza
145 E. 1300 South, Suite 404
Salt Lake City, Utah 84115

Dear Mr. Williams:

We would like to comment on the Washington County HCP Draft EIS. While some areas cause us ~~some~~ concern, we feel that this document, on the whole is balanced and attempts to reach suitable compromises fair to all parties.

Our concern lies with the Babylon area. Specifically we wish to make it clear that we support the scientific findings that grazing be allowed in this area. This conclusion is highly appropriate and our conversations with UDWR, BLM and local biologists further substantiate this finding since no live tortoise sightings have occurred in the Babylon area. Additionally, we have not seen any tortoises in the process of running cattle in this area. 8-1

It is our understanding that the USFWS might issue a biological opinion to the USFWS mandating that all grazing permits be removed in DWMAs, including possibly the Babylon area. We will protest, on the basis of sound science, if indeed this happens. We continue to follow legal developments in the West pertaining to grazing issues. 8-2

Thank you for the opportunity to review the HCP. We appreciate the fact that grazing has been a difficult issue for all involved.

Sincerely,

Responses to Comments

8. Private party

8-1. Washington County has not proposed eliminating grazing from Zone 4. Biological review of grazing will continue through ESA section 7 consultation between BLM and USFWS.

8-2. In some areas, grazing is believed detrimental to desert tortoise. See response 8-1.

dt: wchcp/nepa (comments)

State of Utah
DEPARTMENT OF TRANSPORTATION

ichael O Leavitt
Governor
Thomas H Warne
Executive Director
Clint Topham
Deputy Director

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Salt Lake City, Utah 84119-5998
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Commission
Glen E. Brown
Chairman
Todd G. Weston
James G. Larkin
Ted D. Lewis
Hal M. Clyde

August 24, 1995

Robert D Williams
Assistant Field Supervisor
U S. Fish and Wildlife Service
145 East 1300 South, Suite 404
Salt Lake City, UT 84115

Re: Washington County, Utah, Desert Tortoise Incidental Take Permit Application/Documents

Dear Bob:

UDOT is aware of the concerns regarding the threatened desert tortoise in Washington County. We have worked closely with your office to evaluate impacts to the tortoise associated with installation of a bike path along SR18. Anticipated mitigation for the SR18 bike path is the installation of desert tortoise-proof fencing along both sides of the highway. The impending completion of the Washington County HCP is of interest to UDOT/FHWA due to the alignment of area roads with respect to the proposed Mojave Desert habitat reserve.

As currently presented, the subject documents commit UDOT/FHWA to fencing of SR18 and I-15 as part of the Washington County HCP (5.2.1) and the Implementation Agreement (p.10, F). UDOT and FHWA were never consulted as to their commitment level in this regard. In particular, section 1.3 6 of the HCP indicates that a subcommittee was established to address fencing issues. UDOT/FHWA were not included on this subcommittee, yet their interests were paramount to decision making. 9-1

Certainly, UDOT/FHWA have an obligation to assess their projects and related impacts to the tortoise, as well as current impacts to the tortoise from the roadways. If fencing is an appropriate mitigation for project impacts, then this should be advised through either formal or informal consultation between our agency, FHWA, and the USFWS. Should fencing not be determined appropriate mitigation for transportation projects, has the HCP process considered other funding mechanisms for tortoise fencing in these areas, or a cooperative funding effort by interested parties? 9-2

I would suggest modifying the text in the HCP and Implementation Agreement to identify a need for tortoise fencing, however, not commit funding sources at this point In addition, I recommend 9-3

Responses to Comments

9. Laura A. Romin; Utah Department of Transportation

9-1. UDOT and FHwA are identified in the HCP as parties to erect fencing; however, UDOT and FHwA are not identified as signatory parties to the implementation agreement. The need for desert tortoise protection along Interstate Highway 15 and Utah Highway 18 has been documented by the Service and Utah Division of Wildlife Resources. For over 2 years, the Service has been discussing this need with FHwA and UDOT and intends to address this need through ESA informat and formal section 7 consultation.

The subcommittee was convened temporarily to identify where fencing is needed and what type of fencing is required; the fencing subcommittee was not convened to identify all possible mechanisms for fencing installation. Implementation of this HCP will require cooperation of several entities, and FHwA and UDOT are encouraged to continue their support of fencing identified rights of way.

9-2. See response 9-1. Additionally, cost of fencing in many areas of the reserve will be borne by developers adjacent to the reserve. There may be situations where fence cost-sharing by agencies and developers is appropriate, and USFWS encourages creative approaches to funding both project mitigation and desert tortoise protection efforts. As mentioned in the FEIS, cost-sharing agreements with Washington County and other agencies is expected for some actions.

9-3. See response 9-1. USFWS agrees that fencing design should be done in consultation with UDOT and FHwA.

that development of fence designs (which, as indicated in 5.2.1 of the HCP, will be reviewed by HCAC and approved by the Washington County Commission) should be done in consultation with UDOT/FHWA engineers and environmental staff. 9-3

UDOT/FHWA promote the idea that fenced right-of-ways should be considered essentially removed from tortoise habitat: allowing road maintenance, reconstruction and widening; utility maintenance and installation; and bicycle path construction and maintenance. This has been addressed in the HCP (3 5 and 5.2.1). 9-4

In the HCP (3.5) it states that Highway 18 will be fenced on both sides, enclosing a right-of-way of 200 feet. UDOT/FHWA current plans are to fence a corridor enclosing 300 feet which will allow adequate right-of-way for potential road modifications. The Implementation Agreement (p.10, F) correctly ensures a 300 foot right-of-way and this should be corrected in the HCP. 9-5

We appreciate the opportunity to comment on the subject documents.

Sincerely,

Laura A. Romin
Wildlife Coordinator

cc: Lynn Zollinger, UDOT
Jay Devashrayee, UDOT
Bill Gedris, FHWA

Responses to Comments

9-4. USFWS agrees with this concept if the rights-of-way are suitably fenced for desert tortoise protection.

9-5. USFWS concurs that the HCP and IA must be made consistent on this point. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Washington County is facilitating contact with appropriate landowners to implement the 300-foot right-of-way. The HCP and the EIS have been revised to indicate the right-of-way will be between 200 and 300 feet.

dt: wchcp/nepa(comments)

C. Richard Tracy & Eric T. Simandle
Biological Resource Research Center
Department of Biology / PA 314
Reno, Nevada 89557-0015
Voice: (702) 784-4565
FAX: (702) 784-1369

To: Robert D. Williams, U.S. Fish and Wildlife Service

From: C. Richard Tracy and Eric T. Simandle, University of Nevada, Reno

Re: Washington County, Utah Incidental Take Permit Application / Documents

Date: August 25, 1995

We have reviewed the Washington County, Utah Incidental Take Permit application and documents and prepared the following comments to assist your office and the Washington County HCP Steering Committee in implementing an effective and reasonable habitat conservation plan.

It is apparent that a great deal of effort has gone into the preparation of these documents. It is our hope that the suggestions that we have put forth here will be used constructively and not be regarded as criticism of the plan. Our opinions are based solely on our scientific knowledge of this species and the affected areas.

We agree wholeheartedly with the concept of the HCP and the specific goals and objectives set forth in the HCP documents and are encouraged that the Steering Committee has intended to include the recommendations of the Desert Tortoise Recovery Plan (DTRP). However, we have noted several instances where the management goals are counter-indicated by the objectives and the DTRP.

With respect to the management goals, we believe that the "Kayenta style" developments that are proposed in Zones 1 and 4 can be compatible with desert tortoise populations only with the additional conditions that: 1) pets are required to be restrained at

10-1

Responses to Comments

10. **Dr. C. Richard Tracy and Eric T. Simandle; University of Nevada, Reno**

10-1. USFWS appreciates these comments from a member of the Desert Tortoise Recovery Team. Through proposed monitoring, the value of the reserve in Zones for desert tortoise recovery will be determined and evaluated. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: "Kayenta style" development is now only proposed for 400 acres of Zone 1 and the western portion of Zone 5. Within the Town of Ivins (which is most of the private land in Zone 1), dogs are required to be restrained. The Town of Ivins and Washington County does maintain residential speed limits within their jurisdiction on residential roads for safety reasons, and they believe that these speed limits and their enforcement capabilities are adequate to protect children and desert tortoises.

all times and 2) adequate speed bumps or other traffic slowing devices are used to reduce the chances of vehicles killing tortoises. 10-1

Additionally, permitting hunting in Zones 3 and 4 may detrimentally affect the tortoise population by encouraging vehicular traffic in these regions. This may be especially important during the big game season when tortoises are likely to be still active and obtaining the food necessary to survive their hibernation. Disturbance of tortoises during this critical time period by vehicles or hunters themselves could lessen their chance of surviving hibernation. If any hunting is to be allowed, we suggest that it be limited to upland bird hunting and that vehicular traffic within these zones be controlled by closing most of the unimproved roads in the area. 10-2

Permitting grazing in Zone 4 may have also adversely affect the tortoise population and is listed as incompatible with desert tortoise recovery in the DTRP. Recent research has suggested that in times of low food supply grazing can reduce the fecundity of tortoises and thereby lessen the chance of this population recovering. While there may be few tortoises in this area, it appears that the habitat is very similar to the City Creek site which does support high densities of tortoises. Therefore the chances of future increases in tortoise populations in this area may be very good if it is properly managed. Further, at the current stocking rate of approximately 4 cows per square mile, it appears that this area can only support about 28 cows. Insofar as the Endangered Species Act requires that management decisions be made to facilitate the recovery of the desert tortoise the prudent decision here seems obvious; on balance, permitting the grazing of 28 cows is far from a sufficient benefit for the damage that these cows can do to tortoise resources. 10-3

Permitting mining activities also could pose a threat to the desert tortoise populations in Zone 4. The DTRP suggests that mining be considered as compatible only on a case-by-case basis under the condition that the cumulative impacts do not significantly impact the desert tortoise habitats or populations. The small size of this zone increases the chances that the impact to the tortoise habitat in this area will be high. Further, the DTRP 10-4

Responses to Comments

10-2. UWFWS appreciates these comments from a member of the Desert Tortoise Recovery Team. While they are apparently sparse, desert tortoises have been observed in Zone 4 desert habitat. Law enforcement within the reserve will occur year-round. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: In Zone 3 of the reserve, all non-improved roads are scheduled to be closed to vehicular traffic, not just during the hunting season. All roads will be left open in Zone 4 as no desert tortoises are known to occur in this part of the reserve. Should desert tortoises be discovered in Zone 4, the HCAC may meet to discuss potential changes in Zone 4 reserve management. However, as Zone 4 is entirely BLM lands, it will be the responsibility of the BLM to enact any such changes.

10-3. See response 10-2. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: As stated in response 10-2, no desert tortoises are known to occur in Zone 4, and therefore Washington County does not accept that grazing is detrimental to desert tortoises in Zone 4. In addition, as stated in response 10-2 above, Zone 4 is managed exclusively by the BLM, and it is a BLM decision whether or not to continue grazing in Zone 4 now or in the future. However, Washington County and HCAC is expected to participate in this decision process.

10-4. See responses 10-1 and 10-2. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: As stated in response 10-3, no desert tortoises are known to occur in Zone 4. Zone 4 is managed exclusively by the BLM, and it is a BLM decision whether or not to continue mining in Zone 4 now or in the future.

requires that any potential effects on desert tortoise populations are carefully mitigated during the operation and that the land is restored to its pre-disturbance condition. It is our opinion that because none of these conditions are met, and this zone is relatively small, tortoises in this zone would be in harms way if mining activity is allowed. 10-4

The geometry of the proposed DWMA needs to be considered carefully. Some of the large private holdings along highway 18 need to be targeted for trade. In particular, the lengthy stretch of private holdings and the planned management of these areas, create a barrier to dispersal of tortoises within the total DWMA. Acquisition of the southernmost section of this private area as a part of the DWMA could be particularly beneficial insofar as it would increase the size of the corridor between the eastern and western portions of the DWMA. Additionally, no traffic including activities should be permitted in this sensitive corridor area. Further, the proposed visitor's center in Paradise Canyon is a particularly destructive idea for this sensitive corridor area. We recommend that the visitor's center (a visitor's center being a particularly good idea for management of interested visitors and tourists as well as the displaced tortoises) definitely should be located south of Interstate 15 to manage traffic and interest in tortoises to areas away from the DWMA. 10-5 10-6

Lastly, we feel that reductions in vehicular traffic throughout the DWMA are required to protect the species from harm. This is especially the case in areas where there are many unimproved roads crossing portions of the DWMA. The danger here is both from the traffic itself and also from the off-road activity that is stimulated by human access. Destruction of habitat is highly likely under these conditions and we believe that regulations alone will not be able to stop such destruction from occurring. Instead, we encourage a review of the existing roads in the DWMA and the closing of roads that are not essential to approved activities. 10-7

Responses to Comments

10-5. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Washington County assumes that the author is referring to the southern portion of Winchester Hills along Highway 18. There was considerable discussion between the Technical Advisory Committee and the HCP Steering Committee regarding the boundary in the area in question, and the proposed boundary was voted on and unanimously approved by the Steering Committee.

10-6. See responses 6-1 and 6-2. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: See response 6-1.

10-7. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Washington County agrees in concept with this comment and has proposed to close/gate all unimproved roads in Zones 2, 3, and 5. If additional roads need to be closed, this will be considered by the HCAC.

We feel that our comments point to management presented in the HCP that may abate recovery of the desert tortoise and could lead to an unnecessarily lengthy time to delisting. Additionally, we feel that the impacts of these management schemes are not adequately addressed in the Environmental Impact Statement (EIS). Further, we feel that the general comments about traffic through the DWMA should be considered in both modifying the HCP and addressed in any EIS. 10-8

The DTRP advises that, because of the small size of this DWMA, that management be intensive and promptly implemented if the population is to be given a reasonable chance of recovery. Therefore, we urge your office and the Washington County Steering Committee to include our recommendations in the final HCP.

Sincerely,

C. Richard Tracy
Professor of Biology

Eric T. Simandle

Eric T. Simandle

Responses to Comments

10-8. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Washington County has strived to develop an HCP which protects the desert tortoise to the maximum extent practicable. Sometimes, practicality may result in decisions or compromises which the author may not support 100%. However, Washington County firmly believes that the proposed HCP promotes recovery far better than no HCP, and therefore, the USFWS should issue the permit as written.

dt: wchcp/nepa (comments)

United States Department of the Interior

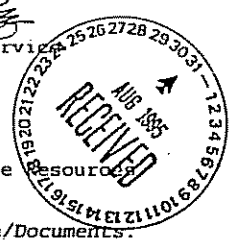
BUREAU OF LAND MANAGEMENT
Utah State Office
324 South State, Suite 301
Salt Lake City, Utah 84111-2303

6840
(UT-932, UT-045)

FAX received August 28, 1995

AUG 2 9 1995

Memorandum



To: Field Supervisor, U.S. Fish and Wildlife Service
Utah Field Office
Lincoln Plaza
145 East 1300 South, Suite 404
Salt Lake City, Utah 84115

From: Deputy State Director, Division of Renewable Resources

Subject: Review of *Washington County, Utah, Desert Tortoise Incidental Take Permit Application/Documents.*

The Utah Bureau of Land Management (BLM) has reviewed the subject document and prepared several comments for your consideration. BLM remains committed to the Habitat Conservation Plan (HCP) process in Washington County. We are pleased with the progress that has been made thus far. It is our intention to continue to do our part to ensure that this effort continues to move forward toward implementation and improved management of the special status plant and animal species located in the area. We hope that these comments will improve the quality of the document.

General Comments.

1. We noticed that there is no discussion regarding compliance with Recovery Plans, Federal Land Use Plans, State and local zoning ordinances, etc. A section in the HCP should discuss this issue. 11-1

2. The issue of whether or not the desert tortoise is native to the area is discussed several times in the HCP and the Draft Environmental Impact Statement (DEIS). The issue is essentially moot and the various discussions are redundant. It should be discussed one time and then dropped. 11-2

3. There is confusion regarding some of the acreage figures used and whether or not the entire county is part of the HCP. For example, Table ES1 (p.v) and ES2 (p. vi) indicate that there are 34,436 acres (approximately 54 sections) of low density tortoise habitat in Washington County. However, Figure 2.2 (p. 17) shows approximately 134 sections or about 86,000 acres of low density of habitat, including the Beaver Dam Slope area. Is the Slope part of the HCP? The actual extent of the HCP needs to be clarified and acreage figures adjusted accordingly. 11-3

4. Several places in the document, including pages 31 and 40 of the proposed HCP and pages 22 and 25 of the DEIS state that "BLM 11-4

Responses to Comments

11. Deputy State Director; U.S. Bureau of Land Management

11-1. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Compliance with Recovery Plans is discussed generally in the HCP, and more specifically in the EIS, as is compliance with other Federal, State, and Local plans and ordinances.

11-2. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The issue of whether or not the desert tortoise is native to the area was raised as a concern during public scoping meetings and continues to be an issue with Washington County residents (see other comment letters). It is discussed within both the HCP and the EIS to adequately address the public's concerns; however, it had no meaningful impact on the proposed HCP.

11-3. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The Executive Summary and Sections 1.2 and 1.4 have been revised to clarify the description of the HCP coverage in Washington County. The desert tortoise habitat discussed for reserve and non-reserve within the HCP coincides with the Upper Virgin River Recovery Unit, which does not include the Beaver Dam Slope area. The Beaver Dam Slope area is part of the Northeastern Mojave Recovery Unit and is not included in the HCP planning area.

11-4. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: This has been changed in the HCP..

should be requested to apply for a minerals withdrawal." This statement should be clarified as BLM can request mineral withdrawals only for federal minerals. 11-4

Specific Comments.

Habitat Conservation Plan.

1. Page 1. 1.1. The Need For an HCP in Washington County. There is a need in this section for a concise discussion of the relationship between The Endangered Species Act and the HCP. There should be a discussion on exactly what "take", "incidental take", Section 10 Permit, etc. mean. These items are mentioned in the DEIS but should be identified at the beginning of the HCP.

2. _____. There is some information in the HCP which is out of date. For example, Table 1.1 lists the Siler pincushion as proposed for down listing to threatened (also see page 9, Section 1.4). This action has already been approved.

3. Page 6. Table 1.3. The membership and affiliation on the steering committee needs to be updated.

4. Page 9. 1.4. Coordination With the Draft Desert Tortoise Recovery Plan (DDTRP). This section and certain other sections need to be updated to reflect implementation of the Final Desert Tortoise Recovery Plan which has replaced the draft plan. 11-5

5. Page 16. 2.1.4. Mexican Spotted Owl. This section needs to be updated to reflect the fact that a draft Mexican spotted owl Recovery Plan has been published and work is beginning on a final plan.

6. Page 17. 2.1.6. Woundfin and Virgin River Chub. This section should be updated to include a discussion on the Virgin spinedace and the recently completed Conservation Agreement. Also, has the final Virgin River fishes Recovery Plan been released?

7. Page 27. Part 3.2.2. Private-BLM Land Exchange. Change the beginning of the fourth sentence from "... all of the private landowners..." to "...most of the private land owners within the proposed reserve boundaries have agreed to participate in this acquisition program.". Some owners are still evaluating the various options available to them. For example, to our knowledge the owners of the turkey farm have not agreed to sell or exchange. Others may change their mind on whether or not they want to exchange lands.

8. Page 28. 3.3. Description and Management of Reserve Zones. Insert the word "proposed" between the words "The" and "reserve".

9. _____. A summary map depicting the zones in the

Responses to Comments

11-5. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Items 1 through 8 have been modified as suggested. Regarding item 9, Figure 3.1 of the HCP depicts the Zones on page 25 of the draft HCP/EIS. Item 10 has been modified as suggested. Washington County recognizes the position of the BLM regarding item 11, and is pursuing special legislation to enact the proposal. Regarding item 12, firefighting has been added to the lists of approved uses for Zones 1, 2, and 5. The HCAC will consider what additional fire fighting restrictions, if any, would be necessary for the reserve. The funding question in item 13 is addressed in the HCP—costs and revenues are expected to increase at a similar rate. Item 14 is modified as suggested.

proposed reserve, such as the one on page 23 of the DEIS should be inserted here.

10. _____. Part 3.3.1.2. Management (of Zone 1). A question exists as to the legality of having the Town of Ivins manage BLM administered federal lands. Therefore, the following should be inserted after the 2nd sentence in this paragraph: "Management of resources on BLM administered public lands not directly related to desert tortoise objectives, including management of wilderness values on Red Mountain will remain with BLM. Prescriptions on public lands must conform to federal laws and regulations." This is to clarify that the Town of Ivins cannot assume administration of other aspects of managing federal lands under present laws and regulations which make specific delegations to the Secretary of the Interior (also see DEIS, page 22, paragraph one).

11. Page 30. Part 3.3.2.2. Management (of Zone 2). BLM has not yet endorsed the proposal to transfer all remaining lands in this zone to the UDNR for management as an extension of the State Park. Until and unless special legislation is enacted into law that provides otherwise, management of public lands within this zone must conform to federal laws and regulations, including management of those portions of the Red Mountain Wilderness Study Area located within the Zone. 11-5

12. Page 40 and Page 42. Fire fighting discussion. The HCP notes that fire fighting activities would be allowed in Zones 3 and 4. What would the fire management prescription be in the other three zones? In those Zones where fire fighting would be allowed, should there be restrictions or other specific direction identified?

13. Page 110. 6.5. Funding. There is some question as to how the HCP proposes to keep up with inflation. It may be desirable to depict what different discount rates do to the total budget requirements.

14. Page 137. 7.7.2. Potential Impacts to Dwarf Bear-Claw Poppy. A potential impact that should be identified here is fragmentation and loss of habitat due to commercial and residential development, associated road construction, etc.

Draft Environmental Impact Statement.

General Comments.

1. There is no discussion on compliance with various Recovery Plans, Federal Land Use Plans, State and local plans and other ordinances. This discussion should be a part of the DEIS. 11-6

2. The DEIS should include a discussion of (1) benefits resulting from implementation of the HCP, and (2) the value of the desert tortoise and the other listed and candidate plant and animal 11-7

Responses to Comments

11-6. Section 1.7 of the FEIS provides discussion on this topic. See response 11-1.

11-7. This information is already in both the HCP and the DEIS.

species located in the area. 11-7

Grazing.

3. The intent of the HCP regarding livestock grazing within the proposed reserve is confusing and needs to be clarified regarding (1) who would actually acquire the permits, and (2) if grazing would be allowed to continue in portions of the reserve. 11-8

Language in the Comparison of Alternatives Matrix on page 35 of the DEIS and elsewhere in the document should be amended to make clear that the grazing permits would be acquired by the Washington County HCP Administer, not BLM (see Table 6.3, page 111 of the HCP). Department of the Interior policy prevents BLM from purchasing its own permits which it has issued to grazing users.

The Comparison of Alternatives Matrix on page 35 also notes that "Four grazing permits would be acquired by BLM on a willing seller/willing buyer basis and grazing would be retired from most of the proposed reserve." (also see Table 5.1, page 99 of the HCP). Under the Environmental Consequences Section (Rangeland 4.2.3.1. page 88), the document states that under the proposed action, "...all current grazing permit holders within the proposed reserve would receive offers to sell their permits according to the terms listed in the HCP". While we believe that offering compensation is a good practice and should be pursued in all cases, the HCP and DEIS does not consistently support this concept. The HCP at 3.3.4.2 (Management of Zone 4, page 41) clearly states that grazing in that zone should be continued (also see DEIS, page 25). The DEIS at 4.2.3.1 (page 88) notes that grazing in Zone 4 will continue to undergo Section 7 review and would not be affected by the proposed action. The inconsistencies between the various statements in the respective documents should be rectified. Neither the HCP nor the DEIS mention grazing prescriptions or restrictions in Zones 1 and 2 which contain portions of three grazing allotments. Since existing grazing use in this area is very light and does not overlap areas of habitat or known tortoise occurrence (elevations are above 4,000 feet), we believe that grazing elimination would be unjustified and inappropriate. Nonetheless, HCP/FWS intentions should be made clear, given the Recovery Plan language that grazing would be eliminated in DWMAs. 11-9

Specific Comments.

1. Page 11, paragraph 2. The DEIS states that "...the HCP's desert tortoise reserve (figure 1.3) encompasses the entire Upper Virgin River DWMA (which coincides with the Upper Virgin River Recovery Unit). Consequently, any reserves established as part of the HCP necessarily becomes the recovery plans DWMA for that area.". A total of 22,216 acres of the reserve would provide habitat for wildlife other than the desert tortoise. Much of this additional acreage (such as the portion on top of Red Mountain) 11-10

Responses to Comments

11-8. The HCP and EIS have been revised to clarify the grazing status of each Zone and the fact that Washington County, not the BLM, would purchase the grazing permits in Zone 3 on a willing-seller basis. Grazing allotments in Zones 1 and 2 do not include desert tortoise habitat and would stay as is. Grazing would be permitted in Zone 4 (see responses 8-1 and 10-3). USFWS maintains grazing should be removed from all DWMAs as called for in the Desert Tortoise Recovery Plan, and in that case, removal shall be through ESA section 7 consultation with BLM.

11-9. Washington County's proposal to offer compensation to current grazing permit holders complements eventual BLM removal of grazing within DWMAs. See response 11-8.

11-10. USFWS concurs that, in addition to the guidance provided in the HCP, criteria should be developed under informal and formal ESA section 7 consultation.

lacks habitat features and climatic conditions necessary for the desert tortoise. BLM believes that the automatic application of special prescriptions for the protection of desert tortoise in such areas is not warranted and suggest that zone managers have discretion as to whether or not the prescriptions are applied. Sound criteria could be developed to guide the use of such discretion. 11-10

2. Page 27. paragraph 1. The DEIS states that FWS will fund a five-year translocation study. BLM strongly recommends that to minimize and mitigate impacts and to promote full public disclosure, this paragraph be amended to state that if desert tortoises are to be relocated in Washington County outside the HCP reserve that these tortoises be classified as an experimental, non-essential population. This would ensure that areas outside the HCP reserve would continue to be managed under multiple use management and that these uses would not be jeopardized by the presence of new tortoise populations. 11-11

3. Page 28. 2.2.2.5. 2nd Paragraph. The term "worst case scenario" should not be used in EIS analysis. The proper procedure is to analyze the most reasonable foreseeable alternatives and impacts. Further, the term "worst case" calls for a subjective judgement. What is a "worst case scenario" to one group may be a great scenario to another group. 11-12

4. Page 45. 3.3.5. Opportunity Costs. This section discusses only opportunity costs of development. Are there not opportunity costs associated with losing desert tortoises or desert tortoise habitat? A discussion on substitutes for both houses and tortoises would be helpful. 11-13

5. Page 47. Paragraph 1. "Fully built-out, based on the development pattern currently existing in St. George..." may be a questionable assumption. Different build-out scenarios should be examined. Defining long and short run impacts is essential. How many years is short run? 11-14

6. Page 52. 3.6. Threatened, Endangered, Candidate, and Sensitive Species. A discussion of the Shem milkvetch (*Astratgalus eremiticus* var. *ampullarioides*) is missing and should be added to this section. 11-15

7. Page 57. 3.6.4. Woundfin. A discussion regarding the threat from the red shiner should be added to the 2nd paragraph in this section. 11-16

8. Page 76. Table 4.1 (as well as the other two tables). This table is confusing and in need of narrative explanation. Are these annual numbers? If not, how many years does it take to realize a "Total Lost Construction and Development Values" of $34 billion? Is there a loss of 95,000 people under the No Action Alternative or does it not allow 95,000 people to move into the county? 11-17

Responses to Comments

11-11. Subsequent discussions with BLM have resulted in the understanding that such a population classification is not consistent with section 10(j) of the ESA. USFWS and BLM are proceeding with appropriate environmental review for this action.

11-12. The change has been made in the FEIS.

11-13. These are opportunity costs for losing desert tortoises; however, the HCP proposes a reserve where others may prefer development. Therefore, the opportunity cost analysis is a loss of development.

11-14. While different build-out scenarios could result in different impacts regarding lost revenues, using the historical patterns was believed to be the best predictor of impacts. Short-run impacts are differentiated from long-run impacts by whether or not the area has been developed as explained in Section 4.1.1.1 of the DEIS.

11-15. The change has been made in Section 3.6.3.3 of the FEIS.

11-16. The change has been made in the FEIS.

11-17. Explanation can be found in Sections 3.3.5 and 3.3.5.1 of the FEIS.

9. Page 78. 4.1.4. Threatened....Species. This section should include a discussion of impacts to the Shem milkvetch (*Astragalus eremiticus* var. *ampullarioides*), a species which is currently under pressure from OHV use and residential development proposals. This is one of the most endangered species in the county. This discussion should be carried forward in each of the alternatives. 11-18

Summary.

The proposed HCP/DEIS was reviewed by personnel in the BLM Dixie Resource Area and the Utah State Office. If you have any questions regarding any of these comments, please contact Ronald Bolander in the State Office at 801 539-4065. He can provide any additional information that you made require.

Attachment
Addendum (1 p)

Responses to Comments

11-18. The change has been made in Section 3.6.3.3 of the FEIS.

Addendum.

Comments From Minerals Division in the Utah State Office. All of these comments pertain to the Draft EIS.

1. General Comment. The document notes that no mineral lands would be impacted by implementation of the HCP. If this is the case why is there a requirement to withdraw lands from mineral entry? 11-19

2. Page 49. 3.4.2.1. BLM Lands. Paragraph 1. Change 23,000 mining claims to 1,192 mining claims. This is the number currently registered with BLM for Washington County. 11-20

Change 460,000 acres to 22,800 acres which is the correct number of acres currently under mining claim status. 11-21

3. Page 86. 4.2.2.1. BLM Lands. paragraph 2. There are 3 mining claims located within the proposed reserve in T.41 S. R. 16 W. Section 24. If these claims are valid, they should have the right of access. 11-22

Responses to Comments

11-19. It is the intent of the HCP reserve management to minimize impacts to desert tortoise. Mineral withdrawal is consistent with reserve management and the HCP suggests in various zones that mineral claims be withdrawn and access removed.

11-20. The change has been made in the FEIS.

11-21. The change has been made in the FEIS.

11-22. The change has been made in the FEIS.

dt: wchcp/nepa (comments)

WASHINGTON COUNTY
Water Conservancy District

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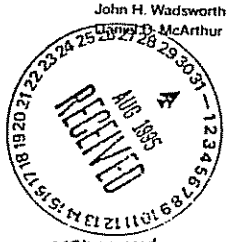
August 28, 1995



postmarked
August 28, 1995

Robert D. Williams
U.S. Fish & Wildlife Service
145 East 1300 South, Suite 404
Salt Lake City, UT 84115

Dear Mr. Williams:

Comments on the Washington County Desert Tortoise Incidental Take Permit Application/Documents are enclosed.

We appreciate the opportunity to comment and are willing to continue work with USFWS and Washington County to accomplish the objectives of the HCP.

Respectfully,

Ronald W. Thompson

Ronald W. Thompson

RWT/rm
Enclosure

August 28, 1995

WASHINGTON COUNTY WATER CONSERVANCY DISTRICT COMMENTS ON DESERT TORTOISE INCIDENTAL TAKE PERMIT APPLICATION/DOCUMENTS

I. FEDERAL FISH AND WILDLIFE PERMIT/APPLICATION

The application is inconsistent with the HCP and EIS. The HCP in Section 4.3, page 52, states that the incidental take permit is a wide-take permit so take may occur any where in the county outside the reserve. Also, in Section 4.5, page 89, the HCP states "the USFWS has accordingly recognized that the county's take permit is county-wide outside of the proposed reserve. The EIS in Section 2.2.2.2 states the incidental take permit would be a county-wide permit, therefore, take may occur anywhere in the county outside the established reserve. The application appears to apply only to the 12,298 acres of known tortoise habitat and is not a county-wide take application. 12-1

II. DESERT TORTOISE INCIDENTAL TAKE PERMIT APPLICATION/DOCUMENTS.

PART II: Proposed Washington County Utah Habitat Conservation Plan.

Section 1.7, page 11. There is ample circumstantial evidence that the desert tortoise is not native to the St. George area. The statements contained in this section that scientist who have studied the region have argued that the occurrence of the associated species and the diverse age structure of the population make it likely that the desert tortoise have been in this area for centuries is flimsy at best and ill-logical at worst. There are numerous areas where Gila monsters and side-winders occur where desert tortoise do not occur. Also, the historic 12-2

Responses to Comments

12. **Ronald W. Thompson, Washington County Water Conservancy District**

12-1. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The permit application references Section 4.1 of the HCP, which clarifies your concern.

12-2. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response:
Section 1.7: The discussion regarding the nativeness of the desert tortoise in the HCP remains as written.

evidence is that all age classes tortoises were brought into the area. There by, providing the all the classes which occurred on the Beaver Dam slope where the tortoises were transported from.

Section 2.1.1, page 16, states "researchers" agreed that within or adjacent to the populated areas of Washington County, desert tortoise population have declined due to road kills, depredation by dogs and degradation of habitat." There is no research on which to base this statement. Earliest known research work on desert tortoise in this area was done by Woodbury and Hardy and was entirely within the Beaver Dam Slope area. No reference was made to the St. George area by Woodbury Hardy. Changes or declines in population is speculation as no long-term population base has been established. The population may actually have increased or rather than declined. This statement about treads should either be documented or should be dropped from the HCP.

12-2

Section 2.1.6, references to the Woundfin and Virgin River chub should make it clear that there no impact whatsoever on these two species as a result of the proposed HCP.

Section 2.1.8, page 21, makes reference to the Bonneville cutthroat trout without noting that this species is not native to Washington County having been introduced in the Ash creek drainage in the mid-1980's.

Section 3.3.4.2, page 41, indicates management of zone 4 would be similar to zone 3 and other areas of the reserve, however, zone 4 north of the Virgin River contains no known tortoises. This zone should not be included in the HCP and if included, management should continue as at present until it is determined to be a translocation site and then management should be worked out accordingly, but should not be prejudged.

Section 3.4.1, page 47. refers to a protocol for water development in non-take areas. This

Responses to Comments

Section 2.1.1, p.16:	The statement in the HCP has been modified accordingly.
Section 2.1.6:	The HCP is clear on this point (see Section 7.6.2).
Section 2.1.8:	The proposed change has been incorporated.
Section 3.3.4.2:	The language in the HCP has been changed; however, Zone 4 is still considered to be an important component of the reserve.
Section 3.4.1:	The protocol has been included in the Final permit application/ documents.

protocol is not included within the HCP and is impossible to evaluate without its inclusion. Also, the last sentence indicates this protocol will apply to future Section 7 Consultation for utility projects. Section 7 Consultation is only appropriate where federal lands or funds are involved. This should be made clear.

Section 3.4.2, refers to the need for the HCAC to review flood control projects. It should be made clear what "review" means. Is "review" approve, disapprove or is it simply to review without any additional action. Review should only be necessary in take areas and areas now containing tortoises.

Section 3.5, page 48, refers to a road maintenance protocol which is not available within the documents.

Section 4.3, page 52, indicates the incidental take may occur anywhere in Washington County outside the reserve. Yet the application for a incidental take permit does not include the entire county only the area where incidental take was identified most likely to occur.

12-2

Table 4.2, page 55, Item 6 lumps the Harrisburg/Leeds Babylon area. This lumping is inappropriate since tortoises do not occur in the area east of Leeds and in the Babylon area north of the Virgin River. Areas which are not known to be existing habitat or historic habitat require special treatment and authorization by the Secretary of the Interior to be included. Such authorization if granted is not mentioned within the document.

Section 4.5, page 89, states that current desert tortoise survey protocol requires tortoise surveys in all areas of Washington County below 4,000 feet in elevation. It is not clear what protocol is being referred to here or how it got to be approved. It seems to be very arbitrary. The protocol should be available for public review and included in this document. If the protocol is in fact appropriate and requires surveys of all areas below 4,000 feet what

Responses to Comments

Section 3.4.2: The HCAC can not approve or disapprove actions, they can only make recommendations to the Washington County Commission. The HCAC would review proposed flood control projects to evaluate their consistency with the HCP. Formal approval of flood control projects lies with appropriate local, state, or federal agencies, not with the HCAC.

Section 3.5: The protocol has been included in the Final permit application/ documents.

Section 4.3: See response 12-1.

Table 4.2: "Lumping" was done for convenience of mapping. Desert tortoise distribution is inherently patchy, and other take areas include areas devoid of desert tortoises. The second and third sentences appear to refer to the designation of critical habitat, which is not relevant to the HCP.

Section 4.5: The protocol referenced is the USFWS protocol for desert tortoise surveys, and it is available. Potential habitat has been designated as part of the areas of Washington County requiring survey. The HCP has substantially reduced the survey requirement in Washington County to only areas of potential habitat and designated incidental take.

is the need to designate potential habitat? It serves no purpose if the area must all be surveyed anyway.

Section 5.2.1 Fencing, is very vague as to what type of fence will be constructed making it very difficult to understand what other impacts the fence might cause. Fences can be very destructive to the migration of certain animals and they also are a barrier to windblown material which would collect along the fence and becomes unsightly and a fire hazard. Gates are nice to talk about, but unless they are kept closed they serve no purpose and it is extremely difficult to keep a gate closed where there is much traffic. This is especially true of the Cottonwood road where the plan requires either a gate or fencing. Neither appear to be practical. Before deciding to there needs to be consideration of what the pressure is and the pressure is or the activity being excluded.

Section 5.2.2, page 95, this section anticipates the hiring of two full-time law enforcement agents. One with the BLM and one with the Division of Wildlife Resources. This appears to be gross overkill. It will make the proposed reserve one of the most intensively controlled unoccupied areas anywhere. Two full-time enforcement officers for a sixty thousand acre preserve, unless they are assigned other duties like fence maintenance is a waste of tax-payers money and money which could be better used in other management areas.

Section 5.2.4.1, page 96, calls for a study costing $750,000 on translocating desert tortoises in Washington County. It is hard to imagine what information is lacking that would require the expenditure of $750,000. Translocating of tortoises is ongoing in the Las Vegas area and other parts of the desert tortoise range and is no mystery. This information from other areas should be used and the study drastically reduced to around a $50,000 range. The $1,000 per month designated to temporarily handle desert tortoises should include ample money to

12-2

Responses to Comments

Section 5.2.1: The HCP specifies what the objective of fencing is for certain areas. It will be the responsibility of the HCAC to review specific fencing plans to ensure other potentially adverse impacts are minimized. The same is true for areas identified for gating.

Section 5.2.2: This was the decision of the HCP Steering Committee.

Section 5.2.4.1: The $750,000 was an estimate prepared by the USFWS for the cost of the study.

handle research needs.

Section 5.3.3, page 99, allocates $1,250,000 for monitoring. It would appear that the people who would be employed to do this monitoring could also do the law enforcement and other maintenance efforts, thereby eliminating a significant expenditure of money for law enforcement and maintenance.

Section 5.3.4, on page 99, calls for the acquisition and retirement of four grazing allotments with the statement that grazing will not be permitted until a definitive study of livestock and desert tortoise interrelationships has been completed, which demonstrates that livestock grazing is consistent with reserve management objective. No funds are allocated for this study and it would be impossible to do a study of the interrelationships of tortoise and livestock if there is no livestock. Grazing should be continued at the present level within these four allotments while the study proceeds.

Figure 6.1, page 104, shows an organizational chart which indicates that Washington County commission falls directly under the supervision and administration of the US Fish and Wildlife Service. We doubt if this is what the Washington County Commission had in mind when they agreed to sign on to the HCP.

Section 6.6, page 113, indicates that surveys are required on potential habitat areas, but does not indicate the frequency of these surveys. Is this a one time survey or is this necessary to make a survey everytime someone goes out there and does something. We recommend this be a onetime survey. Also this section indicates that tortoise surveys and removals will only be scheduled during certain times of the year and that because biologists may be busy that HCAC may recommend that the county commission establish a fee to cover additional costs of processing and temporary desert tortoise shelter. The two full-time law enforcement

12-2

Responses to Comments

Section 5.3.3: See responses to Sections 5.2.2 and 9.0

Section 5.3.4: This was the decision of the HCP Steering Committee.

Figure 6.1: This has been corrected.

Section 6.6: This is a one-time survey, prior to development only. At this time, it is not anticipated that the two law enforcement personnel will conduct survey and removal of desert tortoises. Placing a time limit on the validity of surveys is believed to be necessary due to changing conditions. This may result in premature and unneeded grading to avoid resurvey; however, this is permitted as long as the conditions of the HCP are followed. The wording regarding the misdemeanor has been corrected to state that landowners are responsible for having their property surveyed by a biologist. The desert tortoise survey protocol is available from Washington County and the USFWS.

individuals should be trained to be able to do surveys and handle tortoises for relocation. Later this same section indicates that surveys will only be good for 60 and 90 days without indicating which type of area. It should be made clear that this is only in the incidental take areas as defined in this section. Putting a short-time limit on these authorizations is a sure formula to bring about premature and unneeded excessive grading to avoid having to resurvey. Also this section indicates that city/county ordinances will be amended to state the landowner who does not perform surveys will have committed a class B misdemeanor. It is not the landowner who will be performing the survey it is the HCP biologist. If ever included in an ordinance, it should be clarified as to what the intent is. Also this section repeatedly refers to a US Fish and Wildlife Service protocol without any information as to what this protocol is, it should be included within the document and made available to landowners and to the public prior to approval of this plan.

12-2

Section 6.7, Incremental Implementation provides for an annual cap of 625 acres. There is no information as to why this cap is applied and there seems to be no justification for it. If the reserve is created in one or two years then the incidental take areas should be immediately available thereafter.

Section 6.8, Plan Amendments provides for amendments after approval by the commission to be submitted to the US Fish and Wildlife Service for approval. The Fish and Wildlife Service will then determine whether a public hearing will then be necessary or whether the amendments are approved or denied. If denied the commission may request an administrative or judicial review of the US Fish and Wildlife Service decision. At present there is no administrative process for review of Fish and Wildlife Service decisions. Fish and Wildlife Service should be required to provide for such an administrative review, if the

Responses to Comments

Section 6.7: The cap has been removed.
Section 6.8: The amendment procedure has been revised.

plan calls for it and is approved. This section provides for any party to the HCP to request an amendment if the a new species is listed under the act. This puts the entire HCP in jeopardy everytime a new species is listed. This is a serious flaw in the plan. The listing of a new species can not be used as justification to disrupt the entire HCP plan and process. This requirement should be eliminated from the HCP.

Section 6.9, covers activities anticipated to permitted by the incidental take permit. The list should include water management and conservation projects.

Section 6.10, on page 120, indicates Ivins is the only city which has agreed to sign the implementation agreement. There is no indication of what will happen if the cities do not sign the implementation agreement. It is our understanding, LaVerkin has already indicated that it will not sign.

Section 7.1.2.1, indicates the estimated take would be 1,186 animals. This is incorrect, because most of the animals are intended to be translocated. The actual take will undoubtedly be far fewer than this number.

Section 7.1.2.3, on page 125, indicates the habitat connecting link between the Beaver Dam slope and this upper Virgin River group is unknown. This is incorrect. The dispersal link is well known. These tortoises were carried from the Beaver Dam slope by man into adjacent communities and dispersed out from there.

Section 7.1.2.3, on page 125, refers to the Virgin River providing a barrier between zones 4 and 5. This is true. The Virgin River does limit the northern movement. And in fact, there are no tortoises north of the Virgin River. Zone 4 should not be included in the HCP. The only possible way for gene flow across the Virgin River would be by the tortoises being physically carried across the Virgin River and introduced into the area.

12-2

Responses to Comments

Section 6.9: Water management and conservation have been added.

Section 6.10: This has been clarified in the HCP.

Section 7.1.2.1: The actual number of desert tortoises killed is expected to be far less than 1,186. However, the estimated "take" allowed under the Section 10(a) permit, using the legal definition, is a maximum of 1,186. Any animal cleared and moved by Washington County under this permit would be considered "taken."

Section 7.1.2.3: While many people maintain that many desert tortoises were transported from the Beaver Dam Slope to the Upper Virgin River DWMA, the USFWS and the Desert Tortoise Recovery Team believe that desert tortoises were native to this area prior to their being translocated. Zone 4 is included in the reserve area as its habitat characteristics are considered suitable for desert tortoise, and it may make a good translocation site.

Section 7.1.2.4, on page 129, states, "to date live desert tortoise have not been found in this area and that it violates reserve design criteria because it lacks a target specie as well as having a number of inholding." Zone 4 should be deleted for these reasons from the projected reserve. If included, it should be designated an experimental area only and the tortoises translocate there not fall under the restrictions of the Endangered Species Act.

Section 7.5.2, on page 135, notes that the HCP should not affect waterways or riparian habitat. Yet the next section (7.5.3, same page) calls for a comprehensive inventory of distribution of status of the Southwest willow flycatcher. If there are no impact on waterways or riparian habitat and this is where the willow flycatcher is, then a comprehensive inventory is not needed.

Section 7.6.1, on page 136, indicates that sports fishes introduced from Quail Creek Reservoir as well as the invasion of parasites pose a threat to the continued existence of the woundfin. Quail Creek Reservoir has not been the source of the introduction of sports fishes or disease into the river. This entire description of potential affects of Quail Reservoir should be deleted from the document, since the HCP has no affect one way or the other nor does Quail Creek Reservoir have any affect one way or the other on the desert tortoise or other protected species intended to be covered by the plan. This is clearly stated in Section 7.6.2, page 136, where it states it is anticipated there will be no adverse impacts to the population of woundfin and Virgin River chub thus producing no additional threat to the survival of these species. This statement should be left as is and the rest of this section plus Section 7.6.3 should be deleted.

Section 8.2.1, on page 139, with the heading species which may be listed as threatened or endangered within the foreseeable future, lists the Virgin spinedace. This information is out

12-2

Responses to Comments

Section 7.1.2.4: See response 11-11.

Section 7.5.2: The comprehensive inventory is intended to provide information regarding the status of southwestern willow flycatcher, it is not intended to determine impacts from development. The inventory information could be used in developing projects or actions which could benefit this listed species in Washington County.

Section 7.6.1: Thank you for your comment; however, the HCP wording has been left as is.

Section 8.2.1: Status of the Virgin spinedace has been updated. A conservation agreement for the Virgin spinedace was signed by the Utah Division of Wildlife Resources, USFWS, BLM, and the National Park Service. This agreement calls for conservation actions to be implemented for the management of this species. With the signing of this document, the USFWS expects that the resulting proposal to list the Virgin spinedace as a Category 3c species will be published in the near future. Information on the Shem milk-vetch provided in the HCP has been updated. Regarding the Bonneville cutthroat trout, the description in the HCP does not imply that it is native. And for the lowland leopard frog, all of the available information is provided. The purpose of this section is to provide information on any and all candidate and sensitive species that may occur in Washington County.

of date as the proposed listing of spinedace has been withdrawn as a result of the Spinedace agreement. Any discussion of the spinedace should note this fact. The life cycle of the Shem Milk-vetch should note for its survival it must have some soil disturbing activity. Creation of a preserve would be detrimental to its survival. The same is true of the Holmgren Milk-vetch. The Bonneville cutthroat trout is not native and the head waters of the Virgin River is not historic habitat for it. Mention of it should either indicate this or it should be deleted from the discussion. The Lowland Leopard frog, should be deleted from the discussion since according to the document nothing is known of its distribution or status in Utah.

Chapter 9.0, entitled "Discussion of Water Impacts on Endangered Fish", is inappropriately included within this HCP. This section notes the desert tortoise is the focus of the HCP and is a terrestrial species and its habitat nexus lack any needs to aquatic species instream flows or pools of water to survive. This discussion if it is to be included in the HCP it should be entitled "Additional Protection Efforts by Washington County to Protect and Enhance Endangered Species."

Section 10.2, on page 172, indicates the "No Development in Tortoise Habitat" alternative would not result in any effective conservation measures in this recovery unit. It should be added that since this is the only mechanism in the endangered species act for protection of endangered species. It is essential to have a cooperative effort (HCP) by local people to effectively protect endangered or threatened species.

Section 10.3, notes the value of the land within the tortoise reserve is approximately $200,000,000. This is the cost of protecting Desert Tortoise on Washington county and should be used when evaluating the economic costs.

12-2

Responses to Comments

Chapter 9.0: The Chapter has been left as is.
Section 10.2: This is clear from the introduction of the HCP.
Section 10.3: The economic impacts of the alternatives are discussed in detail in the EIS.

III. ENVIRONMENTAL IMPACT STATEMENTS FOR INCIDENTAL TAKE PERMITS ISSUANCE FOR DESERT TORTOISE WASHINGTON COUNTY, UTAH

The first page which is unnumbered of this document, indicates 12, 298 acres of take. This is incorrect. 12,298 acres will be excluded from the preserve, however, it does not mean that all of these acres will be impacted by activities contemplated at this time. Take can only be stated in animal numbers. 12-3

The executive summary page "iv", discusses issues eliminated from further analysis among which were whether desert tortoises were native to St. George area. This discussion should not have been eliminated from analysis, had it been included it would have brought some proper perspective to the discussion and allowed meaningful analysis of what is and has happened to this population. Also since atomic fall out is regarded by many scientists as the single most important recent factor in the status of desert tortoise populations in this area, it should have been included. Its exclusion constitutes a major flaw in the analysis making it inadequate and invalid. Major issues to be analyzed, includes as item number 7 "Impacts to the Virgin River Flow". Since the HCP in Section 9, page 169, specifically says that there is no nexus to aquatic species, instream flows or pools of water. Since this has already been clearly established, this should not have been included as a major issue and analyzed in the document. It should have been dropped from discussion along with the other items not included for analysis. The Executive Summary section alternatives including the proposed action, again refers to 12,298 acres of take of desert tortoise habitat and 11,832 acres of potential habitat. This is incorrect, there will not be a take of this many acres. Take as defined would have to be identified as numbers, not acres. If there is to be a discussion of

12-4

12-5

12-6

12-7

Responses to Comments

12-3. The term "acres of take" refers to acreage in which incidental take of desert tortoise will be permitted.

12-4. See responses 2-1, 11-2, and 12-2.

12-5. See response 15-8. The issue is, therefore, outside the scope of the FEIS.

12-6. The author, like Washington County, has maintained that there will be no adverse impact to fishes as a result of issuance of the incidental take permit. While this issue of impact continues to be a point of discussion with USFWS, as called for in Chapter 9 of the HCP, USFWS and others are in the process of developing the *Virgin River Basin Integrated Resource Management and Recovery Program*. A Memorandum of Understanding was signed on October 19, 1995, in which parties, including the author, agreed to develop a program within 6 months that will provide for recovery of Virgin River fishes and meet future human water needs. The Management and Recovery Program time frame will not affect implementation of permitted actions under the Washington County HCP but is intended to address water development needs and Virgin River Basin conservation.

12-7. See response 12-3.

take in terms of acres, then there must clearly indicate that it will be years if ever before the area included in a take would ever be impacted and would remain indefinitely available. 12-8

This same section on page vi, indicates the total cost of the HCP would be $11,555,000. The total cost would be far higher than this since it does not include all the proposed fencing required by the client. This cost which has been shifted to the landowners should be estimated and included in a total cost. 12-9

The executive summary under "Landownership Use and Management", on page vii, indicates major uses of federal lands, but does not include grazing, which should be included. 12-10

Also this same section indicates that recreational opportunities are only important because of the scenic beauty of lands adjacent to Zion's National Park. This is an incorrect statement and either should be deleted or qualified to indicate that many recreational opportunities exist, irregardless of Zion National Park. 12-11

In this same section, there is a discussion of five special recreational management areas on BLM's land within Washington County. Apparently this is a proposal coming from the proposed Dixie Resource Management Plan which is not available to the public for analysis. Since it is not approved or available references to it should not be included within this Environmental Impact Statement. 12-12

On page xii of the executive summary under agricultural resources it sates no farm lands would be impacted by the proposed action or other alternatives, this is not true, as pointed out in the HCP, the county and cities have invested a great deal in infrastructure to develop the area to be included in the desert tortoise reserve. By creating this reserve and eliminating this development in this area, growth has been directed from this area onto the farm lands and has accelerated their elimination from agricultural protection. 12-13

These comments cover through page vii of the Executive Summary.

Responses to Comments

12-8. An incidental take permit does not imply that the permitted amount of take must be accomplished within a certain time frame, but simply states the time frame during which incidental take is permitted. See response 15-9.

12-9. Cost of fencing to be borne by entities other than Washington County is included in Table 6.3 of the HCP.

12-10. The change has been made in the FEIS.

12-11. The change has been made in the FEIS.

12-12. The language has been changed to address this situation.

12-13. Development of agricultural lands is a function of economics that is at the discretion of the landowner, and not a direct result of the permit issuance.

Table ES-3, on page viii, lists four grazing allotments that could be impacted by the action alternative. This table is incomplete. There are other allotments that would be impacted, particularly in the area north of the Virgin River in Zone 4. 12-14

Water Resources. The HCP specifically notes that there is no impact on water so the discussion of water is unnecessary and misleading since it would lead one to believe that water is effected as one of the alternatives when this is not true. This section should simply state that there is no effect on water and leave it at that. 12-15

Wildlife Resources, page ix, the EIS notes that riparian areas, primarily along the Virgin and Santa Clara Rivers, provide habitat for a variety of wildlife species. This should include the statement that they riparian areas are not effected by any of the alternatives proposed in the HCP. 12-16

Section 1.2, on page 2, notes the decline of tortoises was due to a number of factors including habitat degradation, mortality from human contact, predation and upper respiratory tract disease. However, it neglects to note that many scientists and researchers feel that atomic fallout from the testing in Southern Nevada was the greatest factor in the decline of the Beaver Dam slope population but had much less effect on the St. George populations which is the basic reason why they are in better condition than the Beaver Dam slope population. Neglecting to include and analyze fallout constitutes a major flaw in the entire analysis and must be corrected or the EIS will be found inadequate. 12-17

Section 1.5.1, begins with the statement that the scientific community and long time residents of Washington County disagree over the origin of the desert tortoise in the area. This would lead one to believe that none of the local residents are scientists or researchers. This is not true. During the public hearings many Ph.D's and other people familiar with the 12-18

Responses to Comments

12-14. Table ES3 identifies grazing allotments in Zone 3 that Washington County has proposed to purchase. While there are other allotments in Zone 4, Washington County is not currently proposing to purchase those allotments.

12-15. Water resources was an issue identified by the public during the scoping process for the DEIS, and therefore must be addressed. See response 12-6.

12-16. The paragraph referenced is a discussion of existing environment; conclusions about effects of alternatives are therefore inappropriate.

12-17. See responses 15-8 and 12-5.

12-18. See responses 2-1, 11-2, and 12-2.

situation from Dixie College and Southern Utah State University testified that the tortoise were not native to the St. George/Hurricane area. This is a very one-sided version of the true situation and should not have been just brushed off. Without this evaluation of where the tortoises came from and how they have thrived in this area since being introduced, the entire analysis comes into question. The fact that associated species such as gila monsters and sidewinders occur here is not necessarily an indication since they occur many places where tortoises do not occur. Also, the diverse age structure is not valid because the local people brought in all age classes from the Beaver Dam slope. Some tortoises were introduced more than 100 years ago, which would have allow a diverse age structure to be established even if it had not existed. Regardless of the proof of the matter, the EIS should have considered this and analyzed what possible effects this would have had, had they not been native.

12-18

Non-historic range is treated much differently under the ESA than is historic range and would have caused a great deal of difference in the level of protection required. Without this analysis, the EIS is inadequate and unsatisfactory and should be redone.

Section 1.6, Major Issues to be Analyzed, lists impacts to the flow of the Virgin River yet the HCP and EIS makes clear that there is no nexus or impact on the flows in the Virgin River in any alternative. The executive summary under Socio-Economics on page ix and x makes the statement that the alternatives would not alter the way of life for the residents of Washington County and the population would continue to grow and outside social and economic forces would continue to effect the communities with or without the HCP.

12-19

Also, under **Alternative B, Water Resources,** page xiv, of the Executive Summary notes that any changes in water usage over the next 20 years is considered to be independent of the

12-20

Responses to Comments

12-19. See response 12-6 and 12-15.

12-20. See response 12-6 and 12-15.

actions of any of the alternatives, including Alternative B. This is because water use is a function of population and the population of Washington County is anticipated to increase at the same rate regardless of which alternative is implemented. Given these statements, how can impacts on water flows in the Virgin River be considered a major issue. This should be deleted from the document and there should be no analysis of water except to note there is no nexus or impacts. 12-20

Section 1.7.1.2, on page 13, states that the proposed HCP is consistent with the BLM's current management plan, the Virgin River Management Framework Plan (MFP) approved in 1981. This is not true. The 1981 plan only considered tortoises to exist or be threatened on the Beaver Dam slope and did not consider the upper area around St. George as habitat for the tortoise. Also this same section states that if the HCP is approved before the revised RMP goes into effect, then the existing MFP will need to be amended. If the HCP is consistent with the current MFP then there is no necessity to revise it. Obviously, the first statement of consistency is incorrect. 12-21

Table 2.1, Amount of Desert Tortoise Habitat in the Incidental Take Area, lumps Harrisburg, Leeds, and Babylon together. These are not similar areas since the Babylon area and the area east of Leeds does not now contain tortoises. This lumping makes it appear as if there were tortoises in the entire area, which is not true. 12-22

Table 2.2, page 22, Zone 4 indicates 5,191 acres of desert tortoise habitat. Since there are no tortoises in the area it is not yet known whether this is tortoise habitat or not. It should have only been listed as potential habitat. 12-23

Section 2.2.2.3, under Zone 3, on page 25, states that water development should be allowed consistent with HCP Appendix G protocol. There is no Appendix G and the protocol is not 12-24

Responses to Comments

12-21. The change has been made in the FEIS.

12-22. See response 12-2 (Table 4.2).

12-23. The description of Zone 4 has been changed in Table 2.2

12-24. See response 1-5. Washington County has proposed public restriction from reserve access from Skyline Drive other than at designated trails. Access to the reserve from other areas along Skyline Drive may be allowed by the zone manager for purposes of desert tortoise reserve management.

available for inspection. Also, this same section has as the last item that no general public access would be permitted along Skyline Drive into the reserve except on designated trails. What would be "general public access" and who would be restricted and who would be allowed? 12-24

Under Zone 4, vehicles should be restricted to designated roads only and should also include trails. 12-25

Section 2.3, page 35, has a comparison of alternatives matrix which includes water resources. The treatment of water in this table is incorrect. Alternative A states water usage will increase as the population increases. This is obviously a true statement but irrelevant. It should have stated instead no impact would be expected as the EIS is analyzing the HCP alternatives not population growth. 12-26

Section 3.2, page 37, lists resources eliminated from further consideration. Water should also have been eliminated since there is no impacts on water from the various alternatives. 12-27

Section 3.2.3, Cultural Resources, does not analyze the effect of fencing on cultural resources within the area. This should have been included as fencing will have a major impact on these resources if encountered. 12-28

Section 3.6.4, page 57, indicates that flows from Quail Creek Reservoir maybe contributed to the loss of woundfin and other native fishes. This statement is speculative and unsupported and should not have been included. Flows from Quail Creek Reservoir have been found to be supportive of native fish and enhancing rather than contributing to the loss. Also it indicates the introduction of sports fishes from Quail Creek Reservoir as well as the 12-29

Responses to Comments

12-25. The FEIS is consistent with the HCP.

12-26. See response 12-6 and 12-15.

12-27. See response 12-6 and 12-15.

12-28. In order to construct fencing, all Federal and State laws protecting cultural resources must be followed.

12-29. The comment has been addressed in the FEIS.

invasion of parasites pose a threat to the continued existence to the woundfin. Quail Creek Reservoir has not introduced sports fish into the river that were not already there. This too should be deleted from the document. 12-29

Section 3.6.24, page 62, Virgin Spinedace, again makes no mention of the spinedace agreement making the write up totally out of date and unresponsive to the current situation. 12-30

Section 3.7.2, page 66, Groundwater, contains numbers from various documents but does not indicate there is no effect from any of the alternatives on the groundwater resources, giving the impression that some of them would. This should either be noted or any discussion of groundwater deleted from the document. 12-31

Section 3.7.4, page 68, water rights, has no relevance to any of the alternatives and should be deleted from the document, along with Section 3.7.7, water development potential. 12-32

Section 3.7.7.4, instream flow requirements, indicates that the biological opinion issued for the Quail Creek Dam stipulates that either a natural flow or a minimum flow of 86 cfs must be maintained in the Virgin River below the Dam for all months of the year. This is an incorrect statement. What the opinion says is that 86 cfs or natural flow of the river will be maintained below Quail Creek Reservoir to satisfy the water rights at the Washington Fields Diversion. There is no need to include a lengthy discussion of water, water rights, instream flows or riparian areas as they are not affected. 12-33

Section 4.1.1, page 75, begins with the statement that the no action alternative will not alter the way of life for the residents of Washington County. Population will continue to grow and outside social and economic forces will continue to affect communities. If this 12-34

Responses to Comments

12-30. Status of the Virgin spinedace has been updated in the FEIS.

12-31. See response 12-15.

12-32. See response 12-6 and 12-15.

12-33. The comment has been addressed in the FEIS.

12-34. The change has been made in the FEIS. The change has also been made to the Executive Summary of the FEIS.

alternative were adopted present restrictions on habitat alteration would continue to apply in those areas with desert tortoise habitat. It is very frustrating to continue to read this statement, lengthy discussions of water upon which there is no impact and the statements that there is no impact upon agricultural resources, when all through the document it is obvious that there are such impacts. This whole discussion of social economics and water is out of context, misleading, arbitrary, capricious and makes the EIS inadequate. 12-34

Section 4.1.4.4, page 80, states under the proposed alternative that increased ground water pumping or other actions that would potentially affect threatened or endangered species would be subject to Section 7 Consultations with the USFWS. It should be noted that Section 7 Consultation is only required and appropriate on federal land. 12-35

Section 4.1.5, page 83, again launches into a discussion of water resources without any appropriate need. It notes that over the next 20 years, development will occur at the same rate in the county regardless of whether or not the HCP is implemented and the take areas are made available for development. This section on water resources is not appropriate for this document and should be deleted. 12-36

Section 4.2.4.4, page 94, also should note that only on federal land would a Section 7 Consultation be required. 12-37

Section 4.2.5, page 96, again refers to water resources, when there is no affect on water resources. It should be deleted from this alternative as well. 12-38

Section 4.3.4.4, page 101, indicates that development of additional wells will be subject to Section 7 Consolation with the FWS, this is true only on federal land and there is no need to 12-39

Responses to Comments

12-35. ESA section 7 consultation is appropriate for Federal actions, whether or not on Federal land.

12-36. See responses 12-6 and 12-15.

12-37. See response 12-35.

12-38. See responses 12-6 and 12-15.

12-39. See responses 12-6, 12-15, and 12-33.

include such a statement in the document. It also states, "if instream flow requirements are reduced elimination of zones 1 and 2 from the reserve and conversion of state and private lines within these zones to take areas would make more land available for development in Washington County. The instream requirements has nothing to do with the elimination of zones 1 and 2 from the reserve or the conversion of state and private lands to take areas. This reference to instream flows requirements is misleading and inappropriate and must be deleted. 12-39

Section 4.3.5, Water Resources, page 105, should either be deleted or indicate that there is no effect on water resources from any of the alternatives, including A, B and C. 12-40

IV. DRAFT IMPLEMENTATION AGREEMENT

Page 1, under "I. Definitions." defines the term biological opinion to mean a biological opinion issued by the Fish and Wildlife Service as a part of Section 7 Consultation, but does not include a draft copy of this biological opinion. It is not possible to analyze the effect without seeing what the biological opinion is going to propose at this point. 12-41

Section V.A.1., "Exchanges", refers to the Memorandum of Understanding between the State of Utah and the BLM is found in appendix E of the HCP. The is no appendix E and this memorandum of understanding is not included or available for evaluation.

Responses to Comments

12-40. See responses 12-6 and 12-15.

12-41. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The Implementation Committee decided on the wording in the Implementation Agreement. They believed that since the incidental take impact on desert tortoise was forever, then the reserve should exist in perpetuity.

Section V.A.C., lists plans to be prepared following permit issuance. Included among these plans in the Washington County Water District Virgin River Habitat Conservation and Management Plan. It should be made clear what affect, preparation or non-preparation of this plan would have on approval/non-approval or implementation of the Plan. Approval of the plan as envisioned would provide additional benefits to various wildlife species, but is not a requirement of any of the alternatives.

Under Section V.F., Fencing, page 10, requires fencing by landowner/developers, but does not specify what type of fence would be required. This is a serious defect in both the plan, environmental assessment and the agreement, since the cost of these fences and the type of construction is very important to the final acceptance of the plan.

Section V.L., page 14, indicates that Fish and Wildlife Service and BLM intend to fulfill their responsibilities, but only if they receive financial resources, which is necessary on their part. It should also indicate what would happen to the plan if they do not receive adequate financial resources. There should be an escape clause for all concerned without destroying the whole utility and momentum of the HCP. 12-41

Section V.O., page 15, places an annual cap of 615 acres on release of lands within the take areas, since there is no identified areas of the release cap it should be deleted.

Section V.Q., unforeseen circumstances, on page 16, provides for the county, upon notice, to be relieved of any and all obligations to provide further mitigation or compensation is provided in this agreement. It should in addition specify what credit and how such credit would be allowed for work already completed under the agreement.

Section V.S., page 17, Duration of Reserve, refers to the lands placed in the reserve remaining in protective status in perpetuity. The reference to perpetuity should be deleted retaining only the statement that it will be in effect so long as protection is required to meet the requirements of the Endangered Species Act. 12-41

dt: wchcp/nepa (comments)

August 28, 1995

Robert D. Williams
U. S. Fish and Wildlife Service
Utah Field Office
145 East 1300 South, Suite 404
Salt Lake City, Utah 84115

postmarked August 28, 1995

Subj: ES/TE/Habitat Conservation Plan --Washington County, Utah
Mail Stop 60120

Dear Preparers:

The writer makes the following comments and observations of material presented in Parts I through IV inclusive of the Washington County, Utah, Desert Tortoise Incidental Take Permit Application/Documents.

In Parts II and III "Fire Fighting Should Be Allowed" should be stated under management recommendations for Zones 1 and 2. This may prevent delays in trying to obtain a permit to access the reserved area to fight an ongoing fire. 13-1

In the copy of Part II Page 51 Paragraph 2 there is a reference to - "(see footnote on page 25)" No Page 25 was found. Was the footnote placed on Page 23? The copy received does not have a numbered page 24, 25, or 26. It is assumed that Figure 3.1 Proposed Reserve Boundaries should be Page 26. 13-2

Geographic names like Buckskin Canyon, Paradise Canyon, Padre Canyon are not listed on any of the enclosed maps. The general area can be determined only by the Zone in which they occur. It is suggested that geographic names used be identified as to location and depicted on a larger scale map. 13-3

It would also aid the reader if Township and Ranges were placed on the respective figures illustrating the Zones and Zone Maps.

On Figure 3.7, Page 49 of Part II a water line connects the wells in Snow Canyon to the St George-Ivins systems. Existing water lines and wells in the Hurricane vicinity are not illustrated on the map. 13-4

Responses to Comments

13. Private party

13-1. USFWS recognizes the need for fire suppression and also supports the Desert Tortoise Recovery Plan recommendation of aerial suppression as the primary method in DWMAs. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: This has been corrected.

13-2. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: These have been corrected.

13-3. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: A larger scale map has not been included due to cost and copying difficulties. The use of geographic names has been minimized in the Final. Township and Ranges have been added to zone maps.

13-4. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The figure depicts only a sampling of utility corridors.

In Part II Page 99 Paragraph 5.3.3 Reserve Monitoring. It is suggested by the first sentence that there are negative population trends in the Washington County area. This writer did not find documentation for this suggestion in Part II or Part III nor in the DDTRP. It is recommended the first sentence be changed to read -- Reserve Monitoring will emphasize research aimed at understanding whether the population is increasing or declining and the causal factors for the identified trend. The same change could also be made in Part III Page 27 Paragraph 5 - Monitoring Measures include:. 13-5

In Part II Pages 103 through 112 information is developed concerning the Permit Administration. It appears to this writer that the budget proposed will exceed potential funding. For example. Table 6.2 Revenue Projection , indicates a Total Fees Generated as $9,410,974. It appears that the listed amounts are the actual dollars received in the years illustrated. However, in Table 6.4. Non-discretionary Budget Items the amounts, listed in constant 1994 dollars, show an expenditure of $9,400,000. Inflated at a rate of 4% per year the amount of revenue required for the HCP will exceed $13,500,000.

It does not seem likely that a 4% annual raise would suffice to retain an Administrator or Biologist. The $20,000 per year allocated for Office and Travel appears to be inadequate to cover preperation of required reports and travel cited in the responsibilities of the Administrator and Biologist.

On Page 107 of Part II Pagragraph 6.3.2 Quarterly Reports - Surveys Conducted. Align the last work "Survey" to indent line under the word Owner.

13-6

Under Blood Work: One option for tortoise desposition is "Euthanized". It is understood that any URTD infected or diseased animal should not be translocated. However, how about using them for research on a possible treatment or to aid in the development of a vaccine to prevent the disease.

On Page 113 of Part II Paragraph 6.6 Incidental Take Process, contains some time line constraints applicable to activities in the take areas. For example, survey protocol and removal are scheduled during active periods for the tortoise. Also the review process and potential re-survey could delay a project for five to six months.
Question: Are the local residents and contractors aware of the time constraints imposed by the HCP?

The last paragraph on Page 113 of Part II is repeated in the sixth paragraph on Page 115 with only the "The" at the end of line four added. Also on Page 115 the first paragraph is repeated as the last paragraph with a minor change in line four of the respective paragraphs. Line four top paragraph "---landowner) will remove the desert tortoises ---" and line four bottom paragraph reads - " --landowner) will conduct the removal of desert ---".

Responses to Comments

13-5. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: This change has been made.

13-6. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Regarding the budget, it is expected that inflation will raise costs and revenue proportionally. Budget reallocations may become necessary to maintain qualified staff; this will be the responsibility of the HCAC. Regarding euthanized desert tortoises, they could become available if the USFWS permitted their use in research. Washington County recognizes that the survey time frames may cause constraints for builders. Washington County urges all contractors and developers to plan in advance, and Washington County will work with them to ensure that delays are minimized. Other corrections noted in this comment have been made. However, the cap has been removed, and the acreages have been corrected.

In Part II and Part III the proposed reserve land is shown to be 60,969 acres. It does not appear that this total reflects the acreage that will be added under provisions for habitat acquisition, cited in Paragraph 6.7 on Page 116. "For habitat acquisition, an acre of take will be released for every 2.299 acres acquired within the reserve subject to an annual cap of 625 acres." Assuming the cap of 625 acres/year times 20 years equals 12,500 acres times the factor 2.299 acres/acre equals 28,738 acres minus the 12,500 acres released equals 16,238 acres, or an added 25.37 square miles.
The total reserve acres at the end of 20 years would be 60,969 plus 16,238 acres for a total of 77,207 acres or 120.64 square miles. 13-6

As an interesting note: The area of 120.64 square miles proposed in the reserve for the tortoise in Washington County is circa 9.67% the size of the State of Rhode Island.

In the DDTRP it is recommended the Upper Virgin Recovery Unit should include 70 to 90 square miles. In the HCP plan the area of over 120 square miles exceeds this recommendation by 150%. 13-7

In the copy received, page 138 in Part II is blank. 13-8

Sincerely,

cc: Ivins Mayor Christopher Blake

Responses to Comments

13-7. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: This is true.

13-8. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: This has been corrected.

dt:wchcp/nepa (comments)

Postmark: 28 Aug. 1995

August 28, 1995

US Fish and Wildlife Service
Attn... Bob Williams

Dear Sir:

This letter is to let you know that I am opposed to locking up the area between LaVerkin and Leeds in Washington County for Tortes habitat, and especially closing this area to motorized travel. Many are the families I know of who use this area for Easter and other recreational outing and have done so for years. I have been in this area many times during my lifetime (50 years) and I have yet to see a Tortes in this area. It is also an area I hunt deer in, and that is what makes me so upset is to think I will no longer be allowed to drive into this area. I am not so much opposed to it being set aside for the worthless Tortes! But I think I still should be allowed to drive into this area on one of the many roads that exist there and have been for a hundred years. Here's hoping you will use a little common sense and allow motor vehicle travel at least on the established roads in the area. 14-1

Sincerely,

Responses to Comments

14. Private party

14-1. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The area in question appears to be Zone 4, which is currently managed by the BLM. Management Regulations recommended in the HCP for Zone 4 permit hunting and vehicular use of designated roads.

dir: wchcp/nepa (comments)

August 28, 1995

FAX # 801-524-5021
Robert D. Williams
U S Fish & Wildlife Service Field Office
145 East 1300 South, Suite 404
Salt Lake City, Utah 84115

Dear Mr. Williams:

We have been reading a copy of the Washington County, Utah Desert Tortoise Habitat and Permit Application / Documents Consisting of Four Parts in One Bound Volume (herein after called "Report") and have the following comments. (This was a hurried reading because we did not know of the availability of the Report nor where to request a copy until August 18th and did not receive it until the 21st)

1. On pages 44-46 of Part II, in the Discussion, Figure 3.6 and Table 3.6, some 20 ± acres we own on the North side of the Virgin River were NOT included in the proposed Reserve (T41S R13W, Section 27, tax #3303-B-NP). It has always been our understanding that this 20 acre parcel would be among the property we would be exchanging for other BLM property which we have previously identified for the in-state exchange. If this 20 acre parcel is not included, it will be left landlocked, and we will be without a legal access. Including this 20 acres will provide for a more biodiverse habitat in the Reserve. 15-1

2. A problem not yet addressed by the Report is that of Greenbelt and who will be responsible for the 5 years of rollback taxes due when Reserve property is removed from its present agricultural use. 15-2

3. Your Report clearly indicates which of our properties you are assigning to the proposed Reserve (which we are willing to exchange) but does not indicate what we can expect in return, nor how soon the exchanges will be effected. A TIMELY completion date is imperative. In December of 1994, we were told, after a drive of 400 miles to attend a meeting called by the BLM and the HCP for property owners, and being among those who were willing to participate in an in-state exchange, that we could expect our exchange to be competed within 6 to 8 months, especially since Lowe property was "high priority." Within two days of that meeting, we were in the field with BLM representative Ray Mapston touring the ground we would be giving up to the Reserve and the land we expected to exchange for it. The 6 to 8 month time is over and we now are told it will be another 15 to 15-3

1

Responses to Comments

15. Private party

15-1. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The acreages and maps were corrected; however, in subsequent discussions, you decided not to include the 20 acres in the reserve.

15-2. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Washington County is well aware of the issue with rollback taxes. This will be resolved following permit issuance.

15-3. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The land exchange process is with the Federal government and proceeds according to their time frame. Washington County has no control over this process; however, the HCP Administrator will do everything in his power to expedite the process.

18 months to two years or more before the exchange occurs. This is NOT a timely solution. Set a deadline and stick to it or release all land for development and disregard the preservation of turtles. Geologic time is no solution even though the Turtles have survived such-- landowners, taxpayers, and voters will not, but their descendants remember with a vengeance. 15-3

4. Our most pressing concern is with Hurricane City Fathers now attempting to impose a highway along 600 North that cuts across Spilsbury and Lowe property identified as part of the Reserve in Zone 5. The Lowes do not want to do anything that would interfere with our commitment to exchange properties. Your expressed desires are requested in writing immediately. 15-4

5. Rationing land for development to 625 acres per year as indicated in your discussion in INCREMENTAL IMPLEMENTATION (see paragraph 6.7, page 116, part II) is absurd and fraught with potential lawsuits over which properties will be allowed to be developed first. What is the purpose of the HCP if owners in take areas are not allowed to proceed after having to give land for the development of the Reserve? This adds insult to injury. 15-5

6. Mining is mentioned as a proscribed activity for the Reserve, yet you are taking acreage in Zone 5 on which cinders have been mined and/or stolen from the cinder knolls on government as well as private property for years. Has the value of the cinders in these knolls been computed into the exchange? 15-6

7. Fencing in Zone 5 is indicated for the Hurricane area. Who will be responsible for it? Since development of our property is precluded, there will be no developer funds to pay the cost. 15-7

8. No mention is made of "downwind" fallout should atomic testing begin again in Nevada and how it will affect turtle habitat-- not to mention humans. What effect did it have previously, and who cared then? 15-8

9. The proposed permit on take areas is for 20 years. What happens at the end of that time period in the take areas that might yet remain undeveloped, or to the Reserve areas should the turtles be gone or the estimates of turtle population be grossly overstated in the initial studies. 15-9

10. In reading the Report, we perceive the MANY who had input on the biological side and the paucity of consultants regarding the economic side. It seems to us that this whole 15-10

Responses to Comments

15-4. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: At this time, Washington County recognizes the position of the landowners adjacent to 600 North, and has not moved the reserve boundary. Washington County has added language to the HCP, however, that alterations in the reserve boundary in Zone 5 will be considered as long as there is no reduction in Zone 5 acreage.

15-5. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The cap on incidental take has been removed.

15-6. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The cinder mine in Zone 5 is on BLM lands within the reserve. Continuation of mining on BLM lands is up to the BLM, not Washington County. Appraisal instructions for federal land exchanges will dictate how minerals are appraised.

15-7. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The cost of fencing in the Hurricane area will be borne by developers adjacent to the reserve.

15-8. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The issue of atomic fallout is outside the scope of the HCP.

15-9. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: When the permit expires, Washington County will have the option to request renewal from the USFWS.

15-10. The USFWS recognizes that regional planning such as that under the Washington County HCP can be a frustrating and long process; however, the USFWS maintains that communication with the author was maintained through public meetings and notices. Your comments were forwarded to Washington County for consideration in revising their HCP.

HCP is driven by the economic ramifications of property ownership, plans and expectations, all boiling down to the real estate principle of location, location, location. If Washington Country were not such a booming area in the Real Estate markets, if the scenery and climate were not so attractive to potential residents moving into the area, if.... if.... if all the other reasons the small amount of privately owned property is at a premium in the County, there would be no turtle issue and cattle would continue to graze and property owners to maintain the fences that have protected the turtles for decades, while the owners awaited higher and better uses for their land. With an eye to the future, the Lowes and Spilsburys have made possible the development of homes in the Hurricane area by providing easements for water, sewer, and power, and for jobs by providing land for the Hurricane Industrial Park. Now instead of reaping the benefits of planning we find that our prime subdivision land will house turtles instead of people and that we are "out of the loop" when it comes to communications from the U.S. Fish and Wildlife Service. 15-10

11. Lack of communication from the beginning has been a problem for land owners such as ourselves who live and work outside the immediate area. In perusal of Chapter 6, p. 113 of part III of the Report, which is a list of persons or entities receiving notice of the availability of the draft Environmental Impact Statement, neither the Spilsburys nor Lowes were included and together we own over half the designated Reserve area in Zone 5 in addition to property in the take area (see p. 46 and pp. 82 & 83 of part II). 15-11

12. There has been a continuing problem of turtle dumping on the Spilsbury and Lowe properties which has artificially increased the turtle population there. The most recent occurrence being within the last two months. 15-12

13. Future "Reports" would certainly be easier to read if a section is included at the beginning listing all acronyms and what they represent. The proliferation of alphabet soup saves space but is certainly confusing to those who do not use them habitually. 15-13

We are no "Johnny-come-latelys" to property ownership in the Washington County area, as land designated as habitat has been in the family for several generation. Our feelings are expressed in the attached article written when we learned we owned the world's best turtle hatchery after attending a meeting in which the Service met with the HCP. 15-14

Respectfully,

Responses to Comments

Washington County response: Thank you for your comment.

15-11. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Washington County has worked hard to communicate with landowners and apologizes for any oversight that has occurred.

15-12. The issue of alleged "turtle dumping" is not relevant to the EIS.

15-13. A list of acronyms has been developed and is included at the beginning of the FEIS.

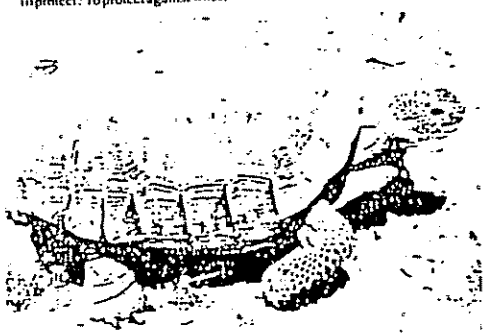
15-14. Thank you for your comments.

The Billion Dollar Tortoise

The Desert Tortoise are curious creatures!
Slow, shy, with unusual features.
The top and bottom are covered with shell
head, and legs contract: with the tail.
Left alone they move like a tank!
Designers were many - a committee to thank.
Their fate is also in the hands of committee!
The emotions I feel are both love and pity.

WAY down south in Utah's Dixie land is a curious reptile known as the Desert Tortoise. It is quiet, shy, slow of foot and wouldn't hurt anything. It hibernates in the winter and "shades up" in the summer. During the spring months of May and June, it comes out to graze, mate, and propagate. During the hot summer it "holes up" to stay cool. In the fall it comes out again to be counted by those who would "shut down America" to make room for the Desert Tortoise. But why? To show future generations a reptile that everybody loves and for which some are willing to forego thousands of houses and millions in property tax revenue to protect.

To protect? To protect against what?



To protect against the private property owner who might do something to cause this turtle harm or even death. Interestingly enough, the Desert Tortoise seems to flourish on private property but does not do so well on government land that makes up the majority of real estate in Washington County.

Why the Desert Tortoise does better on private than public land may be a mystery. Possibly, the answer is found in the fact that a private landowner controls, patrols, and keeps coyotes and people away from his cattle and his turtles. Another reason

duced. There appears to be no solid evidence the Desert Tortoise is indigenous to Washington County. Many citizens remember when turtles were purchased at Beaver Dam in Nevada and brought to Utah as pets. Others admit bringing a truckload of turtles to sell in Utah towns, then dumping the unsold turtles north of St. George to get rid of them. Still, others claim the chain placed in a hole drilled in the turtle's shell pulled out and let their tortoise escape into the hills. In any event the Desert Tortoise now resides in Utah and appears puzzled as to why all the fuss is made over the limited space it occupies.

Strangely enough, the space affected is not limited to that occupied by the turtle. A total of 11,000 acres of (private) land are considered suitable as Desert Tortoise habitat and restricted as to private use. Some "loose" calculations may help bring the matter into perspective. Consider: If six thousand of the eleven thousand acres identified as turtle habitat could be used for housing developments and produce three houses per acre worth $100,000 each the value of the improved land would be worth one billion eight hundred million dollars. This would provide housing for 90,000 people and generate up to $18,000,000 in property tax

tion jobs for construction people, suppliers, and maintenance.

In the United States a 1,600 square foot home ranges in price from $100,000 to nearly $500,000 for the same house. The difference in price is not in the cost of materials and labor but in the cost of an improved building lot. If 11,000 acres in Washington County are eliminated from residential development, a number of factors would be called into play that could force housing costs sky high:

(a) The limited supply of available building lots would increase the cost of new housing beyond the reach of the typical American family.

(b) The cost of existing housing would follow the increased cost of new structures.

To artificially limit the supply of building lots for people to accommodate the Desert Tortoise without putting an equal number of acres of suitable government owned land back into the hands of the private owner is unrealistic and economically unsound. People build houses on private land and virtually all public education is funded through taxes on real property.

To date the average Dixie property owner has paid nothing for the donated Desert Tortoise placed on his land. The Tortoise has flourished under the protective care of those who are now treated as criminals by trespassers who have come upon the land in search of the reptile and found them healthier and in some places greater in number than any place on earth. (The author has the dubious honor of possessing the "finest turtle hatchery in the world.") Still, efforts to trade the turtle hatchery, Virgin River, and La Verkin Creek property for BLM land go unheeded!

There is a solution to the Desert Tortoise issue but it may not be found in a "committee" made up of people hired whose battle cry might be: "Cattle Free by '93."

A *quick fix* might come by:

(a) A Federal Judge declaring that all desert Tortoise belong to the owners of land upon which they are located to be enjoyed but not intentionally hurt or destroyed.

ecuted under the laws of the state wh come upon private property adverse t the true owner's interest where prop erty is posted.

(c) Any restriction placed on privat property may initiate action of cor demnation with a sum to be charged the rate of 1% per month of appraise value until title legally passes to government entity.

(d) All government owned raw lan held within one-half mile of an inco porated city must be sold to the highe private bidder to reduce the Nation debt and become part of the greate state and county tax base.

A few government personnel an environmental groups appear mo interested in endangered species tha in half the world's population that go bed hungry at night, more interested the spotted owl than jobs for taxpay ers, more interested in bedding ground for the Desert Tortoise than beddin places for Utah citizens in Washingto County. To paraphrase another thought: You can kill turtles and peop with ill conceived laws and regul tions as with poison or an ax; it ju takes a little more time!

If the public wants turtles, let th farmers and ranchers raise them; the compensate the producer for the re tiles. And please, don't insist they rais coyotes and turtles on the same rang *coyotes eat desert tortoise!*

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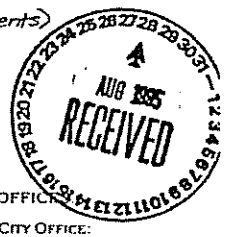
dt: wchcp/nepa (comments)



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ATTORNEYS AT LAW

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St. George, Utah 84771-0400

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FAX (801) 628-1610

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(801) 538-0400
FAX: (801) 538-0423

MESQUITE OFFICE:
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P.O. Box 1347
Mesquite, Nevada 89024
(702) 346-7347
FAX: (801) 628-1610

August 24, 1995

Robert D. Williams
Assistant Field Supervisor
Fish & Wildlife Service
145 East 1300 South, Suite 404
Salt Lake City, UT 84115

VIA FEDERAL EXPRESS

Dear Mr. Williams:

I am writing on behalf A.R. Spilsbury Family Enterprises, owner of a substantial portion of land within Section 28, Township 41 South, Range 13 West. The land is located within the city limits of Hurricane. I believe you are very familiar with this property. It is referenced on pages 44, 45 and 46 of the Washington County, Utah Desert Tortoise Incidental Take Permit Application/Documents submitted by Washington County Commission, Washington County, Utah to the U.S. Department of the Interior Fish and Wildlife Service, June 19, 1995 (hereafter "Document").

The owner of the property received no notice of the Document. The notice list in Chapter 6.0 at pages 113-132 fails to include A.R. Spilsbury Family Enterprises or any representative of that entity. Vyonne Mendenhall, a principal in A.R. Spilsbury Family Enterprises, first becase aware of the existence of the Document by reading a newspaper article. She requested the Document from Fish and Wildlife and received it on August 17, 1995. 16-1

Responses to Comments

16. **David Nuffer; Snow, Nuffer, Engstrom, Drake, Wade, and Smart**

16-1. Following discussions with your client, the comment period was not extended, as their comments were received by the close of the comment period.

Obviously, this failure to provide adequate notice has substantially impaired Spilsbury's ability to respond to the Document and violates statutory, regulatory, and constitutional requirements. For that reason, at the outset, on behalf of A.R. Spilsbury Family Enterprises, I request an additional 30 days, or until September 27, 1995, to provide written comments in response to the Federal Register Notice. 16-1

In addition, I should point out that the references to the Spilsbury property in the Document do not accurately reflect an agreement reached with the Spilsbury Family which provided that the area shown as private/developed on Figure 3.6 of the Document was to be outside the critical habitat and reserve areas. This area was to be protected by a conservation easement providing restrictions similar to those listed on page 44 of the Document. However, the area was clearly to be outside the critical habitat and preserve. 16-2

Further, you should be aware that the Spilsbury's will provide information including biological data which shows that the requisite elements for critical habitat are not present on this property. Since first being informed of the critical habitat designation, the Spilsburys have raised these concerns. 16-3

Finally, I believe you should be aware of the admitted placement of a desert tortoise on the Spilsbury property by Fish and Wildlife personnel. Please see the letter of August 8th and statement of August 16th enclosed. This raises serious questions about government action and intervention with regard to the property, and the validity of any government biological data. 16-4

Sincerely,

SNOW, NUFFER, ENGSTROM, DRAKE, WADE & SMART

David Nuffer

DN/mg
cc: Senator Robert Bennet
Senator Orrin Hatch
Bill Mader, HCP Administrator
Washington County Commissioners
SWCA

Nuffer Data M Mendenhall 860501 letrw 082495 860501 dn/mg

Responses to Comments

16-2. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The maps and acreages have been corrected.

16-3. The issue of designation of critical habitat is not part of the HCP process. If you are interested in proposing revisions to critical habitat boundaries, you may contact the USFWS separately to discuss that process.

16-4. The letter you reference is from the Utah Division of Wildlife Resources.

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE RESOURCES

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
Robert G. Valentine
Division Director

Southern Region
622 North Main Street
PO Box 606
Cedar City, Utah 84721-0606
801-586-2455
801 586-2457 (Fax)

August 8, 1995

Vyon Mindenhall
A.R. Spilsbury Family Enterprises
1701 Duneville Street
Las Vegas, Nevada 89102

Dear Mrs. Mendenhall:

This letter is in response to your request for information regarding the release of a desert tortoise on the Spilsbury property in Hurricane, Utah. District Conservation Officer Gary McKell picked up and released the tortoise in high quality creosote habitat in the vicinity of the Hurricane cinder knolls. After investigation, as per your request, we believe it was released on Spilsbury property. The desert tortoise was a large unmarked male. It was a healthy animal with no external parasites or signs of disease.

Since 1991, the Utah Division of Wildlife Resources (UDWR) has been working with Washington County, other government agencies, and private interests, to reconcile conflicts between economic development and desert tortoise conservation. The objective of this effort has been to develop a Habitat Conservation Plan under Section 10 of the Endangered Species Act.

The Washington County HCP includes the apportionment of desert tortoise habitat into reserve areas and take areas. Under the HCP, take areas will be developed, and reserve areas bordering urban development will be fenced to maintain the viability of tortoise populations. The Washington County HCP is currently in the final stages of review, and is expected to start implementation in early 1996.

Because fencing of proposed HCP reserves has not been completed, wild desert tortoises occasionally wander into adjacent urban areas. These tortoises are currently being returned to reserve areas. The release site was not selected based on the ownership of the property. Officer McKell was simply returning the individual to quality habitat within the proposed reserve area near the pick-up site.

If you have any questions or need any further information

please contact UDWR, Southern Regional Office (622 S. Main St. Cedar City, UT 84720).

Sincerely,

James Guymon
Regional Supervisor

cc: Bob Valentine, Randy Radant, Leo Lentsch, Dale Hepworth, Rick Frideil, Dennis Kay, Gary McKell

August 16, 1995

Yvonne Meddenhall

In June of this year 1995, I was called on the telephone by Scott Stratton-Hurricane City Police, Stacy Gubler-Hurricane City Animal Control and Gary McKell-Fish and Wildlife, to go and open the gate West of the Hurricane City Shop on 600 North. Brandon Wright was with me at the time. I was asked to open the gate, which leads to private property which is owned by AR Spilsbury Ent. I lease this property. When I got on site the Officers asked my to open the gate to allow them to release a tortoise and also to dress a deer that was killed on SR 9. I felt very hesitant to open this gate. Once the gate was opened the tortoise was released in the sandy area, North East of the cinder knoll. I needed to go back to work and the Officers stated that they would close the gate. I left at this point.

Should you need any further information please feel free to contact me.

Cordially,

Kurtis Wittwer

I was Also a witness to this

Brandon Wright 8-16-95

MICHELLE L. HOLMSTEAD
NOTARY PUBLIC - STATE OF UTAH
175 NORTH 300 WEST
P.O. BOX 628
LAVERKIN, UT 84745
COMM. EXP.

MICHELLE L. HOLMSTEAD
NOTARY PUBLIC - STATE OF UTAH
175 NORTH 300 WEST
P.O. BOX 628
LAVERKIN, UT 84745
COMM. EXP. 3-1-98

dt: wchcp/nepa (comments)

FAX received
August 28, 1995

August 28, 1995

Robert D. Williams
Assistant Field Supervisor
Fish and Wildlife Service
145 East 1300 South, Suite 404
Salt Lake City, Utah 84115

RE: Washington County Draft Habitat Conservation Plan
Desert Tortoise
Sec. 28. T41S, R13W , S.L.B & M.
Approximately 520 acres privately owned property
A. R. Spilsbury Family Enterprises

Dear Mr. Williams,

In 1843 George and Fanny Spilsbury left their home land of England to sail across the ocean to a new land, America. They arrived in New Orleans with only $5.00. Money they had earned on the voyage sewing. They sold all of their clothing in order to pay their fare up the Mississippi. Arriving in Nauvoo, Ill. with only their pots and pans, determination and the skill of a builder. In 1850 they started their pioneer journey which came to an end in Touqerville, Utah, 1868. They had to endure thousands of miles of hardships and sacrifices, including giving birth to 13 children with only 5 surviving the harsh conditions of the wilderness. One of these children George M. Spilsbury had a son Archie P. Spilsury, who was a rancher like his father. Archie P. Spilsbury died in 1968 and left his estate to his heirs. Archie Rlington Spilsbury was one of these heirs and he formed the A.R. Spilsbury Family Enterprises to help manage the property in his estate. He died in 1990.

This brief history is not meant to bore you but I feel I have a distinct commitment to record the history of my ancestors. In doing so, record the history of ownership of the parcel of land that has been designated as critical habitat for the desert tortoise by the Department of the Interior, Fish and Wildlife Service of the United States of America.

I am not an Attorney, Realtor, Biologist, Engineer, or Economist. I am a mother of 5 children 3 of whom are in college and 2 that soon will be. They are contributing, productive citizens of society. I coach competive youth soccer, teach children how to play the flute and direct the church choir. I also act as a General Partner for A.R. Spilsbury Family Enterprises. Managing our real property holdings in conjunction with agricultural and developmental use. I tell you this in order to make you understand the burden that has been placed on me in responding to this federal action. Nevertheless, in order to protect my

rights and that of my family I have made an attempt to become enlightened in this process from the time I was first notified in September of 1993. This was done by correspondence from Milo McCowen of the HCP Steering Committee. Until that time the A.R.Spilsbury's were unaware of any federal actions or proposed actions on our private property We are private landowners with specific property targeted for use in a designated tortoise reserve. Despite the fact we did not receive proper notice. The A. R. Spilsbury's will attempt to respond to the deadline, as specified in your cover letter I received with the Draft Conservation Plan for Washington County.

The A. R. Spilsbury's private property is addressed in Zone 5 of the Washington County Application /Documents. I received these documents on or about, Aug. 19, 1995. I requested them to be sent to me after reading an article in the newspaper.

I have been involved in numerous and painful public meetings, private meetings, conferences, phone conversations in order to resolve our concerns with our property rights. We have made every effort in cooperating with Washington County in the HCP process. These activities are cataloged in an attachment to this letter. (Attachment 1B)

I have written several letters to the HCP Steering Committee and also to the Fish and Wildlife Service to try and resolve this issue. (Attachment 2B)

I had an information packet compiled to outline our position and agreements with the HCP plan and exchange process and submitted this packet to Bill Mader, HCP administrator; Ted Stevenson, Chief of Branch Lands, Bureau of Land Management, Salt Lake, Utah; Jim Crisp, Area Manager, Bureau of Land Management, St. George, Utah; Ann Morgan, Bureau of Land Management offices in Reno, Nevada; Dallen Gardner representing Jim Doyle for the interstate exchange process for Washington County.

Included in this information packet is a description of property along with a brief description of the development that we have planned for the property. (EXHIBIT II) of (Attachment 1A)

A description and map of properties to be included in the reserve consisting of approximately 183 acres including the acreage along the river corridor Also shown is a 13.11 parcel of land in Section 29 in ownership of the BLM that we would exchange though the instate exchange.
(EXHIBIT III) of (Attachment 1A)

A description and map of BLM property located in Douglas County, Nevada. This is the parcel of land that we have requested be exchanged through the interstate exchange that Mr. Jim Doyle is facilitating for Washington County.
(EXHIBIT IV) OF (Attachment 1A)

These are our Concerns:

1) There are approximately 200 acres of our private property to be included in the reserve according to the proposed HCP Plan, Zone 5: Hurricane, Figure 3.6, and Table 3.6. Parcel Information. 40.17 of these acres are to be allowed development in the "Kayenta" style housing development. These 40.17 acres were to be outside of the reserve boundary. In this area development would occur leaving 75% of each acre in a natural state. This would allow for a buffer between the reserve and development.

Approximately 29 acres along the River Corridor were to be included in the reserve boundary, allowing for biodiversity. This would adjust the total acreage of A.R. Spilsbury private property to be in the Zone 5 reserve at approximately 183 acres.

I had a meeting with Mr. Bill Mader on Aug. 24, 1995, and he concurred that the agreement that the A. R. Spilsbury's had made with the HCP, and the information that he had submitted to SWCA was not in agreement with the final document. The document needs to be edited in accordance with our agreement.

17-1

2) Exchange process:

The A.R.Spilsbury's have expressed their willingness to exchange our property in Sec. 28, to be included in the reserve for BLM property in Sec. 29, that is adjacent to our property on the West. This is outlined in exhibit (1A).

We have had meetings both on the property and in the BLM offices in St. George. Mr. Bill Mader, and Jim Crisp have concurred that they feel that this would be a viable exchange. We are waiting for FWS approval.

For the balance of our exchange the A. R. Spilsbury's would like to be involved with the interstate exchange that Mr. Jim Doyle is contracted to facilitate. We have had meetings with the BLM, Bill Mader, and Dallen Gardner. Phone conversations and meetings with Jim Doyle to acquaint us with the process and to make our position known and clear. We submitted and prepared an information packet (Exhibit 1A), at the request of these agencies to

17-2

Responses to Comments

17. Vyonne Spilsbury Mendenhall; A.R. Spilsbury Family Enterprises

17-1. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: The maps and acreages have been corrected.

17-2. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Washington County appreciates your concern regarding the land exchange process and is working hard to facilitate this process.

assure them of our intentions, Feb. 1995.

To my knowledge and pursuant to conversations with the HCP administrator the A.R. Spilsbury's were being represented in the interstate exchange by Jim Doyle and Dallen Gardner.

In a phone conversation with Mr. Gardner on July 27, 1995, I had called for an update on the exchange process when I was informed that our position was not being represented by Mr. Jim Doyle or Dallen Gardner. Mr. Gardner said that our position was not clear and until he received a letter of clarification he would not proceed. Needless to say I was more than confused.

On August 24, 1995, I had a meeting with Mr. Russell Gallian, Washington County Commissioner, and was present when he had a phone conversation with Mr. Gardner. Mr. Gallian informed Mr. Garner that he felt that our position was clear according to the documents that we had presented him and that we were private property owners in Washington County to be represented in that exchange process. He dictated a letter in reference to that conversation and will be sending me a copy. I have not yet received that copy to include in these comments. I am more comfortable with the process after my meeting with Mr. Gallian. He did however request that I should send Mr. Gardner a letter. I intend to do so. 17-2

The A. R. Spilsbury's have also been looking for BLM property that has been marked for disposal in Washington County and we have been frustrated with the process. Any desirable land marked for disposal or exchange has already been set aside for State exchange. Jim Crisp of the BLM has had numerous meetings with us and is aware of our desire to find acceptable exchange parcels in State in the event that the interstate exchange is not accepted through Congress. I find that a huge burden has been placed upon us to find property that is a like for like or value for value exchange. It is my hope that when the HCP document is accepted by the Fish and Wildlife Service, that the efforts by the BLM to find suitable property for exchange will escalate.

The A. R. Spilsbury's would like to request that, unless an acceptable exchange can be completed in a period of two (2) years, or the show of due diligence. We would like to have our property deleted from the reserve, or be allowed to develop our private property in the reserve as outlined on page 26 of the Draft Environmental Impact Statement for Zone 5. "Exception given to some private lands in the reserve to be developed for housing. That would have to leave approximately 75 % of the impacted habitat in an unaltered state". The A.R.Spilsbury's would request that action be applied to our private property in

the preserve in the case of no exchange or purchase. Clear text to this effect needs to be added to the HCP and EIS.

Failure to provide an exchange or purchase private property for fair market value in any absence of any allowable development, constitutes condemnation of property. 17-2

3) 3.4.2.3 Private Lands

Grazing of private lands. Grazing of cattle of our private land in zone 5 has historically occurred for the last 100 years. This issue needs to be addressed. 17-3

4) 4.3.5 Road Protocol

Page 48 of the Draft HCP does not address any of the proposed roadways for Zone 5, 600 N. or Virgin River Blvd, these issues were discused in my prior correspondence. (Attachment 2B) 17-4

5) Mining

3.3.5.2 Management. The issue of mining in Zone 5 needs to be addressed. I was informed that there would be no mining of cinders in the reserve boundary. I would like this clarified. 17-5

6) Figure 3.7 Future Utility Corridors

There is no future utility corridors addressed for Zone 5. 17-6

Sincerely,

Yvonne Spilsbury Mendenhall
General Partner
A.R. Spilsbury Family Ent.
1701 Duneville St.
Las Vegas, Nev.
(702) 878-6175

Enclosures: Request for extension

CC: Senator Orrin Hatch
Senator Robert Bennet
Congressman James Hansen
Commissioner Russell Gallian
William Mader
HCP Administrator

Responses to Comments

17-3. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Grazing will be managed similarly to Zone 3 consistent with reserve management practices.

17-4. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: There are to be no additional roads within the reserve in Zone 5.

17-5. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: See response 15-6.

17-6. Your comments were forwarded to Washington County for consideration in revising their HCP.

Washington County response: Utility corridors in Zone 5 are addressed in sections 3.3.5.2 and 3.4.3 of the HCP.

17-7. Thank you for your comments.

FAX received
August 28, 1995

Aug. 26, 1995

Robert D. Williams
Assistant Field Supervisor
Fish and Wildlife Service
145 East 1300 South, Suite 404
Salt Lake City, Ut. 84115

Dear Bob,

You may have already received a letter from my legal counsel regarding a request for the 30 day extension together with some of my concerns with the recent HCP proposal. This letter was a product of my meeting with Mr. Nuffer on Aug. 24, 1995, before our phone conversation on Aug. 25, 1995, and meetings I had with Mr. Mader and Mr.Gallian on Aug. 24, 1995. In these meetings many of my concerns with the HCP document and the exchange process were addressed and alleviated.

Pursuant to our phone conversation Aug. 25, 1995, you agreed to grant me an extension for filling of comments to be postmarked no later that September 8, 1995. I appreciate your consideration in granting the extension to and the opportunity to address my concerns with the Fish and Wildlife Service. I intend to comply with the September 8, 1995 deadline for my comments on the HCP for Washington County, Utah. Please provide me with written confirmation of the extension as soon as possible.

17-7

I would also like to make you aware that I realize that the placement of tortoises on my property was executed by a State of Utah Division of Wildlife Resources agent and not the Fish and Wildlife as stated in the letter.

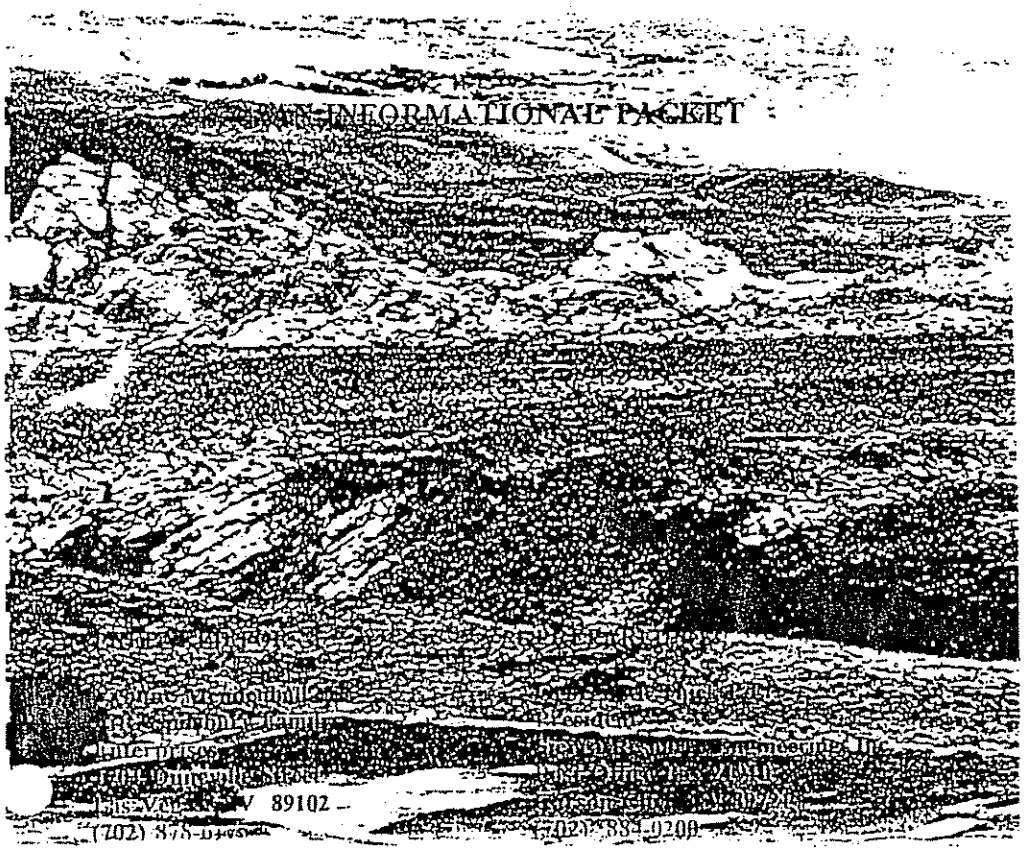
Sincerely,

Yvonne Spilsbury Mendenhall
General Partner
A. R. Spilsbury Family Ent.
1701 Duneville. St.
Las Vegas, Nev 89102
(702) 878-6175

Attachment
IA

A.R. SPILSBURY FAMILY ENTERPRISES

HABITAT WITHDRAWAL



A.R. SPILSBURY FAMILY ENTERPRISES

HABITAT WITHDRAWAL

AN INFORMATIONAL PACKET

PREPARED FOR:

Vyonne Mendenhall
A.R. Spilsbury Family
Enterprises
1701 Duneville Street
Las Vegas, NV 89102
(702) 878-6175
FAX (702) 878-4874

PREPARED BY:

George M. Thiel, P.E.
President
Sierra Resource Engineering, Inc.
Post Office Box 21910
Carson City, NV 89721
(702) 884-0200
FAX (702) 884-0233

INDEX

I. Introduction

II. Cove Property Development Description

III. Selected Alternatives

IV. Potential Exchange Property

INTRODUCTION

Sierra Resource Engineering, Inc., has been involved with the development of the property for a period of approximately two (2) years. The Engineers have been working on behalf of the A.R. Spilsbury Family Enterprises, Vyonne Mendenhall and Las Vegas Paving Corporation. Involved in their tasks were determining site feasibilities and preparing maps illustrating site constraints with regard to topography, drainage, etc. Through their course of involvement, they identified zoning per the attached Exhibit 1, contiguous to the property. Subsequent to their Feasibility Analysis Desert Tortoise Habitat was depicted illustrating areas subject to withdrawal of lands for habitat usage.

The property is held by the heirs of A.R. Spilsbury and has been under their ownership for a substantial period of time. The Spilsbury family has deep roots within the community and their desire to develop the property in a compatible land use to Hurricane City has been tantamount to the evolution of the designs provided within this document. It is their desire to preserve the historic value of the area as well as progressing to the needs of the future citizens of the community.

COVE PROPERTY
DEVELOPMENT DESCRIPTION

The property involved consists of the majority of Sec. 28, T.41S, R.13W. S.L.B. & M. encompassing an area of approximately 560± acres. The existing use is primarily agricultural/grazing with power, the Quail Creek Pipeline, etc., abutting the South edge of the property.

The proposed subdivision consisted of:

1.) A Resort Hotel, convention facility;

2.) A 2,000± unit subdivision, a planned development with open space amenities, championship golf course, and architectural symbiosis with the community and environment.

Access is provided via existing roadway infrastructure adjacent to the Industrial Park and proposed extension to 600 North as the proposed main traffic corridor. Access was further delineated in the Master Plan on routes accessing the Southern boundary. Roadways internal to the development were to be completed in a phased manner in compliance with applicable city standards.

Water and Wastewater infrastructure was to be connected to the utilities servicing the City of Hurricane along with electric, telephone, gas and other services associated with the community.

In summary the technical consultants found no site constraint affecting the property that could not be ameliorated through normal and standard engineering practices. Exhibit II, attached, illustrates the findings provided by the design consultants.

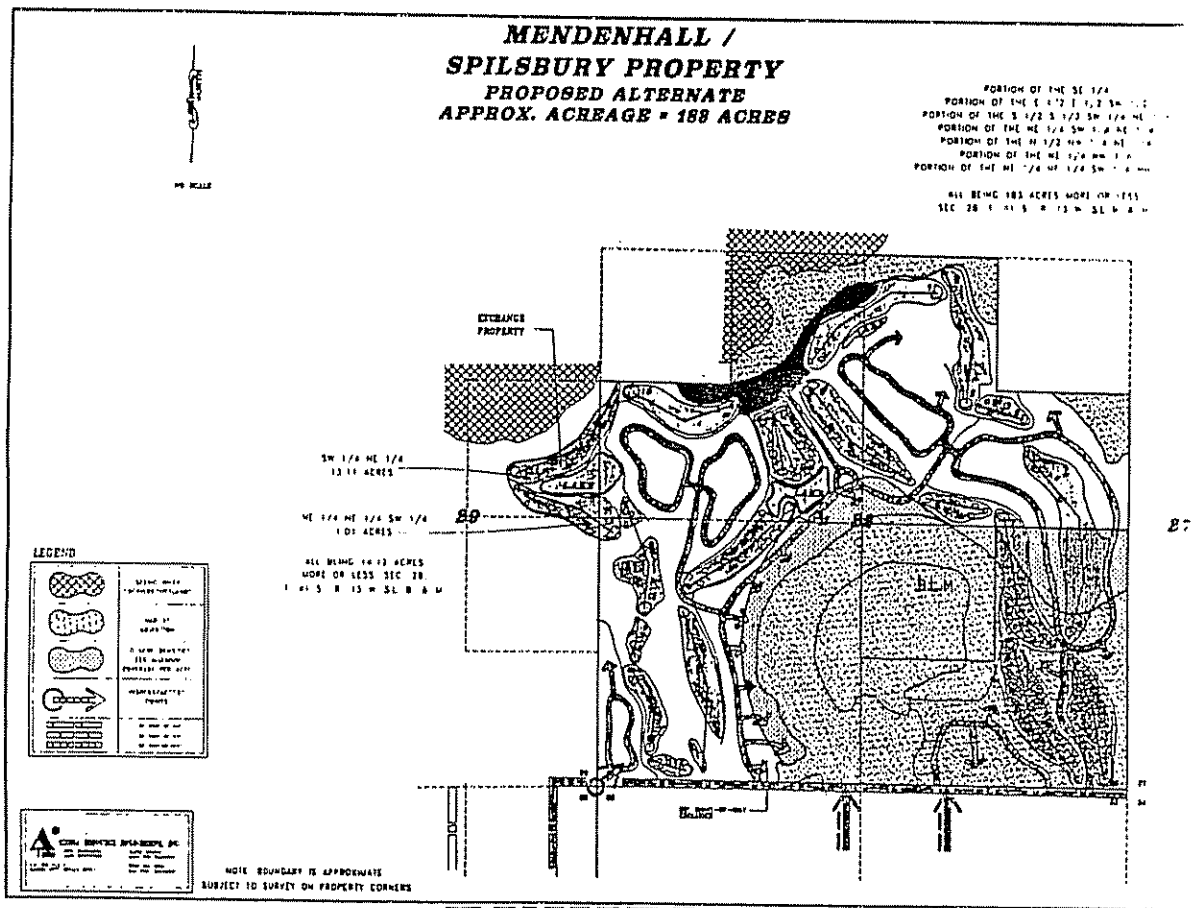

MENDENHALL /
SPILSBURY PROPERTY
PROPOSED ALTERNATE
APPROX. ACREAGE = 188 ACRES
EXCHANGE PROPERTY
SW 1/4 NE 1/4
13.11 ACRES
NE 1/4 NE 1/4 SW 1/4
1.01 ACRES
89
87
LEGEND
NOTE BOUNDARY IS APPROXIMATE
SUBJECT TO SURVEY ON PROPERTY CORNERS

EXHIBIT II

SELECTED ALTERNATIVE

Provided as Exhibit III is the negotiated alternative resolved through discussions with our Biological Consultant, and Bill Mader, Wildlife Biologists for Washington County. His conversations in our presence has involved officials of the Bureau of Land Management and the U.S. Fish and Wildlife Service. The withdrawal area consists of 183± acres all within Section 28, T.41S., R.13W, S.L.B. & M. See Exhibit III. Areas within the depiction illustrate areas for low density, minimum coverage of residential units; as well as areas withdrawn for Desert Tortoise Habitat and areas sensitive to the Virgin River environment. The map provided is an exact description of the property to be withdrawn.

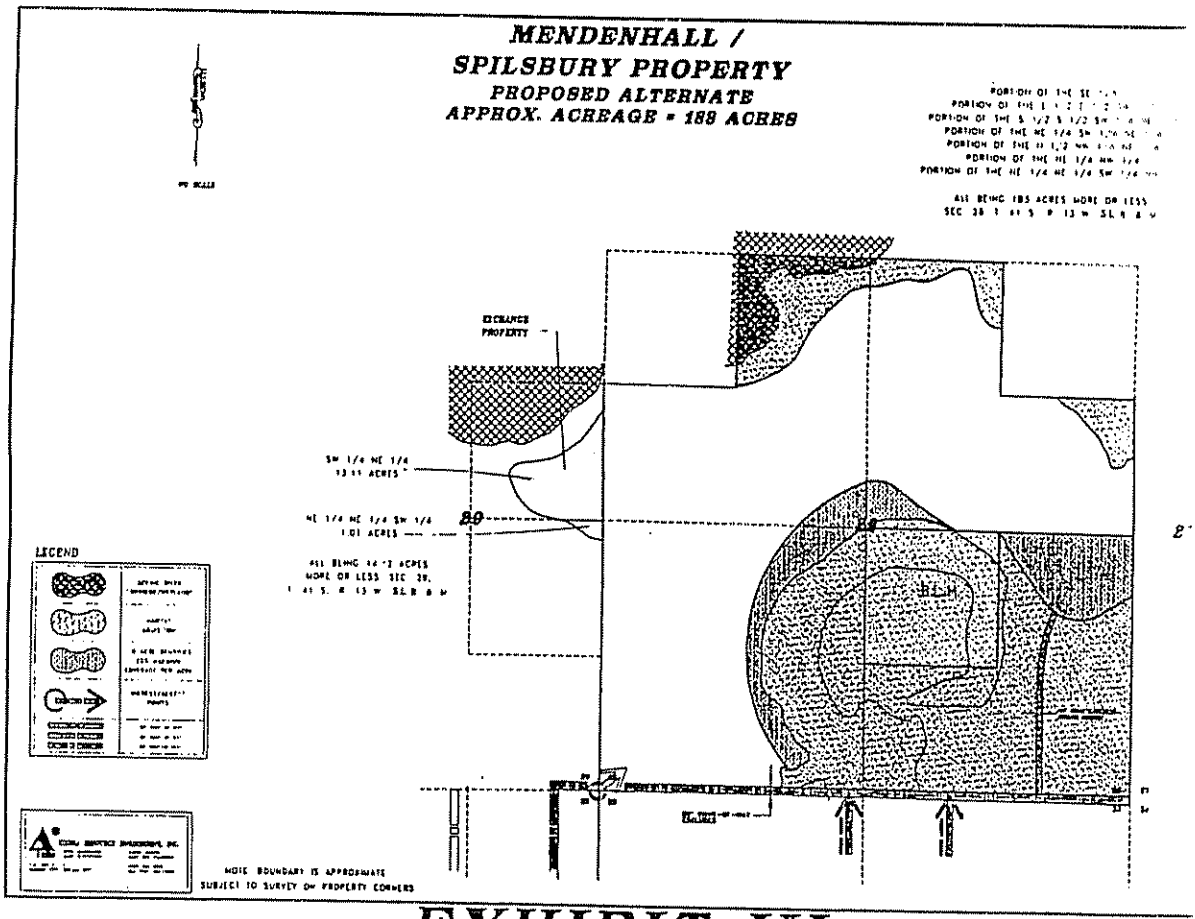

MENDENHALL /
SPILSBURY PROPERTY
PROPOSED ALTERNATE
APPROX. ACREAGE = 188 ACRES
EXCLUDED PROPERTY
SW 1/4 NE 1/4
13.11 ACRES
NE 1/4 NE 1/4 SW 1/4
1.01 ACRES
ALL BEING 14.12 ACRES
MORE OR LESS SEC 29,
LEGEND
NOTE BOUNDARY IS APPROXIMATE
SUBJECT TO SURVEY ON PROPERTY CORNERS

EXHIBIT III

POTENTIAL EXCHANGE

Areas of interest for exchange are the 13.12 acres shown in the SW 1/4 NE 1/4, and the NE 1/4, SW 1/4 Section 29, T.41S., R.13W., S.L.B. & M., Exhibit III, and is more particularly described as an island projecting to the west of the Spilsbury Property. The description is referenced on the map.

Alternative A

The family has expressed an interest in the property, Exhibit IV, located in Douglas County, Nevada. Resolution as to determining the interest in the exchange is predicated upon normal due diligence criteria, such as:

1.) Feasibility to enact the exchange.

2.) Geographical/Geological constraints.

3.) Value.

4.) Regulatory Entitlements.

5.) Cultural Resources.

6.) Environmental Concerns.

7.) Infrastructure service capabilities.

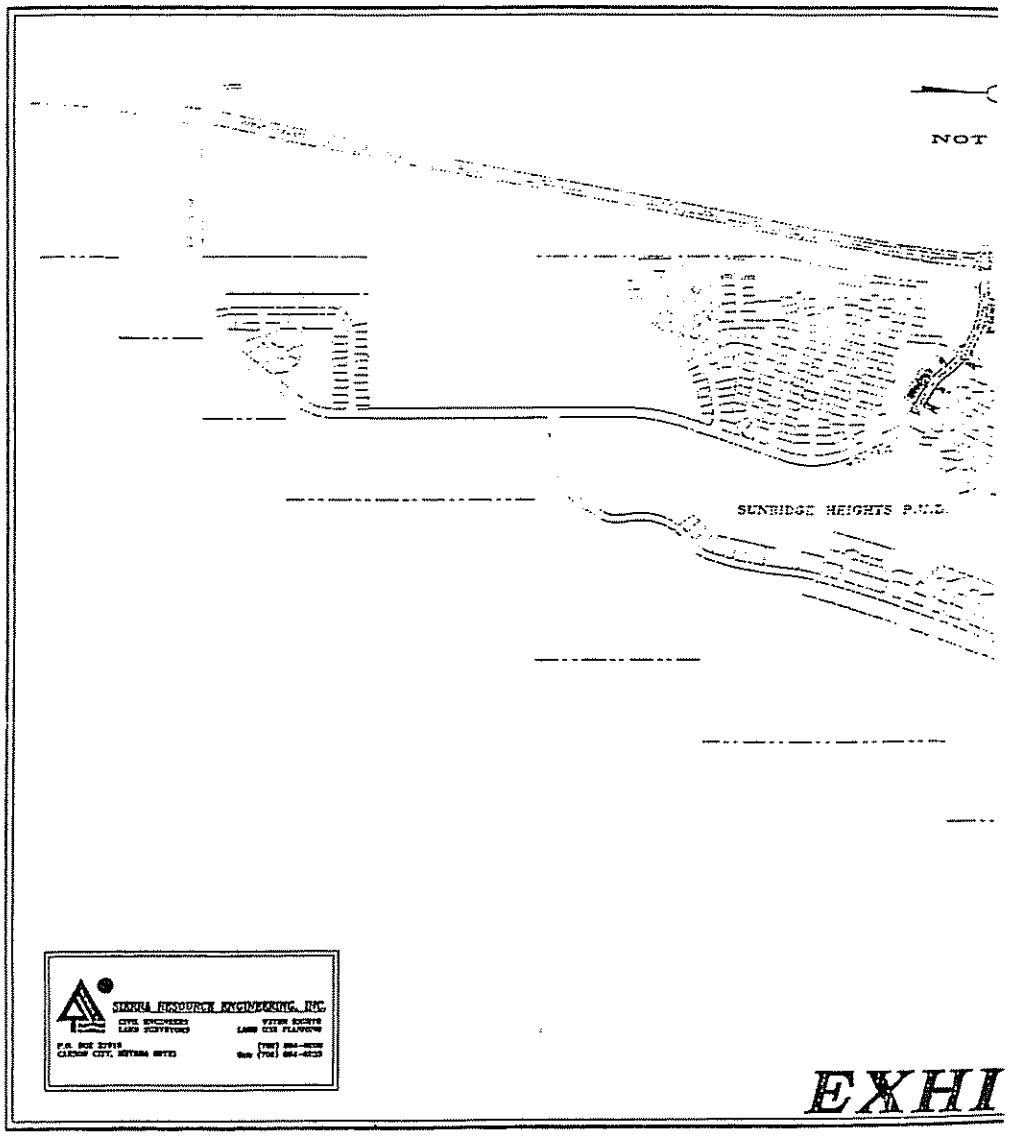
8.) Administrative approvals.

Alternative B

Predicated upon the base appraisal and review by the family, the family is exploring renumeration for the withdrawal, dependent upon consideration of timing and value.

Alternative C

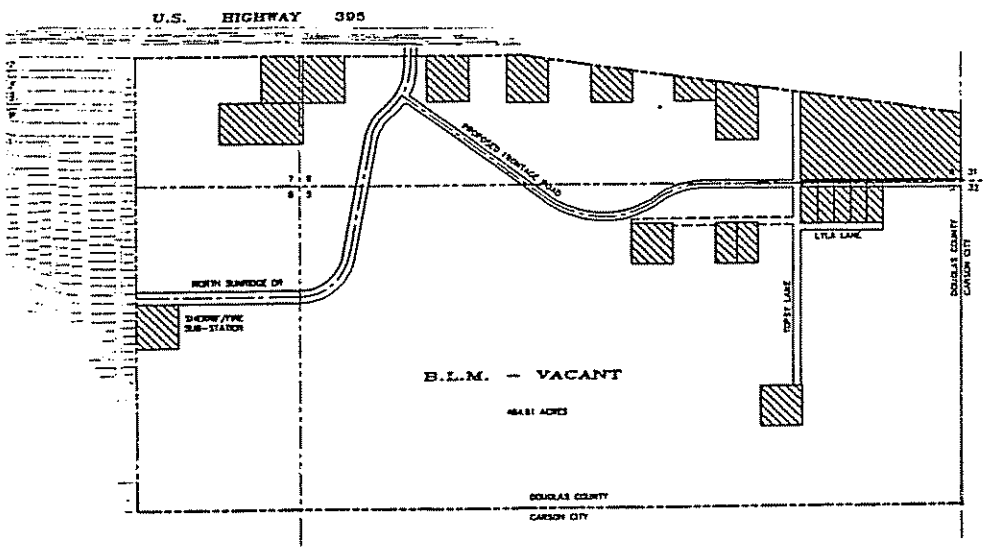
The family is also exploring the option of an in-state exchange, with similar due diligence considerations respective of Alternative B, listed above.


NOT
SUNRIDGE HEIGHTS P.U.D.
SIERRA RESOURCE ENGINEERING, INC.
EXHI

RTH

SCALE

BEING A PORTION OF THE E 1/2, E 1/2 OF SEC. 6 AND THE NE 1/4, NE 1/4 OF SEC. 7 AND THE W 1/2 OF SEC. 5 AND THE N 1/2, NW 1/4 OF SEC. 8, T. 14 N., R. 20 E. M.D.B. & M.



NOT A PART

B.L.M. EXHIBIT

IT IV

[redacted] Enclosure

FOR INFORMATION

SNOW, NUFFER, ENGSTROM, DRAKE,
WADE & SMART
A PROFESSIONAL CORPORATION

STEVEN E. SNOW
DAVID NUFFER*
CHRIS L. ENGSTROM
LYLE R. DRAKE
TERRY L. WADE •
RANDALL R. SMART
JEFFREY N. STARKEY •
E. SCOTT AWERKAMP
MICHAEL A. DAY

* Also Admitted in Arizona
• Also Admitted in Nevada

ATTORNEYS AT LAW

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P.O. Box 400
St. George, Utah 84771-0400

(801) 674-0400

FAX (801) 628-1610

OTHER OFFICES:

SALT LAKE CITY OFFICE:
341 South Main St. Suite 201
Salt Lake City, Utah 84101
(801) 538-0400
FAX: (801) 538-0423

MESQUITE OFFICE:
250 West Mesquite Blvd. No. 1
P.O. Box 1347
Mesquite, Nevada 89024
(702) 346-7347
FAX: (801) 628-1610

August 24, 1995

Robert D. Williams
Assistant Field Supervisor
Fish & Wildlife Service
145 East 1300 South, Suite 404
Salt Lake City, UT 84115

VIA FEDERAL EXPRESS & FACSIMILE

Dear Mr. Williams:

I am writing on behalf A.R. Spilsbury Family Enterprises, owner of a substantial portion of land within Section 28, Township 41 South, Range 13 West. The land is located within the city limits of Hurricane. I believe you are very familiar with this property. It is referenced on pages 44, 45 and 46 of the Washington County, Utah Desert Tortoise Incidental Take Permit Application/Documents submitted by Washington County Commission, Washington County, Utah to the U.S. Department of the Interior Fish and Wildlife Service, June 19, 1995 (hereafter "Document").

The owner of the property received no notice of the Document. The notice list in Chapter 6.0 at pages 113-132 fails to include A.R. Spilsbury Family Enterprises or any representative of that entity. Vyonne Mendenhall, a principal in A.R. Spilsbury Family Enterprises, first becase aware of the existence of the Document by reading a newspaper article. She requested the Document from Fish and Wildlife and received it on August ___, 1995.

Enclosure

Obviously, this failure to provide adequate notice has substantially impaired Spilsbury's ability to respond to the Document and violates statutory, regulatory, and constitutional requirements. For that reason, at the outset, on behalf of A.R. Spilsbury Family Enterprises, I request an additional 30 days, or until September 27, 1995, to provide written comments in response to the Federal Register Notice.

In addition, I should point out that the references to the Spilsbury property in the Document do not accurately reflect an agreement reached with the Spilsbury Family which provided that the area shown as private/developed on Figure 3.6 of the Document was to be outside the critical habitat and reserve areas. This area was to be protected by a conservation easement providing restrictions similar to those listed on page 44 of the Document. However, the area was clearly to be outside the critical habitat and preserve.

Further, you should be aware that the Spilsbury's will provide information including biological data which shows that the requisite elements for critical habitat are not present on this property. Since first being informed of the critical habitat designation, the Spilsburys have raised these concerns.

Finally, I believe you should be aware of the admitted placement of a desert tortoise on the Spilsbury property by Fish and Wildlife personnel. Please see the letter of August 8th and statement of August 16th enclosed. This raises serious questions about government action and intervention with regard to the property, and the validity of any government biological data.

Sincerely,

SNOW, NUFFER, ENGSTROM, DRAKE, WADE & SMART

David Nuffer

DN/mg
cc: Senator Robert Bennet
Senator Orrin Hatch
Bill Mader, HCP Administrator
Washington County Commissioners
SWCA

Nuffer Data:M:Mendenhall 860501:lwrw 082495 860501 dn/mg

Enclosure

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE RESOURCES

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
Robert G. Valentine
Division Director

Southern Region
622 North Main Street
PO Box 606
Cedar City, Utah 84721-0606
801-586-2455
801-586-2457 (Fax)

August 8, 1995

Vyon Mindenhall
A.R. Spilsbury Family Enterprises
1701 Duneville Street
Las Vegas, Nevada 89102

Dear Mrs. Mendenhall:

This letter is in response to your request for information regarding the release of a desert tortoise on the Spilsbury property in Hurricane, Utah. District Conservation Officer Gary McKell picked up and released the tortoise in high quality creosote habitat in the vicinity of the Hurricane cinder knolls. After investigation, as per your request, we believe it was released on Spilsbury property. The desert tortoise was a large unmarked male. It was a healthy animal with no external parasites or signs of disease.

Since 1991, the Utah Division of Wildlife Resources (UDWR) has been working with Washington County, other government agencies, and private interests, to reconcile conflicts between economic development and desert tortoise conservation. The objective of this effort has been to develop a Habitat Conservation Plan under Section 10 of the Endangered Species Act.

The Washington County HCP includes the apportionment of desert tortoise habitat into reserve areas and take areas. Under the HCP, take areas will be developed, and reserve areas bordering urban development will be fenced to maintain the viability of tortoise populations. The Washington County HCP is currently in the final stages of review, and is expected to start implementation in early 1996.

Because fencing of proposed HCP reserves has not been completed, wild desert tortoises occasionally wander into adjacent urban areas. These tortoises are currently being returned to reserve areas. The release site was not selected based on the ownership of the property. Officer McKell was simply returning the individual to quality habitat within the proposed reserve area near the pick-up site.

If you have any questions or need any further information

Enclosure

August 16, 1995

Yvonne Meddenhall

In June of this year 1995, I was called on the telephone by Scott Stratton-Hurricane City Police, Stacy Gubler-Hurricane City Animal Control and Gary McKell-Fish and Wildlife, to go and open the gate West of the Hurricane City Shop on 600 North. Brandon Wright was with me at the time. I was asked to open the gate, which leads to private property which is owned by AR Spilsbury Ent. I lease this property. When I got on site the Officers asked my to open the gate to allow them to release a tortoise and also to dress a deer that was killed on SR 9. I felt very hesitant to open this gate. Once the gate was opened the tortoise was released in the sandy area, North East of the cinder knoll. I needed to go back to work and the Officers stated that they would close the gate. I left at this point.

Should you need any further information please feel free to contact me.

Cordially,

Kurtis Wittwer

I was Also a witness to this

Brandon Wright 8-16-95

MICHELLE L. HOLMSTEAD
NOTARY PUBLIC - STATE of UTAH
375 NORTH 300 WEST
P O BOX 628
LAVERKIN, UT
COMM. EXP.

MICHELLE L. HOLMSTEAD
NOTARY PUBLIC - STATE of UTAH
375 NORTH 300 WEST
P O BOX 628
LAVERKIN, UT 84745
COMM. EXP. 5-1-98

Attachment - 1B

A.R. Spilsbury Family, Enterprise

Itemized list of meetings, phone calls, and written correspondence with the HCP and BLM personnel.

Date	Meetings	Phone Calls	Correspondence
09-09-93	Public Comments		
09-14-93	HCP		
10-07-93		Marilet A. Zablan, FWS	
10-15-93	HCP		
10-25-93	HCP		Fax to Milo McCowen
10-28-93			Letters
11-08-93	HCP		
12-06-93	HCP		
12-28-93			Fax-Maps
02-11-94	Milo McCowen	Bob Williams	
02-24-94	HCP		
02-25-94	BLM		
03-16-94	HCP		
04-05-94	HCP		
04-16-94		Gallen Gardner, Exchange Milo McCowen	
06-23-94	HCP		
07-01-94	HCP-Bill Mader		
07-21-94	HCP		
07-26-94	HCP-Bill Mader		
07-28-94	HCP-Bill Mader		
09-26-94		Bill Mader, HCP	
09-27-94	HCP-Bill Mader		
09-28-94	HCP-Bill Mader		
09-29-94	Jim Doyle, Exchange		
09-30-94		Bob Williams, Bill Mader Conference Call	
10-04-94	HCP-Bill Mader		
10-06-94	HCP		
10-06-94	HCP-Bill Mader		
10-13-94	HCP-Bill Mader		
10-20-94		Bill Mader, HCP	
10-21-94	HCP-Bill Mader		
10-25-94	HCP-Bill Mader		

Attachment - 1B (cont.)

Date	Meetings	Phone Calls	Correspondence
11-08-94	HCP-Bill Mader		
11-10-94	HCP-Bill Mader		
11-16-94		Bill Mader, HCP	
11-17-94		Bill Mader, HCP	
11-30-94	BLM		
12-07-94		Bill Mader, HCP	
12-17-94	BLM		
12-28-94	Trip to Carson City, NV to look at BLM property for exchange		
12-29-94		Bill Mader, HCP	
01-04-95		Gallen Gardner- Exchange BLM-Nevada	
01-05-95		Bill Mader, HCP Jim Doyle, Exchange	
01-27-95		Bill Mader, HCP	
02-02-95	BLM-Ted Stevenson HCP-Bill Mader		
03-08-95	BLM-Ted Stevenson, Robert Douglas, Randy Massy, Jim Crisp, Ray Mapston, Bill Mader, HCP		
03-13-95		Gallen Gardner, Exchange Bill Mader, HCP	
04-04-95		Bill Mader, HCP	
04-11-95		Bill Mader, HCP	
04-18-95	HCP-Bill Mader, BLM-Jim Crisp		
05-03-95		Bill Mader, HCP Randy Massy, BLM	
05-17-95	HCP-Bill Mader BLM-Jim Crisp Gallen Gardner, Exhange		
05-23-95	BLM meeting on Property Sec. 29		
06-07-95	BLM-Jim Crisp HCP-Bill Mader		
07-05-95		Bill Mader, HCP	
07-06-95	BLM-Bob		
07-26-95		Bill Mader, HCP	
07-28-95		Gallan Gardner, Exchange Jim Crisp, BLM	

Attachment 2B

FAX FROM VYONNE MENDENHALL

Fax (702) 878-4874 Home phone 878-6175
Cell. 379-3710

3
----------PAGES TO FOLLOW

DATE: Jan. 5,1995

TO: Dallen Gardner

To follow is a copy of the map showing the A. R. Spilsbury Family Ent. private property that was to be included in the Tortoise Preserve. The dark cross hatch marks are the property that will be included. The broken hatch marks designate the property that will be developed in a Kayenta style for a buffer zone as we had discussed. The amount of acreage is approximately 203 acres. Section 28 T41S R13W SLBM

The BLM property that we are looking at for exchange is located in the state of Nevada, Douglas County, R20E T14N Sections 5, 6, 7, 8. Acreage of approx. 501 acres. I am also sending you a copy of a BLM Carson City map indicating the property that is described above.

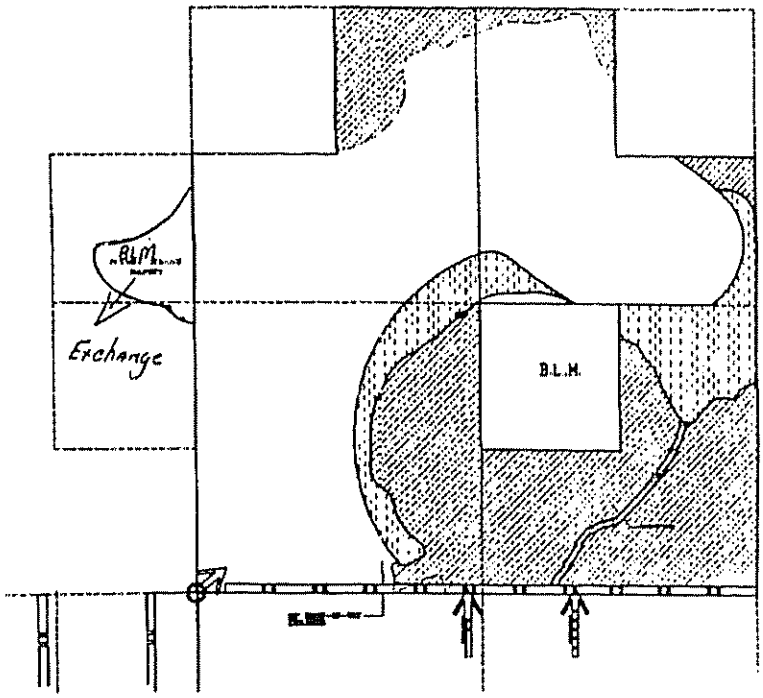
Please note that we are still interested in that little finger of BLM property that is adjacent to our Section 28 indicated on the map which includes our private property included in the preserve.

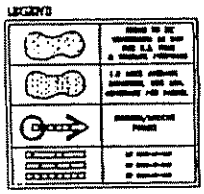
Sincerely,
Vyonne Mendenhall

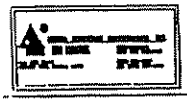
Vyonne Mendenhall

MENDENHALL / SPILSBURY PROPERTY

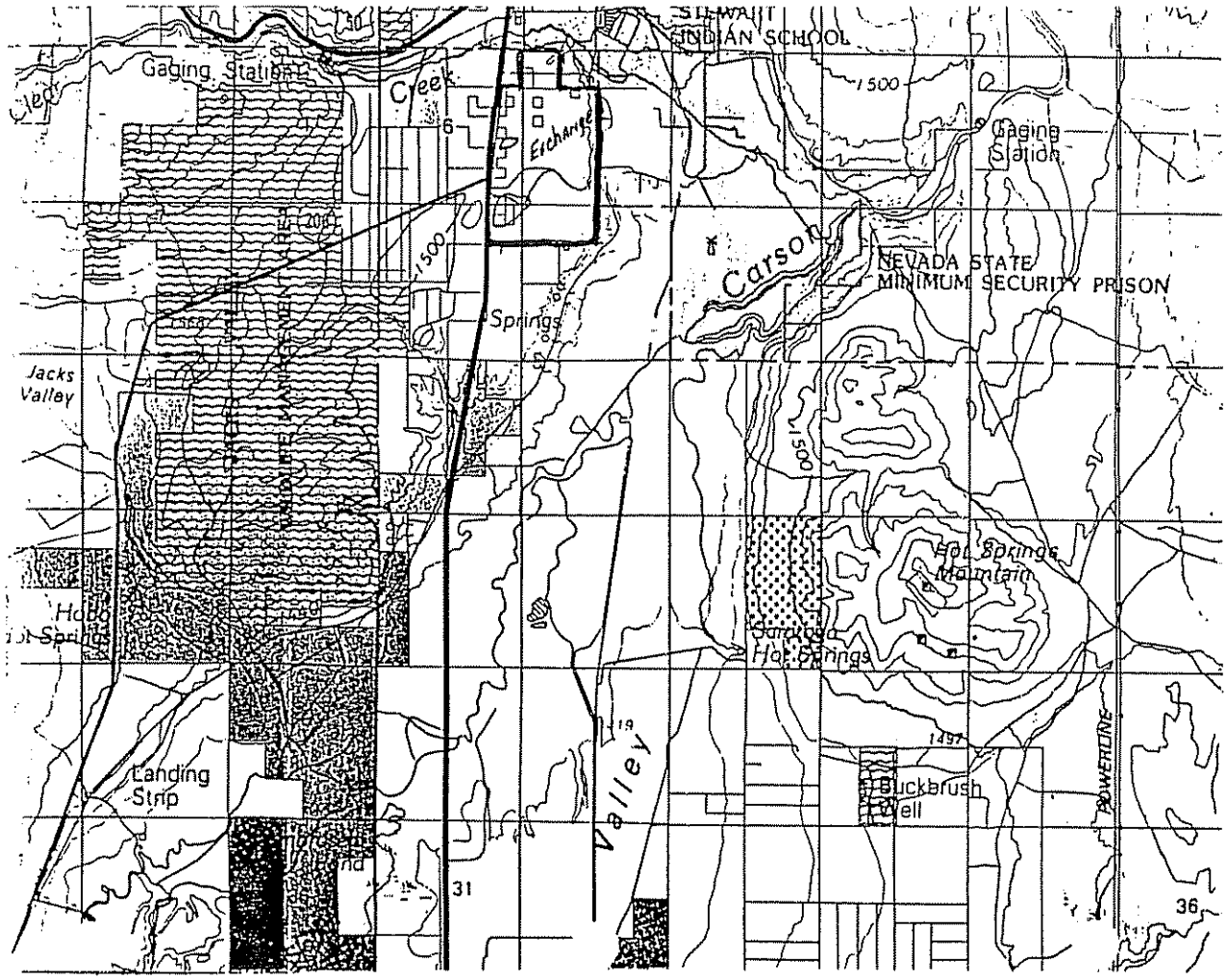
MODIFIED EXHIBIT "B"
PROPOSED ALTERNATE
APPROX. ACREAGE = 303 ACRES







NOTE: BOUNDARY IS APPROXIMATE
SUBJECT TO SURVEY ON PROPERTY CORNERS


STEWART
INDIAN SCHOOL
Gaging Station
Creek
Exchange
1500
Gaging
Station
Carson
NEVADA STATE
MINIMUM SECURITY PRISON
Springs
Jacks
Valley
Hot Springs
Mountain
Hot Springs
Landing
Strip
Valley
Buckbrush
Well
POWERLINE
31
36

Attachment 2B

Nov. 1, 1993

Vyonne Spilsbury Mendenhall
General Partner
A.R. Spilsbury Family Ent.
1701 Duneville St.
Las Vegas, Nv. 89102

Milo McCowan
HCP Stirring Committee Chairman
472 N. Kolob Rd.
P.O. Box 790-236
Virgin, Utah 84779

RE: Upper Virgin River Recovery Unit
Section 28 T 41 S. R. 13 W. Salt Lake Base and Meridian

To whom it may concern,

Section 28 is a section of land consisting of 640 acres. In this section 520 acres are privately owned. It has been marked for inclusion in the Tortoise Habitat Preserve. This property is located in the Hurricane City limits in Washington County in the State of Utah. It is owned by the A.R.Spilsbury Family Enterprises. It has been in ownership of the family for generations.

According to reports done by SWCA, a consulting firm hired by the HCP, the tortoise density located on our property consists of low to some medium density located primarily on 40 acres in the parcel owned by the BLM consisting of cinders. The biological reports used to produce these maps have not been seen by me personally. I had conversation with the Fish and Wildlife office in Reno on 10-14-93 and the BLM biologist in St.George Utah and apparently no survey has been done by either one of these agencies. I have requested copies of the population survey maps from both Linda Sappington and Ron Vorkian both of the HPC and I have not received them. To our knowledge there is only one tortoise burrow on our property and that is located on the east of the cinder hill. We have personally never seen a tortoise on our property.

Our property located within the preserve is not contiguous with the block of habitat located primarily near the Hurricane area, nor is there a linkage to the St. George area. It is separated by a natural geographical fence, the Virgin River Gorge. The Gorge is several hundred feet deep at this particular point and runs along the north extreme of our property for one half of a mile. We are on the extreme southern parameter of the preserve, southern of the Virgin River. The total acreage involved in this (island) of preserve is 1,050 acres. See map A.

Our 520 acres included in this (island) is deficient in several of the attributes necessary for protection of the tortoise, as set forth in the Federal Register 50 CFR part 17. On the direct west is a proposed bonded development of a 18 hole golf course and a 400 unit home division making the species subject to disturbance from his number one predator man and dog. Directly to the south is also home development and a Industrial Park. There is also a proposed Virgin River Boulevard that will be running east and west on the section line between section 28 and 33, to service the golf course community and other development. There is a public school and park including baseball fields on the extreme southeast end of this (island) and a natural geographical barrier, the Virgin River Gorge, on the north that separates this 1050 acres from the larger block habitat on the north of the river of approximately 5,000 acres. See map B.

This proposed preserve does not meet primary constituent elements set forth in the Federal Register. It is not contiguous with the rest of the Habitat. This block in not interconnected by a corridor of linkage containing protected, preferred habitat for the species. It is separated by a Gorge of more than a 100 ft. deep. It also contains roads that have been used for decades, and it is not unaccessible to humans. It has a cinder knoll that has been excavated for cinders and the BLM has been unsuccessful in deterring non-permitted removal for decades. These cinders are being removed by large trucks and tractors. This property also has 80 to 100 acres that are currently under cultivation for agricultural purposes. See map A. and C.

The financial responsibility of acquiring these privately owned lands and the cost of managing and fencing would warrant careful consideration. Do the financial consequences of acquiring this private (island) outweigh the benefits of including it in a public preserve?

The Desert Tortoise population would best be served if a relocation process could be initiated to relocate the tortoise off the private land south of the Virgin River away from the City and human impact to the north side of the river where the property is almost inclusively owned by the BLM and is less accessible to the adverse effects of man.

This plan would allow for growth and development for the city of Hurricane. More protected contiguous habitat for the tortoise and would allow for the private land owner to choose the best use for his land. The taxpayers of this country would also be spared an undo burden of paying for the purchasing of privately owned property management expenses and the high cost of fencing.

We believe that we have a responsibility to preserve and protect the world and its inhabitants. We would not like to see the tortoise hurt or destroyed in any manor

We would like to solicit the HCP for a clearance survey and also for an incidental take permit.

We would like to retain ownership of our inheritance. This property that has been in our family for generations. Property that our Great, Great, Great Grandfather sacrificed for and pioneered the oceans and the wilderness in hopes for a better life for their posterity. Who made the great southwest what it is today. We would like to have the opportunity to pass on this inheritance to our posterity to give them a sense of who they are and where they came from. There is no dollar value that can compensate us for this. The Government can always print more money but no one is capable of making more land.

We would be willing to compromise with the HCP and the Fish and Wildlife Service and the Department of Interior on the amount of our private property that would be drawn into the preserve as indicated on maps B and C. Although this property does not meet the requirements set forth for critical habitat or preserve, according to the Federal Register 50 CFR Part 17, it might be suited with proper fencing for a translocation site or nature center with total area of more than one square mile. It would draw out our agricultural area and water storage and allow us our one access to that cultivated area along the road that enters that section from the south. Our other access to that area would be in the preserve.

Our family has had an eye towards development of our property when the growth of the area warranted such. We have donated property to the City of Hurricane for Schools and for the Industrial Park. We have donated property for water storage and right of ways for power, sewer, waterlines in a hope that this would initiate growth in this area. Now that this has come to fruition we would like the opportunity to chose the best use for our property. This use may be same use that it has had for generations that of agriculture or a new use that of development.

Any consideration that you might give in this matter would be greatly appreciated.

We have resolved our holdings of this property with Calvin and Mona Lowe. The A.R. Spilsbury Family Ent. is the sole owners of all private property in Sec. 28.

Sincerely,

Vyonne Spilsbury Mendenhall
General Partner
A.R.Spilsbury Family Enterprises
1701 Duneville St.
Las Vegas, Nevada 89102 (702)-878-5175

Attachment 2B

Oct. 28,1993

Vyonne Spilsbury Mendenhall
General Partner
A.R. Spilsbury Family Ent.
1701 Duneville St.
Las Vegas, Nv. 89102

Department of Interior
Fish and Wildlife Service
Field Supervisor.
Nevada Field Office
4600 Kietzke Lane, Building C-125
Reno, Nv. 89502

RE: Upper Virgin River Recovery Unit
Section 28 T 41 S. R. 13 W. Salt Lake Base and Meridian

To whom it may concern,

Section 28 is a privately owned section of land consisting of 520 acres. It has been marked for inclusion in the Tortoise Habitat Preserve. This property is located in the Hurricane City limits in Washington County in the State of Utah. It is co-owned as tenance-in common by the A.R.Spilsbury Family Enterprises and Calvin and Mona Lowe. It has been in ownership of the family for generations.

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within it be

Any consideration that you might give in this matter would be greatly appreciated.

We are in the process of desolving our tenance-in-common holding with our cousins Calvin and Mona Lowe ~~and~~ the A.R. Spilsbury Family Ent. will be the sole owners of private property in Sec. 28.

Sincerely,

Yvonne Spilsbury Mendenhall
General Partner
A.R.Spilsbury Family Enterprises
1701 Duneville St.
Las Vegas, Nevada 89102 (702)-878-6175

dt: wchcp/nepa (comments)

State of Utah

GOVERNOR'S OFFICE OF PLANNING AND BUDGET
Resource Development Coordinating Committee

Michael O. Leavitt
Governor
Brad T. Barber
State Planning Coordinator
Catherine Quinn
Committee Chairman
John A. Harja
Executive Director

116 State Capitol Building
Salt Lake City, Utah 84114
(801) 538-1027
Fax (801) 538-1547

August 28, 1995

Robert Williams
US Department of the Interior
Fish and Wildlife Service
Suite 404 Lincoln Plaza
145 East 1300 South
Salt Lake City, Utah 84115

LATE
postmarked August 29, 1995

SUBJECT: Washington County Desert Tortoise Incidental Take Permit Application/Documents
State Identifier Number: UT950718-020

Dear Mr. Williams:

The Resource Development Coordinating Committee (RDCC), representing the State of Utah, has reviewed this proposal and has no comments at this time. 18-1

The Committee appreciates the opportunity to review this proposal. Please direct any other written questions regarding this correspondence to the Utah State Clearinghouse at the above address or call Carolyn Wright at (801) 538-1535 or John Harja at (801) 538-1559.

Sincerely,

Brad T. Barber
State Planning Coordinator

BTB/ar

Responses to Comments

18. **Brad T. Barber; State of Utah, Governor's Office of Planning and Budget (late)**

18-1. Thank you for your review.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

UTAH FIELD OFFICE
LINCOLN PLAZA
145 EAST 1300 SOUTH, SUITE 404
SALT LAKE CITY, UTAH 84115

In Reply Refer To

July 18, 1995

Dear Reviewer:

Upon your request, the U.S. Fish and Wildlife Service (Service) has sent you a copy of the *Washington County, Utah Desert Tortoise Incidental Take Permit Application/Documents*, consisting of four parts in one bound volume:

Part I.	Application Form
Part II.	Proposed Washington County, Utah Habitat Conservation Plan (PHCP)
Part III.	Draft Environmental Impact Statement for Incidental Take Permit Issuance for Desert Tortoise, Washington County, Utah (DEIS)
Part IV.	Draft Implementation Agreement (DIA)

The Service would like to clarify that there are some pages intentionally left blank in the document, for pagination purposes. Also, the Service would like to clarify the format of the legal descriptions of land parcels in several of the tables.

As you review the documents, please note that the following pages are intentionally left blank:

Part II (PHCP): viii, 4, 12, 18, 20, 24, 26, 50, 54, reverse of 93, reverse of 94, 102, 138, 168, 174, 180, and 184.
Part III (DEIS): 24, 34, 36, 106, 112, and 138.
Part IV. (DIA): iv.

Also, please note that in Part II (PHCP), the legal descriptions of land parcels include Townships and Ranges followed by an "03" and "04," respectively. The "03" stands for south, and the "04" stands for west. For example, Township 4103 refers to Township 41 South, and Range 1604 refers to Range 16 West. You will find this numbering convention in the following portions of the PHCP: Tables 3.3 through 3.6 and Tables 4.4 through 4.12, found on pages 33 through 89.

Thank you for your attention to these documents and to the Washington County habitat conservation planning process.

Sincerely,

Robert D. Williams
Assistant Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region

IN REPLY REFER TO:

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225

STREET LOCATION:
134 Union Blvd.
Lakewood, Colorado 80228

ES/TE/Habitat Conservation
Plan--Washington County
Mail Stop 60120

July 14, 1995

Dear Interested Party:

Enclosed for your review is a copy of the *Washington County, Utah, Desert Tortoise Incidental Take Permit Application/Documents*, consisting of four parts in one bound volume:

Part I. Application Form,
Part II. Proposed Washington County, Utah, Habitat Conservation Plan,
Part III. Draft Environmental Impact Statement for Incidental Take Permit Issuance for Desert Tortoise, Washington County, Utah, and
Part IV. Draft Implementation Agreement.

Parts I, II, and IV were prepared by Washington County and submitted to the Fish and Wildlife Service in compliance with the Endangered Species Act. Part III was prepared by the Service, in compliance with the National Environmental Policy Act.

Your comments are valuable to us. Please give the *Application/Documents* a close review. The Service will forward any and all of your comments on the application, proposed habitat conservation plan, and draft implementation agreement (Parts I, II and IV) to Washington County for its review and use in finalizing Parts I, II, and IV. Where possible, any and all of your comments on all parts of the *Application/Documents* will be reviewed by the Service and the County. The Service will consider all comments in finalizing the environmental impact statement (Part III). The Notice of Availability of these documents, which began the 45-day comment period, was published in the July 14, 1995, issue of the Federal Register.

Please address written comments only to be received or postmarked by August 28, 1995, to:

Robert D. Williams
U.S. Fish and Wildlife Service
Utah Field Office
145 East 1300 South, Suite 404
Salt Lake City, Utah 84115

I appreciate your interest in the conservation of threatened and endangered species and thank you for your participation in the Washington County Habitat Conservation Planning process.

Sincerely,

Terry Terrell

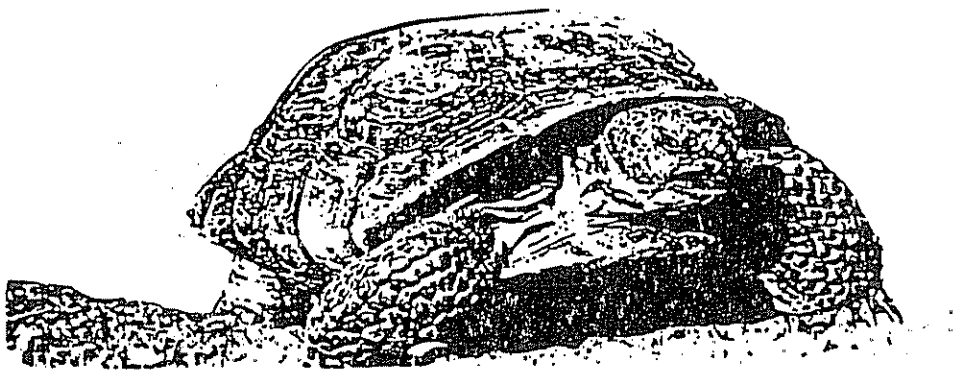
TERRY T. TERRELL

DEPUTY Regional Director

WASHINGTON COUNTY, UTAH
DESERT TORTOISE INCIDENTAL TAKE PERMIT
APPLICATION/DOCUMENTS
Part IV

Final
Implementation Agreement
Habitat Conservation Plan
Washington County, Utah

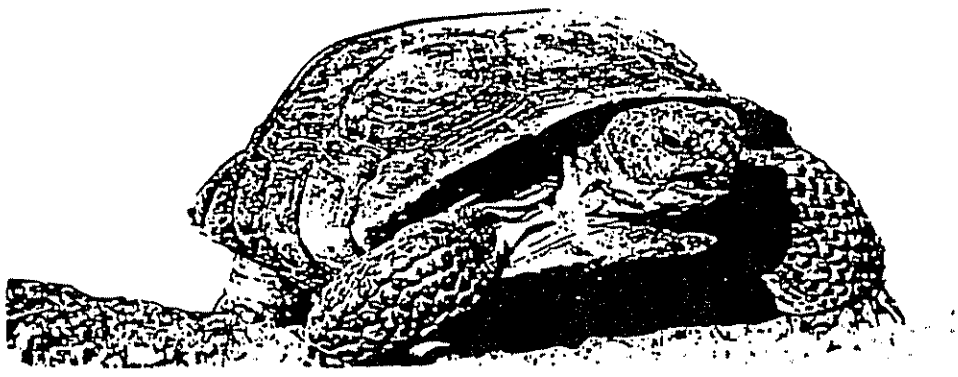
December 1995



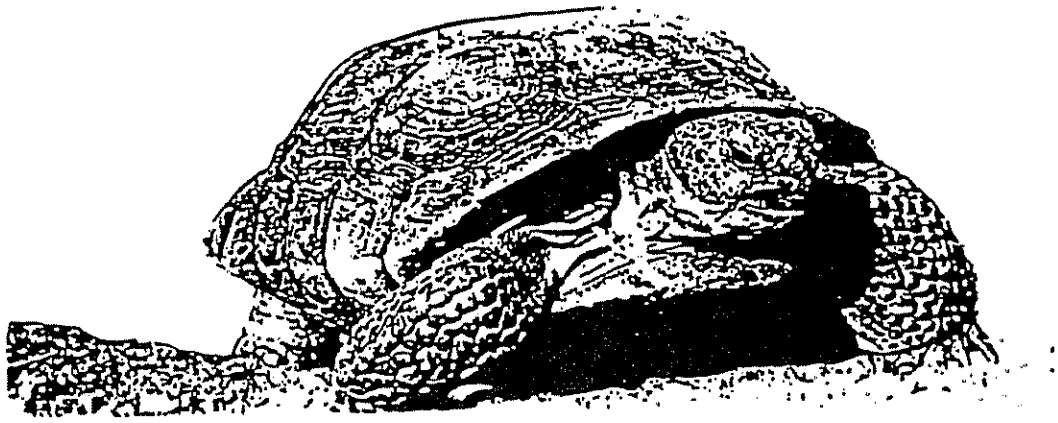
WASHINGTON COUNTY, UTAH
DESERT TORTOISE INCIDENTAL TAKE PERMIT APPLICATION/DOCUMENTS
Part IV

Final
Implementation Agreement
Habitat Conservation Plan
Washington County, Utah

December 1995



IMPLEMENTATION AGREEMENT



WASHINGTON COUNTY, UTAH
HABITAT CONSERVATION PLAN

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THIS AGREEMENT is made and entered into as of the _____ day of _____, 1995, by and between the United States Fish and Wildlife Service (USFWS), the United States Bureau of Land Management (BLM), State of Utah (acting through the Utah Department of Natural Resources [UDNR]), Washington County (the County), and the City Ivins located within Washington County, Utah (collectively, the Cities).

For and in consideration of the mutual covenants and conditions contained herein, the parties hereto do hereby agree as follows:

I. DEFINITIONS

Terms defined and utilized in the HCP and the ESA shall have the same meaning when utilized in this Agreement, except as specifically noted.

A. The term "Biological Opinion" means the biological opinion issued by USFWS as part of the Section 7 consultation under ESA for the Washington County Incidental Take Permit issuance on _____, 1995.

B. The term "ESA" means the Endangered Species Act of 1973, as amended, 16 U.S.C. §§ 1531-1543.

C. The term "FLPMA" means the Federal Land Policy and Management Act of 1976, 43 U.S.C. §§ 1701 *et seq.*

D. The term "HCP" means the "Washington County Habitat Conservation Plan," dated December1995, as approved by USFWS on _____, 1995.

E. The term "Interstate Land Exchange" refers to a proposed private-federal land exchange between private landowners within the Reserve and the BLM involving public and private lands in at least two states.

F. The term "Intrastate Land Exchange" refers to one or more proposed private-federal land exchanges between private landowners within the Reserve and the BLM involving public and private lands only in Utah.

G. The term "Landowners" or "Landowner" means title holders or other persons or entities who own or have a right to acquire fee ownership of lands. In this context, the term "Landowner" does not refer to any Party.

H. The term "Listed Species" means and refers to the: Mojave desert tortoise (*Gopherus agassizii*), peregrine falcon (*Falco peregrinus*), bald eagle (*Haliaeetus leucocephalus*), woundfin (*Plagopterus argentissimus*), Virgin River chub (*Gila robusta seminuda*), dwarf bear-claw poppy (*Arctomecon humilis*), Siler pincushion cactus (*Pediocactus sileri*),

southwestern willow flycatcher (*Empidonax traillii extimus*) and Mexican spotted owl (*Strix occidentalis lucida*).

I. The term "National Conservation Area" means an official designation of land made by the United States Congress.

J. The term "Participating Cities" means those cities and towns which have signed an interlocal agreement with Washington County in conjunction with the HCP.

K. The term "Party" means only a signatory to this Agreement.

L. The term "Permit" means an incidental take permit issued pursuant to Section 10(a)(1)(B) of the ESA.

M. The term "Reserve" means the lands designated pursuant to the HCP which would be reserved and managed for the benefit of the Mojave desert tortoise and dwarf bear poppy as well as associated desert species.

N. The term "Species of Concern" means the species found in Washington County which were candidates or proposed for listing, on the Endangered Species List at the time of HCP submission, and any additional species which are described in the HCP.

O. The term "Take Areas" means those areas identified in the HCP in which incidental take of the Mojave desert tortoise will be allowed.

P. The term "Tortoise" means the Upper Virgin River Recovery Unit of the Mojave population of the desert tortoise (*Gopherus agassizii*).

Q. The term "Unforeseen Circumstances" means an unforeseen and significant adverse change in:

i. The population of the tortoise throughout the Upper Virgin River Recovery Unit of the Mojave population;

ii. The population of another Listed Species for which the HCP has provided the basis for issuance of a permit under Section 10(a)(1)(B) of the ESA; or

iii. The habitat or natural resources of the Reserve lands which is likely to lead to a significant loss of the tortoise or another Listed Species throughout the Upper Virgin River Recovery Unit.

II. RECITALS

This Agreement is entered into based upon the following:

A. Listing

The tortoise was listed as a threatened species in a final rule making of USFWS on April 2, 1990, pursuant to the provisions of the ESA. Critical habitat for the tortoise was published in the Federal Register on February 8, 1994. Eight other Listed Species are found in the planning area addressed by the HCP.

B. Habitat Conservation Plan

Because of the potential conflict between the protection and conservation of the Listed Species and proposed or anticipated development activities within the HCP area, the parties hereto have participated in a planning process convened and directed by the County to develop an HCP, pursuant to the provisions of Section 10(a)(1)(B) of the ESA. The HCP proposes a cooperative Federal, State and local program of conservation for the tortoise and its habitat. In October, 1995, the County submitted the HCP to USFWS with a request that USFWS issue a permit to allow Tortoises to be incidentally taken within the permit Area.

The HCP is intended to provide for the continued existence and enhancement of the tortoise in the Upper Virgin River Recovery Unit , thereby providing a basis for the USFWS to issue the permit. The HCP may also provide for the continued existence and enhancement of other Listed Species and Species of Concern which occupy the same habitat. The HCP includes provisions for the establishment of public ownership of habitat and funding for the ongoing maintenance of such habitat. The HCP also provides for incidental take of habitat devoted to urban uses (including, among others, residential, commercial, industrial, and recreational uses).

Studies conducted by Federal land management personnel and consultants to the County, together with independent reviews by USFWS, have concluded in a biological opinion that the HCP will not jeopardize the continued existence of the tortoise and other listed species; that the HCP will, to the maximum extent practicable, mitigate and minimize the taking of the tortoise; that any such taking will be incidental; that the HCP promotes the long-term conservation of the tortoise; that any take contemplated hereby will not appreciably reduce the likelihood of the survival and recovery of the tortoise in the wild, and that the HCP will be implemented as discussed in greater detail below.

C. Interlocal Agreement

An Interlocal Agreement to implement the fee collection aspects of the HCP and agreeing to the terms and condition of the HCP has been prepared by Washington County and approved by the following municipalities: Hurricane, Ivins, Rockville, St. George, Santa Clara, Springdale, Virgin, and Washington.

D. Issuance of Permit

The USFWS will issue a permit concurrently with the execution of this Agreement in response to Washington County's application. Issuance of the permit is a condition precedent to the performance of this Agreement, which shall not become effective or binding upon any Party unless and until the permit has been issued. Preparatory to issuance of the permit, the USFWS will take action in accordance with applicable law and issuance of the permit will be based only upon finding, after appropriate opportunity for public comment and appropriate NEPA compliance, that:

1. Incidental Take

Any permitted taking of the subject listed species will be incidental to the carrying out of otherwise lawful activities; and,

2. Minimize and Mitigate

The HCP and this Implementation Agreement will, to the maximum extent practicable, minimize and mitigate the impacts of such incidental taking; and,

3. Adequate Funding

The funding sources identified and provided for herein will ensure that adequate funding for the HCP will be provided; and,

4. No Likely Jeopardy

Any permitted taking of the tortoise will not appreciably reduce the likelihood of the survival and recovery of the tortoise in the wild; and

5. Other Measures

Any other measures set forth in the HCP and required by the USFWS as being necessary or appropriate for the purposes of the HCP will be fulfilled.

E. Monitoring by USFWS

After issuance of the permit, the USFWS will monitor the implementation thereof, including, but not limited to the management, maintenance and monitoring of the Reserve in order to ensure compliance with the permit, the HCP and this Agreement. In addition, the USFWS shall, to the maximum extent possible, ensure the availability of its staff to cooperate with and provide technical and research assistance to the parties.

III. GENERAL TERMS

A. Incorporation of HCP

The HCP and each of its terms are intended to be, and by this reference are, incorporated herein. In the event of any direct contradiction between the terms of this Agreement and the HCP, the terms of this Agreement shall control. In all other cases, the terms of this Agreement and the terms of the HCP shall be interpreted to be supplementary to each other.

B. Cooperative Effort

In order that the legal requirements set forth in this Agreement are fulfilled, each of the parties to this Agreement shall perform the tasks set forth herein. This Agreement thus implements the cooperative Federal, State and local program of conservation for the tortoise, other Listed Species and Species which may benefit under the HCP.

C. Purposes

The purposes of this Agreement are:

1. To assure the implementation of each of the terms of the HCP.
2. To specify the obligations, responsibilities and tasks assigned to each of the parties pursuant to the terms of the HCP.
3. To provide remedies and recourse should any Party fail to perform its obligations, responsibilities and tasks as set forth in this Agreement.

IV. ADMINISTRATION OF THE HCP

The administration of the HCP shall be conducted in accordance with its terms, as follows:

A. Washington County

Washington County will administer the HCP. For details, see Chapter 6.0, starting on page 103, of the HCP.

B. HCP Administrator

The HCP administrator will be employed by Washington County to administer the HCP under County authority. For details, see page 103 in HCP.

C. HCP Biologist

See page 105 in HCP.

D. Habitat Conservation Advisory Committee (HCAC)

See pages 105-106 in HCP.

E. Technical Committee (TC)

See page 106 in HCP.

V. RESERVE ACQUISITION AND MANAGEMENT

A. Acquisition

Acquisition of Reserve lands will be facilitated by the County. Landowners have been consulted throughout the HCP process and have been encouraged to participate in these land exchanges. In the event they do not, the HCP will have no legal effect on their property and will place no restrictions on use of their property within the Reserve. However, such lands will not receive the benefits of the permit and non-participating entities owning land within the Reserve will remain subject to Section 9 enforcement provisions of the ESA.

Four methods have been identified for creation of the Reserve: (1) consolidation of lands through exchanges, (2) purchase of lands by Land and Water Conservation Fund (L&WCF), (3) purchase of conservation easements, and (4) donations.

Properties to be acquired for the Reserve have been identified by legal description, tax assessor number, current landowner, and approximate acreage in Tables 3.2 - 3.6 (pages 29, 31-32, 36-39, 41, and 45) in the HCP. This section briefly explains the methods by which these properties will be acquired.

1. Exchange

a. State School Trust Lands - BLM Land Exchange

This exchange is described on page 24 of the HCP. A Memorandum of Understanding (MOU) between the State of Utah and BLM to guide the exchange of lands within the proposed Reserve boundaries for BLM lands elsewhere in the State of Utah has been signed.

b. Private Lands - BLM Land Exchange (Interstate and Intrastate Land Exchanges)

The interstate and intrastate land exchanges are described on page 24 of the HCP.

2. Land and Water Conservation Fund Purchase

Some funds appropriated for the L&WCF have been made available for land acquisition for the Reserve in FY 1995. The owners of lands constituting tortoise habitat of a nature which would justify the use of L&WCF for acquisition have been identified.

3. Conservation Easements

Should acquisition or exchange of certain lands within the proposed Reserve prove to be unnecessary or infeasible, the County will seek to acquire conservation easements or other protective mechanisms, creating the required protection for Reserve lands without fee simple acquisition of those lands. Such conservation easements preferably in perpetuity are acceptable for fulfillment of the permit, granted in perpetuity or for so long as such protection is required by the ESA, whichever is less.

4. Donation

Donation of Reserve lands by landowners is acceptable to help accomplish Reserve acquisition goals.

5. Facilitation of Acquisition

The HCP has established a fund of $1,000,000 to be used for the facilitation of acquisition of Reserve lands. These funds will be disbursed by the HCP administrator, based on recommendations by the HCAC, and upon approval by the County.

6. Reports

The County will report on acquisition activities in quarterly and annual reports. USFWS will annually evaluate the level of progress toward total Reserve acquisition. Five years following permit issuance, USFWS will make a determination whether adequate progress toward Reserve acquisition has been made. If the level of progress is determined to be inadequate, then USFWS will enter into discussions with the County and the HCAC to consider Reserve acquisition alternatives.

B. Operation of the Reserve

Reserve management and monitoring are discussed on pages 99-100 in the HCP.

The Reserve has been divided into five zones, as detailed in Chapter 3 of the HCP. The management responsibility for each of these zones is proposed to be as follows:

Zone	Management Agency
Zone 1	Town of Ivins/BLM
Zone 2	State Parks/Town of Ivins/BLM
Zone 3	BLM
Zone 4	BLM
Zone 5	BLM

Each Party listed above will manage the lands owned or otherwise controlled by it within the Reserve consistent with the HCP and this Agreement.

The County has sought the support of the State of Utah, BLM and the Utah Congressional Delegation for designating the Reserve, or those portions managed by BLM as public lands, as a National Conservation Area (NCA) to be managed by the BLM. The BLM will have no management authority over private, State Park lands, or State School Trust lands within the Reserve boundary.

C. Plans to be Prepared

The following plans will be prepared following permit issuance:

Agency	Plan	Time Frame	Funding
County	Interpretation and Education Plan	2 yrs	County
USFWS	Tortoise Translocation Plan	5 yrs*	USFWS
UDWR	Tortoise Monitoring Plan	2 yrs	County/ State
UDPR	Tortoise Management Plan (Snow Canyon)	2 yrs	County/ State
BLM	Dixie Resource Area RMP	2 yrs	County/BLM
BLM	Dixie Resource Area Activity Level Plan	5 yrs	County/BLM
Washington Co. Water District	Virgin River Conservation & Habitat Management Plan	18 mos	Water District

* 6 Months after completion of study

D. HCP Funding Contributions

The HCP will provide interim funding to the BLM for Reserve planning and management in ten semi-annual installments of $25,000, for a total of $250,000 over five years. These funds will be disbursed for five years, with payments starting within 90 days of permit issuance, and continuing every six months thereafter, for a total of 10 payments over five years.

The HCP will provide $50,000 to UDNR to help fund the development of its tortoise management plan and associated management activities. These funds will be disbursed semi-annually over two years, with payments starting within 90 days of permit issuance, and continuing every six months thereafter, for a total of 4 payments over two years.

E. Purchase of Grazing Permits

The grazing purchase program is described on page 100 of the HCP.

F. Fencing

Three types of fencing barriers are envisioned per the HCP (pages 93-94). The first is a barrier which keeps human activities and pets out and keeps tortoises in. Approximately 26 miles of this type of barrier will be installed by the parties stated in the following areas where geographic features are not adequate barriers.

Party Responsible	Fence Location
Landowner/Developer	Ivins through Padre Canyon to Snow Canyon Road, on the southern Reserve line
Landowner/Developer	Paradise Canyon: both northern and southern Reserve lines
Landowner/Developer	Winchester Hills: southern and eastern portions, where cliffs would not prevent incursion into the Reserve from the west by humans and pets
Landowner/Developer	Middleton to the North Washington Reserve line
Landowner/Developer	North Washington Reserve line
Landowner/Developer	Eastern Reserve boundary at property line west of Red Cliffs Rd

The second type of barrier would be a tortoise proof fence, which would be constructed along roughly 19 miles in areas where geographic features are not adequate, as follows:

Party Responsible	Fence Location
Landowner/Developer	Reserve boundary from Snow Canyon Road to Paradise Canyon
City of St. George	Skyline Drive (north side)
FHWA/UDOT	Utah Highway 18 (both sides)
FHWA/UDOT	West side of Interstate 15

As BLM acquires non-federal lands in the HCP area along SR-18, it will coordinate with UDOT to ensure a right of way width between 200 and 300 feet to facilitate desert tortoise protection with fencing. The third type of fence would be a range fence to protect endangered plant areas, totalling about 26 miles, in areas shown on Figure 5.1 in the HCP.

Vehicle barriers are proposed for the following locations:

Party Responsible	Vehicle Barrier Location
UDNR	Gate to remain on dirt road to St. George well site off Snow Canyon Road
St. George City	Gate roads off of Skyline Drive, east of U-18, which provide utility access
Washington City	Gate two utility access roads off the north end of the North Washington Reserve line
UDOT	Gate road off I-15, heading west, about 1.5 miles south of the Red Cliffs Road
County	Cottonwood Road will either be gated where it crosses the northern and southern boundary of the Reserve, or it will be fenced.

Maintenance of tortoise fences will be conducted by the agency or landowner responsible for their construction. Inspection of fences will be the responsibility of the County.

G. Law Enforcement

Law Enforcement is discussed on pages 94 and 97 in the HCP. Funds from the HCP will be disbursed quarterly to the BLM and UDNR in February, May, August, and November, for a period of five years. Funding for law enforcement will be initiated between 90 and 180 days following permit issuance.

UDNR and BLM law enforcement positions will be new positions over and above existing manpower levels and be stationed in St. George due to need for timely response to HCP issues. They will be responsible for enforcement of HCP Reserve regulations, and all laws and regulations (local, State, and Federal) which pertain to the protection and conservation of threatened, endangered, candidate, and Utah sensitive species and their habitats. Specific duties, assignments, and responsibilities of these positions will be outlined in annual work plans submitted by the respective agency to Washington County through the HCAC. Similarly, summary reports will be provided annually by these two agencies to Washington County. Law enforcement personnel will be required to document all work on daily activity logs and bi-weekly time sheets or time and activity sheets. Personnel in the new UDNR and BLM enforcement positions will be required to devote at least 66 percent of their annual work load to enforcement related to the Washington County HCP. The remaining 34 percent of each agency's enforcement responsibilities may be accomplished by additional law enforcement personnel from the agency during periods of peak activity.

H. Education

See page 97 in the HCP.

I. Management of Taken Tortoises

Translocation is discussed on pages 97-98 in the HCP. Major responsibilities and tasks are as follows:

Task	Responsible Party
Notification to HCP administrator, prior to subdivision grading, that site will be graded.	Land Owner
Scheduling of survey and tortoise removal, if done by County.	HCP Biologist
Alternative list of consultants made available to landowner for tortoise survey.	HCP Biologist and/or Administrator
Standardized survey forms to document survey results.	HCP Biologist and/or Administrator
Survey audit.	UDNR
Removal of tortoises from property.	HCP Biologist/Administrator or Consultant retained by the Landowner
Temporary tortoise care for translocation research (1-5 yrs)	HCP Biologist and/or Administrator
Receipt, health tests, and translocation of tortoises (1-5 yrs).	USFWS/Research
Management of taken tortoises (6-20 yrs).	HCP Biologist and/or Administrator

J. Other Species Enhancement

See pages 100-102 in the HCP.

K. Ordinances

The following ordinances have been or will be enacted by the County for areas within its jurisdiction to implement the management objectives identified in the HCP:

Ordinance	Purpose
Leash Law	To require that all dogs must be on leash within the Reserve and in areas adjacent to the Reserve.
Firearms	To prevent the discharge of firearms within the Reserve except during regulated hunting seasons.
Development Code	To require density restrictions, native vegetation, and open space within Zone 1 of the Reserve in Ivins.
Fencing/Walls	To require that developers establish fences/walls as specified in the HCP at the boundary between their property and the Reserve.
Vehicle Speed	To minimize probability of vehicle strike of tortoise on the Tuacahn and Cottonwood Roads.
Off-Road Vehicles	To prevent the use of off-road vehicles within the Reserve.

The County will exercise its best efforts to ensure that such ordinances are also adjusted by each participating city.

L. Assurances

A primary purpose of this Agreement is to provide for the long-term reconciliation of the concerns of the parties regarding the protection and enhancement of the tortoise and the present and prospective urban uses within the area (including but not limited to residential, commercial, industrial and public service uses), by providing for the Reserve and the take areas, resulting in the issuance of the permit.

The participating cities have entered into agreements with the County which require that they and each of them will pay or arrange for the payment of significant sums of money over time and to convey substantial and valuable parcels of real property in order to establish, fund, and maintain the HCP implemented by this agreement so as to provide a legal basis for issuance by USFWS of the permit. This agreement does not create, deny, or abridge any claim or cause of action which the cities or any of them may assert against any Party hereto.

The USFWS and BLM intend to fulfill their responsibilities as set forth in this Agreement completely and expeditiously. Both BLM and USFWS will, to the maximum extent practicable, allocate sufficient staff and financial resources as may be necessary to accomplish these goals as required herein. USFWS shall include in annual budget requests sufficient funds to fulfill its obligations under this Agreement and the HCP. BLM shall likewise include in annual budget requests sufficient funds to fulfill its obligations under this Agreement and the HCP.

Based upon the performances and commitments specified in this Agreement and the HCP, USFWS will issue a permit as provided by 16 U.S.C. 1539 and 50 C.F.R. 17.22. The permit will be issued based upon the best scientific information currently available to USFWS, and will constitute compliance by the County, participating cities, and the landowners whose property is included in the HCP, with all provisions of the ESA. Except as provided under Section VIII.B.2, no further mitigation or compensation shall be required of any Landowner or participating city who has complied with requirements set forth under this Agreement or parties (if different from permit applicants) with respect to the "take areas" to provide for the conservation, protection, or enhancement of the tortoise.

M. Development of Take Areas

1. Specific Duties

a. Survey and Removal

Survey and removal requirements are detailed on pages 110, 113, and 115 of the HCP for incidental take areas and on page 115 of the HCP for potential habitat areas.

b. Reporting

Reporting requirements are detailed on page 113 of the HCP.

N. Monitoring and Enforcement by County

The County shall monitor compliance by the participating cities with the obligations set forth in this Agreement and in the HCP with respect to the lands over which the participating cities have jurisdiction and shall strictly enforce the terms of Section VI.C.2., below.

O. Incremental Implementation of Take

Lands will be released for take as lands are acquired for the Reserve and/or mitigation monies are expended. Incidental take will be allowed according to the schedule presented in Table 2, based on expenditures in various categories and acquisition of certain Reserve habitats. Release of an acre of incidental take will result from expenditures from $1,000 to $10,000 depending on the activity funded (see Table 2). For habitat acquisition, an acre of take will be released for every 2.3 acres acquired within the Reserve.

Pro rata acreage will be considered released for take the day the County issues a check in support of any of the expenditures shown in Table 2 and the day Reserve acreage is legally acquired. The County will determine the specific areas selected for any given take.

Table 2. **Incremental Implementation Release Schedule.**

Increment Per Acre Released	Category	Total Budget	Total Acres Released
$1,000	Law Enforcement	$650,000	650
	Habitat Acquisition	$1,000,000	1,000
	Fencing	$500,000	500
	Monitoring	$1,000,000	1,000
	Habitat Acquisition for Other Species	*	*
	HCP Biologist	$760,000	760
$5,000	Grazing Permits	$175,000	35
	Education	$500,000	100
	Translocation	$240,000	48
$10,000	Reserve and HCP Administration	$1,780,000	178
Acquisition of 2.3 acres	Preserve Lands	18,428 acres	7,993
Total Released for Incidental Take			12,264

* If habitat is acquired for other species, it is possible that the number of acres which could be released under this incremental implementation schedule could exceed the number allowed under the HCP. It should be made clear that the only way the number of acres released for incidental take would exceed the number requested in the permit would be by amendment.

P. Non-Signatory Properties

It is recognized that certain properties may become covered by this Agreement and the Federal permit issued contemporaneously with the approval of this Agreement, the owners of which are not signatories hereto. The parties shall facilitate the development of these properties consistent with the ESA by allowing them to be included within the permit and the funding mechanisms as provided for herein. Notwithstanding any other provision of this Agreement, any such property or property owner shall not be bound by any funding requirement established pursuant to this Agreement unless such property owner voluntarily so elects at the time approval for subdivision or other development approval of that property is sought. A property owner who seeks any discretionary development approval will be required to agree as a condition of such approval to participate in the funding mechanism established pursuant to this Agreement in order to receive the benefits conferred by the permit. Such property owners may elect to be excluded from the permit and be covered by otherwise applicable law, including the prohibition against takings of listed species as provided in the ESA.

Q. Unforeseen Circumstances

In response to unforeseen circumstances, any Party to the Implementation Agreement may request the HCAC to meet to discuss appropriate amendments to the HCP.

R. Listing of Additional Species

Should species identified as proposed or candidate species be listed pursuant to the ESA subsequent to this Agreement, the USFWS will evaluate the HCP as it exists at the time of the subsequent listings to determine whether or not the HCP would support the issuance of permits under Section 10(a) of the ESA for those species.

S. Duration of Reserve

Irrespective of the length of the permit granted by the USFWS, the parties recognize that once Tortoises have been taken and their habitat modified within the permit area by development of the take areas as authorized in the permit, the take and habitat modification will be permanent. Therefore, lands which have been placed in the Reserve prior to any termination or modification of this Agreement or the HCP shall remain in protected status so long as such protection is necessary to meet the requirements of the ESA.

VI. FUNDING PROGRAM

A. Funding Sources

Funding sources are described on pages 108-110 of the HCP.

B. Interim Funding

Interim sources of funding or loans will be sought by the parties to provide start-up monies.

C. Failure to Meet Funding Obligation

1. County

In the event that the County is unable to meet all or part of its funding obligation, the County will enter into discussions with USFWS to discuss feasible alternatives which can accomplish the requirements as stated in the HCP. In the event that funding cannot continue at committed levels, then an amendment procedure may be initiated. In the event that the County cannot continue to make payments as specified in the HCP or worked out through an amendment procedure, then the County's obligation to make payments required above shall terminate and the County shall thereafter have no obligation to make further payments and the USFWS may initiate action under Section VIII.B.2 of this Agreement.

2. Participating Cities

If any Participating City fails to meet its funding obligation as set forth in the Interlocal Agreement, fails to enact the ordinances specified in Section V.K, above, or fails to issue and enforce stop orders immediately upon determination that there has been grading without following established protocols, and that City is unable to provide a satisfactory solution, the City shall lose its benefits under the Permit. In the event of and upon the commencement of any new proceedings or the revival of any prior proceeding for development approvals with respect to any area for which rights and benefits under the permit have been forfeited under this paragraph, the City seeking such approvals shall, as a condition precedent to the commencement or revival of such proceedings, be required to pay to the County all amounts which would have been paid (but which were not paid) by the City prior to such time, but for the prior abandonment, and shall thereafter continue to be required to pay to the County the amounts payable as provided in the HCP.

VII. OBLIGATIONS AND PROGRAMS OF THE PARTIES

All parties to this Agreement shall participate in an annual HCP Implementation Review Meeting and encourage public input at that time. The meetings shall begin one year from the date of issuance of the permit. Additionally, the parties to this Agreement shall have the following obligations and responsibilities:

A. County

The County shall:

1. Use its best efforts to ensure that the private and State school and institutional trust lands within the Reserve are acquired and ownership of title or rights are acquired and transferred to the BLM or UDNR as appropriate.

2. Assist in the implementation and observation of this Agreement with respect to the Take Areas as provided in Section V.M.

3. Participate in the funding program as provided in Section VI.

4. Generally use and exercise the rights and authority available to them in furthering the purposes of and assuring compliance with the terms of this Agreement.

5. Comply with and enforce the conditions of the permit.

6. Issue and enforce stop work orders within its jurisdictional boundaries immediately upon notice of any grading outside the grading boundaries as shown on an approved grading plan. The County may exercise this authority based upon the agreement, its police

power, the permit, or any contractual agreements with the Cities or developers to enforce the HCP and the conditions of the permit.

7. Make available to USFWS pertinent records relating to expended funds for HCP implementation.

8. The parties recognize that the County requires broad discretion in the operation of the HCP and listing the above obligations is not intended to restrict that discretion.

9. Organize the annual HCP Implementation Review Meeting.

B. Town of Ivins

The Town of Ivins shall:

1. Cooperate with the County in the operation and administration of the Reserve as provided in Section V.

2. Assist in the implementation and observation of this Agreement with respect to the Take Areas as provided in Section V.M.

3. Participate in the funding program as provided in Section VI.

4. Generally use and exercise the rights and authority available to it in furthering the purposes of and assuring compliance with the terms of this Agreement.

5. Comply with and enforce the conditions of the permit and the terms of this Agreement within its jurisdictional boundaries. That enforcement authority includes the issuance of stop work orders.

6. Issue and enforce a stop work order immediately upon its determination that there has been grading outside the grading boundaries as shown on the recorded plat. The Town may exercise this authority based upon the agreement, the police power, the permit, or any contractual agreements with developers to enforce the HCP and the conditions of the permit.

C. UDNR

Subject to the availability of funds and personnel, UDNR will coordinate its endangered species program with this HCP to include, among other things, the following:

1. Cooperate in the preparation and publication of public information brochures.

2. Generally use and exercise the rights and authority available to it in furthering the purposes of and assuring compliance with the terms of this Agreement

3. Provide expertise for consideration of and programs for the Species of Concern and coordinate monitoring of the Reserve.

4. Make available to the County, ESA Section 6 monies received from USFWS.

5. Participate in the TC and HCAC.

6. Participate in management of relevant areas of Zone 2 of the Reserve.

7. Conduct periodic audits of surveys and removals.

8. Issue permits for tortoise surveys and removals to qualified individuals.

9. Coordinate monitoring of the Reserve and make available ESA Section 6 monies received from the USFWS.

D. BLM

The BLM will hold primary responsibility for the management of Zones 3, 4, and 5 of the Reserve, as follows:

1. As signatories to an MOU with the State, they will carry out their agreement to exchange BLM lands outside of the Reserve for State lands within the Reserve.

2. As parties to the interstate land exchange and individual Landowner exchanges, they will work to gain title subject to FLPMA.

3. Assist with law enforcement, fencing and other duties as detailed in this Agreement and in the HCP.

4. Manage Zones 3, 4, and 5 of the Reserve, and participate in the management of relevant portions of Zone 2 of the Reserve.

E. USFWS

1. The USFWS will conduct translocation research of tortoises removed from Take Areas in accordance with the HCP and make available pertinent records related to expended funds so the County can plan for possible relocation needs in years 6-20.

2. The USFWS will conduct an annual review of the translocation project and provide these results to the County for comment.

3. The USFWS will, to the maximum extent possible, ensure the availability of staff to cooperate with and provide technical assistance to issue necessary permits for County in its administration of the HCP.

VIII. REMEDIES AND ENFORCEMENT

A. Remedies in General

Each of the parties hereto shall have all of the remedies available in equity (including specific performance and injunctive relief) and at law to enforce the terms of this Agreement, and to seek remedies and compensation for any breach of this Agreement.

B. Section 10(a)(1)(B) Permit

1. Authority of County

The County shall not have the right or authority to terminate or suspend the permit, except that the County shall have the right to revoke, terminate or suspend a participating City's right to enjoy or have the benefit, rights and privileges under the permit if a City does not comply with the terms and conditions of this Agreement, whether or not the City is a signatory there to. The County shall promptly notify USFWS in writing of any action which would provide the basis for such revocation, termination or suspension.

2. Permit Revocation, Termination, and Suspension

a. Suspension

i. The USFWS may suspend the permit for any material violation of the permit or this Agreement as follows.

ii. The USFWS shall not suspend the permit without first: (a) requesting the County to take appropriate remedial or enforcement action; and (b) providing to the County notice in writing of the facts or conduct which may warrant the suspension and a reasonable opportunity to demonstrate or achieve compliance with the permit and this Agreement.

iii. Any suspension under this subsection 3(a) shall be lifted immediately upon the reasonable determination by the USFWS that the violation(s) has been effectively redressed. As soon as possible, but no later than 30 working days, after any suspension under this subsection, the USFWS shall consult with the County concerning actions to be taken to effectively redress the violation(s) that necessitated the suspension. At the conclusion of such consultations, the USFWS shall make a determination of the actions necessary to effectively redress the violation(s). In making this determination, the USFWS shall consider the

conservation needs of the species concerned and any comments or recommendations received during the consultations. As soon as possible, but no later than 30 working days, after conclusion of the consultations, the USFWS shall transmit to the County written notice of the USFWS determination of the actions necessary to effectively redress the violation(s). Upon performance of the necessary actions specified by the USFWS in its written notice, the USFWS shall immediately lift the suspension.

iv. It is the intent of the parties that in the event of any suspension of the permit, all parties shall act expeditiously to cooperate to lift any suspension of the permit to carry out the objectives of this Agreement. Notwithstanding any provision of this subsection VIII.B.2.a, no suspension of the permit, or the rights, benefits or privileges of the permit shall extend beyond a period of 180 days, unless the USFWS makes the determinations required by subsection VIII.B.2.b below.

b. Revocation or Termination

i. The USFWS shall not revoke or terminate the permit for a violation of the permit or this Agreement unless the USFWS determines that such violation: (a) involves an unauthorized taking of a tortoise; and (b) has significantly and adversely affected such species throughout the Upper Virgin River Recovery Unit; and (c) cannot be effectively redressed by other remedial or enforcement action, including remedies resulting from the process specified in subsection VIII.B.2.a.

ii. The USFWS shall not revoke or terminate the permit without first: (a) requesting the County to take appropriate remedial or enforcement action; and (b) providing to the County notice in writing of the facts or conduct which may warrant the revocation or termination and a reasonable opportunity (but not less than 60 days) to demonstrate or achieve compliance with the permit and this Agreement.

iii. In the event that the USFWS revokes or terminates the permit or the rights, benefits or privileges of the permit, the County shall be relieved from any and all obligations to provide further mitigation or compensation as provided in this Agreement, including, but not limited to, any funding or lands.

c. Severability

Subject to the provisions of subsections VIII.B.2.a and VIII.B.2.b, suspension, revocation or termination of the permit (or any rights, benefits or privileges of the permit) in regard to a particular management Zone or City shall not result in suspension, revocation or termination of the permit or affect the benefits, rights or privileges of any other City or Zone.

d. Emergency Action

Should the permit expire or terminate for any reason, the County will continue to be authorized to take emergency action, in response to an actual or threatened disaster, to protect human health or safety. To the extent possible, such actions should be consistent with the HCP.

C. Withdrawal from Agreement

In the event that prior to the grading of any portion of its Take Area, a Party, participating City, or landowner is unable to develop or authorize development of portions of such Take Area as a consequence of (i) this Agreement or any portion hereof or any agreement provided for hereunder being determined to be invalid or unenforceable, or (ii) the imposition of any further requirements, regulations or restrictions, over and above those provided for in this Agreement, within or with respect to a Take Area for the protection or conservation of any species, in addition to any other remedy which it may possess, the County shall have the right upon written notice to the other parties to withdraw from this Agreement and to thereupon be released from any and all further liabilities or obligations hereunder.

D. Limitations and Extent of Enforceability

This Agreement provides for the conservation of the tortoise (and, as a result, other species which share its habitat) through the mitigation and compensatory measures provided. Accordingly, to the extent permitted by law, no further mitigation or compensation for the conservation of the tortoise will be required by any Party.

Nothing herein contained shall be deemed to limit the power of the County and the participating Cities to regulate the use of the lands subject hereto for any purposes in accordance with the Constitution and laws of the United States or the State of Utah, except as specifically agreed to herein.

Notwithstanding the terms of this Agreement, any person may take endangered wildlife in defense of his or her own life or the lives of others. The County or any participating City may take emergency action in response to an actual or threatened disaster. To the extent possible, such actions should be consistent with the HCP.

Nothing herein is intended to limit the authority of the United States Government to invoke the penalties provided for in the ESA. The USFWS has, however, reasonably determined that compliance with the terms of this Agreement shall constitute compliance with the ESA, thus avoiding invocation of such penalties.

E. Enforceability by Cities

It is acknowledged and agreed by the parties hereto that any assurances and commitments

provided to the participating Cities by the County, BLM, UDNR, and USFWS, or any of them, with respect to the extent and limitation of conservation measures which will be required in connection with the development and use of the Take Areas are:

1. Intended to be relied upon by the participating Cities;

2. Made with full knowledge of the extent and effect thereof; and

3. Made with the understanding that such assurances and commitments will not be amended, changed or increased except in accordance with this Agreement.

F. Enforcement by Other Persons

No persons who are not parties or participating Cities are intended to be deemed third Party beneficiaries under this Agreement and any benefit to anyone not a Party or participating City is incidental and not material hereto. Nothing in this Agreement is intended to create any enforcement or other rights against the County either jointly or severally by anyone not a Party or participating city or to permit the County to be made a party to litigation which may be brought against another Party. This agreement shall not be deemed to give rise to any right to any Party to cross-complain against any other Party in any lawsuit initiated by any person or entity not a Party.

The parties have entered into and executed this Agreement upon the representations of all other parties to this Agreement that persons not a signatory to this Agreement except participating Cities shall not have the right to enforce this Agreement. But for this representation, the parties would not have entered into this Agreement. The representations and provisions of this Section VIII.F shall survive the termination of this Agreement and shall continue against all parties even if their obligations under this Agreement have otherwise ceased.

G. Notice of Action: Limitation of Actions

The following provisions shall govern to the extent they are not inconsistent with the ESA, FLPMA, or other applicable State or Federal law.

a. If any Party or a participating city intends to initiate litigation against any other Party, such Party must first serve notice stating:

   i. What obligations the Party is failing to meet, with specific reference to the HCP, this Agreement or other relevant laws; and

   ii. What corrective action is proposed.

b. No action at law or equity may be taken by a Party until 60 days after the date that a notice was served unless irreparable injury to the Reserve necessitates

immediate action. In that event, any such Party instituting litigation must serve a Notice at least twenty-four (24) hours before litigation, specifying the irreparable injury to the Reserve.

c. Any lawsuit must be filed within 120 days of the date of service of a notice as provided above, or else any such cause of action or right shall be deemed to cease and terminate and be of no further force or effect, and no right to assert such right or cause of action shall exist unless and until new notice is given as provided above.

5. In the event that litigation is initiated under or based in whole or in part on this Agreement by a person who is not a Party to this Agreement and a person not a Party to this Agreement seeks an injunction or equitable relief against any Party to this Agreement, the Party defendant shall request that the court order an appropriate bond in the event of litigation by a non-party.

H. Amendments to the HCP

Major changes to the HCP, as set forth in Section 6.8 of the HCP, proposed by Washington County after the effective date of the permit, shall be processed by the Service as an amendment to the permit in accordance with the ESA and permit regulations set forth at 50 C.F.R. Parts 13 and 17 and shall be subject to appropriate environmental review.

IX. MISCELLANEOUS PROVISIONS

A. Successors and Assigns

The terms, provisions and conditions of this Agreement shall be binding on the parties hereto and their successors and assigns, and shall inure to the benefit of the parties hereto and such successors and assigns as may be expressly assigned the benefits hereof by any party hereto.

B. Notices

Notices provided for herein shall be personally delivered to the person set forth below (or that person's successor as identified by notice as provided herein) or shall be deemed given five days after deposit in the United States mail, certified and postage prepaid, return receipt requested and addressed as follows, or such other address of which any Party hereto may from time to time give notice to the other parties:

Town of Ivins
Attention:

United States Fish and Wildlife Service
Attention:

United States Bureau of Land Management
Attention:

Utah Department of Natural Resources
Attention:

Washington County
Attention:

C. Entire Agreement

This agreement supersedes any and all other agreements either oral or in writing, between the parties hereto with respect to the subject matter hereof and contains all of the covenants and agreements between the parties with respect to said matter, and each Party to this Agreement acknowledges that no representations, inducements, promises or agreements, orally or otherwise, have been made by any Party, or anyone acting on behalf of any Party, which are not embodied herein, and that no other agreement, statement or promise not contained herein shall be valid or binding, except the Interlocal agreement between Washington County and the Town of Ivins dated November 11, 1993.

D. Possible ESA Amendment

Should the ESA be amended in a manner that calls into question the authority or obligations of any Party to this Agreement, the parties shall enter into negotiations to amend this Agreement as soon as practicable after the effective date of such amendment. If no agreement is reached, any Party may, upon written notice to the other parties, withdraw from this Agreement and thereupon be released from any and all further liabilities or obligations hereunder.

E. Attorneys' Fees

If any action at law or in equity, including any action for declaratory relief, is brought to enforce or interpret the provisions of this Agreement, all parties to the litigation shall bear their own attorneys' fees and costs, except that attorneys' fees and costs against the United States shall be governed by applicable Federal law, including the Equal Access to Justice Act (28 U.S.C. §2412).

F. Counterpart

This agreement may be executed in any number of counterparts. A complete original copy of this Agreement with all counterparts signature pages attached thereto and all amendments thereto shall be maintained in the official records of Washington County.

G. Term of Agreement

The term of this Agreement shall commence and this Agreement shall take effect upon the execution and delivery of this Agreement by USFWS, BLM, UDNR, the County, and the Cities and the issuance of the permit and shall continue in effect until terminated in writing by all parties.

H. Default

Except as specifically provided for herein, a default by any Party in an obligation set forth herein shall not result in, or be the basis for, the termination or rescission of this Agreement.

I. Elected Officials Not to Benefit

No member of or delegate to Congress shall be entitled to any share or part of this Agreement or to any benefit that may arise from it.

J. Availability of Funds

Implementation of this Agreement shall be subject to the availability of appropriated funds.

K. Exercise of Responsibility

All parties will carry out their responsibilities under this Agreement expeditiously and carefully. The County will request the enactment of appropriate ordinances by non-signatory cities to effectuate the purposes of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first set forth above and agree to abide by its terms.

TOWN OF IVINS

Dated: Feb 23 1996 By: Christopher J. Bell Mayor

STATE OF UTAH (Acting by and through the UTAH DEPARTMENT OF NATURAL RESOURCES)

Dated: Feb 23 1996 By: Howard J. Rigtrup, Dp. Dir DNR

UNITED STATES BUREAU OF LAND MANAGEMENT

Dated: 23 FEB 96 By: A. William Lamb

UNITED STATES FISH AND WILDLIFE SERVICE

Dated: 23 Feb 1996 By: Ralph O. Morgenweck

WASHINGTON COUNTY

Dated: 2-23-96 By:

ATTACHMENT G-2

RESEARCH REGARDING AIRCRAFT NOISE EFFECTS ON THE MEXICAN SPOTTED OWL

CONDUCTED BY THE U.S. FOREST SERVICE, ROCKY MOUNTAIN RESEARCH STATION

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EFFECTS OF HELICOPTER NOISE ON MEXICAN SPOTTED OWLS

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Abstract: Military helicopter training over the Lincoln National Forest (LNF) in southcentral New Mexico has been severely limited to protect nesting Mexican spotted owls (*Strix occidentalis lucida*). To evaluate nesting and nonnesting spotted owl responses to helicopter noise, we measured flush frequency, flush distance, alert behavior, response duration, prey delivery rates, female trips from the nest, and nest attentiveness during manipulated and nonmanipulated periods, 1995–96. Chain saws were included in our manipulations to increase experimental options and to facilitate comparative results. We analyzed stimulus events by measuring noise levels as unweighted one-third-octave band levels, applying frequency weighting to the resultant spectra, and calculating the sound exposure level for total sound energy (SEL) and the 0.5-sec equivalent maximum energy level ($LEQ_{max\ 0.5\text{-}sec}$) for helicopters, and the 10-sec equivalent average energy level ($LEQ_{avg.\ 10\text{-}sec}$) for chain saws. An owl-weighting (dBO) curve was estimated to emphasize the middle frequency range where strigiform owls have the highest hearing sensitivity. Manipulated and nonmanipulated nest sites did not differ in reproductive success ($P = 0.59$) or the number of young fledged ($P = 0.12$). As stimulus distance decreased, spotted owl flush frequency increased, regardless of stimulus type or season. We recorded no spotted owl flushes when noise stimuli were >105 m away. Spotted owls returned to predisturbance behavior within 10–15 min after a stimulus event. All adult flushes during the nesting season occurred after juveniles had left the nest. Spotted owl flush rates in response to helicopters did not differ between nonnesting (13.3%) and nesting seasons (13.6%; $P = 0.34$). Spotted owls did not flush when the SEL noise level for helicopters was ≤102 dBO (92 dBA) and the LEQ level for chain saws was ≤59 dBO (46 dBA). Chain saws were more disturbing to spotted owls than helicopter flights at comparable distances. Our data indicate a 105-m buffer zone for helicopter overflights on the LNF would minimize spotted owl flush response and any potential effects on nesting activity.

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Key words: chain saws, disturbance, flush response, helicopters, Mexican spotted owls, noise, response thresholds, sound measurements, *Strix occidentalis lucida*.

To maintain tactical proficiency for low-level search-and-rescue missions, military air crews require frequent training. Recently, low-level training flights have come under scrutiny for their potential effects on wildlife, which has led to reductions in military access to potential training areas (Holland 1991). Holloman Air Force Base (HAFB), located in southcentral New Mexico, lacks sufficient area and habitat diversity to conduct effective helicopter training operations, but the Sacramento Ranger District of the LNF in the Sacramento Mountains contains the habitat diversity necessary to conduct such training operations. However, to avoid potential effects on nesting Mexican spotted owls (hereafter, spotted owl), military helicopters have been precluded from flying over the LNF during the February–August nesting season. To gain year-long access to the forest for training of the 48th Rescue Squadron (48 RQS), HAFB had to determine if and to what extent their activities might affect nesting spotted owls.

Much of the information about noise effects on raptors is anecdotal and fails to quantitatively measure either the stimulus or a behavioral response related to the animal's fitness. Predictive models for the relation between disturbance dosage and quantifiable effects are even more scarce (Awbrey and Bowles 1990, Grubb and Bowerman 1997). Although many types of human disturbance can affect birds of prey (Fyfe and Olendorff 1976), very little research has addressed the effects of human activity on owls (Wesemann and Rowe 1987; J. C. Bednarz and

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T J Hayden 1988. The Los Medanos cooperative raptor research and management program, unpublished. Final Report 1985–87 for Department of Energy and Bureau of Land Management. University of New Mexico, Albuquerque, New Mexico, USA). Presently, there is no published research available on the possible effect of noise on spotted owls.

The objectives of this study were (1) record, characterize, and quantify helicopter overflights at spotted owl roost sites during a post- or nonnesting season (1995) and at active nest sites during the nesting season (1996); (2) develop a dose-response threshold relation for quantifying spotted owl behavioral responses to variation in noise levels and stimulus distances; (3) determine if helicopter overflights affect spotted owl reproductive success (successful nests) or productivity (young fledged); and (4) develop disturbance-specific management guidelines to minimize potential effects from helicopter overflights on the LNF.

STUDY AREA

This study was located within the Sacramento Ranger District of the LNF in southcentral New Mexico, Otero County. This area was chosen for its large population of spotted owls and its importance as a potential training site for the 48 RQS. Vegetation is primarily Rocky Mountain conifer forest (Brown and Lowe 1980) dominated by Douglas-fir (*Pseudotsuga menzii*) with some southwestern white pine (*Pinus strobiformes*) and ponderosa pine (*P. ponderosa*; Alexander et al. 1984). Elevation in the mountainous terrain ranges between 1,372 and 2,957 m.

METHODS

Surveys and Territory Selection

Territories were surveyed between 15 June and 6 July 1995 and between 15 March and 15 April 1996. We selected territories for our study based on (1) presence of mated pairs of spotted owls, and (2) no captures or manipulations prior to our research. During the 1996 nesting season, a third criterion required pairs to be reproductively active. Seven female and 6 male spotted owls were tested in the nonnesting season. During the nesting season, we concentrated on testing females because of their nest fidelity. Sample sizes in both the nonnesting and nesting seasons were limited by the number of pairs that fit the foregoing criterion.

Vocal imitations of spotted owl calls (Forsman 1983) were used during nocturnal and diurnal point surveys to locate both nonnesting and nesting spotted owls. During nocturnal surveys, we determined initial spotted owl locations between dusk and 2200 (all times reported as Mountain Standard Time). Spotted owl positions were triangulated by plotting compass bearings on topographic maps so that each area could be visited for diurnal surveys (predawn to 0800), when we followed spotted owls to a daytime roost. During the 1995 nonnesting season, we then radioed the location to the 48 RQS for an overflight later that day or conducted a chain saw manipulation. Upon finding a spotted owl during the 1996 nesting season, we attempted to determine its reproductive status by feeding it live mice. Nesting spotted owls take prey back to the nest, while nonreproductive spotted owls either cache or eat the prey (Forsman 1983). Once a territory was determined to be reproductively active, the nest location was recorded for future testing. To minimize interactions with spotted owls, we used the least number of mice necessary to determine reproductive activity.

Spotted Owl Behavior and Response Measures

We documented spotted owl behavior during manipulated and nonmanipulated periods by direct observation (camouflaged blinds 25–30 m from nest or roost) and through video surveillance. To evaluate spotted owl response behavior to helicopter and chain saw manipulations and contrast it with pre- and postmanipulated behavior, we measured the following: (1) flush frequency = proportion of manipulations that elicited a flight response; (2) flush distance = distance (m) flown by a spotted owl in response to a sound stimulus; (3) alert behavior = number of head movements averaged per 5-min block, before, during and after manipulations; (4) time to alert = minutes between start of a manipulation and when a spotted owl initially responded with a head movement in the direction of the manipulation; (5) response duration = minutes following a noise stimulus until a disturbed spotted owl returned to prestimulus behavior; (6) prey deliveries = number of prey deliveries recorded at each nest site (calculated per hour for diurnal, nocturnal, and 24-hr periods); (7) trips = number of times the attending female left the nest (calculated per hour for diurnal, nocturnal, and 24-hr periods); and (8)

nest attentiveness = proportion of time the adult female spotted owl spent on the nest through the nesting season (calculated for diurnal, nocturnal, and 24-hr periods, as well as for nesting phases; see Delaney et al. 1999).

Video Surveillance

Because our use of video was a new and unique application of the various hardware components, we had to design, construct, test, and modify our video surveillance system before applying it in the field (Delaney et al. 1998). We used Marshall black-and-white, miniature video cameras (Marshall Electronics, Culver City, California, USA) with night vision to monitor spotted owl behavior. (Use of trade names does not imply endorsement by the U.S. Forest Service Rocky Mountain Research Station, U.S. Air Force, U.S. Army Construction Engineering Research Laboratories, or Northern Arizona University to the exclusion of other potentially suitable products.) In addition to the 6 infrared light-emitting diodes (LEDs) on the camera board, 9-LED supplemental light sources were constructed to approximately double night-vision capabilities. Panasonic industrial-grade video recorders provided up to 24-hr coverage/VHS tape (Panasonic Corporation of America, Secaucus, New Jersey, USA). Between 9 April and 27 May 1996, cameras were placed at 20 nest sites in adjacent trees, averaging 6.9 m from nests (range = 3.0–10.3 m). A 15-m, power-line-and-coaxial-cable down line and a 60-m trunk line were used to minimize potential disturbance to spotted owls by offsetting the recorder and batteries to an out-of-sight tarpaulin blind. Between 25 April and 3 July 1996, video surveillance systems at 19 successful nests yielded >2,655 hr of spotted owl behavior coverage. All cameras and related equipment were removed after the 1996 nesting season.

Sound Measurements

Instrumentation and Recording.—Sony TCD-D7, digital audio tape (DAT) recorders continuously recorded all noise events, along with exact time and date (Sony Corporation of America, New York, New York, USA). We attached a Bruél & Kjaer (B&K) Type 4149, 1.3-cm condenser microphone (Bruel & Kjaer, Naerum, Denmark) with a 7.5-cm wind screen to a B&K Model 2639 preamplifier, mounted the microphone on a 1-m stick, and placed the unit directly under a spotted owl location (roost or nest) about 1 m from the tree trunk. Using 3 10-m connecting cables attached to the preamplifier, we located the B&K Model 2804 power supply and DAT recorder at our observation point in a camouflaged blind 25–30 m from the spotted owls. A 1.0-kHz, 94-dB calibration signal from a B&K Type 4250 sound level calibrating system was recorded before and after each recorded manipulation. This signal provided an absolute, standardized reference point for sound levels and spectra when data were later reduced via a B&K Type 2144 frequency analyzer. All noise data were analyzed at the U.S. Army Construction Engineering Research Laboratories, Champaign, Illinois, USA.

Sound Metrics.—We used 3 sound metrics in this study: (1) SEL = the sound exposure level, which represents total sound energy for helicopters; (2) $LEQ_{uvg\ 0.5\text{-}sec}$ = the 0.5-sec equivalent average peak energy level for helicopters; and (3)$LEQ_{avg\ 10\text{-}sec}$ = the 10-sec equivalent average energy level for chain saws. Noise is defined as sound that is undesired or that constitutes an unwarranted disturbance; it can alter animal behavior or normal functioning. We analyzed noise events as unweighted one-third-octave band levels, applied frequency weighting to the resultant spectra, and calculated the above metrics. Chain saw noise was relatively steady and most appropriately described by the average sound level, LEQ, over a specified time interval (10-sec). Helicopter noise was more varied and could not be described as well by the average noise level. Aircraft noise events are typically described in terms of SEL, which correlates well with human annoyance to aircraft noise. However, SEL levels cannot be meaningfully compared to LEQ levels; therefore, we also represented helicopters with LEQ for comparison with chain saws.

Frequency weighting is an algorithm of frequency-dependent attenuation that simulates the hearing sensitivity of the study subjects. Frequency weighting discriminates against sound which, while easily measured, is not heard by the subjects. Flat-weighting (or absence of any weighting function) does not emphasize any portion of the frequency spectrum and therefore represents the true sound level and frequency for a noise stimulus event (Fig. 1). The commonly used A-frequency weighting attenuates noise energy according to human hearing range and sensitivity and generally will not be appropriate for animal species. However,

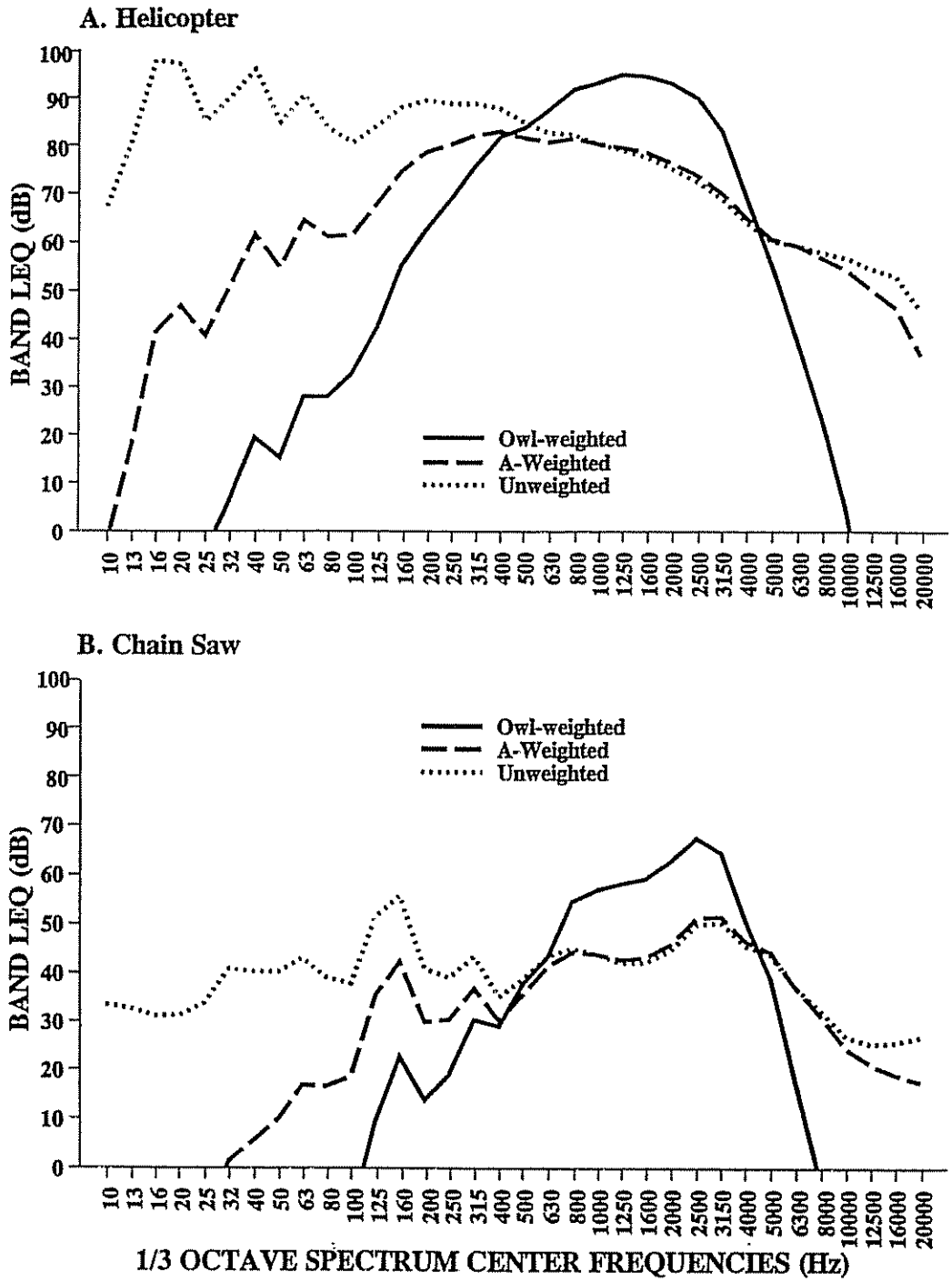

Fig. 1. (A) A comparison of owl-, A-, and unweighted equivalent maximum (helicopter) and average (chain saw) noise energy levels (LEQs) for a 60-m helicopter manipulation on 5 June 1996, and (B) a 60-m chain saw manipulation on 11 June 1996 at the same Mexican spotted owl territory in the Sacramento Mountains, New Mexico.

Table 1. Distribution of sample size by season, manipulation type, and Mexican spotted owl nest sites for noise-effect testing in the Sacramento Mountains, New Mexico, 1995–96. Site totals are not necessarily additive because some sites were manipulated in both years, and not all sites received both helicopter and chain saw manipulations

Season	Helicopter		Chain saws		Season totals	
	Manipulations	Sites	Manipulations	Sites	Manipulations	Sites
Nonnesting (1995)	24	8	25	13	49	13
Nesting (1996)	57	22	55	21	112	22
Totals	81	26	80	27	161	28

it is useful to present A-weighted noise levels (dBA), as well as more appropriately weighted levels, because this weighting algorithm occurs on sound-level meters and is ubiquitously used.

Because both flat- and A-weighting do not accurately reflect the way a spotted owl hears noise, we developed an estimated owl-weighting (dBO) curve. An audiogram describes hearing range and sensitivity and provides information on which a frequency weighting algorithm can be based for a specific species. Available information indicates hearing is quite similar among members of a taxonomic order. Within the order Strigiformes, we found audiograms for 2 species (great horned owl [*Bubo virginianus*], barn owl [*Tyto alba*]) within the same Suborder (Strigi) as spotted owls. These audiograms were used to approximate frequency-weighted noise levels for spotted owls. This owl-weighting emphasized the middle frequency range where test spotted owls had the highest hearing sensitivity (Trainer 1946, Konishi 1973).

Field Manipulations

We conducted a pilot test in January 1995 on HAFB and at an inactive nest site on the LNF to determine experimental flight profiles and microphone placement. Helicopter manipulations occurred between 1 and 22 August 1995 and between 30 April and 25 July 1996. Chain saw manipulations were conducted between 9 July and 23 September 1995 and between 11 June and 26 July 1996. We manipulated 28 spotted owl territories (13 in 1995 and 22 in 1996, with 7 sites manipulated in both years). Twenty-five of these sites received both helicopter and chain saw manipulations, while the remaining 3 sites received only 1 chain saw or helicopter manipulation (Table 1). We tried to minimize the overall number of manipulations and to maximize the time between manipulations, while still striving to conduct as complete an array of manipulations as possible during the incubation, nestling, and fledgling phases of the nesting season. However, because of administrative and logistical delays, as well as to remain conservative in our approach, only 3 chain saw tests and 8 helicopter flights were conducted during incubation. The average interval between consecutive manipulations, regardless of type or season, was 12.8 days (range = 4–79).

During the 1995 field season, spotted owls were manipulated after the normal nesting cycle so that any behavioral responses could not have an adverse effect on nesting success or productivity. Only after spotted owls showed minimal responses during nonnesting did we focus manipulations on nesting spotted owls. Helicopter manipulations were comparable between seasons but, as explained below, a threshold validation approach was taken with chain saws during the 1996 nesting season to limit potential experimental effects. Therefore, we could only compare helicopter and chain saw results for the nonnesting season. This research was conducted under a U.S. Forest Service subpermit to the U.S. Fish and Wildlife Service Region 2 Endangered Species and Special Purpose-Master-Migratory Bird Permits.

Helicopters.—Helicopter tests were conducted with the actual aircraft used by the 48 RQS (Sikorsky, HH-60G, Pave Hawk, twin-jet helicopters). The blade design of the HH-60G greatly reduces blade-slap ('whopping' sound) of an approaching helicopter. Spotted owl territories were randomly presented with 1 of 3 controlled helicopter flight profiles on any 1 day: (1) 15-m vertical, (2) 30-m vertical–30-m lateral, and (3) 60-m vertical. All flights were above tree canopy. The 15-m flight represented a minimum altitude that 48 RQS pilots would rarely fly during training missions. The 60-m profile represented the maximum diurnal altitude and a minimum nocturnal flight altitude. The 30-m vertical–30-m lateral profile approximated a more typical daytime overflight. At each site, we tried to conduct all 3 diurnal profiles during both the nonnesting and nesting

seasons, plus at least 1 nocturnal profile during the nesting season.

Terrain, tree heights, and variation among pilots caused deviations from the intended profiles. To account for these variations and to facilitate a comparison with chain saw results, we calculated straight-line distances from spotted owl to helicopter for all aircraft manipulations. We used field observations of aircraft from 2 to 3 positions of varying elevation and lateral offset, measured tree and spotted owl heights, topographic features, pilot information (Global Positioning System [GPS] flight path data, aircraft altitude, crew observations), and triangulation for these calculations, which we estimated to be ± 10% accurate. In addition to calculating closest distance, we also calculated spotted owl-to-aircraft distance during the approach, using flight speed data to determine the distance at which spotted owls first responded to approaching helicopters. We conducted only 1 pass/flight over any roost or nest site per day, with the entire manipulation lasting <10 min in total audible duration and <30 sec in the immediate vicinity of the spotted owls. Helicopter speed was 150–170 km/hr (80–90 knots).

To define the specific flight line, we positioned 2 1-m-diameter red, helium-filled weather balloons above the canopy approximately 50 m on either side of a spotted owl's position. To position nocturnal flights, we used flashlights (4 D-cell Mag Lites; Mag Instruments, Ontario, California, USA) pointed skyward in conjunction with the pilots' night-vision capabilities. Diurnal flights usually occurred between 1200 and 1300 and nocturnal flights between 2000 and 2200. The 48 RQS developed a pilot's in-flight guide which detailed all spotted owl territories and access routes so pilots could circumvent nontarget and control sites en route to manipulated sites.

Chain Saws.—Stihl Model 025, 44-cc chain saws were used for noise testing (Stihl, Virginia Beach, Virginia, USA). To satisfy LNF fire and safety restrictions, bars and chains were removed and there was no actual cutting during manipulation testing. However, the noise levels and frequency spectra were similar for chain saws tested with and without bars and chains. We used forest vegetation to hide the operator and eliminate visibility as an influencing factor as we ran chain saws continuously for 5 min, alternately revving for 10 sec and idling for 10 sec. In 1995, nonnesting spotted owls were exposed to chain saw noise from 1 of 5 randomly selected initial distances (30, 45, 60, 75, and 90 m). If spotted owls flushed during the initial presentation, the test was ended for that day and the next scheduled manipulation was initiated 15–30 m farther away to establish a distance-response threshold. If the initial manipulation did not cause a flush, the next manipulation about 5–7 days later was presented 15 m closer. Because 60 m was the greatest distance at which chain saws elicited a flush response in 1995, only distances ≥60 m were examined in 1996 (60, 105, 250, and 400 m). This approach minimized potential effects on nesting spotted owls.

Habituation

We used experimental testing and treating sites as their own controls to evaluate possible habituation to repeated noise stimuli. At the end of the 1996 nesting season, we exposed 4 previously unmanipulated sites and 4 manipulated sites to 1 helicopter and 1 chain saw manipulation each, and we compared spotted owl flush response. Helicopter flights followed the most aggressive 15-m profile, while chain saw tests were run at 60 m to remain consistent with our conservative approach to nesting season manipulations. In addition, manipulated sites were used as their own self-controls throughout the study. We measured temporal changes in spotted owl response toward disturbance based on seasonal (response duration and time-to-alert) as well as proximate scales (alert responses pre-, during, and postmanipulation).

Data Analyses

Numbers of manipulated sites and sample sizes for individual analyses varied due to different inclusion criteria, missing data, 7 sites being manipulated in both years, and not all sites receiving both helicopter and chain saw manipulations. We used SPSS 7.5 for Windows (SPSS 1997) to perform descriptive statistics, independent-samples *t*-test for comparing mean values of young fledged and variation in sound levels, Tukey's HSD test in the 1-way analysis of variance for comparing distances for alert, react, and flush responses, and linear regression for exploring the relation between noise levels and distance by type and between net differences in prey deliveries before and after manipulations. We used net differences in prey deliveries because of repeated-measures limitations. We cal-

culated a potential threshold distance for zero-difference with a 95% calibration interval (Graybill 1976). We used a 1-tailed Fisher's exact test to assess 2 × 2 contingency tables for flush response variability with manipulation type, stimulus distance, nesting season and phase, and for reproductive success between experimental and control sites (Zar 1984). To evaluate mean alert response (i.e., head movements) for 5-min intervals pre-, during, and postmanipulation, we used a nonparametric, Multi-Response Permutation Test for matched pairs (PTMP; Mielke and Berry 1982; Slauson et al. 1991. User manual for BLOSSOM statistical software, unpublished. National Ecological Research Center, U.S. Fish and Wildlife Service, Fort Collins, Colorado, USA). We used power analyses (Steidl et al. 1997) on reproductive success and productivity for comparisons between experimental and control sites. All means are reported ± SD. We considered alpha levels of $P < 0.05$ significant.

RESULTS

Manipulation Summary

We presented 161 helicopter and chain saw manipulations during the 1995 nonnesting and the 1996 nesting seasons (Table 1). The fledgling phase received 30 helicopter and 43 chain saw manipulations. The nestling phase received 19 helicopter and 9 chain saw manipulations, and the incubation phase received 8 helicopter and 3 chain saw manipulations. We were not able to compare spotted owl response levels between diurnal and nocturnal periods because, due to scheduling and logistical difficulties, there were only 5 nocturnal helicopter flights over spotted owl nests during the nesting season. Because we analyzed only first exposures (when >1 occurred) for each categorical manipulation distance at each site for flush response, our effective sample size by distance was reduced to 126: 58 helicopters (4 at ≤30 m, 13 at 30–45 m, 15 at 46–60 m, 20 at 61–105 m, 6 at >105 m) and 68 chain saws (6 at 30 m, 3 at 45 m, 23 at 60 m, 3 at 75 m, 2 at 90 m, 16 at 105 m, 13 at 250 m, 2 at 400 m). The 8 helicopter and 8 chain saw postexperiment habituation manipulations were in addition to this sample of 126.

Reproductive Success

Manipulated and nonmanipulated nest sites did not differ in reproductive success (Fisher's exact test: $P = 0.59$) or the number of young fledged ($t_{20} = 0.95$, $P = 0.12$). We conducted power analyses based on data from 17 experimental and 5 control sites. Power levels were 0.22 for detecting a 10% difference in reproductive success between nests and 0.11 for productivity. Power increased to 0.29 and 0.16 for detecting a 15% difference, and 0.36 and 0.21 for a 20% difference. Fifteen of 17 manipulated spotted owl nest sites produced 1.4 young/occupied nest (1.6 young/successful nest), while all 5 nonmanipulated sites were successful in producing 1.8 young/occupied nest and 1.8 young/successful nest. Neither of the failed pairs flushed nor exhibited any unusual response to manipulations during the nesting season. One pair lost their chick to predation 9 days after the last manipulation, while apparently infertile eggs at the other site never hatched, despite normal incubation.

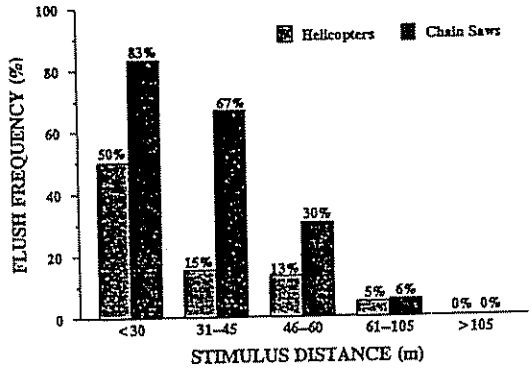

Fig 2. A comparison of Mexican spotted owl flush frequency by stimulus type and distance for helicopter and chain saw manipulations in the Sacramento Mountains, New Mexico, 1995–96.

Flush Response and Associated Thresholds

Distance Thresholds.—As stimulus distance decreased, spotted owl flush frequency increased (Fig. 2), regardless of stimulus type (Tables 2, 3) or season (nesting, nonnesting). We recorded no spotted owl flushes when the noise stimulus was >105 m distant. Only 2 flushes occurred at >60 m stimulus distance (1 helicopter at 89 m, 1 chain saw at 105 m). Chain saws consistently elicited higher response rates than helicopters at similar distances (Fig. 2). At ≤60 m stimulus distance during the nonnesting season, response to chain saws (72%) was greater than response to helicopters (20%; Fisher's

Table 2 Helicopter manipulations eliciting a Mexican spotted owl flush response during the 1995 nonnesting and 1996 nesting seasons in the Sacramento Mountains, New Mexico.

Season	Stimulus distance	Number of presentations	Number of flushes	Flush frequency
Nonnesting (1995)	≤30	1	1	100.0
	30–45	6	1	16.7
	46–60	8	1	12.5
	61–105	7	0	0.0
	≤105	22	3	13.6
	>105	0	0	0.0
1995 season totals		22	3	13.6
Nesting (1996)	≤30	3	1	33.3
	30–45	7	1	14.3
	46–60	7	1	14.3
	61–105	13	1	7.8
	≤105	30	4	13.3
	>105	6	0	0.0
1996 season totals		36	4	11.1
Helicopter totals		58	7	12.1

exact test: $P < 0.01$). In 11 instances at 6 territories (46% of the 24 helicopter flights during nonnesting), spotted owls did not flush in response to helicopter noise that averaged 21 dBO louder than chain saw manipulations that did cause a flush at the same territory (Fig. 3). All flushes recorded during the nesting season occurred after fledging; no flushes were elicited by manipulations during the incubation and nestling phases. Overall, helicopters elicited 0% spotted owl response when beyond 105 m, 14% within 105 m, 19% within 60 m, and 50% within 30 m.

Spotted owl flush rates did not differ between nesting (13.6%) and nonnesting (13.3%) seasons for helicopter manipulations at ≤105 m (Fisher's exact test: $P = 0.34$; Table 2). Flush rates were lower during the incubation and nestling phases (0%) than during the fledgling phase (28%; Fisher's exact test: $P = 0.04$). Adults also roosted farther from juveniles as the number of days postfledging increased (1–20 days: $\bar{x} = 9.7$ m, $n = 10$; 21–40 days: $\bar{x} = 18.2$ m, $n = 15$; 41–60 days: $\bar{x} = 29.3$, $n = 11$). After 20 days, adult flush distance was typically less than adult-to-juvenile distance (21–40 days: $\bar{x} = 10.8$ m, $n = 2$; 41–60 days: $\bar{x} = 13.7$, $n = 3$). An adult spotted owl flew closer to a juvenile during only 1 of these latter 5 manipulations; however, regardless of adult flush distances, new diurnal roosts averaged only 6.5 m farther from juveniles.

Table 3 Chain saw manipulations eliciting a Mexican spotted owl flush response during the 1995 nonnesting and 1996 nesting seasons in the Sacramento Mountains, New Mexico.

Season	Stimulus distance (m)	Number of presentations	Number of flushes	Flush frequency (%)
Nonnesting (1995)	30	6	5	83.3
	45	3	2	66.7
	60	9	6	66.7
	75	3	0	0.0
	90	2	0	0.0
	105			
	≤105	23	13	56.5
1995 season totals		23	13	56.5
Nesting[a] (1996)	60	14	1	7.1
	105	16	1	6.3
	250	13	0	0.0
	400	2	0	0.0
1996 season totals		45	2	4.4
Chain saw totals		68	15	22.1

[a] To minimize additional potential disturbance at nest sites, only chain saw distances ≥60 m were tested in 1996; therefore, season totals are not comparable.

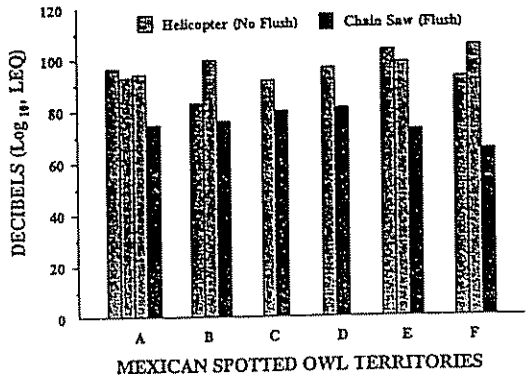

Fig. 3 A comparison of Mexican spotted owl flush response to chain saw and no-flush response to louder helicopters flown at equal or lesser distances at 6 territories during the 1995 nonnesting season in the Sacramento Mountains, New Mexico.

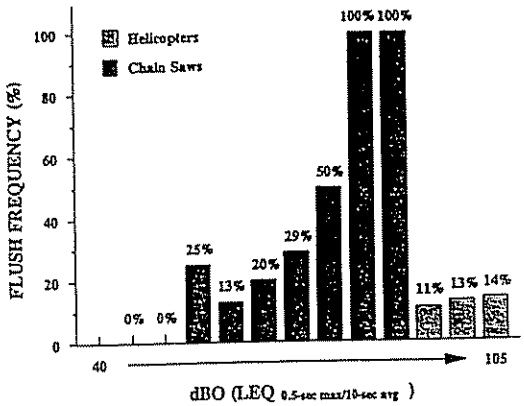

Fig. 4 A comparison of Mexican spotted owl flush frequency by stimulus type and noise level for helicopter and chain saw manipulations in the Sacramento Mountains, New Mexico, 1995–96.

Noise Thresholds.—During the nonnesting season, spotted owls did not flush when the SEL noise level for helicopters was ≤104 dBO (92 dBA) and the LEQ level for chain saws was ≤65 dBO (51 dBA). During the nesting season, spotted owls did not flush when the SEL sound level for helicopters was ≤102 dBO (92 dBA) and the LEQ level for chain saws was ≤59 dBO (46 dBA). These dB levels represent the noise level thresholds below which there were no spotted owl flush responses for the stimulus type and season indicated. Noise levels recorded near nest sites before and after disturbance trials were usually 25–35 dB (reaching upwards of 40 dB on windy days). Helicopters typically became audible at approximately 2,000 m.

Owl-, A-, and flat-weighting curves differed for 2 equidistant helicopter and chain saw trials at the same site (Figs. 1A,B). Within the midfrequency range, helicopters were louder than chain saws; yet, more of the total chain saw noise energy was in the midfrequency range where estimated spotted owl sensitivity was greatest. Helicopter energy level peaked at the lower end of the spectrum below the estimated spotted owl hearing sensitivity range. This difference partially explains the higher response rates for chain saws at lower noise levels than for helicopters (Fig. 4).

Alert Response

Spotted owls exhibited alert responses (i.e., head movements) when helicopters were an average of 403 ± 148 m away (n = 34; Fig. 5) but showed no response when helicopters were >660 m distant. Distances between helicopter and spotted owl for react responses (i.e., wing and body movements; $\bar{x}$ = 124 ± 59 m, n = 2) and flush responses (i.e., flight; $\bar{x}$ = 45 ± 28 m, n = 7) were shorter than for alert responses (Tukey's HSD: $P < 0.01$). The stimulus distances for react and flush responses did not differ (Tukey's HSD: $P = 0.75$), but sample sizes were very limited. However, the indicated trend was for severity of response type to increase as stimulus distance decreased.

We compared average head-movements/5 min for the 30–60 min prior to a manipulation (i.e., the mean of all 5-min, premanipulation means), the 5-min interval of the manipulation, and the 30–60 min following the manipulation. Spotted owls responded to noise stimuli with more alert movements ($\bar{x}$ = 7.4 ± 5.6, n = 91)

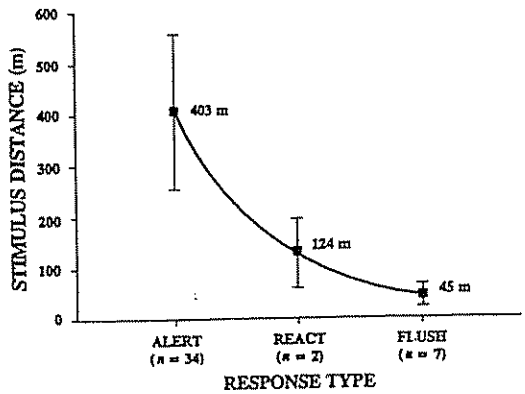

Fig. 5 Relation between stimulus distance and Mexican spotted owl response type during helicopter flights at 26 nest sites in the Sacramento Mountains, New Mexico, 1995–96. Error bars denote 2 standard deviations of the mean.

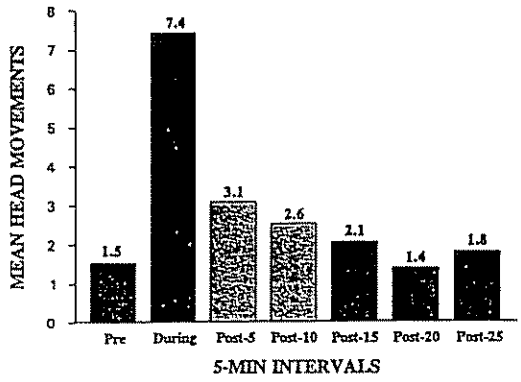

Fig 6. Variation in mean frequency of Mexican spotted owl head movements (alert response) pre-, during, and postmanipulation for helicopter and chain saw noise events in the Sacramento Mountains, New Mexico, 1995–96. Bar shading indicates significant variation ($P \leq 0.08$)

than during premanipulation intervals ($\bar{x} = 1.6 \pm 1.5$, $n = 84$; PTMP: $P < 0.01$; Fig. 6). Spotted owls typically returned to premanipulation behavior in the third 5-min interval (between 10–15 min) after a stimulus event. Only the first (3.1 ± 3.7, $n = 57$; PTMP: $P = 0.01$) and second 5-min intervals (2.6 ± 3.0, $n = 51$; PTMP: $P = 0.08$) following a manipulation had greater frequencies of head movements than premanipulation levels.

Habituation

Experimental Testing.—Three of 4 previously unmanipulated spotted owls flushed in response to helicopter flights, while none of the 4 previously manipulated spotted owls flew (Table 4; Fisher's exact test: $P = 0.07$). During chain saw testing, 2 of the 4 unmanipulated spotted owls flushed, while no manipulated spotted owls flew ($P = 0.21$). Spotted owls may have habituated to the manipulations during successive exposures, and more so to helicopters than to chain saws. However, sample sizes were too small to establish significance for indicated trends.

Seasonal Change in Response Duration.—Response duration was consistently longer for chain saws than helicopters, was inversely related to stimulus distance, and generally decreased as the nesting season progressed. Mean response duration following helicopter flights dropped from 10.3 ± 9.4 min ($n = 14$) in July to 8.2 ± 5.5 min ($n = 12$) in August. Mean response durations following chain saw manipulations were 22.2 ± 22.3 min ($n = 19$) in July and 10.7 ± 8.6 min ($n = 5$) in August. Response durations following chain saw manipulations were 1.3–2.2 times longer than following helicopter flights.

Response duration averaged 16.6 ± 16.8 min ($n = 47$) when stimuli were ≤60 m away, and 7.0 ± 7.9 min ($n = 25$) when stimuli were >60 m away. Spotted owls required 11.6 ± 10.5 min ($n = 24$) to return to prior resting condition after helicopter flights of ≤60 m, compared to only 6.0 ± 8.8 min ($n = 11$) when flights were >60 m away. Response durations for chain saws were 21.1 ± 20.9 min ($n = 23$) at ≤60 m and 7.4 ± 7.6 min ($n = 14$) at >60 m, which was 1.2–1.8 times longer than helicopter durations

Table 4. Habituation testing of helicopter and chain saw noise stimuli at 4 manipulated Mexican spotted owl nest sites and 4 previously unmanipulated sites in the Sacramento Mountains, New Mexico, 1996

Parameter	Helicopter		Chain saw	
	Unmanipulated	Manipulated	Unmanipulated	Manipulated
Dates	8–25 Jul	8–22 Jul	19–23 Jul	16–26 Jul
Flushes	3 (75%)	0	2 (50%)	0
Distance (m, SLD)[a]				
Mean	36.5	42.8	60.0	60.0
Range	33–40	40–47	60.0	60.0
Owl-weighting (dB)[b]				
Mean	101.7	100.9	69.9	68.5
Range	[c]	99.8–102.3	64.9–72.9	65.2–74.5
A-weighting (dB)[b]				
Mean	95.5	90.4	56.4	56.0
Range	[c]	89.9–91.4	51.3–59.7	53.8–60.5

[a] SLD = straight-line distance between stimulus and spotted owl
[b] dB = decibels
[c] Only 1 noise level recording was available for analysis

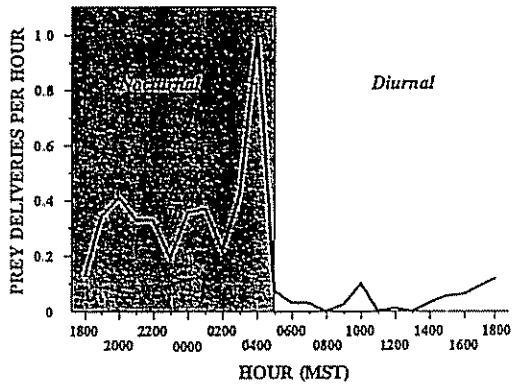

Fig 7. Mean prey deliveries per hour (Mountain Standard Time [MST]) averaged across the entire nesting season for Mexican spotted owls in the Sacramento Mountains, New Mexico, 1996.

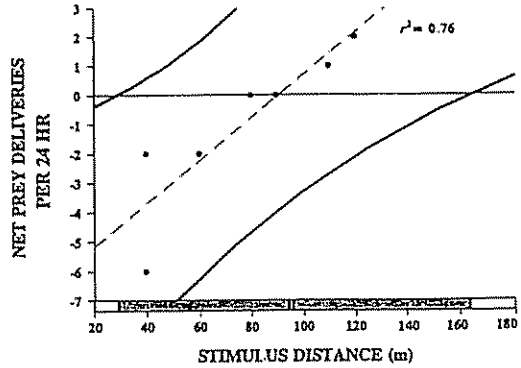

Fig 8. The linear regression and 95% prediction interval between stimulus distance and net difference in prey deliveries (postmanipulation deliveries minus premanipulation deliveries) for the 24-hr periods after and before helicopter and chain saw manipulations at 4 Mexican spotted owl nest sites in the Sacramento Mountains, New Mexico, 1996. Shading along the distance axis indicates the 95% calibration interval (± 68 m) around the estimated potential threshold distance (96 m) for zero-difference in prey deliveries (Graybill 1976).

Seasonal Change in Time to Alert.—Time to alert increased as the nesting season progressed and as stimulus distance increased. Spotted owls exhibited alert responses after only 0.6 ± 0.7 min (n = 13) during helicopter flights in July, compared with 1.4 ± 1.4 min (n = 9) in August and 1.6 ± 0.6 min (n = 6) in September. Spotted owl response was quicker during chain saw manipulations: <0.2 ± 0.4 min (n = 22) in June, >0.2 ± 0.4 min (n = 13) in July, 0.3 ± 0.5 min (n = 6) in August, and 0.5 min (n = 1) in September. When helicopter flights were ≤60 m away, spotted owls responded in 1.0 ± 1.0 min (n = 21) compared to 1.2 ± 1.0 min (n = 10) for flights >60 m. Spotted owls responded to chain saws in 0.1 ± 0.2 min (n = 26) at distances ≤60 m, and in 0.3 ± 0.5 min (n = 16) when saws were >60 m away. Time to alert was consistently 3.0–10.0 times longer for helicopters than for chain saws.

Prey Delivery Rates and Related Behaviors

Over 81% of all prey deliveries within the nesting season (n = 387) occurred during nocturnal hours (n = 16 spotted owl territories). Mean prey deliveries per hour were highest (1.00) at 0400, when >18% of all prey were delivered (Fig. 7). Prey deliveries per hour averaged 0.03 during diurnal hours compared with 0.37 during nocturnal hours, which translates to 0.36 prey deliveries/12-hr diurnal period and 4.20 deliveries/12-hr nocturnal period.

There were only 7 instances of full 24-hr video records 1–2 days before and immediately after a manipulation. Net differences in prey deliveries for the 24-hr periods after and before noise manipulations (postmanipulation deliveries minus premanipulation deliveries; Fig. 8) were highly correlated with stimulus distance (r^2 = 0.76, n = 7 at 4 sites). The estimated potential threshold distance for a negative effect on prey deliveries was 96 m, which is consistent with the 105-m threshold for flush response described above. Because of limited sample size, the 95% calibration interval around this estimated threshold ranged between 28 and 164 m. Experimental helicopter and chain saw manipulations did not affect spotted owl nest attentiveness or the number of female trips from the nest; differences for the 24-hr periods pre- and postmanipulation were not correlated with stimulus distance.

DISCUSSION

Research Effects

Spotted owls tend to be less affected by nearby, nonthreatening human activity than most other raptor species. Sovern et al. (1994) found both nesting and nonnesting spotted owls became accustomed to observers sitting quietly 25–50 m away in only 10–15 min. Our use of blinds and their placement, along with the microphones, 1–4 hr in advance of manipulations provided additional visual and temporal buffering. Monitoring spotted owl behavior during those premanipulation hours and through unattended video camera coverage at other times confirmed undisturbed, normal activity. While

monitored spotted owls were aware of the cameras, we recorded no unusual behaviors or changes in activity patterns in response to their presence. In fact, spotted owls that used the camera trees, and sometimes the same branch, for perching continued to do so after camera placement. Neither locator balloons, which were above the canopy and obscured by intervening vegetation, nor flashlights with directional beams pointed skyward were normally visible to manipulated spotted owls. Our data collection activities did not seem to affect spotted owl responses to experimental manipulations.

Reproductive Success

Other noise disturbance research suggests aircraft overflights alone have a negligible effect on raptor reproductive success and young fledged per nest (Platt 1977, Anderson et al. 1989, Ellis et al. 1991). We believe the small, nonsignificant decrease in reproductive success between manipulated (n = 17) and nonmanipulated (n = 5) sites in our study was attributable to natural attrition inherent in the larger manipulation sample.

Our ability to detect a biologically meaningful difference in reproductive success and productivity between manipulated and nonmanipulated nests was limited by population size. Sample sizes of 116 nests for measuring success and 362 nests for measuring productivity would have been required to reach an adequate power level of 0.80. With only 30–50 spotted owl territories reproductively active on the Sacramento Ranger District each year, and only about 80% of those sites successfully producing young in a good year, adequate power levels can never be reached.

Although we were not able to relate the number of flushes or the number of manipulations to the number of young fledged, both parameters should be addressed in noise disturbance research (Awbrey and Bowles 1990). Helicopter-induced flushes have been found to affect the number of young gyrfalcons (*Falco rusticolus*) that fledged in Alaska (Platt 1977), while Awbrey and Bowles (1990) hypothesized flushes may be the best predictor of eventual reproductive loss.

Flush Response

The proportion of spotted owls flushing in response to a manipulation was negatively related to stimulus distance and positively related to noise level. Grubb and King (1991), McGarigal et al. (1991), Stalmaster and Kaiser (1997), and others reported similar findings for bald eagles (*Haliaeetus leucocephalus*), with response to human activity increasing as stimulus distance decreased. Platt (1977) describes a comparable pattern for gyrfalcon response to helicopter flights.

The dose-response relations of flush frequency with distance (Fig. 2) and noise level (Fig. 4) indicated that chain saws, although not as loud as helicopters, caused spotted owls to respond from farther away and at higher frequencies. Results for both stimuli are consistent with a model derived from 9 studies of aircraft disturbance effects on several species of nesting raptors (Bowles et al. 1990), which predicts increasing flush probability with increasing noise levels.

Temporal Variation in Spotted Owl Flush Response.—Most studies have not examined the effects of human activities during the incubation and fledgling phases of the nesting season, primarily because of concerns over causing early nesting failure and premature fledging by juveniles (Awbrey and Bowles 1990). However, we observed a strong dichotomy in response behavior between prefledging and postfledging periods, with female spotted owls only flushing after their chicks had left the nest. Spotted owls, like other raptors, appear reluctant to leave the nest during the incubation and nestling phases (Craig and Craig 1984, Fraser et al. 1985, Anderson et al. 1989, Ellis et al. 1991). For bald eagles, flush frequency increased as the nesting season progressed and nest attendance declined, with the highest response rate occurring postfledging (Grubb and Bowerman 1997).

The fact that adult spotted owls were more likely to flush in response to manipulations later in the reproductive cycle also suggests a decrease in adult defensive or protective behavior as juveniles mature. Because adult spotted owls roosted at increasing distances from maturing juveniles, flush distance may become less critical as the fledgling phase progresses, especially because adults did not flush farther than their original distance from juveniles. Although season and nesting phase influence avian response to disturbance (Thiessen 1957, Knight and Temple 1986), prior experience, habituation, and animal temperament may be more important factors (Hart 1985, Manci et al. 1988). In

fact, prior experience may be the best indicator of animal response to overflights (Bowles 1995).

Distance and Sound Thresholds.—Our distance-response threshold for spotted owls was similar to that of most other raptor species exposed to aircraft overflights (N F R Snyder et al. 1978. An evaluation of some potential impacts of the proposed Dade County training jetport on the endangered Everglade Kite, unpublished report. U S Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, Maryland, USA; Craig and Craig 1984, Anderson et al. 1989). For example, Grubb and Bowerman (1997) recommended helicopter survey flights remain >150 m from bald eagle nests and be <1 min in duration. Despite the aggressive nature of our testing regime (i.e., close proximity, repeated exposure, little or no prior experience), spotted owl behavioral responses were minimal when noise disturbance stimuli were >105 m away, and reproduction was not detrimentally affected. Because the 48 RQS varies every flight path during normal training operations over the forest, spotted owls on the LNF would not likely receive as much military helicopter disturbance within any year as the manipulated pairs received during this study.

Distance was a better predictor of spotted owl response to helicopter flights than noise levels. Even when we controlled for distance, noise levels varied among helicopter flights more than among chain saw manipulations. Helicopter noise varied not only with distance but also with rotor pitch, rotor torque, power levels, pilot technique, aircraft loading, speed, topography, and weather. Awbrey and Bowles (1990) described distance as the most commonly used surrogate for noise exposure in the animal effects literature, and suggested distance may be the best representative for the relation between stimulus and response measures. Grubb and King (1991) determined distance was the single most important predictor of bald eagle response in a classification tree model. Their model ranked noise sixth, behind distance, duration of disturbance, visibility, number of disturbances per event, and stimulus position relative to the affected eagle.

Helicopters Versus Chain Saws.—Few researchers have directly compared differences in raptor responsiveness between aerial and ground-based disturbances. In our study, ground-based disturbances elicited a greater flush response than aerial disturbances. Nesting bald eagles in Arizona showed the highest response frequency and severity of response to ground disturbances, followed by aquatic and aerial disturbances (Grubb and King 1991). Awbrey and Bowles (1990), in their meta-analysis of noise disturbance research on raptors, noted aircraft overflights were less detrimental than common ground-based activities such as hiking.

Spotted owls may have perceived helicopters as less threatening than chain saws because of their shorter duration, gradual crescendo in noise levels, minimal visibility, and lack of association with human activity. Helicopters would have elicited greater spotted owl response if exposure times were increased through slower maneuvers such as hovering. Chain saws started abruptly with an associated startle effect, whereas approaching helicopters were always preceded by a gradual increase in noise levels. Disturbing activities in close proximity to a spotted owl's location may also be more visible and therefore elicit a greater response than an activity farther away, regardless of noise level. However, we believe visibility had very limited effect on our results; helicopters were usually not visible, or only briefly so, to spotted owls roosting within or beneath the forest canopy. Grubb and Bowerman (1997) found aircraft visibility had little effect on bald eagle responsiveness. Although chain saws were also operated out of sight of reference spotted owls in all but a few instances, field crews had to set up recording equipment beneath the spotted owls for both types of manipulations. Subsequent chain saw operation may have been associated more with this ground-based human activity. In addition, raptors may be less disturbed by aerial manipulations because of their use of that medium (Gilmer and Stewart 1983).

Alert Response

Spotted owls initially responded to noise disturbances by turning toward the source. This orienting, alert response is an example of an animal's awareness of the disturbance through increased readiness to respond (Archer 1979, Brown 1990). Orienting response becomes progressively less frequent with repeated exposure to the same stimuli (Archer 1979). The relatively quick return to predisturbance behavior we documented is consistent with Ellis (1981), who showed heart rates of prairie falcons (*Falco mexicanus*) exposed to aircraft overflights returned to predisturbance levels within 5 min

Our mean alert response threshold (403 m) corroborates a regional U S Fish and Wildlife Service policy that recommends a 400-m buffer zone around spotted owl nest sites (C Torez, U S Fish and Wildlife Service, personal communication)

Habituation

Habituation is defined as an animal's progressive loss in responsiveness toward a stimulus and is an important determinant in overall response behavior (Peeke and Herz 1973). Although statistically insignificant due to small sample size, experimental spotted owls were less likely to flush (0 of 8) in response to helicopter and chain saw manipulations later in the season than control spotted owls (5 of 8 or 62%), suggesting that spotted owls may have been habituating to manipulation testing. Platt (1977) and Anderson et al. (1989) observed a similar decrease in flush response to aircraft overflights between experienced and relatively naive raptors. In northcentral Michigan, a pair of nesting bald eagles near a military air base was 14% less responsive and the median distance to aircraft eliciting a response was half that (400 m vs 800 m) of 5 other pairs more remotely located (Grubb et al. 1992). In addition, response duration decreased and time to alert increased during the 1996 field season. However, we consider these trends weaker evidence for habituation because the influence of seasonal factors, such as nesting phase, cannot be differentiated.

Prey Delivery Rates and Related Behaviors

The effects of human activity on a raptor's ability to procure prey during the nesting season has not been well documented (Awbrey and Bowles 1990). Holthuijzen et al. (1990) found that prey delivery rates did not differ between experimental and control sites for prairie falcons exposed to construction and mining activity. Comparable examples for nocturnal raptors are lacking. We found prey delivery rates were highly and positively correlated with stimulus distance. Thus, manipulations in close proximity to spotted owl territories may affect prey delivery rates. The estimated threshold for detrimentally affecting prey deliveries (96 m) indicates a subflushing response consistent with the 105-m flush threshold and emphasizes the potential importance of this threshold distance. However, these threshold findings are based on a specific range of manipulations per territory; changes in stimulus frequency, duration, timing, and distance could strongly influence overall spotted owl response behavior.

Weather conditions should be considered when determining the effects of human activity on raptors (Schueck and Marzluff 1995). To control for possible weather effects, we did not conduct any manipulations during periods of inclement weather. This approach was consistent with the training protocol for the 48 RQS, which limited activity during such periods. However, factors such as precipitation, wind, and clouds can limit foraging ability of raptors (Brown et al. 1988, Bosakowski 1989, Flemming and Smith 1990) and thereby place greater importance on the next available foraging times, when disturbance could become more critical.

MANAGEMENT IMPLICATIONS

This research differs from previous noise disturbance studies by a unique combination of factors: (1) interpretation of noise levels via owl-weighting, which is more specific to the subject animal's hearing sensitivity than the generalized and less applicable A- or flat-weighting; (2) field experimentation with a threatened species in its natural habitat during a normal nesting season; and (3) controlled experimentation with the same resource and military aircraft, personnel, and flight profiles that initially raised the question of potential disturbance. A progressive, incremental, and conservative approach made this experimentation possible with no resultant negative effect on spotted owl activity or productivity.

Potentially detrimental noise levels were our initial and primary concern, but stimulus distance evolved as a more easily defined, quantified, and managed characteristic. Spotted owl response data were readily analyzed by distance because manipulation stimuli were presented by distance. In addition, distance results also directly translate into practical management implications. However, any application of our spotted owl response distances to develop management protocols for spotted owls elsewhere is inherently limited because it is predicated on having the same stimulus in a context similar to our experimentation. Alternatively, considering spotted owl response in terms of noise levels enables our results to be more generally ap-

plied, with due caution, to other types of helicopters under more varying conditions. This distinction is explained by the fact that noise level at the target species is the final measure of stimulus noise, whereas distance is only 1 of numerous intermediate factors (such as terrain, vegetation, atmospheric conditions, stimulus type, size, operation, etc.) that can affect noise level at the target.

Nonetheless, our data indicate the following recommendations for management of helicopter noise near Mexican spotted owls:

(1) At comparable distances, helicopter overflights were less disturbing to spotted owls than chain saws. This result validates, for this species and aircraft, the already established pattern that ground-based activities are typically more disturbing to raptors than aerial activities.

(2) Spotted owls did not flush when helicopter SEL noise levels were ≤102 dBO (92 dBA). Hence, helicopter noise levels below this threshold should not detrimentally affect nesting spotted owls.

(3) A 105-m radius, hemispherical protection zone should eliminate spotted owl flush response to helicopter overflights on the LNF. Zero flush response beyond 105 m for both helicopters and the more disturbing chain saws support this conclusion. Detrimental effects on prey delivery rates should also be minimized because the estimated threshold for this subflushing response (96 m) was <105 m.

(4) Short duration, single pass, single aircraft overflights had little effect on spotted owls. Other flight maneuvers involving circling, hovering, landing, etc., with potential increases in duration, proximity, or noise levels were not included in our experimentation.

(5) Our behavioral data indicate diurnal flights will likely have less potential for disrupting critical spotted owl activity than nocturnal flights. However, during nighttime hours, the 3 hr following sunset and preceding dawn were most important. Helicopter overflights between these nocturnal hours should minimize effects on spotted owl behavior.

(6) Considering the frequency of our manipulation testing, we recommend separating potential owl overflights along the same route by at least 7 days. Because flights over the same sites were separated as much as possible to minimize effects during our testing, data on the potential effects of more frequent overflights are lacking. However, actual rescue training flights avoid using the same route and therefore should not affect the same nest site twice in a breeding season.

(7) Although multiple flights over any 1 site are not recommended, our trend data indicate the likelihood of habituation with repeated exposures and as the nesting season progressed. Thus, naive, unexposed spotted owls may be more affected than spotted owls that have previously experienced overflights.

(8) Spotted owl flush response to helicopter overflights did not differ between the nesting and nonnesting seasons. Within the context of our experimentation, we found no substantive evidence that helicopter overflights during the nesting season detrimentally affected spotted owl success or productivity.

In conclusion, these research findings are specific to Mexican spotted owls and Pave Hawk helicopters, as well as to the seasons and habitat associated with our testing. Therefore, extrapolation to different avian genera or species, or other aircraft and locations, must be done with caution. For example, changes in forest type or elevation alone may influence prey availability and delivery rates, which may in turn influence spotted owl response behavior. We also caution against use of these findings to infer how spotted owls would respond under different circumstances that were not directly tested, such as spotted owl responses during early courtship and incubation, responses to >1 helicopter or overflight, or responses in different nesting habitat or under different foraging conditions. While our research was effective in answering the original, specific disturbance question, these results must be qualified by the limiting context of their derivation when applied to broader managerial questions.

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Responses of Mexican Spotted Owls to Low-flying Military Jet Aircraft

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Abstract—To investigate the effects of military fixed-wing aircraft training on the behavior of the endangered Mexican spotted owl (*Strix occidentalis lucida*), we subjected four adults and one juvenile owl to low-altitude, fixed-wing, jet aircraft overflight trials in Colorado in 1996 and 1997. Trials consisted of three sequential fly-bys, each at a greater aircraft speed and noise level, over owl territories in narrow and steep-walled canyons. All overflights were about 460 m above canyon rims, the lowest altitude allowed during training flights. Maximum noise levels, measured at one owl site, were 78, 92, and 95 dB (sound volume) for the first, second, and third fly-bys, respectively. Behaviors of owls during 25-second fly-by periods ranged from "no response" (no body movements) to "intermediate response" (sudden turning of head). The 25-second fly-by responses did not exceed behaviors ("no movement" to "change of roost") exhibited by the owls during 10-minute pre- and postflight observation periods before and after each fly-by.

Keywords: fixed-wing, F-16 jet, Mexican spotted owl, disturbance, noise

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Introduction

To develop and maintain flight proficiency of pilots, the Colorado Air National Guard (COANG) makes approximately 3,300 year-round sorties (one flight, takeoff to landing) by fixed-wing, F-16 jet aircraft on the Fremont and La Veta military operating areas (MOA). The MOAs are located on the southern slope of Pikes Peak (Fremont MOA) and in the Wet and Sangre de Cristo Mountains (La Veta MOA) adjacent to the Fort Carson Military Base in south-central Colorado. In the montane portions of both MOAs, the Mexican spotted owl occurs only in deep, steep-walled, rocky canyons containing ponderosa pine and mixed-conifer forests (Johnson 1997). When combined, the Fremont and La Veta MOAs contained 72 percent (13 of 18) of all spotted owl territories found in Colorado during studies (1989 to 1997) of the owl's distribution and ecology at the northeastern limits of their distribution (Johnson 1997). Due to the importance of the MOAs to Colorado spotted owls, the few reports on the effects of aircraft on raptors (Delaney and others 1999; Holmes and others 1993), and an opportunity to direct jet aircraft flights over the few Mexican spotted owls in the MOAs, we subjected five Mexican spotted owls in four canyons in the Fremont and La Veta MOAs to low altitude F-16 flights in 1996 and 1997.

Study Area and Methods

The Fremont MOA, an area of about 490 km^2 ranging in elevation from 1,830 to 3,500 m, is located immediately west of Fort Carson, El Paso County, Colorado, and includes much of the south slope of Pikes Peak. The La Veta MOA, an area of about 5,180 km^2 ranging from 1,890 to 3,535 m elevation,

is 24.5 km south of the Fremont MOA and includes portions of the Wet and Sangre de Cristo Mountains. The montane areas in both MOAs contained ponderosa pine (*Pinus ponderosa*) forests at lower elevations and mixed-species forests containing ponderosa pine, Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), blue spruce (*Picea pungens*), quaking aspen (*Populus tremuloides*), and Gamble oak (*Quercus gamblii*) at higher elevations. Both MOAs were dissected with deep, narrow rocky canyons, some of which were annually occupied by spotted owls while other canyons were occupied only occasionally during our 9-year study (Johnson 1997).

To examine the effects of jet overflights on spotted owls, we recorded the behavioral responses of day-roosting owls to low-altitude jet (F-16) overflight trials in Colorado in 1996 and 1997. An overflight trial consisted of three separate, but same-day, fly-bys over each owl. Each fly-by was at sequentially greater aircraft speeds and sound levels: "enroute cruise" (speed approximately 300 knots), "2nd power setting" (approximately 425 knots), and "higher-power setting" (approximately 520 knots). We recorded the behavior of the roosting owls subjected to overflight trails during (1) a 10-minute period immediately prior to a fly-by, (2) during a 25-second fly-by period, and (3) during a 10-minute period immediately after each fly-by. All owls had been captured with noose poles, mist nets (Forsman 1983), or leg-hold traps (Johnson and Reynolds 1997) and fitted with tail-mounted transmitters from 24 hours (one owl) to greater than 30 days (all other owls) prior to the trials. On the day of a trial, owls were located on their day roosts with hand-held receivers. Owl behaviors were observed continuously during each fly-by period with binoculars and 20x scopes by two to four observers in at least two separate locations hidden by trees and shrubs between 30 and 100 m from the owls. Observers were at their observation positions more than 30 minutes prior to overflights to allow the owls to adjust to any disturbances related to our arrival. We used these observation distances and pretrial arrival times because spotted owls become accustomed to observers sitting quietly 25 to 50 m away in only 10 to 15 minutes (Sovern and others 1994).

Planned elapsed time between each sequential fly-by was 10 minutes between the end of the 10-minute postfly-by observation period and the beginning of the next 10-minute prefly-by observation period. Aircraft safety factors constrained our control of the speed sequencing of fly-bys; thus, slower aircraft speeds always preceded higher speeds. Pilots attempted each fly-by at 460 m above each canyon rim, the lowest altitude allowed during flight training; we could not determine the exact distances between owls and aircraft. All flights were across or perpendicular to the length of canyons and were directed via radio communication between the pilot and a COANG controller on the canyon rim directly above the owl's roost. Owl behaviors during the 25-second fly-by periods were assigned to one of four categories: (1) "no response" (no discernible body movement); (2) "low response" (opening of eyes, slow head turn); (3) "intermediate response" (sudden movement of head, wing, or body); and (4) "high response" (flush or change of roost). Owl behaviors during the 10-minute pre- and postfly-by observation periods were assigned to the following categories: (1) owl asleep, no discernible body movement; (2) eyes open, slow head turns, preening; (3) alert, sudden head turns; and (4) movement to new roost. These categories were equivalent to categories used for the owl responses during the 25-second fly-by.

Four territories containing a total of five different owls were subjected to overflight trials during the study: two adult females in two different territories and one adult male and his female fledgling in a third territory in 1996, and an adult male and a 1-year-old female in a fourth territory in 1997. Two of the five owls were subjected to overflight trails twice; one female, overflown in 1996, was tested in 1997 in the same territory where she was treated in 1996, and the fledgling tested in 1996 was again overflown as a 1-year-old (AHY) in 1997 in the fourth territory (above) where she had paired with an adult male. Thus, seven overflight trials were conducted in which five different owls were treated once and two owls twice. In 1996, a Larson-Davis Model 820 sound level meter, with an attached 1.3 cm condensor microphone covered with a 9.0 cm wind screen, was used to determine sound volumes (dB) and duration (seconds) of three sequential fly-bys at one territory only. We reported A-weighted decibels (dBA), a logarithmic measure of the magnitude of a sound that an average human hears. While BA may not be representative of the noise energy that spotted owls might hear (Delaney and others 1999), dBA occurs on most sound level meters and is ubiquitously used. We used likelihood ratio tests (exact methods due to small samples) (CYTEL 1998) to compare observed frequencies of owl behaviors during pre- and postflight 10-minute periods and responses during the 25-second fly-bys among aircraft power settings.

Results

During each overflight trial, owls were day roosting in trees (for example, Douglas-fir, quaking aspen, Gambel oak) or on rock walls of canyons between 200 and 300 m below the canyon rims. All overflights occurred between 1200 and 1600 hours Mountain Standard Time and between 27 and 29 August in 1996, and on July 4, 1997. Elapsed time between the end of a 10-minute postfly-by and the beginning of a 10-minute prefly-by observation period during fly-bys in a canyon varied from 10 to 40 minutes. Ambient temperatures during all overflight experiments ranged from 18 to 29 °C, and winds were calm to light. At the one canyon territory where durations and sound levels of fly-bys were measured with a sound level meter, sound duration for "enroute cruise" was 15.5 seconds and volume was 78 dBA, for "2nd power setting," 19.0 second and 92 dBA, and for "higher-power setting," 22.5 second and 95 dBA. During overflights trials while the sound levels were being recorded in this territory, a thunderstorm was in progress; intermittent light-to-heavy rain was falling, and numerous thunderclaps were recorded. Close thunderclaps had durations of 4.5 to 6.0 seconds and sound volumes between 62 and 87 dBA. Thunderstorms did

not occur during any of the other fly-by trials. Mean ambient or residual sound in the canyons was 61.2 dBA (range = 56.4 to 69.1 dBA, n = 4), excluding the thunderclaps measured in the one canyon.

In 17 (81 percent) of the 21 total fly-bys, only two (9.5 percent) owls showed a higher level of alertness during the post- than preflight 10-minute periods while two (9.5 percent) showed greater movement during the preflight than in the postflight 10-minute periods (table 1). While the numbers of same levels of behaviors by owls during the pre- and postflight periods increased with power setting, the increase was not significant (P = 0.34, df = 4). Of the two owls that showed greater movement during postflight periods, one changed roost trees (a 5-m flight) 5 minutes into the 10-minute postflight period for the "enroute cruise." This change of roost appeared to be induced by the thunderstorm rain. The second owl also changed roost trees (a 15-m flight) 7 minutes into the 10-minute postflight observation period ("2nd power setting"). This owl moved from a roost in direct sunlight to a shaded roost site. Two other roost changes, both made by the fledgling owl in the 1996 trials, were observed during the 10-minute prefly-by period for the "enroute cruise." Both of these roost changes appeared to result from the owl's seeking protection from the thunderstorm rain and to escape the mobbing of small birds.

During the 25-second fly-by period for "enroute cruise," one (14.3 percent) owl showed no response, four (57.1 percent) showed low responses (slow head turn), and two (28.6 percent) showed intermediate responses (sudden head turn toward origin of the sound). For the "2nd power setting," two (28.6 percent) owls showed no response, three (42.8 percent) owls showed low response, and two (28.6 percent) showed intermediate response. For the "higher power setting," two (28.6 percent) showed no response, two (28.6 percent) showed low response, and three (42.8 percent) owls showed intermediate response. None of the owls showed high response (flush) during any of the 25-second fly-by periods. Overall, there were no differences in observed and expected response levels during the 25-second fly-bys (P = 0.92, df = 4).

The female fledgling showed an intermediate response during each 25-second fly-by in 1996. However, when this owl was overflown on its new territory in 1997, it showed a low response during the 25-second "enroute cruise," and no responses during the 25-second fly-bys at the "2nd power" and "higher power setting." While the fledgling changed roosts twice in the 10-minute prefly-by period (see above), it exhibited a mix of no responses and low responses to thunderclaps that occurred during the pre- and post- 10-minute observation periods in 1996. However, it responded at the intermediate level to each 25-second fly-by in that year. The greater responses to fly-bys versus thunder may be related to the duration of noise: 4.5 to 6.0 second for thunder verses 15.5 to 22.5 second for overflights. Noise duration was greater for overflights due to the approach and departure of the aircraft. The adult female owl treated in both years showed only a single response ("low" to "2nd power setting") during the three 25-second fly-by periods in 1996. In 1997, however, she showed an intermediate response during all three 25-second fly-bys.

Discussion

The behaviors displayed by the five Mexican spotted owls between the time of our arrival near a roosting owl (always more than 30 minutes) and the beginning of the first 10-minute prefly-by observation periods in each overflight trial suggested that the owls had adjusted to our presence before 10-minute prefly-by trials were begun. With the possible exception of two roost changes made by two of the owls in the latter half of the 10-minute postfly-by observation periods, the behaviors of the owls during the pre- and postfly-by periods of the sequentially louder fly-bys, showed that the owls that responded at the second or third levels all very quickly returned to normal day-roosting behavior (sleeping, awake but quiet, preening). Delaney and others (1999) also noted a quick return to normal behavior by Mexican spotted owls after disturbance by helicopters. Because the two owls that changed roosts in the postfly-by periods in our study showed only "low" responses to the preceding 25-second fly-bys, we believed the two postfly-by changes of roosts were not directly caused by the fly-bys. However, the roost changes may have resulted from a residual alertness of the owls caused by the fly-bys. We expected the greatest responses from the owls during the 25-second fly-by periods. However, five (23.8 percent) of the 21 fly-bys produced no responses, nine (42.8 percent) produced low responses, and

Table 1—Number of behavior categories of five (two treated twice) Mexican spotted owls preceding and following three sequential jet fly-bys of increasing power and noise that (1) were greater in the 10-minute preflight observation period than in the 10-minute postflight observation period, (2) were the same in both periods, and (3) were greater in the post- versus preflight periods.

Fly-by	Owls	Pre > post	Pre = post	Post > pre
Enroute cruise	7	2	4	1
2nd power setting	7	-	6	1
Higher power setting	7	-	7	-
		2 (9.5 %)	17 (81.0 %)	2 (9.5 %)

seven (33.3 percent) produced intermediate responses; none produced high (flush) responses.

There was no consistent year-to-year pattern of responses during the 25-second fly-by periods of the two owls subjected to overflight trials in both study years. The adult female tested in both years exhibited higher response levels in 1997 than in 1996 during the 25-second fly-by periods. The higher 1997 responses of this female may have resulted from the owl's different roost locations in the 2 years. In 1996, the owl was roosting in the bottom of the main canyon 300 m below the canyon rim. Her 1997 roost was in a smaller side canyon, 55 m closer to the canyon rim and the aircraft. The fledgling that was overflown in 1996 responded at the intermediate level to all three 25-second fly-bys in that year. However, during the 1997 fly-bys, this 1-year-old owl responded with a "low" response to only the "enroute cruise;" she showed no response to the other two louder fly-bys. This owl's low responses in 1997 may have resulted from a year's habituation to military flights over the MOAs (see Delaney and others 1999 for possible habituation in spotted owls to helicopters and chainsaws). Alternatively, the higher response levels of this owl in the first year may have been due to an increased alertness of the owl caused by thunder, rain, and the mobbing by small birds during the overflight trials in 1996. It is not uncommon for spotted owls to change roosts during daylight hours in response to weather (rain, sun, temperature), mobbing birds, or attempts to capture prey (Forsman and others 1984; Johnson 1997; Sovern and others 1994).

Our observations of spotted owls exhibiting alert behavior (for example, sudden head turns), or even changing dayroosts, in the 10-minute prefly-by observation periods showed that owl responses to low altitude F-16 overflights did not exceed, and were often less than, responses to naturally occurring events. The relatively minor responses of spotted owls to fixed-wing jet aircraft flights near or at a minimum height of 460 m (plus distance from owl roost site to canyon rim) observed in this study are consistent with Delaney and others' (1999) finding that Mexican spotted owls in New Mexico exhibited no flush (change of roost) responses to noise when helicopters were farther then 105 m from roosting owls, and no alert (sudden head turn) responses when helicopters were greater than 660 m distant. Delaney and others (1999) did show, however, that as the distance from helicopters to owls decreased, the severity of owl responses increased. The 460-m minimum flight altitude for fixed-wing jet aircraft training flights in this study prevented us from determining the effects of closer flights on the behavior of spotted owls or to determine the distance at which Mexican spotted owls consistently flush from low flying aircraft.

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