

FINAL ENVIRONMENTAL ASSESSMENT

Amendment to State Parks Section 6 Grant Agreement and Associated Ivins City Detention Basin Construction Project

Tuacahn Wash, Washington County, Utah

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The Utah State Parks Section 6 ESA federal grant with the U.S. Fish and Wildlife Service must be amended. The amendment request emanates from a proposed construction project requiring an easement across the aforementioned parcel. The construction project proposes to build storm water detention structures in Tuacahn Wash, east of Ivins, Utah, in order to prevent flooding on adjacent properties. Two potential detention basin locations are proposed: 1) East of Tuacahn Drive and south of the Tuacahn High School/Center for the Arts with a capacity of 44 acre feet when inundated, on land owned by Ivins City within the Red Cliffs Desert Reserve. The dam would be 19 feet tall and 600 feet long. 2) North of the Tuacahn Amphitheatre with a capacity of 22 acre feet, on lands owned by Tuacahn and Snow Canyon State Park. Culvert upgrades at Tuacahn Drive and Center Street would be required under either detention basin location. Construction activities would occur over an approximate three-month period beginning in the winter of 2007.

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CHAPTER 1 PURPOSE AND NEED

This chapter describes the need for action and the objectives to be met by the proposal.

1.1 Introduction

This environmental assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA). NEPA and its implementing regulations require analyses of proposed actions that would be managed, regulated, or funded by federal agencies and would affect the environment. The US Fish and Wildlife Service (USFWS) is serving as the lead agency for NEPA compliance as outlined in a memorandum of understanding among state and federal agencies involved in the proposed action. This EA discusses the environment affected by the U.S. Fish and Wildlife Service proposed action to amend a Section 6 ESA grant with the State of Utah. The amendment is associated with a proposal to construct a detention dam on private lands which would require an easement across lands acquired with Section 6 grant monies.

Ivins City is proposing to construct a detention dam to control high water flows generated within Tuacahn Wash during storms which may cause flood damage to new property developments. Tuacahn Wash is located at the mouth of Padre Canyon east of Ivins City, Utah (**Figure 1**). Construction of the dam would require an easement across Utah State Park lands that were purchased with Federal Section 6 grant funding. Therefore, the USFWS is proposing to amend the current grant agreement and thus, serves as the lead agency for NEPA compliance (see above; for federal nexus see Background, **Section 1.2**).

The project entails constructing a detention basin in Padre Canyon in association with (and as a separate proposed action from) two smaller basins (one existing; one being established) in the subdivisions at the mouth of Padre Canyon (see Diagram 1, **Appendix A**). Under project Alternatives A and B, the proposed basin would be constructed on lands owned by City of Ivins, east of Tuacahn Drive and south of the Tuacahn High School/Center for the Arts (Tuacahn Amphitheatre). Under Alternative C, the proposed basin would be constructed on lands owned by Tuacahn and Snow Canyon State Park, north of the Tuacahn Amphitheatre (**Figure 2**). Access to the basin under each alternative would require a right-of-way (ROW) easement. Under Alternative A, an easement would be required from Snow Canyon State Park and from the Heritage Arts Foundation (private property). Under Alternative B, only an easement from Snow Canyon State Park would be required. Under Alternative C, an easement would be required from Tuacahn Amphitheatre. Under either option for the main basin (Alternatives A, B, and C), the smaller associated basins would be located in the subdivisions north (1 existing basin) and south (1 proposed basin) of Tuacahn Drive (Diagram 1, **Appendix A**). If approved, construction activities would begin in the winter of 2007 and would be completed within 90 days.

Effects to wildlife species from the project include the incidental killing or displacement of a relatively small number of small reptiles or mammals during construction, the permanent loss of desert tortoise habitat, and possible take of desert tortoises (see Environmental Consequences for Wildlife, **Section 4.1.4** and for Federal Threatened, Endangered, and Candidate Species, **Section 4.1.5**).

The USFWS must assess the character and design of this project and ensure compliance with Federal rules and regulations. This EA would assist the USFWS in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any “significant” impacts could result from the proposed action and all associated activities. “Significance” is defined by NEPA; this definition can be found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of “Finding of No Significant Impact.” USFWS would use the EA data and analyses as the basis for issuing a decision document.

1.2 Background

Establishment of the Red Cliffs Desert Reserve

In 1994, the USFWS designated 129,100 acres of critical habitat for the desert tortoise (listed as Threatened in 1990) in Washington County. In 1996, the USFWS issued an “incidental take” permit to Washington County authorizing the taking of an estimated 1,169 tortoises associated with the development of approximately 350,000 acres of desert tortoise habitat on private land in the county. One requirement for issuance of an incidental take permit was the approval by the USFWS of a Habitat Conservation Plan (HCP). The objectives of an HCP are to indefinitely perpetuate listed species and protect their habitat, while still meeting the growth and development needs of the county. Washington County’s HCP (Washington County Commission 1995) was formally approved in 1996, and allows orderly growth and development to continue without further jeopardizing the survival and recovery of federally listed or candidate species, with special emphasis on the desert tortoise. The central element of Washington County’s HCP was the establishment and long-term management of the Red Cliffs Desert Reserve (the Reserve), a 62,000 acre area of multiple jurisdiction lands located north of St. George. The HCP also recognizes the need for flood control and other water retention structures in the Reserve (Washington County 1995:46).

Since 1996, implementation of the management strategies identified in the Desert Tortoise Recovery Plan (USFWS 1994) and the HCP have been ongoing. Management of the Reserve is conducted through collaboration between Washington County, Bureau of Land Management, USFWS, Utah Division of Parks and Recreation, Utah Division of Wildlife Resources, participating municipalities, and the remaining landowners with private holdings in the Reserve. The multiple partners function through standing committees, including the Technical Committee (TC) and the Habitat Conservation Advisory Committee (HCAC). The TC is composed of biologists from the Washington County HCP, BLM, USFWS, Snow Canyon State Park, US Geological Survey, and a

local biologist. Its purpose is to provide biological information on endangered, threatened, and candidate species as needed by the HCAC or the Washington County HCP. The purpose of the Washington County HCP is to establish and manage the Reserve to conserve and contribute to recovery efforts for the desert tortoise. The Reserve (~63,000 acres) is mitigation for the loss of desert tortoise habitat (12,264 acres) from city growth and development outside of the Reserve. As stated in the Executive Summary of the Washington County HCP, "Within this area (the Reserve), uses will be carefully controlled and all management actions will place the desert tortoise as the highest priority."

The Reserve includes approximately 38,787 acres of desert tortoise habitat throughout the 5 zones. The Project Area lies in Zone 2, one of five designated zones within the Reserve. Zone 2 encompasses 5,493 acres of land between Ivins City and Highway 18 and is designated as "high density" for tortoises (i.e., 101-400 average tortoises per square mile).

Lands Acquired with Section 6 Federal Grant Funding

With the establishment of the Washington County HCP in 1996, specific parcels of land were identified and considered key to the conservation of tortoise in the Red Cliffs Desert Reserve. One such parcel was a privately-owned parcel in Zone 2, at the mouth of Padre Canyon, encompassing a portion of the Tuacahn Wash. In June 1999, The Conservation Fund, a not-for-profit organization purchased 143 acres of this land. That same year, Utah State Parks used Section 6 HCP land acquisition grant money to purchase 52.42 acres from The Conservation Fund and incorporated the new acres into Snow Canyon State Park boundaries. Pursuant to this grant, the lands are to be managed in keeping with desert tortoise conservation and recovery goals. If the land is proposed to be managed otherwise, a grant amendment must be proposed by the state and approved by the Service. When approved, the state can then incorporate the new management proposals, in this case, a ROW easement across a portion of their lands.

Detention Basin Construction Project

In 1995, a 125-year flood occurred in Tuacahn Wash that damaged the Tuacahn High School/Center for the Arts (cost of damages unknown); residential communities at the mouth of Tuacahn Wash were not yet developed. Prior to housing and municipal developments in the area, flooding events naturally overflowed their banks. Housing developments and roads have since been built around the wash without complete assessments of the Tuacahn Wash flooding potential.

The 1995 flood damages underscored the need to develop or improve infrastructure to accommodate large flood events and protect residential and municipal structures. As developments have encroached into the wash area, the channel has been narrowed. The banks of the current wash can likely accommodate a two- to three-year flood event (two-year event = 439 cubic feet per second (cfs)); however, culverts at Tuacahn Drive (three at 36-inch diameter) and Center Street (one at 48-inch diameter) can

accommodate less than the two-year event with capacities of 183 and 112 cfs, respectively. As a result, flooding of Tuacahn Drive and Center Street is likely to occur during most major events.

In an effort to address the impending flood problem, a detention dam was proposed in 1998 at a HCAC meeting. Further HCAC discussions followed in December 2002, 26 October 2004, and 22 February 2005; Ivins City Council meetings on 16 January 2003; and TC meetings on 20 March 2002, 17 April 2002, 17 September 2002, 18 October 2002, 17 May 2005, and 9 June 2005. Revisions to the original detention basin design were initiated on 29 March 2006. A modified engineering plan for the detention basin, incorporating preliminary comments from the agencies and input from Ivins City, was completed in June 2006.

In 2002, Ivins City purchased a seven-acre parcel of land from a private landholder that encompasses a portion of Tuacahn Wash above the housing and municipal developments. The land was purchased after coordination with the USFWS and was purchased with the intention of building a detention dam. The remaining privately owned land surrounding the seven-acre parcel had been purchased by Snow Canyon State Park using Section 6 grant federal HCP land acquisition grant money. In addition, these lands are within the Red Cliffs Desert Reserve, which serves as mitigation for the 1996 Washington County Habitat Conservation Plan. To access Ivins City's seven-acre parcel for the proposed detention dam, a ROW easement across Snow Canyon State Park lands would be required.

Figure 1 Project Area Vicinity

Figure 2 Project Area

1.3 Purpose and Need

The Section 6 federal grant agreement between Service and the State of Utah needs to be amended. The need for an amendment arises from a requested easement across lands that were acquired by Utah State Parks with Section 6 federal grant monies. The easement is needed to access a detention basin construction site. The detention basin is being constructed in Tuacahn Wash to alleviate the flooding of adjacent housing and municipal infrastructure in flash flood events.

Tuacahn Wash passes storm runoff through the east section of Ivins City. In 2001, Alpha Engineering prepared a hydrology study for Tuacahn Wash (Alpha Engineering 2001; reevaluated in June 2006). This report indicated that, given the combined flow capacities of existing culverts at Tuacahn Drive and Center Street, it was probable that high flows generated within Tuacahn Wash during major storm events would flood Center Street in most years if no steps were taken to increase the size of the culverts passing under Tuacahn Drive and Center Street or provide for water detention.

A major flood event within the Tuacahn Wash could cause damage to properties along the wash and damage roadways. There is thus a need to change the infrastructure of the current wash to provide a safer environment for the public.

The purpose of the project is to accommodate and prevent flooding of roads and developments in the vicinity of Tuacahn Drive and Center Street. To that end, this can be achieved with the use of detention basins that would temporarily hold enough water to prevent flooding of these areas.

1.4 Relationship to Statutes and Regulations

As described below, the project is consistent with all Federal laws and regulations. The project has been approved by Ivins City and complies with State of Utah and Washington County statutes and applicable zoning laws. More information can be found in Chapter 3 (Affected Environment).

1.4.1 Endangered Species Act

The Endangered Species Act provides a program for the conservation of threatened and endangered plants and animals and their habitats. The USFWS currently maintains a list of 1,922 endangered or threatened species, 747 of which are plants. A complete Biological Assessment (BA) was prepared for this project and is included in **Appendix B**. It was determined that the project is Likely to Adversely Affect the desert tortoise. There would be No Effect on any other threatened or endangered species.

1.4.2 Migratory Bird Treaty Act and Executive Order 13186

The Migratory Bird Treaty Act governs the taking, killing, possession, transportation,

and importation of migratory birds, their eggs, parts, and nests. Executive Order 13186 directs executive departments and agencies to take certain actions to further implement the Migratory Bird Treaty Act, such as requiring agencies to take reasonable steps that include restoring and enhancing habitat, incorporating migratory bird conservation into planning processes, promoting research and information exchange, providing training and visitor education, and developing partnerships beyond agency boundaries. The USFWS leads the coordination and implementation of this order. As construction is scheduled to take place in winter, no impacts to active migratory bird nests would occur, although any individual birds in the vicinity of construction activities may be temporarily displaced into adjacent suitable habitat.

1.4.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940, as amended, provides for the protection of the bald eagle (*Haliaeetus leucocephalus*) and the golden eagle (*Aquila chrysaetos*) by prohibiting, except under certain specified conditions, the taking, possession, and commerce of these birds. Bald and golden eagles may fly over the Project Area and may roost on rocky cliffs within the canyon. Bald eagles are considered potential occasional visitors to the area, but would not be expected to nest or occur there on a regular basis. Cliffs within the area provide suitable nesting habitat for golden eagles (see Section 3.4). Romin and Muck (2002) suggest a spatial and seasonal buffer on active golden eagles nests of 0.5 miles and 1 January - 31 August, respectively. Thus, a golden eagle nest survey would be conducted prior to any construction during the seasonal window.

1.4.4 National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1969 created the Advisory Council on Historic Preservation (ACHP) to advise on matters involving historic preservation, which is authorized to review and comment on all actions licensed by the Federal government which would have an effect on properties listed in or eligible for the National Register of Historic Places. The USFWS is complying with the mandates of the NHPA, as amended.

1.4.4 Clean Water Act

The Clean Water Act employs a variety of regulatory and nonregulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. Tuacahn Wash is a defined and jurisdictional Waters of the U.S. and would be altered by dredge and/or fill activities associated with project-related construction. A Joint Permit for Section 404 (US Army Corps of Engineers) and Stream Alteration (Utah State Engineer) is required and would be obtained if and when the EA is approved. Although several willow trees occur within the wash, stream values such as aquatic habitat and other water-supporting features are absent. Implementation of the project would not impact water quality; the project is consistent with the Clean Water Act.

1.4.5 Clean Air Act

The Clean Air Act of 1970 put into place National Ambient Air Quality Standards,

established New Source Performance Standards to determine how much pollution should be allowed by different industries in different regions, specified standards for controlling auto emissions, encouraged states to develop plans to achieve such standards, and required that state plans be approved by the Environmental Protection Agency (EPA). Lands within Washington County have been placed in Class II under the Prevention of Significant Deterioration guidelines, adopted by the State of Utah, which allows for air quality deterioration associated with moderate, well-controlled growth. Emissions anticipated from the implementation of the project would be of short duration and would not exceed ambient air quality standards. Water or other dust suppressants would be used as needed for dust control. Equipment would be properly maintained to minimize emissions. Implementation of the project would be consistent with the Clean Air Act.

1.4.6 Floodplain Management (Executive Order 11988)

Executive Order 11988 requires that executive agencies take special care when undertaking actions that may affect floodplains, directly or indirectly, by avoiding the disruption of these areas wherever there is a practicable alternative and by minimizing any environmental harm that might be caused by Federal actions. Under this order, activities are not to impact the natural and beneficial values served by floodplains that could in turn impact human safety, health, and welfare. The Federal Emergency Management Agency (FEMA), which produces maps of moderate or special flood hazard areas, has not yet mapped the Project Area, located inside of flood hazard area Zone A. Although the project occurs in a floodplain, human safety and welfare would be improved by implementing the project.

1.4.7 Protection of Wetlands (Executive Order 11990)

Executive Order 11990 requires that executive agencies take special care when undertaking actions that may affect wetlands, directly or indirectly, by avoiding the disruption of these areas wherever there is a practicable alternative and by minimizing any environmental harm that might be caused by Federal actions. No wetlands occur within the Project Area. However, dredge and/or fill activities associated with project-related construction would occur within Tuacahn Wash, a defined and jurisdictional Waters of the U.S. A Section 404 Permit would be required and obtained, if and when the EA has been approved.

1.4.8 Environmental Justice (Executive Order 12898)

Executive Order 12898 requires all Federal agencies to take actions, to the extent practical and permitted by law, to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human effects of its programs, policies, and activities on minority populations and low income populations in the United States and its possessions. The project would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

1.5 Identification of Issues

1.5.1 Public Involvement

The proposed project was listed on the Department of Natural Resources website on 7 April 2005. A Notice of Scoping (NOS) for the project was sent out on the same date. The NOS was mailed to 55 individuals or groups, including affiliated American Indian Tribes. A link to the NOS was also published in the Legal Notices section of The Spectrum (St. George, Utah) on 14-19 April 2005; four comment letters/responses were received (see **Appendix C**).

1.5.2 Relevant Issues

The following resource issues were determined to be within the scope of the project decision and are discussed in Chapters 3 and 4.

Soil Resources:

Issue #1

- The project involves surface disturbance that could impact soils.

Hydrology and Floodplains:

Issue #2

- The project involves modifications to the natural hydrological function of the wash.

Vegetation Resources:

Issue #3

- The project involves disturbance of native vegetation.

Issue #4

- Construction activities could contribute to the spread of noxious weeds.

Wildlife Resources:

Issue #5

- The project involves permanent and temporary habitat loss and the creation of temporary levels of noise above ambient levels. These disturbances could impact wildlife species.

Federal Threatened, Endangered, and Candidate Species:

Issue #6

- The project would impact occupied and designated desert tortoise critical habitat.

Recreation:

Issue #7

- The Project Area vicinity is used frequently for hiking and wildlife viewing and the project may impact visitors' enjoyment of the area.

Socioeconomics:

Issue #8

- The project would provide a social and economic benefit to residents of the downstream subdivisions by decreasing the potential for damage to property in the event of a flood.

1.5.3 Issues Not Carried Forward for Further Analysis

Air Quality

The project would not decrease air quality from the current air quality class.

Cultural Resources

A qualified archaeologist has completed a Class III cultural resource inventory for archaeological, cultural, and historical resources within the Project Area and none were found. A Class I file search for reported projects and previously recorded cultural sites was completed at the Utah State Historical Preservation Office (SHPO). Results indicated that six previously recorded archaeological sites have been recorded within one mile of the project, but were not within the immediate vicinity. A report (**Appendix D**) was submitted to SHPO and no formal letter was received for at least 30 days expressing concerns, thus we conclude that no archaeological, cultural, or historical resources would be impacted by the project.

Farmlands

The project would not occur in an area of prime or unique farmlands.

Water quality

Implementation of the project would not impact water quality.

Wetlands/riparian zones

There are no wetlands in or near the Project Area.

Wild and scenic rivers

There are no wild and scenic rivers near the Project Area.

Paleontology

The project would occur in an area that has been determined to have little potential for paleontological resources of scientific interest.

Native American religious concerns

Consultations have been initiated with the Paiute and Hopi Tribe of Utah. To date, neither tribe has identified specific concerns for the Project Area.

CHAPTER 2 PROJECT ALTERNATIVES

2.1 Alternative A (Proposed Action)

Lower Padre Canyon Detention Basin - Access within Tuacahn Wash

The Proposed Action is for the USFWS to approve Snow Canyon State Parks in granting a ROW easement to Ivins City in conjunction with the construction of a detention basin and dam on Ivins City property. Under Alternative A, the proposed site for construction of the dam and main detention basin would occur in the Reserve on property owned by Ivins City. The site is 300 feet east of Tuacahn Drive, 2,500 feet south of the Tuacahn High School/Center for the Arts (400 feet south of Tuacahn property), and 3,000 feet north of the subdivisions (see **Figure 2, Photo 1**), in the SW¼ of Section 28, T41S R16W. The total construction cost for Alternative A would be approximately \$760,000 (refer to **Appendix E** for cost breakdown).



Photo 1. View of proposed Lower Padre Canyon detention basin site, looking southeast.

Design features: The dam would be approximately 600 feet in length with a maximum height of 19 feet from the flow line of the existing wash to the top of the dam. The anticipated footprint area of the dam is 1.36 acres (see **Table 1** for disturbance figures). The inundated area for the 100-year event (1,714 cfs) is 7.0 acres (**Table 1**). The basin area would have a capacity of approximately 44 acre-feet, most of which would be contained within the capacity of the existing wash. The wash would not be excavated and would remain in a natural state.

The basin would be at full capacity at 1,456 cfs with an outlet flow of approximately 386 cfs through a 72-inch diameter outlet pipe with a 64-inch orifice plate. With an inlet flow above 1,456 cfs, additional water would flow over the emergency spillway. The outlet

would allow natural flows at low levels. For the 10-year storm event, the highest depth of detention would be approximately 10 feet, at which point detention would occur for 10 minutes before receding for a total detention time of 6.5 hours. Under the 25-year storm event, drainage would occur over approximately seven hours. Under full capacity (such as the 100-year storm), the basin would drain within 7.5 hours, and thus would be dry between storm events..

The proposed top and bottom elevations of the dam would be 3,146 and 3,128 feet above sea level. An emergency spillway, designed for flows in excess of 1,456 cfs, would occur at 3,143 feet elevation. The spillway would be located on the east end of the dam and centered over the wash to allow overflow directly back into the wash. Diagram 3 in **Appendix A** contains proposed specifications of the outlet structure.

Table 1 Acreage of permanent and temporary disturbance of the main basin and dam under each alternative.

DISTURBANCE	ALTERNATIVE A LOWER PADRE BASIN WITH WASH ACCESS	ALTERNATIVE B LOWER PADRE BASIN WITH DIRECT ACCESS	ALTERNATIVE C TUACAHN BASIN
Permanent (dam)	1.36	1.36	0.7
Permanent (access road)	0.5	0.21	0.0
Temporary (basin – inundated area)	7.0	7.0	4.0
Temporary (construction)	1.0	1.0	1.0

Construction: Although soils investigations have not yet been conducted, it is anticipated that the dam would be constructed with existing materials taken from the lower detention basins adjacent to Tuacahn Drive and Center Street (approximately 15,700 cubic yards) and additional imported fill (approximately 700 cubic yards of local, weed-free material). To finalize dam design details, geotechnical studies, including soil drilling, would be required prior to construction in order to assess the quality of fill for use during construction.

To obtain this geotechnical data, four holes would be drilled at depths between 30 and 50 feet. The drilling would be conducted using a wash-rotary drilling method at the proposed site of the detention dam. The holes would be drilled with a drill rig mounted on a 2-5 ton Ford truck. At each 3.5 inch-diameter hole location, drilling activities would disturb an area approximately 100 square feet in size. Water used for the wash-rotary method would recirculate water from a water trailer (needing to be refilled each day) or a 5,000 gallon water truck. The water trailer or truck may require a D-8 dozer or track-mounted Excavator to pull the rig onto the site if the access road is not suitable. There would be no residual water pooling or running down the wash. Due to the wash-rotary method, minimal underground vibration would result from the drilling activities. Estimated duration of the drilling activities is three working days. The site would be accessed by crossing Snow Canyon State Parks property. The property is relatively undisturbed desert tortoise habitat with intact vegetation communities of annual and perennial herbaceous understory and shrub structure. The geotechnical data would be obtained from the lab approximately 30-45 days after on-site drilling activities have been

completed.

Any imported fill material would not include topsoil in order to minimize the spread of noxious weed seed. In order to reduce the visual impact on the downstream face of the dam, the following items would be incorporated into the design: 1) A curvilinear dam that blends into the natural contours of the landscape would be constructed, 2) Native vegetation would be planted near the downstream toe of the dam (see Environmental Protection Measures), 3) Water to establish the native vegetation would be supplied by a temporary 2-inch high-density polyethylene (HDPE) waterline that would run above ground from the water main in Tuachan Drive, and 4) Rocks would be randomly placed on the downstream face of the dam.

It is anticipated that the outlet structure would be made of concrete with metal inlet grates (see Diagram 3, **Appendix A**). At the inlet, the structure would vary in elevation in order to pass through lower flows. The outlet would be designed with a hinged metal flapper plate on the end of the pipe in order to prevent access by wildlife and people. In addition, riprap or a concrete waterway would be placed at the end of the outlet in order to dissipate storm water into the wash. The emergency spillway would be constructed of grouted riprap. Approximately 16,400 cubic yards of total material would be needed for the construction of the dam, of which approximately 700 cubic yards would be imported.

Construction would occur on weekdays during normal working hours. The sequence of construction activities for the detention dam would begin with vegetation grubbing and debris removal. Next, the foundation for the dam would be completed and materials for the dam would then be installed. At least four trucks, two excavators, two bulldozers, one blade, two scrapers, and a water truck would be required. After each day's construction activities are completed, project vehicles would be left on site within permanent and temporary disturbance areas. Construction for Alternative A would be completed in approximately 90 days.

Access and Traffic: Access to the project site would run across private (Heritage Arts Foundation, Inc.) property, west of State Parks land, then south within the wash (owned by Snow Canyon State Park) to the project site (**Photo 2; Figure 2**, access option 1). An easement would be required from both Heritage Arts and Snow Canyon State Park to access Ivins City property from the north and along the wash (see Diagram 2, **Appendix A**). The easements would be acquired by Ivins City to last for the duration of construction activities and future maintenance of the basin (indefinitely). It would be necessary to amend the Section 6 grant agreement between State of Utah Department of Natural Resources and the USFWS that allowed for Section 6 grant monies to be used to purchase the land for the conservation and recovery of desert tortoises. The Section 6 grant agreement amendment would occur once the EA (and FONSI) are finalized. The access road would be 1,700-feet long and at least 12-feet wide with a gravel base (imported) to support heavy trucks. This road would occur largely within the Tuacahn Wash (approximately 50 feet wide); entering the wash approximately 300 feet above the northern end of the proposed 100-year flood inundation area (see Diagram 2,

Appendix A). Road disturbance is considered permanent because gravels would not be removed after construction (see Environmental Protection Measures: *Soils/Erosion* and *Vegetation*). Utilizing the wash for access would prevent disturbance of vegetation.



Photo 2. Wash providing access to the proposed Lower Padre Canyon detention basin site, looking north.

Culverts: Currently there are three culverts at Tuacahn Drive and one culvert at Center Street (see Appendix A, Figure 1). The Tuacahn Drive culverts (each 36 inches in diameter) are smaller than the Center Street culvert (48-inch diameter) because the Tuacahn Drive is a smaller road with less maximum allowable height for a culvert. The maximum flow allowable under these culverts (currently) is 183 cfs total at Tuacahn Drive and 112 cfs at Center Street. Under current conditions (Alternative D, No Action), the 10-year, 25-year, and 100-year storms would overtop the Tuacahn Drive culverts as well as the Center Street culvert.

Under Alternative A, the three culverts at Tuacahn Drive and the one culvert at Center Street would be removed and replaced with two culverts at each crossing (four culverts total). Two pre-cast box culverts (both 9.5 feet in width; 3 feet high) would be installed at Tuacahn Drive and two (8.7 feet in width; 4 feet high) would be installed at Center Street under Alternative A. Culvert installation would require disturbance to these roads and coordination with utilities.

The new Tuacahn Drive culverts would pass the 25-year storm (new capacity of Tuacahn Drive culverts = 454 cfs; see **Table 2** with 25-year storm flow = 432 cfs). Before flowing through the Tuacahn Drive culverts, water conveyed down Tuacahn Wash would be detained slightly by the detention basin in the subdivisions that occurs just north of the Tuacahn Drive culverts. Flows larger than a 25-year storm (432 cfs), water would overtop Tuacahn Drive and flow back into the wash, an area which would

also be excavated as the second of the subdivision basins. The new Center Street culverts would be large enough to pass the 100-year storm under Alternatives A and B (new capacity of Center Street culverts = 551 cfs; compare to 100-year storm flow in **Table 2**). The water would then pass through the Center Street culverts after passing through this excavated area. No flooding would occur in this area because the Center Street culvert would convey all water up to 100-year storm capacity. In excess of the 100-year storm, water would overtop Center Street and flow back into the wash south of Center Street where no property damage could occur.

Table 2 Estimated flows for Tuacahn Wash above Center Street under current conditions (No Action or Alternative D) and projected under the implementation of Alternatives A, B, or C.

STORM EVALUATED	ALTERNATIVE A OR B LOWER PADRE BASIN + LOWER BASINS	ALTERNATIVE C TUACAHN BASIN + LOWER BASINS	ALTERNATIVE D NO ACTION
100-year	551 cfs	778 cfs	1,714 cfs
25-year	432 cfs	560 cfs	1,220 cfs
10-year	359 cfs	435 cfs	871 cfs

Alternative A is the most practical option from an engineering perspective. The seven-acre parcel acquired by Ivins City was chosen for the dam site because the channel is particularly narrow and deep at this location. The majority of the drainage in Padre Canyon could be captured if the dam were built in this area, thus Alternative A has the highest potential to accomplish the project objectives of protecting people and properties against flooding.

Maintenance: Maintenance of the detention facility would consist of monthly inspections of the outlet structure on foot, and excavation and removal of debris after major flood events. Large equipment would only be needed to remove sediment that builds up and reduces the detention basin capacity, which is anticipated to occur once every 2-3 years. Sediment removed from the basin would be transported off-site. Access to the site for this purpose would occur as for construction activities, following the guidelines in the Utility Development Protocol (UDP), which include desert tortoise training for all maintenance personnel.

Environmental Protection Measures:

Implementation of the project would comply with all applicable Federal and State laws, and local zoning and building ordinances, during all phases of the project. The following design features and construction protocols would be in effect during project implementation.

Hazardous Materials – If a fuel/oil or other hazardous material spill occurs, actions would be taken to minimize the amount and spread of the spill material. Such measures may include straw bale plugs (certified weed-free), earthen berms, or use of other absorbent materials. If necessary, soil remediation would be conducted and would include the removal of contaminated soils to an approved bioremediation facility and a soil sample(s) would be taken to verify the success of the site remediation. In

addition, the construction contractor would be required to follow any other local, state, or Federal regulations related to the use, handling, storing, transporting, and disposing of hazardous materials. A Hazardous Materials Management Plan would be prepared and approved by Snow Canyon State Park and the Reserve prior to issuing a FONSI/Decision Notice (DN) on this project.

Soils and Erosion –

Dam disturbance: Disturbed sites would be smoothed to restore the site to approximately the original contour following constructions, minimizing slope in order to reduce risk of erosion. During construction, any topsoil from excavation activities would be scraped and stockpiled and conserved for revegetation efforts. Excavation would take place within the dam area. Erosion would be prevented during construction by installing silt fences. Silt fences would be installed around stockpiles and disturbed areas. Following construction, all temporarily disturbed areas previously vegetated would be covered with any topsoil from stockpiles and reseeded with approved seed mixes. The seed mix would consist of native plant species observed in the area during field surveys, and those known to be palatable to desert tortoise, listed below.

Species	pound/acre
Creosote bush (<i>Larrea tridentata</i>).....	1.5
4-wing saltbrush (<i>Atriplex canescens</i>).....	1.5
Green Mormon tea (<i>Ephedra viridis</i>).....	1.5
Desert needlegrass (<i>Stipa speciosa</i>).....	5.5
Indian ricegrass (<i>Achnatherum hymenoides</i>).....	5.5
Globe mallow (<i>Sphaeralcea ambigua</i>).....	2.0
Desert marigold (<i>Baileya multiradiata</i>).....	2.0

A friable, but firm seed bed would be established, and if necessary, disturbed areas would be decompacted prior to reseeded. All restoration would be considered successful only with signed evaluation by the HCP administrator and the USFWS.

Access road: No ground disturbance would occur during or immediately following rain events or under any wetted condition that would create deep rutting. On areas covered with gravel (i.e., roads), seeding would be delayed until soil has reestablished naturally (via wind) over the gravel. Seeding would take place in early spring (or late fall) to coincide with suitable temperatures for establishment. A qualified biologist would make yearly site visits to monitor soil conditions in graveled areas (to determine when conditions are suitable for seeding) and the success of vegetation establishment. Follow-up seeding or corrective erosion control measures would be implemented on areas of surface disturbance which experience reclamation failure as many times as is necessary to establish vegetation (see *Vegetation*).

Noxious Weeds – All construction and future maintenance related vehicles and equipment would be cleaned of soils, seeds, vegetative matter, or other debris or matter that could contain or hold noxious seeds. Only certified weed-free seed and rock/fill would be used. A weed control plan, to be implemented by Ivins City after construction

activities are completed, would be developed and approved by Snow Canyon State Park and the Reserve prior to issuing a FONSI/DN on this project and would be implemented immediately after construction is completed and into perpetuity.

Cultural Resources – If, during any project activities, cultural, historical, or prehistoric resources were inadvertently discovered, a USFWS Authorized Officer, Snow Canyon State Parks, and Ivins City would be notified, and all work in the area would cease. An inspection by a professionally trained archeologist would be conducted and a mitigation plan developed, if necessary, in consultation with SHPO and affiliated tribes.

Fire – All construction personnel would have fire tools and extinguishers available at all times for use if the occasion arises. Construction personnel would be trained in basic fire control procedures.

Vegetation – Rehabilitation measures planned for the disturbed areas include replacement of topsoil and reseeding (see *Soils/Erosion*). Restoration and reclamation of disturbed areas would be carried out by a private contractor in accordance with standards specified by Ivins City officials, the HCP administrator, and USFWS. Newly seeded vegetation would take at least 2-5 years to become established, and due to variable growing conditions each year, the success of vegetation establishment cannot be fully evaluated for at least 3 years following reseeding. Restoration evaluation is based on a goal of achieving 50% range site potential within 15 years of the restoration effort. During the 15 year re-establishment time, follow-up seeding or other corrective measures may be needed on areas of disturbance where restoration efforts have failed. Restoration/rehabilitation activities would also occur on any new surface disturbance due to the access road. On the access road, gravels would be kept in place after construction and soil and vegetation would be allowed to reestablish naturally (see *Soils/Erosion*). It is unknown how long, or if, vegetation would reestablish on the access road. In an effort to increase the possibility of vegetation reestablishing, seed would be spread on the road within one year following construction.

Recreation – To ensure public safety, hiking along the Padre Canyon Trail during construction activities may be restricted with barricades and signs.

Protocols for Desert Tortoise Protection – Commitments to lessen-avoid effects to the desert tortoise and habitat would be implemented under the Proposed Action. The commitment measures are taken directly from the HCP UDP and the *Mitigation/Minimization Guidelines* prepared by the TC (WCC 1995, Appendix G; included as **Appendix F** of this EA). Guidelines are not considered final at this time and may be further revised upon final project approvals. The protocols and guidelines would be applicable to pre-construction and construction phases of this project. Future maintenance activities would also commit to the UDP in full (see Maintenance, above). All Terms and Conditions identified in the Biological Opinion issued by the USFWS for this project would also be implemented and adhered to.

Golden Eagle – A golden eagle nest survey would be conducted within 0.5 miles of any

construction activities that would occur during the period 1 January - 31 August. If an active nest were discovered, a USFWS Authorized Officer, Snow Canyon State Parks, and Ivins City would be notified, and all work in the area would cease.

Project Scheduling – Construction activities within the Reserve would mostly take place during the tortoise inactive/hibernation period (December 1 – February 15). Prior to construction activities, the Project Area would be inventoried for the presence of desert tortoise burrows that could potentially be impacted by the project. Identified burrows would be marked (e.g., flagged or fenced) for avoidance. During the inactive season, a qualified tortoise biologist would periodically (at least 3-4 times/week) be on site to monitor construction activities, ensure protection of any tortoise burrows, and ensure that all terms and conditions and minimization/avoidance measures outlined in the UDP and Biological Opinion for this project are followed. If a tortoise or tortoise burrow are identified in heavy equipment construction areas in the absence of the tortoise biologist, construction would halt until a tortoise biologist is on-site to ensure minimal disturbance. Where there are burrows, the biologist would clear the disturbance areas and oversee fencing off of areas where heavy equipment would be accessing the construction site. During the active season, a qualified tortoise biologist would be on site during all construction activities. If impacts to occupied burrows could not be avoided, the UDP would be followed as it would be during any disturbance to tortoise habitat during the active or inactive season.

Monitoring – To ensure that all Terms and Conditions of the UDP and Biological Opinion for this project are met, a qualified Biologist would conduct monitoring during project construction and until successful revegetation is completed.

Mitigation – Mitigation measures would be developed, in coordination with species experts and the TC, as stipulations to the approval of this project for all unavoidable impacts. Unavoidable impacts may include “take” of desert tortoise in the form of adult harassment and undetected juvenile or hatchling (<50 mm MCL) mortality, damage to tortoise burrows, and disturbance of critical habitat. Potential mitigation strategies may include but not be limited to rehabilitation of temporarily and permanently disturbed acres at a 3:1 and 4:1 ratio, respectively, in accordance with previous mitigation from utility development projects in The Red Cliffs Reserve. The mitigation plan details would be included in the FONSI/DN for this project.

2.2 Alternative B

Lower Padre Canyon Detention Basin - Direct Access from Tuacahn Drive

Alternative B would be identical to Alternative A with the exception of the access route.

Access and Traffic: Under Alternative B, access to the project site would occur straight from Tuacahn Drive, directly east to the wash (providing access under Alternative A), to above where the outlet pipe is located on the proposed dam structure (see Diagram 2, **Appendix A**). An easement from Snow Canyon State Park would be required to cross the parcel west of the basin footprint. The access road would be 650-

feet long, and at least 12-feet wide with a gravel base. Unlike the access road under Alternative A, this road would require crossing and piping of three natural washes, and fill may be required to provide a flatter driving surface to support heavy equipment. Due to culvert installation and additional roadway grading, Alternative B construction costs would total approximately \$500 – \$2,000 more than Alternative A.

Although the route itself is shorter (**Table 1**), Alternative B would require more involved construction for access than Alternative A because the area of disturbance is more densely vegetated and spans more natural land contours than access through the existing wash under Alternative A.

2.3 Alternative C

Tuacahn Detention Basin – Access within Existing Roads

Under Alternative C, the dam and detention basin would be located above the Tuacahn Amphitheatre, at the north end of the Tuacahn High School/Center for the Arts development, in the NW¼ of Section 28, T41S R16W (**Figure 2**). This site is marked by past and present disturbance from road building and other construction activities (**Photo 3**). Tuacahn owns 80% of this site; the remaining 20% (to the north) is administered by Snow Canyon State Park. The total construction cost for Alternative C would be approximately \$771,000.

Design features and construction would be similar to Alternative A, with the following exceptions:

Design features: The dam would be approximately 320 feet in length with a maximum height of 17 feet from the flow line of the existing wash to the top of the dam. The anticipated footprint area of the dam is 0.7 acres (**Table 1**) and would occur completely on Tuacahn property. The dam would require a total fill of 8,884 cubic yards. The inundated area for the 100-year event would be approximately four acres (**Table 1**), with a capacity of 22 acre-feet. The majority of the inundated area would be located on Tuacahn property, and a small portion to the north would extend into Snow Canyon State Park. No surface disturbance would occur outside of Tuacahn property. As under Alternative A, drainage would occur directly back into the existing wash and an emergency spillway would be designed for flows in excess of the 100-year storm. Detention times for water in the basin under Alternative C would be similar (within 5-10 minutes) to those under Alternative A for the 10-year, 25-year, and 100-year storms.



Photo 3. View of Tuacahn detention basin site, looking northwest.

Access and Traffic: Access to the site proposed for Alternative C would occur within the wash, via an existing dirt road on Tuacahn property.

Culverts: More extensive downstream culvert modifications would be necessary under Alternative C. Three pre-cast box culverts (7.4 feet in width; 3 feet high) would be installed at Tuacahn Drive and two (11.5 feet in width; 4 feet high) would be installed at Center Street.

2.4 Alternative D

No Action

Under the No Action Alternative, the existing culverts would remain the only means of controlling stormwater runoff down Tuacahn Wash. The developments at the mouth of Padre Canyon would continue to be at risk from flooding. Specifically, high flows generated within Tuacahn Wash during major storm events would be expected to flood Center Street in most years, causing potential damage to property, possible injuries, and costly remediation measures. A detention basin would not be constructed, access would not be needed, and there would be no need to amend the Section 6 grant agreement.

2.5 Alternatives Considered but Dismissed from Further Analysis

- An alternate site for the detention basin was identified just north of the subdivisions at the south end of the Reserve, having a volume of 63.2 acre-feet and covering 13.5 acres when inundated. This option was rejected due to strong opposition from residents of the subdivisions because it would obstruct views of Snow Canyon and surrounding cliffs, thereby lowering property values.

- Constructing a smaller, deeper detention basin on the parcel of land owned by Ivins City was considered but dismissed due to the difficulties and cost of removing water (a longer outlet pipe would be needed that would reduce flows), and maintaining the basin depth, as well as soil and vegetation disturbance that would occur in the wash.
- A final alternative considered was to construct new, larger culverts at existing crossings and to not build any detention dams. This alternative was rejected due to insufficiency of new culverts alone in controlling a 100-year storm event without control of the volume and velocity of storm water. Culvert replacements would likely be necessary in other downstream areas under this alternative.

2.6 Alternatives Comparison

Under Alternative D, no construction would occur and there would be no impacts to soils, hydrology, vegetation, wildlife, or recreation. However, the existing culverts would remain the only means of controlling stormwater runoff down Tuacahn Wash and the developments at the mouth of Padre Canyon would continue to be at risk from flooding, causing potential damage to property, possible injuries, and costly remediation measures. Implementation of Alternative D could have major socioeconomic impacts (Table 3).

With the exception of the access route, Alternatives A and B are identical. Under Alternative A, the access road would be 1,700-feet long and would occur largely within Tuacahn Wash. Under Alternative B, the access road would be 650-feet long and would occur straight from Tuacahn Drive, directly east to Tuacahn Wash. Unlike the access road under Alternative A, this road would require crossing and piping of three natural washes, and fill may be required to provide a flatter driving surface to support heavy equipment. Although the Alternative B route is shorter, it would require more involved construction for access than Alternative A because the area of disturbance is more densely vegetated and spans more natural land contours than access through the existing wash under Alternative A. Implementation of Alternative B would have more impacts on soils, vegetation, desert tortoise, and other wildlife than Alternative A (Table 3).

Under Alternative C, the dam and detention basin would be located above the Tuacahn Amphitheatre rather than on the property purchased by the City with the intention of building a detention dam. Under Alternative C, no surface disturbance would occur within designated critical habitat for the desert tortoise, although inundation may occur there during floods. Access to the site would be via an existing dirt road and the amount of disturbance associated with the dam and inundated area would be noticeably less than under Alternative A (Table 1). Implementation of Alternative C would have less impact on soils, vegetation, wildlife, recreation, and desert tortoises than under Alternative A. However, under Alternative C, the basin would only have a capacity of 22 acre-feet as apposed to 44 acre-feet under Alternative A. Alternative C thus only partially addresses the flooding and subsequent damage to property during a 25-year flood. Overall, Alternative C would provide a moderate benefit in terms of preventing flood damage, while Alternative A would provide a major benefit. Under Alternative A, impacts to tortoises would be minimized by following the Environmental Protection Measures described above and by adhering to the UDP. Further, potential mitigation strategies may include but not be limited to rehabilitation of temporarily and permanently disturbed acres at a 3:1 and 4:1 ratio, respectively, in accordance with previous mitigation from utility development projects in The Red Cliffs Reserve. The mitigation plan details would be approved by Snow Canyon State Park and the Reserve and included in the FONSI/DN for this project.

Table 3. Summary of Adverse Environmental Consequences

Affected Component	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D (No Action)
Soils	Minor	Moderate	Negligible	No Impacts
Hydrology and Floodplains	Negligible	Negligible	Negligible	No Impacts
Vegetation	Moderate	Moderate to Major	Minor	No Impacts
Wildlife	Moderate	Moderate to Major	Minor	No Impacts
Listed TEC Species	Likely to Adversely Affect Desert tortoise	Likely to Adversely Affect Desert tortoise	Not Likely to Adversely Affect Desert tortoise	No Effect
Recreation	Minor to Moderate	Minor to Moderate	Negligible	No Impacts
Socioeconomics	Major <i>beneficial</i>	Major <i>beneficial</i>	Moderate <i>beneficial</i>	Major

CHAPTER 3 AFFECTED ENVIRONMENT

This chapter presents the potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources) of the impact area presented in Chapter 1 of this assessment. This chapter provides the baseline for comparison of impacts/consequences described in Chapter 4.

The Project Area is located within the Mojave Desert physiographic subdivision at approximately 3,130 feet elevation at the proposed detention basin site. Dominant plants in the vicinity are typical of the Mojave Desert. As recorded at Ivins City, long-term (>30 years) precipitation averages 8.77 inches per year. Long-term average daily summer (July) high and winter (January) low temperatures measure 103°F and 29°F, respectively (www.weather.com).

3.1 Soils

Soils in the area are fine sandy loam and belong to the Tobler and Badland complexes, characterized as well-drained soils on alluvial fans and floodplains formed in alluvium weathered from sandstone and shale. Permeability is moderately rapid and runoff is slow (SCS 1977).

3.2 Hydrology and Floodplains

Executive Order 11988 (Floodplain Management) defines a floodplain as any lowland and relatively flat area adjoining inland (or coastal) waters, including that area subject to a one percent chance or greater of flooding in any given year (42 FR 26951). Tuacahn Wash qualifies as a floodplain due to flooding frequency, although Padre Canyon has not been characterized as a moderate or special flood hazard area by FEMA. Runoff from Tuacahn Wash drains through Santa Clara City and eventually to the Santa Clara River via Lava Flow Wash. The channel is 10-50 feet wide with banks up to 10 feet tall. Downstream from the Reserve, the channel has been narrowed by encroaching developments and the area previously available for water detention has been reduced. There is no aquatic habitat and no wetlands or other water-supporting features in the canyon. Additional information on Tuacahn Wash hydrology can be found in Alpha Engineering (2001).

3.3 Vegetation

The Project Area receives less than 10 inches of average annual precipitation. Dominant vegetation is typical of the Mojave Desert and consists of creosote bush, four-winged saltbrush, green Mormon tea, desert thorn (*Lycium sp.*), and grasses, including desert needlegrass and Indian ricegrass. Several desert willows (*Chilopsis linearis*) also occur in and scattered on the banks of the wash, although no other riparian vegetation or stream characters are present. Non-native cheatgrass (*Bromus tectorum*)

is prevalent within the Project Area and surrounding areas. No invasive species that are characterized as noxious were observed during field surveys on 14-15 March 2005.

3.4 Wildlife

A field survey was conducted for desert tortoise on 14-15 March 2005 according to UDP protocol, which involves systematically walking parallel transects to cover the entire area of a proposed disturbance. The entire area west of the proposed basin disturbance and east of Tuacahn Drive was surveyed in addition to the proposed basin disturbance, including the wash. Surveys were conducted from mid-morning to mid-afternoon under favorable conditions for observing wildlife (no rain or substantial cloud cover). All wildlife species recorded below, other than desert tortoise, were observed incidentally during surveys for desert tortoise.

Mammals and Reptiles

A wide variety of mammal and reptile species are present on the Reserve and Snow Canyon State Park. Observations of individuals (or sign) of wildlife species were recorded during field surveys conducted according to UDP protocol for desert tortoise. Surveys were conducted in all areas of suitable tortoise habitat within and immediately adjacent to the proposed Lower Padre Canyon and Tuacahn detention basin sites on 14-15 March 2005. The following wildlife species were observed: side-blotched lizard (*Uta stansburiana*), white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), desert cottontail (*Sylvilagus audubonii*), and kangaroo rats (*Dipodomys sp.*).

Fishes

There is no fish habitat in or near the Project Area. The nearest perennial stream channel is the Santa Clara River, four miles to the south.

Birds

The Reserve and Snow Canyon State Park provide habitat for many bird species. Canyon wren (*Catherpes mexicanus*), scrub jay (*Aphelocoma californica*), various sparrows (*Amphispiza sp.*), and Gambel's quail (*Callipepla gambelii*) were observed during field surveys. Birds of conservation concern listed by the USFWS and/or Partners in Flight (PIF) that may occur in the Project Area are listed in **Table 4** and are described below.

Table 4. Birds of conservation concern occurring in the Reserve that may occur in the Project Area.

COMMON NAME	SCIENTIFIC NAME	LIST
Golden eagle	<i>Aquila chrysaetos</i>	BCC
Northern harrier	<i>Circus cyaneus</i>	BCC
Peregrine falcon	<i>Falco sparverius</i>	BCC
Gambel's quail	<i>Callipepla gambelii</i>	PIF
Loggerhead shrike	<i>Lanius ludovicianus</i>	BCC
Sage sparrow	<i>Amphispiza belli</i>	BCC, PIF

BCC = Birds of Conservation Concern (USFWS), PIF = Partners in Flight (Priority Species).

- Golden eagle: Golden eagles occur in open country within tundra, shrublands, grasslands, woodland-brushlands, open coniferous forests, and occasionally riparian habitats. These eagles prefer to breed in elevated nest sites that are isolated from human activity, usually sheltered ledges on cliff faces near hunting areas. They will nest in trees and occasionally on the ground in the absence of suitable cliffs. Golden eagles are year-round residents in southern Utah (Hawkwatch 2005) and may use the Project Area for foraging and the cliffs within Padre Canyon provide nesting habitat, although no individuals or nests were observed during surveys in March 2005.
- Northern harrier: Northern harriers are found most often in marshes, meadows, and fields. Most individuals remain in Utah year-round, hunting for small rodents and birds. Nests consist of sticks and grasses, and occur on the ground or on low vegetation. The Project Area does not provide typical habitat for this species.
- Peregrine falcon: Peregrine falcons nest on tall cliffs near, and often directly above streams, rivers, or reservoirs. Nests are shallow scrapes placed in cracks, holes, and small caves on cliff faces. Typical prey include waterfowl, shorebirds, doves, swallows, swifts, and meadowlarks. Although some individuals leave Utah for the winter, many reside year-round. Breeding and nesting typically begin in late March or early April, although migrants may return to Utah as early as February (Messmer et al. 1998). The cliffs within Padre Canyon provide nesting habitat and the Project Area could be used for foraging. No peregrine falcons were observed during surveys.
- Gambel's quail: Gambel's quail typically reside in desert mountain foothills, mesquite springs, plains with diverse vegetation, and any area of the desert receiving slightly more rainfall than surrounding parts. Gambel's quail are non-migratory and roost in dense shrubs or trees at night (UMMZ 2005). The Project Area provides habitat for this species and a covey was observed in thick brush adjacent to Tuacahn Drive during field surveys.
- Loggerhead shrike: The loggerhead shrike is a common year-round resident of Utah, where it prefers grasslands, pastures, desert scrub habitats, open woodlands, and other open areas. These birds typically nest in thick brush, shrubs, or tall trees. Females lay eggs in early or late spring (CDC 2005a). The Project Area provides suitable habitat for this species, although it was not observed during field surveys.
- Sage sparrow: The sage sparrow is present in the Reserve only in the winter. This species prefers shrubland, grassland, and desert habitats. Nests

are constructed of twigs and grasses, and are built either low in a shrub or on the ground (CDC 2005b). The Project Area provides suitable habitat for this species, although it was not observed during field surveys.

3.5 Federal Threatened, Endangered, and Candidate Species

The species in **Table 5** are listed by the USFWS as Threatened, Endangered, or Candidate (TEC) species that may occur in Washington County. Section 9 of the Federal Endangered Species Act makes it unlawful for any person to “take” listed animals. “Take” is defined in Section 3(18) of the Federal Endangered Species Act as “to harass, harm pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such activity.” Determination statements related to the impacts of this project of listed species are provided in the Biological Assessment (**Appendix B**) and Chapter 4 of this document. Measures designed to minimize impacts to listed species are provided in Section 2.1, Environmental Protection Measures, of this document and in the UDP (**Appendix F**). Further, mitigation plan details would be included in the FONSI/DN for this project.

The Biological Assessment describes the criteria for consideration of each listed species in this EA. Bald eagle, California condor, and desert tortoise were considered because these species may occur in or near the Project Area. The remaining species are not known or expected to occur within or near the Project Area, and would not be discussed further in this EA.

Table 5. Federally listed TEC species that may occur in Washington County.

COMMON NAME	SCIENTIFIC NAME	STATUS
California Condor	<i>Gymnogyps californianus</i>	Endangered, Experimental
Desert Tortoise	<i>Gopherus agassizii</i>	Threatened
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	Threatened
Willow Flycatcher	<i>Empidonax traillii extimus</i>	Endangered
Virgin River Chub	<i>Gilia seminude</i>	Endangered
Woundfin	<i>Plagopterus argentissimus</i>	Endangered
Dwarf Bear-Poppy	<i>Arctomecon humilis</i>	Endangered
Hermit Milkvetch	<i>Astragalus ampullarioides</i>	Endangered
Holmgren Milkvetch	<i>Astragalus holmgreniorum</i>	Endangered
Siler Pincushion	<i>Pediocactus sileri</i>	Threatened
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Candidate

California condors may fly over the Project Area and may roost on rocky cliffs within the canyon, but are unlikely to use the area for foraging or nesting. Condors are unlikely to forage in the area because the species feeds only on carrion, and mainly that of larger animals such as bison, deer, and pronghorn. Large ungulates do not likely occur frequently enough in Padre Canyon that a carcass would be available at the same time that a condor was present in the area. Condors are considered potential occasional visitors to the area, but would not be expected to occur there on a regular basis.

Desert tortoises are known to occur in the Project Area. Approximately 120 acres of tortoise habitat exists between Tuacahn Drive and the cliffs to the east. Two tortoises and four burrows were found during surveys of Padre Canyon in July 1987 (WCC 1995). One adult male tortoise and five burrows were found during field surveys by JBR on 14 March 2006. This tortoise and any other individuals in the Project Area may be relatively isolated from nearby populations due to topography and fencing. Cliffs and Tuacahn Drive occur to the east and west, respectively; and fencing across private property and new housing developments occur to the north and south, respectively.

3.6 Recreation

The Project Area is adjacent to the Padre Canyon Trail, which is a popular route within Snow Canyon State Park. Padre Canyon Trail is closed from March 15 through October 15 each year in order to protect desert tortoises; hiking is only allowed while the trail is open. Access to Padre Canyon (including the trail) is limited to Tuacahn Drive, which project vehicles would also utilize during construction. The northernmost lower basin is adjacent to the Toe Trail, which runs along the boundary of the subdivisions (south) and Snow Canyon State Park property (north). The Toe Trail is a 2.5-mile trail open to hiking, biking, and horseback riding year-round. Both trails are located in Snow Canyon State Park within the Red Cliffs Desert Reserve, which is a relatively quiet and aesthetically pleasing area where scenic value is paramount.

Winter visitation to Snow Canyon in 2006-2007, during the time of construction, is expected to be 60,000-80,000 visitors. It is unknown, however, what proportion of these visitors are expected to hike in Padre Canyon or on the Toe Trail. Hunting is not allowed anywhere in Snow Canyon State Park.

3.7 Socioeconomics

At the mouth of Padre Canyon, Citadel Estates, Eagle Rock, Alborada, and Copper Canyon subdivisions have been developed on either side of the Tuacahn Wash. According to Ivins City, these subdivisions consist of at least 150 units combined. Properties lie within 100-200 feet of the wash on either side and not within the floodplain itself. Tuacahn Drive and Center Street lie within the path of storm water and are heavily utilized by both residents of the subdivisions and other drivers coming to and from Ivins City and St. George. There are no detours around the intersection of Tuacahn Drive and Center Street that would be reliable and safe in the event of flooding. Tuacahn Drive also provides exclusive access to the Tuacahn Center for the Arts.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

Chapter 4 forms the scientific and analytic basis for comparing the alternatives. The potential effects, or impacts, on the human environment from implementing the Proposed Action, Alternatives to the Proposed Action, or No Action alternative are described. Chapter 4 focuses on the most significant effects, and describes other effects briefly. Chapter 4 is organized similar to Chapter 3, discussing each element of the affected environment. Potential impacts are described in terms of duration (short term or long term) and intensity. The thresholds of change for the intensity of a potential impact are defined as follows:

Negligible – The impact is the lowest level of detection.

Minor – The impact is slight, but detectable.

Moderate – The impact is readily apparent.

Major – The impact is a severe or adverse impact or of exceptional benefit.

Because all known mitigating measures have been included in the descriptions of the Proposed Action, the environmental consequences described below are unavoidable.

4.1 Alternative A (Proposed Action)

Lower Padre Canyon Detention Basin - Access within Tuacahn Wash

4.1.1 Soils

The project includes the use of heavy equipment for excavation and land clearing activities. New surface disturbance associated with the dam, detention basin, and access road would measure 1.86 acres of permanent disturbance and 8.0 acres of temporary disturbance (**Table 1**). All staging and soil stockpiles would occur on site, within the permanent and temporary disturbance areas. Revegetation and working under dry conditions would minimize impacts to soils, including the potential for the project to increase erosion potential in the area. Impacts to soils would be both short term (i.e., temporary) and long term (i.e., permanent). These impacts would be minor.

4.1.2 Hydrology and Floodplains

As a result of dam and basin construction, Tuacahn Wash would convey sediment and floodwaters at a reduced rate. In the event of an average 100-year storm, water would be discharged at a rate of 386 cfs below the dam, relative to 1,456 cfs unobstructed. Although the basin would empty within 24 hours, water would be discharged over a longer period than under natural conditions due to the reduced rate of flow, and natural low-water flows may be impeded. Sediment load in discharged water would also be less as it would settle within the basin during detention.

The width of the floodplain itself would be narrowed as a result of dam and basin construction. Alpha estimates that the existing area of flow is 31.26 acres (between State Parks property north of the proposed dam and subdivision property to the south) and would be reduced to 7.39 acres with the installation of the detention dam (see

Diagram 4, **Appendix A**). Connectivity of the floodplain to the larger watershed would be reduced as a result of this narrowing as well as the reduced rate of flow. No natural hydrologic processes that provide for ecological, biological, or fishery functions, however, would be adversely affected. Long-term impacts to hydrology and floodplains would be negligible.

4.1.3 Vegetation

Project-related construction (not including inundation within the wash) would disturb 1.0 acres of vegetation temporarily and 1.86 acres permanently for the dam and access roads (**Table 1**). Less than seven additional acres of vegetation could be inundated after rainfall events, but this area would be drained within 24 hours. After the 10-year storm event, for example, the area would be drained within seven hours. In addition, the few desert willows downstream from the dam would no longer receive water quantities typical of natural low flows.

Disturbance to vegetation in the access roads would be temporary, consisting of compaction and damage from vehicle traffic a few times per day for the duration of construction (approximately 65 working days). Native vegetation could establish again after reseeding (see Environmental Protection Measures, *Soils/Erosion and Vegetation*, Chapter 2). Monitoring of the area after construction would be done in accordance with the weed control plan implemented by Ivins City for multiple years after construction (see Environmental Protection Measures, *Noxious Weeds*, Chapter 2), under which weed abatement measures would be initiated if infestations occur. Temporary disturbance to vegetation would also occur in the vicinity of the dam site as construction vehicles and personnel would need to use these areas for staging and stockpiling of soil. Confining activities and equipment to the smallest areas possible would minimize temporary disturbances.

The permanent loss of 1.86 acres of creosote-bursage would reduce the already limited creosote-bursage vegetation in the area. During a 100-year storm event, the outermost areas of the detention basin footprint would be inundated with approximately one foot of water for less than 24 hours. At all other times this vegetation would remain unaffected. Impacts to inundated vegetation would be short term and minor because inundation would be infrequent and for less than 24 hours. Impacts to desert willows in the wash downstream would be long term and moderate.

Because all disturbed areas adjacent to the detention basin and access roads would be reseeded with native vegetation and all project vehicles would be cleaned prior to entering and leaving the site (see **Appendix B**), the likelihood of invasive vegetation establishment would be low. Animal wastes dumped into the wash north of the detention basin on Tuacahn property may create conditions conducive to weed invasion in and around the basin as wastes collect and settle during the detention period. Environmental protection measures (i.e., weed control plan) would minimize this potential. Cheatgrass infestation in the area is extensive and not expected to increase above baseline as a result of the project.

4.1.4 Wildlife

A field survey was conducted for desert tortoise on 14-15 March 2005 according to UDP protocol, which involves systematically walking parallel transects to cover the entire area of a proposed disturbance. The entire area west of the proposed basin disturbance and east of Tuacahn Drive was surveyed in addition to the proposed basin disturbance, including the wash. Surveys were conducted from mid-morning to mid-afternoon under favorable conditions for observing wildlife (no rain or substantial cloud cover). All wildlife species, other than desert tortoise (listed in Section 3.4), were observed incidentally during species-specific surveys for desert tortoise; results of the desert tortoise survey are discussed in Section 3.5.

Long-term effects on mammal or reptile populations would consist of direct impacts to small reptiles and mammals within the dam footprint or in the path of vehicles and a permanent loss of 1.86 acres of habitat (**Table 1**). The permanent loss of 1.86 acres of creosote-bursage habitat would reduce the already limited habitat for wildlife in the area. Based on observations made during field surveys, an unknown but relatively small number (expected to be <50) of small reptiles or mammals would be directly impacted (i.e., killed or displaced) by vehicles and personnel over the course of construction. Less than six acres of additional habitat could be inundated temporarily during storm events. Most other impacts to wildlife in the area would consist of short-term displacement from active construction areas, due to noise and human presence, into adjacent, suitable undisturbed habitat. .

The project would have few short- or long-term effects on birds or their habitat due to the timing of and short duration of the construction. Construction would occur in winter, so no impacts to nesting birds would occur. Any raptor species that use the cliffs within Padre Canyon (approximately 2,000 feet to the west and 600 feet to the east) may be displaced from winter roosting and perching sites either up- or down-canyon to avoid noise and human presence during the project. The foraging area for these species may be temporarily reduced for the short term. .

4.1.5 Federal Threatened, Endangered and Candidate Species

Concerning California condors, no nesting sites or sightings are known within the Project Area. The project would have **No Effect** on California condors.

The project is unlikely to injure or kill any tortoises greater than 180-mm MCL (maximum carapace length) because these individuals would be detected in pre-construction surveys. Hatchling and juvenile tortoises (less than 180-mm MCL) may be undetected inside non-descript burrows of rodents or other mammals, and these individuals could be injured or killed by construction activities. No adult tortoise burrows or hibernacula are expected to be destroyed under Alternative A because none were found within the dam footprint during surveys on 14 March 2005. Tortoise surveys would be conducted prior to construction and any occupied hibernacula in the footprint of the dam or in the vicinity of the basin would either be avoided or the tortoise removed and relocated, as dictated by the UDP.

The permanent loss of 1.86 acres (**Table 1**) would reduce the already limited designated critical habitat for tortoise in the area. The basin would not impede tortoise movements east and west. Movements by tortoises north and south would be narrowed by the dam, and tortoises would be forced to head east or west around the dam site. This small habitat area on the east side of Tuacahn Drive has become increasingly valuable to resident tortoises that have lost much of their local range from encroaching developments. Due to the loss of 1.86 acres of designated critical habitat and potential “take” of desert tortoise, the project **May Affect and is Likely to Adversely Affect** the desert tortoise. Incidental “take” of tortoises would occur if any tortoise is disturbed (including moved during pre-construction surveys), injured, or killed. “Take” is defined in Section 3(18) of the Federal Endangered Species Act as “to harass, harm pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such activity.” Project design features, construction activity scheduling (during the inactive season), and mitigation commitments would help minimize and avoid most temporary impacts to desert tortoise and their designated critical habitat. The mitigation plan details would be included in the FONSI/DN for this project.

4.1.6 Recreation

During construction activities, the Project Area and vicinity may be undesirable to hikers in Padre Canyon or on the Toe Trail from the temporary increase in noise and dust generated from construction equipment. Official restrictions on hiking during construction may also be imposed. This indirect, short-term, and minor impact would last for approximately 90 days. After project completion, the dam and basins may reduce the scenic value on these trails for some users and thus degrade visitors’ experiences in Snow Canyon State Park. The Project Area vicinity, however, is already disturbed from seasonal water flows and several developments (i.e., roads and the Tuacahn Center for the Arts), thus scenic value of the area has previously been impacted. No impacts to overall visitation rates to the Park are expected. Impacts to recreation would be short to long term and minor to moderate.

4.1.7 Socioeconomics

The project would greatly reduce the potential for flooding and associated damage with the subdivisions. Tuacahn Drive and Center Street would also be less likely to flood, thus the project would provide a long-term and major benefit to residents of the subdivisions as well as users of Tuacahn Drive and Center Street. In addition, the project is not expected to affect incomes to State Parks or Ivins City as visitation rates to the area would not be reduced.

4.2 Alternative B

Lower Padre Canyon Detention Basin - Direct Access from Tuacahn Drive

The environmental consequences associated with Alternative B would be the same as those described for Alternative A with the following exceptions related to access.

4.2.1 Soils and Vegetation

Relative to Alternative A, approximately 0.29 fewer acres of soils and vegetation would be permanently disturbed under Alternative B for the access road (**Table 1**). The access road under Alternative B would be built on less stable surfaces and would require more excavation and fill procedures to allow the road to support heavy machinery. More vegetation would be disturbed under this alternative because the access road would occur in an area where vegetation is denser (relative to a wash). Impacts to soils and vegetation under Alternative B would be short term and moderate to major.

4.3 Alternative C

Tuacahn Detention Basin – Access within Existing Roads

4.3.1 Soils

Relative to Alternative A, approximately four fewer acres of soils would be permanently disturbed and/or temporarily inundated under Alternative C (**Table 1**). There would be no disturbance associated with road construction (**Table 1**). Most of the area to be disturbed under Alternative C is previously disturbed from equestrian and ATV use as well as construction activities on Tuacahn property (see **Photo 3**). Overall impacts to soils under Alternative C would be short to long term and negligible.

4.3.2 Hydrology and Floodplains

Tuacahn Wash would convey sediment and floodwaters at a similar but slightly reduced rate under Alternative C. Water may be discharged over a longer period than under natural conditions due to the slightly reduced rate of flow but would likely be similar even under low-flow conditions. The width of the floodplain itself would be similar to its current state, with an area of flow unlikely to be much less than 31.26 acres (see Diagram 4, **Appendix A**). Connectivity of the floodplain to the larger watershed would also remain largely unaffected. Long-term impacts to hydrology and floodplains would be negligible.

4.3.3 Vegetation

Relative to Alternative A, approximately four fewer acres of vegetation would be permanently disturbed and/or temporarily inundated under Alternative C (**Table 1**). In addition, the potential for noxious weed invasion as a result of the project may be reduced under Alternative C. Specifically, the disposal of animal waste into the wash on Tuacahn property would dissipate more naturally (without the risk of settling in the detention basin) because the basin would be above the disposal site. Overall impacts to vegetation under Alternative C would be short to long term and minor.

4.3.4 Wildlife

Long-term effects on mammal or reptile populations would consist of direct impacts to small reptiles and mammals within the dam footprint or in the path of vehicles. Relative to Alternative A, approximately four fewer acres of habitat would be permanently disturbed or temporarily inundated under Alternative C (**Table 1**). Most of this area, however, is previously disturbed from equestrian and ATV use as well as construction

activities on Tuacahn property (see **Photo 3**). Based on observations made during field surveys, an unknown but relatively small number (expected to be <50) of small reptiles or mammals would be directly impacted (i.e., killed or displaced) by vehicles and personnel over the course of construction, given the amount of identical and adjacent habitat. Short-term habitat loss within the basin during rainfall events would be minimal considering the existing level of disturbance. Most impacts to wildlife would include short-term displacement from areas surrounding active construction, due to noise and human presence, into adjacent, suitable undisturbed habitat. Populations on a whole would not be affected.

The project would have few long-term effects on birds or their habitat. Raptor species that use the cliffs (within 400 feet to the west, east, and north) within Padre Canyon may be displaced from winter roosting and perching sites either up- or down-canyon to avoid noise and human presence during the project. As construction would occur in winter, no impacts to nesting birds would occur. Impacts to wildlife species, including BCC, would be short to long term and minor.

4.3.5 Federal Threatened, Endangered, and Candidate Species

Tortoise surveys would be conducted prior to construction and any occupied hibernacula would either be avoided or the tortoise would be removed and relocated. No surface disturbance would occur north of Tuacahn property where critical habitat exists, although inundation may occur there during floods. Further, habitat for tortoise above the Tuacahn Amphitheatre is marginal, and no tortoises or tortoise sign (i.e., burrows, carcasses, scat) were found in this area during surveys on 15 March 2005. No direct impacts to tortoise individuals or burrows are expected as neither tortoises nor tortoise sign were found. Indirect impacts from habitat loss would be minimal. Because 0.86 acres of the proposed temporary inundation area under Alternative C still occurs within designated critical habitat for desert tortoise (north of Tuacahn property), the project **May Affect**, but would **Not Likely to Adversely Affect** the desert tortoise.

4.3.6 Recreation

Relative to Alternative A, the detention dam and basin under Alternative C would be less visible to hikers on the Padre Canyon Trail. There would thus be little to no loss in scenic value and visitors' experience in Snow Canyon Park would not be degraded by the view of a detention basin. The Padre Canyon Trail would not be closed to hikers during construction under Alternative C. Overall impacts to recreation under Alternative C would be negligible.

4.3.7 Socioeconomics

Relative to Alternative A, the detention dam proposed under Alternative C would detain less water. Relative to Alternatives A or B, flooding and subsequent damage to roads and property in the subdivisions may occur more frequently. Overall, Alternative C would provide a moderate benefit in terms of preventing flood damage.

4.4 Alternative D No Action

The environmental consequences associated with the No Action Alternative would be identical to those already occurring in the area. The proposed detention basins would not be installed; there would thus be no project-related impacts to soils, hydrology and floodplains, vegetation, wildlife, Federally listed species, or recreation. Risks to subdivision residents, properties, and tortoises along the wash from water, sediment, and debris during flood events would be identical to those now occurring. Depending on the size of future storm events, these impacts could be major.

4.5 Cumulative Impacts

According to the Council for Environmental Quality's regulations for implementing NEPA (40 CFR 1500-1508), federal agencies must consider both the context and intensity of potential effects when they evaluate the significance of proposed actions. Context refers to the factors or resources that the proposed action may directly or indirectly affect; intensity refers to the severity of impact of these factors or resources. The following are examples of factors that should be considered when intensity is evaluated:

- beneficial and adverse impacts;
- public health and safety;
- unique characteristics of the geographic area;
- highly uncertain effects and unique or unknown risks;
- scientific, cultural, and historic resources;
- federal, state, and local laws; and
- cumulatively significant impacts.

The regulations also require that agencies consider whether the action may adversely affect endangered or threatened species or designated critical habitat. When this EA was prepared, the factors and resources discussed below were found to be applicable to the proposed action, and both direct and indirect impacts on these factors and resources have been reviewed for significance.

Cumulative effects are those impacts to the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). The Cumulative Effects Area (CEA) for this project was defined as The Red Cliffs Desert Reserve (see **Figure 3**). Since 1996, the 62,000-acre Reserve (72% BLM, 12% SITLA, 10% Snow Canyon State Park, and 6% Private) has been managed as a refuge area for listed and sensitive species, with very restricted land use and little development under the provisions of the HCP, the 1994 Recovery Plan, and the 2001 Public Use Plan. These management restrictions have benefited the desert tortoise and other sensitive plant and animal species, view sheds, watersheds, and other resources. The Reserve contains approximately 38,800

acres of tortoise habitat (McLuckie et al. 2006).

Past actions that have occurred on the Reserve include: livestock grazing, an abandoned City of St. George dump site, outdoor recreation, water tank installation, the widening and realignment of Skyline Drive, fiber optic cable installation on existing power poles, a St. George City water line restoration project, the installation of new power lines, the removal of an old power line, and the building of a new substation. Utility upgrades and replacement, water line restoration, and road improvement projects were anticipated and identified during the establishment process of the Reserve (Washington County 1995, page 46).

All past disturbances within the CEA (i.e., the Reserve) are not known. However, most recently and evident, the Skyline Drive and substation projects resulted in the loss of approximately 18 and 14 acres of designated critical habitat, respectively. Past disturbances on The Reserve also include fires sparked by lightning storms in the Mojave Desert during two periods in late June and late July of 2005. Wildfires in the summer of 2005 burned approximately 14,740 acres of designated critical habitat within the CEA. Of this, approximately 10,450 acres are considered tortoise habitat (McLuckie et al. 2006), which represents 27% of the critical habitat for desert tortoise in the CEA.

Reasonably foreseeable future actions close to the proposed basin include construction of detention basins in the subdivisions that have a combined capacity of 10 acre-feet (discussed under Alternative A: design features and Alternative A: culverts). Additional future actions in the CEA include the Ledges Waterline Project, Skyline to Redhills Power Line Upgrade Project, Skyline to Ledges Power Line Project, and the Middleton to Red Butte Power Line Upgrade Project. Temporary and permanent disturbances associated with these potential projects are not yet known, but given their expected alignments within or near existing roads, disturbances are expected to be relatively small (approximately 20 and 0.1 acres, respectively).

Impacts related to past, present, and reasonable foreseeable future actions include the loss of wildlife habitat (including designated critical habitat for the desert tortoise), the "take" of desert tortoises, loss of native vegetation, increased noise levels associated with increased traffic, increased recreational use, destruction and removal of cultural artifacts, hazardous materials spills, soil erosion and compaction, introduction of man-made facilities to the visual landscape, introduction of non-native plant species, littering, and impacts to washes and floodways from culvert installation and road building.

The incremental impact of this project, 1.86 (dam area and access road) and 8.0 acres of permanent and temporary disturbance, respectively (under Alternative A, with the largest amount of disturbance), and the addition of an approximately 600 x 19 foot-high dam in the CEA, when added to the amount of past, present, and future disturbances in the CEA, would be minor. The incremental impact would be minor because it accounts for a very small percentage of the total disturbance that has occurred from past and present actions combined with potential future actions in the CEA.

Figure 3 Cumulative Effects Area

CHAPTER 5 COORDINATION AND CONSULTATION

The issue identification section of Chapter 1 identifies those issues analyzed in detail in Chapter 4. Chapter 1 also provides the rationale for issues that were considered but not analyzed further. Relevant issues were identified through the public as described below.

5.1 Summary of Public Participation

5.1.1 Initial Public Scoping

The proposed project was listed on the Department of Natural Resources website on 7 April 2005. A Notice of Scoping (NOS) for the project was sent out on the same date. The NOS was mailed to 55 individuals or groups, including affiliated American Indian Tribes. A link to the NOS was also published in the Legal Notices section of The Spectrum (St. George, Utah) on 14-19 April 2005; four comment letters/responses were received (see **Appendix C**).

Copies of the four letters are in **Appendix C**. Letters in support of the project were received from the State Engineer and the Mayor of Santa Clara City. The State Engineer recommended the inclusion of detailed design documents into the EA and the application for a Stream Alteration Permit; the Mayor expressed support for the project citing the urgent need for flood control and minimal loss of tortoise habitat in the Reserve. A letter in opposition to the Alternative A location of the project was received from Snow Canyon State Park, citing impacts to recreation (scenic value), tortoises, and the potential spread of noxious weeds. We also received detailed recommendations for mitigation of impacts to tortoises, riparian habitat, invasive species, and scenic values from the Washington County HCP TC.

A notice of the availability of the draft EA for public comment was issued in a statewide news release wire for Utah newspapers and sent to potentially interested parties. The review period ran from December 11, 2006, to December 16, 2007. The draft EA was also available online at <http://mountain-prairie.fws.gov/federalassistance> website. No comments on the draft EA were received during the comment period.

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5.1.2 Draft EA Public Comment

The Draft EA, including the Biological Opinion, will be posted for a 15-day public comment period. Comments will be responded to and addressed in the Final EA.

5.2 List of Preparers

Name	Title	Responsible for the Following Section(s) of this Document
Laura Arneson (JBR)	Biologist	Field Surveys and Document Preparation
Eric A. Holt (JBR)	Project Manager/Biologist	Field Surveys and Document Preparation
Karla Knoop (JBR)	Hydrologist	Document Preparation
Greg Brown (JBR)	Division Manager/Biologist	Document Review
Otto Jose (USFWS)	Grants Administration Specialist (Denver)	Document Review
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CHAPTER 6 REFERENCES

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Inc. Environmental Consultants.

Appendix A

Engineering Diagrams

Appendix B
Biological Opinion

Appendix C
Public Comment Letters

Appendix D
Cultural Resources Inventory Report

Appendix E
Construction Cost Breakdown

Appendix F
Utility Development Protocol