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Environmental Assessment

Slate Canyon Water Pipeline Replacement Project

Pleasant Grove Ranger District
Uinta National Forest
Utah County, Utah
Sections 3, 8, 9, 10, and 17, Township 7 South, Range 3 East,
Salt Lake Base Meridian

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SUMMARY

The Uinta National Forest (UNF) proposes to authorize the State of Utah (State) to replace an aging water pipeline in Slate Canyon. The pipeline runs from the four existing Boardman Springs collection boxes to the storage reservoir located on the bench above Utah State Hospital (Hospital), a distance of about 3.8 miles (3.5 miles of which are on U.S. Forest Service [Forest Service] administered public lands). The existing facility consists of a 70-year-old, 5 ½- to 8-inch diameter cast iron water pipeline. The continued corrosion of the aged pipeline has resulted in a thin-walled and leaking pipe. Construction of the pipeline replacement project would occur on about 4.3 acres of Forest Service administered public lands. The project is located within portions of Sections 3, 8, 9, 10, and 17, Township 7 South, Range 3 East, Salt Lake Base Meridian.

The objectives of this project are to:

provide continued access to the State's water rights at Boardman Springs;
reduce the need for pipeline maintenance and associated natural resource damage and disturbance;
reduce potential pipeline ruptures caused by vandalism and natural events;
enhance the visual integrity of Slate Canyon by removing exposed sections of the existing pipeline where the pipe can be removed without extensive resource damage; and
provide a safe and reliable water delivery system to the Hospital.

In addition to the proposed action, the Forest Service also evaluated a no-action alternative in accordance with the Forest Service direction for implementing the National Environmental Policy Act (NEPA), which states that a no-action alternative should be considered in detail in each environmental analysis (FSH 1909.15). Under this alternative, the existing pipeline would not be replaced and the Hospital would continue to use the existing water pipeline.

Based upon the effects of the alternatives, the responsible official will decide:

whether to authorize the replacement of the water transmission pipeline located in Slate Canyon that is operated and maintained by the Hospital; and, if so,
what avoidance, mitigation, and monitoring measures are required.

CHAPTER 1
INTRODUCTION

Document Structure

The U.S. Forest Service (Forest Service) has prepared this Environmental Assessment (EA) in compliance with National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EA discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into the six parts listed below.

Chapter 1—Introduction. The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and fulfilling that need. This chapter also details how the Forest Service informed the public of the proposal and how the public responded.

Chapter 2—Comparison of Alternatives, Including the Proposed Action. This chapter provides a more detailed description of the agency's proposed action as well as any alternative methods for achieving the stated purpose. Alternatives were developed based on issues raised by the public and other agencies. This chapter also provides a summary table of the potential environmental consequences associated with each alternative.

Chapter 3—Affected Environment and Environmental Consequences. This chapter describes the existing conditions and environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource. Within each section, the affected environment is described first, followed by a discussion of the effects of the no-action and proposed action alternatives. The no-action alternative provides a baseline for evaluation and comparison of the proposed action.

Chapter 4—Agencies and Persons Consulted. This chapter provides a list of preparers and agencies consulted during the development of the EA.

Chapter 5—Response to Comments. This chapter provides copies of the comment letters that were received during the 30-day circulation of the Draft EA. Responses to each comment are also provided.

Chapter 6—References Cited. This chapter lists all of the references consulted in the writing of this report.

Appendices. The appendices provide more detailed information to support the analyses presented in the EA.

Additional documentation, including more detailed analyses of project area resources, may be found in the project planning record located at the Pleasant Grove Ranger District Office in Pleasant Grove, Utah.

Background

The Utah State Hospital (Hospital) in Provo, Utah, is the holder of a special use permit (permit PLG101401A) issued by the Uinta National Forest (UNF) for the operation and maintenance of water collection and transmission facilities within an area known as Slate Canyon. Slate Canyon is located in the Wasatch Mountains east of Provo. This steep-sided canyon extends about 3

miles east from its mouth at Slate Canyon Drive on the eastern edge of the City of Provo. Elevation at the mouth of the canyon is about 4,750 feet above mean sea level (msl), and rises to about 7,400 feet msl at Boardman Springs No. 2. An intermittent stream occupies the canyon bottom; however, this stream is seasonally dry in places.

A special use permit was first issued to the Hospital in 1937. The most recent permit was issued in 2003 and will expire December 31, 2011. This permit covers portions of Sections 3, 8, 9, 10, and 17, Township 7 South, Range 3 East, Salt Lake Base Meridian.

This permit is used to exercise a water right held by the State of Utah (State) for a group of four springs known as Boardman Springs 1, 2, 2a, and 3, located within Slate Canyon. Water from these springs is conveyed to the Hospital via the existing pipeline in Slate Canyon and serves as the principal source of culinary water for the Hospital. The Boardman Springs water right is included as part of the Knight Springs water right (55-4108). This water right allows the State to convey up to 1.10 cubic feet of water per second from the springs. The proposed project would not convey more water than allowed under the existing water right or increase the amount of water being diverted from the spring.

The existing 5½- to 8-inch-diameter pipeline that conveys water from the springs to the Hospital is about 70 years old and in poor condition, with thin walls from years of corrosion and damage from avalanches and flooding in the vicinity of the pipeline. In recent years, maintenance of the pipeline has greatly increased as deterioration continues.

Original construction included burying segments of the pipeline beneath a trail in the canyon (designated as Forest Service Trail 061), and other segments of pipe were suspended from the canyon walls. Some previously buried segments of the pipeline have become exposed at the surface from the erosional effects of avalanches and periodic flooding within the canyon (see Figure 1-1). Annual maintenance is required on the pipeline as rock falls and snow slides cause ruptures in segments of the pipeline. These ruptures result in water loss and soil erosion from flowing water. Moreover, some portions of the pipeline are suspended on canyon walls and are relatively inaccessible from the existing trail, making those segments difficult to maintain (see Figure 1-2).

Purpose and Need for Action

The objectives of this project are to:

provide continued access to the State's water rights at Boardman Springs;
reduce the need for pipeline maintenance and associated natural resource damage and disturbance;
reduce potential pipeline ruptures caused by vandalism and natural events;
enhance the visual integrity of Slate Canyon by removing exposed sections of the existing pipeline where the pipe can be removed without extensive resource damage; and
provide a safe and reliable water delivery system to the Hospital.

The new pipeline is needed to replace the existing aged pipeline, which allows access to the State's water rights and supplies culinary drinking water to the Hospital in Provo. Operation of the Hospital requires a safe and reliable culinary water supply. The current pipeline is not dependable, and damage to the pipeline has the potential to contaminate the water supply.

Figure 1-1. Photograph of Exposed Water Pipeline and the Effects of Flooding in Slate Canyon

Figure 1-2. Photograph of Exposed Water Pipeline Inaccessible from the Trail (Visible Pipeline Is Circled)

The pipeline in Slate Canyon is the only method for the State to access its water rights at Boardman Springs because of the topography of the surrounding area. Because the water rights are for springs located within the UNF, it is necessary to pipe water from the springs across lands administered by the Forest Service.

The purpose of this project is also to reduce damage to the pipeline from vandalism and natural events and reduce the need for pipeline maintenance. The existing pipeline is about 70-years old and rapidly deteriorating. The walls of the pipeline are thin, and portions of the pipeline are exposed, making it very prone to damage from rockfalls, avalanches, and vandalism. This exposure is especially problematic because the canyon is steep and subject to frequent rockfalls and avalanches that puncture the pipe and cause leaks. These leaks must then be repeatedly repaired to maintain the integrity of the pipeline. In addition, some portions of the pipeline are currently anchored to the canyon walls and are not readily accessible from the existing trail. Maintenance of these portions of the pipeline disrupts vegetation and other resources located outside the existing trail. Construction of a new pipeline within the existing trail would minimize the need for maintenance in undisturbed areas and protect resources within Slate Canyon.

Moreover, the exposed portions of the pipeline are visually intrusive and detract from the natural character of the canyon. Removal of portions of the pipeline, where the pipe can be removed without extensive resource damage, would reduce these visual intrusions.

Proposed Action

The UNF proposes to authorize the State to replace the existing 5 ½- to 8-inch-diameter water transmission pipeline from the four Boardman Springs collection boxes to the water storage reservoir located near the Hospital. The new pipeline would be buried below the surface of the existing trail in Slate Canyon; the alignment is shown in Figure 1-3. Construction may also include the relocation of the junction box where the pipeline from Boardman Springs 1 and 3 converges with Boardman Springs 2 and 2a at the top of the main canyon. It is expected that two cleanout valves would be located within the right-of-way. The visible portion of the valve would consist of a small riser off to the side of the trail with a metal lid. Also, five air valves in pressurized sections would be buried along the pipeline. Three air vents consisting of an aboveground 2-inch pipe would be located on the side of trail and would be surrounded by rock for erosion protection.

Construction activities would require heavy machinery such as backhoes, trenchers, compactors, and material haulers. Because of the narrowness of the existing trail corridor (6 to 10 feet wide), staging areas would be located at the mouth of Slate Canyon off Forest Service administered lands, and appropriate machinery turnaround locations would be identified where the trail naturally widens or where conditions along the trail permit widening within the right-of-way.

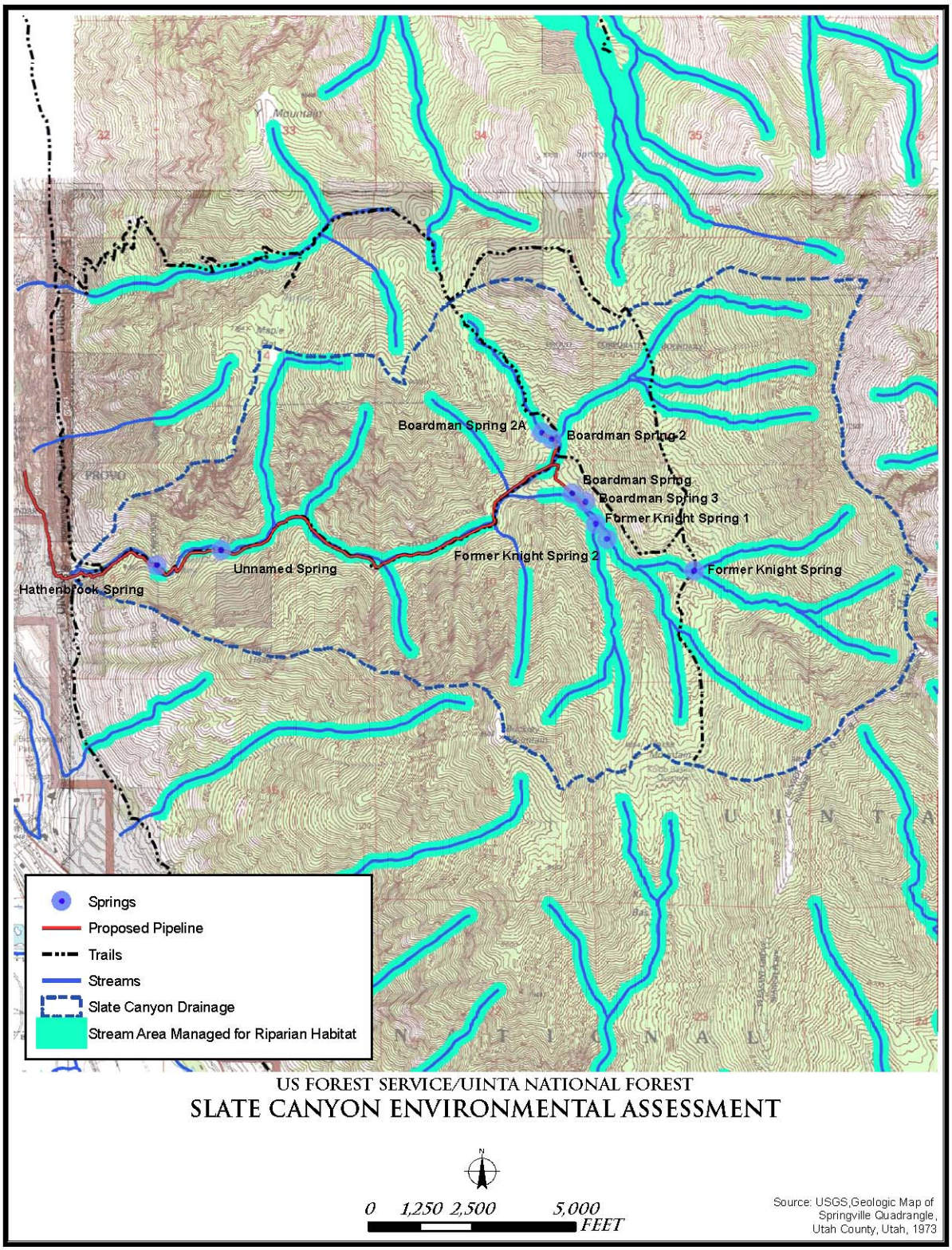

Figure 1-3. Project Location Map

In general, the process to lay new pipe beneath Slate Canyon Trail would begin by digging a trench a maximum of 3 feet wide and about 5 to 6 feet deep within the existing trail and within the 10-foot right-of-way. Additional disturbances would occur at up to ten stream crossings. Each stream crossing would be up to 40 feet wide (20 feet on each side of the trail's centerline). Some of the excavated native material (dirt and rocks) would be stockpiled to backfill the trench after the pipeline was installed. The remaining native material would be removed from Slate Canyon as spoils and deposited at a spoils site or landfill off Forest Service administered lands. This process would minimize large stockpiles along the trail over long periods of time. The bottom portion of the trench surrounding the pipe would be backfilled with bedding material, the pipe would be laid, and then more bedding material would cover the pipe. Remaining portions of the trench would be backfilled with the stockpiled native materials. Any necessary imported fill material would be acquired off Forest Service administered lands.

Where the proposed replacement pipeline crosses the channel of a perennial or ephemeral drainage, appropriate erosion-control measures would be installed. From preliminary survey information, it is estimated that up to ten crossings of a primary drainage channel in Slate Canyon or of tributary, auxiliary channels would be needed. In order to trench and lay pipe in the streambed, the stream may need to be temporarily diverted around the construction area.

It is anticipated that the pipeline replacement would occur during the 2006 construction season, which is expected to last 5 to 7 months. It is possible that construction would not be completed in 2006 because of weather conditions, and the canyon would remain closed to the public until August 2007. The existing pipeline would not remain operational during construction. In order to facilitate the removal of the existing pipeline, the Hospital would use Provo City water during construction. Water from the springs would be re-channeled into the existing stream via the overflow from the existing collection boxes during construction until the new pipeline became operational. Those sections of the old pipeline that are exposed and can be removed without extensive resource damage would be removed during construction, and the rest of the pipeline would be abandoned in place. Some sections of exposed pipe may be slightly visible from the trail, but are located a considerable distance and are not within the direct viewshed of the trail.

See Chapter 2 for a detailed description of the proposed action.

Decision Framework

Given the purpose and need, the Uinta National Forest Supervisor will review the proposed action and any other alternatives in order to make the following decisions:

whether to authorize the replacement of the water transmission pipeline located in Slate Canyon that is operated and maintained by the Hospital; and, if so,
what avoidance, mitigation, and monitoring measures are required as part of this proposed project.

Public Involvement

The Slate Canyon Water Pipeline Replacement project has been listed in the following UNF Schedule of Proposed Actions (SOPA) winter 2004, spring 2005, summer 2005, autumn 2005, and winter 2006. The SOPA is published quarterly and mailed to over 400 individuals, as well as posted on the Forest Service web page.

On January 24, 2005, a scoping letter was mailed out to 109 members of the public or other local, state, and federal agencies to solicit comments on the project. The Forest Service published a *legal notice* in the *Provo Daily Herald* on February 2, 2005, requesting scoping comments. The 30-day period for public and agency comment was from February 2, 2005 through March 4, 2005. The scoping document and legal notice were also posted on the Forest Service's web page. Three comment letters were received during the scoping period; those letters are included in Appendix A. Using the comments received from scoping, the Forest Service developed a list of issues to address.

On November 21, 2005, a copy of the Draft EA was mailed out to 109 members of the public or other local, state, and federal agencies to solicit comments on the EA. The Forest Service published a *legal notice* in the *Provo Daily Herald* on November 29, 2005, requesting scoping comments. The 30-day period for public and agency comment was from November 29, 2005, through December 29, 2005. The EA was also posted on the Forest Service's web page. Two comment letters and two verbal comments were received during the scoping period; those comments and responses to the comments are included in Chapter 5.

Issues

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, UNF Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations require this demarcation in Sec. 1501.7, which states it is necessary to "identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review …". A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the project administrative record on file at the Pleasant Grove Ranger District, 390 North 100 East, Pleasant Grove, UT.

The Forest Service identified five potentially significant issues raised during scoping. These issues include the following items.

Effects on potential habitats for threatened, endangered, or sensitive plant and wildlife species and/or migratory birds. The new pipeline would be located primarily within the already disturbed trail, but construction activities have the potential to affect plants and animals occurring in Slate Canyon. A comment was received that expressed concerns that construction of the pipeline would have adverse impacts on threatened and endangered plants/animal populations and habitat within the Slate Canyon drainage. In addition, the commentor expressed concerns about impacts to birds protected under the Migratory Bird Treaty Act. The commentor requested the Forest Service develop and implement a memorandum of understanding with the U.S. Fish and Wildlife Service to promote the conservation of migratory bird populations. The commentor also requested that the Forest Service conduct a rigorous evaluation to minimize impacts to migratory birds and their habitat, before approving the proposed action. The commentor requested that all unavoidable migratory bird habitat loss be mitigated. In addition, the commentor requested surveys for Forest Service sensitive species and management indicator species prior to approval of the

proposed action. Chapter 3 provides a discussion of potential effects on threatened and endangered species, as well as a discussion of effects on migratory birds.

Effects on visual quality in Slate Canyon: Slate Canyon has important visual resources (i.e., views of the Utah Valley, views of the canyon walls). Installation of the pipeline has potential to affect views from and of the canyon during construction. In addition, any new exposed pipeline has the potential to affect long-term views of the canyon. Chapter 3 provides a discussion of potential visual effects.

Effects on Rock Canyon/Buckley Mountain roadless areas: The pipeline alignment is located within a roadless area. During construction, vehicles would have to access the canyon to install the new pipeline. A scoping comment was received that expressed concerns that the project would increase all-terrain vehicle (ATV) accessibility in Slate Canyon both during and after construction and requested that measures be implemented to reduce off-road vehicle access to the trail. Chapter 3 provides a discussion of potential effects on the Rock Canyon/Buckley Mountain Roadless Area.

Effects on riparian areas: There are small riparian areas near the spring boxes that may be affected by installation of a new pipeline. Additionally, according to the UNF Forest Plan, most of Slate Canyon Creek is located within a "stream area managed for riparian habitat." This area extends 50 feet on either side of the stream (100 feet total) and would include most of the proposed right-of-way. A comment was received that expressed concerns that construction of the pipeline would have adverse effects on wetlands, riparian habitat, and aquatic resources both within the study area and within the watershed. Chapter 3 provides a discussion of potential effects on riparian habitat.

Effects on soil and water quality: Installation of a new pipeline has the potential to disturb existing topsoil and promote erosion, which can affect water quality. A scoping comment was received that expressed concerns that construction of the pipeline would have adverse impacts on soil and water quality, particularly on 303(d) waters downstream. Chapter 3 provides a discussion of potential effects on soil and water quality.

CHAPTER 2
COMPARISON OF ALTERNATIVES

This chapter describes and compares the alternatives considered for the Slate Canyon Pipeline Replacement project. It includes a description and map of the no-action and proposed action alternatives. This section also presents the alternatives in comparative form and provides a clear basis for choice among alternatives by the decision maker and the public. Information used to compare the alternatives is based upon the estimated effects of implementing each alternative.

Alternatives

Alternative 1

No-Action

Under the no-action alternative, the U.S. Forest Service (Forest Service) would not authorize the State of Utah (State) to replace the Slate Canyon water pipeline as described below under Alternative 2, the proposed action. The existing pipeline would continue to be maintained by the State. Pipeline ruptures would be repaired as necessary, as allowed under the existing special use permit. The pipeline would be accessed for maintenance via Trail 061. In addition to being episodically damaged by flooding, landslides, and avalanches, the pipeline would continue to corrode. It would eventually become non-serviceable, and an alternative water supply for the Utah State Hospital (Hospital) would eventually be needed.

The existing condition currently includes about 200 yards of flood-related erosion damage to the existing trail in the canyon. This damage would have to be repaired eventually because boulders dominate this portion of the trail. Repairs to the trail would be required to accommodate continued maintenance of the pipeline. Repairing the washed out sections of the trail would involve grading and importing about 1,900 cubic yards of fill material. The State would perform annual maintenance of the trail to maintain access to the pipeline until the pipeline became non-serviceable.

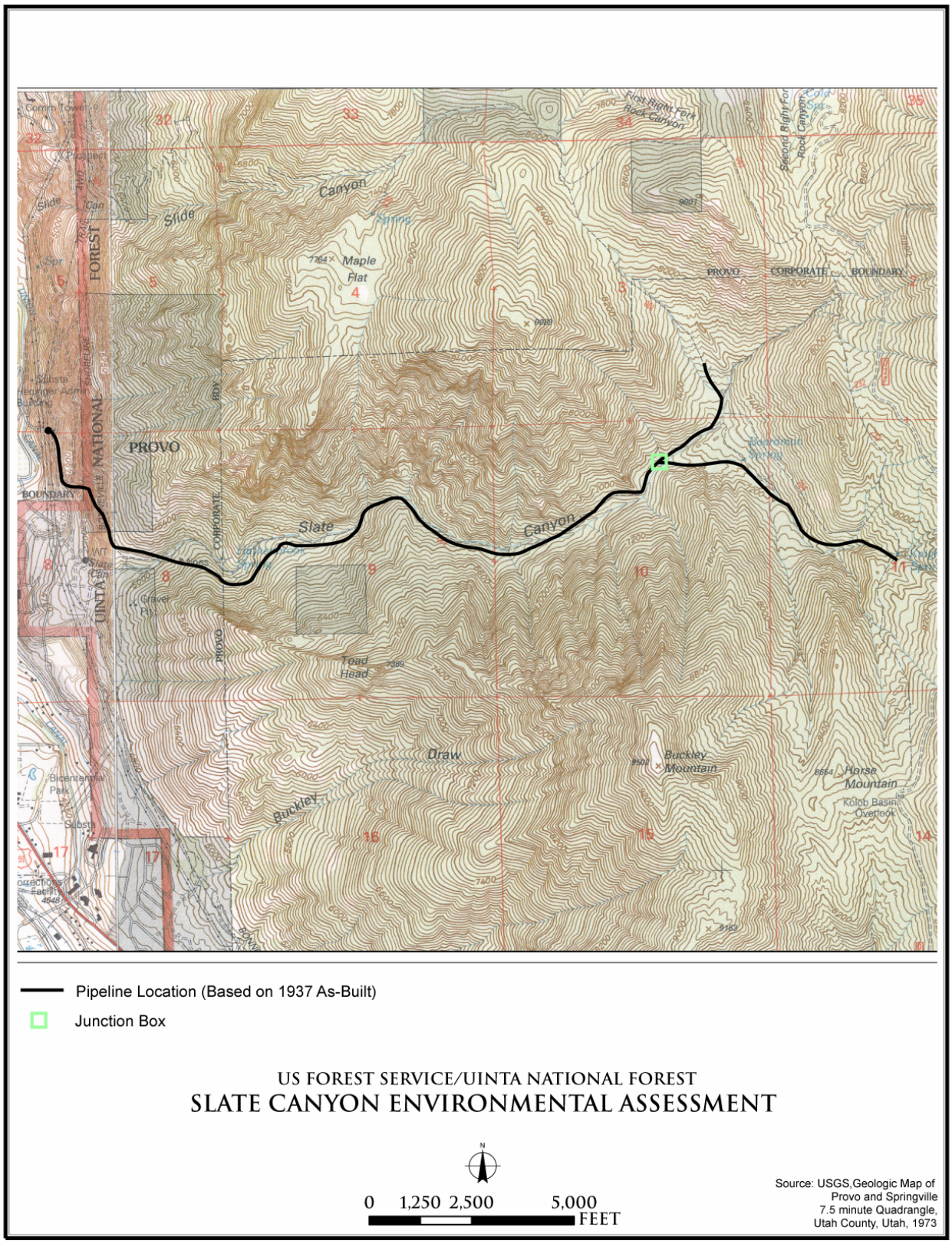

Figure 2-1. Existing Water Transmission Pipeline

Alternative 2

Proposed Action

The Uinta National Forest (UNF) proposes to authorize the State to replace the existing 5½-to 8-inch-diameter water transmission pipeline from the four Boardman Springs collection boxes to the water storage tank located near the Hospital. About 3.5 miles of the 3.8-mile pipeline is located within the UNF, the other 0.3-mile of pipeline is located within the City of Provo.

The existing pipeline diameter varies between 5½ and 8 inches. The proposed pipeline would be 6 inches in diameter. The new pipeline would convey the same amount of water as the existing pipeline. The rate at which water is discharged by the springs is independent of the diameter of the pipeline conveying the water down the canyon. The flow rate of water passing through the pipeline is controlled by a combination of two things: (1) the rate at which water flows out of the spring, which can vary, and (2) the collection box structure, which limits flow into the pipe by virtue of the size of the exit orifice coming out of the box.

The new pipeline would generally be located 30–60 inches below the surface of the existing alignment of Trail 061. A 10-foot-wide disturbance, including 5 feet on both sides of the trail's centerline, would be required to construct the proposed project. The disturbance may be slightly more than 10 feet wide at designated turnaround locations and in the vicinity of pipeline air vents and the junction box. At each of the stream crossings, the proposed disturbance would be up to 20 feet on each side of the existing trail centerline.

The right-of-way in the current special use permit was not strictly defined by a survey but is understood to generally follow the existing canyon trail. The new pipeline would also follow the existing trail (see Figure 2-2).

Construction may also include the relocation of the junction box where the pipeline from Boardman Springs 1 and 3 converges with Boardman Springs 2 and 2a at the top of the main canyon. It is estimated that two cleanout valves would be located within the right-of-way. The visible portion of the valve would consist of a small riser off to the side of the trail with a metal lid. Five air valves in pressurized sections would be buried along the pipeline. It is also estimated that three air vents consisting of an aboveground 2-inch pipe would be located on the side of trail and would be surrounded by rock for erosion protection. The improvements described above would be located within the trail or just to the side of the trail and would be located within the existing 10-foot right-of-way.

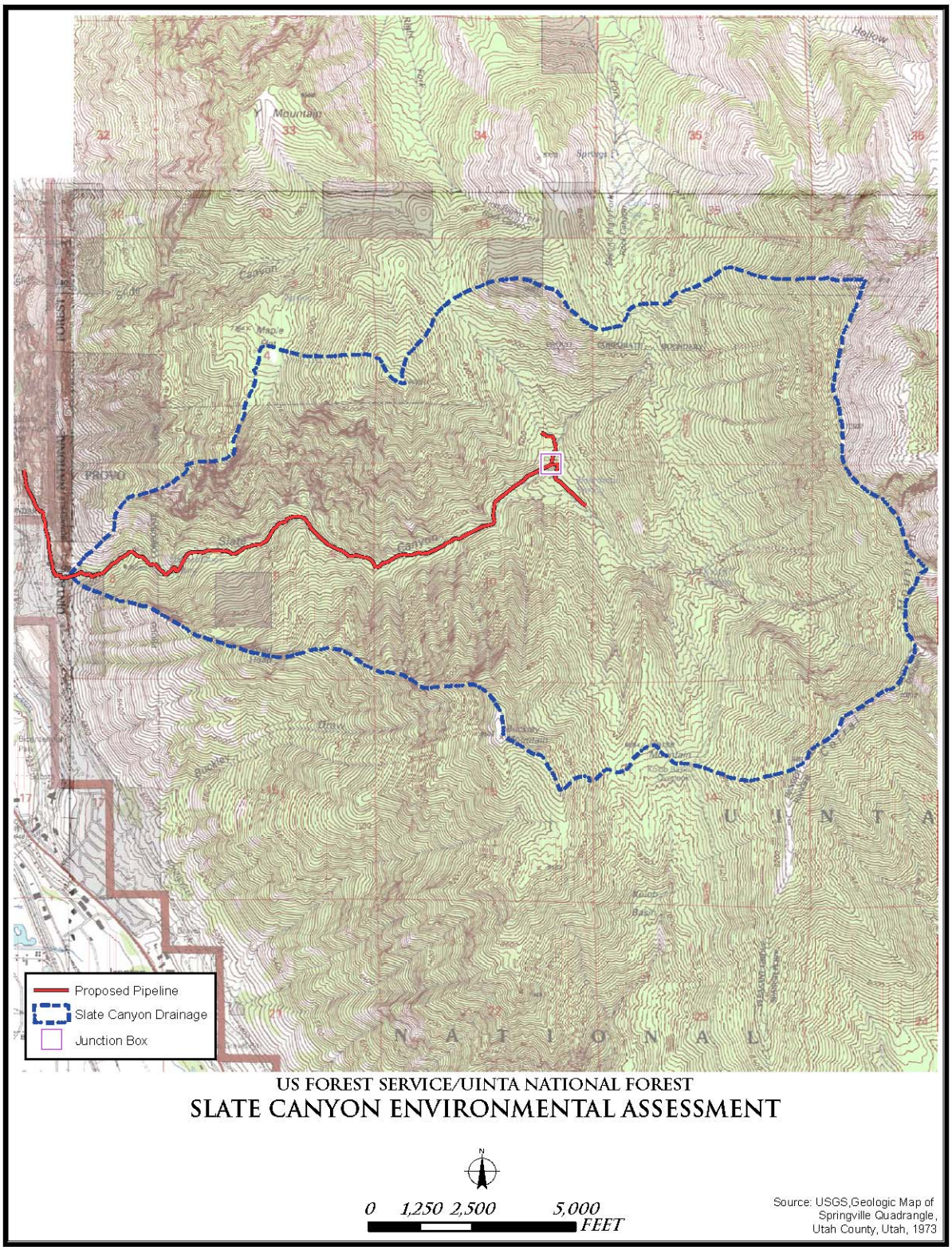

Figure 2-2. Proposed Action Alternative

Slate Canyon Trail is a narrow corridor about 10 feet wide in most places, but it ranges from 4 to 10 feet wide depending on location within the canyon. The canyon terrain is steep, and often no buffer exists between the trail and the steep grades of the side slopes. About 200 yards of the existing trail have been washed out due to recent flood-related erosion in the canyon. Boulders dominate these portions of the trail, and the trail would be repaired before or during construction as necessary to accommodate the travel of machinery. Repairing the flood-damaged areas of the trail may involve importing fill material and materials grading. The trail reconstruction is necessary for the maintenance and operation of the pipeline. Annual maintenance of the trail would be required under the proposed action alternative. This maintenance would include scraping and grading within the trail corridor.

Construction activities would require heavy machinery, such as backhoes, trenchers, compactors, and material haulers. The use of explosives is not permitted in the canyon, so construction methods and equipment would be adapted to the soil and rock. Because of the tight construction corridor, work would be limited to one active construction site and crew along the corridor at any time. Prior to construction, turnaround locations would be identified where the trail naturally widens or where conditions along the trail permit widening. Construction of temporary turnarounds may require removal of vegetation and native soil disruption.

Staging for heavy machinery and material haulers would occur at the mouth of the canyon in the existing parking lot off Forest Service-administered lands. If the parking lot is not big enough to hold all of the staged equipment and materials, the surrounding area would be used, which may require vegetation removal and soil disturbances near the existing parking area.

In general, the process to lay new pipe in Slate Canyon Trail would begin by digging a trench a maximum of 3 feet wide and 5 to 6 feet deep. Some of the excavated native material (dirt and rocks) would be stockpiled to backfill the trench after the pipeline has been installed. The remaining native material would be removed from Slate Canyon as spoils and deposited at an approved spoils site or landfill off Forest Service-administered lands. This process would minimize large stockpiles along the trail over the construction period. The bottom portion of the trench surrounding the pipe would be backfilled with bedding material. The pipe would be laid, and then additional bedding material would cover the pipe. The selected pipe material may be rigid (ductile iron pipe) or flexible (high density polyethylene [HDPE]). This would affect techniques used to transport and place the pipe, as well as trench and backfill design. Remaining portions of the trench would be backfilled with the stockpiled native materials.

Where the proposed replacement pipeline crosses the channel of a perennial or ephemeral drainage, appropriate erosion-control measures would be installed. From preliminary survey information, it is estimated that up to ten crossings of either a primary drainage channel in Slate Canyon or tributary, auxiliary channels would be needed. One such example is shown in Figure 2-3. Although the stream only flows during the spring and early summer and during monsoon rains in the upper canyon, the stream may flow all year in the lower canyon. In order to trench and lay pipe in the streambed, the stream may need to be temporarily diverted around the construction area.

It is anticipated that the pipeline replacement would occur during the 2006 construction season, which is expected to last 5 to 7 months. Construction would begin at the base of the canyon and move up the trail. It is expected that 100 to 200 feet of pipe could be installed per day. The existing pipeline would not remain operational during construction. In order to facilitate the

removal of the existing pipeline, the Hospital would use Provo City water during construction. Water from the springs would be re-channeled into the existing stream via the overflow from the existing collection boxes during construction until the new pipeline became operational. Those sections of the old pipeline that are exposed and can be removed without extensive resource damage would be removed during construction, and the rest of the pipeline would be abandoned in place. Existing below ground vents and spring boxes would be removed.

The proposed project would incorporate the UNF Forest Plan (UNF 2003) standards and guidelines, mitigation measures, and site-specific conservation measures listed in Appendix D of this EA.

Figure 2-3. Stream and Trail Crossing

Comparison of Alternatives

This section provides a summary of the effects of implementing both no-action and proposed action alternatives. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 2-1. Comparison of Project Alternatives

Resource	Alternative 1: No-Action	Alternative 2: Proposed Action
Air Quality	Intermittent pipeline and trail maintenance activities would generate a minor amount of vehicle emissions and fugitive dust, which would not exceed EPA National Ambient Air Quality Standards for PM_{10}.	Short-term construction activities and long-term intermittent maintenance activities would generate a minor amount of vehicle emissions and fugitive dust, which would not exceed EPA National Ambient Air Quality Standards for PM_{10}.
Biological Resources	No biological resources would be substantially affected.	The proposed project would result in short-term construction-period vegetation disruptions, which could affect several species that potentially forage and water in Slate Canyon. However, these impacts would be small scale for a short period of time and revegetation after project construction would ensure that the plant and animal diversity within Slate Canyon would not be affected in the long term.
Cultural Resources	No cultural resources would be affected.	No cultural resources would be affected.
Geology and Soils	The frequency of pipeline maintenance would continue to increase, requiring that the trail be graded and repaired to allow entry by maintenance vehicles. Grading would loosen native materials comprising the road surface and increase erosion and sedimentation.	Short-term construction activities would slightly increase erosion and sedimentation. Construction in stream crossings would also temporarily increase soil erosion and sedimentation. Burying the pipe would generally reduce damage to the pipeline caused by geohazards. With mitigation, geology and soils impacts would be minimal.
Hydrology	Pipeline maintence would result in increased soil erosion and sedimentation, which could increase stream turbidity. The incidence of water release from the damaged pipeline would tend to increase, causing more frequent episodes of soil erosion and stream-channel scour.	Short-term construction activities could cause a short-term increase in stream turbidity. Erosion may temporarily increase during construction; thus, sediment delivery to streams adjacent to the trail would be expected to increase slightly. With mitigation, hydrology impacts would be minimal.
Recreation Resources	No recreational resources would be affected.	Short-term construction activities would close the trail to recreational users during construction.

Resource	Alternative 1: No-Action	Alternative 2: Proposed Action
Roadless Areas	The frequency of pipeline maintenance would continue to increase, requiring that the trail be graded and repaired to allow entry by maintenance vehicles. The exposed portions of the pipeline would remain in place, which would not contribute to the natural feel of the canyon.	The proposed project would have no adverse long-term effects on Wilderness capability ratings in the Rock Canyon/Buckley Mountain Roadless Area. Construction would require removal of some areas of native vegetation; these areas would be restored in accordance with the restoration plan in Appendix D of this EA, and there would be no long-term effect. The removal of existing exposed pipe would have a beneficial effect.
Visual Resources	Existing visual intrusions caused by the exposed pipeline would remain in the canyon.	Short-term construction activities would affect visual resources within the canyon. This includes construction equipment and disturbance of soils and rock materials. Long-term impacts would be beneficial to visual resources.

Alternatives Considered but Eliminated from Further Analysis

Because the State's water rights are accessed from springs located within the UNF, there are no alternatives that evaluate placement of the pipeline on lands other than those administered by the Forest Service. Additionally, because of the topography of the area surrounding the four Boardman Springs, other pipeline alignment alternatives would result in substantial impacts to natural resources. A pipeline is the only feasible method for conveying culinary water from the Boardman Springs, where the State has water rights, to the Hospital.

Replacement of Exposed Portions of Supply Pipeline Only

An alternative that would only replace the exposed section of pipe at various locations along the existing pipeline (approximately 0.5 mile in length) was considered in the *Feasibility Study of Slate Canyon Source Development, Source Protection, and Pipeline Replacement Report* prepared by Nolte Engineering (Nolte 2003). This alternative would replace only the exposed portions of the pipeline and would be accomplished by placing all new pipe beneath the existing trail and connecting back to the original pipeline as necessary. The new pipeline would be designed for a larger hydraulic capacity and thus would be larger in diameter. Consequently, at every connection to existing pipe, a reducer would need to be installed. Air vents would be installed at appropriate points where the exposed piping was replaced. Placing the new pipeline beneath the trail would require construction methods similar to Alternative 2, but it would occur at fewer locations along the trail. This alternative was eliminated from consideration because it provided an incomplete solution to present liabilities for a safe and reliable culinary water supply; it postponed the inevitable complete replacement of the pipeline; and it failed to solve current maintenance problems presented by the aged pipeline.

Pipeline Removal

During the scoping period a comment was received that stated that the two alternatives (the proposed action and no-action alternatives) do not meet the mandate of NEPA to develop and analyze a reasonable range of alternatives so that the environmental document presents and

discloses the effects of the proposed action and alternatives in comparative form. The commentor requested that the Forest Service analyze a third alternative that includes elimination of the pipeline to allow for an evaluation of the impacts of having the pipeline versus not having the pipeline.

In order for an alternative to be evaluated, it must achieve the proposed action's objectives as stated in the purpose and need. This alternative does not meet the objective of providing access to the State's water rights at Boardman Springs in accordance with the State's special use permit which is valid until 2011. This alternative also does not meet the objective of providing a safe and reliable water delivery system to the Hospital. Therefore, this alternative was not analyzed in detail.

500-year Design Alternative

A scoping comment was received that requested that the Forest Service analyze an alternative pipeline design that would withstand a 500-year hydrologic event instead of a 100-year event because the need for the pipeline will exceed 100-years. This alternative was not analyzed in detail because a 100-year design is standard for pipeline projects of this nature. The pipeline would be designed in accordance with the *State of Utah Division of Facilities Construction and Management Design Manual* (State of Utah - Department of Administrative Services 2005) and the *Rules Governing Public Drinking Water Systems* (State of Utah Department of Environmental Quality 2005).

CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the physical, biological, social, and economic environments of the affected project area and the potential changes to those environments from implementation of no-action or proposed action alternatives. It also presents the scientific and analytical basis for the comparison of alternatives presented in Chapter 2.

Air Quality

Affected Environment

Under the federal Clean Air Act, National Ambient Air Quality Standards (NAAQS) have been established by the U.S. Environmental Protection Agency (EPA), and these are the standards that have been established as the official ambient air quality standards for Utah. They include both primary standards to protect public health and secondary standards to protect public welfare (such as protecting property and vegetation from the effects of air pollution). Table 3-1 shows the NAAQS for the pollutants of primary concern in the study area.

Table 3-1. National Air Quality Standards

	National (EPA) Standard	
Pollutant	Primary	Secondary
Lead (Pb)		
Quarterly average	1.5 μg/m^3	1.5 μg/m^3
Particulate matter (PM_{10})		
Annual arithmetic mean	50 μg/m^3	50 μg/m^3
24-hour average	150 μg/m^3	150 μg/m^3
Particulate matter (PM2.5)		
Annual arithmetic mean	15 μg/m^3	15 μg/m^3
24-hour average	65 μg/m^3	65 μg/m^3
Carbon monoxide (CO)		
8-hour average	9 ppm	No standard
1-hour average	35 ppm	No standard
Ozone (O_3)		
8-hour average	0.08 ppm	0.08 ppm
1-hour average	0.12 ppm	0.12 ppm
Nitrogen dioxide (NO_2)		
Annual average	0.05 ppm	0.05 ppm

ppm = parts per million; μg/m^3 = micrograms per cubic meter
Source: U.S. Environmental Protection Agency 2003

The project site is located in Utah County, which has been declared a nonattainment area for PM_{10} and an attainment area for all other air pollutants. Because the project is federally controlled and in a nonattainment area, it is subject to the federal general conformity air quality regulation (*40 Code of Federal Regulations* [*CFR*] *60 Part 93*), which requires the federal applicant to demonstrate the estimated emissions from the project conform to the emission estimates and air pollutant reduction strategies specified by the state's air quality implementation plan. However, the general conformity regulation applies only if the project's annual emissions (including construction or operation, and including vehicle emissions along public roads) would exceed the threshold of 100 tons per year for any pollutant for which the project site is in either a nonattainment or maintenance area.

Environmental Effects

Effect of Alternative 1 (No Action)

The no-action alternative would require some annual repair and maintenance activities that could include temporary and intermittent use of a truck, backhoe, scraper, grader, or bobcat. This alternative would generate minor amounts of fugitive dust (from vehicle traffic on the dirt trail and excavation by heavy equipment) and a small amount of localized emissions from vehicle and equipment exhaust during construction. Emissions and dust generated by maintenance activities would be minor and would not exceed the PM_{10} threshold of 100 tons per year or otherwise cause any adverse air quality impacts.

Effect of Alternative 2 (Proposed Action)

Construction of the proposed pipeline would require the use of heavy equipment that would generate vehicle emissions and fugitive dust. Construction emissions were estimated based on the equipment usage shown in Table 3-2 during an estimated 201-day annual construction period.

Estimated annual emissions for the proposed action are listed in Table 3-3.[1] The estimated PM_{10} emissions during construction were 5.8 tons/year, well below the general conformity applicability threshold of 100 tons/year. Therefore, the general conformity regulation does not apply to this project, and no additional air quality analysis is necessary.

The project's construction emissions are relatively low and would be distributed over a relatively large distance, with most of the PM_{10} emissions generated along the length of Trail 061. Thus, on any given day of construction, it is unlikely the emissions would result in an ambient air pollutant concentration high enough to exceed allowable state and federal limits, or otherwise cause any adverse air quality impacts.

Annual repair and maintenance activities would generate minor amounts of fugitive dust and localized emissions. Emissions and dust generated by maintenance activities would be temporary and intermittent and would produce fewer emissions than construction of the pipeline. Consequently, repair and maintenance activities would not exceed the PM_{10} threshold of 100 tons per year, or otherwise cause any adverse air quality impacts.

1. Appendix B shows the calculation spreadsheet used to estimate emissions.

Table 3-2. Estimated Equipment Usage During Pipeline Replacement

Item	Quantity
Number of construction days	201 days
Non-road construction equipment	Trencher = 151 piece-days Backhoe = 151 piece-days Bobcat = 151 piece-days Hand compactor = 151 piece-days Water truck = 151 piece-days
Quantity of excavated material	7,431 CY
Quantity of excavated material put back into trench	3,963 CY
Quantity of spoils material shipped off-site	3,468 CY
Quantity of select import fill	1,847 CY
Number of truckloads delivering supplies to the site	161 truckloads
Number of employees commuting to the site	8 employees
Average one-way haul distance along the dirt trail	1.9 miles
Average one-way haul distance along paved roads	50 miles

Notes: CY = cubic yards
Equipment estimates provided by Psomas Engineering, August 2005

Table 3-3. Estimated Annual Emissions During Construction

	Emissions (tpy)			
Annual emissions	VOC	CO	NO_X	PM_{10}
Construction vehicle exhaust emissions	0.7	5.1	5.7	1.0
General construction fugitive dust	---	---	---	0.5
Soil loading and dumping	---	---	---	0.4
Dozer work	---	---	---	0.0
Unpaved road fugitive PM_{10}	---	---	---	3.8
Paving off-gas	0.0	---	---	---
Architectural painting (VOC = 500 g/L)	0.0	---	---	---
Dump truck tailpipe emissions	0.0	0.0	0.1	0.01
Worker commute tailpipe emissions	0.2	2.8	0.3	0.01
Total Emissions (tpy)	**0.9**	**8.0**	**6.1**	**5.8**

Mitigation

No mitigation is necessary.

Biological Resources

Affected Environment

Wildlife

Special Status Species

The project area has potential habitat for a number of species with special management status. In this report, special status species means those protected by state or federal law or policy and includes those listed as threatened or endangered under the Endangered Species Act (ESA), those listed on the U.S. Forest Service's (Forest Service's) *Intermountain Region Proposed, Endangered, Threatened, and Sensitive Species List* (December 2003), those management indicator species (MIS) identified in the Uinta National Forest (UNF) Forest Plan (UNF 2003) to fulfill requirements of *36 CFR 219.19*, and those listed by Utah Division of Wildlife Resources (UDWR) on the state's sensitive species list.

The U.S. Fish and Wildlife Service (USFWS), UDWR, and Forest Service biologists were consulted to identify special status animal species that may occur in the general project area. The environmental consulting firm, Jones & Stokes, collected biological observations during two field visits to the proposed project site on May 16, 2005, and June 30, 2005. The table in Appendix C lists those special status species identified as potentially occurring in the Slate Canyon drainage. An analysis of the species listed in Appendix C was conducted and the results are presented in the Wildlife Biologist Report, Biological Assessment, and Biological Evaluation that were prepared for this project. Of those species evaluated, it was determined that the following four species have potential habitat within the project area based on assessments of known occurrences of the species, historic ranges, and habitat preferences:

Peregrine Falcon (*Falco peregrinus anatum*),
spotted bat (*Euderma maculatum*),
Townsend's (western) big-eared bat (*Plecotus townsendii*), and
Flammulated Owl.

Peregrine Falcon
The Peregrine Falcon was formerly classified as endangered but was removed from the list of endangered and threatened wildlife in 1999. The Peregrine Falcon has a nearly cosmopolitan distribution and breeds on every continent except Antarctica. Formerly it nested throughout much of Utah, but now it primarily nests on the Colorado Plateau and a few locations along the Wasatch Front. Peregrine Falcons occupy a wide variety of open habitats. They often nest on cliffs but also on riverbanks, tundra mounds, large stick nests of other species, tree cavities, and human-made structures. They forage wherever prey is concentrated, especially tidal flats, river mouths, lakeshores, farmlands, dunes and beaches, and river valleys. (UNF 2003b)

Historical nests are known from above Alpine in the early 1970s and in the canyons east of Utah Lake from the 1930s to the 1960s (UNF 2003b). Slate Canyon is located in habitat suitable for peregrines.

Spotted Bat
The spotted bat has been captured in Utah in several habitats including lowland riparian, desert shrub communities, sagebrush–rabbit brush, ponderosa pine forest, montane grassland (grass-

aspen), and montane forest and woodland (grass-spruce-aspen) (UDWR 2000). They use rock crevices high up on steep cliff faces. Cracks in limestone and sandstone with 1–2 inch widths are important potential roosting sites (USDA Forest Service 1991). The spotted bat has been found within the UNF. Rock outcroppings occur within the project area and may supply potential roosting habitat.

Spotted bats have been recorded in American Fork Canyon and in the city of Provo (UDNR 2002). Bats are difficult to study and little is known about the distribution or habitat use patterns of spotted bats on the UNF (UNF 2003b). Rock outcroppings occur within the project area and may supply potential roosting habitat. Many bat species concentrate their foraging activity over streams, rivers, lakes, and wet meadows (UNF 2003b).

Townsend's (Western) Big-Eared Bat

Townsend's big-eared bat occurs throughout western North America from southern British Columbia to southern Mexico, with isolated populations in the central and eastern U.S. It is widely distributed across Utah. Townsend's big-eared bats have been found at various locations along the Wasatch Front in or near the UNF, including mine adits and caves in American Fork Canyon, Slide and Rock Canyons, the city of Provo, Powerhouse Mountain in the Hobble Creek area, and Bear Canyon on Mount Nebo. (UNF 2003b)

Townsend's big-eared bat is considered common and is one of the most common bat species in Utah. This species has been found at elevations between 3,300 and 8,850 feet in Utah. It commonly occurs in desert shrub, pinyon/juniper, sagebrush steppe, mountain brush, mixed forest, and ponderosa pine forest. Maternity colonies of up to a thousand or more individuals form in March and April and are generally located in caves, mines, or buildings. In winter, both sexes hibernate in mines and caves. Townsend's big-eared bat is very susceptible to human disturbance. Disturbance of a maternity colony or hibernating group often causes the bats to abandon the site (NatureServe 2005). Human disturbance from recreational cave use is a potential threat to Townsend's big-eared bats in UNF. (UNF 2003b)

Flammulated Owl

The Flammulated Owl breeds throughout much of the western U.S. and into Mexico and migrates to Mexico and Central America in winter. Rangewide, the species is not thought to be declining (NatureServe 2005). In Utah, population trend is unknown but thought to be stable (UDNR 1998). Its habitat is montane forest. Flammulated Owls typically select mature and old growth ponderosa pines and Douglas-firs with open stand structure. They nest in cavities, typically abandoned large woodpecker holes. Flammulated Owls feed on nocturnal arthropods. In the UNF, nests have primarily been found in cavities in aspen trees within stable aspen or seral aspen forest types. (UNF 2003b)

Data from USGS shows that the northern portion of the proposed project alignment is located in suitable Flammulated Owl habitat (USGS no date). However, the proposed alignment is not located within seral aspen forest types, and no Flammulated Owls are known to occupy the watershed. Flammulated Owl may use the area as foraging habitat.

Management Indicator Species

As required by the planning regulations, each National Forest must identify species to be used to evaluate and monitor management practices in its Land and Resource Management Plan (Forest

Plan). Management Indicator Species (MIS) or groups of species serve as ecological indicators of ecosystem health. The Forest Service identified five management indicator species in the UNF Forest Plan shown in Table 3-4.

Table 3-4: Management Indicator Species

Common Name	Scientific Name	Management Indicator Community
American beaver	*Castor canadensis*	Riparian
Three-toed woodpecker	*Picoides tridactylus*	Conifer
Northern goshawk	*Accipiter gentilis*	Aspen/conifer
Bonneville cutthroat trout	*Oncorhynchus clarki utah*	Aquatic
Colorado River cutthroat trout	*Oncorhynchus clarki pleuriticus*	Aquatic

American Beaver

American beaver were widely distributed across Alaska, Canada, and the continental United States prior to 1800. They were trapped heavily, and by the mid-1800s many beaver populations had been eliminated or dramatically reduced. Populations have become reestablished throughout much of the United States and Canada and are increasing rangewide. The beaver is a riparian obligate species, although it inhabits a wide variety of riparian habitats as long as there is sufficient permanent water and food. Willow and aspen are the most common sources of woody wood and dam-building material for beavers on the UNF. (UNF 2005a)

According to the 2005 MIS surveys conducted on the UNF, there were no American beaver detected on the Pleasant Grove Ranger District. The nearest beaver observation occurred approximately 25 miles east of Slate Canyon, near Strawberry Reservoir. Beaver colonies are known to occur within the Pleasant Grove Ranger District, but they did not occur in the sample of randomly selected sections. (UNF 2005e)

Three-toed Woodpecker

Three-toed Woodpeckers are widely distributed throughout boreal and sub-alpine forests of North America and occur throughout mountainous areas of Utah. Three-toed Woodpeckers do not migrate, although periodic irruptions occur, presumably because of failure of the food supply. On the UNF, Three-toed Woodpeckers occur in conifer forest types and are most closely associated with the spruce/fir forest type. The woodpeckers excavate cavities in snags and dead portions of live trees. Most of their diet consists of wood-boring beetles and caterpillars that attack conifers. Densities of Three-toed Woodpeckers can increase substantially in response to spruce beetle (*Dendroctonus rufipennis*) outbreaks. (UNF 2005a)

Data from the United States Geological Survey (USGS no date) show that there is suitable habitat for Three-toed Woodpecker within the Slate Canyon drainage but not in the immediate project vicinity. Three-Toed Woodpeckers are typically found in conifer forest types including Douglas-fir, lodgepole pine, and ponderosa pine. About 395 acres of spruce-fir forested vegetation occurs within the Slate Canyon drainage but would not be affected by project construction.

According to the 2005 MIS surveys conducted on the UNF, the nearest detected Three-toed Woodpecker occurred about 20 miles north of the Slate Canyon. An incidental detection occurred about 3 miles northeast of Slate Canyon, near Rock Canyon. (UNF 2005d)

Northern Goshawk

Northern Goshawk is widely distributed throughout North America and Eurasia. In Utah, it is widely distributed throughout the mountainous areas. Goshawks are typically permanent residents or short-distance migrants. The goshawk is broadly associated with forested vegetation types within the UNF. They occur in stable aspen, seral aspen, spruce/fir, Douglas-fir/white fir, and mature forested riparian vegetation types. Goshawks nest in relatively dense, mature stands and forage in a variety of habitat types, including open habitats and early-seral vegetation types. They prey on a wide variety of birds and small mammals. Most common prey species include woodpeckers, jays, grouse, snowshoe hares, and red squirrels. (UNF 2005a)

According to the 2005 MIS surveys conducted on the UNF, the nearest known goshawk nesting site in Rock Canyon is about 2.5 miles north of Slate Canyon. The nearest known post fledgling area (2000–2005) is located about 1.5 miles north of Slate Canyon and surrounds the nesting site in Rock Canyon. The nest was known to be occupied in 2005, which was also the first reporting of goshawk in Rock Canyon (UNF 2005c). According to the Neotropical Migratory Bird Survey Data for the Lower Provo Management Area, a Northern Goshawk was detected less than one mile north of Slate Canyon (along the Springville Transect) on July 15, 2005 (UNF 2005f).

Bonneville Cutthroat Trout

Bonneville cutthroat trout are a Region 4 and State sensitive species. Conservation agreements have been developed for this species within Utah. The conservation and recovery for this species depend on eliminating or reducing the impact of activities that threaten the species' existence. Bonneville cutthroat trout will be used as MIS in sub-basins that have been identified as containing either persistence or conservation populations of this species. (UNF 2005a)

Bonneville cutthroat trout have been extirpated from the majority of streams on the UNF. Remnant populations have been found in the following management areas: Upper and Lower Provo River, American Fork, Nebo Creek, Hobble Creek, Diamond Fork, and the Upper Spanish Fork River. (UNF 2003b)

Colorado River Cutthroat Trout

Colorado River cutthroat trout are a Region 4 and State sensitive species. Conservation agreements have been developed for this species within Utah. The conservation and recovery for this species depends on eliminating or reducing the impact of activities that threaten the species' existence. Colorado River cutthroat trout will be used as MIS in sub-basins that have been identified as containing either persistence or conservation populations of this species. (UNF 2005a)

Colorado River cutthroat trout have been extirpated from the majority of streams on the UNF. Remnant populations have been found in the West Fork Duchesne River, Upper Currant Creek, Willow Creek, and the Right Fork of White River (UNF 2003b).

Other Wildlife

Other wildlife species known to occur in the project area include deer, neotropical birds, small mammals, amphibians, and reptiles. Small mammals prevalent throughout the canyon include

rabbits, mice, rats, squirrels, and chipmunks. Small mammals serve as the food source for predatory animals, such as the fox, owl, and hawk. Nonpredatory birds that occupy the canyon include robin and grouse. Predatory birds that occupy the canyon include the hawk, falcon, and owl. There are several species of snakes that occupy Slate Canyon, including the western rattler.

Larger mammals, such as cougars, foxes, and black bears, roam the higher, more remote areas. These mammals are usually active at night. Elk and mule deer are fairly prevalent throughout the area and feed mainly on forbs, buds, and twigs of thick shrubs. UDWR has designated the lower portion of Slate Canyon as critical deer winter range. Most deer winter range along the Wasatch Front has been degraded by urban development, and deer populations have typically decreased in these areas. Fish are not known to be present in Slate Canyon Creek due to the intermittent nature of the streams and lack of a perennial water source.

The proposed project would be subject to the federal Migratory Bird Treaty Act (MBTA), first enacted in 1916, which prohibits any person to "pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase..." any migratory bird.

The list of migratory birds includes nearly all bird species native to the United States; non-native species such as European starlings are not included. The statute was extended in 1974 to include parts of birds, as well as eggs and nests. Thus, it is illegal under MBTA to directly kill, or destroy a nest of, nearly any bird species, not just endangered species. Activities that result in removal or destruction of an active nest (a nest with eggs or young being attended by one or more adults) would violate the MBTA. Removal of unoccupied nests or bird mortality resulting indirectly from a project is not considered a violation of the MBTA.

Neotropical migrant birds represent over 50 percent (or, more precisely, 340 of the 600 species) of North American birds. As spring begins, more than 300 species of neotropical migratory birds head north to breed and raise young in the United States and Canada. In the fall, they return to warmer climates in tropical regions. UNF neotropical bird surveys recorded 85 neotropical migrant bird species located on the Heber, Pleasant Grove, and Spanish Fork Ranger Districts (Sitting Up and Webb 2000). The most recent survey data for the Lower Provo Management Area indicates that there were 25 neotropical bird species detected within 1 mile of Slate Canyon (along the Springville transect) in 2005 and 32 species in the same area in 1994 (UNF 2005f).

Vegetation

General Vegetation

Vegetation types vary considerably in the project drainage. Areas surrounding lower portions of the pipeline route support oak woodland, transitioning to oak-maple woodland farther up the canyon. The project crosses a tree-dominated riparian community (less than 1 acre) found adjacent to a portion of the primary Slate Canyon drainage. The project also crosses small patches of scree (less than 0.25 acres) and mahogany-oak communities (less than 2 acres). Sections of spruce-fir communities occur adjacent to the project area but rarely intersect with the proposed pipeline. Small riparian areas are found near each of the four spring boxes and are associated with the remaining drainage in Slate Canyon. Most of the proposed pipeline is

located in a Riparian Habitat Conservation Area (RHCA class III). Figure 3-1 depicts the general vegetation cover within the drainage.

Special Status Species

The project area has potential habitat for one botanical species with special management status. As with wildlife above, special status species are those protected by state or federal law or policy and includes those listed as threatened or endangered under the ESA, those listed on the Forest Service's *Intermountain Region Proposed, Endangered, Threatened, and Sensitive Species List* (December 2003) and those listed by UDWR on the state's sensitive species list. The table in Appendix C lists those special status species identified as potentially occurring in the project area or Slate Canyon drainage.

The USFWS and UDWR have been consulted for special status plant species that may occur in the general project area and for ways to avoid, minimize, and mitigate potential impacts to these species. Based on assessments of known occurrences of the species, historic ranges, habitat preferences, Wasatch jamesia is the only species that may be adversely affected by the proposed project.

Wasatch Jamesia

Wasatch jamesia is restricted to rock cliffs and outcrops. The jamesia is known to occur in the Deep Creek and Wasatch Mountains in Utah, as well as in Nevada, California, Wyoming, Colorado, and New Mexico (Welsh et al. 1993). This species occurs at a wide range of elevations and has been observed to prefer shaded or otherwise protected rock surfaces at the lower elevational limits. Suitable habitat for Wasatch jamesia occurs within the project area, but no plants were observed during a botanical site visit made by the Forest Service.

Noxious Weeds

Noxious and invasive weed species occurring in Slate Canyon include dalamatian toadflax, Canada thistle, musk thistle, and cheatgrass, which are colonizing species and are difficult to manage and eradicate.

Dalmatian toadflax (*Linaria dalmatica*) is a herbaceous perennial from the Mediterranean region. It is considered a noxious weed in the United States and is associated with disturbed, open habitats. Dalmatian toadflax is a species of high concern because it is difficult to eradicate once established, it is a prolific seed producer, and it is a highly competitive plant. Dalmatian toadflax is a perennial that grows up to 4 feet tall. Its waxy green leaves are heart shaped, 1 to 3 inches long, and clasp the stem. Dalmatian toadflax is primarily a weed of the intermountain West but a population also exists in the Great Lakes region. Dalmatian toadflax seedlings are relatively poor competitors with grass species, but once established, the weed can become extremely invasive, especially on dryland sites, disturbed areas, and roadsides. Once an area becomes infested, both species can dramatically reduce forage production and decrease native plant and wildlife habitat.

Canada thistle (*Cirsium arvense*) is a perennial with an extensive horizontal root system and stems that grow 1–4 feet tall. Its leaves are oblong, lance shaped, and spiny tipped. Canada Thistle's flowers are purple in color and unisexual. Canada Thistle is native to Eurasia and is found in croplands, rangeland, and roads. (Summit County 2005)

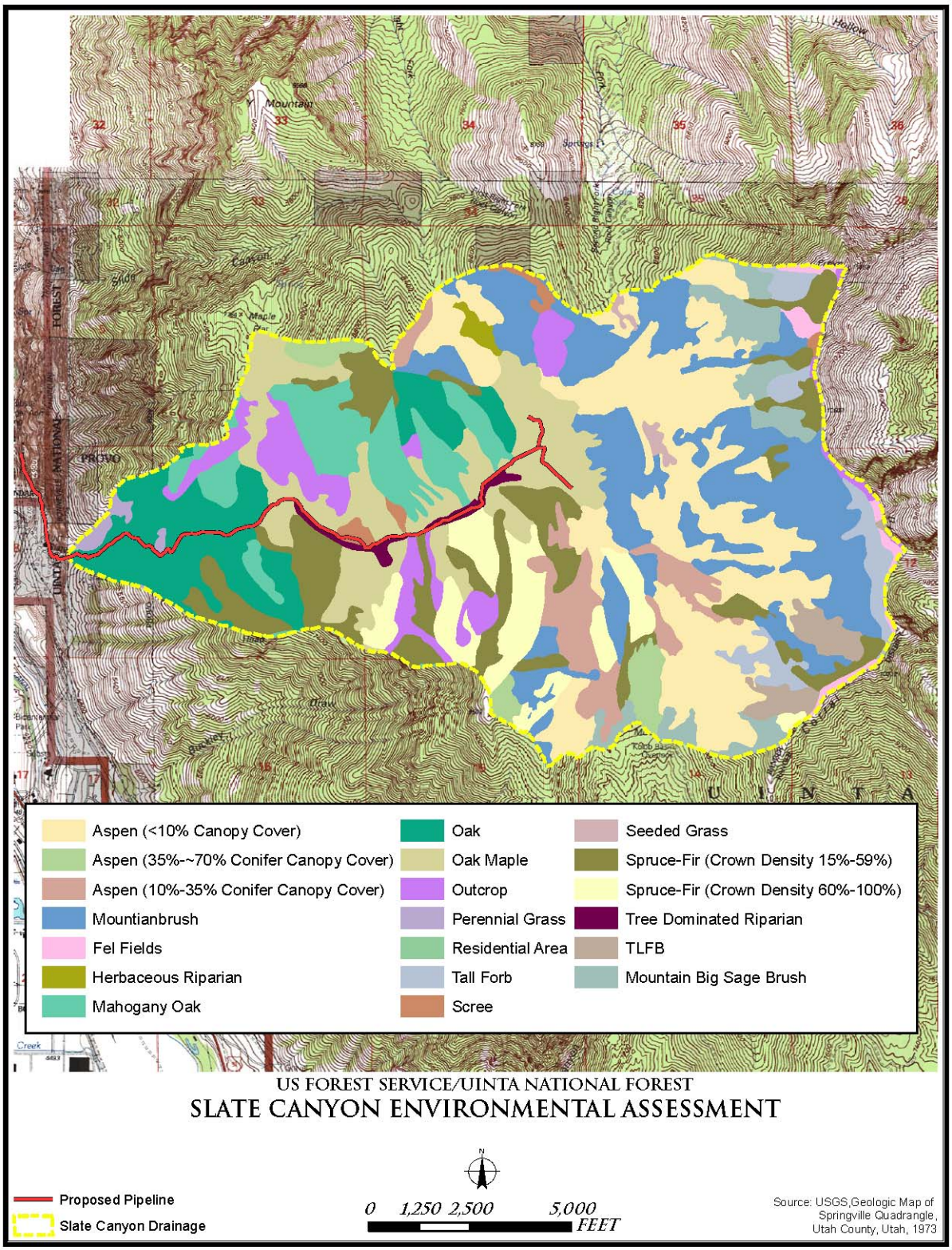

Figure 3-1. General Vegetation in the Slate Canyon Drainage

Musk thistle (*Carduus mutans*) is a biennial with stems that grow 6–7 feet tall. Its leaves are dark green with a light green rib, are spiny, and grow all along the stem. Musk Thistle's flowers range from purple to rose in color and have spiny heads that are 1½–3 inches in diameter. Musk Thistle is native to southern Europe and western Asia and is found along roadsides, rangeland, ditch banks, and wastelands. It spreads rapidly and forms extremely dense stands. (Summit County 2005)

Cheatgrass (*Bromus tectorum L.*) is a weedy annual grass ranging from 2 inches to 2 feet tall. It has a branched base and is typically rusty-red to purple at maturity. Cheatgrass is widely adapted to the Great Basin and Colorado Plateau. It grows on all exposures and all types of topography from 2,500 to 13,000 feet in elevation. It has potential to quickly invade heavily grazed rangeland, roadsides, burned areas, and disturbed sites (USU 2005).

Environmental Effects

Effect of Alternative 1 (No Action)

Wildlife

Under this alternative, conditions would stay as they are for both special status species and other wildlife. Short-term, intermittent pipeline and trail maintenance would occur within Slate Canyon, but these small scale activities would occur relatively infrequently and would not substantially disturb species that live or forage in the canyon.

Vegetation

Under the no-action alternative, conditions would stay as they are for both rare and common plants. Short-term, intermittent pipeline and trail maintenance would occur within Slate Canyon. These repairs have the potential to disturb small areas of vegetation but would not result in large areas of soil disturbance or plant trampling. The risk of noxious weed import would be minimal.

Effect of Alternative 2 (Proposed Action)

Wildlife

Special Status Species

No special status species are known to occur within the project area. The pipeline would be located primarily within the existing Slate Canyon Trail; consequently, it is anticipated that the project would not result in mortality of any special status wildlife species, and there would be a minimal potential for habitat disturbances. All habitat disturbances would be temporary and habitat would be restored in accordance with the restoration plan in Appendix D of this EA, which would ensure that there would be no unavoidable habitat loss. In addition, construction of the proposed project would occur within a small portion (4.3 acres) of the Slate Canyon drainage (3,771 acres). The drainage has an abundance of riparian and woodland habitat.

Spotted bat: Construction of the proposed pipeline would occur within Slate Canyon Trail and would not affect rock outcroppings that may provide roosting sites. In addition, construction would occur during the day, when bats are inactive. Consequently, the project would not affect individual bats. The project may impact a small amount of spotted bat foraging habitat. Riparian vegetation is prevalent in Slate Canyon and in the surrounding canyons. Construction would affect about 3 percent of the total tree-dominated riparian vegetation in the Slate Canyon drainage. Construction impacts would be localized and short-term and would primarily result

from removal of vegetation, which would be restored following project construction. Consequently, the project would not cause a trend toward federal listing of the species or affect its viability.

Townsend's big-eared bat: Construction of the proposed pipeline would occur within Slate Canyon Trail and would not affect any caves that may provide roosting sites. In addition, construction would occur during the day when bats are inactive. Consequently, the project would not affect individual bats. In up to ten locales, the proposed project crosses riparian habitat. Riparian habitat is prime foraging habitat for Townsend's big-eared bat. Where the proposed pipeline crosses these riparian areas, the riparian vegetation would be removed (up to 20 feet on either side of the trail centerline) by construction activities. Less than 1 acre of tree-dominated riparian vegetation would be removed as a result of construction. This disturbance would affect about 3 percent of the total tree-dominated riparian area in the Slate Canyon drainage. Restoration of these areas would help mitigate impacts to this habitat but it would require several years for the vegetation adjacent to these crossings to return to the existing state. Consequently, the project may impact a small portion of the Townsend's big-eared bat foraging habitat, but it is not likely to cause a trend toward federal listing of the species or affect its viability.

Peregrine Falcon: The project may impact foraging habitat for this species but would not impact nesting habitat. The proposed project has the potential to affect less than 1 acre of forested riparian areas during construction, but construction would be short-term and preconstruction avian nest surveys would be conducted to ensure that no Peregrine Falcon nests are present. If nests are present, a 1-mile avoidance buffer would be maintained around the nest until the hatchlings have fledged (in accordance with Forest Plan guidance). Most construction activities would occur within the existing trail and would not affect vegetation. Some vegetation removal would occur near stream crossings; however, these areas would be re-vegetated after construction. Suitable falcon foraging areas are abundant in the canyon and in the surrounding areas; consequently, the project has minimal potential to directly or indirectly affect Peregrine Falcon. The project is short-term, isolated, and would affect a very small amount of habitat; consequently, it would not result in a trend toward federal listing of the species or affect its viability.

Flammulated Owl: The proposed project would not affect seral stage aspen populations and, therefore, would not affect nesting habitat for the Flammulated Owl. Project construction would require temporary vegetation removal.

Management Indicator Species

Five MIS for the UNF have been evaluated: beaver, goshawk, three-toed woodpecker, and two cutthroat trout species (see Appendix C). As noted in Appendix C, there are no known occurrences of these species in the project area.

Bonneville cutthroat trout and Colorado River cutthroat trout: According to Ron Smith, the Forest Service fisheries biologist, there is no potential for fish to occur in the stream in Slate Canyon (personal communication 2006). The stream is intermittent, and, in years with low snow pack, it does not flow. Consequently, there will be no effects on this species or its habitat from the pipeline reconstruction because neither the species nor suitable habitat is believed to occur within the project boundaries.

Northern Goshawk: The project may impact foraging habitat for this species, but no nesting habitat would be impacted. The proposed project has the potential to affect less than 1 acre of forested riparian areas during construction, but construction would be short-term and preconstruction avian nest surveys would be conducted to ensure that no Northern Goshawk nests are present in the vicinity of the project. If nests are present, a 0.5-mile avoidance buffer would be maintained around the nest until the hatchlings have fledged (in accordance with Forest Plan guidance). Most construction activities would occur within the existing trail. Some vegetation removal would occur near stream crossings; however, these areas would be re-vegetated after construction. Less than 3 percent of the tree-dominated riparian vegetation in Slate Canyon would be disturbed as a result of the project. Suitable foraging areas are abundant in the canyon and in the surrounding areas; consequently, the project would have minimal potential to directly or indirectly affect Northern Goshawk. The project is short-term, isolated, and would affect a very small amount of habitat; consequently, it would not affect forest health or forest trends. Current Forest Service monitoring data provide no evidence that goshawk population trend has been declining on the UNF in recent years (UNF 2005a).

Three-toed Woodpecker: The conifer forest types located in the immediate project vicinity consists of immature stands and the project would not disturb potential nest trees. Forest health and forest trends would not be affected by construction of the proposed project. Current Forest Service monitoring data indicate that Three-toed Woodpecker are currently relatively common and well distributed in conifer-forest types across the UNF and that population viability of this species is unlikely to be at risk. (UNF 2005d)

American beaver: There is no known potential habitat for the American beaver within the Slate Canyon drainage. No beaver signs were observed within or adjacent to the drainage during the field trip. Thus, the project is not likely to affect beavers or forest trends. According to the 2005 Beaver Monitoring Report, beavers are sufficiently common and well distributed in suitable riparian habitat across the UNF such that population viability of beavers is not at risk (UNF 2005e).

In sum, the project would have no negative direct or indirect effects on populations or population trends of any of the MIS species.

Other Wildlife

Construction dust, noise, vibration, and increased human presence and equipment may result in indirect adverse effects on wildlife in the project vicinity and may result in temporary avoidance of these areas by birds and other wildlife species. However, these effects would be short-term. Many of the potentially affected species are well adapted to human disturbances, and no long-term impacts are anticipated.

The proposed action has the potential to affect nesting birds protected under the MBTA. Consequently, to prevent undue harm to migratory birds, avian nest surveys (for bird species listed under the MBTA) would be conducted within 50 feet of the pipeline, less than 10-days prior to the start of construction activities. The surveys would be paid for by the State. If nests were encountered within the project area, an avoidance buffer, which would be determined by species, would be set up until the hatchlings fledge. In addition, construction activities would occur during daylight hours to reduce and prevent impacts on birds (particularly nesting birds). This would ensure that impacts to migratory birds would be minimal.

The project would result in short-term, localized adverse impacts to potential foraging habitat for migrating neotropical birds. However, foraging habitat is abundant in Slate Canyon and in the surrounding area, so impacts would be minimal.

The project crosses both critical and high-quality habitat for deer. During the field trips, the overall deer habitat within the area appeared to be in good condition. Use of young woody vegetation appeared to be moderate. The proposed project would occur within about 1 acre of critical deer habitat and 1.8 acres of high quality deer habitat. There are about 1,190 acres and 530 acres of high quality and critical deer habitat in the Slate Canyon drainage, respectively. Foraging habitat is abundant in Slate Canyon and the removal of vegetation during construction of the proposed project would result in a minor reduction in available forage within the drainage.

Vegetation

General Vegetation

The proposed project would result in up to ten stream crossings, which could require the removal of up to 20 feet of riparian vegetation on either side of the steam. This habitat is located within areas managed for riparian habitat and would require compliance with the standards and guidelines described in the UNF Forest Plan (see Appendix D of this EA for a list of specific standards and guidelines). In addition, this area would be revegetated after construction in accordance with the restoration plan (see Appendix D of this EA). These measures would ensure that the short-term construction impacts to riparian areas would be minimal.

Special Status Species

The Forest Service conducted a habitat assessment and site visit to determine the presence or absence of special status plant species along the trail. Based on this site visit and the lack of suitable habitat for sensitive botanical species, with the exception of Wasatch jamesia, it is anticipated that the project would not result in mortality of any special status species, and there would be a minimal potential for habitat disturbances. All vegetation disturbances would be temporary and would be restored in accordance with the restoration plan in Appendix D, which would ensure there would be no unavoidable habitat loss.

Suitable habitat for Wasatch jamesia occurs within the project area, but no plants were observed during a botanical site visit made on June 20, 2005. The project may impact suitable habitat for Wasatch jamesia, but it is not likely to result in a trend toward federal listing of this species or affect its viability.

Noxious Weeds

Weed seeds could be brought into the project area by heavy equipment during project construction. During construction and immediately afterwards, the area disturbed by construction could provide conditions for weed establishment from the presence of disturbed, bared soil, higher levels of light, and the opportunity for seed importation provided by equipment traffic. Additionally, removal of native vegetation could provide open spaces for invasive weeds to establish. This could decrease forage for deer and other wildlife species in the canyon. In addition, noxious weeds out-compete native plants, which reduces biodiversity and compromises visual scenery. Noxious weeds can also increase fire frequency and intensity.

Controlling weeds can be difficult; the most effective control method is to prevent weeds from growing and expanding their range of infestation. When control techniques are successfully

applied, site rehabilitation will be implemented to prevent weed reestablishment. Site rehabilitation usually requires a substantial time commitment, as well as repeated follow-up control treatments. Implementation of UNF Forest Plan (UNF 2003) standards and guidelines (Noxious Weeds Management, pg 3-15 though 3-17) would ensure there would be no substantial noxious weed impacts.

Mitigation

The proposed project would implement the applicable UNF Forest Plan (UNF 2003) standards and guidelines for Noxious Weeds Management (pg 3-15 though 3-17), Aquatic and Riparian Habitat Management (pg 3-2 though 3-3), Wildlife and Fish Habitat Management (pg 3-11 though 3-13), and Vegetation Management (pg 3-17 though 3-20); the applicable standards and guidelines are listed in Appendix D of this document. In addition, avian surveys would be required prior to the start of construction (see Appendix D for site specific conservation measures that would be implemented).

Cultural Resources

Affected Environment

The first occupants of the Great Salt Lake Basin were Native Americans who concentrated their activities in temperate and well-watered locations such as Utah Valley. As a result, the density of prehistoric archaeological sites in the canyons and mountains along the eastern edge of Utah Valley is quite low. These sites include lithic scatters, small campsites, and rock (C. Thompson pers. comm.). No Native American sites have been documented within Slate Canyon.

Provo was founded in 1849 during the initial Mormon settlement of Utah. The Utah State Hospital (Hospital) first opened in 1885 on the southern outskirts of the new city. The Hospital has held water rights to a series of springs in Slate Canyon since the 1920s. From 1933 to 1935, the Civilian Conservation Corp (CCC) constructed a series of water control features at the mouth of Slate Canyon. This effort does not appear to have involved repair, replacement, or alteration of any water transmission structures associated with the Hospital.

The Forest Service first issued a special use permit for the water pipeline to the Hospital in 1937, and records indicate that the existing 5 ½- to 8-inch-diameter pipeline was constructed at that time (Nolte 2003).

Environmental Effects

In accordance with the requirements of *36 CFR 800.4* and Section 106 of the National Historic Preservation Act (NHPA), the Forest Service has conducted an archaeological survey of a portion of the UNF for the proposed water pipeline replacement project in Slate Canyon. The proposed pipeline alignment within the existing trail was surveyed from Boardman Springs 2 and 2A and Boardman Springs 1 and 3, west to the junction of these two trails. From the junction of the two trails, the survey was then conducted west to the Forest Service boundary. A transect was walked on the trail surface, with additional survey along the sides of the trail where terrain allowed. Visibility on the trail was excellent but extremely limited because of heavy vegetation in most areas beyond the trail surface. Rock faces adjacent to the trail were inspected for rock art, but no art was observed.

Cultural materials identified within the project area of potential effects (APE) during the survey were limited to three items below.

A single section of abandoned pipe upslope from the existing pipeline. The remnants of this segment appear to represent an effort to relocate the pipeline to an upslope location, beyond floodwaters in the canyon, but undercutting of the side slopes defeated this effort. This single section of pipe is considered part of the existing pipeline, 42UT1462.

An abandoned pipe near the mouth of Slate Canyon previously recorded as 42UT1337. These sections of rusted and abandoned pipe are located in the lower portion of Slate Canyon and are part of an old pipe from Hathenbrook Spring. The Utah State Historic Preservation Officer (SHPO) has previously determined this site to be ineligible for nomination to the National Register of Historic Places (NRHP) (SHPO pers. comm.).

The existing pipeline, recorded as 42UT1462. The pipeline is over 50 years old and generally deteriorated, with sections that have been replaced at various times. As a result, it lacks enough historic integrity to qualify for the National Register of Historic Places. Moreover, it lacks the distinguishing characteristics required under NRHP Criteria A, B, C, or D; and is not considered eligible for nomination to the NRHP.

No additional prehistoric or historic cultural resources were observed within the project APE. At the mouth of Slate Canyon, the remains of the Slate Canyon CCC Water Diversion System were observed, but this site is outside the project APE and has been determined to be ineligible for nomination to the NRHP (SHPO pers. comm.).

Effect of Alternative 1 (No-Action)

The no-action alternative would not adversely affect any cultural resources. Continued maintenance of the pipeline would require additional pipeline repairs that would further reduce the integrity of the pipeline. However, since the pipeline is not considered a historic property under Section 106 of the NHPA, these modifications would not constitute an adverse impact to a cultural resource.

Effect of Alternative 2 (Proposed Action)

The first located resource—sections of the abandoned water pipeline 42UT1337—has been formally determined ineligible for the NRHP by the Utah SHPO. Consequently, 42UT1337 is not a historic property under Section 106 of the NHPA. Thus, removal of this pipeline would not result in an adverse impact to a cultural resource.

The existing and still functioning Hospital water pipeline, 42UT1462, is adjacent to or within the project alignment in several locations. In existence since at least the 1930s, this pipeline is generally deteriorated, with sections that have been replaced at various times. Erosion within the canyon from floods has damaged the pipe, which has required repairs. In some cases, portions of the pipeline have been relocated from their original locations. In general, the presently used pipeline appears to lack historic integrity. Moreover, this pipeline lacks the distinguishing characteristics required to meet NRHP Criteria A, B, C, or D. Consequently, construction of the new pipeline and removal of the existing pipeline would have no effect on historic properties as defined by Section 106 of the NHPA.

Mitigation

No mitigation is necessary.

Geology and Soils

Affected Environment

Drainage and Geological Characteristics

Slate Canyon is located in the Wasatch Mountains of north-central Utah, comprising the easternmost range of the Basin and Range Province that extends west to the Sierra Nevada in California. This geologic province was created by the stretching of the earth's crust, which resulted in extensive faulting in a north-south direction. Crustal movement along the Wasatch Fault that demarks the steep western front of the Wasatch Mountains began about 15 million years ago and continues today. Slate Canyon is a 5.89-square-mile drainage that formed on the uplifting Wasatch block and drains west down the steep mountain front to the Provo Valley.

With the exception of the recent fluvial sediments along the canyon streams and colluvium and landslide deposits on the slopes, the drainage comprises old, metamorphic bedrock originating in the Paleozoic and Pre-Cambrian eras as marine sediments. These rocks include limestones, dolomites, metamorphosed shales and sandstones, and quartzites. Bedrock outcrops are widespread in the canyon. At the mouth of the canyon, and along the pipeline route north to the Hospital, there are boulders, cobbles, sands, and gravels originating from ancient Lake Bonneville (of which Utah Lake is a remnant) and from alluvial fan and piedmont alluvium derived from erosion of adjacent uplands.

Geologic Hazards

Seismic Hazards

The project is located in a seismically active area. Potential hazards include rupture of ground surface from shallow faulting, ground shaking (earthquake) from fault rupture, and liquefaction of saturated sandy substrates causing surface deformation. In addition, earthquakes can induce landslides. A description of these potential hazards appears below.

Surface Rupture. Surface rupture along the Wasatch Fault zone could possibly occur. This fault zone passes along the foot of the Wasatch Mountains in the vicinity of the pipeline terminus and reservoir at the Hospital. The Wasatch Fault is one of the longest and most active faults in the United States.

Ground Shaking. Ground shaking from faulting along the Wasatch Fault could be substantial throughout the pipeline route. The central sections of the Wasatch Fault may produce earthquakes up to magnitude 7.5–7.7.

Liquefaction. Because it comprises shallow soils over bedrock, the pipeline route in Slate Canyon is considered to have a *very low* potential for liquefaction (Utah Geological Survey 1994).

Landslides and Avalanches

Numerous active and paleontological landslides exist within Slate Canyon. About 60 percent of the drainage is considered a landslide-susceptible area, including the slopes above the easternmost pipeline extension and both the steep north- and south-facing slopes above the pipeline in the west-central area (Figure 3-2). About 20 landslides of various areal extents have been mapped in the drainage, in addition to about 20 watercourses subject to debris torrents. The latter includes the primary Slate Canyon drainage adjacent to (and crossed by) about half of the total pipeline route. As previously noted, landslides, snow slides, and stream erosion have frequently damaged the existing pipeline.

Solution Collapse

Limestone geologic units (Figure 3-3), which are widespread in the drainage, are potentially subject to solution collapse, if infiltrating precipitation dissolves sufficient rock to form caverns or sinkholes (Mulvey 1992). The occurrence of such features in Slate Canyon is not known.

Geologic Resources

Alluvium at the mouth of Slate Canyon was mined for aggregate in the past, and portions of it now constitute abandoned pits. The pipeline route from the canyon mouth to the Hospital (outside of Forest Service administered lands) crosses a terrace above a former pit. The last part of the pipeline (0.2 miles) crosses a soil type that is a cobbly loam (USDA Soil Conservation Service 1972). It may also be suitable as a source for coarse aggregate or stone fill.

No bedrock or placer minerals are known to exist in Slate Canyon.

Soils

The pipeline corridor crosses primarily “stream canyon” Land Suitability Index (LSI) types (64–71% of total). The largest unit (35% of the total) is comprised primarily of cliffs, talus, and rubble (colluvium) with little soil development, attesting to the unstable nature of the canyon environment. Other stream canyon types have some soil development, but the coarse-textured component (gravels, cobbles, and stones) is large because the substrate is alluvium and/or colluvium. Where vegetation is present (especially trees), soil development is more advanced, and the hazard of mass movement is substantially lower.

Other soil/LSI types include “active and inactive landslides” (6% of the total), “relatively stable glacial moraine” (3%), and “alluvial fan” and “mountain-front piedmont colluvium” below the mouth of the canyon (19% of the total). The landslide units are located in the vicinity of former Knight Springs No. 3, which was originally an additional source of water until a landslide eliminated the spring box and pipeline.

Soil Expansion-Contraction

Soils rich in certain types of clays exhibit shrink-swell behavior with drying and wetting. Most soils in the project area have low clay content and, therefore, have very low shrink-swell potential.

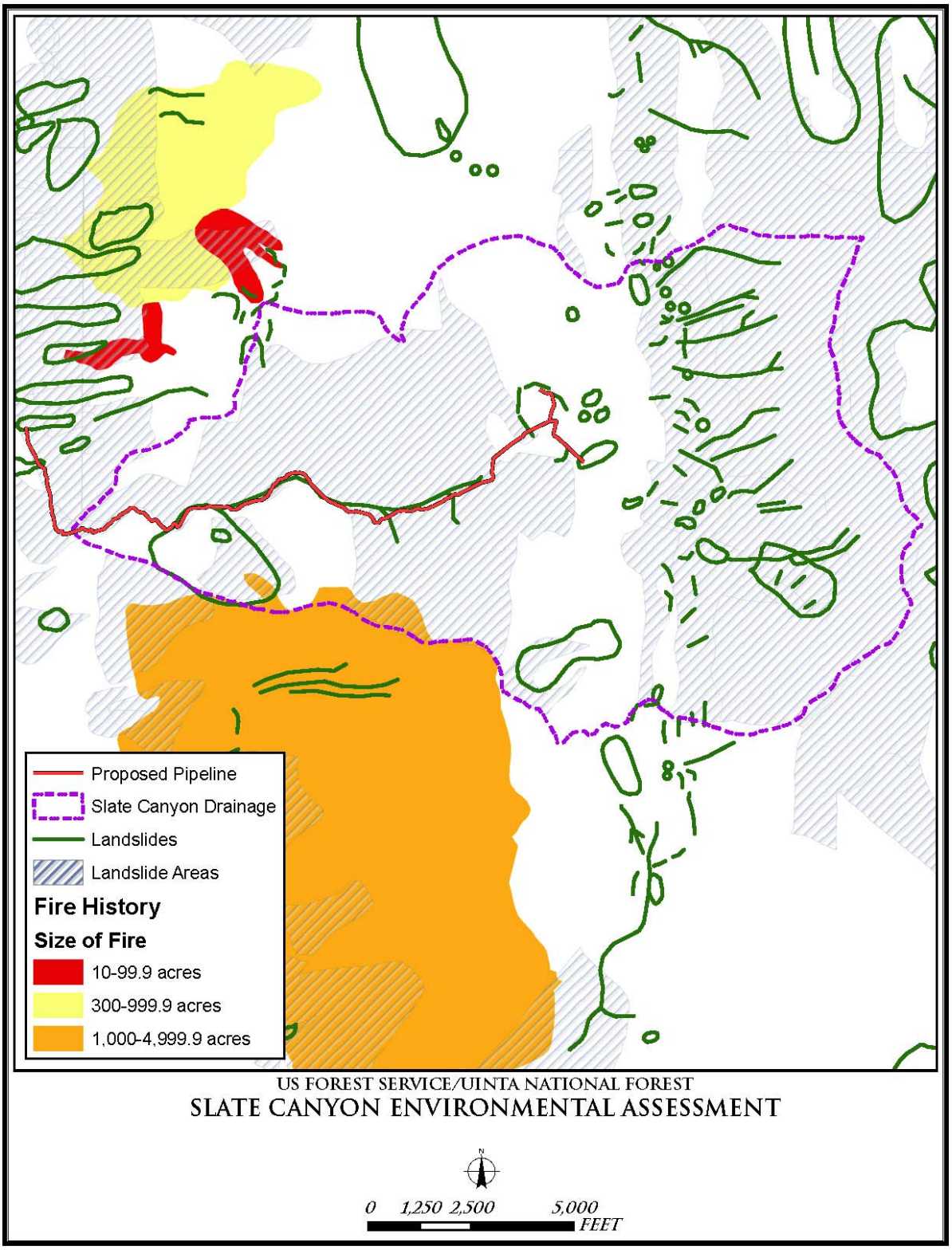

Figure 3-2. Fire and Landslide Hazards and Fire History

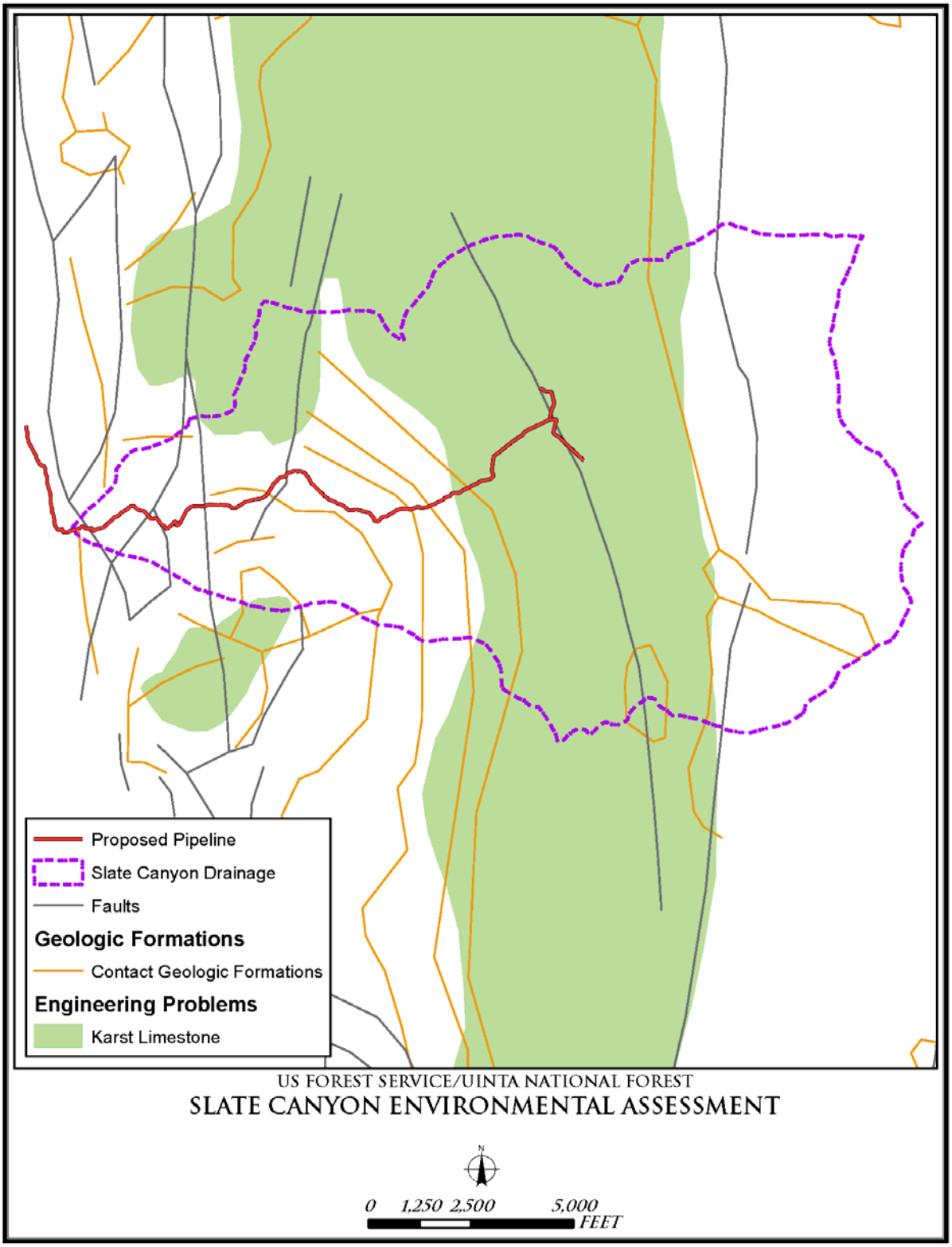

Figure 3-3. Geologic Hazards

Fire History

Only one wildfire has recently burned in the Slate Canyon drainage—the Springville fire of 2002. It burned extensively in the neighboring drainage to the south and entered the ridgetop portion of Slate Canyon, where 48 acres were burned. The burned area constitutes 1.2 percent of the Slate Canyon drainage. Forest Service staff estimated that fire-accelerated erosion from the burned area would diminish to zero within four years (i.e., by 2006) (UNF *Burned Area Report—Springville Fire* 2002). The Slate Creek drainage has not been burned to an extent or magnitude that would result in detectable modification of the existing slope and stream hydrology (UNF 2002). Several other small fires have burned in the drainage north of Slate Canyon, but these fires did not enter Slate Canyon. Figure 3-2 shows areas that have historically burned in or near the drainage.

Environmental Effects

Effect of Alternative 1 (No-Action)

The no-action alternative would result in conditions similar to the existing conditions previously described, except the frequency of pipeline failure would increase as corrosion advanced and landslides, avalanches, and floods continued to damage aboveground sections of the pipeline. Similarly, the incidence of release of water from damaged pipeline would tend to increase, causing more frequent episodes of soil erosion and stream-channel scour.

A high level of pipeline maintenance would continue to increase, requiring the trail to be graded and repaired as needed to allow entry by maintenance vehicles. Grading would loosen native materials comprising the road surface and increase rates of sediment yield during subsequent precipitation. Replacement of buried pipeline sections and reconstruction of pipeline suspension systems would require additional disturbances of vegetation, soil cover, and mineral soil, thereby increasing sediment yield during subsequent precipitation. Stream channel bottoms at numerous pipeline crossings would continue to be disturbed by vehicle traffic or pipeline excavation, resulting in subsequent bedload movement as channels regained stable profiles during periods of flow.

Damage to the pipeline during a major earthquake on the Wasatch Fault would likely be substantial because of its fragile condition and exposure to landslides and avalanches.

Attainment of desired conditions for soils specified in the UNF Forest Plan (UNF 2003) would continue to be impeded by recurring pipeline failure and maintenance actions in the vicinity of the pipeline. Forestwide goals for watershed health would continue to not be fully met in this small area, although reclamation of disturbed sites according to Subgoals 2-44 and 2-45, described in the UNF Forest Plan (UNF 2003), could be required for ongoing maintenance operations. Thus, adherence to forestwide standards and guidelines for soil and geologic resources could be attained.

Effect of Alternative 2 (Proposed Action)

Construction of the new pipeline would result in excavation of compacted soils comprising Trail 061, excavation of undisturbed soils in several locations, and temporary storage of some excavated material on slopes adjacent to the trail.

Native soil and rock would be excavated in a trench about 5- to 6-feet deep, with a maximum top width of about 3 feet along the existing trail. Some of this material would be temporarily placed

in a wedge on the downslope side of the trail. Some of this material would be used to backfill the trench. The remaining material that would not be acceptable backfill (e.g., boulders and cobbles) would be removed as spoils. The excavated material would not be compacted. The lower portion of the trench surrounding the pipe would be backfilled with imported granular material quarried from a location off Forest Service administered lands and compacted to 90 percent. In sections of the pipeline alignment where the substrate is primarily comprised of cobbles/boulders, the entire trench would be backfilled with imported granular material. In sections of the pipeline alignment, where the substrate is primarily comprised of soil or gravel, some of the excavated material would be backfilled into the upper trench, and it would also be compacted to 90 percent. Any excess material would be removed from Slate Canyon as spoils and deposited at a spoils site or landfill off Forest Service administered lands. Near and at stream crossings, waste rock and soil could not be temporarily stored downslope of the trail; therefore, it would be added to temporary storage wedges in upslope locations. The following impacts are expected to occur as a result of this construction.

Erosion of Trail Surface and Stream Sedimentation. The runoff regime of, and sediment yield from, trail surfaces where cobble/boulder substrates are replaced by imported granular fill would be changed by the project. Where native compacted material is excavated but replaced and compacted, ratios of infiltration to runoff would be relatively unchanged. Where imported material is used for backfill of the upper trench, the surface particle size would be finer than the pre-project surface. Consequently, entrainment of surface particles during rain and snowmelt would increase relative to the pre-project condition. This effect would be reduced by shaping the restored trail surface to drain away from the trail and not down the trail (see mitigation measure GS-2, below). Overall, sediment delivery to adjacent streams would be expected to increase only slightly between existing and post-project conditions.

Erosion of Soil/Rock Storage Areas and Stream Sedimentation. The temporary storage wedges would cover existing vegetation, such as herbaceous species and surface litter. The wedges would be composed primarily of soils and small rocks and would be subject to erosive forces during precipitation events. Consequently, erosion may temporarily increase during construction. However, trenches would be backfilled as soon as possible to minimize the amount of time that these soils would be exposed. The potential effect of soil loss and stream sedimentation from the soil storage wedges would be minimal.

Erosion from Excavation of Undisturbed Soils and Stream Sedimentation. Where construction could disturb vegetated areas—such as turnaround areas, air valve and vent stations, and the potential junction box location —temporary soil and rock storage wedges would also be created on the slopes below the excavation and would be subject to potential short-term erosion as described above. Mitigation measure GS-3, described below, would be applicable to these areas and to any other vegetated areas that would be disturbed by project construction. This measure would minimize potential impacts. In addition, the backfilling of the trench with compacted native soils would decrease infiltration and increase soil entrainment by running water. However, mitigation measure GS-3, described below, can also be applied to the trail if compaction of the surface backfill is foregone.

Indirect effects of the proposed action would include the following:

Potential for Pipeline Damage from Landslides, Avalanches, Floods, and Ground-Shaking during Earthquakes and Induced Soil/Channel Erosion. Burial of the pipeline would result in a major decrease in the incidence of pipeline damage from landslides, avalanches, and floods. As described above, the frequency of these events in Slate Canyon is high. In some cases, such pipeline damage results in a release of water from the system that causes substantial erosion of surface soils and downstream channels. The frequency of such events would be substantially reduced.

Pipeline burial may also result in less damage during the intense ground shaking of a large earthquake because of the confinement and resistance to movement afforded by the trench and the protection from impact afforded by the relatively fine-textured backfill. Compliance with the *State of Utah Division of Facilities Construction and Management Design Manual* (State of Utah Department of Administrative Services 2005), the *State of Utah Department of Environmental Quality Rules Governing Public Drinking Water Systems* (Utah Division of Drinking Water 2005) and recommendations in the geotechnical report during design of the project would reduce the potential for pipeline damage, and additional mitigation measures would not be needed. The reduction in the potential for damage from ground shaking, and in induced soil erosion and channel scour from pipeline failure, are also project benefits.

Potential for Pipeline Damage from Surface Fault Rupture, and Induced Soil Erosion. Pipeline burial may or may not reduce the potential for pipeline shearing because of surface fault rupture between the canyon mouth and the storage tank near the Hospital. The precise location of future ruptures is unknown, but the fault system along the front of the Wasatch Range passes through the area of the pipeline terminus and the storage tank. The proposed project would not increase this potential for damage.

Potential for Pipeline Damage from Soil Expansion and Induced Soil/Channel Erosion. Expansion and contraction of clayey soils when wetted and dried could possibly damage the pipeline and cause erosive release of water in areas of these soils. Soil/LSI landslide units LS1, LS2, and S14 all have some clay content, but none of them are primarily composed of clay. The potential for shrink-swell damage along this route would not be substantial.

Reduction in Canyon Entry and Soil Disturbance for Maintenance. Because the rate of pipeline damage for natural events would be diminished, the frequency of repair operations would also decrease substantially. This change would reduce the frequency at which the trail surface and canyon soils would be disturbed for pipeline repair, thus reducing the potential for soil erosion and stream sedimentation.

Change in Availability of Aggregate/Fill Resources. As noted previously, the pipeline terminus and storage tank may be situated on substrates having possible value as aggregate sources. However, the project involves replacement of the existing pipeline generally in the same location so that potential availability of any aggregate resource in the project area would not substantially change.

At the locations of borrow sites that would be used to get fill material for trench backfilling, supplies of aggregate/fill soils would be diminished. However, new fill material sources

located off Forest Service administered lands could be readily developed, so it is unlikely that the project would cause a shortage of fill resources in the region.

Mitigation

Project specific mitigation measures described below, as well as best management practices (BMPs) discussed in the UNF Forest Plan (Soil and Water Resource Management, pg 3-8 through 3-10, also listed in Appendix D of this EA) for protection of soils and water resources would be implemented during project construction to avoid or reduce potential impacts to soils and stream water quality. Resulting minimal adverse impacts to soils would be of short duration. The proposed action would help achieve desired conditions, meet Forestwide goals, and adhere to Forestwide standards and guidelines for soil and water resources.

GS-1: Avoid Earthwork when Soils Are Too Wet or Too Dry. Soils shall be in a loose or friable condition prior to surface disturbance to avoid detrimental soil disturbance. Excessive wet conditions produce soil clods and soil compaction, while excessive dry conditions produce soil powder, both of which are detrimental to soil structure, thus inhibiting proper soil function for drainage, water holding capacity, and soil stability. Prohibit construction during spring runoff where construction occurs on/near floodplains or wetlands. Construction timing limitations would decrease the risk of facility site damage, water contamination, and stream and riparian impacts from flooding events.

GS-2: Reshape Road/Trail Surface after Trench Backfill to Drain Laterally. As the road/trail surface is restored after the trench is filled, it should be outsloped, and rolling dips should be installed so that the trail surface drains away from the road/trail rather than down it.

GS-3: Placement and Treatment of Waste Soil Wedges. This measure is intended to create soil surfaces that promote infiltration of water and eliminate surface runoff. It involves a technique called *extreme surface roughening*, also known as *pocking* or *gouging*, which causes sediment and rainfall/snowmelt to be intercepted and trapped at the microscale, thereby facilitating vegetation establishment and minimizing erosion. Fine sediments collect in the micro-surface basins, creating favorable conditions for plant germination and establishment. This measure would be implemented in any vegetated area that is disturbed outside of the existing trail. The following steps are involved in this process.

- Mark areas where waste soil wedges should be placed; original ground slope in these areas should not exceed 35 percent. Do not create soil wedges around trunks of trees that are to be retained.
- Remove and temporarily stockpile all vegetation and topsoil (A-horizon) from the wedge placement areas. Where the pipeline route deviates from the road/trail, stockpile all vegetation from the trench area as well. The excavated depression acts as a keyway to anchor the wedge fill.
- Spread and shape waste soils from trench excavation, with heights above original ground not to exceed 2 feet. Use a technique of dropping the excavated material onto the wedge site from a height of about 3 feet. Assure smooth transition of wedges into undisturbed areas.

- Replace topsoil using the same dropping technique. The finished surface should be hummocky, with no continuous downhill slopes exceeding 2 feet in length.
- Place stockpiled vegetation randomly over the replaced topsoil, and lightly embed it into the surface using a backhoe bucket.
- Provide additional soil cover where cleared vegetation was sparse. This cover may be either chips or hogged material from a fuel-thinning project or a planted grass cover. Provide this additional soil cover according to recommendations of a Forest Service soil scientist or watershed specialist.

Hydrology

Affected Environment

Slate Canyon is a 5.89-square-mile drainage that formed on the uplifting Wasatch Mountains block and drains west down the steep mountain front to the Provo Valley (Figure 3-4). The Slate Canyon drainage is bound by Slide Canyon to the north; several unnamed drainages and Buckley Draw to the south; and, Bartholomew, Jennings and Snowslide Canyons on the east.

Stream Characteristics and Riparian Habitat Conservation Areas

All of the streams in the drainage are classified as *intermittent* streams. However, flow within various segments of the mainstem stream and the tributaries persist for different periods of time annually (and varies interannually depending upon winter precipitation).

The 100-foot area along most of Slate Canyon Creek (50 feet on each side) is designated as a "stream area managed for riparian habitat" (see Figure 3-4). Called Riparian Habitat Conservation Areas (RHCAs), these areas are stream-related environments where primacy is given to protection of riparian vegetation. Closely paralleling and often crossing the mainstem stream, the trail route for the new pipeline falls within these areas for much of its length. All of the RHCAs in the Slate Canyon drainage are characterized as Class III. Where the proposed pipeline crosses the stream (up to 10 locations), construction activities would remove the riparian vegetation (up to 20 feet on either side of the trail centerline). This disturbance would affect about 0.14 percent of the total riparian area conservation area (RHCA class III) in the Slate Canyon drainage.

There are gaps in the areas managed for riparian habitat along those reaches of the stream that cease flowing earlier in the year. In particular, early-drying reaches include the lower reach of the mainstem near the canyon mouth, a reach in the middle of the mainstem below the springs, and the lower reaches of three tributary streams.

Streamflow in the drainage is highly variable. High flows can result from summer thunderstorms, snow melt in years with substantial snowpack and/or rapid warming of the snowpack in spring, or intense rainfall in warm winter storms (UNF 2003). The Forest Service estimates the maximum probable flow expected from a storm event in the drainage, based on modeling by the Forest Service, is 518 cubic feet per second (cfs), a relatively small value that reflects the small size of the drainage (UNF 2002).

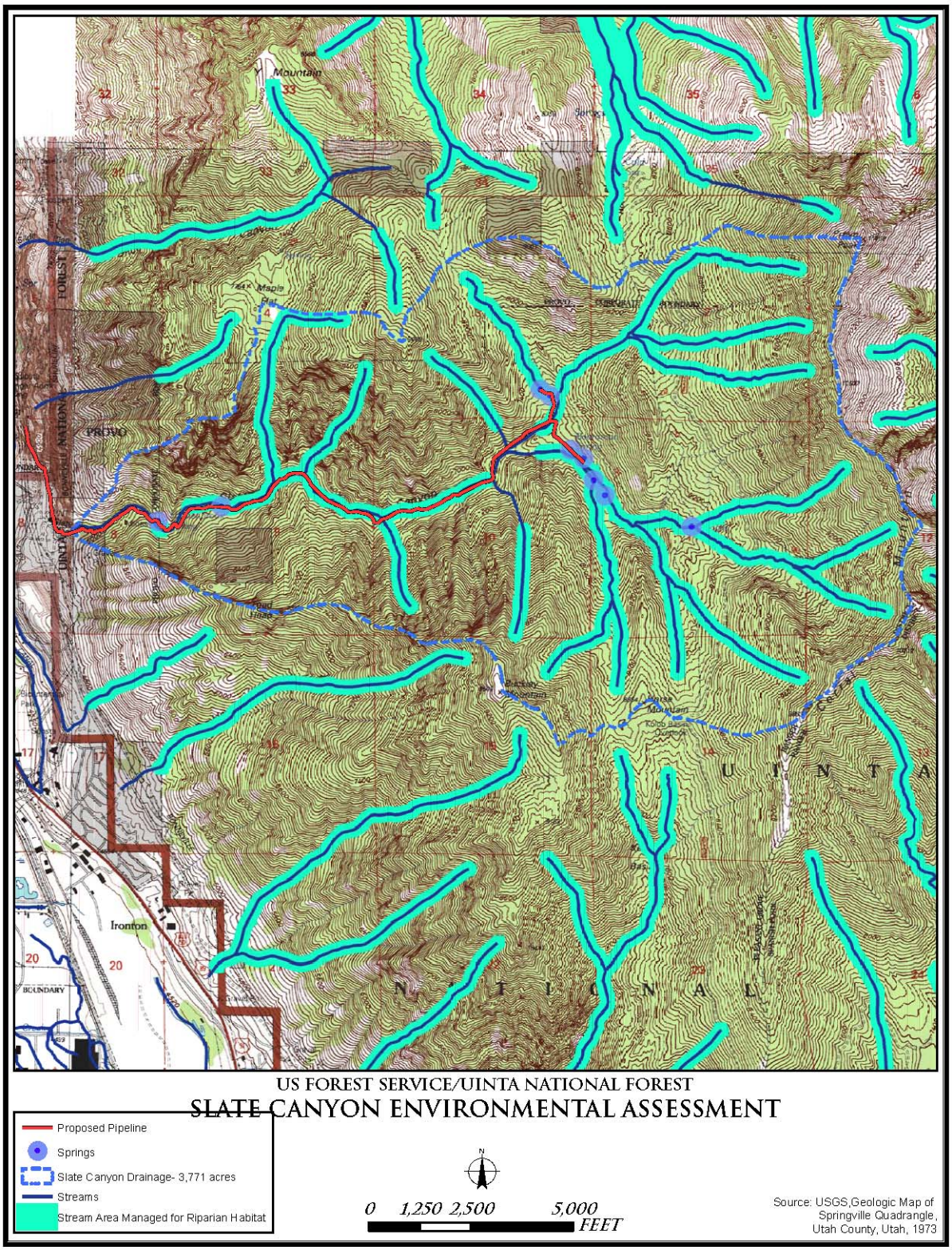

Figure 3-4. Slate Canyon Drainage

The proposed project would convey water from four Boardman Springs. The Boardman Springs water right is included as part of the Knight Springs water right (55-4108). This water right allows the State to convey up to 1.10 cubic feet of water per second from the springs. The proposed project would not convey more water than allowed under the existing water right or increase the amount of water being diverted from the springs.

Water Quality

In general, waters in the UNF are rated as "high quality waters" by UDWQ. Spring water in Slate Canyon Creek is of high quality, although somewhat mineralized by the widespread presence of limestone ($CaCO_3$) and dolomite ($CaMgCO_3$) in the drainage. During periods of low streamflow, water quality is of high quality, but during periods of high streamflow, sediment loads can be entrained and the water can be somewhat turbid.

Slate Canyon Creek is not on, and has not formerly been on, the State's 303(d) list of streams where water quality is impeding beneficial uses. Utah Lake is a nearby 303(d) listed water, but Slate Canyon Creek is intermittent and water from the creek never reaches Utah Lake. Consequently, the project would not affect any 303(d) listed waters. The drainage is also not part of a *priority watershed* identified for special management in the UNF Forest Plan (UNF 2003).

Environmental Effects

Effect of Alternative 1 (No Action)

Not building the project would result in conditions similar to the existing conditions, except the frequency of pipeline failure would increase as corrosion increases and landslides, avalanches, and floods continue to damage aboveground sections of the pipeline. Similarly, the incidence of water release from the damaged pipeline would tend to increase, causing more frequent episodes of soil erosion and stream-channel scour.

A high level of pipeline maintenance by the State of Utah (State) would continue to increase, requiring that the trail be repaired and graded from time to time to allow entry by maintenance vehicles. Grading would loosen native materials comprising the trail surface and increase rates of sediment yield during subsequent precipitation. Replacement of buried pipeline sections and reconstruction of pipeline suspension systems would require additional disturbances of vegetation, soil cover, and mineral soil, thereby increasing sediment yield during subsequent precipitation. Stream channel bottoms at numerous pipeline crossings would continue to be disturbed by vehicle traffic or pipeline excavation, resulting in subsequent bedload movement as channels regained stable profiles during periods of flow.

Attainment of desired conditions for water resources and RHCAs specified in the UNF Forest Plan (UNF 2003) would continue to be impeded by recurring pipeline failure and maintenance actions. Forestwide goals for streams and RHCAs would continue to not be fully met, although reclamation of disturbed sites according to Subgoals 2-44 and 2-45, described in the UNF Forest Plan (UNF 2003), could be required for ongoing maintenance operations.

Effect of Alternative 2 (Proposed Action)

Those effects previously described in the Geology and Soils section related to increased soil erosion and potential stream sedimentation would also apply to the Hydrology section. In addition, effects that are unique to stream channels and RHCAs are described below.

Degradation of Water Quality during Construction of Stream Crossings. Excavation of the trench beneath the channel of Slate Canyon Creek at up to 10 locations could cause stream turbidity if construction is conducted when streamflow is present. However, the use of temporary diversions would reduce the potential for stream turbidity (see Mitigation Measures H-1 and H-2 below). Necessary permits would be acquired from the Army Corps of Engineers and the Utah Division of Water Rights.

Indirect effects of the proposed action would include the following:

Changes in Channel Stability. At less than 10 channel crossings, the natural, mobile channel bed would be replaced by relatively impervious fill protected from scour by an erosion-resistant material. This change would constitute creation of grade control structures in the channel. By damming the normal downstream movement of bedload at these locations, the channel would be expected to aggrade upstream (and a short distance downstream) until bedload was able to pass over the new grade-control. Bed aggradation can induce channel widening through bank erosion, which could contribute to stream sedimentation. This potential impact can be avoided by recessing the erosion-resistant material beneath the anticipated natural scour depth (see Mitigation Measures H-1 and H-2 below).

Reduction in Canyon Entry and Soil Disturbance for Maintenance. Because the rate of pipeline damage from natural events would be diminished, the frequency of repair operations would also decrease. This change would reduce the frequency at which the trail surface and canyon soils would be disturbed for pipeline repair, thus reducing the potential for soil erosion and stream sedimentation.

Mitigation

Project-specific mitigation measures described below, as well as BMPs discussed in the UNF Forest Plan (Aquatic and Riparian Habitat Management, pg 3-2 through 3-3 and Soil and Water Resource Management, pg 3-8 through 3-10, also specified in Appendix D of this EA), would be implemented during project construction to avoid or reduce potential impacts to RHCAs and water quality. Resulting minimal adverse impacts to these resources would be of short duration. Overall, the proposed action would help achieve desired conditions, meet Forestwide goals, and adhere to Forestwide standards and guidelines for RHCAs and water resources.

H-1: Divert Streamflow around Trenching Operations at Stream Crossings. Streamflow at the time of construction of pipeline stream crossings shall be diverted using a piping system, such that streamflow does not impinge upon disturbed soils or channel segments. Piping shall be placed so as not to cause scour at the outfall. Construction at stream crossings would occur later in the season when stream flows are low or absent.

H-2: Prevent Damming of Bedload Transport. At stream crossings, erosion-resistant material covering the trench backfill shall be recessed to a depth no higher than the stream's anticipated scour depth at maximum probable flow. A scour-depth estimate shall be made using established procedures, the maximum probable flow (518 cfs) (UNF 2002), and channel geometry and pattern.

Mitigation measures GS-1 through GS-3, described in the Geology and Soils section, would also reduce soil erosion and stream sedimentation, which would reduce hydrology and water quality impacts in the Slate Canyon drainage resulting from this project.

Recreation Resources

Affected Environment

The UNF receives a large amount of recreational use. Recreational activities occur in Slate Canyon. Slate Canyon is accessible via Trail 061 in Provo, Utah. Trail 061 in Slate Canyon is used for hiking, mountain biking, running, horseback riding, hunting, and dispersed camping.

Recreation Opportunity Spectrum Classes

The Recreation Opportunity Spectrum (ROS) provides a framework for defining the types of outdoor recreation opportunities the public might desire on public lands and identifies that portion of the spectrum that any given area might be able to provide. The ROS classes reference recreation goals and objectives described in the UNF Forest Plan (UNF 2003). The Forest Service has designated ROS classifications for all land located within the UNF as set forth in the UNF Forest Plan. The Slate Canyon drainage has been classified as Semi-Primitive Non-Motorized (SPNM), Roaded Natural (RN), and Semi-Primitive Motorized (SPM) (see Figure 3-5). The proposed pipeline would cross through an area designated as SPM. Table 3-5 describes the ROS classifications that apply to the drainage.

Table 3-5. ROS Classes Applicable to Slate Canyon

Recreation Opportunity Spectrum Class	Setting Description
Semi-Primitive Non-Motorized	Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size (2,500 acres). Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on site controls and restrictions may be present but subtle. Motorized use is not permitted.
Semi-Primitive Motorized	A predominately natural or natural-appearing environment of moderate-to-large size characterizes this area. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present but subtle. Motorized use is permitted. Moderate opportunity for solitude, tranquility, and closeness to nature. High degree of self-reliance, challenge, and risk in using motorized equipment. Vegetation alterations very small in size and few in number, widely dispersed, and not obvious. Limited facilities for signing sanitary and safety needs in native or rustic materials. Minimal site modification for facilities. Interpretation through very limited on-site facilities. Use of maps, brochures, and guidebooks
Roaded Natural	Opportunity to be with other users in developed sites; little challenge or risk; predominantly natural-appearing environment as viewed from sensitive roads and trails with moderate evidence of human sights and sounds; moderate concentration of users at campsites; some obvious user control; access and travel is standard motorized vehicles; resource modification and utilization practices are evident but harmonize with the natural environment.

Source: UNF 2003 (EIS)

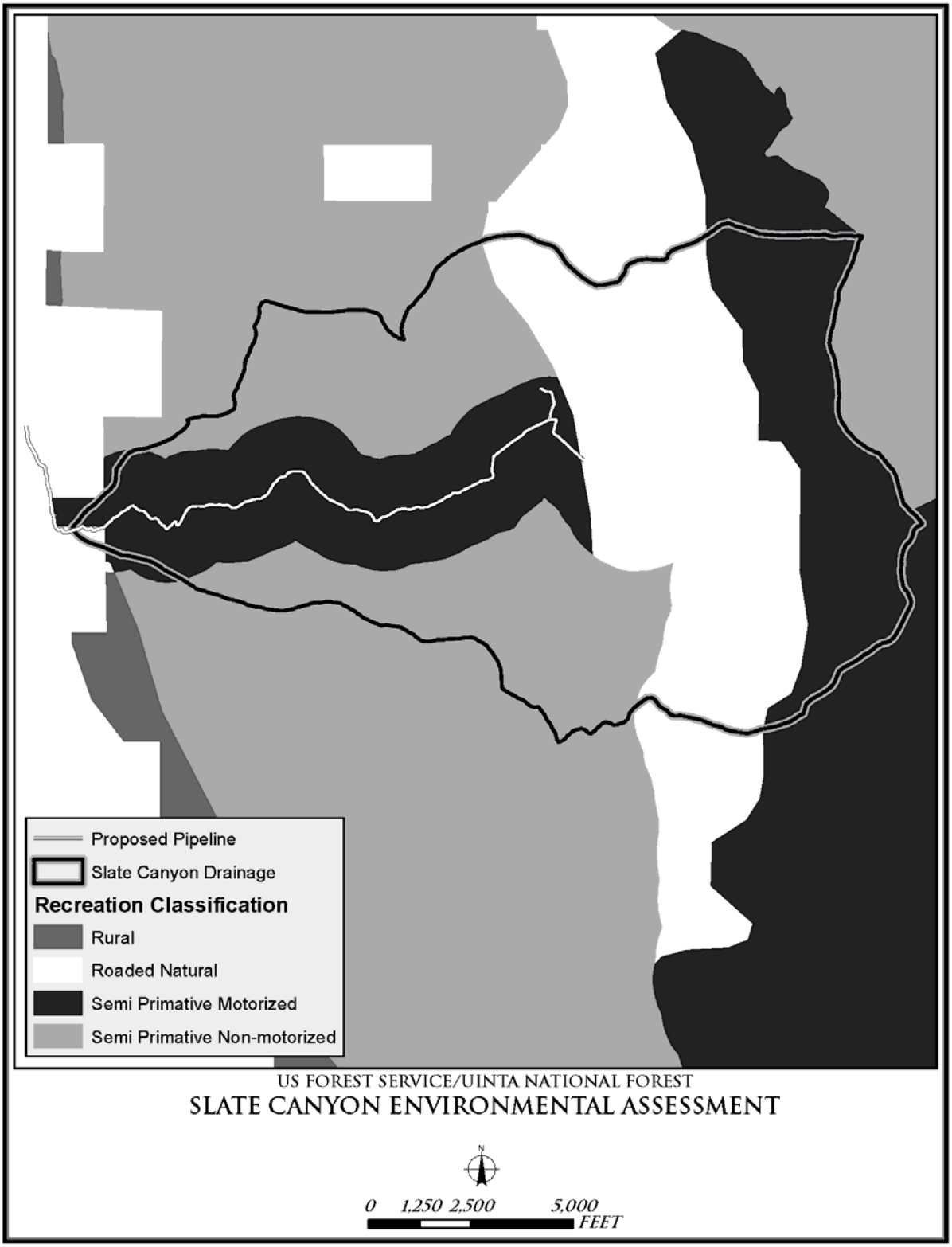

Figure 3-5. ROS Classes for Slate Canyon

Management Prescriptions

Slate Canyon exists within the Lower Provo Management Area of the UNF. The management prescription for Slate Canyon is Watershed Emphasis with a Wildland Urban Interface overlay (see Figure 3-6). See Table 3-6 for the Forest Service description of the management prescriptions.

Slate Canyon Recreational Uses

According to the UNF Forest Plan (UNF 2003), hunting, fishing, and wildlife viewing are common activities in the Lower Provo Management Area. At the time of the field visit, there was evidence of the following recreational activities in Slate Canyon: hiking, mountain biking, running, horseback riding, and dispersed camping. There are several dispersed camping sites in Slate Canyon along Slate Canyon Trail (Trail 061), particularly near Boardman Springs and near the mouth of the canyon. These unimproved sites are generally located 15 to 25 feet from the trail and contain temporary fire rings. According to the UNF Forest Plan (UNF 2003), motorized recreation, illegal campfires, group size violations, and trail cutting are enforcement problems in the Lower Provo Management Area.

Table 3-6. Slate Canyon Management Prescriptions

Management Prescription	Description
Watershed Emphasis	These areas are managed to achieve high-quality soil productivity and watershed conditions. Where improvement is needed, it is achieved by implementing watershed improvement projects and applying soil and water conservation practices to land-disturbing activities. Motorized trail opportunities are limited to those existing in 2003. No increase in miles of motorized trails is allowed. Livestock grazing and timber harvest are not allowed.
Wildland Urban Interface	The use of this prescription is intended to identify those National Forest System lands that are close to or intermingled with lands owned or managed by others. The prescription is applied in areas where management on National Forest System lands influences or is influenced by the proximity of other lands. In addition, all the watersheds in the forest where wildland fire use is restricted are included in these areas. Management emphasizes cooperating with adjacent landowners in managing for diverse interests. Application of this prescription identifies areas where hazardous fuels treatments and coordination with adjacent communities to reduce fire risk will be emphasized. Wherever this prescription is used, there is an underlying prescription that identifies the primary emphasis of the area. If there is any conflict between generally allowed activities, the most restrictive prescription will apply. If prescribed fire is allowed in the underlying prescription, it may be used in these areas. If wildland fire use is allowed in the underlying prescription, it may be used in these areas outside of watersheds where wildland fire use is restricted (as shown in Appendix E on page E-9). However, if one of these watersheds overlaps with prescription 1.5, Recommended wilderness, wildland fire use is authorized. Motorized recreation is allowed only on designated roads and motorized trails.

Source: UNF 2003

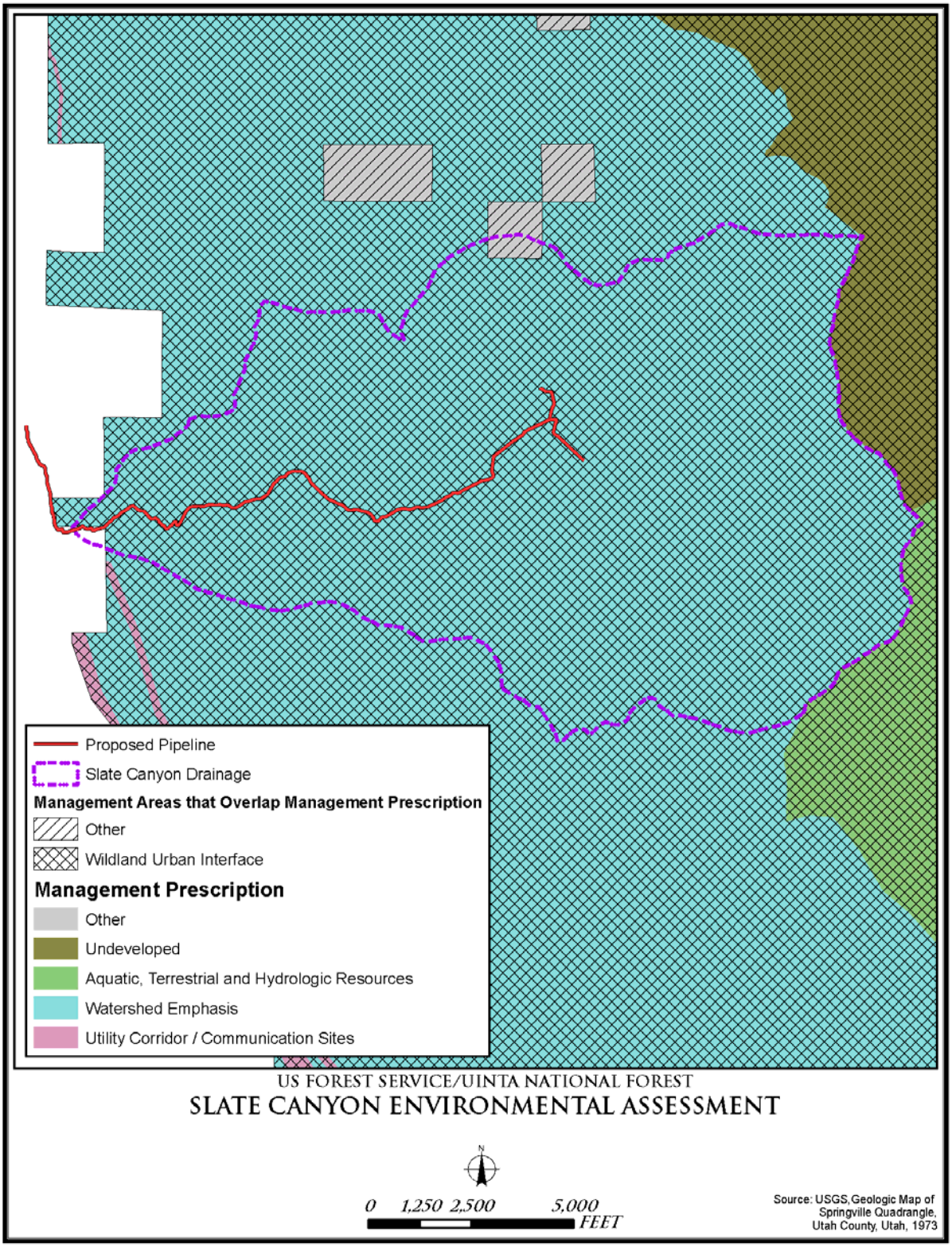

Figure 3-6. Management Prescriptions for Slate Canyon in the Lower Provo Management Area

Slate Canyon Trail begins at the mouth of Slate Canyon and continues in an easterly direction up the canyon for about 3.7 miles. Slate Canyon Trail crosses Slate Canyon Creek at multiple locations. Slate Canyon Trail is composed of gravel and varies in width. The bottom third of the trail is about 6 to 8 feet wide and composed of compacted soil and gravel. The middle third of the trail is between 4 and 6 feet wide and consists of boulder fields and debris from rockslides and flooding from snowmelt. The final third of the trail is about 3 to 5 feet wide and composed of soil and vegetation.

Two Forest Service trails intersect the eastern terminus of Slate Canyon Trail. Slide Canyon Trail (Trail 062) connects to Slate Canyon Trail north of the project site and heads west down Slide Canyon and east to Squaw Peak Road (road number 027). Boardman Springs Trail (Trail 254) is a short north/south connector trail that connects Slate Canyon Trail to Knight Springs Trail (Trail 253) and Squaw Peak Road. The western terminus of Slate Canyon Trail connects with the Bonneville Shoreline Trail (Trail 219) (See Figure 3-7 for a map of trails connecting to Slate Canyon Trail). Squaw Peak Road is located slightly east of Knight Springs Trail and runs in a north/south direction from Hobble Creek Canyon to Provo Canyon. Table 3-7 includes a description of each of the trails and the road.

Table 3-7. Trail Descriptions

Trail Name	Trail Number	Trail Class	Length	Authorized Uses
Slate Canyon	061	Developed/Improved	3.7 miles	Biking, hiking, and pack and saddle
Boardman Springs	254	Simple/Minor Development	0.88 mile	Biking, hiking, and pack and saddle
Knight Springs	253	Simple/Minor Development	2.23 miles	Biking, hiking, motorcycles, and pack and saddle
Slide Canyon	062	Developed/Improved	3 miles	Biking, hiking, and pack and saddle
Squaw Peak Road	027	High Clearance Vehicles	NA	ATV, motorcycles, and standard highway vehicles
Bonneville Shoreline Trail	219	Developed/Improved	20 miles	Biking, pedestrian

Source: UNF Travel Access Map (2005), available at http://svinetfc2.fs.fed.us

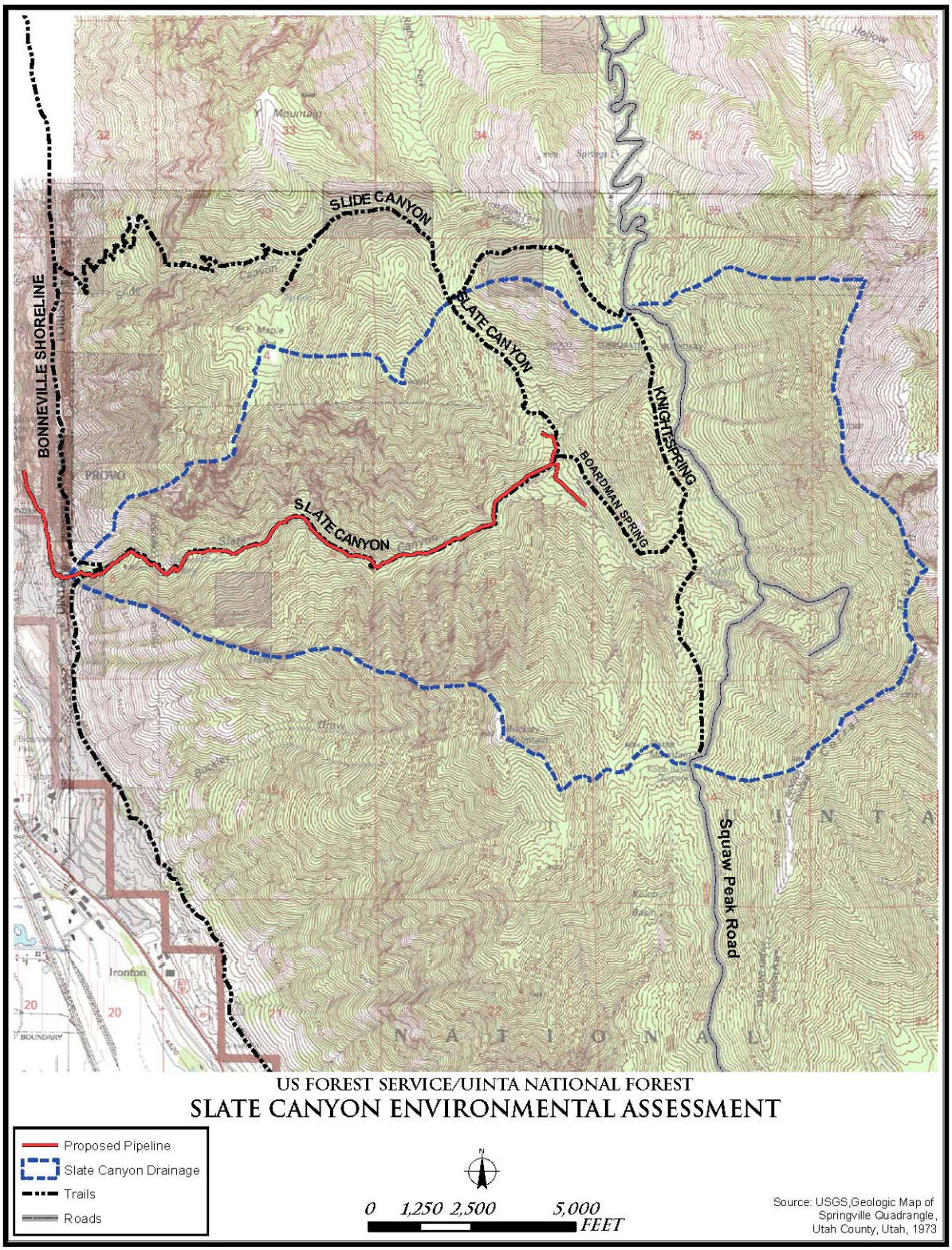

Figure 3-7. Trails and Roads in the Slate Canyon Vicinity

Environmental Effects

Effect of Alternative 1 (No-Action)

Not building the project would result in conditions similar to the existing conditions, except the frequency of pipeline failure would increase as corrosion increases and landslides, avalanches, and floods continue to damage aboveground sections of the pipeline. Similarly, the incidence of release of water from the damaged pipeline would tend to increase, causing more frequent episodes of soil erosion, which would adversely affect those portions of the trail located over the pipeline and would require more frequent grading to maintain the trail and short-term trail closures during maintenance. Intermittent trail closures due to pipeline maintenance would increase until the pipeline became non-serviceable. The Hospital would discontinue trail maintenance after the pipeline became non-serviceable.

Effect of Alternative 2 (Proposed Action)

During construction of the project, Slate Canyon Trail and portions of Boardman Springs Trail would be closed to all users for safety purposes. Trail access would be blocked by a gate or barrier at the western terminus of Slate Canyon Trail. The eastern terminus of the trail would be posted with closure signs. Other trails in the Slate Canyon vicinity would be accessible via Slide Canyon Trail. Slide Canyon Trail runs parallel to Slate Canyon Trail and accommodates similar forms of travel. Slide Canyon Trail is also accessible from the mouth of Slate Canyon via the Bonneville Shoreline Trail to a trailhead in Slide Canyon (see Figure 3-6). Consequently, Slide Canyon Trail would provide an adequate detour route for hikers and bikers during pipeline construction. The Slide Canyon Trail also connects to Knight Springs Trail and Squaw Peak Road, which would ensure trail connectivity. Once construction is complete, Slate Canyon Trail would reopen, and opportunities for recreation in Slate Canyon would resume. The gate at the eastern terminus of Slate Canyon trail would remain in place to prevent unauthorized vehicle access.

Although Slate Canyon Trail would be disturbed during the pipeline replacement project, all recreational impacts would be temporary resulting from construction activities. Slate Canyon Trail would likely be closed from April 1–October 1, 2006, during construction, although it is possible that construction would not be completed in 2006 because of weather, and the canyon would remain closed to the public until construction is complete, which could be as late as August 2007.

As part of the proposed project, slope and trail stabilization would take place within the trail corridor to help restore areas that were damaged due to the high runoff/flood events that occurred in spring 2005. There would be no long-term adverse impacts to the recreation resources in Slate Canyon as a result of the pipeline replacement project.

Mitigation

No mitigation is necessary.

Roadless Areas

Affected Environment

There are currently 35 inventoried roadless areas in the UNF, totaling approximately 554,850 acres or about 62 percent. These roadless areas provide sources of public drinking water, opportunities for dispersed recreation, and undisturbed landscapes that provide privacy and seclusion. In addition, these areas often provide important habitat for rare plant and animal species. Moreover, they support a diversity of native species and provide opportunities for monitoring and research.

Slate Canyon occurs within the Rock Canyon/Buckley Mountain Inventoried Roadless Area, which contains 16,480 acres. However, Trail 061, including a buffer of 33 feet on each side of the trail was not included in the roadless area inventory. The State has a deeded easement and special use permit that allows them to use motorized equipment on Trail 061 periodically to maintain the existing pipeline and to take water quality samples at Boardman Springs. Based on a Forest Supervisor Special Order, Trail 061 is closed to other motorized access.

Table 3-8 shows the wilderness capability assessment completed for the UNF Forest Plan Environmental Impact Statement (EIS) (UNF EIS 2003) for this roadless area.

Environmental Effects

Effect of Alternative 1 (No Action)

Under the no-action alternative, the new pipeline would not be constructed, exposed portions of the existing pipeline would not be removed, and short-term maintenance activities (e.g., trail reconstruction and pipeline repair) would occur until the pipeline became non-serviceable. The existing pipeline is not visually attractive and distracts from the natural feel of Slate Canyon. The pipeline does not positively contribute to the landscape character and integrity of Slate Canyon.

The need for continual maintenance of the pipeline and trail is increasing every year as the pipeline deteriorates and would continue under the no-action alternative. Maintenance activities would result in intermittent construction-period impacts, such as increased erosion and sedimentation, increased PM_{10} emissions from dust and vehicle emissions, vegetation disruption, and trail closures. Construction activities would have temporary and intermittent effects on certain roadless area characteristics (e.g., soil, water, and air resources; primitive and semi-primitive classes of recreation; and landscape character and integrity). However, these impacts would be minor and would cease once the pipeline became non-serviceable.

Effect of Alternative 2 (Proposed Action)

Table 3-9 shows the project's effects on wilderness capabilities in the Rock Canyon/Buckley Mountain Roadless Area. The columns to the left list the wilderness capabilities and ratings and the right hand column provides analysis as to how the project would affect those capabilities.

The proposed project would have no adverse long-term effects on wilderness capability ratings in the Rock Canyon/Buckley Mountain Roadless Area.

Table 3-10 shows the estimated effects of the proposed project on the nine roadless area characteristics. The proposed project would have no adverse long-term effects on any of the nine roadless area characteristics.

Mitigation

RA-1: Provide Physical Barrier to Unauthorized Use. After construction, a physical barrier (e.g., barrier rock) would be installed on both sides of the Forest Service gate at the mouth of Slate Canyon to prevent unauthorized vehicle use of Slate Canyon Trail.

Table 3-8. Rock Canyon/Buckley Mountain Wilderness Capability Assessment

Environment	
Opportunity for solitude	Low
Natural and free from disturbance	Low
Scientific, educational, or historical values	High
Challenge	
Opportunity for challenge and adventure	Moderate
Degree of primitive and unconfined recreation opportunities	
Summer	
Camping	Low
Hunting	Moderate
Fishing	Low
Backpacking	High
Hiking	High
Winter	
Skiing	NA
Mountain climbing	Low
Hiking	Low
Special Features	
Special ecological, geological, or scenic features	Moderate
Abundance and variety of wildlife	Moderate
Manageability – the extent that boundaries:	
Are recognizable	Low
Conform to terrain	Low
Are manageable	Low
Constitute a barrier to prohibited use	Low

Note: All ratings of high, moderate, low, or NA are based on the professional judgments of local district staff employees and specialists and display the perceived capability of the area to exhibit the above outlined wilderness characteristics.

Source: UNF 2003 (EIS)

Table 3-9. Project Effects on Rock Canyon/Buckley Mountain Wilderness Capabilities

Wilderness Capabilities	Rating	Project Effects
Environment		
Opportunity for solitude	Low	Temporary effect: short-term construction would increase human presence in Slate Canyon. Long-term effect would be beneficial because maintenance in the canyon would be reduced.
Natural and free from disturbance	Low	Beneficial effect: removal of exposed pipeline would reduce human-made disturbances and improve the natural setting.
Scientific, educational, or historical values	High	No effect
Challenge		
Opportunity for challenge and adventure	Moderate	No effect
Degree of primitive and unconfined recreation opportunities		
Summer		
Camping	Low	Temporary effect: closure of the Slate Canyon Trail during construction would preclude access to the camping areas within Slate Canyon.
Hunting	Moderate	Temporary effect: hunters would not be able to access Slate Canyon Trail during construction; Slide Canyon Trail could be used as an alternate.
Fishing	Low	No effect: there are no fish in the project area.
Backpacking	High	Temporary effect: hikers would not be able to access Slate Canyon Trail during construction; Slide Canyon Trail could be used as an alternate.
Hiking	High	Temporary effect: backpackers would not be able to access Slate Canyon Trail during construction; Slide Canyon Trail could be used as an alternate.
Winter		
Skiing	NA	No effect
Mountain climbing	Low	No effect
Hiking	Low	Temporary effect: hikers would not be able to access Slate Canyon Trail during construction; Slide Canyon Trail could be used as an alternate.
Special Features		
Special ecological, geological, or scenic features	Moderate	No effect
Abundance and variety of wildlife	Moderate	No effect
Manageability – the extent that boundaries:		
Are recognizable	Low	No effect
Conform to terrain	Low	No effect
Are manageable	Low	No effect
Constitute a barrier to prohibited use	Low	No effect: during construction access to Slate Canyon Trail would be physically blocked and/or posted with warning signs. After construction, gates to restrict motorized access to the trail at the mouth of the canyon would remain in place.

Sources: UNF 2003 (EIS) and Jones and Stokes 2005

Table 3-10. Project Effects on Roadless Area Characteristics

Roadless Area Characteristic	Estimated Effect
Soil, water, and air resources	Erosion may temporarily increase during construction and long-term maintenance of the trail surface; therefore, sediment delivery to adjacent streams would be expected to increase slightly. Construction in stream crossings would also slightly increase erosion and sedimentation. Burying the pipe would generally reduce damage to the pipeline caused by geohazards. With mitigation, geology and soils impacts would be minimal. Short-term construction activities and long-term intermittent maintenance activities would generate a minor amount of vehicle emissions and fugitive dust, which would be less than the threshold for PM_{10}.
Sources of public drinking water	The proposed project would not affect Boardman Springs or any other sources of public drinking water. The proposed project would improve the reliability and safety of the water conveyance system from Boardman Springs to the Hospital.
Diversity of plant and animal communities	The proposed project would result in short-term construction-period vegetation disruptions, which could affect species that potentially forage in Slate Canyon. However, these impacts would be small scale for a short period of time and revegetation after project construction would ensure that the plant and animal diversity within Slate Canyon would not be affected.
Habitat for special-status species and species dependent on large undisturbed areas of land	Slate Canyon provides foraging and watering habitat for several special-status species. However, the project would not affect any species dependent on large undisturbed areas of land or permanently destroy habitat.
Primitive and semi-primitive classes of recreation	The proposed project area is designated as Semi-Primitive Motorized. However, Trail 061 is closed to motorized use in accordance with a Forest Supervisor special order. The State is exempt from this order due to its special use permit, which authorizes vehicles to be used for maintenance activities. The proposed project would be consistent with the Semi-Primitive Motorized classification and would not adversely alter the natural-appearing environment. Construction would require removal of some areas of native vegetation; these areas would be restored in accordance with the restoration plan in Appendix D, and there would be no long-term effect. The removal of existing exposed pipe would have a beneficial effect.
Reference landscapes for research study or interpretation	The proposed project would not affect any reference landscapes for research study or interpretation.
Landscape character and integrity	Construction would require removal of some areas of native vegetation; these areas would be restored in accordance with the restoration plan in Appendix D and there would be no long-term effect.
Traditional cultural properties and sacred sites	The proposed project would not affect any cultural properties and sacred sites.
Other locally unique characteristics	The proposed project would not affect any locally unique characteristics.

Visual Resources

Affected Environment

UNF lands provide natural areas of vegetation and wildlife habitat, an ecosystem that abuts the Wasatch Front urban area and allows the urban user to experience the forest's natural resources. This includes the use of trails and the enjoyment of the viewshed from within and adjacent to the forest boundary. People value the landscape, specifically highly scenic landscapes that provide picturesque views, contribute to a "sense of place," and provide cultural enclaves. Maintaining the scenic integrity of Slate Canyon is important not only to the Forest Service, but also to the public users of the trail. As explained in the *Landscape Aesthetics: A Handbook for Scenery Management* (USDA Handbook #701 1996), "Landscape character is an overall visual and cultural impression of landscape attributes—the physical appearance and cultural context of a landscape that gives it an identity and 'sense of place.'"

Visual Quality Objectives

Forest Service visual goals and objectives are defined in the UNF Forest Plan based on the visual resource quality (VRQ) analysis was completed as part of the UNF Forest Plan EIS (UNF EIS 2003). The plan references Forest Service Visual Quality Objectives (VQOs) as set forth in the UNF Forest Plan EIS (UNF EIS 2003), which serve as the basis for the procedural portion of the VRQ.

The Forest Service has conducted a visual inventory of all lands in the UNF and has classified these lands according to the VQOs set forth in the UNF Forest Plan. Slate Canyon "has been assigned the objective classification of Retention to ensure management activities remain visually unnoticeable" (UNF 2003). Table 3-11 explains the Retention classification as it applies to the area.

Table 3-11. Retention Classification

Visual Quality Objective Level	Objective	Mitigation Schedule
Retention	Management activities are not visually evident when managed according to the retention visual quality objective. Activities may only repeat form, line, color, and texture that are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc., should not be evident.	All visual alterations must be reduced during construction or immediately upon construction completion.

Visual Characteristics of Slate Canyon

Slate Canyon is a narrow, somewhat densely vegetated canyon consisting of a riparian corridor and steep side slopes. The side slopes include rock outcrops, loose gravel/erodible areas, and vegetated upland slopes. A trail accessing the canyon crosses the creek at multiple locations. The following photographs depict the typical visual characteristic of the canyon (Figures 3-8 and 3-9).

Figure 3-8. A Westward View from Slate Canyon Trail

Figure 3-9. A View of Rock Outcrops along the Slate Canyon Trail

An existing 5-inch pipeline is exposed along sections of the canyon. Due to the large amount of erosion, particularly during rainfall and runoff events in the spring of 2005, sections of the pipeline that were once buried within and adjacent to the trail are now exposed, as shown in Figure 3-9. Angular rock of varying sizes throughout sections of the trail currently supports the pipeline. Portions of the pipe are also exposed along the canyon's hillside several hundred yards from the trail, as shown in Figure 3-10. Although the pipe is exposed through this area, it is a substantial distance from the trail and it somewhat blends into the hillside.

Figure 3-10. Hillside with Exposed Pipe

Environmental Effects

Effect of Alternative 1 (No-Action)

Other than the temporary visual impacts associated with the continual maintenance of the trail and the repair of the broken pipeline in the future, no other actions would affect the viewshed of the canyon. The existing visual impact from pipe exposure and erosion as a result of pipe leaks would continue to affect the visual quality of Slate Canyon.

Effect of Alternative 2 (Proposed Action)

During construction of the proposed project, the trail would be closed to all users for safety purposes. Once construction is complete, the new pipeline would not be visible from the trail, and any disturbances to the area would be treated with appropriate grading and revegetation methods to restore the site to stable conditions with indigenous vegetation (see Mitigation Measures V1 through V3). As part of construction, slope stabilization would take place within the trail corridor to help restore areas that were damaged from the high runoff/flood events that occurred in spring 2005.

Disturbance to vegetated land adjacent to the trail from construction activities would also occur in some areas as a result of the proposed action. These areas would be restored with native vegetation to blend into the existing landscape and minimize permanent alterations to the area.

Under the proposed action, those sections of the old pipeline that are exposed and can be removed without extensive resource damage would be removed, and the rest of the pipeline would be abandoned in place. Some sections of exposed pipe may be slightly visible from the trail but are located a considerable distance and are not within the direct viewshed of the trail. Removing distant sections of the pipe would adversely affect the vegetation and cause erosion where vegetation was removed to access the pipeline, which would have a more adverse visual impact than abandoning the pipeline in place.

The burial of the pipe in the trail would be visually beneficial to the project site. The pipeline is currently a visual distraction to recreational users of the trail. Those exposed sections of pipe that would be abandoned in place are located outside of the trail viewshed and would not be noticeable by recreational users. Additionally, revegetation and rebuilding the currently damaged trail would provide a visual benefit and would increase safety for recreational trail users. Figures 3-11 and 3-12 are examples of the exposed pipe and damaged trail and the proposed treatment to protect and conceal it from the trail users.

Figure 3-11. A Visual Simulation of the Existing Condition where the Pipeline Crosses Trail 061 (Left) and with the Proposed Pipeline Reconstruction and Improvements (Right)

Figure 3-12. A Visual Simulation of the Existing Condition where Trail 061 Has Been Eroded by Seasonal Floodwaters (Left) and the Proposed Pipeline Reconstruction (Right)

Mitigation

The following design mitigation measures are provided to reduce the scenic impacts of the existing pipeline and to minimize scenic impacts of future pipeline construction.

V1: Topography and Earthwork. In addition to the movement of soil, earthwork also includes the movement of rocks, the use of soil retention, the disturbance of tree roots, and the dumping or stockpiling of earth and rock material. Earthwork activities resulting in excessive cut and fill often leave long-lasting negative visual impacts. When the soil's dark surface layer is disturbed, the lighter subsurface soil is exposed. The resulting visual contrast creates an eyesore within the viewshed. Excessive disturbance of existing topography also eliminates existing vegetation and creates runoff and erosion problems. Techniques to minimize problems related to topographic disturbance include the following.

1. Minimizing Cut and Fill Slopes by

   locating the trail, and buried pipe in areas of minimal slope;
   minimizing the trail width and grade; and
   aligning the trail and buried pipe with existing topography.

2. Minimizing Earthwork Contrasts by

   blending slopes to match and mimic existing topography;
   utilizing existing natural screens (i.e., vegetation, topography, etc.);
   retaining existing features such as vegetation, rocks, and drainage channels;
   applying native seed mixes to areas of cuts and fills; and
   prohibiting long-term dumping/stockpiling of earth and rock on downhill slopes.

3. Maintaining Topographic Integrity by
   locating the project away from areas adjacent to prominent landforms; and
   ensuring that the shape and placement of project blend with existing topography.

V2: Vegetation. Vegetation can be utilized as a visual screen for the burial of the pipe. The retention of existing vegetation is an effective method of reducing a project's visual impact. Retaining existing vegetation reduces erosion and runoff problems, lessens site recovery duration, and often reduces rehabilitation costs. Upon completion of project construction, disturbed areas shall be revegetated in order to blend the project in with the adjacent landscape. In the event of vegetative clearing, practices shall minimize visual contrast and create natural-looking clearings and edges. Techniques include the following.

1. Retaining Existing Vegetation by

   minimizing surface disturbance; and
   protecting roots from damage during construction.

2. Minimizing Project Impacts on Existing Vegetation by

   minimizing clearing size;
   preserving islands of vegetation within the construction limits rather than clearing the entire area;
   using irregular clearing shapes to blend with the existing landscape when clearing vegetation and avoiding straight lines;
   feathering/thinning the edges of cleared areas to create natural-looking edges;
   maintaining a mix of tree/shrub species in various sizes along edges; and
   disposing of all excess vegetative material.

V3: Restoration. A restoration plan is an important part of any project. Upon completion of project construction, all disturbed areas shall be restored as closely as possible to their previous conditions. Restoration efforts shall minimize a project's long-term visual impacts by decreasing the amount of disturbed area while adequately providing for project operations. Restoration techniques include:

1. Blending disturbed areas into the undisturbed surrounding landscape by

   recontouring the site as closely as possible to its previous form;
   replacing native rock and debris in order to lessen unnatural-looking grass cover;
   planting native plant materials in natural-looking patterns; and
   breaking up unnatural lines in the disturbed site (i.e., clearing edges, cut and fill extents, etc.) with rocks, debris, and native plant materials.

2. Revegetating Disturbed Areas by

   roughening the surface in order to trap water and speed vegetative growth after recontouring the site;
   stockpiling and reusing topsoil;
   furrowing steep slopes;
   applying a Forest Service approved seed mix to disturbed areas;
   selecting native plant species; and
   planting and/or seeding at optimal times: in spring, seed from March 1 through May 31, in fall, seed from October 1 through November 30.

Cumulative Effects

This section analyzes cumulative impacts based on a list of past, present, and reasonably foreseeable projects that are or would be located in Slate Canyon and that could impact the same resources that would be affected by the proposed action.

Approach and Methodology

The Council on Environmental Quality (CEQ) provides the following definition of a cumulative effect (40 CFR 1508.7):

> The 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 (Federal or non-federal) or person undertakes such other actions.

CEQ guidance recommends that a cumulative impact analysis focus on effects that can be evaluated meaningfully. The study area for each cumulative impact evaluation varies by resource area and is discussed below.

Past, Present, and Reasonably Foreseeable Future Actions

This section provides an updated list of past, present, and reasonably foreseeable projects and management activities considered in the cumulative impacts analysis.

Hathenbrook Spring Pipeline Replacement

Provo City Metropolitan Water District (Provo City) has requested a special-use permit from the Forest Service to develop and transmit water from Hathenbrook Spring near the mouth of Slate Canyon drainage. Provo City owns the water rights at Hathenbrook Spring and would like to access that water for culinary use. Development would include installing a new spring box and installing about 20 feet of junction transmission line to join a main line installed in the same pipe trench as that proposed by the Hospital. About 0.3 mile of main water transmission line would be installed along the Slate Canyon Trail on Forest Service administered lands.

Recreational Use

The UNF receives a large amount of recreational use. Recreational activities that occur in Slate Canyon include backpacking, hiking, mountain biking, running, horseback riding, hunting, and dispersed camping. Slate Canyon is accessible via Trail 061 in Provo, Utah. Trail 061 is a component of the UNF trail system and connects to four other trails. Recreational use of the UNF results in an increased human presence and utilization of the forest resources.

Evaluation of Cumulative Impacts

Potential cumulative impacts in Slate Canyon, described in the following sections, would be primarily associated with the combined human use and pipeline construction and maintenance in Slate Canyon. These uses are not particularly resource intensive and have been occurring for a long time.

Air Quality

The study area for the cumulative air quality analysis is Utah County due to the regional nature of emissions. Utah County is currently designated as a non-attainment area for PM_{10}. The predominant air quality factors influencing air quality in Utah County have historically been and will likely continue to be the stationary and mobile source emissions associated with continued development, all of which would occur with or without implementation of the proposed project. As described above, the proposed project would result in a minor short-term increase in PM_{10} emissions during construction and on a long-term basis would generate a small amount of PM_{10} emissions associated with continued maintenance of the trail and pipeline. The proposed project is in conformity with State air quality goals and would not have a considerable contribution to PM_{10} exceedances in Utah County.

Biological Resources

The study area for the cumulative biological resources analysis includes the project area and the Slate Canyon drainage. A table listing special status species that could potentially occur in the study area and in the cumulative effects area is included in Appendix C. Of the species listed in the table, seven species are known to occur or have habitat in the Slate Canyon project area. These species include the spotted bat, western (Townsend's) big-eared bat, Northern Goshawk, Peregrine Falcon, Flammulated Owl, Northern Three-toed Woodpecker, and Wasatch jamesia. Two species including slender moonwart and Garrett bladderpod have habitat in the cumulative effects area. The proposed project has the potential to affect a small percentage of the riparian and woodland foraging habitat for the bats and birds in Slate Canyon but would not affect nesting habitat. The other disturbances in the canyon resulting from cumulative activities (recreation and pipeline construction and maintenance) would be dispersed and would have minor effects on riparian and woodland habitat. Consequently, the cumulative effects on special status biological resources in Slate Canyon would be minor.

Cultural Resources

The study area for the cumulative cultural resources analysis includes the Slate Canyon drainage. Slate Canyon has relatively low cultural resource sensitivity due to the rugged terrain and flooding that has occurred in the canyon. Consequently, the proposed project and cumulative activities occurring in the drainage have a low potential to encounter cultural resources. The survey conducted for the proposed project did not identify any significant cultural resources along the existing trail. If undocumented cultural resources are present in the canyon, recreational users could encounter the resources and disturb or destroy them. However, most recreational use is concentrated on the trail, which was surveyed for cultural resources and none were found. The removal of the existing inoperative Hathenbrook Spring pipeline could affect cultural resources; however, a cultural resources survey completed in the area did not reveal any potential impacts to cultural resources.

Geology and Soils

The study area for the cumulative geology and soils analysis includes the Slate Canyon drainage. Erosion is the primary geology and soils concern in the Slate Canyon drainage. Flooding in the canyon has redirected the stream flow and washed out substantial portions of the Slate Canyon Trail, leaving behind cobbles and boulders. The proposed project would repair the trail, restore

the stream channel, and prevent future trail erosion by outsloping the trail and installing rolling dips to drain the trail surface away from the trail rather than down it. Project impacts would be limited to a very small part of the drainage—about 0.1 percent.

Other cumulative activities in the canyon would not substantially disturb the vegetative cover or increase erosion. The Hathenbrook Spring pipeline replacement may disturb about 0.3 mile of the trail, but this disruption would be short-term and the Forest Service would require mitigation to reduce erosion.

Recreational use of the trail, which does not include motor vehicles, would not be expected to degrade its condition. Other possible activities, such as hiking, mountain biking and dispersed camping, in the watershed would be episodic and relatively infrequent, although they may cause soil disturbance. Wildfire and, to a lesser degree, fire suppression have the potential to cause widespread disturbance of soils. Fuel treatments would be planned and implemented so as to minimize soil disturbance and mitigate adverse effects of runoff.

The limited scale and temporary nature of the proposed action, the reduced frequency of pipeline maintenance, and the relatively limited activities that have been and may be conducted in the watershed are insufficient to result in a substantial cumulative degradation of watershed soils and hydrologic function.

Hydrology

The study area for the cumulative geology and soils analysis includes the Slate Canyon drainage. Erosion is the primary hydrology and water quality concern in the Slate Canyon drainage. Project impacts would be limited to a very small part of the watershed.

Other cumulative activities in the canyon would not substantially affect streams or RHCAs in the drainage. The Hathenbrook Spring pipeline replacement may disturb about 0.3 mile of the trail, but this disruption would be short-term and the Forest Service would require mitigation to reduce erosion

Recreational use of the trail, which does not include motor vehicles, would not be expected to degrade its condition. Other possible activities in the drainage would be episodic and relatively infrequent, although they may impact streams and RHCAs. Wildfire and, to a lesser degree, fire suppression have the potential to cause widespread damage to streams and RHCAs. Fuel treatments would be planned and implemented so as to minimize stream and RHCA disturbance and mitigate adverse effects of runoff.

The limited scale and temporary nature of proposed action, the reduced frequency of pipeline maintenance, and the relatively limited activities that have been and may be conducted in the watershed are insufficient to result in a substantial cumulative degradation of watershed hydrologic function.

Recreation

Since recreational activities in Slate Canyon primarily center on trail use, the cumulative recreation analysis area includes Slate Canyon Trail, Bonneville Shoreline Trail (the portion that is near Slate Canyon Trail), Slide Canyon Trail, Knight Springs Trail, and Boardman Springs Trail. These trails are all connected and are part of the larger UNF trail system. The proposed project would have a short-term effect on the trail system from the closure of Slate Canyon Trail

during construction. However, the trail repair and continued trail maintenance by the State as a result of the project would have a beneficial impact on recreational resources in the study area. Construction of the Hathenbrook Spring pipeline would result in the short-term closure of Slate Canyon Trail. However, the closure would be temporary and would not affect the other trails in the trail system. The other cumulative activities would not adversely affect recreation opportunities in the study area.

Roadless Areas

The cumulative analysis area for Roadless Areas analysis includes the Rock Canyon/Buckley Mountain Inventoried Roadless Area. The proposed project and other cumulative activities would have no adverse long-term effects on wilderness capability ratings in the Rock Canyon/Buckley Mountain Roadless Area.

Visual Resources

The cumulative analysis area for the visual resources analysis includes the Slate Canyon drainage. The proposed project would result in the removal of most of the exposed portions of the existing pipeline, which would be visually beneficial. The other cumulative activities would have no adverse long-term effects on visual resources in Slate Canyon.

CHAPTER 4
CONSULTATION AND COORDINATION

ID Team Members

The following Forest Service personnel were members of the Interdisciplinary Team.

ID Team Leader	Marcy DeMillion
Wildlife	Karen Hartman
Visuals	Bernadette Barthelenghi
Recreation	Larry Velarde
Fisheries	Ron Smith
Botany	Denise Van Keuren
Cultural Resources	Charmaine Thompson
Soils	Bob Davidson
Hydrology	Jeremy Jarnecke

Consultation

The Forest Service and/or the environmental contractor consulted the following individuals; federal, state, and local agencies; tribes and non-Forest Service personnel during the development of this EA.

Agencies

Utah Division of Wildlife Resources

US Fish and Wildlife Service

Utah State Historic Preservation Office (SHPO)

Tribes

Ute

Goshute

Scoping Letter Recipients

The following organizations and individuals received the scoping letter that was sent out on January 24, 2005.

Senator Robert F. Bennett	Senator Orin Hatch	Representative Chris Cannon
Congressman Jim Matheson	Traci Conti, Region 3 Director Utah Department of Transportation	Gwen Davis Northwestern Band of Shoshone Nation
Park Manager Utah Lake State Park	Kit Mullen, Superintendent Timpanogos Cave National Monument	Bruce Strom, Park Manager Wasatch Mountain State Park

Janine Blaeloch Western Land Exchange Project	Mutual Dell Organization Camp C/O Frank McQuade	North Utah County Water Conservancy C/O John Jacobs
Larry Ellertson, Commissioner Utah County Commission	Clyde Naylor, Director Utah County Public Works	Pres. Home Owners Association Attn: Patrick J. Fleming
Paul Hawker Utah County Parks & Recreation	Leon Bear Skull Valley Band of Goshute Indians	Amos Murphy Confederate Tribes of the Goshute Res.
Wasatch County Council ATTN: Val Draper	Ron Olsen, Property Agent PacifiCorp - Utah Power	Douglas Sakaguchi, Habitat Manager Division of Wildlife Resources
Provo City Parks & Recreation ATTN: Roger Thomas/ Max Mitchell	Kerry Strauss Slate Canyon Neighborhood Trails	Richard & Jean Stagg
Utah Environmental Congress C/O Craig Axford	Save Our Canyons	Wasatch Mountain Club
Dale Bartholomew Public Lands Equal Access Alliance	Utah Four Wheel Drive Association	Julie Mack North Fork Preservation Alliance
Utah Dept of Environmental Quality	Utah County Community Development Utah County Planner	Utah County Fire Marshal
Dave Bennett Utah County Search & Rescue	Glen Meyer, TERT Manager	Utah State Hospital C/O Russell Armstrong
U.S. Fish and Wildlife Service C/O Laura Romin	Gerald Gordon Utah Wildlife Federation	Mayor Lehi City
Phil Barker, Mayor Alpine City	Ted Stillman, Manager Alpine City	Ted Barrett, Mayor American Fork City
Mayor Cedar Hills Town	Jess Adamson, Mayor Highland City	Jim Danklef, Mayor Pleasant Grove City
Frank Mills, Public Works Director Pleasant Grove City	Mayor Lindon City	Jerry Washburn, Mayor Orem City
Lewis K. Billings, Mayor Provo City	Fritz Boyer, Mayor Springville City	Arlo Shelly
Jay Allen American Fork High School	Barry Bezzant	Stacey Arens
Kevin Card Pleasant Grove High School	Dan Proctor	Darrell Cook Mountainland Association of Governments
Utah Valley Convention & Visitors Bureau	Blain Wilkey Central Utah Film Commission	US Army Corp of Engineers C/O Brooks Carter
Beverly Heffernan, Specialist USDI Bureau of Reclamation	Ronald Johnston, Program Director USDI Bureau of Reclamation	Barbara Gardner Utah Div of Forestry, Fire & State Lands
Paul Dremann Trout Unlimited	James Catlin Wild Utah Project	Craig F. McCullough OSPG, LLC
Mark A. Clemens Sierra Club	Tom Powell Utah National Parks Council	Girl Scouts of Utah

Magalie R. Salas, Secretary Federal Energy Regulatory Commission	Mayor Draper City	Salt Lake County Council
Mayor Salt Lake County	Michael R. Kelsey	Bureau of Environmental Health Services Attn: Tarry Veve, Director
Robert L. Morgan, Executive Dir. Utah Department of Natural Resources	Harold Sersland CUWCD	Francine R. Bennion Rock Canyon Preservation Alliance
Yukus Y. Inouye	Don LeBaron	Gary & Kathy Harding Star Trails ATV Riders Association
Wade Bradshaw, Mayor Beaver City	Beaver County Commission	Robert R. Easton
Bureau of Air Quality Attn: Steve Alder, Director	Zoya Rennka	Gini Hansen
Jody Rice	Mary McPheters	Pacific Legal Foundation Attn: Emma T. Suarez, Esq.
Utah County Public Works	Quinney Natural Resources Library Utah State University	Berdean H. Jarman
Congressman Jim Matheson	Congressman Rob Bishop	Maxine Natchees Ute Indian Tribe
Steve White, Commissioner Utah County Commission	Curt Kennedy Utah Snowmobile Association	Bruce Kartchner Back Country Horsemen of Utah
Vicky Lane	Kevin Card Pleasant Grove High School	Christina Waggoner
U.S. Fish & Wildlife Service C/O Laura Romin	Sandra Daw, Clean Air Commission Utah Division of Environmental Health	Michael Weland, Commissioner Utah Reclamation Mitigation & Conser.
Utah Dept of Environmental Quality	Rulon Gammon, Mayor Vineyard Town	Lee C. Gibbons

CHAPTER 5
RESPONSE TO COMMENTS

Comment Letter 1

Pamela C Jarnecke/R4/USDAFS
12/05/2005 08:51 AM

To: Pam Gardner/R4/USDAFS@FSNOTES, Marcy DeMillion/R4/USDAFS@FSNOTES
cc:
bcc:
Subject: Fw: Slate Canyon public comment

----- Forwarded by Pamela C Jarnecke/R4/USDAFS on 12/05/2005 08:50 AM -----

"Michael R. Kelsey" <kelsey@canyoneering.com>
12/03/2005 06:34 PM

To: Pam Gardner <comments-intermtn-uinta-pleasantgrove@fs.fed.us>
cc:
Subject: Slate Canyon

>From Michael R. Kelsey
Kelsey Publishing
456 E. 100 N.
Provo, Utah, USA, 84606-3208
Tele & Fax 801-373-3327
Email Addresses--One of these should work!
kelsey@canyoneering.com
mrkelsey@quik.com
kelseypublishing@hotmail.com

Pamela: I have no objections to putting in a new pipeline up Slate Canyon. There is already a road there, so more work done on the place shouldn't be a problem. Mother Nature will heal things anyway. However, my only concern is, that you make sure ATV's are not allowed in the canyon after the project is completed. Right now motorcycles & ATV's can get around the gate and even though I've complained many times over the past few years, nothing has been done about it. So just make sure the new barrier at the bottom of the canyon is strong enough to keep those machines out.

Thanks. Sincerely Michael R. Kelsey

1-1

Response to Written Comment Letter 1

Response to Comment 1-1

The area is currently closed to OHV use. The Forest Service gate at the mouth of Slate Canyon is intended to prevent unauthorized vehicle traffic. The gate would remain in place after construction of the proposed project. In addition, physical barriers (e.g., barrier rock) would be placed on either side of the gate to prevent unauthorized vehicles from maneuvering around the gate (see Mitigation Measure RA-1 in Chapter 3 and in Appendix D of the EA).

Comment Letter 2

December 29, 2005

Pamela Gardner, District Ranger
Pleasant Grove District Ranger
Uinta National Forest
390 North 100 East
Pleasant Grove, Utah 84062

Re: Pipeline Replacement in Slate Canyon

Dear Ms. Gardner:

These comments for the pipeline replacement are submitted on behalf of Utah Environmental Congress and Wildlaw offices respectively. We thank you for the opportunity to comment on the entire environmental assessment (EA) for this project.

It is our understanding the purpose and need of this project is to replace the aging and dilapidated pipeline that currently carries water to the Utah State Hospital pursuant to its water right. The current pipeline is 70 years old, is corroded, and is damaged from erosion and avalanches. A special use permit has been held by the hospital so that water can be transferred from the Boardman springs in Slate Canyon. The water right permits the hospital to transfer 1.10 cubic feet of water per second.

2-1 The current EA only includes two analyzed alternatives; however NEPA requires analysis of a wide range of alternatives. Such alternatives need not necessarily be viable alternatives that fit a project's purpose and need. We understand that the existence of a pipeline is the only way to convey water to the hospital so that it may take advantage of its water right. However the water diversion and extraction has caused significant damage to the stream, and surrounding ecosystem. Significant damage has also likely occurred to riparian habitat, vegetation, and wildlife that depend upon the stream habitat. The analysis of an alternative that would take out the pipeline would provide a baseline to compare what the effects of having the pipeline are. While we recognize the value and the need of replacing the pipeline the two alternatives analyzed plus a pipeline removal scenario would help disclose the significant effects of the project.

2-2

2-3

2-4 The new pipeline would be buried below the existing trail in Slate Canyon, and construction would include installation of four new air vents as well as a new junction box. Impacts to the environment could occur based on the need for heavy machinery such as backhoes, trenchers, compactors, and material haulers. The Forest Plan requires that such equipment be limited in use in riparian and stream areas. Plan, p. 3-2. The project will require extensive digging for the new piping as well as impacts to streams through ten stream crossings. Please insure that proper

2-5 stream alteration permits are secured if needed. Such permits are likely available through the U.S. Army Corp of Engineers. Indications from the EA appear that there will be deliberate stream alteration where pipes cross streams and when streams are temporarily diverted.

2-6 Though special status sensitive species receive mention and their typical range and distribution in Utah and the Uinta National Forest are disclosed no surveys seem to have been conducted. Existing habitat for Townsend's big-eared bats exists but no surveys seem to have been completed. The Forest Service Manual/Handbook (FSM/FSH) states that the supervisor needs to determine the distribution, status, and trend of sensitive species and their habitats. Projects need to maintain and improve the distribution status and trend of sensitive species and their habitats. Data from site-specific surveys need to be used to inform the analysis of the effects (positive and negative) to the distribution, status, and trend of sensitive species and their habitats. Please complete such surveys at least for species with potential habitat such as sensitive bat species.

2-7 The project is located in big game winter range and so revegetation efforts should be vigilant to provide adequate habitat for big game in this area. Plan, p. 3-45. Use of motorized vehicles should be limited or eliminated based on protection of big game habitat as well as protection of riparian vegetation.

2-8 The treatment of management indicator species (MIS) for this project does not currently comply with recent rulings from the Tenth Circuit Court of Appeals. It appears the Forest has mentioned five MIS that are designated in the Uinta National Forest Plan, but apparently none of them are found in the project area. Please ensure this is true based on thorough surveys for these MIS. If this is the case then the Forest needs to select several other species that would serve as MIS for this project. As the court in this case held the Forest has the discretion to choose appropriate MIS for each project. It is important to select and monitor more than just a few MIS with population trend data inside the project area to meet NFMA and the Forest Plan's fish and wildlife diversity MIS mandates. The recent 10th Circuit Court of Appeals ruling alluded to directly inform these issues:

> *Under a plain reading of § 219.19 and UEC I, we conclude that the Forest Service must select an MIS with some evidence that it is "present in the [project] area." The Forest Service must then collect "actual, quantitative population data," id. at 1226, to monitor population trends and to determine relationships to habitat changes. See 36 C.F.R. § 219.19(a)(6). It must also confirm, with "good faith efforts," the presence of the selected MIS within a project area. UEC I, 372 F.3d at 1230. If no MIS representative is "present in the [project] area," the Forest Service must show good-faith efforts to confirm and explain the absence of selected MIS. It may be that the Forest Service selected an improper guild, or actions previously taken may have had a significant deleterious effect on the chosen MIS. "[W]here impossible, the Forest Service is not required by the applicable statutes and regulations to collect population data." Id. at 1229.*

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The Forest Service must select within each guild an appropriate MIS that is present in the project area. Selecting only one or two (or a few) acceptable MIS actually present in a project area cannot satisfy the overall monitoring obligations of § 219.19. See Martin, 168 F.3d at 7 (concluding that the Forest Service violated §§ 219.19 and 219.26 because it "ha[d] no population data for half of the MIS in the Forest and thus [could not] reliably gauge the impact of the timber projects on these species"). Utah Envtl. Cong. v. Bosworth, 421 F. 3d 1105 (10th Cir. 2005). (Emphasis added.)

Please let me know if you need a copy of this decision to help educate yourself on these key holdings. As this Circuit Court has ruled, the Forest is entitled deference in the MIS it selects for projects implementing the Forest Plan, but in order to meet the requirements of §219.19, that MIS selection *must include MIS actually in the project area* so that the effects of the project on the MIS population trends can be determined and analyzed in meeting the NFMA and Forest Plan requirements. In this case without any MIS in the project area it will be impossible to ascertain the effects of this management activity on animal/plant population trends. We suggest selection of an MIS such as macroinvertebrates, which are known to be excellent indicator species since they can effectively evaluate the effects of management activities on water quality. They also respond rapidly to changes in habitat conditions which is another reason that they are an excellent indicator species. 2-9

On page 3-13 of the EA various mitigation measures described in the Forest Plan are referenced. Are all standards/guidelines from these pages of the Forest Plan going to be implemented for any given management problem? Under NEPA, mitigation if proposed must be described in detail and the effectiveness of that mitigation must be discussed as well. National Audubon Society, 132 F.3d 7, 17 (2nd Cir. 1997) ("we emphasize the requirement that mitigation measures be supported by substantial evidence in order to avoid creating a temptation for federal agencies to rely on mitigation proposals as a way to avoid preparation of an EIS"); Friends of the Ompopompoosuc v. FERC, 968 F.2d 1549, 1556-57 (2nd Cir. 1992); Abenaki Nation of Misissquoi v. Hughes, 805 F.Supp. 234, 245 (D. Vt. 1992), aff'd 990 F.2d 729 (2nd Cir. 1993). 2-10 2-11

In National Audubon, for example, the Second Circuit upheld a lower court decision striking down a Forest Service EA that concluded that significant impacts could be reduced below a level of significance. The Second Circuit agreed that the Forest Service could not rely on such mitigation measures as a means to avoid undertaking an EIS where the mitigation measures were not supported by "substantial evidence". 2-12

Although the EA states there is no beaver habitat in the project area this is likely due to the fact that significant amounts of wetlands and riparian areas have been de-watered or otherwise lost due to this piping. If possible, please establish mitigation designed to restore lost wetlands and areas of the creek that may have had flowing water at one time. Consider working with the state to maintain historic (or close to historic) flows of water so that the riparian and aquatic habitat for wildlife can be restored. The Forest Plan directs the Forest Service to mimick natural stream discharges so that aquatic species and habitat can be maintained. Plan, p. 3-10. 2-13 2-14

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2-15 The proposed project will impact soils based on the need to build trenches and replace the soils with imported materials. To the extent possible please utilize native soils so that erosion is further limited during rain and snowmelt events. Plan, p. 3-9. Also please abide by Forest Plan guidelines/standards that direct the Forest to maintain at least 70% of potential effective ground cover to provide nutrient cycling and protect the soil from erosion. Plan, p. 3-8. The maintenance for adequate ground cover in riparian habitat conservation areas should also be followed. Plan, p. 3-9.

2-16 Please evaluate if the total soil resource commitment is within 4% of riparian acreage within the watershed pursuant to the Plan. p. 3-43.

2-17 Although the project will remove a relatively small amount of riparian vegetation and will help achieve desired future conditions there will be short-term harm to aquatic resources. Because flow quantities are variable and are dependent upon seasonal factors please try to limit the impacts by constructing during times of low or no flow.

2-18 As mentioned above please evaluate the efficacy of specific mitigation measures and describe how effective transplanted riparian vegetation will be in serving as riparian buffers. One of the mitigation measures purposes diverting streamflow during construction. EA, p. 3-27. This seems to be the type of action that would require adequate stream alteration permits from the Army Corps (ACOE). Please remember to secure all needed permits for stream alteration activities.

2-19 If a Finding of No Significant Impact is issued please ensure that it is well justified based on the predicted impacts of the proposed project and a realistic assessment of the degree of impacts that can be mitigated. The Forest Service is obligated to support a FONSI through a convincing and well supported justification for a FONSI otherwise an EIS must be prepared. See Pac. Marine Conservation Council v. Evans, 200 F. Supp. 2d 1194, (D. Cal. 2002); Sierra Club v. United States DOT, 243 U.S. App. D.C. 302, (D.C. Cir., 1985) Makua v. Rumsfeld, 136 F. Supp. 2d 1155, (D. Haw., 2001).

Thanks again for the opportunity to comment on the EA and we hope these comments will prove helpful in improving the project. Please send any other documents related to this project to our office as they are released.

Sincerely,

/s/ Joel Ban
Wildlaw

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4

Response to Written Comment Letter 2

Response to Comment 2-1

According to Chapter 10 of the *Forest Service Environmental Policy and Procedures Handbook*, "alternatives must meet the purpose and need of the proposed action" (USFS 2004). NEPA requires analysis of a reasonable range of alternatives. The EA considers a proposed action alternative and a no-action alternative. Consequently, the analysis presented in the EA meets the requirements of NEPA and the Forest Service NEPA guidance. No other feasible alternatives were identified that would meet the purpose and need described in Chapter 1 of the EA. The existence of a pipeline is the only feasible means to convey water from the springs to the hospital to utilize the State's water right. Three additional alternatives were considered but eliminated from further consideration because they did not meet the purpose and need or were not feasible to implement.

Response to Comment 2-2

This EA has been prepared to analyze the effects of the construction of the new pipeline on Forest Service administered lands. The Forest Service has the authority to approve or deny the proposed water pipeline replacement, but they cannot revoke the State's existing water right. The State has possessed water rights for collection of water at Boardman Springs since the 1920s. The existing pipeline has conveyed water from Boardman Springs to the Hospital for more than 70 years. There is no documentation of conditions in Slate Canyon prior to the installation of the pipeline; consequently, the effect of the water diversion and extraction on the stream or surrounding ecosystem is unknown. Originally the state collected water from seven well sites in Slate Canyon, but the collection facilities at three sites (Knight Springs 1, 2, and 3) were destroyed between 1977 and 1988 as a result of a debris flow. The habitat and conditions in Slate Canyon are similar to many other canyons along the Wasatch Front, and there is no evidence of substantial habitat degradation as a result of water diversion or spring water collection.

Response to Comment 2-3

According to Chapter 10 of the Forest Service *Environmental Policy and Procedures Handbook*, "the no-action alternative provides a baseline for estimating the effects of other alternatives" (USFS 2004). In this case, the baseline condition in Slate Canyon includes the existing pipeline, which operates under an existing Forest Service special use permit. In the *American Rivers v. Federal Energy Commission, 187 F.3d 1007* (9th cir. 1999) case, an environmental organization challenged the Federal Energy Regulatory Commission's use of existing conditions as baseline for impact analysis, arguing that the Federal Energy Regulatory Commission should have compared the decision to modify licensing to the environment as if the existing dam had never been built. The court, however, held that existing conditions were in fact the proper baseline for impact analysis.

Response to Comment 2-4

The use of heavy equipment is acknowledged in Chapter 2 of the EA. Equipment use would be minimized to the extent feasible in accordance with the UNF Aqua Guideline 6, which states the following: "limit equipment operation in Riparian Habitat Conservation Areas (RHCAs). If the

use of equipment in these areas is required, incorporate additional mitigation to minimize adverse impacts." Consequently, the project would require construction to occur during periods of low stream flow (Aqua Guideline 4), and construction equipment would be required to be cleaned prior to project site entry (Aqua Standard 7). Additionally, site-specific conservation measures identified in Appendix D of the EA would be implemented to minimize resource damage and restore riparian habitats in the RHCAs. The project would comply with applicable Standards and Guidelines identified in the Forest Plan (see Appendix D).

Response to Comment 2-5

As is stated in Chapter 3, Hydrology in the EA, necessary permits would be acquired from the U.S. Army Corps of Engineers and the Utah Division of Water Rights prior to construction. Any streambed alterations would be short-term and would comply with Mitigation Measure H-1 and any additional permit provisions. Construction would occur during low stream flow.

Response to Comment 2-6

A wildlife report was prepared for this project based on evaluation of existing data, the results of two preliminary site visits conducted by a Jones and Stokes biologist and Forest Service staff, and consultation with the U.S. Fish and Wildlife Service and Utah Division of Wildlife Resources.

The results of this data collection effort indicate that the project would not directly affect sensitive species breeding, nesting, or roosting habitat. The project may temporarily affect foraging habitat. The existing data and informal agency consultation determined there would be no adverse impacts to these species resulting from the proposed action. Impacts to foraging habitat were considered to be minor because foraging habitat is abundant in the drainage and in the region and because habitat restoration activities would be required to potential minimize adverse impacts.

This methodology is consistent with the Forest Service Manual that directs the Forest Service to "obtain information on actual occurrences and status populations as required for assessments or to meet legal requirements for endangered and threatened species in plans and projects. Seek data first from existing sources such as State Heritage Databases or records of the U.S. Fish and Wildlife Service or State wildlife fish agencies. Conduct surveys as necessary to verify or supplement available information" (USFS 1991).

Reviews of previous data and field verifications were used to determine the projects effects on the distribution, status, and trend of sensitive species in the Slate Canyon drainage; this information is presented in Chapter 3 of the EA and in the Biological Evaluation prepared for this project.

Surveys for Townsend's big-eared bats were not conducted because construction of the proposed pipeline would predominately occur within Slate Canyon Trail and would not affect any caves that may provide roosting sites. In addition, construction would occur during the day when bats are inactive. Consequently, the project would not affect individual bats. In up to ten locations, the proposed project crosses riparian habitat. Riparian habitat is prime foraging habitat for Townsend's big-eared bat. Where the proposed pipeline crosses these riparian areas, the riparian vegetation would be removed (up to 20 feet on either side of the trail centerline) by construction activities. This disturbance would affect about 3 percent of the total tree-dominated riparian

vegetation in the Slate Canyon drainage. Restoration of these areas would mitigate impacts to this habitat.

Response to Comment 2-7

Revegetation efforts are described in Appendix D and in Chapter 3 of the EA. The proposed project would disturb a very small portion of the designated critical or high quality deer winter habitat located within the Slate Canyon drainage. The project would not increase the use of "inappropriate off-highway vehicles" and therefore would be consistent with Guideline MP 3.3-9 (referenced by the commentor as "Plan, p. 3-45"). Mitigation measure RA-1, described in Chapter 3 and Appendix D, is intended to prevent unauthorized motor vehicle use on the trail. Motorized vehicle use associated with project construction or maintenance would be authorized and would not conflict with Guideline MP 3.3-9 or MP 3.3-10.

Response to Comment 2-8

There is no known occurrence or habitat for Three-toed Woodpecker, American beaver, Bonneville cutthroat trout, and Colorado River cutthroat trout. Northern goshawk may forage in the project area, but no nesting habitat would be affected. The Forest Service is not required to select MIS on an individual project basis. There is currently no regulatory requirement that the Forest Service select other species to serve as MIS that occur within a project area or on a project basis if Forest Service–designated MIS are absent.

The regulation cited in this comment, *36 CFR 219.19*, is no longer in effect. The Forest Service issued new planning regulations on January 5, 2005. The transition language in the new regulations states: "For units with plans developed, amended, or revised using the provisions of the planning rule in effect prior to November 9, 2000, the Responsible Official may comply with any obligations relating to management indicator species by considering data and analysis relating to habitat unless the plan specifically requires population monitoring or population surveys for the species. Site specific monitoring or surveying of a proposed project or activity area is not required, but may be conducted at the discretion of the responsible official" (*36 CFR 219.14(f),* 2005).

The Forest Plan was revised in 2003. The revision designated Northern Goshawk, Three-toed Woodpecker, American beaver, Bonneville cutthroat trout, and Colorado River cutthroat trout as the MIS for the UNF (UNF 2003). The wildlife report, prepared for the EA, analyzed the project in light of the MIS designated in the revised Forest Plan.

The wildlife report concluded that the project may impact foraging habitat for Northern Goshawk but no nesting habitat will be impacted. The proposed project has the potential to affect forested riparian areas during construction, but construction would be short-term and preconstruction avian nest surveys would be conducted to ensure that no Northern Goshawk nests are present in the vicinity of the project. If nests are present, a 0.5-mile avoidance buffer would be maintained around the nest until the hatchlings have fledged (in accordance with Forest Plan direction).

Most construction activities would occur within the existing trail. Some vegetation removal would occur near stream crossings; however, these areas would be re-vegetated after construction. Suitable foraging areas are abundant in the canyon and in the surrounding areas; consequently, the project has minimal potential to directly or indirectly affect Northern

Goshawk. The project is short-term, isolated, and would affect a very small amount of foraging habitat; consequently, it would not affect forest health or forest trends. Current Forest Service monitoring data provide no evidence that goshawk population trend has been declining on the UNF in recent years (UNF 2005a).

The proposed project would not affect any of the other species designated as UNF MIS or their habitat. Therefore, monitoring at the plan level is not relevant to this project decision. Current regulations specifically state that site-specific monitoring or surveying of a proposed project or activity area is not required (*36 CFR 219.14(f)*). Populations of MIS populations across the UNF are not declining for any of the five MIS species (UNF 2005a). Because the proposed project is not located in suitable habitat for Three-toed Woodpecker, American beaver, Bonneville cutthroat trout, or Colorado River cutthroat trout, the project would not contribute to a downward trend for these species.

Response to Comment 2-9

As was stated in the previous response, the MIS are not selected on a project-specific basis. Additionally, no aquatic macroinvertebrates were detected during a preliminary site visit. The purpose of the site visit was not to evaluate macroinvertebrate presence or ecological stream function; however, some observations relative to aquatic macroinvertebrates were made. The selection of macroinvertebrates as MIS species would not comply with Forest Service guidance, which states that ecological indicators should only be selected if "scientific evidence exists confirming that measurable changes in these species or groups would indicate trends in the abundance of other species or conditions of biological communities they are selected to represent" (USFS 1991).

Response to Comment 2-10

The applicable standards and guidelines are listed in Appendix D of the EA.

Response to Comment 2-11

The mitigation for the proposed project includes the applicable Forest Plan standards and guidelines, resource specific mitigation measures, and site-specific conservation measures (all mitigation measures are listed in Appendix D of the EA). The effectiveness of the standards and guidelines was previously evaluated as part of the Forest Plan EIS, and the adopted standards and guidelines are used on all projects on the UNF. The resource-specific mitigation measures and site specific conservation measures are all measures that provide project-specific procedures to assist in the implementation of the Forest Plan Standards and guidelines related to aquatic and riparian habitat management, soil and water resource management, noxious weed management, vegetation management, scenery management, recreation management and watershed management. These measures are adequately defined and are standard industry practice for projects of this nature. Additionally, several of the measures require surveying and monitoring during and after construction to ensure the effectiveness of the mitigation.

Response to Comment 2-12

Under the no-action alternative, the State would reconstruct the trail in Slate Canyon that washed out as a result of flooding in 2005. The trail would be needed to continue maintenance on the existing pipeline, and trail maintenance would be allowed under the existing special use permit.

In addition, continued use of the existing pipeline would increase the risk of pipeline rupture, which would result in additional erosion and scour in the canyon. The proposed action would reduce the potential long-term impacts related to pipeline rupture. The implementation of mitigation measures ensures that the project would be consistent with Forest Plan standards and guidelines and reduces the potential construction-related impacts. Overall, the impacts of the project are short-term and minimal. As stated above, all recommended mitigation measures are consistent with industry standard practices and are not intended to avoid the preparation on an EIS.

Response to Comment 2-13

See response to comment 2-2. The existing pipeline in Slate Canyon was built more than 70 years ago, and there is no information about the stream flow or habitat in the canyon prior to pipeline construction. The condition of the canyon prior to pipeline construction is unknown and it would be speculative to assume the environmental conditions in the canyon 70 years ago. NEPA does not require the consideration of remote and speculative consequences (CEQ 1997). Currently, the canyon does not contain vegetation or sustained stream flow necessary to support beaver, and, therefore, the project would have no effect on existing beaver populations. The proposed project would not change the flow of water in the Slate Canyon stream or affect the spring collection boxes; hence, the project would have no effect on wetlands. This EA considers approval of a replacement pipeline, and it is beyond the scope of this EA to impose limitations on the State's water right.

Response to Comment 2-14

Forest Plan Guideline S&W-8 states that requirements for instream flows should be "consistent with valid existing rights." Because the State has a valid existing water right and because the State would not extract more water than is specified in the right, it is beyond the authority of the Forest Service to set new requirements for instream flows. Guidelines S&W-9 through S&W-11 pertain to projects that change stream flow and are not subject to existing water rights. The proposed action would not affect the existing stream flow and is consistent with existing water rights.

Response to Comment 2-15

The project would comply with Forest Plan Guideline S&W-3 through Guideline S&W-5 (as specified in Appendix D of this EA). Mitigation Measures GS-1 through GS-3 and V2 (also specified in Appendix D of this EA) would minimize erosion and provide ground cover following construction. Generally, construction would occur within the existing Slate Canyon Trail, which was heavily eroded during floods of spring 2005. Many segments of the trail are currently devoid of topsoil and are comprised of boulders and cobbles. Consequently, the project would disturb a small amount of vegetation or native soils. Native soils disturbed as part of this project would be stockpiled and replaced to the extent feasible. Off-site borrow material would be used as necessary. However, implementation of Mitigation Measure GS-2: Reshape Road/Trail Surface after Trench Backfill to Drain Laterally, would minimize soil erosion on the trail. Vegetation would be restored in accordance with Mitigation Measure V2.

Response to Comment 2-16

The proposed project would result in disturbances in about 0.14 percent of the total RHCAs in the Slate Canyon drainage (as described in Chapter 3 of the EA). This is far below the 4 percent criteria.

Response to Comment 2-17

See Mitigation Measure H-1 in Appendix D of this document and in Chapter 3. This mitigation measure states "construction at stream crossings will occur later in the season when stream flows are low or absent." Revegetation methods would be conducted in accordance with industry standards and the standards and guidelines established in the Forest Plan (see response to comment 2-11).

Response to Comment 2-18

See response to comment 2-5.

Response to Comment 2-19

If the proposed action is approved, the Forest Service rationale will be documented in the Decision Notice and will include the findings supporting the finding of no significant impacts.

Verbal Comments and Responses

This section includes two verbal comments that were received by Marcy DeMillion of the Forest Service. A response for each comment is provided following the summary of the comment.

Verbal Comment 1

Mike Stewart contacted Marcy DeMillion of the Forest Service concerning the Slate Canyon legal notice. He asked how much the State was spending on the waterline, as he thought this would take longer than 10 years to recover the cost when the Hospital could use Provo City water. He requested a copy of the EA (which was mailed the same day). This comment was received via a telephone call on November 27, 2005.

Response to Verbal Comment 1

Part of the purpose of the proposed project is to provide the State with continued access to the State's water rights at Boardman Springs. The Forest Service has the discretionary authority to approve or disapprove construction of the new pipeline to access the State's water rights on Forest Service-administered lands. It is beyond the authority of the Forest Service to determine how the State provides water to state facilities located off of Forest Service lands. The proposed project has been funded through a State appropriation, and the funding decisions or funding priorities are outside the decision framework of the Forest Service.

Verbal Comment 2

Bart Simons, the Provo City Water Sources Manager, contacted Marcy DeMillion of the Forest Service concerning a typographical error in the cumulative effects section of the EA. The sentence states that it is 200 feet from the spring box to Slate Canyon Trail; it should say it is 20

feet. Bart requested that this be corrected in the final EA. This comment was received via a telephone call on December 5, 2005.

Response to Verbal Comment 2

This typographical error has been corrected in the final EA. This error does not affect the cumulative effects analysis.

CHAPTER 6
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APPENDIX A

PUBLIC SCOPING COMMENTS

Providing a voice for the voiceless

Utah Environmental Congress

March 3, 2005

Pamela Gardner, District Ranger
Pleasant Grove Ranger District,
Uinta National Forest
390 North 100 East
Pleasant Grove, UT 84062

Dear Ms. Gardner,

The Utah Environmental Congress (UEC) thanks you for this opportunity to provide scoping comments in response to your letter of January 24th regarding the proposal to authorize the replacement of an aging water pipeline in Slate Canyon. Please maintain the UEC on this and all mailing lists on your District as an interested party.

Thank you for providing the useful map with your letter. The map helps us understand the location and extent of the action and is very helpful. We understand that the new pipeline would be placed in the existing road alignment from the canyon bottom to the springs. This will also involve about 13 crossings of the primary/tributary/auxiliary channels in Slate Canyon.

It appears that in the environmental document will be prepared, the Forest anticipates two alternatives: the proposed action and an alternative that would leave the facilities as is. The purpose of NEPA's mandate to develop and analyze a reasonable range of alternatives including the alternative o no action is so that the environmental document presents and discloses the effects of the proposed action and alternatives in comparative form. This sharply defines the issues and disclosing the effects of the proposed action and alternatives, providing a clear basis for selecting among options by the decisionmaker and the public. We do not believe that the two alternatives proposed will meet this mandate because comparison of the two proposed alternatives will not disclose the effects of having a pipeline versus not having the pipeline.

It is important to develop alternatives that disclose the effects of the pipeline, however since a pipeline already exists (no action alternative) there is no alternative that will accomplish this. In order to meet this requirement we request that the Forest develop a third alternative that proposes to remove the pipeline altogether and analyze its effects in detail. Including this alternative and comparing its effects with the other alternatives will disclose the long-term impacts of the pipeline and diversions that will exist in both of the currently proposed alternatives. Under NEPA, it is entirely appropriate to analyze alternatives that are outside of the legal requirements of the agency or applicant. We believe it is necessary to do this in this case in order to disclose the effects and their significance.

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The UEC understands and appreciates the need for this project, and we do not inherently oppose the action to improve culinary water supply. However we think it is clear that this is a major federal action with significant effects[1] in context and intensity. This holds for both the short and long term. This is particularly obvious when you consider the effects to wetlands, riparian habitat, and aquatic resources in the watershed. Simply put, either action currently proposed for analysis involves the dewatering of the Slate Canyon watershed. Compliance with the CWA and effects to 303(d) waters downstream raises and additional significance issue. The need for an EIS is triggered even if there *may* be significant impacts. Here, it is clear that there *are* significant impacts. We encourage the Forest to not waste time on an EA and go straight to the preparation of an EIS.

There also may be significant effects to TES plant/animal populations and habitat that do exist in the Slate canyon watershed. Effects to soils are also a serious issue that needs to be analyzed in detail. We concur that the six preliminary issues listed in the scoping document do need to be analyzed in detail because both the proposed action and the no action alternatives will involve various impacts to these resource conditions and issues.

We recommend that the cumulative effects boundary be the entire affected watershed.

The Migratory Bird Treaty Act (MBTA) makes it unlawful to take, kill, or possess migratory birds, their parts, nests, or eggs.[2] Executive Order 13186 issued in January of 2001 re-instituted the responsibilities of Federal agencies to comply with the MBTA. It is well known that many migratory bird species are currently declining across this region. Compliance with both the MBTA and Executive Order 13186 is an important consideration for the development of the Proposed Action because the proposed action and the no action alternatives will directly and indirectly take individuals, populations and/or impair habitat quality for migratory birds. This underlines the importance of including the alternative recommended above as well as the need to inform this decision with a meaningful and complete cumulative effects analysis.

Agencies are instructed to "develop and implement, within 2 years, a Memorandum of Understanding (MOU) with the Fish and Wildlife Service (Service) that shall promote the conservation of migratory bird populations." (EO 13186 § 3) Has a current MOU been signed by both agencies? If so, we request a copy be provided within (or as an appendix to) the environmental document, and not simply included in the project file, as we are not yet aware of the presence of this legally-mandated document.

We recommend that the Forest conducts a rigorous evaluation, using the newest data and research, to minimize impacts to migratory birds (and their habitat), before approving this action, including a focus on all species on the 2002 List of Birds of Conservation Concern as well as all species that are listed among the Partner's in Flight Priority Species. The effects of the action contemplated includes (approximately) habitat types from low elevation brush to various broadleaved and coniferous forests to alpine meadows, and includes impacts to springs, wetlands and riparian habitat along the length

[1] Effects and impacts are synonymous under NEPA
[2] 16 U.S.C. § 703-712.

of the canyon. In light of this, the list of potentially affected migratory birds/habitat may be particularly extensive for this action. To help meet responsibilities under Executive Order 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds), we recommend you conduct all activities outside critical breeding seasons for migratory birds, minimize temporary and long-term habitat losses, and mitigate all unavoidable habitat losses. It appears that there would be some unavoidable habitat losses in both the proposed action and the no action alternatives. In light of this, we recommend that efforts first should be focused on complete avoidance of negative impacts to these resources before entertaining mitigation to partially repair negative impacts. If your activities occur in the spring or summer, we recommend you conduct surveys during implementation for migratory birds to assist you in your efforts to comply with the Migratory Bird Treaty Act (16 U.S.C. 703-712) and E.O. 13186. If some portion of your mitigation includes off-site habitat enhancement, which may be an unavoidable possibility considering the context, scope and scale of the actions under analysis, it should be in-kind and either within the watershed of the impacted habitat or within the foraging range of the habitat-dependent species.

Surveys of FS sensitive species (plants, animals and their habitat) in the area should be done before approving this action so the analysis in the EA/EIS can determine how the proposed action may affect the distribution, status and trend of sensitive species. This is needed to meet direction in the Forest Plan as well as FSH/FSM direction for FS Sensitive species.

The analysis also needs to determine the effects of the proposed action on the population trends of the MIS. The 10th Circuit Court of Appeals has ruled that, "Similarly, the court in Forest Guardians reasoned that the language of § 219.19 required the Forest Service "to acquire and analyze hard population data of its selected management indicator species" before approving a timber sale, because these regulations clearly preclude reliance "solely on habitat trend data as a proxy for population data or to extrapolate population trends." 180 F. Supp. 2d at 1281. Likewise, we agree that a reading of § 219.19 as requiring only habitat analysis is "inconsistent with the regulation's plain meaning," Yuetter, 994 F.2d at 738. Accordingly, we conclude that in order to effectuate its MIS monitoring duties under the language of its regulations, the Forest Service must gather quantitative data on actual MIS populations that allows it to estimate the effects of any forest management activities on the animal population trends, and determine the relationship between *management* activities and population trend changes." Utah Environmental Congress v. Bosworth, 2004 U.S. App. LEXIS 12441 (10th Cir. 2004). The Forest needs to gather the required quantitative population trend data for all MIS and analyze it before approving this project, which is a huge action that implements the Forest Plan. The Forest also must first determine the relationship between management activities and the MIS population trends in the body of the EA/EIS before approving this action.

The need for any reconstructed pipeline coming down this canyon will far exceed 100 years. The design for any new pipeline should be in light of anticipated 500-year hydrologic events, not a 100-year hydrologic event.

Availability of the environmental document

NEPA is clear in outlining the contents of its Environmental Assessment. The Environmental Assessment, "(b) Shall include brief discussions of the need for the proposal, of alternatives as required by section 102(2) (E), of the environmental impacts of the proposed action and alternatives, and a listing of the agencies and persons consulted."[3] 40 CFR § 1500.1(b) states, "Environmental documents and appropriate analyses shall be circulated and reviewed at the same time as other planning documents" ... "NEPA procedures must insure that environmental information is available to public officials and citizens **before decisions are made** and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA." This is not contained in the short scoping document to which we are currently responding. Whether an EA or an EIS is prepared, we urge the Forest to circulate the environmental document before a decision is made.

If an EA is prepared, it will undoubtedly require a heavily mitigated FONSI. We recommend a 30-day public comment period on any mitigated FONSI for this action before making your decision. (See 40 CFR 1501.4(e)(2).)

The Forest must implement NEPA procedures and involve the public in good faith. We believe that failing to provide the EA for public comment before signing a decision would constitute such a failure.

Thank you for this scoping/substantive comment opportunity. As we commented earlier, we are not inherently opposed to the proposed action. Communities require culinary water. However, this clearly is a major federal action and we believe an EIS needs to be prepared. We know that the Pleasant Grove District works hard to manage these lands as best as possible. We know because it is evident on the ground and we thank you for that.

Sincerely,

Kevin Mueller,
Executive Director

[3] 40 CFR§1508.9

Heidi Little/R4/USDAFS
02/01/2005 11:34 AM

To Marcy DeMillion/WO/USDAFS@FSNOTES
cc
bcc
Subject Fw: slate canyon pipeline proposal

Heidi Little
Computer Assistant
Uinta National Forest
801 34205103
hlittle@fs.fed.us
—— Forwarded by Heidi Little/R4/USDAFS on 02/01/2005 11:34 AM ——

"Michael R. Kelsey" <kelsey@canyoneering.com>
01/31/2005 11:35 AM

To: comments-intermtn-uinta-pleasantgrove@fs.fed.us
cc:
Subject: slate canyon pipeline proposal

From Michael R. Kelsey
Kelsey Publishing
456 E. 100 N.
Provo, Utah, USA, 84606-3208
Tele & Fax 801(385 after 3/2005)-373-3327
Email Addresses--One of these should work!
kelsey@canyoneering.com
mrkelsey@quik.com
kelseypublishing@hotmail.com

Pam Gardner:

January 31, 2005

Regarding your proposal to install a new pipeline up Slate Canyon:

I've hiked up that canyon often over the years and I have no problem with the need for a new pipeline, largely because there's a road and pipeline already there. I trust that who ever wins the bid for construction, will leave the canyon as pristine as possible.

My only concern would be this, that measures be taken to totally hault any ATV's or motorcycles from going up the canyon during construction, and after construction of the pipeline. This means setting up a strong gate with lock, and installing large boulders or Jersey barriers to prevent ORV's from going upcanyon once things are back to normal. Also lots of warning signs!

I'm telling you now Pamela, and I think you already know this, those people who buy & ride motorcycles & ATV's are some of the most lawless people in our society! If you give them one cm, they will take a whole kilometer! So any gaps have to be plugged up with large boulders.

By the way, I spent a couple of hours with Caroline recently in the mouth of State Canyon, and at the base of Y Mtn. and into Rock Canyon showing her all the gaps I've found where these people are gaining access to the Bonneville Shoreline Trail--about half of which is on FS land, if your map is correct. Since then I have spoken with Roger Thomas who is the head of Provo City's Parks Department. He seems to

hate the ORV crowd about as much as I do, thank somebody's god! It seems he will be willing to work with the FS in taking steps to prevent ORV's of various kinds from getting upon the mountain side or up our canyons.

Good luck with your battles. Sincerely MRK

United States Department of the Interior
FISH AND WILDLIFE SERVICE
UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

In Reply Refer To
FWS/R6
ES/UT
05-0366

February 18, 2005

Pamela J. Gardner
District Ranger
Pleasant Grove Ranger District
390 North 100 East
Pleasant Grove, Utah 84062

RE: Replacement of an Aging Water Pipeline in Slate Canyon from the Spring Junction Boxes to the Storage Reservoir

Dear Ms. Gardner:

This responds to your letter of January 24, 2005 regarding the subject project. We have no comments on the project, as proposed. Should project plans change or if additional information becomes available we may choose to provide comments in the future.

We appreciate the opportunity to review your project. Should you have any questions or need any further information please contact Betsy Herrmann, Fish and Wildlife Biologist at (801)975-3330 ext. 139.

Sincerely,

for Henry R. Maddux
Utah Field Supervisor

APPENDIX B

AIR QUALITY EMISSIONS CALCULATIONS

Air Quality Emissions Estimation Methodology

The following tables were used to calculate emissions estimates. Fugitive dust emissions were estimated based on EPA's AP-42 emission factors. Tailpipe emissions from on-road haul trucks and commute vehicles were estimated based on EPA's MOBILE6.2 model. Tailpipe emissions from off-road construction equipment were estimated based on factors from EPA's document *Nonroad Engine and Vehicle Emission Study, EPA/460/3-91-02, November, 1991*.

Appendix A. Utah Pipeline Replacement, Annual Construction Emissions: (EPA 1991 Emission Factors)

Construction Site Fugitive PM-10 (Based on AP-42 Factors)

Construction days/year	==>	210	days/yr
Fugitive Dust Emmission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.022	AP-42 bulk loading factor
Earthwork Volume/year (cys/yr)	==>	13,151	7431 cy Exc, 3963 cy replace, 1847cy select fill
Average Daily Acres of Construction	==>	0.5	Applies SCAQMD general fugitive dust factor of 10 lbs/acre/day
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor

Unpaved Haul Road Fugitive PM-10 (Based on AP-42 Factors)

Vehicle Type	Annual Round Trips	Round Trip distance (miles)	Calc.Annual VMT	AP-42 Emission Factor (lbs/VMT)	Control Effcy	PM-10 Emissions	
Annual Dump Truck Trips on Unpaved Roads (10 cy per truck for bulk hauling)	693	3.8	2,632	1.17	0	1.5	tpy
Annual Front End Loader Travel on Unpaved Areas (1 loaders, 210 days/yr, 1 miles per day)	210	1	210	1.17	0	0.1	tpy
Annual Car Trips on Unpaved Roads	1680	3.8	6,384	0.68	0	2.2	tpy

Construction Vehicle Exhaust Emissions

		Number of	Hours	No.	Default	Default	EPA 1991 Emission Factor (gm/hp-hr)					
Equipment Type		Vehicles	per Day	of days	HP	Load Factor	HC	CO	NOx	PM		Total HP
Bore/Drill Rigs	==>	0	10	210	218	0.75	1.40	9.20	11.00	1.40		0
Concrete/Industrial Saws (Hand compactor)	==>	0.72	10	210	56	0.73	1.40	9.20	11.20	1.40		40
Cranes	==>	0	10	210	194	0.43	1.30	4.20	10.30	1.40		0
Dozer	==>	0	10	210	157	0.575	1.30	4.30	10.30	1.40		0
Crushing/Proc. Equipment	==>	0	10	210	154	0.78	1.00	7.95	6.88	1.40		0
Excavators	==>	0.72	10	210	163	0.58	0.70	5.20	10.50	1.40		117
Graders	==>	0	10	210	162	0.575	1.60	3.80	9.60	1.40		0
Off-Highway Tractors	==>	0	10	210	255	0.41	1.00	7.95	6.89	1.40		0
Off-Highway Trucks	==>	0.72	10	210	417	0.49	1.00	8.50	5.91	1.40		300
Other Construction Equipment	==>	0	10	210	107	0.62	1.00	7.95	6.88	1.40		0
Pavers	==>	0	10	210	87	0.6	3.20	10.30	5.80	1.40		0
Paving Equipment	==>	0	10	210	111	0.53	1.00	7.94	6.88	1.40		0
Rollers	==>	0	10	210	99	0.43	1.60	10.00	8.00	1.40		0
Rough Terrain Forklifts	==>	0	10	210	94	0.475	1.60	10.00	8.00	1.40		0
Rubber Tired Dozers	==>	0	10	210	348	0.59	0.80	3.00	9.00	1.40		0
Rubber Tired Loaders	==>	0	10	210	155	0.465	0.90	4.30	10.30	1.40		0
Scrapers	==>	0	10	210	290	0.66	0.70	5.00	8.70	1.40		0
Signal Boards	==>	0	10	210	6	0.82	1.00	7.95	6.88	1.40		0
Skid Steer Loaders	==>	0	10	210	62	0.515	1.00	8.50	5.79	1.40		0
Surfacing Equipment	==>	0	10	210	8	0.49	1.00	7.95	6.89	1.40		0
Tractors/Loaders/Backhoes (Trencher + Bobcat)	==>	1.44	10	210	77	0.465	1.40	6.80	10.80	1.40		111
Trenchers	==>	0	10	210	60	0.695	1.30	8.10	10.00	1.40		0
		3.6	Total Equip		568	Total HP						

Appendix A. Utah Pipeline Replacement, Annual Construction Emissions: (EPA 1991 Emission Factors)

Dump/Delivery Truck Tailpipe Emissions		Delivery Trucks Trip 1	Water Truck Trip 2	Trip 3	Trip 4	Trip 5
Miles/round trip	==>	104	1	0	0	0
Round trips/day	==>	1	5	0	0	0
Number of Trucks	==>	1	1	0	0	0
Number of Days	==>	161	210	0	0	0

	ROG	CO	NOx	PM10
MOBILE6.2 HDDV (grams/mile)	0.37	1.53	6.22	0.45

Worker Commute Tailpipe Emissions		
Miles/round trip	==>	104
trips/day	==>	8
Number of Light Duty Trucks	==>	1
Number of Days	==>	210

	ROG	CO	NOx	PM10
MOBILE6.2 EFs (grams/mile)	0.78	14.2	1.36	0.03
Start Emission Rate (grams/trip)	1.8	22.88	0.84	0.02
Hot Soak (grams/trip)	0.22			
Evaporative Running Loss (grams/mile)	0.09			

VOC from Paving (non-cutback asphalt)

Acre/yr	EF, lbs/ac	VOC, tpy
0	2.62	0

VOCs from Architectural Painting

Parameter	Single Family Units	Multi Family Units	Comm + Indust Bldg Floor Area
Items Painted Per Year	0	0	0
VOC Content of Paint, g/L	500	500	500
VOC Emissions, tons/yr	0.0	0.0	0.0

	Emissions (tpy)			
Annual Emissions	VOC	CO	NOx	PM10
Construction Vehicle Exhaust Emissions	0.7	5.1	5.7	1.0
General Construction Fugitive Dust	---	---	---	0.5
Soil Loading & Dumping	---	---	---	0.4
Dozer Work	---	---	---	0.0
Unpaved Road Fugitive PM-10	---	---	---	3.8
Paving Off-Gas	0.0	---	---	---
Architectural Painting (VOC = 500 g/L)	0.0	---	---	---
Dump Truck Tailpipe Emissions	0.0	0.0	0.1	0.01
Worker Commute Tailpipe Emissions	0.2	2.8	0.3	0.01
Total Emissions (tpy)	**0.9**	**8.0**	**6.1**	**5.8**

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Fugitive Dust Emission Factors (Without Controls)

Category	Wt (tons)	Speed (mph)	Silt (%)	Moisture (%)	No. wheels	Silt loading (g/m2)	Uncontr. EF	Units	AP-42 Section
Dump trucks on unpaved road	10	20	5	2.45	6		1.17	lbs/VMT	13.2.2-1
Pickup truck on unpaved public road	4	25	5	2.45	4		0.68	lbs/VMT	13.2.2-1
Batch loading: Load trucks, dump from trucks							0.0222	lbs/T	Table 11.9-4. Adjusted by 0.6 to convert TSP to PM10 (App. B-2).
Bulldozer operation			6.9	7.9			0.753	lbs/hr	Table 11.9-1
Dump Trucks on paved roads (local dusty road)	18					3	0.306	lbs/VMT	13.2-1
Dump Trucks on paved roads (regional highways)	18					0.4	0.083	lbs/VMT	13.2-1
Rock crusher w/spray bar							0.0007	lbs/ton	11.19.2
Screening & conveyors w/ spray bar							0.00118	lbs/ton	11.19.2

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APPENDIX C

SPECIAL-STATUS SPECIES

Special-Status Species

This table lists species that are protected by law or policy and that may potentially occur in the Slate Canyon Pipeline Replacement Project area. Shaded species are carried forward and discussed in the body of this environmental assessment.

Species Common Name (*Scientific Name*)	**Species Present in the Project Area?**	**Suitable Habitat in the Project Area?**	**Species Present in Cumulative Effects Area?**	**Habitat Present in Cumulative Effects Area?**	**Status**	**Distribution/ Habitat Association**
Mammals						
Canada lynx (*Lynx Canadensis*)	N	N	N	N	Federally listed threatened	Lynx inhabit boreal and subalpine coniferous forests. In the western U.S., lynx are primarily associated with lodgepole pine, Engelmann spruce, and subalpine fir.
American beaver (*Castor canadensis*)	N	N	N	N	MIS	The species is fairly common in Utah, where it may be found in permanent slow moving streams, ponds, small lakes, and reservoirs.
Spotted bat (*Euderma maculatum*)	N	Y	Y	Y	FS sensitive species State species of concern	Occurs in many different habitats. Cracks in limestone and sandstone 1–2 inches wide are important roosting areas (USDA Forest Service 1991).
Western (Townsend's) big-eared bat (*Plecotus townsendii*)	N	Y	Y	Y	FS sensitive species State species of concern	Caves and adits are the primary habitat determinants for the species (USDA Forest Service 1991). Occurs in many different habitats.
Fisher *(Martes pennanti*)	N	N	N	N	FS sensitive species	Typically occurs in late-successional forests (will avoid nonforested areas)
Birds						
Northern Goshawk (*Accipiter gentiles*)	N	N	N	Y	FS sensitive species State conservation species MIS	Nests in a wide range of forests — coniferous, deciduous, and mixed. In Utah, primarily nests in conifer and aspen stands on northerly aspects and near permanent water.
Peregrine Falcon (*Falco peregrinus*)	N	Y	Y	Y	FS sensitive species	Occupies a wide variety of habitats — often nests on cliffs but also on riverbanks, large stick nests from other species, tree cavities, and human-made structures.

Species Common Name (*Scientific Name*)	**Species Present in the Project Area?**	**Suitable Habitat in the Project Area?**	**Species Present in Cumulative Effects Area?**	**Habitat Present in Cumulative Effects Area?**	**Status**	**Distribution/ Habitat Association**
Flammulated Owl (*Otus flammeolus*)	N	Y	N	Y	FS sensitive species	Mature and old growth ponderosa pine and Douglas-fir with open stand structure. Nests typically found in cavities in stable or seral aspen.
Northern Three-toed Woodpecker (*Picoides tridactytus*)	N	N	N	Y	FS sensitive species State species of concern MIS	Occurs throughout mountainous areas of Utah — frequently detected in spruce/fir forests.
Bald Eagle *(Haliaeetus leucocephalus)*	N	N	N	N	Federally listed threatened	In the UNF, wintering Bald Eagles are known to occur in American Fork Canyon, Provo Canyon, Diamond Fork Canyon, Salt Creek, the Vernon Management Area, as well as other areas across the UNF. Large trees and snags are typically selected for perches and roosts.
Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)	N	N	N	N	Federal candidate for ESA listing	This species is primarily found in dense, low-elevation, riparian forest. It requires large blocks of riparian habitat (particularly woodlands with cottonwoods and willows) with dense understory foliage. The last known sighting for cuckoos on the UNF was in 1942.
Herptiles						
Columbia spotted frog (*Rena pretiosa*)	N	N	N	N	FS sensitive species State conservation species	Inhabits aquatic systems with ponded habitats possessing emergent vegetation — currently found along the Provo River above and below Jordanelle Reservoir (off forest but near Forest Boundary) and Diamond Fork Creek.
Fish						
Colorado cutthroat trout (*Oncorhynchus clarki pleuriticus*)	N	N	N	N	FS sensitive species State conservation species MIS	Found in Colorado River System. Four management areas within UNF – West Fork Duchesne River, Upper Current Creek, Willow Creek, and Right Fork of White River.

Species Common Name (*Scientific Name*)	**Species Present in the Project Area?**	**Suitable Habitat in the Project Area?**	**Species Present in Cumulative Effects Area?**	**Habitat Present in Cumulative Effects Area?**	**Status**	**Distribution/ Habitat Association**
Bonneville cutthroat trout (*Oncorhynchus clarki utah*)	N	N	N	N	FS sensitive species State conservation species MIS	Found in seven management areas that enter the Great Basin to Utah Lake — Upper and Lower Provo River, American Fork, Nebo Creek, Hobble Creek, Diamond Fork, and the Upper Spanish Fork River.
June sucker (*Chasmistes liorus*)	N	N	N	N	Federally listed endangered	June sucker inhabit Utah Lake and limited spawning occurs in the lower Provo River below the Olmstead Diversion.
Invertebrates						
Utah valvata snail (*Valvata utahenisis*)	N	N	N	N	Federally listed endangered	Historically known from the Snake River in Idaho and from northern Utah, this species is believed to be extirpated from Utah.
Plants						
Barneby woody aster (*Aster kingii* var. *barnebyana*)	N	N	N	N	FS sensitive species	Rock outcrops, cliffs, and ledges. On lower elevations, it is restricted to northern exposures. It has been found mainly in the Mt. Nebo area (southern Wasatch Mts.). Elevation 5,000–11,750 ft.
Dainty moonwort (*Botrychium crenulatum*)	N	N	N	N	FS sensitive species	Wet meadows, marshes and bogs. In Utah only known from five sites around 9,000 feet (Farrar 2004)
Slender moonwort *(Botrychium lineare)*	N	N	N	Y	FS sensitive species	It has been found at sea level in cool climates; in Utah, it is most likely at higher elevations (approximately 7,000–9,000 ft) in moist soils. Specific habitats have ranged from meadows dominated by knee-high grass, shaded woods and woodlands, grassy horizontal ledges on a north-facing limestone cliff, dense fir/aspen overstory, and a flat upland section of a river valley (NatureServe 2005). There have been two documented populations, in Wasatch and Duchesne Counties, but none in UNF (Farrar 2004).

Species Common Name (*Scientific Name*)	**Species Present in the Project Area?**	**Suitable Habitat in the Project Area?**	**Species Present in Cumulative Effects Area?**	**Habitat Present in Cumulative Effects Area?**	**Status**	**Distribution/ Habitat Association**
Rockcress draba (*Draba densifolia* var. *apiculata*)	N	N	N	N	FS sensitive species	Alpine tundra and talus in rock strips above timberline. Spruce-fir krummholz, moist soils on receding snowbanks. Found in Uinta Mts. Rare in Wasatch Range (Salt Lake County) and Deep Creek Mts. (western Juab County).
Wasatch jamesia (*Jamesia americana* var. *macrocalyx*)	N	Y	N	Y	FS sensitive species	Rock crevices and cliffs on mountain brush and spruce-fir communities. At lower elevations, it occurs in protected, mainly north-facing outcrops. Elevation 5,690–9,000 ft.
Garrett bladderpod (*Lesquerella garrettii*)	N	N	N	Y	FS sensitive species	Alpine, subalpine talus, and rocks outcrops in Davis, Salt Lake, Utah, and Wasatch Counties. Elevation 8,900–11,400 ft.
Clay phacelia (*Phacelia argillacea*)	N	N	N	N	Federally listed endangered	Clay phacelia is endemic to Spanish Fork Canyon on substrates derived from shale of the Green River Formation.
Ute ladies'-tresses (*Spiranthes diluvialis*)	N	N	N	N	Federally listed threatened	Ute ladies'-tresses are only known on the UNF along the Diamond Fork drainage, with adjacent populations located adjacent to FS administered lands along the Spanish Fork River. It grows in wet meadow habitats associated with creeks and springs, at elevations from 4,400 to 6,800 feet (Atwood et al.).
Deseret milkvetch (*Astragalus deserticus*)	N	N	N	N	Federally listed threatened	This threatened plant is known from a single off-forest population. It occurs on private lands east of the UNF and Highway 89, growing on sandy soils derived from sandstone inclusions in the Moroni Formation (UDWR 1998).

Notes: ESA = Endangered Species Act
FS = Forest Service
MIS = Management Indicator Species
UNF = Uinta National Forest

Species Status List Sources

Forest Service Status List
US Forest Service Region 4 list of special-status species.
Source: Intermountain Region proposed, endangered, threatened, and sensitive species: known/suspected distribution by forest (December 2003).

State Status List
State of Utah Natural Resources Division of Wildlife Resources list of special-status species.
Source: Utah's State Listed Species by County, September 22, 2004. Available at: <http://dwrcdc.nr.utah.gov/ucdc/ViewReports/sscounty_20040922.pdf>.

Federal Status List
U.S. Fish and Wildlife Service list of special-status species.
Federally Listed and Proposed Endangered and Threatened Species in Utah, as of June 2005. Salt Lake City, UT. Unpublished.

MIS (Management Indicator Species) List
Species identified in the USFS Uinta NF Forest Plan to fulfill requirements of 36CFR Chapter II - 219.19.
Source: United States Department of Agriculture, Forest Service Intermountain Region. *Uinta National Forest Final Environmental Impact Statement for the 2003 Land and Resource Management Plan.* May 2003.

Distribution/Habitat Association Sources

Atwood, D., J. Holland, R. Bolander, B. Franklin, D. H. House, L. Armstrong, K. Thorne, and L. England. 1991. *Utah threatened, endangered, and sensitive plant field guide*. United States Department of Agriculture, Forest Service, Ogden, UT.

Farrar, D. R. 2004. *Botrychium searches and collections in Nevada and Utah in 2003.* Report submitted to the Humboldt-Toiyabe National Forest. Unpublished. January 21, 2004. On file at Uinta National Forest Supervisor's Office.

NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.5. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org./explorer>. (Accessed: August 9, 2005)

USDA (U.S. Department of Agriculture) Forest Service. 1991. *Threatened, Endangered, and Sensitive Species of the Intermountain Region.* Ogden, UT.
UDWR (Utah Division of Wildlife Resources). 1998. *Inventory of Sensitive Species and Ecosystems in Utah—Endemic and Rare Plants of Utah: An Overview of Their Distribution and Status.*

APPENDIX D

RESTORATION PLAN

Restoration Plan

The proposed action for the Slate Canyon Pipeline Replacement project would require pipeline construction and continued pipeline maintenance within Slate Canyon. These construction activities have the potential to adversely affect Slate Canyon. Consequently, this restoration plan outlines measures that would be incorporated into the project to reduce construction-related impacts.

The first section of the plan includes a list of resource specific guidelines and standards from the Uinta National Forest (UNF) Forest Plan (UNF 2003) that are applicable to the proposed project. The second section includes a list of conservation measures that will be incorporated into the project to reduce the potential for adverse impacts.

Applicable UNF Forest Plan Standards and Guidelines

Aquatic and Riparian Habitat Management

Aqua-1 Standard: Trees shall not be felled into streams, lakes, or bogs except when needed to improve aquatic habitat.

Aqua-4 Guideline: Limit construction and other activities affecting stream channels to those periods when such activities will have the least detrimental effect on the aquatic environment, unless emergency conditions deem otherwise.

Aqua-5 Guideline: Avoid equipment operation in stream courses, open water, seeps, or springs. If use of equipment in such areas is required, impacts should be minimized.

Aqua-6 Guideline: Limit equipment operation in Riparian Habitat Conservation Areas (RHCAs). If the use of equipment in these areas is required, incorporate additional mitigation to minimize adverse impacts.

Aqua-7 Standard: Prohibit storage of fuels and other toxicants within RHCAs. Do not fuel or service equipment in RHCAs unless there are no other alternatives. If such sites are required within an RHCA, appropriate containment measures must be employed. Construction or maintenance equipment service areas shall be located and treated to prevent gas, oil, or other contaminates from washing or leaching into streams. Equipment working in open water and wetlands shall be cleaned prior to entry into such areas to remove gas, oil, and other contaminants.

Aqua-9 Guideline: Subject to valid existing rights, free-flowing water and associated riparian vegetation communities should be retained at developed spring sites. If possible, existing spring developments should be modified to return water to riparian ecosystems within the source drainage.

Soil and Water Resource Management

S&W-1 Standard: Maintain or improve long-term soil productivity and hydrologic function of the soil by limiting activities that would cause detrimental soil disturbance. Detrimental soil disturbance consists of severely burned soils, loss of ground cover, or detrimental soil displacement, erosion, puddling, or compaction, as defined in Forest Service Handbook (FSH) 2509.18 and applicable Intermountain Region supplements.

S&W-2 Guideline: Avoid land use practices that reduce soil moisture effectiveness, increase average erosion, cause invasion of exotic plants, and reduce abundance and diversity of forbs in the long-term (some short-term practices that would seem to contradict this direction may be beneficial in the long-term).

S&W-3 Guideline: Maintain at least 70% of potential effective ground cover to provide nutrient cycling and protect the soil from erosion in excess of soil loss tolerance limits.

S&W-4 Guideline: Maintain adequate ground cover to filter runoff and prevent detrimental erosion in RHCAs.

RHCA Ground Cover Requirements

RHCA	Minimum Ground Cover Requirement	Minimum Percent of RHCA to Meet Requirement
Class I	90% of potential	90%
Class II	80% of potential	80%
Class III	80% of potential	70%

S&W-5 Guideline: Borrow material should be taken from upland sources wherever feasible.

S&W-6 Guideline: Where practical, on-site topsoil should be conserved and replaced on disturbed areas.

S&W-7 Guideline: To the extent practical, require concurrent reclamation of all permitted surface-disturbing activities.

S&W-12 Guideline: Riprap or other erosion protection materials should be sufficient in size and placed in such a manner as to withstand peak flows comparable to a 100-year flood.

S&W-13 Guideline: Reduce stream sedimentation created as a result of construction.

S&W-15 Guideline: Where channel changes are necessary, natural channel velocities should not be increased over the total length of the affected stream channel.

Wildlife and Fish Habitat Management

WL&F-3 Guideline: Provide for wildlife movement through and/or around structures or project sites such as fences, spring developments, guzzlers, roads, and ditches.

WL&F-11 Guideline: Prohibit management activities around active raptor nest sites (for species other than northern goshawk) from nest site selection to fledging. Nesting periods and recommended buffers by species are defined in Appendix C, "Recommended Raptor Buffers." These recommended buffers may be modified on a site-specific and project-specific basis based on field observations and knowledge of local conditions, or as knowledge of raptor ecology improves.

Noxious Weeds Management

Weeds-1 Standard: Only certified noxious weed-free hay or feed is allowed on National Forest land, including hay or feed for use by recreational livestock. Any materials such as hay, straw, or mulch that are used for rehabilitation and reclamation activities shall be certified weed-free.

Weeds-2 Standard: All seed used on National Forest System lands will be free of seeds from weeds listed on the current Utah Noxious Weed List and the supplemental "Additional Noxious Weeds Declared by Utah Counties" list (UDAF 2000b) and meet or exceed all standards set in the Utah Noxious Weed Act.

Weeds-4 Guideline: Select weed-free locations for project and incident camps, staging areas, cargo loading, drop points, helibases, and parking areas whenever possible.

Weeds-6 Guideline: Avoid or minimize all types of travel, including driving and skidding, through noxious weed-infested areas.

Weeds-7 Standard: Designated wash areas shall be established and utilized on projects where highly aggressive or extensive infestations of noxious weeds are present and where equipment moving about the project has the potential to spread these infestations.

Weeds-8 Guideline: To the extent practical and consistent with other land management objectives, retain shade to suppress noxious weeds in areas where ground-disturbing activities are planned.

Weeds-9 Standard: For at least three years after a project is completed, treat invading noxious weeds, as needed, on areas impacted by ground-disturbing operations.

Weeds-10 Guideline: Stockpiles of topsoil should be kept free of weeds. Topsoil should not be imported from off-site (particularly from off-forest) except when absolutely necessary. If soil is to be brought in from off-forest, it should be tested for the presence of noxious

weed seed and transported onto the Forest only if it is found to be weed-free.

Weeds-11 Guideline: Gravel or borrow material source sites with noxious weed species present should not be used unless effective treatment or other mitigation measures are implemented.

Weeds-12 Guideline: Spray or remove weeds on sites to be disturbed prior to beginning ground-disturbing activities.

Weeds-13 Guideline: Integrated Pest Management (IPM) strategies, including biological, physical, and chemical treatments, may be used to control noxious weeds and other undesirable plants on the Forest.

Weeds-15 Guideline: For all proposed projects and activities, implement appropriate mitigation measures to prevent the establishment and aid the control of noxious weeds.

Weeds-16 Standard: U.S. Forest Service (Forest Service) policies and guidance and Environmental Protection Agency (EPA) label instructions for pesticide application will be followed in implementing all treatment methods.

Vegetation Management

Veg-9 Guideline: Revegetation should be initiated as promptly as practical. Seed only where natural regeneration of desirable species is unlikely or is expected to be slow. Select low nutrient demanding native species to reduce the need for fertilization. Spot reseed as necessary.

Scenery Management

Scene-3 Standard: The Forest Service publication *The Built Environment Image Guide* (USDA 2001a) and the Recreation Opportunity Spectrum (ROS) class will be considered in facility design and in the selection of construction materials and colors.

Recreation Opportunity Spectrum Classes

ROS-1 Guideline: Forest resource uses and activities should meet the objectives for the assigned ROS classes as displayed on the map for each management area located in Chapter 5 of the UNF Forest Plan.

Watershed Emphasis

MP-3.2-2 Guideline: Total soil resource commitment should be limited to no more than 3% of the riparian area acreage with this prescription within any given watershed.

Mitigation Measures

Geology and Soils

GS-1: Avoid Earthwork when Soils Are Too Wet or Too Dry. Soils shall be in a loose or friable condition prior to surface disturbance to avoid detrimental soil disturbance. Excessive wet conditions produce soil clods and soil compaction, while excessive dry conditions produce soil powder, both of which are detrimental to soil structure, thus inhibiting proper soil function for drainage, water holding capacity and soil stability. Prohibit construction during spring runoff where construction occurs on/near floodplains or wetlands. Construction timing limitations would decrease the risk of facility site damage, water contamination, and stream and riparian impacts from flooding events.

GS-2: Reshape Road/Trail Surface after Trench Backfill to Drain Laterally. As the road/trail surface is restored after the trench is filled, it should be outsloped, and rolling dips should be installed so that the trail surface drains away from the road/trail rather than down it.

GS-3: Placement and Treatment of Waste Soil Wedges. This measure is intended to create soil surfaces that promote infiltration of water and eliminate surface runoff. It involves a technique called *extreme surface roughening*, also known as *pocking* or *gouging*, which causes sediment and rainfall/snowmelt to be intercepted and trapped at the microscale, thereby facilitating vegetation establishment and minimizing erosion. Fine sediments collect in the micro surface basins, creating favorable conditions for plant germination and establishment. This measure will be implemented in any vegetated area that is disturbed outside of the existing trail. The following steps are involved in this process.

Mark areas where waste soil wedges will be placed; original ground slope in these areas should not exceed 35%. Do not create soil wedges around trunks of trees that are to be retained.

Remove and temporarily stockpile all vegetation and topsoil (A horizon) from the wedge placement areas. Where the pipeline route deviates from the road/trail, stockpile all vegetation from the trench area as well. The excavated depression will act as a keyway to anchor the wedge fill.

Spread and shape waste soils from trench excavation, with heights above original ground not to exceed 2 feet. Use a technique of dropping the excavated material onto the wedge site from a height of about 3 feet. Assure smooth transition of wedges into undisturbed areas.

Replace topsoil using the same dropping technique. The finished surface should be hummocky, with no continuous downhill slopes exceeding 2 feet in length.

Place stockpiled vegetation randomly over the replaced topsoil, and lightly embed it into the surface using a backhoe bucket.

Provide additional soil cover where cleared vegetation was sparse. This cover may be either chips or hogged material from a fuel-thinning project or a planted

grass cover. Provide this additional soil cover according to recommendations of a Forest Service soil scientist or watershed specialist.

Hydrology

H-1: Divert Streamflow around Trenching Operations at Stream Crossings. Streamflow at the time of construction of pipeline stream crossings shall be diverted using a piping system, such that streamflow does not impinge upon disturbed soils or channel segments. Piping shall be placed so as not to cause scour at the outfall. Construction at stream crossings will occur later in the season when stream flows are low or absent.

H-2: Prevent Damming of Bedload Transport. At stream crossings, erosion-resistant material covering the trench backfill shall be recessed to a depth no higher than the stream's anticipated scour depth at maximum probable flow. A scour-depth estimate shall be made using established procedures, the maximum probable flow (518 cfs), and channel geometry and pattern.

Roadless Areas

RA-1: Provide Physical Barrier to Unauthorized Use. After construction a physical barrier (e.g., barrier rock) will be installed on both sides of the Forest Service gate at the mouth of Slate Canyon to prevent unauthorized vehicle use of Slate Canyon Trail.

Visual Resources

V-1: Topography and Earthwork. In addition to the movement of soil, earthwork also includes the movement of rocks, the use of soil retention, the disturbance of tree roots, and the dumping or stockpiling of earth and rock material. Earthwork activities resulting in excessive cut and fill often leave long-lasting negative visual impacts. When the soil's dark surface layer is disturbed, the lighter subsurface soil is exposed. The resulting visual contrast creates an eyesore within the viewshed. Excessive disturbance of existing topography also eliminates existing vegetation and creates runoff and erosion problems. Techniques to minimize problems related to topographic disturbance include the following.

1. Minimizing Cut and Fill Slopes by

   locating the trail, and buried pipe in areas of minimal slope;
   minimizing the trail width and grade; and
   aligning the trail and buried pipe with existing topography.

2. Minimizing Earthwork Contrasts by

   blending slopes to match and mimic existing topography;
   utilizing existing natural screens (i.e., vegetation, topography, etc.);
   retaining existing features such as vegetation, rocks, and drainage channels;
   applying native seed mixes to areas of cuts and fills; and
   prohibiting long-term dumping/stockpiling of earth and rock on downhill slopes.

3. Maintaining Topographic Integrity by

locating the project away from areas adjacent to prominent landforms; and
ensuring that the shape and placement of project blend with existing topography.

V2: Vegetation. Vegetation can be utilized as a visual screen for the burial of the pipe. The retention of existing vegetation is an effective method of reducing a project's visual impact. Retaining existing vegetation reduces erosion and runoff problems, lessens site recovery duration, and often reduces rehabilitation costs. Upon completion of project construction, disturbed areas shall be revegetated in order to blend the project in with the adjacent landscape. In the event of vegetative clearing, practices shall minimize visual contrast and create natural-looking clearings and edges. Techniques include the following.

1. Retaining Existing Vegetation by

minimizing surface disturbance; and
protecting roots from damage during construction.

2. Minimizing Project Impacts on Existing Vegetation by

minimizing clearing size;
preserving islands of vegetation within the construction limits rather than clearing the entire area;
using irregular clearing shapes to blend with the existing landscape when clearing vegetation an avoiding straight lines;
feathering/thinning the edges of cleared areas to create natural-looking edges;
maintaining a mix of tree/shrub species in various sizes along edges; and
disposing of all excess vegetative material.

V3: Restoration. A restoration plan is an important part of any project. Upon completion of project construction, all disturbed areas shall be restored as closely as possible to their previous conditions. Restoration efforts shall minimize a project's long-term visual impacts by decreasing the amount of disturbed area while adequately providing for project operations. Restoration techniques include:

1. Blending disturbed areas into the undisturbed surrounding landscape by

recontouring the site as closely as possible to its previous form;
replacing native rock and debris in order to lessen unnatural-looking grass cover;
planting native plant materials in natural-looking patterns; and
breaking up unnatural lines in the disturbed site (i.e., clearing edges, cut and fill extents, etc.) with rocks, debris, and native plant materials.

2. Revegetating Disturbed Areas by

roughening the surface in order to trap water and speed vegetative growth after recontouring the site;
stockpiling and reusing topsoil;

furrowing steep slopes;
applying a Forest Service approved seed mix to disturbed areas;
selecting native plant species; and
planting and/or seeding at optimal times: in spring, seed from March 1 through May 31, in fall, seed from October 1 through November 30.

Slate Canyon Site Specific Conservation Measures

1. Best Management Plans (BMPs) (FSH 2509.22) will be used where ground-disturbing activities occur. These BMPs will be applied to protect soil, water, and vegetation resources where construction activities will occur in sensitive areas and will be described for site-specific conditions within the erosion and drainage control plan developed prior to project construction and in consultation with permitting agencies.

2. Minimize tree or shrub removal during project construction.

3. Construction activities will be limited to the greatest extent possible in riparian habitat and/or undisturbed areas.

4. Temporary equipment and materials staging areas will be located in previously disturbed areas.

5. All construction boundaries will be flagged, staked or fenced, and no disturbance will be allowed outside these boundaries.

6. To control erosion and protect water quality, silt fences or straw bales (certified as weed-free according to State of Utah standards) will be properly erected around all construction activities. These will be monitored and maintained by the State of Utah.

7. Follow invasive species prevention measures outlined in the Forest Plan Standards and Guidelines, listed above. In no cases will weeds or potentially weed-contaminated materials (bales, borrow material) be transported or transferred across the project area.

8. Prior to initiating construction, all equipment will be washed and visually inspected for invasive, nonnative seeds and reproductive plant parts. Nonnative materials will be removed and disposed of appropriately. All equipment to be used for construction will be thoroughly cleaned prior to mobilization to and from the project site.

9. Implement an approved weed management strategy in all disturbed areas in accordance with Forest Service protocol to minimize potential effects from noxious weeds. This includes the monitoring and eradication of weeds before and up to one year after construction is completed. Any borrow material used during construction of the proposed projects will be certified by the State of Utah as weed-free as per Forest Service standards.

10. At the start of trenching activities, any topsoil will be removed and stockpiled on-site but separately from other excavated materials. The stockpiled topsoil will be protected from wind and water erosion and reserved until backfilling the trench or grading activity is completed and then used to recover the disturbance to final grade. In areas along the pipeline where there is no topsoil, imported, certified weed-free topsoil soil will be used.

11. The Forest Service will require the State or its construction contractor to post signs notifying the public of the trail closure. These signs will be at the mouth of the canyon and at the eastern trail connections.

12. Construction activities will occur during daylight hours to reduce and prevent impacts on roosting birds and any bats that may forage in the area.

13. To prevent undue harm to migratory birds, the State will conduct avian nest surveys, for bird species listed under the Migratory Bird Treaty Act and raptors, will be conducted within 50 feet, of the pipeline, less than 10-days prior to the start of construction activities. If active nests are encountered during nest surveys, an avoidance buffer will be set up until the hatchlings fledge. The buffer varies by species and will be determined based on the buffers presented in Appendix C of the Forest Plan.

14. Prior to construction, the State will complete a detailed restoration plan that will be approved by the Forest Service.

15. Upon completion of project construction, all disturbed areas will be re-contoured to their original grade. In areas where the trail requires reconditioning prior to pipeline construction, the re-contouring and final grade will meet Forest Service engineering, recreational and visual resource standards.