RECLAMATION

Managing Water in the West

Tropic Ditch Replacement Project Final Environmental Assessment and Finding of No Significant Impact

Bureau of Reclamation
Provo Area Office

PRO-EA-06-02

U.S. Department of the Interior
Bureau of Reclamation
Provo Area Office
Provo, Utah

October 2006

TROPIC AND EAST FORK IRRIGATION COMPANY TROPIC DITCH REPLACEMENT PROJECT ENVIRONMENTAL ASSESSMENT

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SUMMARY

The purpose of this project is to reduce the amount of salt entering the Paria River and ultimately the Colorado River. One way to reduce the amount of salt reaching the Colorado River is to eliminate seepage from the historic Tropic Ditch. The Bureau of Reclamation, Provo Area Office has proposed funding for the project under the Colorado River Salinity Control Program. In addition to reducing the amount of salt loading, the project would also conserve water lost to evaporation and seepage.

The purpose of this Environmental Assessment (EA) is to analyze the potential environmental consequences of the proposed construction of an irrigation pipeline by Tropic and East Fork Irrigation Company. The construction of the pipeline would originate approximately one mile within the east border of Bryce Canyon National Park. The pipeline would follow approximately one mile of an existing cattle trail through the park. It would continue to pass through the Tropic Canyon and eventually into the Tropic Valley near the town of Tropic in Garfield County, Utah. The pipeline would replace about 5.5 miles of existing open ditch with about 4 miles of pipe.

This EA identifies potential environmental consequences including changes to riparian vegetation, wildlife and biological productivity within seep-created riparian habitat along the ditch as well as consequences to cultural resources. The EA identifies management practices and mitigation measures that would be implemented to reduce or eliminate undesirable effects during project construction.

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1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Introduction and Background

The Bureau of Reclamation (Reclamation) in cooperation with the National Park Service (NPS) has prepared this Environmental Assessment (EA) to analyze the impacts of proposed improvements to the Tropic Ditch. The Tropic Ditch was built in the early 1890's by local farmers who "successfully channeled water from the East Fork of the Sevier River across the Paunsaugunt Plateau to their farms and orchards in the Tropic Valley." "Completion of the Tropic Ditch marked the first time water was diverted from the Great Basin to the Colorado River" (See Figure 1: Project Location Map). (http://www.byways.org/plan/itinerary/53423/?from_byway_id=2020)

The Tropic and East Fork Irrigation Company (Company), the owners of the Tropic Ditch, have approximately 150 shareholders with rights to approximately 25 cubic feet per second (cfs) of water which is stored in the Tropic Reservoir. The water is released to the East Fork Sevier River where it is diverted into the Tropic Ditch by means of a diversion structure. The ditch then travels across the Paunsaugunt Plateau and through Bryce Canyon National Park. While still in the park, the ditch travels down Water Canyon into Tropic Canyon. The ditch then crosses under Highway 12 and approximately one mile down stream it leaves the park. It continues down Tropic Canyon to the two ponds within the Tropic Valley where it is used to irrigate land in and around Tropic. The first pond lies south of Highway 12 approximately 1.5 miles downstream from where the ditch crosses under the highway. A splitter box is used to divert 15 cfs to the pond. Springs in this area are diverted into the ditch supplying approximately 2 cfs to the 10 cfs remaining in the ditch. The remaining 4 miles of the ditch carries this 12 cfs to the second pond (See Figure 2: Springs Location Map).

Recognizing that the current irrigation system is experiencing high losses to seepage, which is causing high amounts of salt to enter the Paria River and eventually the Colorado River, the Company is considering ways to reduce this salt loading. They are proposing to abandon the last 5.5 miles of the ditch and convey the water through a pipeline ranging in diameter from 18 to 30 inches.

The Company has recently finished piping the portion of the ditch from the diversion structure on the East Fork of the Sevier River to Dave's Hollow. They are in the process of piping the ditch from Dave's Hollow to within approximately 1000 feet of the Bryce Rim, approximately 2.5 miles from the beginning of the project analyzed in this EA.

1.2 Purpose of and Need for the Proposed Replacement of Tropic Ditch

The purpose of the Tropic Ditch Replacement Project (Project) is to reduce the amount of salinity reaching the Paria River and ultimately the Colorado River, due to seepage of Tropic Ditch water. This purpose must be met in a cost effective and feasible manner without affecting the purpose of the Tropic Ditch which is to convey water for agricultural use.

Figure 1: Project Location Map

Figure 2: Springs Location Map

The purpose of the Colorado River Basin Salinity Control Program is to "protect the quality of water available in the Colorado River". (www.usbr.gov/uc/progact/salinity/) The Colorado River provides water for more than 23 million people and irrigation for more than 4 million acres of land in the United States, as well as water for about 2.3 million people and 500,000 irrigated acres in the Republic of Mexico. Controlling the salinity of the Colorado River remains one of the most important challenges facing Reclamation. High salinity levels make it difficult to grow winter vegetables and popular fruits. In water systems, it plugs and destroys municipal and household pipes and fixtures.

Recent salinities in the lower portion of the Colorado River are typically about 700 mg/L, but in the future may range between 600 and 1,200 mg/L, depending upon the amount of water in the river system. Salinity damages in the United States portion of the Colorado River Basin range between $500 million to $750 million per year and could exceed $1.5 billion per year if future increases in salinity are not controlled. Controlling salinity damages in the Republic of Mexico continues to be a topic of international consequence.

Although salinity impacts cannot be eliminated, the Basin States and federal government agreed to limit future increases through the adoption of salinity standards. In June 1974, Congress enacted the original Colorado River Basin Salinity Control Act. To provide better program management, Reclamation proposed major changes to the Colorado River Basin Salinity Control Program. In 1995, P.L.104-20 directed Reclamation to conduct a $75 million test of a pilot program to award grants, on a competitive-bid basis, for salinity control projects. (www.usbr.gov/dataweb/html/basinwidescp.html)

The Company diverts water from the East Fork Sevier River into the Tropic Ditch for use by its shareholders to serve their agricultural needs. Currently the water loss from the Tropic Ditch due to seepage is 1060 acre-feet/year or 33% of the water conveyed by the ditch per year. An estimated 50% of this seepage ends up in the Paria River or 530 acre-feet/year. This 530 acre-feet of seepage carries 1829 tons of salt per year to the Paria River (Reclamation Salinity Loading Analysis, 2004). Along with needing to reduce this salt loading, the 1060 acre-feet/year of lost water needs to be retained. This lost water could be held in Tropic Reservoir by the company and its shareholders and be used to meet existing shortages. By reducing the losses within the ditch, the company would be able to better serve the needs of the shareholders.

1.3 Lead and Cooperating Agencies

The Bureau of Reclamation (Reclamation) is the lead agency in the preparation of this EA and the National Park Service (NPS) is a cooperating agency.

1.4 Decisions to Be Made

Reclamation would use this EA to determine whether to provide Salinity Control Program funding for project construction. NPS would determine whether to issue the right of way permit required for construction and use of the proposed pipeline alignment within Bryce Canyon National Park.

1.5 Permits and Authorization

If this EA is approved, the following permits would be required prior to project implementation:

- Stream Alteration Permit – This permit would be issued through the Utah Department of Natural Resources and complies with Section 404 of the Clean Water Act for small projects not affecting wetlands.
- Right-of-Way Permit within Bryce Canyon National Park - Under all alternatives the Tropic East Fork Ditch Company would be required to obtain a NPS permit, through the issuance of a Right-of-Way (ROW) permit to maintain the irrigation ditch or pipeline through the national park service lands. The NPS would work with the Company to develop this permit following the guidance outlined in the NPS Director Orders 53 and 36CFR14. This permit would be prepared based on the installation and long term maintenance needs of the selected alternative.
- Easements with landowners
- Utah Pollution Discharge Elimination Permit – This permit (if required) would be issued to the contractor by the Utah Division of Water Quality and complies with Section 402 of the Clean Water Act for actions disturbing more than one acre of ground or any discharge as a point source into the Paria River.

Compliance with the following Laws and Executive Orders (E.O.) is also required prior to and during project implementation:

Natural Resource Laws

- Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884) – This EA was used as a BA for informal consultation with the Fish and Wildlife Service.
- Clean Water Act

Cultural Resource Laws

- National Historic Preservation Act (16 U.S.C. 470 et seq., 1966)
- Archaeological Resources Protection Act (16 U.S.C. 470aa et seq., 1974)
- Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48 FR 44716)

Native American Laws

- American Indian Religious Freedom Act of 1978 (43 U.S.C. 1996)
- Enhancing the Intergovernmental Partnership, E.O. 12875, October 26, 1993 [58 Federal Register 58093]
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001)
- Consultation and Coordination with Tribal Governments, E.O. 13084, May 14, 1998
- Protection of Indian Sacred Sites, E.O. 13007, May 24, 1996 [61 Federal Register 26771]

Consultation with the Utah State Historic Preservation Office, the Utah Geological Survey, the Ute Tribe, the Paiute Indian Tribe of Utah, the Moapa Paiute Tribe, the Zuni Tribe and the Pueblo of Zuni, the Kaibab Band of Paiute Indians, the Chemehuevi Indian Tribe, the Las Vegas Paiute Tribe, the Shivwits Paiute Band and the Hopi Indian Tribe has been completed.

2.0 ALTERNATIVES

2.1 Introduction

A range of alternatives were considered for replacing the Tropic Ditch that could be used to reduce the amount of salinity reaching the Paria River. This chapter describes the alternatives considered and analyzed.

2.2 No Action Alternative

The No Action Alternative would be the continued use and maintenance of the historic Tropic Ditch. There would be no changes to the ditch alignment or structures. If no action is taken to improve the Tropic Ditch conveyance system, the calculated 1829 tons of salt would continue to reach the Colorado River. The ditch would continue to lose water due to seepage at 1060 acre-feet/year (Reclamation Salinity Loading Analysis, 2004). Maintenance costs of the ditch would continue to rise as sedimentation and vegetation growth increases in the ditch. The Company would continue to lose, on average, 600 acre-feet per year of irrigation water due to sluicing sediment from the ditch that has been washed into it due to severe rain storms. Agricultural productivity in the area would continue to be hindered by the reduced water supply.

2.3 Action Alternative

The Proposed Action to reduce the amount of salt reaching the Paria River and ultimately the Colorado River is to replace the ditch with a buried pipeline ranging from 18 to 30 inches in diameter. This action would eliminate 1829 tons of salt per year from reaching the river along with reducing water losses due to evaporation and seepage (Reclamation Salinity Loading Analysis, 2004). This action would increase the amount of irrigation water by approximately 40% which in turn increases the agricultural productivity of the area. It would also greatly decrease the maintenance required on the irrigation system.

The following section describes the proposed pipeline alignment with three alternative alignments through the Tropic Valley that are similar in scope and impacts but differ in the final placement of the pipeline. All three of the alternative alignments follow the same route for the first 10,000 ft and the final 5,000 ft and would be buried at least three feet in the ground. Any one of these alternatives would ultimately constitute the action alternative depending on right of way acquisition. The environmental consequences of the three alternatives have been evaluated and determined to be similar (See Figure 3: Pipeline Alignment Alternatives).

The proposed buried pipeline begins at the outlet of an existing culvert that crosses under Highway 12 near the Mossy Cave Trailhead within Bryce Canyon National Park. At this point water would be diverted into a pipeline that would follow the existing ditch for about 500 feet. The proposed alignment would run east following an old cattle trail between the Paria River wash and the historic ditch. After approximately 2,400 feet the alignments drops into the wash for approximately 1,200 feet and follows an old irrigation maintenance road before leaving Bryce Canyon National Park. After leaving the Park,

the pipeline would parallel the ditch for approximately another 750 feet. Then the proposed pipeline alignment would follow the ditch alignment to the existing turnout for the first pond. At this point the alignment would follow the north edge of the Paria River wash for about 450 feet. The alignment would then cross the river and be routed down the east side of the Highway until the proposed alignment splits into the three proposed alternative routes through the Tropic Valley. Further down the valley the alignments merge again to go around the south side of the Backbone below the existing ditch until reaching the second pond.

The origin of the three alternative alignments is on the east side of Highway 12 approximately at mile marker 19 on Highway 12. Alternative 1 parallels the highway right-of-way south to the dirt road at approximately 1250 North Center where it then turns east and eventually crosses the Paria River. The pipeline follows this road for approximately 2,700 feet where it then begins traveling in a southeasterly direction for approximately 1,200 feet until reaching the point where all three alignments again converge. Alternative 2 travels directly east from the origin of the three alternative alignments for approximately 1,500 feet until reaching an existing dirt road. It then parallels the road alignment on the west side until intersecting Alternative 1 approximately 2,800 feet to the south. Alternative 2 then turns to the east and follows the same alignment as Alternative 1. Like Alternative 2, Alternative 3 also heads east from the origin of the three alternative alignments. Instead of following the dirt road to the south, it continues east for approximately another 1,700 feet where it then turns and travels in a southerly direction for approximately 3,500 feet to the point where all three alignments again converge. The total lengths of the different alternatives are listed in Table 2.1.

Table 2.1 Entire Length Comparison of the Three Alternatives

Alternative 1	Alternative 2	Alternative 3
21,470 ft	21,110 ft	21,380 ft

A final alternative will be selected once all of the private property easement issues have been resolved. Tropic and East Fork Irrigation Company has easements for the existing ditch alignment. These easements may be used where the proposed alignments coincide. New easements would need to be obtained from land owners, whether public or private, where the existing ditch alignment and the proposed alignment deviate. A fifty foot wide easement would be needed during construction, except within Bryce Canyon National Park, a 30 foot wide construction easement with a fifty by 100 hundred foot turnaround easement every 1,000 feet would be used in order to minimize impacts. A comparison of the maximum acreage impacted by construction activities for each alternative is listed in Table 2.2. A thirty foot permanent easement would also need to be acquired for continual operation and maintenance of the pipeline.

Figure 3: Alignment Alternatives Map

Table 2.2 Maximum Impacted Acreage of the Three Alternatives

Alternative 1	Alternative 2	Alternative 3
24.54 Acres	24.23 Acres	24.64 Acres

Under the Action Alternative approximately 29,000 feet of the Tropic Ditch would be abandoned and left in its current state. Of these 29,000 feet, less than 2,500 feet would be used for the Proposed Action thus leaving 26,500 feet of open ditch within the project area to continue to provide habitat for wildlife within the surrounding area. It is expected that this habitat would be sustained by water collected in the ditch from storm runoff and natural springs in the area.

2.3.1 Pipeline Construction Procedures

2.3.1.1 Construction Sequence

Construction of the pipeline likely would occur in the following sequence:

- Flagging of the construction zone within the Park
- Mobilization of the construction equipment
- Excavation of the trench
- Pipe bedding preparation
- Haul pipe to construction site
- Fuse the pipe
- Place pipe within the trench
- Backfill around pipe and compact backfill
- Clean up and restore areas disturbed by construction
- Plant and reseed disturbed areas to provide for revegetation

2.3.1.2 Trench Excavation

A trench approximately five feet deep and approximately four feet wide would be excavated to provide for the installation of the pipe. Excavation would be performed with the use of an appropriately sized trackhoe to minimize impacts to the surrounding habitat. It is expected that a trackhoe with a footprint of 11 feet by 15 feet would be adequate for construction within the Park. All excavated material would be stockpiled to the side of the trench to be used as backfill once the pipe was installed. Top soil would be separated from other material in order to preserve it to be placed as the last layer.

During excavation of the trench, every effort would be taken to minimize impacts to the native vegetation. Trees and shrubbery would be avoided when possible. It is expected that despite the best efforts of the contractor, some native trees and shrubbery may be removed. Impacts would be reduced within the Park by using a thirty foot construction easement with a fifty foot wide by one hundred foot long turn around easement every thousand feet.

2.3.1.3 Pipe and Appurtenance Installation

The pipe would be transported by flatbed truck from the manufacturer to the staging areas. From the staging areas it would either be transported by loader to the work site or fused into longer sections and drug with a trackhoe to the work site. Efforts would be made to fuse the pipe in the fewest locations possible within the Park to decrease disturbance. The Tropic Wash, proposed pipeline alignment, and maintained roads would be used to transport the pipe to the work site. Each 50 foot section of pipe would be fused together with a pipe fuser and then placed in the prepared trench by trackhoe.

The crew, trench excavation, pipe installation, and finish grading, would all progress along the pipeline alignment from day to day. The crew's equipment would move along the alignment with them. Transportation vehicles would be used to transport the crew to and from the construction site to reduce the disturbance caused by the construction equipment. Each transportation vehicle would carry multiple crew members to minimize the number of vehicles. Pipe would be stockpiled at the staging areas and delivered to the alignment as it is needed.

At various points that would be determined during design, construction would be required to install either drain valves at low spots or air-vacuum valves at high spots. The drain valves would be located at low spots to allow any excess water that is in the pipeline at the end of the irrigation season to slowly drain from the pipe. These drains may be directed and day lighted into natural drainages or the wash. The air-vacuum valves are typically installed right on top of the pipe to vent air during pipe filling or allow air into the pipe while it drains.

After installing the pipe, backfill would be carefully placed around the pipe in layers of native material excavated from the trench. The preserved top soil would be placed last to minimize impacts. Backfill would be mechanically compacted with a vibratory compactor, wheel compactor or trackhoe attachment. Spoil in work areas would be spread evenly to blend with the natural topography and maintain local drainage patterns. Stockpiled topsoil then would be spread evenly over previously vegetated areas and reseeded with native vegetation species.

Any excess spoil material that can not be used as cover over the trench would be hauled from the site and disposed of either in a prior designated dump area in the Tropic area or on property currently owned by the Tropic and East Fork Irrigation Company. This includes all excess vegetation or trees removed during the construction clearing process.

Following construction, manpower would be provided by the Tropic and East Fork Irrigation Company to inspect the pipeline alignment within the Park to insure that restoration goals are met. Weed control would be performed during the inspection times and would include either mechanical or herbicide treatments. Herbicide treatments within the Park require a separate approval process through the Park. Monitoring and treatment would continue until there are two successive years without human intervention.

2.3.1.4 Tropic Wash Crossings

Existing drainage crossings of the Tropic Wash would be maintained during construction. Since it is not proposed to excavate into the existing invert of the Ditch, the existing drainage crossings should not require replacement.

Concrete collars a few feet long would be poured around the pipe in sections where the pipe is in the Tropic Wash. This would be done to prevent the pipe from rising to the surface under conditions where the surrounding soil is water logged.

2.3.1.5 Quality Control Procedures

After backfilling and all construction work are completed, the contractor would ensure quality control of construction through visual inspection and hydrostatic testing. Each segment or reach of pipe would be filled with water and pressurized for hydro testing through contractor-supplied pumps to ensure that the system operates to design specifications. If the pipe leaks or breaks, it would be repaired and re-tested until it meets specifications. After testing a segment, the water may be pumped into the next segment for testing.

The National Park Service would provide oversight during construction in the Park to ensure that construction parameters are being met while minimizing impacts to the resources.

2.3.2 Construction Staging Areas

Three construction staging areas have been surveyed and found to have no cultural or natural resources within them. These areas are identified in Figure 2. The staging areas would be used to stockpile the pipe, equipment and construction vehicles. If additional staging areas are needed, the contractor must demonstrate to Reclamation that those areas have been surveyed before use to ensure no impacts to culture or natural resources.

2.3.3 Operation and Maintenance

Operation of the Ditch once piped would remain essentially unchanged, and maintenance would be reduced significantly as a result. Operation would occur primarily from April 15 to October 15. Long term maintenance requirements and needs would be addressed in the right of way permits related to the project which would be developed in such a way to minimize impacts to the resources.

2.3.4 Land Disturbance

The proposed pipeline alignment, described in Section 2.3, is approximately four miles long and would require a maximum construction width of fifty feet. Construction activities would be confined to this fifty foot width, except within the Park where it would be reduced to thirty feet and the turnaround areas previously described to be located at about 1,000 foot intervals. Within the Park, the construction zone boundaries would be flagged and turn around areas designated with the help of Park personnel to minimize resource impacts during construction.

2.3.5 Transportation Requirements

Construction transportation requirements of the Proposed Action include a maximum of 20 round trips per day to the construction site within the Park. Construction transportation routes for the project include Highway 12, the Tropic Wash, pipeline alignment and other maintained roads. Figure 4 identifies the location of access points and transportation routes to the proposed pipeline alignment within and near the Park. These transportation routes would be chosen because they are currently used as vehicle access to the wash off of Highway 12, are already disturbed, and would be within the proposed pipeline alignment. Transportation to the project would follow the same routes to minimize disturbance to the biologic soil crust and vegetation and trips would be kept to a minimum. No vehicles other than the heavy equipment and those necessary to the construction activities would be allowed within the off-road construction zone.

2.3.6 Standard Operating Procedures

Standard Operating Procedures (SOPs) would be followed (except for unforeseen conditions that would require modifications) during construction, operation and maintenance of the Proposed Action to avoid or minimize adverse impacts on people and natural resources. A preconstruction meeting with the NPS, Reclamation, the contractor and the Tropic Irrigation Company's representative would be held prior to starting work. Weekly meetings would be held to assess the progress of the work within the Park. All construction vehicles and equipment would be washed prior to entering the Park to reduce the spread of noxious weeds. The SOPs and features of the Proposed Action have been formulated to avoid or minimize adverse impacts. Chapter 3 presents the impact analysis for resources after SOPs have been successfully implemented.

Actions related to restoration of the construction site and rehabilitation of certain sections of the historic ditch (i.e. removal of any hardware, monitoring for invasive weeds, and potential restoration of springs) within Bryce Canyon will be coordinated with the park, although the contractor and/or the irrigation company are responsible for completing the restoration work. Specifics of restoration will be outlined in the Standard Operating Procedures and/or right-of-way easements. Specifics of restoration procedures include the determination of what native vegetation is appropriate for the different construction zones, reseeding rates, landscaping, revegetation, and exotic weed removal. These documents will include success criteria for restoration of disturbed areas. Monitoring and treatment will continue until the success criteria are met for two successive years without human intervention. These actions will insure that disturbed areas are returned to a natural state as appropriate.

2.4 Alternatives Considered but Eliminated from Further Analysis

Other alternatives were considered at the onset of this project but were eliminated from consideration. A discussion of each of these alternatives follows.

2.4.1 Piping in Existing Ditch Alignment

Placing the pipeline along the existing ditch would eliminate the need for obtaining additional easements. It would also simplify the design of the pipeline. Drain valves would not be needed because a more constant downward slope would be provided, which

Figure 4: Construction Route Map

eliminates the low spots in the pipeline that would occur under the action alternative. The number of air-vacuum valves would be reduced due to a slower velocity and the existing ditch slope already allows for the conveyance of water. The landowner issues that are involved with the three alignments described above would not exist. However, this alignment would be nearly 8,000 feet longer than Alternative 1 which is the longest of the three alignments mentioned above. It would also require a larger diameter pipe to meet the flow requirements since the slope of the ditch is less than the slope of the other alternatives. Having a flatter slope reduces the velocity of flow thus requiring a larger cross sectional area to pass the same volume of water. These two factors, length and diameter, would increase the pipe and labor costs for this alternative. Because the existing ditch follows the land contours there would be more fittings involved in the construction of this pipeline in order to follow the meanders. Access to the site would be more difficult and the existing ditch would be impacted greatly by this alternative. This alternative would disturb more than 10 percent of the historic ditch requiring a much more extensive analysis since it is listed on the National Historic Register. This alignment would also increase impacts to wildlife and habit by drying up more wet areas and eliminating more open water. This alignment was eliminated as a viable option due to the increased costs and the adverse effects it would have on the historic Tropic Ditch, wildlife and habitat.

2.4.2 Lining the Existing Ditch

Lining the existing ditch would reduce the seepage loss from the ditch and would reduce the salt loading although evaporation would still occur. It is a less expensive alternative than installing a pipeline and maintenance costs would be lowered due to the reduction of vegetation growth. It would still require some maintenance since the ditch would continue to fill with sediment after storm events. It would provide open water for wildlife but would eliminate the existing habitat within the ditch. Like the “Piping in Existing Ditch Alignment” this alternative would disturb more than 10 percent of the ditch length and require more extensive analysis as a change to a cultural resource. This option was eliminated since it would not reduce as much seepage as a pipeline. It was also eliminated due to the adverse effect it would have on the historic Tropic Ditch and existing habitat.

2.4.3 Wash Corridor Alignment

The alternative of installing the pipeline entirely within the Paria River wash starting at the point where the ditch crosses under Highway 12 at the Mossy Cave Trailhead to the Tropic Valley was also considered. This alternative would reduce seepage as effectively as the proposed alternative. This alternative would allow for easy access throughout construction and after for maintenance purposes as long as these activities are performed during times of no runoff. Many of the impacts would be mitigated during the next runoff since approximately half of the construction activities would occur within the wash. This alternative would reduce the amount of seepage and salt loading just as the action alternatives would. The benefits of leaving the ditch in its current state would be preserved, it would maintain its historic characteristics, and continual habitat and open wet areas would remain. This alternative was eliminated due to the increased potential for scouring of the fill material around the pipe exposing it and increasing the potential

for damage. This increased potential for damage could have adverse effects to the purpose of the project to convey agricultural water. The potential risk of not being able access the pipe for maintenance activities during times of runoff was considered to be too great.

2.4.4 Highway Corridor Alignment

The Highway Corridor Alignment differs from the Action Alternative in that this alignment would be within the Highway 12 corridor. The pipeline would parallel Highway 12 through Bryce Canyon National Park and the Tropic Valley until approximately 1250 North Center Street, Tropic. There it would leave the highway corridor and travel east to the second pond. This alternative would eliminate the need for access points and would provide ease during construction since it would parallel maintained roads through out the majority of the alignment. Fewer easements would need to be obtained from private landowners for this alignment alternative since it would follow Highway 12 most of the way. The benefits of leaving the ditch in its current state would be preserved, it would maintain its historic characteristics, and continual habitat and open wet areas would remain. This alternative would reduce the amount of seepage and salt loading just as the action alternatives would. The reason that this alternative was eliminated was that within Bryce Canyon National Park there would not be enough room within the Highway corridor to allow for the installation of a pipeline. The highway parallels the Paria River wash which leaves little room for the pipeline.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This chapter describes the environment affected by the No Action and the Action Alternative. It also identifies potential effects from these alternatives. These effects are discussed under the following resource issues: air quality; water quality; fish and wildlife resources; special status species; vegetation resources; wetlands and riparian resources; cultural resources; paleontology and soils. The present condition or character of each resource is discussed first, followed by a discussion of the predicted effects of the No Action and Action Alternatives.

3.2 Resources Eliminated from Analysis

During the course of the alternatives analysis, several environmental issues were identified. The issues that would not be affected by any of the alternatives, or do not exist in the area were eliminated from further analysis. These issues are listed in Table 3.1.

Table 3.1 Resources Eliminated from Further Study

Element	Rationale
Public Health and Safety	The project would not create any new public health and safety issues within the project area. It would remove the hazard of conveying water in an open ditch; eliminating the potential of someone drowning.
Soundscape	The soundscapes during the construction period may be impacted but may have no long term impact within the project area. The amount of sound created by the construction equipment is not anticipated to be significantly greater than the traffic that travels on Highway 12 next to the project site.
Transportation	Any additional traffic may occur from construction activities and may be for a short duration. There are no foreseen reasons for traffic detours within the project area.
Visual Resources	There would be no direct effects on visual resources since the project area is not within those areas of the Park containing views or features that are unique or of high scenic quality. The proposed pipeline would be buried and the site restored to its original condition within the Park. The proposed

Element	Rationale
	vegetation removal would be done in such a way as to not visually intrude on the landscape. There would be no impact to the night sky or lightscapes.
Recreation Resources	There would be no direct effects on recreation resources found within the project area. If the Mossy Cave Trail parking lot is needed for construction purposes the Park would be contacted, however the entire parking lot would not be used.
Solid or Hazardous Waste	There would be no direct effects from Solid or Hazardous Waste within the project area. A method to deal with hazardous waste spills from equipment may be addressed in the Standard Operating Procedures for the contractor during construction.
Prime and Unique Farmland	There are no impacts to Prime and Unique Farmland found within the project area.
Wilderness and Wild and Scenic Rivers	There are no impacts to Wilderness and Wild and Scenic Rivers found within the project area.
Urban Quality and Design of the Built Environment	There are no impacts to Urban Quality and Design of the Built Environment found within the project area.
Energy Requirements and Conservation Potential	There are no impacts to Energy Requirements and Conservation Potential within the project area.
Park Operations	There would be no impacts to the day to day routine park operations. Actions occurring with both alternatives would be coordinated with the Park in order to facilitate needs related to the projects such as traffic control, use of the Mossy Cave parking lot, revegetation, and exotic weed control. The Tropic and East Fork Irrigation Company or its contractor would be responsible to provide traffic control, revegetation, and exotic weed control.

3.3 Affected Environment

3.3.1 Air Quality

Air quality is regulated by the U.S. Environmental Protection Agency and the Utah Division of Air Quality. The EPA has established the National Ambient Air Quality Standards (NAAQS) under the Clean Air Act which specify amounts of air pollutants for

carbon monoxide, particulate matter (less than 2.5 micrometers), ozone, sulfur dioxide, lead, and nitrogen.

The 1963 Clean Air Act (CAA), as amended (42 U.S.C. 7401 et seq.), requires federal land managers to protect park air quality, while the 2001 NPS Management Policies addresses the need to analyze air quality during park planning.

Bryce Canyon National Park is designated a Class 1 area under the Clean Air Act. The park's air quality is among the best in the nation with occasional periods of regional haze, forest fire smoke, or widely dispersed industrial pollution.

3.3.2 Water Quality

The headwaters of the Paria River are located in Bryce Canyon National Park. It is intermittent and typically has surface flows during spring runoff and storm events. The river channel flows through the Tropic Valley and enters the Grand Staircase-Escalante National Monument near Cannonville, Utah. It joins the Colorado River in Arizona. Currently, an annual average of 1,829 tons of salt reaches the Paria River due to deep percolation of water conveyed by the Tropic Ditch. The salt is being transported to the river through seepage from the Tropic Ditch (1,060 acre-feet per year) and from irrigation (168 acre-ft/year). The sulfate and sodium salts are being leached from the gypsum rich saline marine shale (Reclamation Salinity Loading Analysis, 2004).

In addition, the ditch collects heavy loads of silt from runoff due to heavy thunderstorms during the summer. The irrigation company spends as many as 10 days after a large storm event sluicing sediment from the ditch, which increases the amount of water lost to the company.

3.3.3 Upland Vegetation Resources

In addition to human-altered environments, five vegetation communities were identified in the project area: pinyon and juniper woodland, salt desert shrub, sagebrush, and riparian, and disturbed/agriculture areas. A list of plant species present within the project area can be found in Table 3.2 Vegetation Species. Vegetation communities in the project area are dominated largely by upland communities. Riparian areas are present along the existing ditch length and along Tropic Wash. Additional discussion of riparian values can be found in Section 3.3.4 Wetlands and Riparian Resources.

Pinyon and juniper woodland communities dominate the landscape at the westernmost portion of the project area. Utah juniper and pinyon pine form an open woodland habitat with a shrub component of sagebrush, manzanita, oak, and cliffrose. Grasses and forbs include Indian rice grass, Indian paintbrush, astragalus, and other annual and perennial grasses and forbs. Stands of Gambel oak are also common throughout this area, with some ponderosa pine interspersed.

As the ditch proceeds towards the town of Tropic and loses elevation, habitat transitions to a sagebrush community dominated by big sagebrush. Rabbitbrush and greasewood are other dominant woody species, with cheatgrass, wheatgrass, Indian rice grass and several

annual grasses common in the understory. Salt desert shrub communities, largely dominated by greasewood, are common along areas of exposed Mancos shale.

Much of the land, including land within the project area, near the community of Tropic has been altered by human activities. Agricultural activities have replaced native vegetation with alfalfa and pasture grasses. Housing and road development have altered or eliminated vegetation. Previously disturbed areas are largely dominated by weedy and non-native invasive vegetation, including whitetop, pepperweed, cheatgrass, sweet clover, and thistle.

Table 3.2 Vegetation Species

Common Name	Scientific Name
Riparian	
Fremont cottonwood	*Populus fremontii*
Coyote willow	*Salix exugia*
Russian olive	*Elaeagnus angustifolia*
Tamarisk	*Tamarix ramosissima*
Field horsetail	*Equisetum arvense*
Baltic Rush	*Juncus balticus*
Sedges	*Carex spp.*
Wild rose	*Rosa woodsii*
Cattails	*Typha spp.*
Yellow Sweetclover	*Melilotus sp.*
Pinyon and Juniper Woodland	
Pinyon pine	*Pinus edulis*
Utah Juniper	*Juniperus osteosperma*
Ponderosa pine	*Pinus ponderosa*
Cliffrose	*Cowania mexicana*
Mountain mahogany	*Cercocarpus ledifolius*
Gambel oak	*Quercus gambelii*
Buffaloberry	*Shepherdia rotundifolia*
Green leaf manzanita	*Arctostaphylos patula*
Big sagebrush	*Artemisia tridentata*
Indian rice grass	*Oryzopsis hymenoides*
Indian paintbrush	*Castilleja spp*
Astragalus	*Astragalus spp*
Yellow Sweetclover	*Melilotus sp.*
Cheatgrass	*Bromus tectorum*
Big Sagebrush	
Big sagebrush	*Artemisia tridentata*
Rabbitbrush spp.	*Chrysothamnus spp*
Indian rice grass	*Oryzopsis hymenoides*
Cheatgrass	*Bromus tectorum*
Whitetop	*Cardaria draba*
Western wheatgrass	*Agropyron smitthii*

Salt Desert Shrub	
Greasewood	*Sarcobatus vermiculatus*
Big sagebrush	*Artemisia tridentata*
Rabbitbrush spp.	*Chrysothamnus spp*
Cheatgrass	*Bromus tectorum*
Whitetop	*Cardaria draba*
Altered	
Alfalfa	*Medicago sativa*
Musk thistle	*Carduus nutans*
Whitetop	*Cardaria draba*
Clasping pepperweed	*Lepidium perfoliatum*
Cheatgrass	*Bromus tectorum*

3.3.4 Wetlands and Riparian Resources

Several areas of naturally-occurring riparian vegetation exist within or near the project area. A distinct riparian community dominated by cottonwoods and willows is evident along Tropic Wash. The Proposed Action would take place near and within the barren channel of the wash, which is bordered by patches of riparian vegetation and State Route 12 running along the west side. Dr. Goode Springs, also located in Tropic Wash, is near the project area, but outside of the Proposed Action.

A small wetland area – created by a separate, small pipe diverting water from the ditch – is present just outside Bryce Canyon National Park. This wetland is predominately Baltic rush and sedges, with a few willows and Russian olive. It is approximately 750 square feet in area (0.017 acres).

Seepage from the existing ditch has created riparian habitat along much of the ditch, consisting of linear polygons of riparian species often intermixed with upland species (Maxim, 2006). Near the northeastern end of the project area, these upland species include big sagebrush, rabbitbrush, and greasewood. The western end is interspersed with pinyon pine, Utah juniper, big sagebrush, and ponderosa pine. Dominant species in riparian areas include coyote willow, Fremont cottonwood, Russia olive and tamarisk. An herbaceous understory of sedges, Baltic rush, and horsetail is common. Riparian habitat continues along the majority of the ditch and averages about 15 feet wide, ranging from less than five to over 50 feet wide.

Though Russian olive and tamarisk are generally recognized as providing inferior habitat when compared to native riparian vegetation, they still provide habitat for over 50 species of birds and mammals including several game species (USDA 2005). The riparian habitat overall is of moderate quality, but is considered valuable due to the relative rarity of this type in the area.

3.3.5 Fish and Wildlife Resources

Wildlife habitat is largely a function of vegetation communities. Climate, topography, and hydrology are additional factors that affect vegetation. Five different habitat communities were identified within the project area including riparian and wetland,

pinyon and juniper, sagebrush, salt desert shrub, and human altered/agricultural environments. The upland habitats, including pinyon and juniper, sagebrush, and salt desert scrub within the project area have been, or are adjacent to, previously disturbed areas; including agriculture, grazing, housing development, and road corridors. These disturbances and alterations minimize the quality of natural habitat found within the project area. Habitats within Bryce Canyon National Park remain largely composed of native species and are highly functional on an ecological basis. However, the Proposed Action area within Bryce Canyon National Park would be within a previously disturbed old cattle driveway, adjacent to the existing ditch.

The project lies within the area managed by the Utah Division of Wildlife Resources (UDWR) Paunsaugunt Wildlife Management Unit. This management unit is managed for big game, primarily mule deer *(Odocoileus hemionus)* and elk *(Cervus elaphus)*. Mule deer are common within the project area, but no critical or highly valuable winter range, as defined by the UDWR for game species is within the project area. It is unlikely that elk would frequent the project area.

A diversity of mammalian and avian species may use the upland habitats within the project area. Mammals that may be found within these habitats include mule deer, pronghorn *(Anitlocapra Americana)*, mountain lion *(Felis concolor)*, striped skunk *(Mephitis mephitis)*, badger *(Taxidea taxus)*, gray fox *(Urocyon cinereoargenteus)*, mountain cottontail *(Sylvilagus nuttalii)*, black-tailed jack rabbit (*Lepus californicus*), red squirrel *(Tamiasciurus hidsonicus)*, golden-mantled ground squirrel *(Spermophilus lateralis)*, and various small rodents. Avian species that may use the upland habitat areas for forage, temporary perches, and/or nesting include common raven *(Corvus corax)*, Steller's jay *(Cyanocitta stelleri)*, pinyon jay *(Gymnorhinus cyanocephalus)*, mountain chickadee *(Parus gambeli)*, Northern flicker *(Colaptes auratus)*, and pygmy nuthatch *(Sitta canadensis)*. Raptors that may be present within the project area include golden eagle *(Aquila chrysaetos)*, red-tailed hawk *(Buteo jamaicensis)*, American kestrel *(Falco sparverius)*, Cooper's hawk *(Accipiter cooperi)*, and great-horned owl *(Bubo virginianus)*. These species are known to nest in Bryce Canyon National Park (NPS 2004), but no nests were identified within 0.5 mile of the project area during 2005 field surveys. Upland birds, including band-tailed pigeon (P*atagioenas fasciata)*, mourning dove *(Zenaida macroura)*, and ring-necked pheasant *(Phasianus colchicus)*, also utilize habitat in the project area (UDWR 2005).

Riparian and wetland habitats provide additional forage and cover for many of the species found in upland habitats, but also provide habitat to riparian and wetland dependant species including ducks, geese, American coot *(Fulica Americana)*, and great blue herons *(Ardea herodias)* which may use the irrigation ponds. White-throated swift *(Aeronautes saxatalis)*, violet-green swallow *(Tachycineta thalassina)*, yellow-headed blackbirds *(Xanthocephalus xanthocephalus)*, American goldfinch *(Carduelis tristis)*, and numerous other migratory birds may be present as well. Many of these species use the area seasonally, for summer nesting, and/or during spring and fall migration. Amphibians may also periodically use riparian and wetland areas, but no amphibians were observed during 2005 field reconnaissance (Maxim, 2006).

3.3.6 Special Status Species

3.3.6.1 Federally Listed Species

The Endangered Species Act of 1973 (16 U.S.C. 1531-1543) protects Federally listed endangered, threatened, proposed and candidate plant and animal species and their critical habitats. A review of database information compiled by the UDWR Utah Conservation Data Center (UDWR 2005) and review of the United States Fish and Wildlife Service (USFWS) county list of Federally listed species identified six endangered, three threatened, and one candidate species that may potentially exist within the project area. Threatened species are those that are likely to become endangered in the foreseeable future throughout all or a significant portion of their range. Candidate species are those for which the USFWS has sufficient data to list as threatened or endangered but for which proposed rules have not yet been issued. The list of threatened, endangered or candidate species with potential habitat that may be affected by the proposed project is found in Table 3.3. Species present in Garfield County, but determined not to have potential habitat within the project area, include Aquarius paintbrush (*Castilleja aquariensis*), autumn buttercup (*Ranunculus aesrivalis*), Jones cycladenia (*Cycladenia humilis var. jonesii*), Maguire Daisy (*Erigeron maguirei*), Ute ladies'-tresses (*Spiranthes diluvialis*).

Ten Federally listed (threatened, endangered, or candidate) wildlife species may be found or have potential habitat within the project area: Bald eagle (*Haliaeetus leucocephalus*), Yellow-billed cuckoo (*Coccyzus americanus occidentalis*), Southwestern willow flycatcher (*Empidonax trailli extimus*), California condor (*Gymnogyps californianus*), Mexican spotted owl (*Strix occidentalis lucida*), Utah prairie dog (*Cynomys parvidens*), Colorado pikeminnow (*Ptychocheilus lucius*), Razorback Sucker (*Xyrauchen texanus*), Humpback chub (*Gila cypha*), and Bonytail (*Gila elegans*). No occurrences of these species have been documented within the project area, and none were observed in the project area during the April and May 2005 site surveys. Though riparian habitat is present throughout the project area, existing willow stands provide minor flycatcher and riparian dependent species habitat, due to their small size and lack of density.

Table 3.3 Federally Listed Species with Potential Habitat in the Proposed Project Area

Common Name	Scientific Name	Status	Documented Occurrence	Common Habitat within Area
Bald Eagle	*Haliaeetus leucocephalus*	Threatened	No	Riparian habitats, cliffs
Yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Candidate	No	Willow, cottonwood riparian habitats

Common Name	Scientific Name	Status	Documented Occurrence	Common Habitat within Area
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	No	Willow, riparian habitats
California condor	*Gymnogyps californianus*	Endangered	No	Cliffs
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	No	Canyon habitat
Utah prairie dog	*Cynomys parvidens*	Threatened	No	Sagebrush, grassland habitats
Colorado pikeminnow	*Ptychocheilus lucius*	Endangered	No	Colorado River tributaries
Razorback Sucker	*Xyrauchen texanus*	Endangered	No	Colorado River tributaries
Humpback Chub	*Gila cypha*	Endangered	No	Colorado River tributaries
Bonytail	*Gila elegans*	Endangered	No	Colorado River tributaries

Bald Eagle: Only five active breeding bald eagle pairs have been identified within Utah to date; none of these sites are in the project area. Bald eagles do fly through the project area during migration, and may be present in small numbers during the winter. Outside of breeding periods bald eagles are relatively social, often roosting communally. Wintering areas are commonly associated with open water, though other habitats may be used if food resources, such as rabbit or deer carrion, are readily available. In general, bald eagles avoid areas with nearby human activity and development. (UDWR, 2005)

Yellow-Billed Cuckoo: There are no known yellow-billed cuckoo nests within the project area, and no yellow-billed cuckoos have been documented inside of the project area. Historically, cuckoos were probably regular to infrequent summer residents in Utah and across the Great Basin (UDWR 2005). The current distribution of yellow-billed cuckoos in Utah is poorly understood, though they appear to be an extremely rare breeder in lowland riparian habitats statewide (UDWR 2005). Yellow-billed cuckoos are one of the last migrants to arrive and to breed within the state, arriving in late May to early June and breeding in June and July. Cuckoos typically start their southerly migration by late August or early September. Yellow-billed cuckoos are considered a riparian obligate and

are usually found in large tracts (100-200 acres) of cottonwood and willow habitats with dense sub-canopies (UDWR 2005). The sighting nearest to the project area was one individual in Bryce Canyon National Park along Sheep Creek in 2002 (BCNP, 2002). The riparian habitat that would be affected by the project is not dense enough in most areas to support yellow-billed cuckoos, and no yellow-billed cuckoos were observed during 2005 inventories of suitable habitat.

Southwestern willow flycatcher: The Southwestern willow flycatcher breeds in southwestern United States, and winters in Central America and southern Mexico; this flycatcher is a federally listed endangered species (UDWR 2005). It is rare in southern Utah during the summer. The Southwestern willow flycatcher is found most frequently in riparian habitats, especially in areas of dense willow. Breeding occurs during late spring or early summer, with most activity in June. The major factor in the decline of the Southwestern willow flycatcher is likely the alteration/loss of the riparian habitat necessary for the species (UDWR 2005).

During the May 2005 field survey, taped calls were played to elicit responses from flycatchers potentially within the Proposed Action and adjacent project area. No responses were heard, and no individuals were identified. Previous surveys conducted by Bryce Canyon National Park biologists identified a few individuals along the Yellow, Sheep Creek, and Swamp Creek drainages, but nothing within or near the project area (NPS 2004). The riparian vegetation supported by the ditch and along Tropic Wash is not likely dense enough in most areas for the Southwestern willow flycatcher.

California condor: The endangered California condor is among the rarest birds in North America. Over the last century, populations declined (due to lead poisoning, cyanide poisoning, shooting, and DDT contamination) to the point that the few remaining birds were captured for captive breeding efforts in the 1980s (UDWR 2005). Captive-reared birds have been released in California and northern Arizona. In Utah, sightings were historically rare, but sightings of birds that were released in northern Arizona have been made almost statewide since the late 1990s. California condors are found in mountainous areas, at low to moderate elevations; they prefer rocky and brushy areas. This condor eats carrion, usually feeding on large items such as dead sheep, cattle, and deer. Condors may infrequently pass through the project area, but breeding has not been documented (UDWR 2005).

Mexican spotted owl: In Utah, the Mexican spotted owl is a permanent resident in the southern and eastern part of the state, along the Colorado Plateau. Throughout its range, the Mexican spotted owl is found in a variety of forested habitats and steep, rocky canyons (UDWR 2005). In Utah, Mexican spotted owls are typically found in and around deep, narrow, sheer-walled, sandstone or rocky canyons with some riparian or woody vegetation component. Mexican spotted owls prefer cliff habitat that provides escape cover, shaded roost sites, patches of forested vegetation, and areas providing suitable prey. Mexican spotted owl critical habitat unit CP-12 (as designated by USFWS), is located in and adjacent to the southern part of the proposed project area. However, the habitat found within the project area lacks the primary constituent elements

for Mexican spotted owl canyon habitat. These necessary elements include: presence of water; clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, or riparian vegetation; canyon walls with crevices, ledges, or caves; and a high percent of ground litter and woody debris (USFWS 2004). The majority of the proposed project area is located along the highway corridor, not near to any suitable canyon habitat. No Mexican spotted owls or areas of suitable habitat were identified during the field reconnaissance

*Utah prairie dog***:** Utah prairie dogs are endemic to Utah, and inhabit mixed-grass, high elevation prairies of the Rocky mountains in the southwestern part of the state (Prairie Dog Coalition 2006). The species forms colonies and spends much of their time in underground burrows, often hibernating during the winter. The species breeds in the spring, and young can be seen above ground in late May or early June (UDWR 2005). Utah prairie dogs feed on seeds, grasses, leaves, and insects (particularly cicadas). Moist palatable forage must be available throughout the summer. Populations are threatened by habitat loss, poisoning, and the plague. Utah prairie dogs are found in Bryce Canyon National Park. During the on-site corridor evaluation on May 22 through 25, 2005, biologists conducted a presence/absence walking survey for Utah prairie dogs within the project area corridor, as well as an evaluation of habitat and sign of potential use by this species (e.g. burrows, tracks, scat). Though marginal habitat (some mixed grasses within big sage dominated sagebrush habitat) is present on private lands near the border with Bryce Canyon National Park, the rest of the project corridor and surrounding salt desert shrub (on private lands) and pinyon and juniper woodland habitats (within the park) generally lacks the mixed-grass component important to this species. This species was not identified during presence/absence surveys in May 2006, nor were burrows or sign of use identified within, or immediately near (50 feet on each side of the corridor) the project corridor area during field reconnaissance.

The Colorado pikeminnow *(Ptychocheilus lucius)*, bonytail *(Gila elegans)*, humpback chub *(Gila cypha)*, and razorback sucker (*Xyrauchen texanus)* are native to the Colorado River system of the western United States and Mexico. Due to habitat loss and alteration these species have suffered reductions in population numbers and species distribution and are Federally listed as endangered. These species are not known to occur within any drainage in the immediate project area, however, due to the proposed project's potential impacts to the entire Colorado River drainage, they have been included for discussion.

Colorado pikeminnow: Colorado pikeminnows are large primarily piscivorous minnows that may at times consume insects and other invertebrates (UDWR 2005). They spawn in the spring and summer over riffle areas with gravel or cobble substrate. Adult Colorado pikeminnows prefer medium to large rivers, while young of the species prefer slow-moving backwaters. Although individual Colorado pikeminnows now rarely reach more than one foot in length, historical accounts of six-foot long Colorado pikeminnows exist, making the species the largest minnow in North America (UDWR 2005).

Bonytail: Bonytail are opportunistic feeders, eating insects, zooplankton, algae, and higher plant matter. They spawn in the spring and summer over gravel substrate.

Bonytail prefer eddies, pools, and backwaters near swift current in large rivers (UDWR 2005).

Humpback chub: The humpback chub primarily eat insects and other invertebrates, but algae and fishes are occasionally consumed. The species spawns during the spring and summer in shallow, backwater areas with cobble substrate. Young humpback chub remain in these slow, shallow, turbid habitats until they are large enough to move into white-water areas (UDWR 2005).

Razorback sucker: The razorback sucker eats mainly algae, zooplankton, and other aquatic invertebrates. The species prefers slow backwater habitats and impoundments. The species spawns from February to June, and each female may deposit over 100,000 eggs during spawning (UDWR 2005).

3.3.6.2 State Sensitive Species

Ten Utah State sensitive species including American three-toed woodpecker (*Picoides dorsalis),* Lewis's woodpecker (*Melanerpes lewis),* Greater sage grouse (*Centrocercus urophasianus),* Northern goshawk (*Accipiter gentiles),* Burrowing owl (*Athene cunicularia),* Ferruginous hawk (*Buteo regalis),* Western toad (*Bufo boreas),* Flannelmouth sucker (*Catostomus latopinnis*), Bluehead sucker (*Catostomus discobolus), and* Roundtail chub (*Gila Robusta)* may potentially be affected by project implementation. No occurrences of these species have been documented within the project area, and no individuals were observed in the project area during the April and May 2005 site surveys. Though riparian habitat is present throughout the project area, existing willow stands are not dense enough or large enough to provide quality riparian habitat to support riparian dependent species.

Table 3.4 State of Utah Sensitive Species with Potential Habitat in the Proposed Project Area

Common Name	Scientific Name	Status	Documented Occurrence	Common Habitat within Area
American three-toed woodpecker	*Picoides dorsalis*	State Sensitive	No	Coniferous forests
Lewis's woodpecker	*Melanerpes lewis*	State Sensitive	No	Coniferous forests, woodlands
Greater sage-grouse	*Centrocercus urophasianus*	State Sensitive	No	Sagebrush
Northern goshawk	*Accipiter gentilis*	State Sensitive	No	Forests and riparian zones

Common Name	Scientific Name	Status	Documented Occurrence	Common Habitat within Area
Burrowing owl	*Athene cunicularia*	State Sensitive	No	Open grasslands and prairies
Ferruginous hawk	*Buteo regalis*	State Sensitive	No	Grasslands, agricultural lands, sagebrush
Western toad	*Bufo boreas*	State Sensitive	No	Streams, wetlands, pools
Flannelmouth sucker	*Catostomus latopinnis*	State Sensitive	No	Colorado River tributaries
Bluehead sucker	*Catostomus discobolus*	State Sensitive	No	Colorado River tributaries
Roundtail chub	*Gila Robusta*	State Sensitive	No	Colorado River tributaries

American three-toed woodpecker: The American three-toed woodpecker occurs in Engelmann spruce, sub-alpine fir, Douglas fir, grand fir, ponderosa pine, aspen, and lodgepole pine forests. In Utah, this woodpecker nests and winters in coniferous forests, generally above 2400 m (8,000 ft) elevation (UDWR 2005), with breeding occurring in May, June, and July. American three-toed woodpeckers forage on scaly-barked trees such as spruce, hemlock, and lodgepole pine, and use both live and dead trees for nesting. Moderate quality habitat is present in or around the project area, but no individuals were identified during field reconnaissance, and the species is not known to occur in Bryce Canyon National Park (UDWR 2005).

Lewis' woodpecker: Lewis' woodpeckers are known breeders in central Utah. The Lewis' woodpecker is attracted to burned-over Douglas-fir, mixed conifer, pinyon and juniper, riparian, and oak woodlands. They can also be found in the fringes of pine and juniper stands, and deciduous forests, especially riparian cottonwoods (UDWR 2005). Wintering grounds are over a wide range of habitats, but oak woodlands are preferred. Areas with a good under-story of grasses and shrubs to support insect prey populations are preferred. The major breeding habitat consists of open park-like ponderosa pine forests (UDWR 2005); dead trees and stumps are required for nesting. Habitat is present in or around the project area, but no individuals were identified during field reconnaissance and the species is not known to occur in Bryce Canyon National Park (UDWR 2005).

Greater sage-grouse: Greater sage-grouse inhabit sagebrush plains, foothills, and mountain valleys. Sagebrush is the dominant plant species in quality habitat, but a good understory of grasses, forbs, and associated wet meadow areas are essential for optimum habitat (UDWR 2005). Male sage-grouse gather on traditional "strutting grounds" (also called leks) during March and April and females visit the grounds during the first part of April, with nesting beginning in April. The principal winter food item is sagebrush leaves. During summer, the fruiting heads of sagebrush, leaves and flower heads of clovers, dandelions, grasses and other plants are taken; insects are also a food source during the summer months. Sagebrush eradication and intensive use of lands by domestic livestock have reduced sage-grouse numbers. Sage-grouse range is declining in Utah in both quantity and quality (UDWR 2005). Some moderate to poor quality habitat is present near and within the project area, but no individuals were observed during the field reconnaissance.

Northern goshawk: The northern goshawk breeds in much of the Northern Hemisphere, and occasionally winters outside (south) of its breeding range. It occurs as a permanent resident throughout Utah, but is not common in the state. The northern goshawk prefers mature mountain forest and riparian zone habitats (UDWR 2005); nests are constructed in trees of mature forests. Northern goshawks cruise low through forest trees to hunt, and may also perch and watch for prey. Major prey items include rabbits, hares, squirrels, and birds (UDWR 2005). Northern goshawks are known to nest in and occupy Bryce Canyon National Park. However, the pinyon and juniper woodland habitat that is dominant in the proposed project area is of very low quality to goshawks, which typically live in forested habitats containing species such as subalpine fir and aspen.

Burrowing owl: The burrowing owl is uncommon in its summer range habitat found in the state of Utah. Its habitats are open grassland and prairies, but it also utilizes other open situations, such as golf courses, cemeteries, and airports (UDWR 2005). It eats mainly terrestrial invertebrates, but also consumes a variety of small vertebrates. The burrowing owl often nests in a mammal burrow, usually that of a prairie dog, ground squirrel, or badger; on the occasion that a mammal burrow is no available, the owl might excavate its own (UDWR 2005). Though prairie dog activity was not identified, suitable burrowing owl habitat does exist within the project area; however, no burrowing owl activity or presence was documented during field monitoring.

Ferruginous hawk: The ferruginous hawk is known to breed in northern Utah, with nesting beginning in March and April. Nest substrates vary throughout range, including trees and shrubs, cliffs, utility structures, and ground outcrops (UDWR 2005). During breeding, flat and rolling terrain in grassland or shrub steppe is most often used, but because of a strong preference for elevated nest sites, cliffs, buttes, and creek banks are usually present. Ferruginous hawks winter in open farmlands, grasslands, deserts, and other arid regions where rabbits, prairie dogs, or other major prey items are present (UDWR 2005). Although suitable sagebrush and salt desert shrub habitat does exist near the southern end of the proposed action, no ferruginous hawks were observed during field monitoring.

Western toad: The western toad occurs throughout most of Utah, and can be found in a variety of habitats, including slow moving streams, wetlands, desert springs, ponds, lakes, meadows, and woodlands (UDWR 2005). The toad is inactive during the winter, often burrowing in loose soil or small mammal burrows. Unsubstantiated reports of amphibian occurrences within the ditch have been reported by adjacent landowners, but subsequent surveys by wildlife biologists have not revealed any sensitive amphibian species, including western toad, occurring in the ditch. No western toads or other amphibian species were observed during field visits in 2005.

Flannelmouth sucker: The flannelmouth sucker is native to the Colorado River system of the western United States and northern Mexico. The species is a benthic fish that feeds mainly on algae, although invertebrates and other plant matter are also consumed. (UDWR 2005). Spawning occurs during the spring and early summer in gravelly streambeds. The flannelmouth sucker is primarily found in deep, slow moving pools of large rivers. In Utah, the species is found in the main-stem of the Colorado River and in the Colorado River's large tributaries, including the Paria River. Spawning is known to occur within some sections of the Paria River (Paukert and Rogers 2004). The section of the Paria River occurring within the project area and the wash of the proposed alignment are not perennial streams. Due to the intermittent nature of stream flow in the project area and the resulting limiting impact on the potential for suitable spawning habitat from cyclical stream flows, it is unlikely that this species is present within the immediate project area, nor would be impacted by associated project actions.

Bluehead sucker: The bluehead sucker is native to the Colorado River system. The species is a benthic (bottom dwelling) fish with a mouth modified to scrape algae (the primary food of the bluehead sucker) from the surface of rocks. Members of the species spawn in streams during the spring and summer. Fast flowing water in high gradient reaches of mountain rivers has been identified as important habitat for bluehead sucker (UDWR 2005). In Utah, bluehead suckers have been reduced in numbers and distribution due to flow alteration, habitat loss/alteration, and the introduction of nonnative fishes. According to the UDWR, no bluehead sucker are found within the Upper Paria River system or in the immediate project area.

Roundtail chub: The roundtail chub is a large minnow found within the Colorado River drainage. The species is often found in murky pools near strong currents in the main-stem Colorado River and large tributaries. The roundtail chub spawns over areas with gravel substrate during the spring and summer (UDWR 2005). Population numbers and distribution of roundtail chub have declined due to habitat alteration and competition with introduced exotic fishes. No roundtail chub are found within the immediate project area.

3.3.6.3 Other Sensitive Plant Species

Because of the proximity of the project area to Bureau of Land Management (BLM) lands, the potential for presence of BLM sensitive species within the project area was reviewed. A Bureau of Land Management sensitive species, Claron pepperplant (*Lepidium montanum var claronense)*, is a small member of the mustard family that occurs in sagebrush, pinyon and juniper, and ponderosa pine/bristlecone communities adjacent to the project area. Distribution is limited to the Claron member of the Wasatch limestone formation and other fine-textured substrates at 6,400-8,000 feet elevation. Claron pepperplant usually blooms during May-June, and has documented occurrences within Bryce Canyon National Park (UNPS, 2005). No plants were identified during field reconnaissance in 2005.

3.3.6.4 Conservation Agreement or Strategy Species

Three species currently managed under Conservation Agreements or Strategies were identified as possibly occurring within the area potentially affected by the project. Two of these species Aquarius paintbrush (*Castillega aquariensis*) and Arizona willow (*Salix arizonica*) are not found within the project area. The Colorado River Cutthroat trout (*Oncorhynchus clarki pleuriticus*), though not known to occur in the portion of the Paria River within the project area, is found within the Colorado River drainage, and could therefore potentially be affected by the proposed project.

3.3.7 Cultural Resources

Cultural resources are defined as the expressions of human culture and history in the physical environment, including culturally significant landscapes, historic and archaeological sites, Native American and other sacred places, and artifacts and documents of cultural and historical significance. Historic properties are defined as historic or prehistoric sites, structures, buildings, districts or objects that are listed in or are eligible for the National Register of Historic Places (NRHP). Potential effects of the described alternatives on historic properties are the primary focus of this analysis.

The affected environment for cultural resources is identified as the APE (area of potential effects), in compliance with the National Historic Preservation Act (36 CFR 800.16). The APE is defined as the geographic area within which federal actions may directly or indirectly cause alterations in the character or use of historic properties. The APE for this Proposed Action is limited to the proposed pipeline corridor, access roads, and staging areas.

The town of Tropic, Utah was founded as a result of the Tropic Ditch project. In 1889, a group of men from nearby Cannonville formed the East Fork Irrigation Company to survey and dig the canal. With the advent of the water availability, building lots were sold at the town site. Construction of the Tropic Ditch was completed in 1892 and in 1893 it was brought under the administration of the Tropic and East Fork Irrigation Company. The first State funds for a road into Tropic were granted in 1898, and by 1900 the town had 379 inhabitants.

Class I and Class III cultural resource inventories were completed on 100% (75.1 acres) of the area of potential effect on Utah State land, Bureau of Land Management land, private land, and within the boundaries of Bryce Canyon National Park, for this project (Cultural Resource Inventory of the Tropic Ditch Salinity Project, Garfield County, Utah, U-05-MQ-0562b,n,p - July 2005). The result of that inventory was the documentation of five new archaeological sites and the re-documentation of two previously recorded sites. Of these seven sites only two, the Tropic Ditch and a multi-component site with both prehistoric and historic artifacts present on the surface are recommended as being eligible for the NRHP. The remaining historic properties are not eligible for the NRHP.

A copy of the cultural resource report and recommendations for determination of eligibility and effect were sent to the Utah State Historic Preservation Office (SHPO) on September 9, 2005. Since the project would avoid and/or monitor eligible historic properties during construction, the recommended effect was "no affected properties" and the SHPO concurred with this determination.

3.3.8 Paleontology

A paleontological file search was conducted in June 2005 for the project area by the Utah Geological Survey (UGS) in Salt Lake City Utah. The UGS has determined that there is one paleontological locality in the project area. This locality is in the north end of the project area and should not be affected by the project. The UGS determined that a paleontological survey was not needed. A letter from the UGS stating such is on file in the Bureau of Reclamation, Provo Area Office.

3.3.9 Soil Erosion and Sedimentation

Soils exist within the current proposed project area. Some of the soil is protected from erosion and sedimentation by native vegetation, except for areas within the wash and also in areas where marine shales exist and on steep slopes. The soils in the project area within the park were mapped during the 1990 soil survey as predominately Zyme-Lazear-Rock outcrop complex with 8 to 60% slopes. This is described as 45% Zyme Clay, 30% Lazear gravelly sandy loam, 15% rock outcrop and 10% other soils. The present vegetation is mostly pinyon, juniper, shrubs, and grasses. Runoff on these soils is often rapid and erosion is likely.

Within the Park, biological soil crust has been identified within the proposed project area.

3.4 Environmental Consequences

3.4.1 Air Quality

3.4.1.1 No Action Alternative

Under the No Action Alternative there would be no adverse effects to air quality.

3.4.1.2 Action Alternative

Under the Action Alternative there would be no long term impact to local air quality since no new sources of air pollution would be created. Impacts due to construction

activities would not be long lasting and any generation of new pollution would be eliminated after the project was completed. There is a potential for direct, short term fugitive dust generation from construction activities that could have an adverse affect on the air quality in the vicinity of the project area. The fugitive dust could be generated by excavation activities along with the movement of construction equipment on unpaved roads. Best management practices (i.e. watering for dust control) to minimize fugitive dust may be implemented.

3.4.2 Water Quality

3.4.2.1 No Action Alternative

Under the No Action Alternative, the Paria River would continue to receive concentrated salt loads from deep percolation return flows and seepage from the historic Tropic Ditch. There would be long term minor to moderate adverse impacts under the No Action Alternative.

3.4.2.2 Action Alternative

The Action Alternative would reduce seepage from the historic Tropic Ditch. By eliminating this seepage, 1829 tons of salt would be prevented from reaching the Paria River each year and eventually the Colorado River. This would result in minor long-term reduced salinity in the Colorado River, which would be a positive impact and part of the defined purpose of the Colorado River Salinity Control Program.

3.4.3 Upland Vegetation Resources

3.4.3.1 No Action Alternative

There would be effects to upland vegetation caused by the continued routine maintenance of the ditch to maintain flows and access to the ditch. These communities would remain in their current condition, and would experience no sizeable gains or losses.

3.4.3.2 Action Alternative

The majority of the project area lies within upland habitat areas, and these vegetation communities would be temporarily affected during construction activities. Most areas where construction would take place are already altered from their natural states. Existing alterations include an abandoned cattle trail, agricultural areas, and highway corridor.

Construction would occur during late summer through fall, and would occur within a 50 foot wide area along the Proposed Pipeline Alignment, except within Bryce Canyon National Park, a 30 foot wide construction easement with a fifty by one hundred foot turnaround easement every 1,000 feet would be used in order to minimize impacts. The location of these turnarounds would be coordinated with the NPS in order to select areas to minimize impacts to upland vegetation. These upland and altered areas may experience short term losses. In some cases, trees and brush may be removed within the proposed alignment where they can not be avoided. Park personnel would be consulted to ensure minor disturbance of trees and brush. All areas disturbed by construction

activities would be recontoured and revegetated with native species. Upon completion of reseeding, relatively minor native habitat would be permanently lost. Vegetation communities would likely be reestablished, and some previously disturbed areas may see an increase in native species compositions after reseeding. Areas that are disturbed may be more vulnerable to non-native species and noxious weed infestation. These non-native species typically recover more quickly after a disturbance than native species. Monitoring and inspection of the reseeded areas would be performed by members of the Tropic and East Fork Irrigation Company to provide control of exotic weeds. This will take place until recovery of native species has occurred and there are two successive years without human intervention post construction. To minimize impact to native vegetation, previously disturbed areas would be used during construction, where possible. Agricultural areas would be re-seeded with a seed mix indicative of agricultural cover and as per landowner specifications.

Best management practices would be followed to reduce impacts, including placing staging and material sources outside of sensitive areas. Construction materials and equipment would be washed to remove dirt and weed seeds and reduce the possibility of infestation. After any surface disturbance, proper rehabilitation procedures would be followed to prevent the infestation of invasive species. This would include seeding mixtures of desirable native species, including grasses, shrubs, and forbs. In areas of pinyon and juniper woodland, such as the project area within Bryce Canyon National Park, trees selected for removal would be chosen in a manner in which to maintain the visual quality objectives of the area.

3.4.4 Wetlands and Riparian Resources

3.4.4.1 No Action Alternative

Riparian habitat would remain in its current condition, experiencing minor increases and decreases in quantity and quality varying with naturally occurring precipitation patterns. These areas would likely see an increase in the composition and infestation of noxious and non-native species, such as tamarisk and Russian olive, due to their ability to thrive in disturbed areas. Though periodically removed within the ditch during maintenance, these plant species would likely increase their dominance within the project area resulting in degradation of habitat quality.

3.4.4.2 Action Alternative

The majority of long-term project impacts would occur in ditch-induced wetland and riparian habitats, while naturally occurring wetlands would not be impacted. The majority of project impacts would result not from actual construction activities but from die-off in riparian areas once the ditch is abandoned. Many of the wetland and riparian habitats in the project area are ditch-induced and supported by seepage. These areas would be impacted by implementation of project practices resulting in elimination of seepage, and the distribution, size, and quality of these wetlands would decrease. Both the extent and density of vegetation associated with these areas may be reduced. Additionally, these areas may see increases in dominance of non-native species including tamarisk and Russian olive; these two species may be able to out-compete native species

for limited water supplies when irrigation flows are ceased. Some portions of the ditch may be filled in, which would result in a total loss of riparian habitat in those areas. These areas would be located in small areas around The Backbone in the Tropic Valley (see Figure 1) to prevent animals from getting into the ditch.

Based on the review of existing data and examination of results of similar salinity control projects, it is likely that not all riparian habitats would be lost. The ditch would act as a natural drainage collecting storm and spring runoff. The ditch is located at the base of hills and ridges, and historically has received heavy runoff (Shakespear 2001). Additionally, the ditch would no longer have flowing water running through it and maintenance operations would not be performed to clean out the ditch. This could allow riparian vegetation to establish within the ditch prism.

The amount of riparian habitat that would be lost to the proposed project is approximately nine acres; these losses would be considered permanent and would be the same under all three alignment alternatives. It is possible that not all nine acres of riparian habitat would be lost, as explained in the preceding paragraph. This ditch-induced riparian habitat, while still valuable to wildlife, does not provide the same value to wildlife that naturally occurring wetlands would. However, Reclamation requires by law that any wildlife values lost as a result of project implementation be replaced; Reclamation is currently working with Tropic Irrigation Company to develop a habitat replacement plan. Replacement habitat would be of an equal or greater value to the habitat lost by the proposed project.

To minimize impact to native riparian vegetation, previously disturbed areas would be used during construction, where possible. Best management practices would be followed to reduce construction impacts, including placing staging and material sources outside of sensitive riparian areas. Construction materials and equipment would be washed to remove dirt and weed seeds and reduce the possibility of infestation. After any surface disturbance, proper rehabilitation procedures would be followed to prevent the infestation of invasive riparian species. This would include seeding mixtures of desirable native riparian species.

Construction activities within the wash would follow standard guidelines for construction within stream channels to protect flood flow capacity, channel integrity, and pipeline integrity.

3.4.5 Fish and Wildlife Resources

3.4.5.1 No Action Alternative

Under the No Action Alternative terrestrial wildlife and habitat would remain in their current condition, and there would be no gains or losses in wildlife habitat. Salinity loading of the Colorado River drainage would continue at current rates, which may affect water quality within the drainage, thereby impacting wildlife using the area.

3.4.5.2 Action Alternative

The upland wildlife habitat impacted by the Proposed Action would result in minor impacts to all wildlife species present on the project area. There would be some upland habitat, approximately 24 acres, temporarily lost due to pipeline construction, but similar habitat is available in surrounding areas. Additionally, the area may be recontoured, replanted, and reseeded with native vegetation. Vegetation communities would be monitored until two successive years without human intervention results in a return of native vegetation. Best management practices would be followed to minimize impacts, including placing staging sites and access outside of sensitive or highly valuable habitats. After any surface disturbance, proper rehabilitation procedures would be followed to prevent the infestation of weedy species. This would include seeding mixtures of desirable native species, including grasses, shrubs, and forbs. In areas of pinyon and juniper woodland, such as the project area within Bryce Canyon National Park, trees selected for removal would be chosen in a manner to maintain visual quality of the area.

During the construction period or when maintenance of the pipeline is necessary, there could be an impact of short term displacement (approximately three to six months) of animals that would normally occupy the immediate project area. Construction would occur during late summer through fall because this is not a critical period of time for nesting or fawning for many wildlife species. It would occur within a 50 foot wide area along the Proposed Pipeline Alignment and within a 30 foot wide corridor within the Park. Generally, animals would move easily and find alternative areas for forage and cover, and may return after construction and maintenance operations have been completed. Some upland habitats would experience short term disturbance until native vegetation components within these areas are restored (two to three growing seasons) by recontouring and reseeding.

Impacts to small mammals, especially burrowing animals, could include direct mortality and displacement during construction activities. Most small mammal species would likely experience reduced populations in direct proportion to the amount of disturbed habitat. These species and habitats are relatively common in the area, so the loss would be minor.

Impacts to big game would include short term disturbance and displacement of late summer and fall incidental use during the construction period. It is anticipated, due to the minor amount of habitat disturbance, that minor to no impact to wintering big game populations would occur.

Impacts to raptors and other avian species would include minor short term disturbance and displacement, with no long term impacts.

Those species, including avian and amphibian species, which are dependent on wetland and riparian habitats would experience a long term (greater than five years) loss of habitat. The Proposed Action would result in a decrease in salinity which would increase water quality in the Colorado River and potentially indirectly benefit fish within the

Colorado River System. The total habitat value that would be lost long term would be replaced through acquired mitigation habitat.

3.4.6 Special Status Species

There have been no documented occurrences of any federally threatened, endangered or candidate species or Utah state sensitive species within the project area. However, potential habitat for these species does exist within or adjacent to the project area. Effects of the development of the Proposed Action on Federal and State of Utah sensitive species would be similar to effects on general wildlife.

3.4.6.1 Federally Listed Species

3.4.6.1.1 No Action Alternative

There would continue to be minor direct or indirect impacts to threatened, endangered, or candidate species. Salinity loading of the Colorado River drainage would continue at current rates due to seepage from the Tropic Ditch, which may affect water quality within the drainage, thereby impacting wildlife using the area. Any impacts from salt loading would be the same as they have been historically.

3.4.6.1.2 Action Alternative

There have been no documented occurrences of any federally threatened, endangered or candidate species within the project area. However, habitat for these species does exist within or adjacent to the project area. Effects of the development of the Proposed Action on Federal species would be similar to effects on general wildlife. See Table 3.5 for impacts of the proposed project on individual threatened, endangered and candidate species. In a letter dated September 29, 2006, the Fish and Wildlife Service concurred with Reclamation's findings in Table 3.5 that the Tropic Salinity Project is not likely to adversely affect threatened and endangered species.

The Paria River and the wash where the proposed alignment would be located are not perennial streams. The project would be constructed during times when the river is not flowing. As a result, no impact to endangered fish species within the Colorado River would result from sedimentation entering the Paria River during construction activities. The project may result in long term minor depletions of flows to the Colorado River due to reduced seepage to the Paria River from the Proposed Action. The potential for long term depletion may affect, but is not likely to adversely affect the Colorado Endangered Fish Recovery Program. The project would result in a long term minor decrease in salinity which would increase water quality in the Colorado River and may benefit fish.

Table 3.5 Threatened, Endangered, and Candidate Species Potentially Impacted

Common Name	Scientific Name	Potential Impact
Bald Eagle	*Haliaeetus leucocephalus*	Short term displacement and disturbance May affect, unlikely to adversely affect
Yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Not know to occur within project area Short term displacement and disturbance associated with construction in suitable habitat and up to two to three growing seasons after completion of construction May affect, but unlikely to adversely affect
Southwestern willow flycatcher	*Empidonax traillii extimus*	Not known to occur within project area Marginal/minor suitable habitat for this species in project area No Effect is Anticipated
California condor	*Gymnogyps californianus*	Not known to occur within project area Marginal/minor suitable habitat for this species in project area No Effect is Anticipated
Mexican spotted owl	*Strix occidentalis lucida*	Not known to occur within project area Marginal/minor suitable habitat for this species in project area No Effect is Anticipated
Utah prairie dog	*Cynomys parvidens*	Not known to occur within project area No Effect is Anticipated
Colorado pikeminnow	*Ptychocheilus lucius*	Long term increases in water quality in the Colorado River System Potential decrease in water quantity during construction and operation May affect, but unlikely to adversely affect

Common Name	Scientific Name	Potential Impact
Razorback sucker	*Xyrauchen texanus*	Long term increases in water quality in the Colorado River System Potential decrease in water quantity during construction and operation May affect, but unlikely to adversely affect
Humpback chub	*Gila cypha*	Long term increases in water quality in the Colorado River System Potential decrease in water quantity during construction and operation May affect, but unlikely to adversely affect
Bonytail	*Gila elegans*	Long term increases in water quality in the Colorado River System Potential decrease in water quantity during construction and operation May affect, but unlikely to adversely affect

3.4.6.2 State Sensitive Species

3.4.6.2.1 No Action Alternative

There would continue to be minor direct or indirect impacts to Utah state sensitive species. Salt loading of the Colorado River drainage would continue at current rates due to seepage from the Tropic Ditch, which may affect water quality within the drainage, thereby impacting wildlife using the area. Any impacts from salt loading would be the same as they have been historically.

3.4.6.2.2 Action Alternative

There have been no documented occurrences of any Utah state sensitive species within the project area. However, habitat for these species does exist within or adjacent to the project area. Effects of the development of the Proposed Action on Federal and State of Utah sensitive species would be similar to effects on general wildlife. See Table 3.6 for impacts of the proposed project to individual Utah state sensitive species.

Table 3.6 State Sensitive Species Potentially Impacted

Common Name	Scientific Name	Potential Impact
American three-toed woodpecker	*Picoides dorsalis*	Short term displacement and disturbance
Lewis's woodpecker	*Melanerpes lewis*	Short term displacement and disturbance
Greater sage-grouse	*Centrocercus urophasianus*	Short term displacement and disturbance
Northern goshawk	*Accipiter gentilis*	Short term displacement and disturbance
Burrowing owl	*Athene cunicularia*	None
Ferruginous hawk	*Buteo regalis*	Short term displacement and disturbance
Western toad	*Bufo boreas*	Short term displacement and disturbance Loss of habitat
Flannelmouth sucker	*Catostomus latopinnus*	Long term increases in water quality in the Colorado River Decrease in water quantity
Bluehead sucker	*Catostomus discobolus*	Long term increases in water quality in the Colorado River Decrease in water quantity
Roundtail chub	*Gila Robusta*	Long term increases in water quality in the Colorado River Decrease in water quantity

3.4.6.3 Other Sensitive Plant Species

3.4.6.3.1 No Action Alternative

There would be no direct or indirect impacts to any other sensitive plant species.

3.4.6.3.2 Action Alternative

No individual plants were identified within the project area. There may be some short term disturbance to potential habitat, but this disturbance would occur only during active construction (approximately three to six months) and maintenance activities.

3.4.6.4 Conservation Agreement or Strategy Species

3.4.6.4.1 No Action Alternative

Direct and indirect impacts to any Conservation Agreement or Strategy Species may occur due to the existing salinity loading occurring from surface flows in the existing ditch. Salinity loading of the Colorado River drainage would continue at current rates, which may affect water quality within the drainage.

3.4.6.4.2 Action Alternative

Aquarius paintbrush and Arizona willow are not found within the project area and would not be affected directly or indirectly by the project. The Colorado River cutthroat trout may be indirectly affected. No impact to the Colorado River cutthroat trout population within the Colorado River would result due to sedimentation entering the Paria River during construction activities. The project would be constructed during times when the river is not flowing. However, the project may result in long term depletions of flows to the Colorado River due to reduced seepage to the Paria River from the Proposed Action. The potential long term depletion of flows to the Colorado River may affect, but is not likely to adversely affect these species based on the Conservation Agreement and Strategy for Colorado River Cutthroat Trout.

3.4.7 Cultural Resources

3.4.7.1 No Action Alternative

Under the No Action Alternative there would be no adverse affects to cultural resources.

3.4.7.2 Action Alternative

Under the Action Alternative there would be ground-disturbing activities which have the potential to expose buried cultural resources. In the event human remains or other unknown cultural resources are found during construction all agents would stop work immediately and contact the appropriate archaeologist. All sites identified by the cultural resource survey would be identified and avoided during construction and staging activities. Disturbance of the ditch would be less than 10% so as to not affect the characteristics that make the Tropic Ditch (42Ga5970) eligible to the NRHP under Criterion A. If no cultural resources are exposed during construction, there would be no effect to cultural resources from this alternative.

3.4.8 Paleontology

3.4.8.1 No Action Alternative

Under the No Action Alternative there would be no adverse effects to paleontology.

3.4.8.2 Action Alternative

Under the Action Alternative there would be ground-disturbing activities which have the potential to disturb subsurface fossil material. A file search of the proposed project area by the State of Utah Department of Natural Resources, Utah Geological Survey, was conducted in June 2005. The results of that research revealed that there was one area of

concern near but outside of the north end of the project area. The Utah Geological Survey concluded that this area would not be affected by the Tropic Ditch Salinity Project and therefore, there is no need for a paleontological survey.

If there are inadvertent discoveries of fossil remains during construction, especially near the north end of the proposed project area, work in that area would cease, and the Bureau of Reclamation, Provo Area Office archaeologist would be notified immediately. The archaeologist would notify the land owner and the Utah State Paleontologist at that time and the resource would be avoided, protected or mitigated. If there are no subsurface discoveries, there would be no effect to paleontological resources from this alternative.

3.4.9 Soil Erosion and Sedimentation

3.4.9.1 No Action Alternative

Under the No Action Alternative there would be no adverse effects to Soil Erosion and Sedimentation.

3.4.9.2 Action Alternative

Under the Action Alternative, soil would be excavated and then replaced, compacted and regraded during construction. In the short term period immediately following construction erosion and sedimentation would increase. However, the proposed pipeline alignment would be reseeded and over the long term, the soil would return to a pre-project condition once vegetation is established.

There would be minor to no impacts to the biological soil crusts found within the project area in the Park since the construction corridor follows an existing cattle trail. Whenever possible, the biological soil crust would be avoided. The strategic placement of turnaround areas and the decreased width of the construction corridor within the park would limit the amount of disturbance to these resources.

3.5 Indian Trust Assets

Indian trust assets are legal interests in property held in trust by the United States for federally recognized Indian tribes or individual tribal members. Examples of things that may be trust assets are lands, mineral rights, hunting, fishing, or traditional gathering rights, and water rights. The United States, including all of its bureaus and agencies has a fiduciary responsibility to protect and maintain rights reserved by or granted to Indian tribes or individual tribal members by treaties, statutes, and Executive Orders, which are sometimes further interpreted through court decisions and regulations. This trust responsibility requires the Federal government to take all actions reasonably necessary to protect trust assets, in accordance with the Secretary of the Interior's Principles for Managing Indian Trust Assets in 303 DM 2. Implementation of any of the proposed alternatives analyzed above would have no effect on Indian trust assets. Tribal consultation for the Proposed Action have been undertaken with a letter sent to the Ute Tribe, the Paiute Indian Tribe of Utah, the Moapa Paiute Tribe, the Zuni Tribe and the Pueblo of Zuni, the Kaibab Band of Paiute Indians, the Chemehuevi Indian Tribe, the Las

Vegas Paiute Tribe, the Shivwits Paiute Band and the Hopi Indian Tribe. No concerns regarding Indian trust assets have been communicated by these tribes.

3.6 Environmental Justice

Executive Order 12898 established environmental justice as a federal agency priority to ensure that minority and low-income groups are not disproportionately affected by federal actions. The project area lies on privately and publicly (Bryce Canyon National Park) owned land in Garfield County, Utah. After a review of the United States 2000 census information and socioeconomic data available for Garfield County, populations that could potentially be affected by the proposed project were evaluated (Utah Governor's Office of Budget and Planning 2005). There were no minorities or low-income population centers on or in the vicinity of the project area. Implementation of the Action Alternative would not disproportionately (unequally) affect any low-income or minority communities near the project area. The Proposed Action would not involve population relocation, health hazards, hazardous waste, property takings, or substantial economic impacts. The Proposed Action would therefore have no adverse effects to human health or the environment that would disproportionately affect minority and low-income populations.

3.7 Summary of Environmental Consequences

Table 3.7 summarizes environmental effects under the No Action Alternative and the Action Alternative.

Table 3.7 Summary of Environmental Consequences

Resource Issue	Alternatives	
	No Action	Action
Air Quality	No Effect	Minor/Short term effects due to equipment exhaust during construction and some minor dust from trenching and construction. Mitigate fugitive dust with Best Management Practices (i.e. watering work zones).
Water Quality	Continued salt and sediment loading of the Paria River and Colorado River Long-term minor to moderate adverse impacts	Eliminating 1829 tons of salt from entering the Paria and Colorado Rivers, thereby reducing the salinity and increasing the water quality. Minor long term beneficial due to decreased salinity loads.
Upland Vegetation Resources	Remain in current condition.	Short term vegetation loss with re-establishment of native communities in two years.

Resource Issue	Alternatives	
	No Action	Action
		Potential of invasion of exotic weeds. Monitoring of re-establishment and control exotic weed invasion until there are two successive years without human intervention post construction would mitigate loss of native vegetation from construction.
Wetlands and Riparian Resources	Remain in current condition.	Long term loss of riparian areas along the ditch once it is abandoned. Potential for old ditch to be used as a natural drainage collecting storm and spring runoff. No wetlands affected. Loss of riparian habitat would be mitigated through the implementation of a Habitat Replacement Plan, as required for the Colorado River Salinity Control Forum.
Fish and Wildlife Resources	No direct or indirect impacts Continued salinity loading at current rates into the Colorado River.	Minor short term disturbance and displacement during construction. No long term impacts. May be improved as a result of long term increase water quality.
Special Status Species – Federally Listed Threatened, Endangered, and Candidate Species	Minor direct or indirect impacts from salt loading due to ditch seepage. Salt loading would continue at current rates.	There have been no documented occurrences; however, there would be a short term displacement and disturbance to any species occupying the project area and habitat loss for wetland species. Long term minor beneficial impact due to decrease in salt loads to the Colorado River.
Special Status Species – State Sensitive Species	Minor direct or indirect impacts from salt loading due to ditch seepage. Salt loading would continue at current rates.	There have been no documented occurrences in the area. Effects would be similar to general wildlife. Long term minor beneficial impact due to decrease in salt loads to the Colorado River.

Resource Issue	Alternatives	
	No Action	Action
Special Status Species – Other Sensitive Plant Species	No direct or indirect impacts.	No individual plants identified within the project area. There may be some short term disturbance to potential habitat during construction (3 to 6 months) and during maintenance activities.
Special Status Species – Conservation Agreement or Strategy Species	Minor direct and indirect impacts may occur due to existing salt loading from the ditch seepage. Salt loading would continue at current rates.	The Colorado River cutthroat trout may be indirectly affected due to minor long term depletions of flow from ditch seepage reduction. Long term minor beneficial impact due to decrease in salt loads to the Colorado River.
Cultural Resources	No Effects	No Effects with monitoring
Paleontology	No Effects	No Effects with monitoring
Soil Erosion and Sedimentation	No Effects	Minor short term erosion until vegetation is re-established only in areas that are not already disturbed. Reduced construction corridor in Park to minimize disturbance to biological soil crust. Monitoring of re-establishment and control exotic weed invasion until there are two successive years without human intervention post construction.

3.8 Cumulative Effects

In addition to project specific impacts, the potential for significant cumulative impacts to resources affected by the project and by other past, present, and reasonably foreseeable activities in the area surrounding the Tropic Ditch have been analyzed. According to the Council on Environmental Quality's regulations for implementing NEPA (40 CFR §1508.7), a “cumulative impact” is an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. It focuses on whether the Proposed Action, considered together with any known or reasonable foreseeable actions by

Reclamation, other Federal or State agencies, or some other entity combined to cause an effect.

For purposes of this analysis, cumulative impacts are focused on Garkane Powerline Upgrade, Dr. Goode Springs Management, Highway 12 Road Maintenance, Bryce Canyon Fire Management Plan, Mossy Cave Trail Head Parking Lot and the Piping of the Tropic Ditch west of Bryce Canyon. These projects are described in more detail below.

Garkane Powerline Upgrade: Garkane Power is proposing to upgrade the powerline between the Town of Tropic and Hatch. The compliance for this process is currently underway and may include going through Bryce Canyon following the current powerline or an alternative route not yet determined. Each of the alternatives may be analyzed during the NEPA process.

Dr. Goode Springs Management (annual and special project related): The town of Tropic gets a portion of its water from Dr Goode Springs which is located within the Tropic Wash. The spring is located downstream from Mossy Cave approximately half way to the park's eastern boundary. There is a pipe within the wash and other structures related to the spring. The town maintains this wash which requires annual maintenance and occasional larger scale work. Access to the spring is through the wash.

Highway 12 Road Maintenance: It was discovered in 2005 that the Tropic Wash is eroding to the road shoulder of Highway 12. The Utah Department of Transportation has proposed to place stabilizing structures in the three areas of greatest concern. This may involve fill material, construction of stream barbs, and other structures. Within the park the focus would be within a quarter mile of the park's eastern boundary. It is anticipated that the work for this project would occur in 2006 once the compliance is completed.

Bryce Canyon Fire Management Plan: Bryce Canyon National Park approved a Fire Management Plan in 2005. This plan allows for a range of fire management within the park. The area that the proposed pipeline is being proposed is called the Outback. This fire management area allows for wildland fire use fires (allow natural fires to burn within defined prescriptions), prescribed fires, wildland fire suppression, and mechanical treatment of fuels as appropriate.

Mossy Cave Trailhead Parking Lot: Mossy Cave Trailhead Parking Lot is in the northern section of Bryce Canyon National Park, located on Highway 12, approximately 4 miles east of the intersection of Highways 12 and 63. The parking lot is located just south of the Tropic Ditch culvert that runs under Highway 12. The parking lot provides short term parking for park visitors accessing the Mossy Cave Trail.

Piping of the Tropic Ditch west of Bryce Canyon: The Tropic and East Fork Irrigation Company is currently piping the section of ditch that runs from Dave's Hollow to the Bryce Rim. Construction was completed during the summer of 2006. The portion of the

ditch from the East Fork of the Sevier River to Dave's Hollow was completed in May of 2005.

No known or planned projects in the vicinity of the Tropic Ditch would impact the implementation of either alternative described in this document.

This section addresses the cumulative impacts for each alternative and the resources analyzed in the Environmental Consequence section. The summary of the potential cumulative impacts to the resources is determined under this section.

Under each proposed alternative, No Action and Action, it was determined that there would be no major, adverse impacts to the resources addressed in section 3.4 Environmental Consequences. There would be short term minor adverse impacts to air quality, fish and wildlife resources, and special status wildlife species as a result of implementing the Action Alternative. There would be a loss of wetlands/riparian resources, although the loss would be mitigated by creating or improving wetland/riparian resources in the project area through the implementation of the Action Alternative and Habitat Replacement Plan. Long term minor to moderate impacts to water quality would continue by implementing the No Action Alternative through the continued salt and sediment load into the Paria River although there would be long-term minor beneficial impacts to water quality by implementing the Action Alternative. There would be a long term impact to the soil structure within the pipeline corridor by implementing the Action Alternative, but the amount of loss would be minor compared to the area of land left undisturbed throughout the regional area. Also, most of the proposed pipeline crosses agricultural fields and roads which have already had significant ground disturbance so there will be negligible loss of soil structure in these areas. This decreases the amount of area having significant new ground disturbance to mostly within the park's boundaries. The proposed corridor alignment within the park is not a unique soil type and follows an old stock driveway that has had surface disturbance. To mitigate impacts to non disturbed areas and biological soil crust the Action Alternative reduces the width of the corridor within the park.

Since impacts from either alternative range from no impact to short term, minor to moderate, or long term impacts that can be mitigated and the proposed alternatives will not contribute to the impacts of other past, present, and reasonably foreseeable future actions to the resources, Reclamation has determined that the proposed action would not cumulatively affect any resources.

3.9 Impairment

National Park Service Management Policies (USDI, NPS 2001c) requires analysis of potential effects to determine whether or not actions would impair park resources or values. The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, actions that would adversely affect park resources and values. These laws give the NPS the management discretion to

allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of the park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirements that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources and values. An impact to any park resource or value may constitute impairment. Impairment may result from NPS management activities, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the park. An impact would be more likely to constitute impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

• necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
• key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
• identified as a goal in the park's general management plan or other relevant NPS planning documents.

Potential impairment that may result from park service management activities, visitor activities, or activities undertaken by contractors or others operating in the park as a result of each alternative is analyzed in the environmental consequences section and a determination of impairment is made below.

Under each proposed alternative, No Action and Action, it was determined that there would be no major, adverse impacts to the resources addressed in section 3.4 Environmental Consequences whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of Bryce Canyon National Park; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's General Management Plan or other relevant National Park Service planning documents. Due to this determination there would be no impairment of the park's resources or values (air quality, soils, water quality, upland vegetation resources, wetlands/riparian resources, fish and wildlife resources, special status species, cultural resources, and paleontology).

4.0 ENVIRONMENTAL COMMITMENTS

The following environmental commitments would be implemented as an integral part of the Proposed Action under any of the three route alternatives in the Tropic Valley.

1. Standard Reclamation Management Practices--Standard reclamation management practices would be applied during construction activities to minimize environmental effects and would be implemented by construction personnel or included in contract specifications. Specifically, the amount of open trench allowed during construction and at the end of each workday will be minimized to protect wildlife. Also, workers will be reminded to drive carefully to avoid collisions with wildlife.

2. Additional Analyses--If the Proposed Action were to change significantly from that described in the EA because of additional or new information, additional environmental analyses would be undertaken if necessary.

3. State Stream Alteration Permit--Before implementing the selected alternative, the Company would obtain from the Department of Natural Resources a State Stream Alteration Permit. The conditions and requirements of the State Stream Alteration Permit would be strictly adhered to by the Company.

4. Cultural/Paleontological Resources--Construction personnel would be trained in proper procedures in the event of an inadvertent discovery. Anyone who has inadvertently discovered possible human remains must stop work immediately and contact the National Park Service (435-834-4900) if within the park or Reclamation's archaeologist in the Provo Area Office for all other lands. Work would stop until the proper authorities were able to assess the situation. A "Quick Reference" card explaining the required procedures would be provided by Reclamation to construction workers prior to the start of construction. Instructions for proper procedures in case of inadvertent discovery would be placed in all construction vehicles.

5. Construction Activities Confined to Surveyed Corridor--All construction activities would be confined to the one hundred foot wide surveyed corridor that has been surveyed for cultural and biological resources. Within the Park, only thirty feet of the one hundred foot corridor would be used for construction. Outside of the Park it is expected that only fifty feet of the corridor would be necessary for construction activities.

6. Roads--Existing roads would be used for project activities. No new road construction would be necessary.

7. Disturbed Areas--During construction topsoil would be saved. It would then be redistributed after completion of construction activities. Subsequently, disturbed areas resulting from the project would be smoothed, shaped, contoured, reseeded, and rehabilitated to as near their pre-project construction condition as practicable. Seeding and planting would occur at appropriate times with weed-free seed mixes of native plants. The composition of seed mixes would be coordinated with a wildlife habitat specialist.

Following construction, manpower would be provided by the Tropic and East Fork Irrigation Company to inspect the pipeline alignment within the Park to insure that restoration goals are met. Monitoring and treatment would continue until there are two successive years without human intervention.

8. Visual Resources--Rehabilitation measures would be implemented immediately upon completion of the pipeline. This would include re-contouring and reseeding disturbed areas in a natural appearing way, with native vegetation species. The spread of noxious weeds would be controlled, trash would be cleaned up and construction debris disposed of in designated areas.

9. Air Quality--Best management practices would be implemented to control fugitive dust during construction. The contractor would follow the U.S. Environmental Protection Agency's recommended control methods for aggregate storage pile emissions to minimize dust generation, including periodic watering of equipment staging areas, along with dirt and gravel roads. All loads that have the potential of leaving the bed of the truck during transportation would be covered or watered to prevent the generation of fugitive dust. Chemical stabilization would not be allowed.

Construction machinery and operation and maintenance vehicles would be routinely maintained to ensure that engines remain tuned and emission-control equipment is properly functioning as required by law. The contractor would comply with Utah State air quality regulations.

10. Habitat Replacement--A plan to replace wildlife values foregone would be finalized and approved by Reclamation following coordination with the U.S. Fish and Wildlife Service and the Utah Division of Wildlife Resources.

5.0 CONSULTATION AND COORDINATION

5.1 Introduction

Reclamation's public involvement program gives the public an opportunity to obtain information about a given project and allows all interested parties to participate in these projects through written comments. One of the most important objectives of the program is to obtain information from a well-informed public that would assist decision makers throughout the process and culminate in the implementation of an alternative. This section of the EA discusses public involvement activities undertaken to date for the proposed Tropic Ditch replacement project.

5.2 Public Involvement

Reclamation sent a Scoping Letter on June 13, 2005 to explain the project to interested individuals, groups and stakeholders and to solicit public input regarding the proposed project. Seven responses to the Scoping Letter were received and were considered in preparing this Environmental Assessment.

Coordination between the Bureau of Reclamation and Bryce Canyon National Park has been occurring to discuss pipeline alignment alternatives, cultural resource impacts, and biological resource impacts. Land owners have been involved in the pipeline alignment alternatives selection process. The State Historic Preservation Office and the U.S. Fish and Wildlife Service have been consulted pursuant to all applicable laws and are involved with all relevant processes. The City of Tropic and Garfield County have also been made aware of the proposed project.

The draft EA was made available for public review and comment in June 2006. Two comment letters were received and were fully considered in preparing this final EA.

5.3 Native American Consultation

Reclamation has conducted Native American consultation throughout the public information process. Reclamation transmitted a letter describing the Proposed Action to the Ute Tribe, the Paiute Indian Tribe of Utah, the Moapa Paiute Tribe, the Zuni Tribe and the Pueblo of Zuni, the Kaibab Band of Paiute Indians, the Chemehuevi Indian Tribe, the Las Vegas Paiute Tribe, the Shivwits Paiute Band and the Hopi Indian Tribe. This consultation was conducted in compliance with 36 CFR 800.2(c) (2) on a government-to-government basis. Through this effort, each tribe was given a reasonable opportunity to identify any concerns about historic properties; to advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance; to express their views on the effects of the Proposed Action on such properties; and to participate in the resolution of adverse effects. None of the tribes has identified any issues of concern.

5.4 Paleontological Resources

A paleontological report was requested from the Utah State Geological Survey on June 14, 2005. The record search produced no paleontological resources that would be affected by this project. A letter from the UGS stating such is on file in the Bureau of Reclamation, Provo Area Office.

5.5 Utah State Historic Preservation Office

A copy of the Class III cultural resource report (U-05-MQ-0562b,n,p) has been forwarded to the SHPO. This report includes a project description, the results of the inventory, including maps and a recommendation of determination of effect. Consultation with the Utah SHPO is complete.

6.0 PREPARERS

The following table is a list of the agency representatives and consultants who participated in the preparation of this Draft Environmental Assessment.

Table 6.1 Agency Representatives

Name	Position Title	Contribution
Beverley Heffernan, BA	Environmental Protection Specialist, Bureau of Reclamation, Provo Area Office	Lead Agency Representative
Kristin Legg, MS	Chief of Resource Management and Research, Bryce Canyon National Park	Cooperating Agency Representative
Rafael Lopez, BA	Biologist, Bureau of Reclamation, Provo Area Office	Coordination and Public Involvement
Barbara Boyer, MA	Archaeologist, Bureau of Reclamation, Provo Area Office	Cultural Resources, Indian Trust Assets, Paleontology

Table 6.2 Consultants

Name	Position Title	Contribution
Paul Wright, PE	Senior Engineer, Franson Noble Engineering	Project Manager
Vince Hogge, PE	Engineer, Franson Noble Engineering	Alternatives Analysis
Chad Brown	Engineer, Franson Noble Engineering	EA Coordination Affected Environment Environmental Consequences Environmental Commitments
Tennille Flint	Biologist	Biological Resources
Maggie Peters	Biologist	Biological Resources

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