

Lake Powell Pipeline

Draft Study Report 13 Special Status Wildlife Species

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Special Status Wildlife Species Study Report

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Special Status Wildlife Species Study Report

Executive Summary

ES-1 Introduction

This study report describes the results and findings of an analysis to evaluate threatened, endangered and candidate wildlife species and designated critical habitats and wildlife species of concern, including tribal wildlife species of cultural concern along the proposed alternative alignments of the Lake Powell Pipeline Project (LPP Project), No Lake Powell Water Alternative, and No Action Alternative. The purpose of the analysis, as defined in the 2008 Special Status Wildlife Species Study Plan prepared for the Federal Energy Regulatory Commission (Commission), was to identify potential effects and impacts from construction and operations of the alternatives and identify measures to mitigate effects and impacts from the LPP project as necessary.

ES-2 Methodology

The analysis of impacts on special status wildlife species follows the methodology identified and described in the Preliminary Application Document, Scoping Document No. 1 and the Special Status Wildlife Species Study Plan filed with the Commission.

ES-3 Key Results of the Special Status Wildlife Species Impact Analyses

Table ES-1 summarizes the effects determinations for threatened, endangered and candidate species and impact determinations for species of special concern and tribal species of cultural concern.

**Table ES-1
Summary of Effects and Impacts Determinations**

Alternative	Species	Effects Determination*
Threatened, Endangered and Candidate Species		
South Alternative Existing Highway Alternative Southwest Corner Alternative	California condor	May
	Mexican spotted owl	May
	Southwest willow flycatcher	No
	Utah prairie dog	Likely
	Yellow-billed cuckoo	No
	Greater sage-grouse	No
	Mohave desert tortoise	Likely
	Relict leopard frog	No
	Yuma clapper rail	No
	Kanab ambersnail	No
Transmission Line Alternatives	California condor	Likely
	Mexican spotted owl	May
	Southwest willow flycatcher	No
	Utah prairie dog	Likely
	Yellow-billed cuckoo	No
	Greater sage-grouse	No
	Mohave desert tortoise	Likely
	Relict leopard frog	No
	Yuma clapper rail	No
	Kanab ambersnail	No
No Lake Powell Water Alternative	California condor	No
	Mexican spotted owl	May
	Southwest willow flycatcher	No
	Utah prairie dog	No
	Yellow-billed cuckoo	No
	Greater sage-grouse	No
	Mohave desert tortoise	Likely
	Relict leopard frog	No
	Yuma clapper rail	No
	Kanab ambersnail	No
No Action Alternative	All Species	No
Wildlife Species of Concern and Tribal Wildlife Species of Cultural Concern		
All Alternatives	All Species	Not Significant
Notes: *Effects Determinations: No = No effect May = May affect, not likely to adversely affect Likely = Likely to adversely affect Not Significant = Would not exceed the significance criteria		

Four species have designated critical habitat; effects on these critical habitats would be:

- California condor – no effect
- Mexican spotted owl – permanent disturbance of 8.7 acres of Habitat Unit CP-11
- Southwest willow flycatcher – no effect
- Mohave desert tortoise – no effect

Chapter 1

Introduction

1.1 Introduction

This chapter presents a summary description of the alternatives studied for the Lake Powell Pipeline (LPP) project, located in north central Arizona and southwest Utah (Figure 1-1) and identifies the issues and impact topics for the Special Status Wildlife Species Study Report. The alternatives studied and analyzed include different alignments for pipelines and penstocks and transmission lines, a no Lake Powell water alternative, and the No Action alternative. The pipelines would convey water under pressure and connect to the penstocks, which would convey the water to a series of hydroelectric power generating facilities. The action alternatives would each deliver 86,249 acre-feet of water annually for municipal and industrial (M&I) use in the three southwest Utah water conservancy district service areas. Washington County Water Conservancy District (WCWCD) would receive 69,000 acre-feet, Kane County Water Conservancy District (KCWCD) would receive 4,000 acre-feet and Central Iron County Water Conservancy District (CICWCD) could receive up to 13,249 acre-feet each year.

1.2 Summary Description of Alignment Alternatives

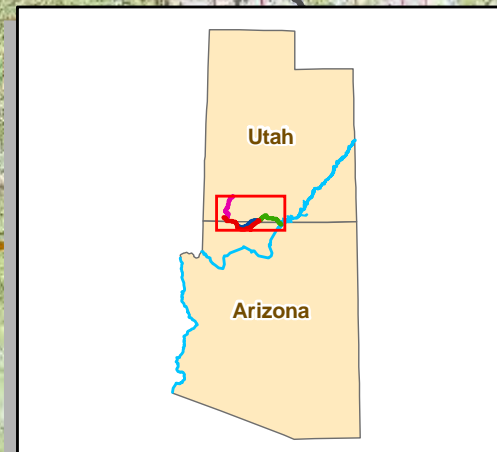
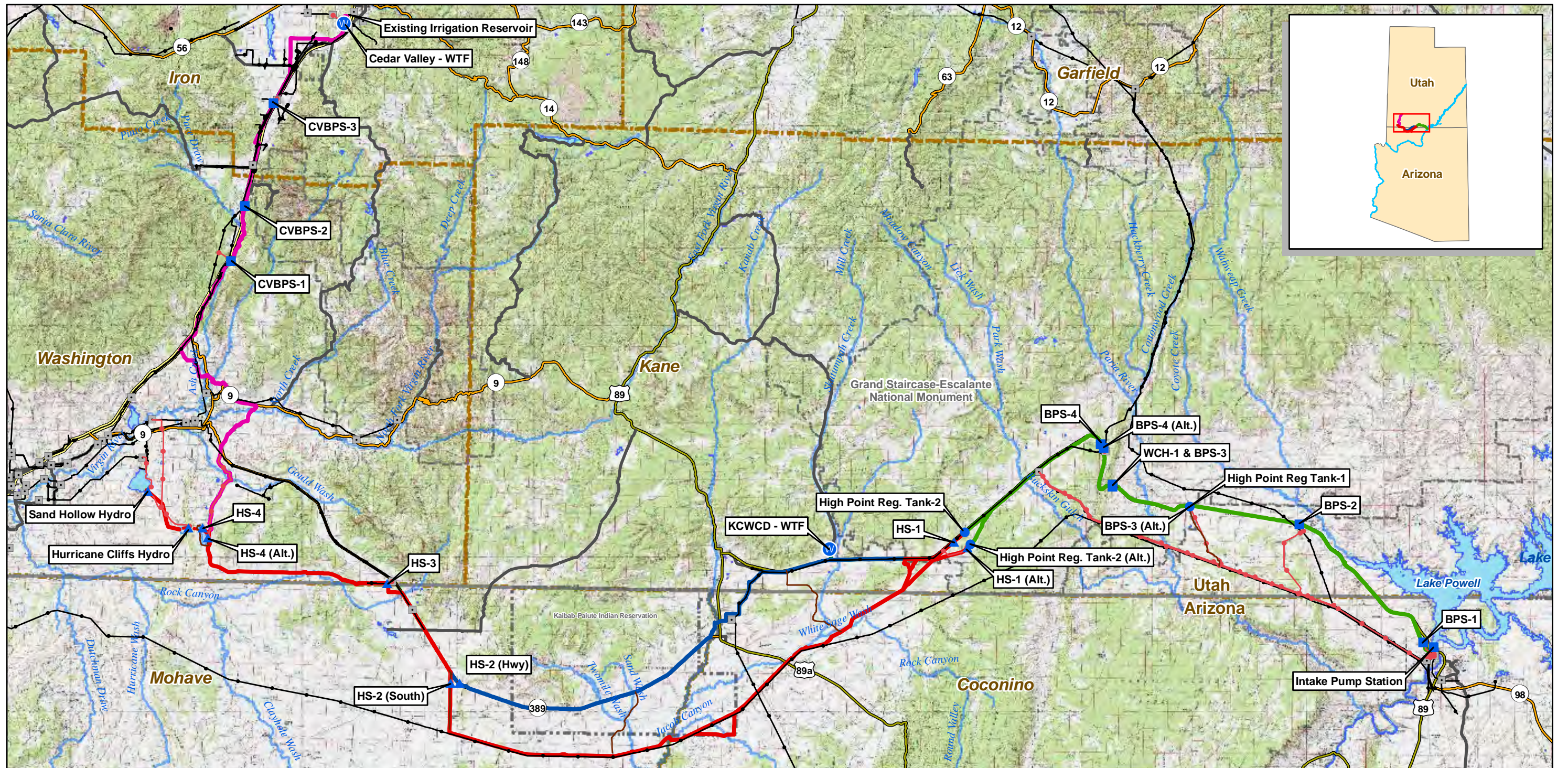
Three primary pipeline and penstock alignment alternatives are described in this section along with the electrical power transmission line alternatives. The pipeline and penstock alignment alternatives share common segments between the intake at Lake Powell and delivery at Sand Hollow Reservoir, and they are spatially different in the area through and around the Kaibab-Paiute Indian Reservation. The South Alternative extends south around the Kaibab-Paiute Indian Reservation. The Existing Highway Alternative follows an Arizona state highway through the Kaibab-Paiute Indian Reservation. The Southeast Corner Alternative follows the Navajo-McCullough Transmission Line corridor through the southeast corner of the Kaibab-Paiute Indian Reservation. The transmission line alignment alternatives are common to all the pipeline and penstock alignment alternatives. Figure 1-1 shows the overall proposed project and alternative features from Lake Powell near Page, Arizona to Sand Hollow and Cedar Valley, Utah.

1.2.1 South Alternative

The South Alternative consists of five systems: Intake, Water Conveyance, Hydro, Kane County Pipeline, and Cedar Valley Pipeline.

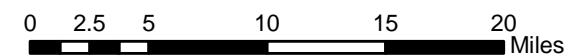
The **Intake System** would pump Lake Powell water via submerged horizontal tunnels and vertical shafts into the LPP. The intake pump station would be constructed and operated adjacent to the west side of Lake Powell approximately 2,000 feet northwest of Glen Canyon Dam in Coconino County, Arizona (Figure 1-2). The pump station enclosure would house vertical turbine pumps with electric motors, electrical controls, and other equipment at a ground level elevation of 3,745 feet mean sea level (MSL).

The **Water Conveyance System** would convey the Lake Powell water from the Intake System for about 51 miles through a buried 69-inch diameter pipeline parallel with U.S. 89 in Coconino County, Arizona and Kane County, Utah to a buried regulating tank (High Point Regulating Tank-2) on the south side of U.S. 89 at ground level elevation 5,695 feet MSL, which is the LPP project topographic high point



- | | | | | |
|----------------------------|--|--------------|-----------------------------------|------------------------|
| Water Treatment Facility | Water Conveyance | Interstate | Hurricane Cliffs Forebay/Afterbay | National Park/Monument |
| Project Pump Station | Hydro System - South Alignment Alternative | US Highway | Lakes & Reservoirs | GSENM-Boundary |
| Project Regulating Tank | Hydro System - Highway Alignment Alternative | ST Highway | Major Rivers & Streams | Tribal Lands |
| Project Hydro Station | KCWCD Pipeline System | Hwy | State Boundaries | County Boundaries |
| Project Transmission Line | Cedar Valley Pipeline | Major Road | | |
| Existing Substation | | Access Roads | | |
| Existing Transmission Line | | | | |

FERC Project Number:
12966-001
BLM Serial Numbers:
AZA-34941
UTU-85472

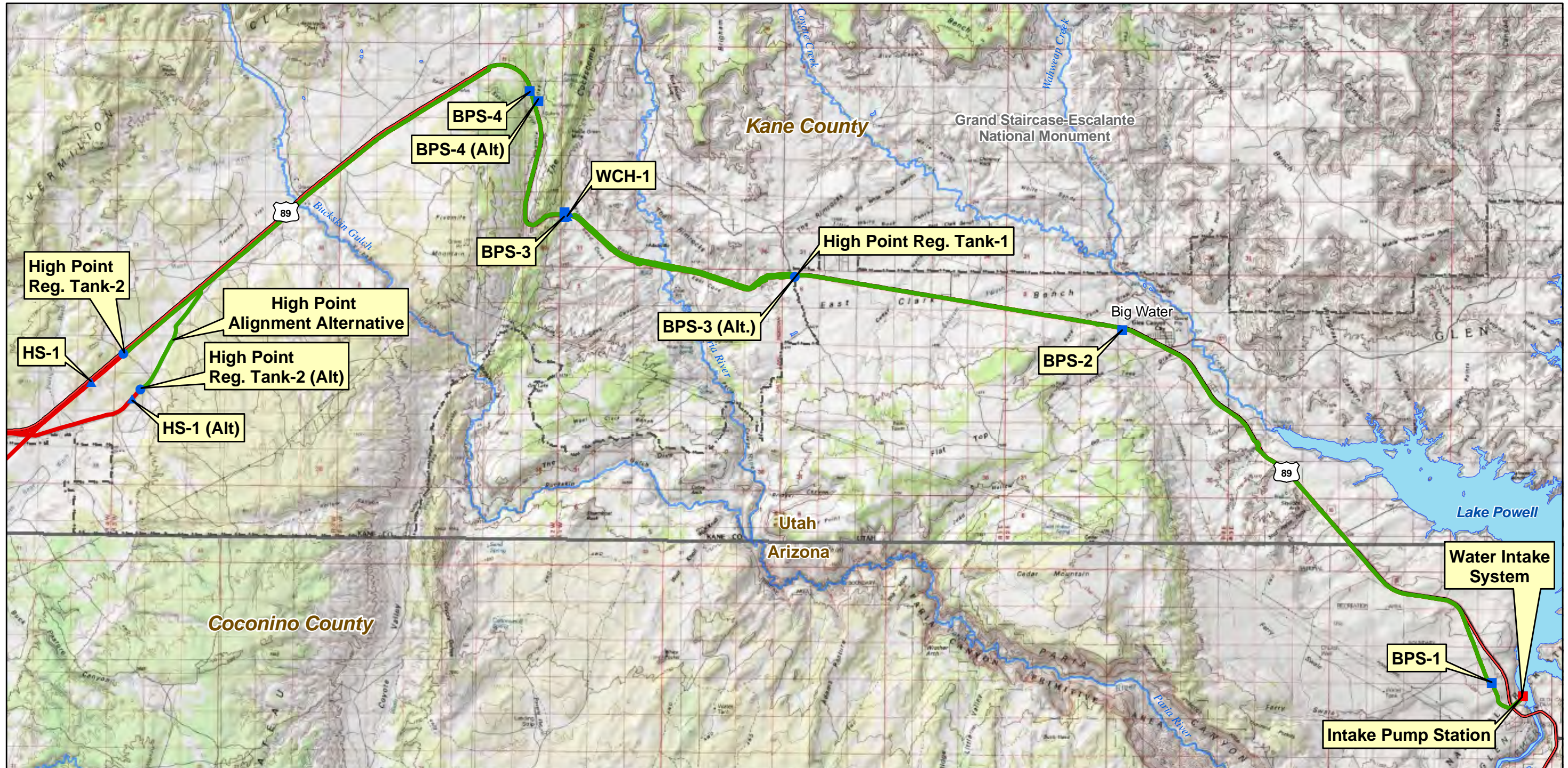


Lake Powell Pipeline Project

Spatial Reference: UTM Zone 12N, NAD-83

UDWR Figure 1-1 MWH

Lake Powell Pipeline Proposed Project and Alternative Features



- | | | |
|--|--------------|--------------------------|
| ■ Project Intake Pump Station | — Interstate | ■ Lakes & Reservoirs |
| ■ Project Booster Pump Station | — US Highway | — Major Rivers & Streams |
| ● Project Regulating Tank | — ST Highway | ■ National Park/Monument |
| ▲ Project Hydro Station | — Hwy | ■ GSENM Boundary |
| — Water Conveyance System | — Major Road | ■ State Boundaries |
| — Hydro System - South Alignment Alternative | | NGS USA Topographic Maps |

FERC Project Number:
12966-001
BLM Serial Numbers:
AZA-34941
UTU-85472

0 0.5 1 2 3 4 Miles



Lake Powell Pipeline Project

Spatial Reference: UTM Zone 12N, NAD-83

UDWR Figure 1-2 MWH

Lake Powell Pipeline
Intake and
Water Conveyance Systems

(Figure 1-2). The pipeline would be sited within a utility corridor established by Congress in 1998 which extends 500 feet south and 240 feet north of the U.S. 89 centerline on public land administered by the Bureau of Land Management (BLM) (U.S. Congress 1998). Four booster pump stations (BPS) located along the pipeline would pump the water under pressure to the high point regulating tank. Each BPS would house vertical turbine pumps with electric motors, electrical controls, and other equipment. Additionally, each BPS site would have a substation, buried forebay tank and a surface emergency overflow detention basin. BPS-1 would be sited within the Glen Canyon National Recreation Area adjacent to an existing Arizona Department of Transportation maintenance facility located west of U.S. 89. BPS-2 would be sited on land administered by the Utah School and Institutional Trust Lands Administration (SITLA) near the town of Big Water, Utah on the south side of U.S. 89. BPS-3 and an in-line hydro station (WCH-1) would be sited at the east side of the Cockscomb geologic feature in the Grand Staircase-Escalante National Monument (GSENM) within the Congressionally-designated utility corridor. BPS-3 (Alt) is an alternative location for BPS-3 on land administered by the BLM Kanab Field Office near the east boundary of the GSENM on the south side of U.S. 89 within the Congressionally-designated utility corridor. Incorporation of BPS-3 (Alt.) into the LPP project would replace BPS-3 and WCH-1 at the east side of the Cockscomb geologic feature. BPS-4 would be sited on the west side of U.S. 89 and within the Congressionally-designated utility corridor in the GSENM on the west side of the Cockscomb geologic feature.

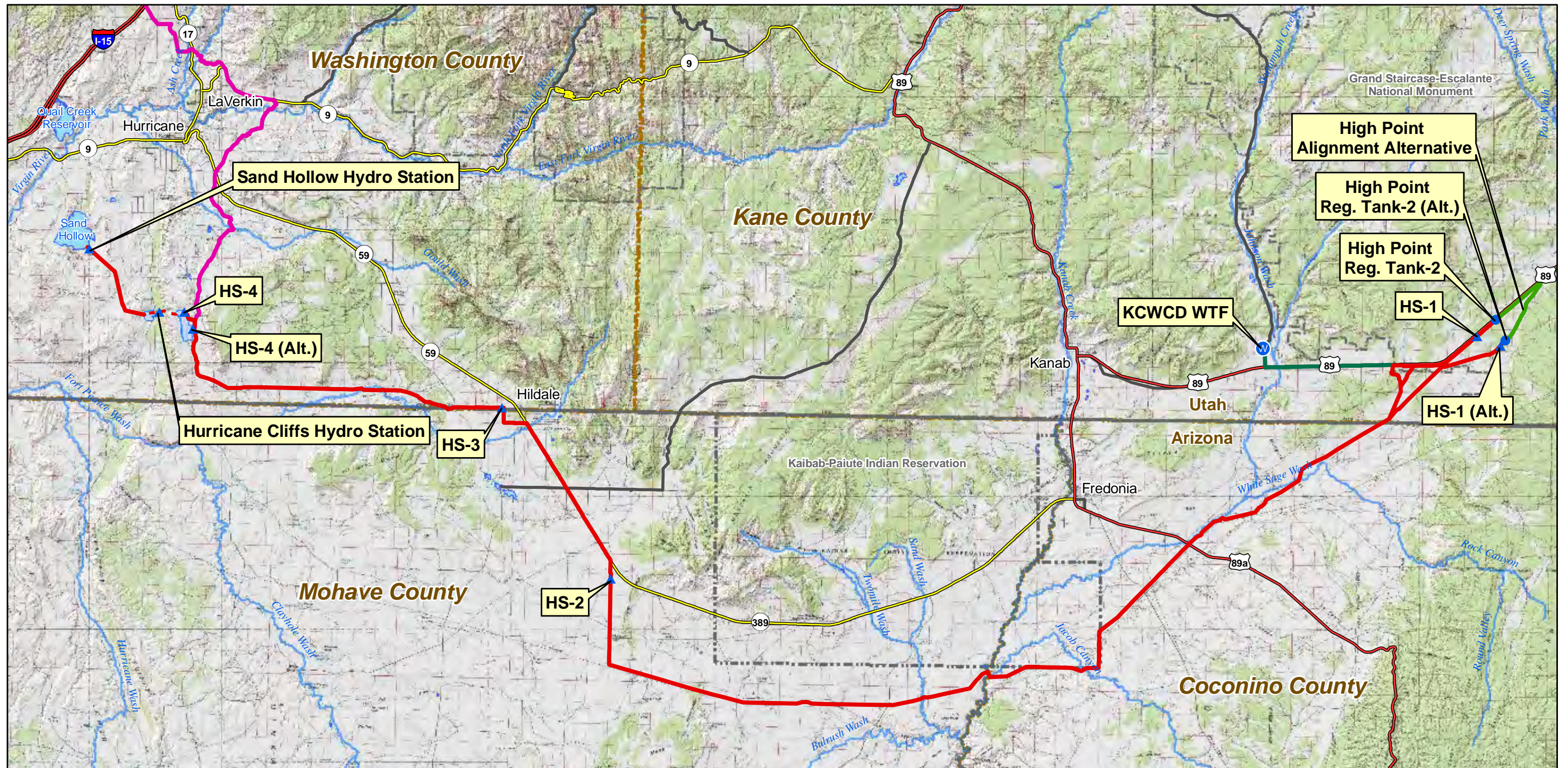
The High Point Alignment Alternative would diverge south from U.S. 89 parallel to the K4020 road and continue outside of the Congressionally-designated utility corridor to a buried regulating tank (High Point Regulating Tank-2 (Alt.) at ground level elevation 5,630 feet MSL, which would be the topographic high point of the LPP project along this alignment alternative (Figure 1-2). The High Point Alignment Alternative would include BPS-4 (Alt.) on private land east of U.S. 89 and west of the Cockscomb geologic feature (Figure 1-2). Incorporation of the High Point Alignment Alternative and BPS-4 (Alt.) into the LPP project would replace the High Point Regulation Tank-2 along U.S. 89, the associated buried pipeline and BPS-4 west of U.S. 89.

A rock formation avoidance alignment option would be included immediately north of Blue Pool Wash along U.S. 89 in Utah. Under this alignment option, the pipeline would cross to the north side of U.S. 89 for about 400 feet and then return to the south side of U.S. 89. This alignment option would avoid tunneling under the rock formation on the south side of U.S. 89 near Blue Pool Wash.

A North Pipeline Alignment option is located parallel to the north side of U.S. 89 for about 6 miles from the east boundary of the GSENM to the east side of the Cockscomb geological feature.

The **Hydro System** would convey the Lake Powell water from High Point Regulating Tank-2 at the high point at ground level elevation 5,695 feet MSL for about 87 miles through a buried 69-inch diameter penstock in Kane and Washington counties, Utah and Coconino and Mohave counties, Arizona to Sand Hollow Reservoir near St. George, Utah (Figure 1-3). The High Point Alignment Alternative would convey the Lake Powell water from High Point Regulating Tank-2 (Alt.) at the high point at ground level elevation 5,630 feet MSL for about 87.5 miles through a buried 69-inch diameter penstock in Kane and Washington counties, Utah and Coconino and Mohave counties, Arizona to Sand Hollow Reservoir near St. George, Utah (Figure 1-3). Four in-line hydro generating stations (HS-1, HS-2 HS-3 and HS-4) with substations located along the penstock would generate electricity and help control water pressure in the penstock. HS-1 would be sited on the south side of U.S. 89 within the Congressionally-designated utility corridor through the GSENM. The High Point Alignment Alternative would include HS-1 (Alt.) along the K4020 road within the GSENM and continue along a portion of the K3290 road.

The proposed penstock alignment and two penstock alignment options are being considered to convey the water from the west GSENM boundary south through White Sage Wash. The proposed penstock



<ul style="list-style-type: none"> Water Treatment Facility Project Regulating Tank Project Hydro Station Hurricane Cliffs Forebay/Afterbay Lakes & Reservoirs Major Rivers & Streams 	<ul style="list-style-type: none"> Hydro System - South Alignment Alternative Water Conveyance System Cedar Valley Pipeline KCWCD Pipeline System 	<ul style="list-style-type: none"> Interstate US Highway ST Highway Hwy Major Road 	<ul style="list-style-type: none"> National Park/Monument GSENM Boundary Tribal Lands State Boundaries County Boundaries 	<p>FERC Project Number: 12966-001</p> <p>BLM Serial Numbers: AZA-34941 UTU-85472</p>	<p>Lake Powell Pipeline Project</p> <p>Spatial Reference: UTM Zone 12N, NAD-83</p> <p> UDWR Figure 1-3 </p> <p>Lake Powell Pipeline Hydro System South Alternative</p>
---	---	--	--	--	---

0 1.25 2.5 5 7.5 10 Miles

alignment would parallel the K3250 road south from U.S. 89 and follow the Pioneer Gap Road alignment around the Shinarump Cliffs. One penstock alignment option would parallel the K3285 road southwest from U.S. 89 and continue to join the Pioneer Gap Road around the Shinarump Cliffs. The other penstock alignment option would extend southwest through currently undeveloped BLM land from the K3290 road into White Sage Wash.

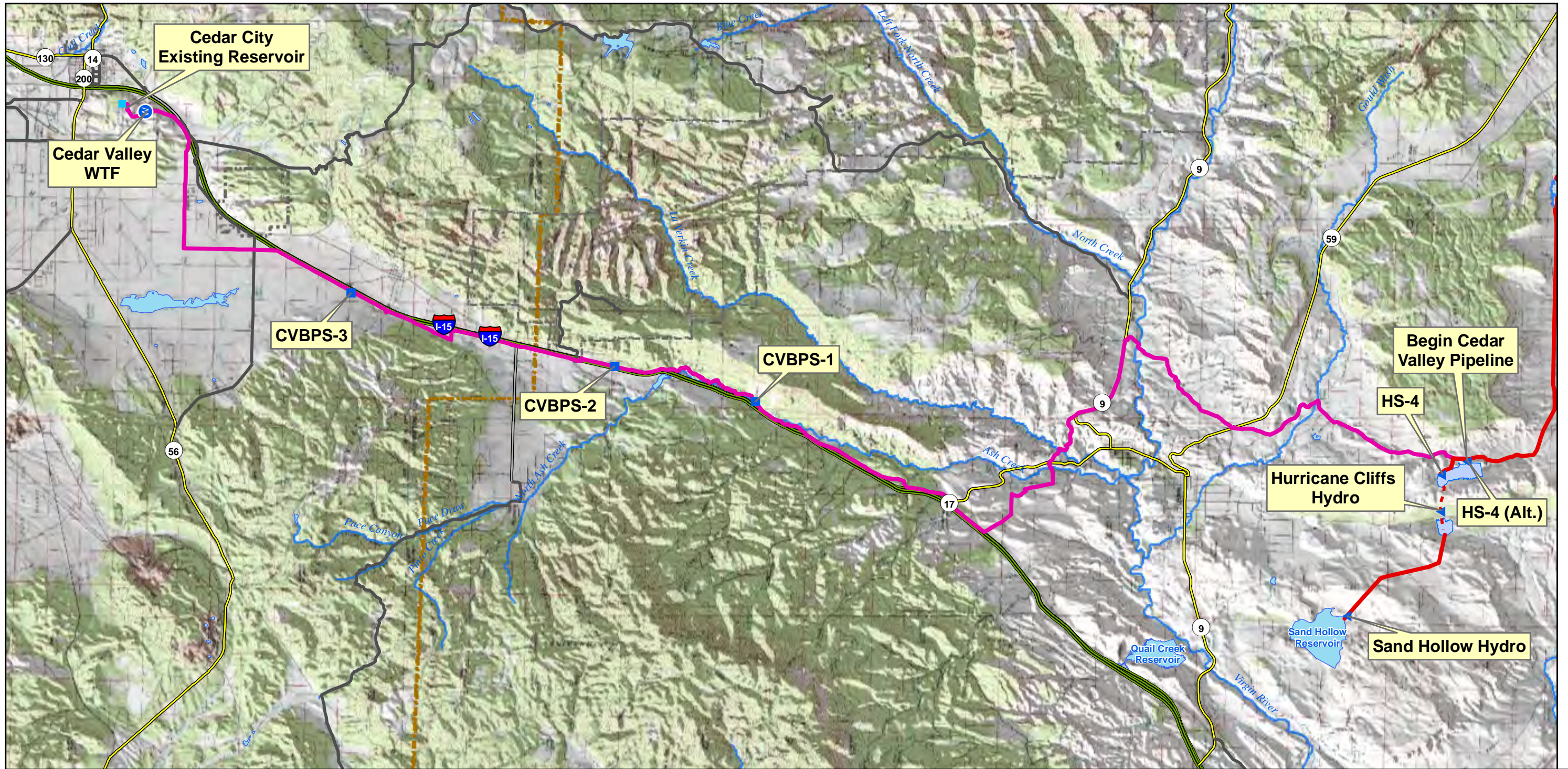
The penstock alignment would continue through White Sage Wash and then parallel to the Navajo-McCullough Transmission Line, crossing U.S. 89 Alt. and Forest Highway 22 toward the southeast corner of the Kaibab Indian Reservation. The penstock alignment would run parallel to and south of the south boundary of the Kaibab Indian Reservation, crossing Kanab Creek and Bitter Seeps Wash, across Moonshine Ridge and Cedar Ridge, and north along Yellowstone Road to Arizona State Route 389 west of the Kaibab Indian Reservation. HS-2 would be sited west of the Kaibab Indian Reservation. The penstock alignment would continue northwest along the south side of Arizona State Route 389 past Colorado City to Hildale City, Utah and HS-3.

The penstock alignment would follow Uzona Road west through Canaan Gap and south of Little Creek Mountain and turn north to HS-4 (Alt.) above the proposed Hurricane Cliffs forebay reservoir. The forebay reservoir would be contained in a valley between a south dam and a north dam and maintain active storage of 11,255 acre-feet of water. A low pressure tunnel would convey the water to a high pressure vertical shaft in the bedrock forming the Hurricane Cliffs, connected to a high pressure tunnel near the bottom of the Hurricane Cliffs. The high pressure tunnel would connect to a penstock conveying the water to a pumped storage hydro generating station. The pumped storage hydro generating station would connect to an afterbay reservoir contained by a single dam in the valley below the Hurricane Cliffs. A low pressure tunnel would convey the water northwest to a penstock continuing on to the Sand Hollow Hydro Station. The water would discharge into the existing Sand Hollow Reservoir.

The peaking hydro generating station option would involve a smaller, 200 acre-foot forebay reservoir with HS-4 discharging into the forebay reservoir, with the peaking hydro generating station discharging to a small afterbay connected to a penstock running north along the existing BLM road and west to the Sand Hollow Hydro Station. A low pressure tunnel would convey the water to a high pressure vertical shaft in the bedrock forming the Hurricane Cliffs, connected to a high pressure tunnel near the bottom of the Hurricane Cliffs. The high pressure tunnel would connect to a penstock conveying the water to a peaking hydro generating station, which would discharge into a 200 acre-foot afterbay reservoir. A penstock would extend north from the afterbay reservoir along the existing BLM road and then west to the Sand Hollow Hydro Station. The water would discharge into the existing Sand Hollow Reservoir.

The **Kane County Pipeline System** would convey the Lake Powell water from the Lake Powell Pipeline at the west GSENM boundary for about 8 miles through a buried 24-inch diameter pipe in Kane County, Utah to a conventional water treatment facility located near the mouth of Johnson Canyon. The pipeline would parallel the south side of U.S. 89 across Johnson Wash and then run north to the new water treatment facility site (Figure 1-3).

The **Cedar Valley Pipeline System** would convey the Lake Powell water from the Lake Powell Pipeline just upstream of HS-4 or HS-4 (Alt.) for about 58 miles through a buried 36-inch diameter pipeline in Washington and Iron counties, Utah to a conventional water treatment facility in Cedar City, Utah (Figure 1-4). Three booster pump stations (CVBPS) located along the pipeline would pump the water under pressure to the new water treatment facility. The pipeline would follow an existing BLM road north from HS-4, cross Utah State Route 59 and continue north to Utah State Route 9, with an aerial crossing of the Virgin River at the Sheep Bridge. The pipeline would run west along the north side of Utah State Route 9 and parallel an existing pipeline through the Hurricane Cliffs at Nephi's Twist. The pipeline



<ul style="list-style-type: none">Water Treatment FacilityProject Pump StationProject Hydro StationHydro System - South Alignment AlternativeWater Conveyance SystemHurricane Cliffs Pressure TunnelCedar Valley Pipeline	<ul style="list-style-type: none">InterstateUS HighwayST HighwayHwyMajor Road	<ul style="list-style-type: none">Hurricane Cliffs Forebay/AfterbayLakes & ReservoirsMajor Rivers & StreamsNational Park/MonumentCounty BoundariesTribal Lands	<p>FERC Project Number: 12966-001</p> <p>BLM Serial Numbers: AZA-34941 UTU-85472</p> <p>0 1 2 4 6 8 Miles</p>	<p>Lake Powell Pipeline Project</p> <p>Spatial Reference: UTM Zone 12N, NAD-83</p> <p>UDWR Figure 1-4 MWH</p> <p>Cedar Valley Pipeline System</p>
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would continue across LaVerkin Creek, cross Utah State Route 17, and make an aerial crossing of Ash Creek. The pipeline would continue northwest to the Interstate 15 corridor and then northeast parallel to the east side of Interstate 15 highway right-of-way. CVBPS-1 would be sited adjacent to an existing gravel pit east of Interstate 15. CVBPS-2 would be sited on private property on the east side of Interstate 15 and south of the Kolob entrance to Zion National Park. CVBPS-3 would be sited on the west side of Interstate 15 in Iron County. The new water treatment facility would be sited near existing water reservoirs on a hill above Cedar City west of Interstate 15.

1.2.2 Existing Highway Alternative

The Existing Highway Alternative consists of five systems: Intake, Water Conveyance, Hydro, Kane County Pipeline, and Cedar Valley Pipeline. The Intake, Water Conveyance and Cedar Valley Pipeline systems would be the same as described for the South Alternative.

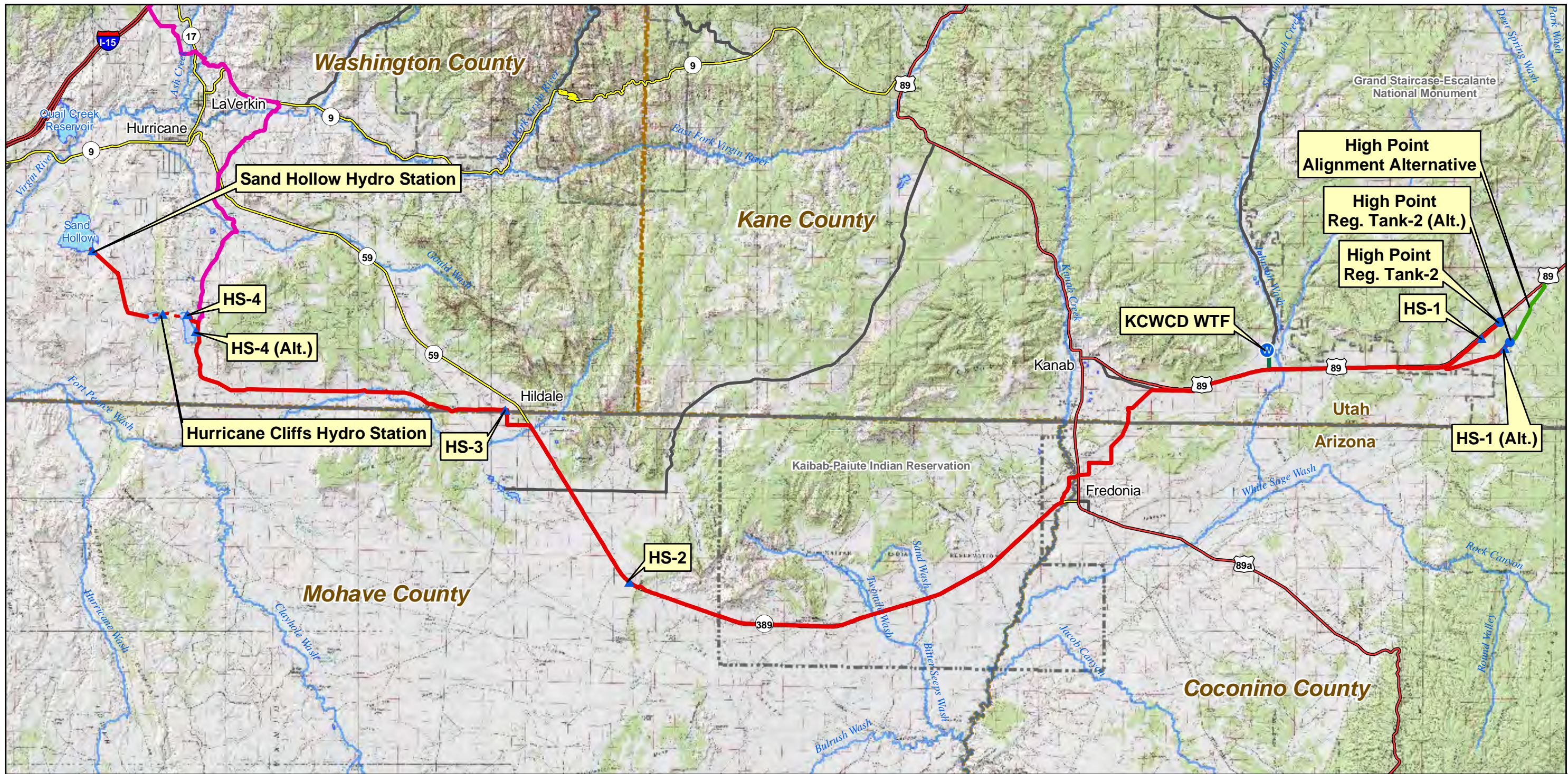
The **Hydro System** would convey the Lake Powell water from the regulating tank at the high point at ground elevation 5,695 feet MSL for about 80 miles through a buried 69-inch diameter penstock in Kane and Washington counties, Utah and Coconino and Mohave counties, Arizona to Sand Hollow Reservoir near St. George, Utah (Figure 1-5). The High Point Alignment Alternative would convey the Lake Powell water from High Point Regulating Tank-2 (Alt.) at the high point at ground level elevation 5,630 feet MSL for about 80.5 miles through a buried 69-inch diameter penstock in Kane and Washington counties, Utah and Coconino and Mohave counties, Arizona to Sand Hollow Reservoir near St. George, Utah (Figure 1-3). The High Point Alignment Alternative would rejoin U.S. 89 about 2.5 miles east of the west boundary of the GSENM. Four in-line hydro generating stations (HS-1, HS-2 HS-3 and HS-4) located along the penstock would generate electricity and help control water pressure in the penstock. HS-1 would be sited on the south side of U.S. 89 within the Congressionally-designated utility corridor through the GSENM. The High Point Alignment Alternative would include HS-1 (Alt.) along the K4020 road within the GSENM and continue along a portion of the K3290 road to its junction with the pipeline alignment along U.S. 89.

The penstock would parallel the south side of U.S. 89 west of the GSENM past Johnson Wash and follow Lost Spring Gap southwest, crossing U.S. 89 Alt. and Kanab Creek in the north end of Fredonia, Arizona. The penstock would run south paralleling Kanab Creek to Arizona State Route 389 and run west adjacent to the north side of this state highway through the Kaibab-Paiute Indian Reservation past Pipe Spring National Monument. The penstock would continue along the north side of Arizona State Route 389 through the west half of the Kaibab-Paiute Indian Reservation to 1.8 miles west of Cedar Ridge (intersection of Yellowstone Road with U.S. 89), from where it would follow the same alignment as the South Alternative to Sand Hollow Reservoir. HS-2 would be sited 0.5 mile west of Cedar Ridge along the north side of Arizona State Route 389.

The **Kane County Pipeline System** would convey the Lake Powell water from the Lake Powell Pipeline crossing Johnson Wash along U.S. 89 for about 1 mile north through a buried 24-inch diameter pipe in Kane County, Utah to a conventional water treatment facility located near the mouth of Johnson Canyon (Figure 1-5).

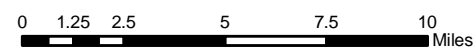
1.2.3 Southeast Corner Alternative

The Southeast Corner Alternative consists of five systems: Intake, Water Conveyance, Hydro, Kane County Pipeline, and Cedar Valley Pipeline. The Intake, Water Conveyance, Kane County Pipeline and Cedar Valley Pipeline systems would be the same as described for the South Alternative.



- | | | | |
|-----------------------------------|--|------------|------------------------|
| Water Treatment Facility | Water Conveyance | Interstate | National Park/Monument |
| Project Regulating Tank | Hydro System - South Alignment Alternative | US Highway | GSENM Boundary |
| Project Hydro Station | Hurricane Cliffs Pressure Tunnel | ST Highway | Tribal Lands |
| Hurricane Cliffs Forebay/Afterbay | Cedar Valley Pipeline | Hwy | State Boundaries |
| Lakes & Reservoirs | KCWCD Pipeline System | Major Road | County Boundaries |
| Major Rivers & Streams | | | |

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UTU-85472



Lake Powell Pipeline Project
Spatial Reference: UTM Zone 12N, NAD-83

UDWR Figure 1-5

**Lake Powell Pipeline
Hydro System
Existing Highway Alternative**

The **Hydro System** would be the same as described for the South Alternative between High Point Regulating Tank-2 and the east boundary of the Kaibab-Paiute Indian Reservation. The penstock alignment would parallel the north side of the Navajo-McCullough Transmission Line corridor in Coconino County, Arizona through the southeast corner of the Kaibab Indian Reservation for about 3.8 miles and then follow the South Alternative alignment south of the south boundary of the Kaibab-Paiute Indian Reservation, continuing to Sand Hollow Reservoir (Figure 1-6).

1.2.4 Transmission Line Alternatives

Transmission line alternatives include the Intake (3 alignments), BPS-1, Glen Canyon to Buckskin, Buckskin Substation upgrade, Paria Substation upgrade, BPS-2, BPS-2 Alternative, BPS-3 North, BPS-3 South, BPS-3 Underground, BPS-3 Alternative North, BPS-3 Alternative South, BPS-4, BPS-4 Alternative, HS-1 Alternative, HS-2 South, HS-3 Underground, HS-4, HS-4 Alternative, Hurricane Cliffs Afterbay to Sand Hollow, Hurricane Cliffs Afterbay to Hurricane West, Sand Hollow to Dixie Springs, Cedar Valley Pipeline booster pump stations, and Cedar Valley Water Treatment Facility.

The proposed new **Intake Transmission Line** would begin at Glen Canyon Substation and run parallel to U.S. 89 for about 2,500 feet to a new switch station, cross U.S. 89 at the Intake access road intersection and continue northeast to the Intake substation. This 69 kV transmission line would be about 0.9 mile long in Coconino County, Arizona (Figure 1-7). One alternative alignment would run parallel to an existing 138 kV transmission line to the west, turn north to the new switch station, cross U.S. 89 at the Intake access road intersection and continue northeast to the Intake substation. This 69 kV transmission line alternative would be about 1.2 miles long in Coconino County, Arizona (Figure 1-7). Another alternative alignment would bifurcate from an existing transmission line and run west, then northeast to the new switch station, cross U.S. 89 at the Intake access road intersection and continue northeast to the Intake substation. This 69 kV transmission line alternative would be about 1.3 miles long in Coconino County, Arizona (Figure 1-7).

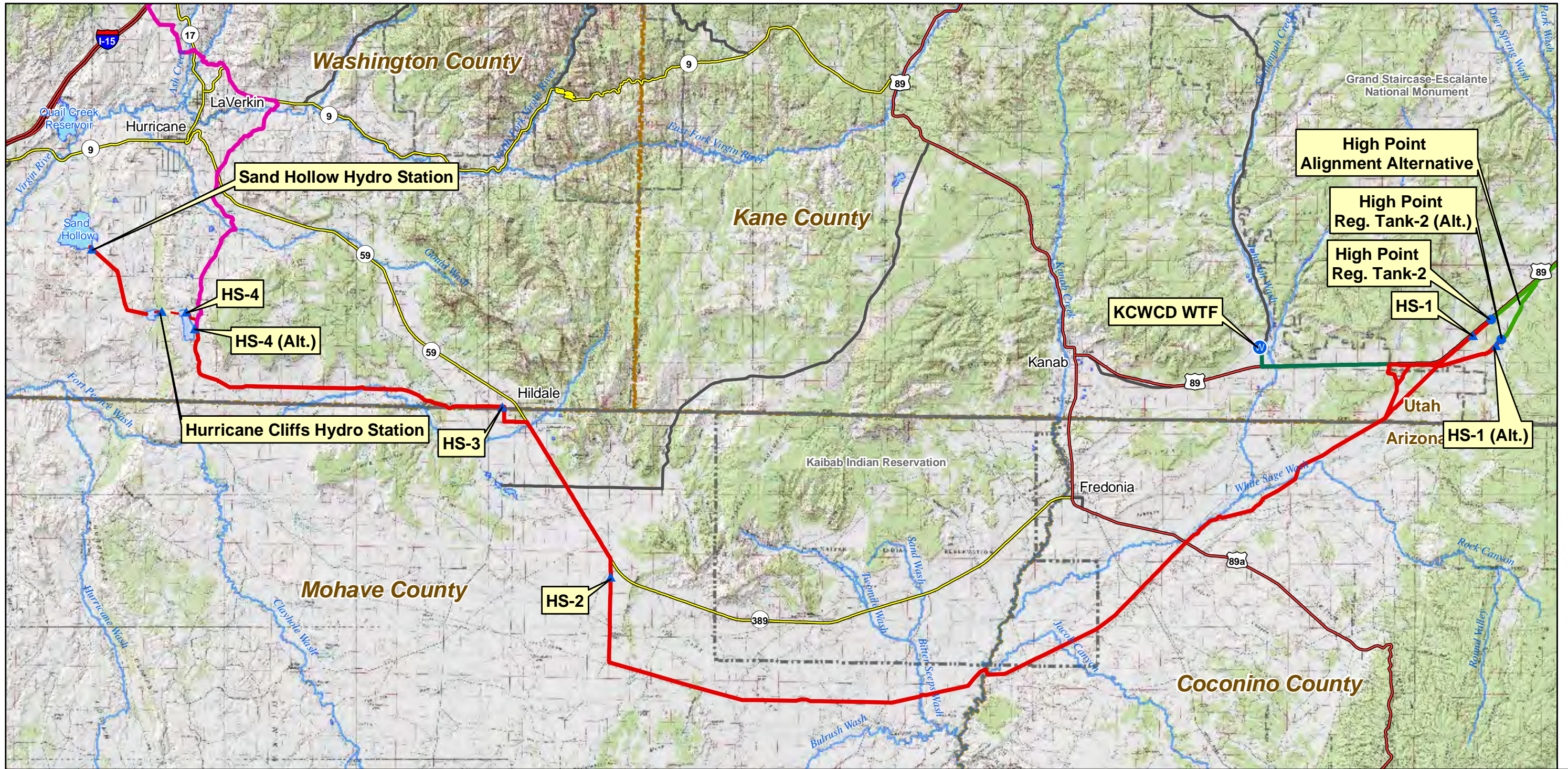
The proposed new **BPS-1 Transmission Line** would begin at the new switch station located on the south side of U.S. 89 and parallel the LPP Water Conveyance System alignment to the BPS-1 substation west of U.S. 89. This 69 kV transmission line would be about 1 mile long in Coconino County, Arizona (Figure 1-7).

The proposed new **Glen Canyon to Buckskin Transmission Line** would consist of a 230 kV transmission line from the Glen Canyon Substation to the Buckskin Substation, running parallel to the existing 138 kV transmission line. This transmission line upgrade would be about 36 miles long through Coconino County, Arizona and Kane County, Utah (Figure 1-7).

The existing **Buckskin Substation** would be upgraded as part of the proposed project to accommodate the additional power loads from the new 230 kV Glen Canyon to Buckskin transmission line. The substation upgrade would require an additional 5 acres of land within the GSENM adjacent to the existing substation in Kane County, Utah (Figure 1-7).

The existing **Paria Substation** would be upgraded as part of the proposed project to accommodate the additional power loads to BPS-4 Alternative. The substation upgrade would require an additional 2 acres of privately-owned land adjacent to the existing substation in Kane County, Utah (Figure 1-7).

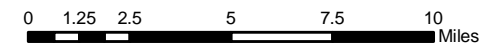
The proposed new **BPS-2 Transmission Line** alternative would consist of a new 3-ring switch station along the existing 138 kV Glen Canyon to Buckskin Transmission Line and a new transmission line from the switch station to a new substation west of Big Water and a connection to BPS-2 substation in Kane



- | | |
|-----------------------------------|---|
| Water Treatment Facility | Water Conveyance System |
| Project Regulating Tank | Hydro System - Southeast Corner Alternative |
| Project Hydro Station | Kane County Pipeline System |
| Hurricane Cliffs Forebay/Afterbay | Cedar Valley Pipeline System |
| Lakes & Reservoirs | |
| Major Rivers & Streams | |

- | | |
|------------|------------------------|
| Interstate | National Park/Monument |
| US Highway | GSENM Boundary |
| ST Highway | Tribal Lands |
| Hwy | State Boundaries |
| Major Road | County Boundaries |

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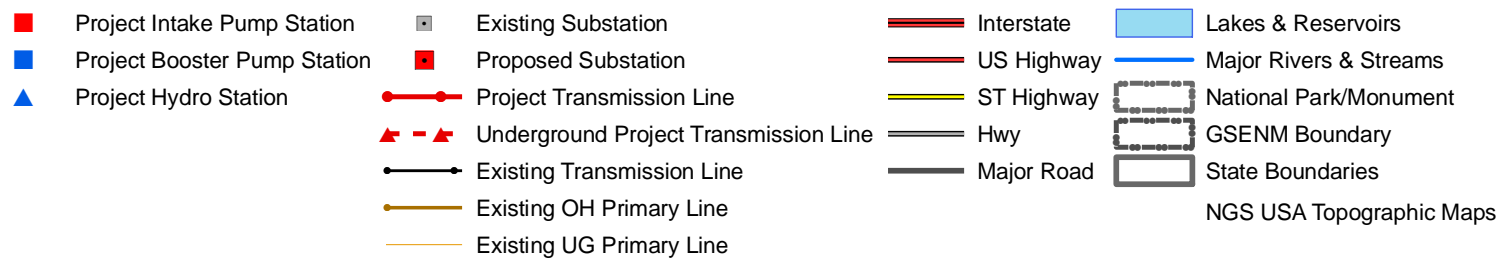
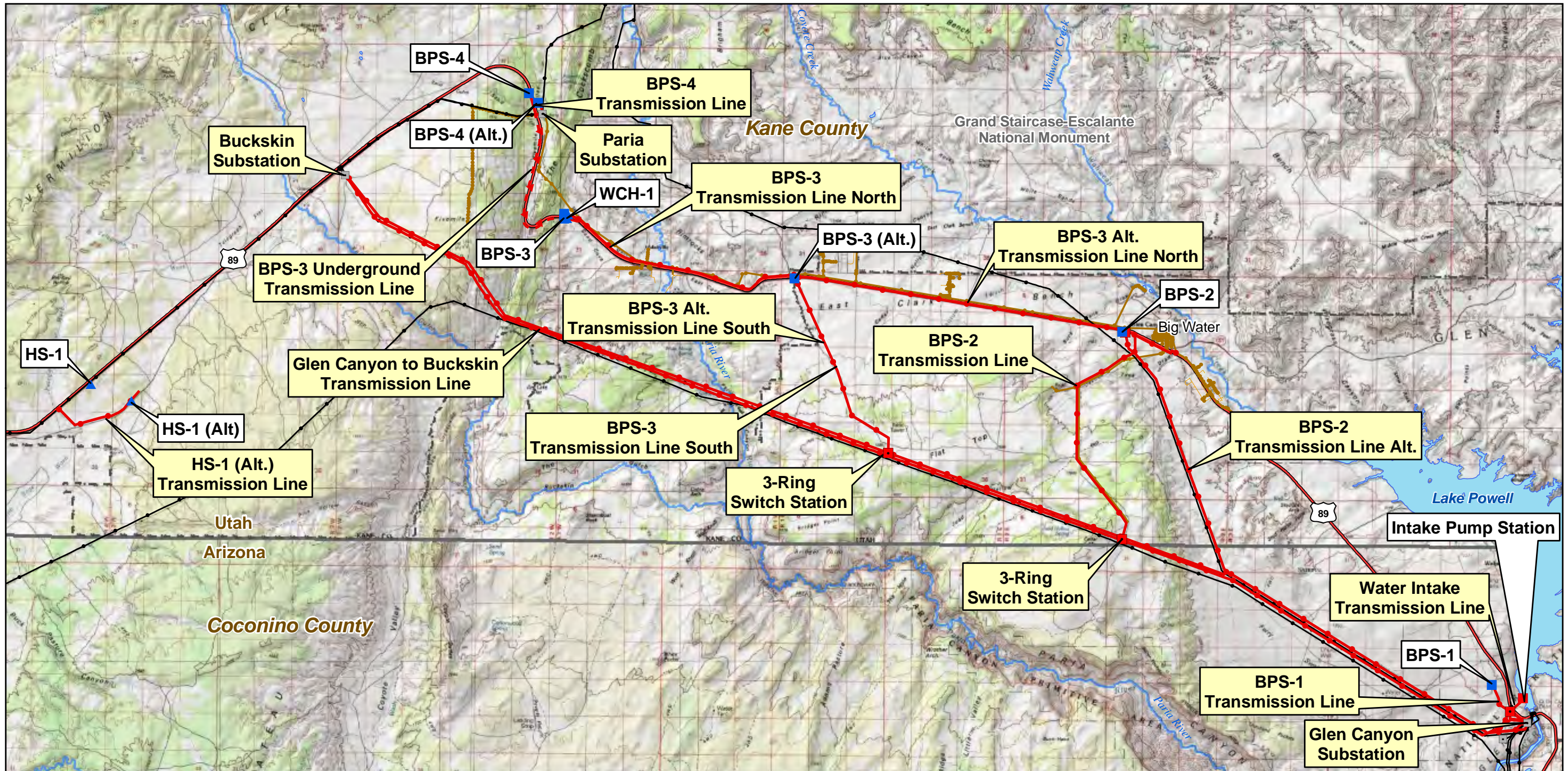


Lake Powell Pipeline Project

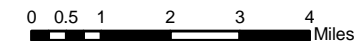
Spatial Reference: UTM Zone 12N, NAD-83

UDWR Figure 1-6

**Lake Powell Pipeline
Hydro System
Southeast Corner Alternative**



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Lake Powell Pipeline Project

Spatial Reference: UTM Zone 12N, NAD-83

UDWR Figure 1-7 MWH

Lake Powell Pipeline
Transmission Line
Alternatives East

County, Utah. The new transmission line would parallel an existing distribution line that runs northwest, north and then northeast to Big Water. This new 138 kV transmission line alternative would be about 7 miles long across Utah SITLA-administered land, with a 138 kV connection to the BPS-2 substation (Figure 1-7).

The new **BPS-2 Alternative Transmission Line** would consist of a new 138 kV transmission line from Glen Canyon Substation parallel to the existing Rocky Mountain Power 230 kV transmission line, connecting to the BPS-2 substation west of Big Water. This new 138 kV transmission line alternative would be about 16.5 miles long in Coconino County, Arizona and Kane County, Utah crossing National Park Service-administered land, BLM-administered land and Utah SITLA-administered land (Figure 1-7).

The new **BPS-3 Transmission Line North** alternative would consist of a new 138 kV transmission line from BPS-2 paralleling the south side of U.S. 89 within the Congressionally designated utility corridor west to BPS-3 at the east side of the Cockscomb geological feature. This new 138 kV transmission line alternative would be about 15.7 miles long in Kane County, Utah (Figure 1-7).

The new **BPS-3 Transmission Line South** alternative would consist of a new 3-ring switch station along the existing 138 kV Glen Canyon to Buckskin Transmission Line and a new transmission line from the switch station north along an existing BLM road to U.S. 89 and then west along the south side of U.S. 89 within the Congressionally designated utility corridor to BPS-3 at the east side of the Cockscomb. This new 138 kV transmission line alternative would be about 12.3 miles long in Kane County, Utah (Figure 1-7).

The new **BPS-3 Underground Transmission Line** alternative would consist of a new buried 24.9 kV transmission line (2 circuits) from the upgraded Paria Substation to BPS-3 on the east side of the Cockscomb geological feature. This new underground transmission line would be parallel to the east and south side of U.S. 89 and would be about 4.1 miles long in Kane County, Utah (Figure 1-7).

The new **BPS-3 Alternative Transmission Line North** alternative would consist of a new 138 kV transmission line from BPS-2 paralleling the south side of U.S. 89 west to BPS-3 Alternative near the GSENM east boundary within the Congressionally-designated utility corridor. This new 138 kV transmission line alternative would be about 9.3 miles long in Kane County, Utah (Figure 1-7).

The proposed new **BPS-3 Alternative Transmission Line South** alternative would consist of a new 3-ring switch station along the existing 138 kV Glen Canyon to Buckskin Transmission Line and a new transmission line from the switch station north along an existing BLM road to BPS-3 Alternative near the GSENM east boundary and within the Congressionally-designated utility corridor. This new 138 kV transmission line alternative would be about 5.9 miles long in Kane County, Utah (Figure 1-7).

The new **BPS-4 Transmission Line** alternative would begin at the upgraded Paria Substation and run parallel to the west side of U.S. 89 north to BPS-4 within the Congressionally designated utility corridor. This new 138 kV transmission line would be about 0.8 mile long in Kane County, Utah (Figure 1-7).

The proposed new **BPS-4 Alternative Transmission Line** would begin at the upgraded Paria Substation and run north to the BPS-4 Alternative. This 69 kV transmission line would be about 0.4 mile long in Kane County, Utah (Figure 1-7).

The proposed new **HS-1 Alternative Transmission Line** would begin at the new HS-1 Alternative and run southwest parallel to the K4020 road and then northwest parallel to the K4000 road to the U.S. 89 corridor where it would tie into the existing 69 kV transmission line from the Buckskin Substation to the

Johnson Substation. This 69 kV transmission line would be about 3 miles long in Kane County, Utah (Figure 1-7).

The proposed new **HS-2 South Transmission Line** alternative would connect the HS-2 hydroelectric station and substation along the South Alternative to an existing 138 kV transmission line paralleling Arizona State Route 389. This new 34.5 kV transmission line would be about 0.9 mile long in Mohave County, Arizona (Figure 1-8).

The proposed new **HS-3 Underground Transmission Line** would connect the HS-3 hydroelectric station and substation to the existing Twin Cities Substation in Hildale City, Utah. The new 12.47 kV underground circuit would be about 0.6 mile long in Washington County, Utah (Figure 1-8).

The proposed new **HS-4 Transmission Line** would consist of a new transmission line from the HS-4 hydroelectric station and substation north along an existing BLM road to an existing transmission line parallel to Utah State Route 59. The new 69 kV transmission line would be about 8.2 miles long in Washington County, Utah (Figure 1-8).

The new **HS-4 Alternative Transmission Line** alternative would connect the HS-4 Alternative hydroelectric station and substation to an existing transmission line parallel to Utah State Route 59. The new 69 kV transmission line would be about 7.5 miles long in Washington County, Utah (Figure 1-8).

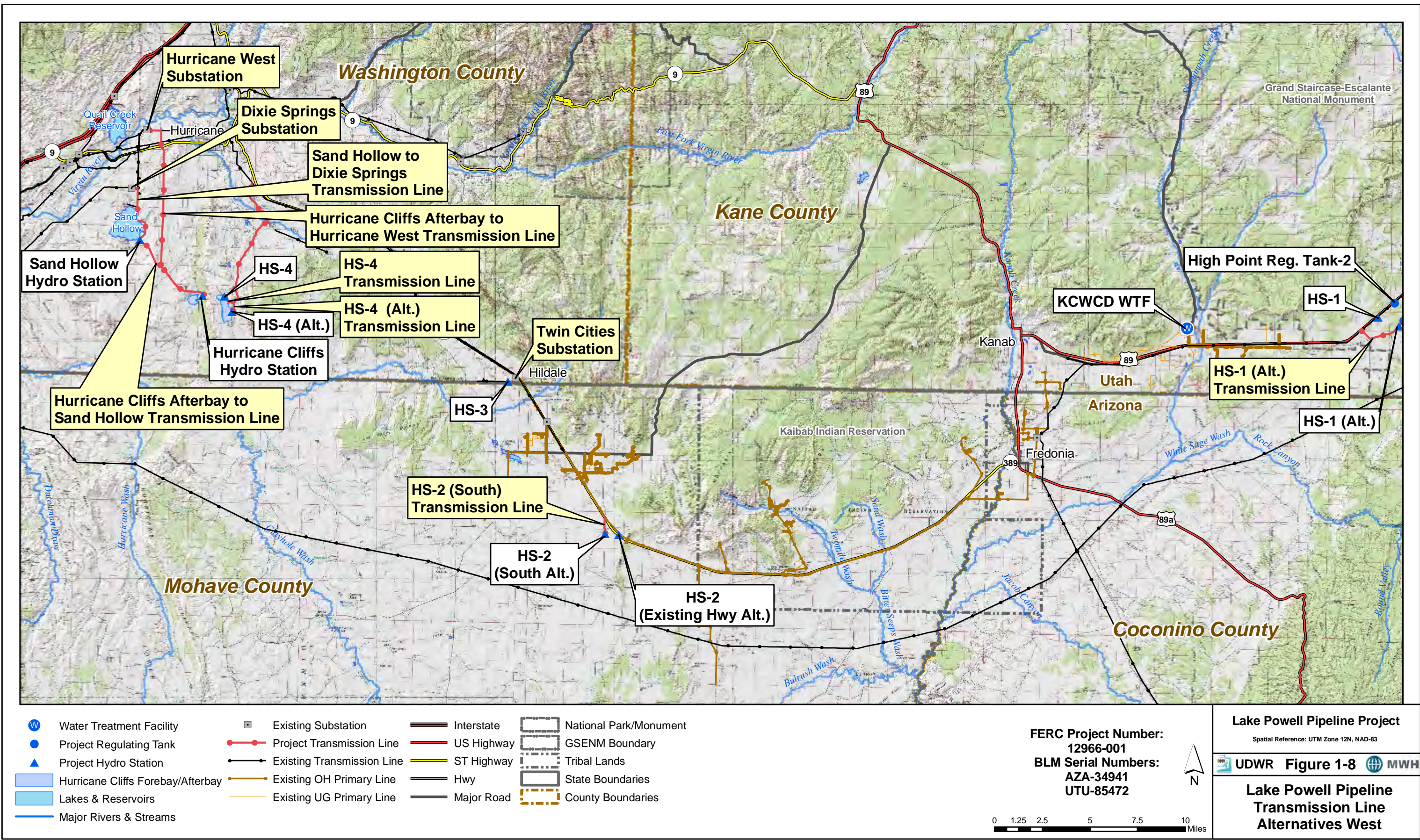
The proposed new **Hurricane Cliffs Afterbay to Sand Hollow Transmission Line** would consist of a new 69 kV transmission line from the Hurricane Cliffs peaking power plant and substation, and run northwest to the Sand Hollow Hydro Station substation. This new 69 kV transmission line would be about 4.9 miles long in Washington County, Utah (Figure 1-8).

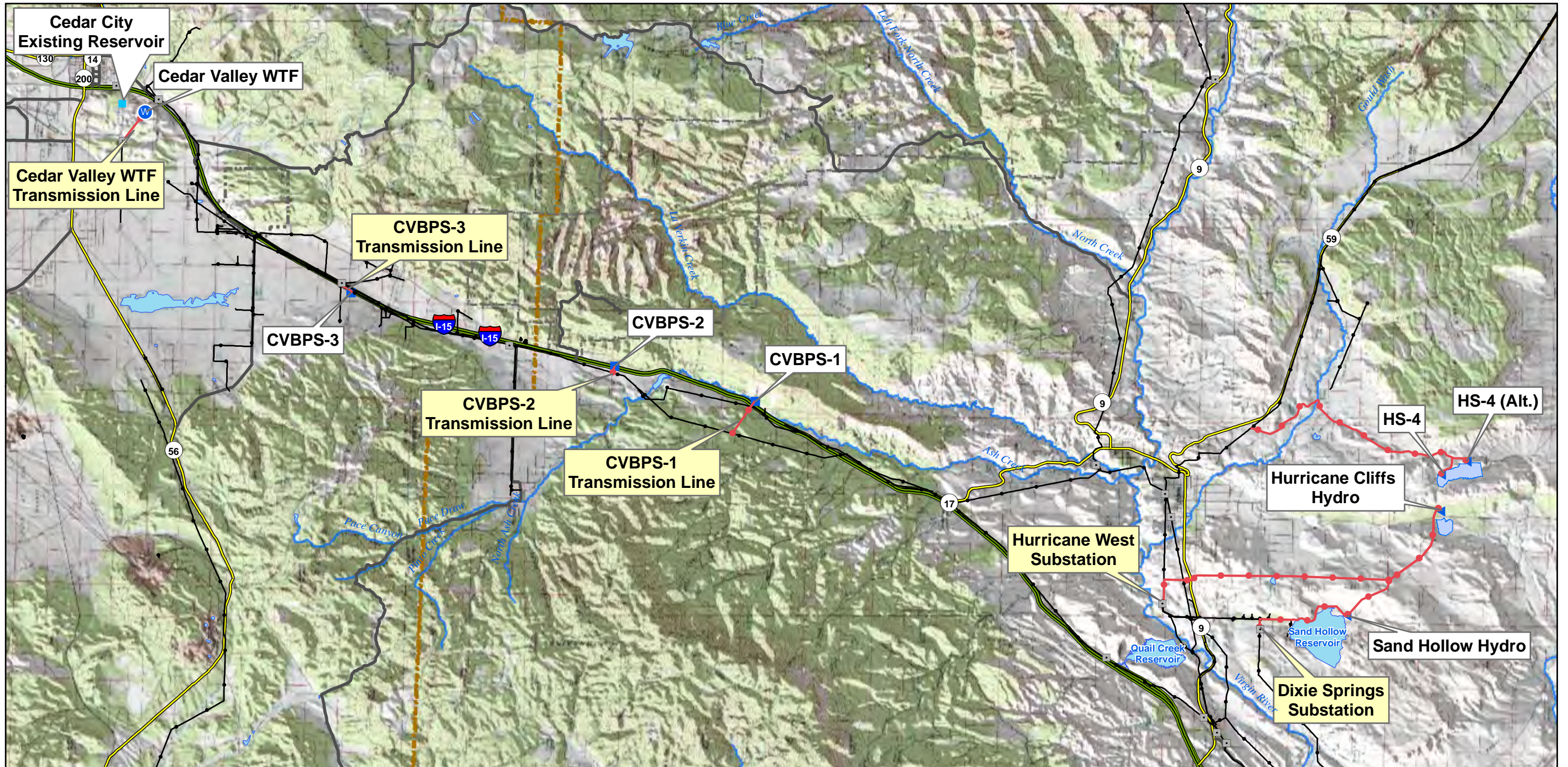
The proposed new **Hurricane Cliffs Afterbay to Hurricane West Transmission Line** would consist of a new 345 kV transmission line from the Hurricane Cliffs pumped storage power plant and run northwest and then north to the planned Hurricane West 345 kV substation. This new 345 kV transmission line would be about 10.9 miles long in Washington County, Utah (Figure 1-8).

The proposed new **Sand Hollow to Dixie Springs Transmission Line** would consist of a new 69 kV transmission line from the Sand Hollow Hydro Station substation around the east side of Sand Hollow Reservoir and north to the existing Dixie Springs Substation. This new 69 kV transmission line would be about 3.4 miles long in Washington County, Utah (Figure 1-8).

The three **Cedar Valley Pipeline** booster pump stations would require new transmission lines from existing transmission lines paralleling the Interstate 15 corridor. The new CVBPS-1 transmission line would extend southeast over I-15 from the existing transmission line to the booster pump station substation for about 1.3 miles in Washington County, Utah (Figure 1-9). The new CVBPS-2 transmission line would extend east over I-15 from the existing transmission line to the booster pump station substation for about 0.2 mile in Washington County, Utah (Figure 1-9). The new CVBPS-3 transmission line would extend west over I-15 from the existing transmission line and southwest along the west side of Interstate 15 to the booster pump station substation for about 0.6 mile in Iron County, Utah (Figure 1-9).

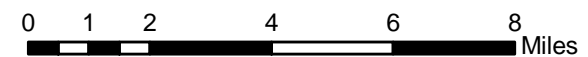
The **Cedar Valley Water Treatment Facility Transmission Line** would begin at an existing substation in Cedar City and run about 1 mile to the water treatment facility site in Iron County, Utah (Figure 1-9).





- | | | | |
|----------------------------|---------------------------|------------------------|-----------------------------------|
| Water Treatment Facility | Existing Substation | Interstate | Hurricane Cliffs Forebay/Afterbay |
| Project Pump Station | Project Substation | US Highway | Lakes & Reservoirs |
| Project Hydro Station | Project Transmission Line | ST Highway | Major Rivers & Streams |
| Existing Transmission Line | Hwy | National Park/Monument | County Boundaries |
| Existing OH Primary Line | Major Road | Tribal Lands | |
| Existing UG Primary Line | | | |

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Lake Powell Pipeline Project
Spatial Reference: UTM Zone 12N, NAD-83

UDWR Figure 1-9

**Cedar Valley
Transmission Line
Alternatives**

1.3 Summary Description of No Lake Powell Water Alternative

The No Lake Powell Water Alternative would involve a combination of developing remaining available surface water and groundwater supplies, developing reverse osmosis treatment of existing low quality water supplies, and reducing residential outdoor water use in the WCWCD and CICWCD service areas. This alternative could provide a total of 86,249 acre-feet of water annually to WCWCD, CICWCD and KCWCD for M&I use without diverting Utah's water from Lake Powell.

1.3.1 WCWCD No Lake Powell Water Alternative

The WCWCD would implement other future water development projects currently planned by the District, develop additional water reuse/reclamation, and convert additional agricultural water use to M&I use as a result of urban development in agricultural areas through 2020. Remaining planned and future water supply projects through 2020 include the Ash Creek Pipeline (5,000 acre-feet per year), Crystal Creek Pipeline (2,000 acre-feet per year), and Quail Creek Reservoir Agricultural Transfer (4,000 acre-feet per year). Beginning in 2020, WCWCD would convert agricultural water to secondary use and work with St. George City to maximize existing wastewater reuse, bringing the total to 96,258 acre-feet of water supply per year versus demand of 98,427 acre-feet per year, incorporating currently mandated conservation goals. The WCWCD water supply shortage in 2037 would be 70,000 acre-feet per year, 1,000 acre-feet more than the WCWCD maximum share of the LPP water. Therefore, the WCWCD No Lake Powell Water Alternative needs to develop 69,000 acre-feet of water per year to meet comparable supply and demand requirements as the other action alternatives.

The WCWCD would develop a reverse osmosis (RO) advanced water treatment facility near the Washington Fields Diversion in Washington County, Utah to treat up to 40,000 acre-feet per year of Virgin River water with high total dissolved solids (TDS) concentration and other contaminants. The RO advanced water treatment facility would produce up to 36,279 acre-feet per year of water suitable for M&I use. The WCWCD would develop the planned Warner Valley Reservoir to store the diverted Virgin River water, which would be delivered to the RO advanced water treatment facility. The remaining 3,721 acre-feet per year of brine by-product from the RO treatment process would require evaporation and disposal meeting State of Utah water quality regulations.

The remaining needed water supply of 32,721 acre-feet per year to meet WCWCD 2037 demands would be obtained by reducing and restricting outdoor residential water use in the WCWCD service area. The Utah Division of Water Resources (UDWR) estimated 2005 culinary water use for residential outdoor watering in the communities served by WCWCD was 102 gallons per capita per day (gpcd) (UDWR 2008a). This culinary water use rate is reduced by 30.5 gpcd to account for water conservation attained from 2005 through 2020, yielding 71.5 gpcd residential outdoor water use available for conversion to other M&I uses. The equivalent water use rate reduction to generate 32,721 acre-feet per year of conservation is 56.6 gpcd for the 2037 population within the WCWCD service area. Therefore, beginning in 2020, the existing rate of residential outdoor water use would be gradually reduced and restricted to 14.9 gpcd, or an 85.4 percent reduction in residential outdoor water use.

The combined 36,279 acre-feet per year of RO product water and 32,721 acre-feet per year of reduced residential outdoor water use would equal 69,000 acre-feet per year of M&I water to help meet WCWCD demands through 2037.

1.3.2 CICWCD No Lake Powell Water Alternative

The CICWCD would implement other future groundwater development projects currently planned by the District, purchase agricultural water from willing sellers for conversion to M&I uses, and convert additional agricultural water use to M&I use as a result of urban development in agricultural areas through 2020. Remaining planned and future water supply projects through 2020 include additional groundwater development projects (3,488 acre-feet per year), agricultural conversion resulting from M&I development (3,834 acre-feet per year), and purchase agricultural water from willing sellers (295 acre-feet per year). Beginning in 2020, CICWCD would have a total 19,772 acre-feet of water supply per year versus demand of 19,477 acre-feet per year, incorporating required progressive conservation goals. The CICWCD water supply shortage in 2060 would be 11,470 acre-feet per year. Therefore, the CICWCD No Lake Powell Water Alternative needs to develop 11,470 acre-feet of water per year to meet comparable supply and demand limits as the other action alternatives.

The remaining needed water supply of 11,470 acre-feet per year to meet CICWCD 2060 demands would be obtained by reducing and restricting outdoor residential water use in the CICWCD service area. The UDWR estimated 2005 culinary water use for residential outdoor watering in the communities served by CICWCD was 84.5 gpcd (UDWR 2007). A portion of this residential outdoor water would be converted to other M&I uses. The equivalent water use rate to obtain 11,470 acre-feet per year is 67.8 gpcd for the 2060 population within the CICWCD service area. Therefore, the existing rate of residential outdoor water use would be gradually reduced and restricted to 16.7 gpcd beginning in 2023, an 80 percent reduction in the residential outdoor water use rate between 2023 and 2060. The 11,470 acre-feet per year of reduced residential outdoor water use would be used to help meet the CICWCD demands through 2060.

1.3.3 KCWCD No Lake Powell Water Alternative

The KCWCD would use existing water supplies and implement future water development projects including new groundwater production, converting agricultural water rights to M&I water rights as a result of urban development in agricultural areas, and developing water reuse/reclamation. Existing water supplies (4,039 acre-feet per year) and 1,994 acre-feet per year of new ground water under the No Lake Powell Water Alternative would meet projected M&I water demand of 6,033 acre-feet per year within the KCWCD service area through 2060. The total potential water supply for KCWCD is about 12,140 acre-feet per year (4,039 acre-feet per year existing culinary plus secondary supply, and 8,101 acre-feet per year potential for additional ground water development up to the assumed sustainable ground water yield) without agricultural conversion to M&I supply. Short-term ground water overdrafts and new storage projects (e.g., Jackson Flat Reservoir) would provide reserve water supply to meet demands during drought periods and other water emergencies.

1.4 Summary Description of the No Action Alternative

No new intake, water conveyance or hydroelectric features would be constructed or operated under the No Action Alternative. The Utah Board of Water Resources' Colorado River water rights consisting of 86,249 acre-feet per year would not be diverted from Lake Powell and would continue to flow into the Lake until the water is used for another State of Utah purpose or released according to the operating guidelines. Future population growth as projected by the Utah Governor's Office of Planning and Budget (GOPB) would continue to occur in southwest Utah until water and other potential limiting resources such as developable land, electric power, and fuel begin to curtail economic activity and population in-migration.

1.4.1 WCWCD No Action Alternative

The WCWCD would implement other future water development projects currently planned by the District, develop additional water reuse/reclamation, convert additional agricultural water use to M&I use as a result of urban development in agricultural areas, and implement advanced treatment of Virgin River water. The WCWCD could also limit water demand by mandating water conservation measures such as outdoor watering restrictions. Existing and future water supplies under the No Action Alternative would meet projected M&I water demand within the WCWCD service area through approximately 2020. The 2020 total water supply of about 96,528 acre-feet per year would include existing supplies, planned WCWCD water supply projects, wastewater reuse, transfer of Quail Creek Reservoir supplies, and future agricultural water conversion resulting from urban development of currently irrigated lands. Each future supply source would be phased in as needed to meet the M&I demand associated with the forecasted population. The No Action Alternative would not provide WCWCD with any reserve water supply (e.g., water to meet annual shortages because of drought, emergencies, and other losses). Maximum reuse of treated wastewater effluent for secondary supplies would be required to meet the projected M&I water demand starting in 2020. The No Action Alternative would not provide adequate water supply to meet projected water demands from 2020 through 2060. There would be a potential water shortage of approximately 139,875 acre-feet per year in 2060 under the No Action Alternative (UDWR 2008b).

1.4.2 CICWCD No Action Alternative

The CICWCD would implement future water development projects including converting agricultural water rights to M&I water rights as a result of urban development in agricultural areas, purchasing “buy and dry” agricultural water rights to meet M&I demands, and developing water reuse/reclamation. The Utah State Engineer would act to limit existing and future ground water pumping from the Cedar Valley aquifer in an amount not exceeding the assumed sustainable yield of 37,600 ac-ft per year. Existing and future water supplies under the No Action Alternative meet projected M&I water demand within the CICWCD service area during the planning period through agricultural conversion of water rights to M&I use, wastewater reuse, and implementing “buy and dry” practices on irrigated agricultural land. Each future water supply source would be phased in as needed to meet the M&I demand associated with the forecasted population. The CICWCD No Action Alternative includes buying and drying of agricultural water rights covering approximately 8,000 acres between 2005 and 2060 and/or potential future development of West Desert water because no other potential water supplies have been identified to meet unmet demand. The No Action Alternative would not provide CICWCD with any reserve water supply (e.g., water to meet annual shortages because of drought, emergencies, and other losses) after 2010 (i.e., after existing supplies would be maximized).

1.4.3 KCWCD No Action Alternative

The KCWCD would use existing water supplies and implement future water development projects including new ground water production, converting agricultural water rights to M&I water rights as a result of urban development in agricultural areas, and developing water reuse/reclamation. Existing water supplies (4,039 acre-feet per year) and 1,994 acre-feet per year of new ground water under the No Action Alternative would meet projected M&I water demand of 6,033 acre-feet per year within the KCWCD service area through 2060. The total potential water supply for KCWCD is about 12,140 acre-feet per year (4,039 acre-feet per year existing culinary plus secondary supply, and 8,101 acre-feet per year potential for additional ground water development up to the assumed sustainable ground water yield) without agricultural conversion to M&I supply. Short-term ground water overdrafts and new storage projects (e.g., Jackson Flat Reservoir) would provide reserve water supply to meet demands during drought periods and other water emergencies.

1.5 Identified Issues

The following issues were raised during the public and agency scoping and informational process:

- What would be the effects of the LPPP on threatened, endangered and candidate species and designated critical habitats in the study area?
- What would be the impacts of the LPPP on federal, state, and agency species of special concern and tribal species of cultural concern?

1.6 Impact Topics

The following impact topics are analyzed in this study report:

- Threatened, endangered and candidate species populations and designated critical habitats
- Federal, state and agency species of special concern and tribal species of cultural concern

Chapter 2 Methodology

2.1 Introduction

This study report analyzes federally listed threatened, endangered and candidate wildlife species, wildlife species of federal, state and agency concern and tribal wildlife species of cultural concern. General wildlife species and habitat are analyzed in Study Report 21, Wildlife Resources (UBWR 2011a). This chapter describes the data used in the analysis, assumptions used in the analysis and effects and impacts analysis methodology.

2.2 Data Used

Targeted field studies were performed for federally listed wildlife species including southwestern willow flycatcher, (*Empidonax trailii extimus*) (LSD 2010a), yellow-billed cuckoo (*Coccyzus americanus*) (LSD 2010a), Mohave desert tortoise (*Gopherus agassizii*) (LSD 2010b) and Utah prairie dog (*Cynomys parvidens*) (LSD 2010c). Existing range and occurrence data for other listed wildlife species and wildlife species of concern were derived from digital data bases where available: the U.S. Fish and Wildlife Service (USFWS) Critical Habitat Portal, Nature Serve, Birds of North America Online, the Utah Conservation Data Center (UCDC), the Arizona Natural Heritage Program Data Management System (AHDMS), Partners in Flight (PIF) and Birds of Utah, species descriptions from standard field guides and online resources (NatureServe), available scientific literature and best professional judgment.

Vegetation community data (LSD 2010d) and topographic elevation data (Google Earth[®]) were also utilized to determine the potential occurrence of listed species and species of concern within the study area.

2.3 Assumptions

The analysis used the following assumptions of noise impacts on listed or special concern wildlife species habitat:

- Highways are equivalent to linear sound sources.
- Construction sites are equivalent to point sound sources.
- The noise threshold for possible effects on wildlife is 60 A-weighted decibels (dBA). Noise levels between 60 to 70 dBA would have minor negative impact on wildlife habitat values, 70 to 80 dBA would have moderate negative impact, and over 80 dBA would have high negative impact.
- Construction noise would not affect areas that are predominantly urban in character and those areas can be eliminated from potential noise impacts on habitat.

The analysis used the following assumptions of construction disturbance on listed species or special concern species wildlife habitat.

- Vegetation communities immediately outside of the vegetation survey area would generally be similar to the contiguous surveyed communities and would be available for dispersal of wildlife species away from construction disturbance.
- Habitats temporarily disturbed by pipeline or transmission line construction would be revegetated with native plant species and would regain significant habitat value after two to three growing seasons.

2.4 Effect Analysis Methodology

2.4.1 Federally Listed Species and Species of Special Concern

Occurrence data for federally listed wildlife species were derived from the targeted field surveys (LSD 2010a,b,c), the Utah Geographic Information System (GIS) database (AGRC 2010) and the Arizona GIS database (AHDMS 2010) for listed species. Species observations in field studies within the temporary or permanent disturbance corridors or historic recorded occurrence data from GIS databases were related to GIS shapefiles of temporary, permanent and noise construction disturbance for LPP project features.

There are limited spatial databases for digital analysis of non-federally listed species. Some species occurrence data have been provided by the Utah Automated Geographic Data Center (AGRC) and the Arizona Fish and Game Department Natural Heritage database (AHDMS). Potential occurrences of species of concern were derived from general field guide mapping and habitat availability within the LPP project study area. Generally, identified species occurrences within one mile of construction corridors were analyzed for potential effects on species populations, home ranges and migration corridors, where appropriate. Avian species were analyzed based on presence of potential nesting habitat; migratory occurrence or fringe habitat was not considered significant for analysis of species impacts. Amphibian, reptilian, and mammalian species were considered potentially present wherever field guide mapping and habitat characterization by vegetation communities (LSD 2010d) indicated reasonable probability of occurrence.

2.4.2 Critical Habitats

Designated critical habitats (USFWS 2010f) were analyzed by GIS to determine the areas of LPP project construction corridor either temporary, permanent and noise disturbance on critical habitats. Where possible, areas of disturbance were calculated for each type of disturbance.

Chapter 3

Affected Environment (Baseline Conditions)

3.1 Impact Area

The effects or impact area includes the following:

- Corridors (approximately 120 feet wide) along the areas directly affected by construction of pipelines and associated features (pressure valves and drains) , access roads, new or upgraded transmission lines and associated features (transformers, switch stations), pump stations and associated features (parking lots, fore bays, after bays) generation stations and associated features (parking lots, transformers, switch stations), construction lay down areas and reservoirs and associated features (dikes, overflows)
- Areas affected by noise and human activity that may impact wildlife habitat values or wildlife population behavior or migration corridors
- Streams and rivers and associated riparian vegetation that could have alterations in flow from baseline conditions under operations of the LPP project

Figures 3-1, 3-2 and 3-3 show the overall study area for the LPP project alternatives. Maps of noise impact areas are included in Appendix A. Detailed maps of project features and facilities are presented in Chapter 1.

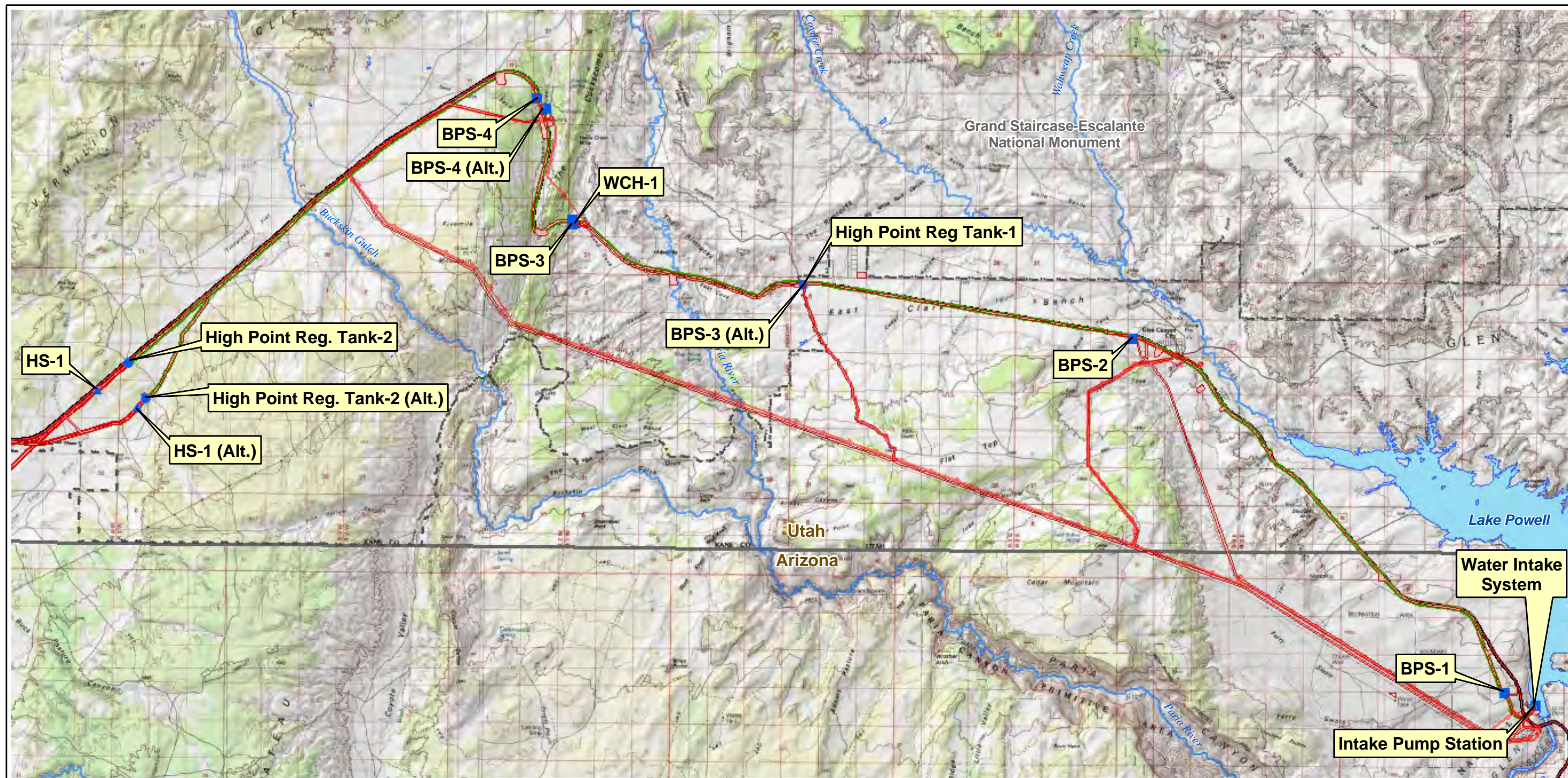
3.2 Overview

The U. S. Fish and Wildlife Service (USFWS) has designated 10 wildlife species listed under the Endangered Species Act of 1973 (ESA) for analysis of effects from the LPP project (USFWS Letter 3/16/09, confirmed 8/5/10 with addition of greater sage-grouse). Eighty one wildlife species of concern have been identified by federal or state agencies or are included in compliance with Executive Order 13186 (66 FR 3853, January 10, 2001) that mandates conservation of migratory birds designated as Partners in Flight (PIF) Watch List priority species. The Migratory Bird Treaty Act of 1918, as amended (MBTA), (16 U.S.C. 703-712; Ch. 128; July 13, 1918) prohibits hunting or take of all migratory birds, including nests and eggs. The Bald Eagle Protection Act (BEPA) of 1940, as amended, (16 U.S.C. §§ 668-668d, June 8, 1940) prohibits any take of bald or golden eagles.

ESA-listed threatened, endangered and candidate species and species of concern, including tribal wildlife species of cultural concern, are analyzed in separate sections of this study report.

3.3 Threatened, Endangered and Candidate Wildlife Species and Designated Critical Habitats

Table 3-1 summarizes the threatened, endangered and candidate wildlife species listed by the USFWS under the ESA for the counties affected by the Project pipeline and transmission line alignments, access roads and staging areas. Each species listing history, distribution, life history and ecology, and critical habitat, if designated, are considered separately for the designated species.



- | | | |
|--|--|--|
| ■ Project Pump Station | — Interstate | — Lakes & Reservoirs |
| ● Project Regulating Tank | — US Highway | — Major Rivers & Streams |
| ▲ Project Hydro Station | — ST Highway | National Park/Monument |
| 250 ft Study Area | — Hwy | GSENM Boundary |
| — Water Conveyance System | — Major Road | State Boundaries |
| — Hydro System - South Alignment Alternative | | |
| —●— Proposed Transmission Lines | | |

FERC Project Number:
 12966-001
 BLM Serial Numbers:
 AZA-34941
 UTU-85472



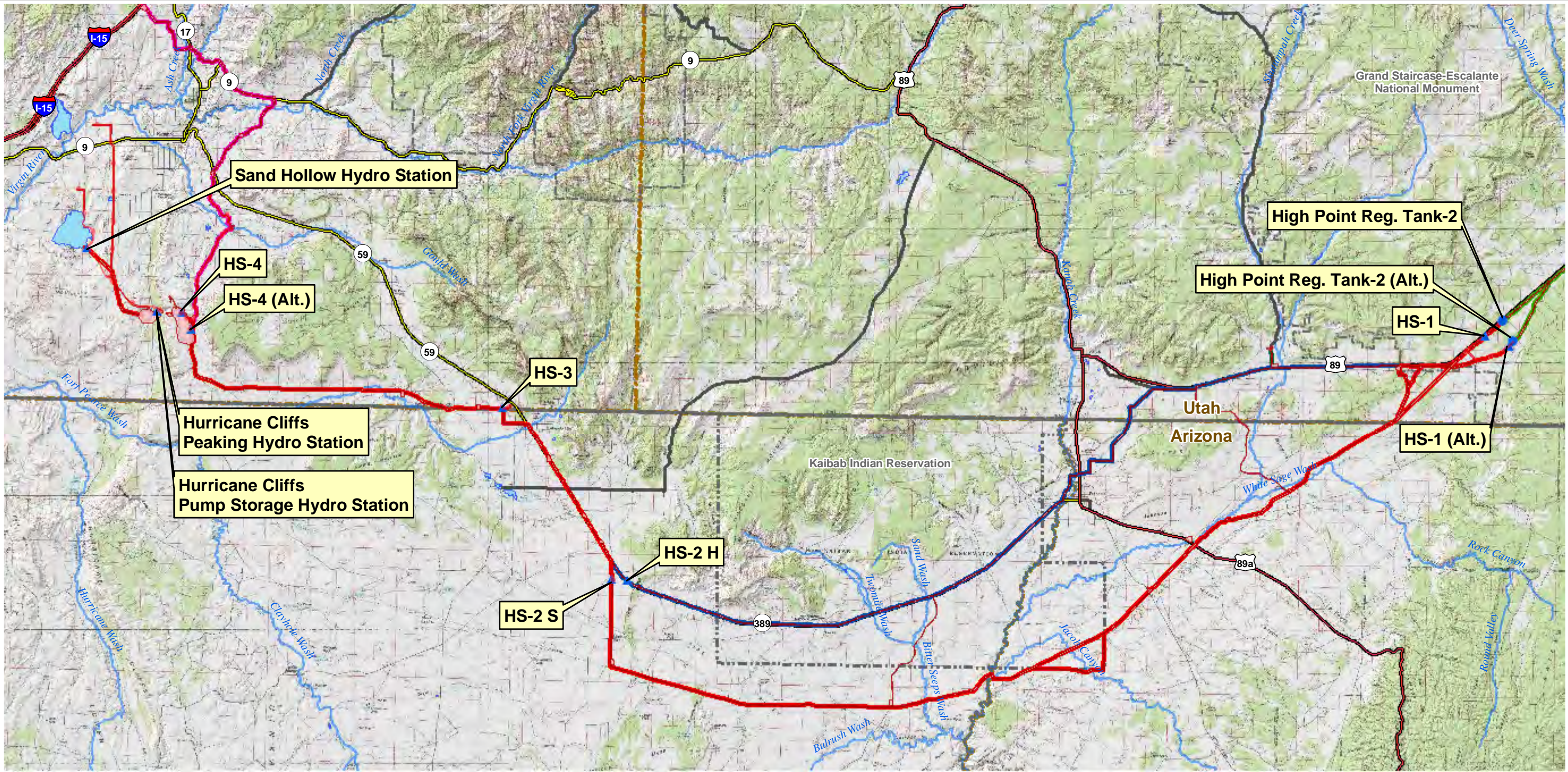
0 0.5 1 2 3 4 Miles

Lake Powell Pipeline Project

Spatial Reference: UTM Zone 12N, NAD-83

UDWR Figure 3-1 MWH

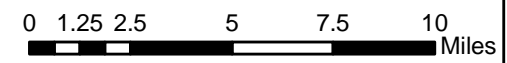
Lake Powell Pipeline Water Conveyance System Study Area



- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- 250 ft Study Area
- Hurricane Cliffs Forebay/Afterbay
- Lakes & Reservoirs
- Major Rivers & Streams
- Water Conveyance System
- Hydro System - South Alignment Alternative
- Hydro System - Existing Highway Alignment Alternative
- Kane County Pipeline System
- Cedar Valley Pipeline System
- Proposed Transmission Lines

- Interstate
- US Highway
- ST Highway
- Hwy
- Major Road
- National Park/Monument
- GSENM Boundary
- Tribal Lands
- State Boundaries
- County Boundaries

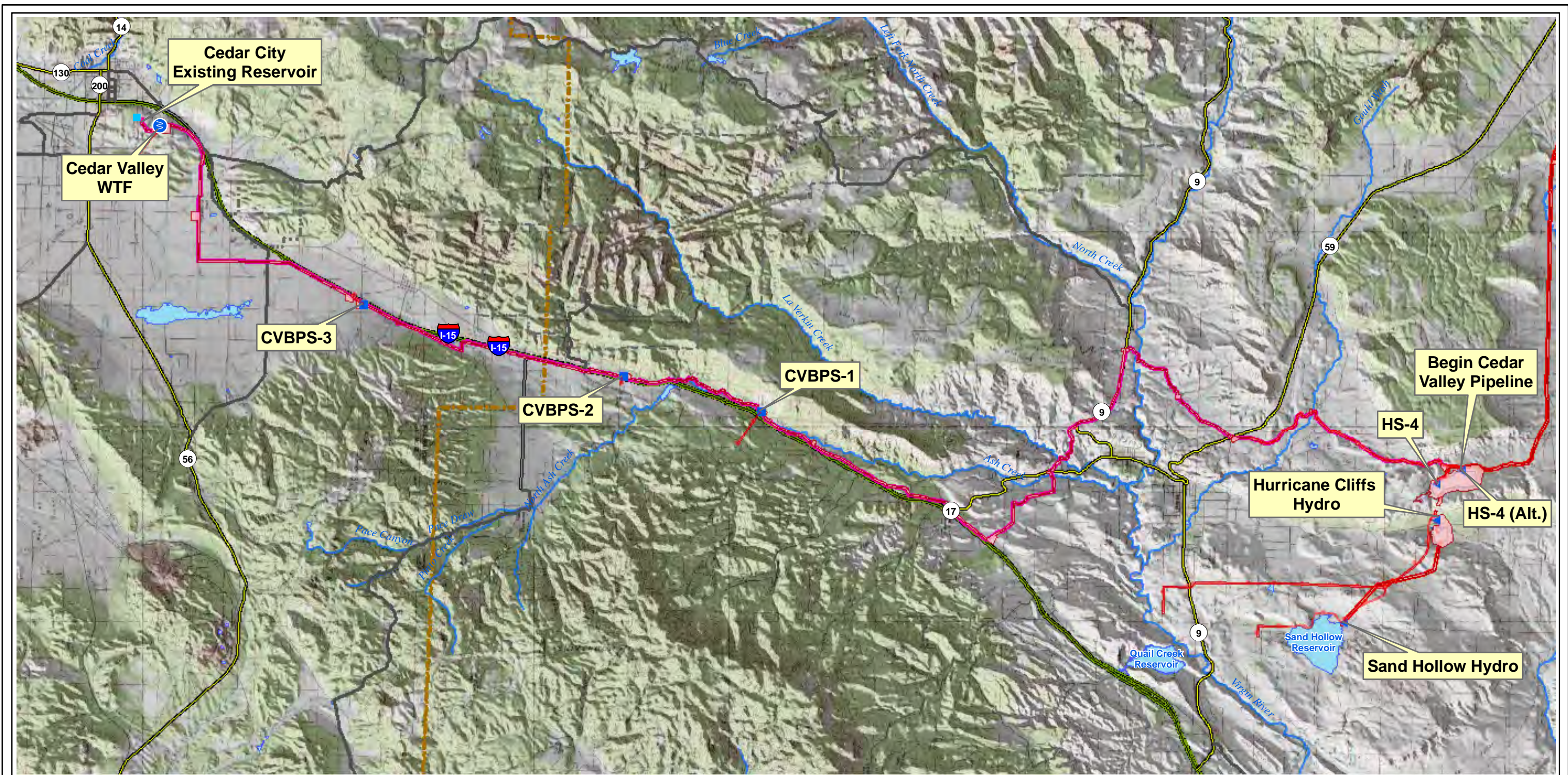
FERC Project Number:
12966-001
BLM Serial Numbers:
AZA-34941
UTU-85472



Lake Powell Pipeline Project
Spatial Reference: UTM Zone 12N, NAD-83

UDWR Figure 3-2 MWH

**Lake Powell Pipeline
Hydro System
Study Area**



<ul style="list-style-type: none"> Water Treatment Facility Project Pump Station Project Hydro Station 250 ft Study Area Hydro System Lake Powell Pipeline Hurricane Cliffs Pressure Tunnel Cedar Valley Pipeline	<ul style="list-style-type: none"> Interstate US Highway ST Highway Hwy Major Road Proposed Transmission Lines	<ul style="list-style-type: none"> Hurricane Cliffs Forebay/Afterbay Lakes & Reservoirs Major Rivers & Streams National Park/Monument County Boundaries Tribal Lands	<p>FERC Project Number: 12966-001</p> <p>BLM Serial Numbers: AZA-34941 UTU-85472</p> <p>0 1.25 2.5 5 7.5 10 Miles</p>	<p>Lake Powell Pipeline Project</p> <p>Spatial Reference: UTM Zone 12N, NAD-83</p> <p> UDWR Figure 3-3 </p> <p>Cedar Valley Pipeline System Study Area</p>
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**Table 3-1
Federally Listed Threatened, Endangered or Candidate Wildlife Species by County**

Common Name	Scientific Name	Listing Status¹	State	County
California condor ²	<i>Gymnogyps californianus</i>	E, EXPN	Utah Arizona	Iron, Kane, Washington Coconino, Mohave
Mexican spotted owl ²	<i>Strix occidentalis lucida</i>	T	Utah Arizona	Iron, Kane, Washington Coconino, Mohave
Southwestern willow flycatcher ²	<i>Empidonax traillii extimus</i>	E	Utah Arizona	Iron, Kane, Washington Coconino, Mohave
Utah prairie dog	<i>Cynomys parvidens</i>	T	Utah	Iron, Kane, Washington
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C	Utah Arizona	Iron, Kane, Washington Coconino, Mohave
Greater sage-grouse	<i>Centrocercus urophasianus</i>	C	Utah	Kane, Iron
Mohave Desert tortoise ²	<i>Gopherus agassizii</i>	T	Utah Arizona	Washington Mohave
Relict leopard frog	<i>Rana onca</i>	C	Arizona	Mohave
Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	E	Arizona	Mohave
Kanab Ambersnail	<i>Oxyloma haydeni kanabensis</i>	E	Utah Arizona	Kane Coconino

Notes

¹ T = threatened, E = Endangered, EXPN = Experimental, Non-Essential; C = Candidate

² Critical habitat designated for this species

Source: Fish and Wildlife Service Species Listing Letters 3/16/09 and 8/5/10

3.3.1 California Condor

3.3.1.1 Listing History and Status

The California condor is listed as endangered (32 FR 4001, 1967 March 11) with critical habitat (41 FR 41914, 1976 September 24), except where nonessential experimental (northern Arizona) (61 FR 54043 54060, 1996 October 16). A California condor Recovery Plan was completed April 25, 1996. (USFWS 2010a). The condor is listed as endangered in southern California and western Nevada and experimental, non-essential in northern Arizona and southern Utah (USFWS 2010a). A five-year review of the condor's status was announced in 2009 (Federal Register: March 25, 2009. Volume 74, Number 56; 12878-12883).

3.3.1.2 Distribution

Severe condor population declines prompted captive breeding programs in the late 1970s. Their range was restricted to chaparral, coniferous forests, and oak savannah habitats in southern and central California. By 1982, only 22 birds survived (Peregrine Fund 2010) and all remaining wild birds were brought into captivity in 1987. As captive breeding programs developed adequate numbers of young condors, reintroduction programs were initiated with one site located on the Vermillion Cliffs in northern Arizona approximately 20 miles southeast of the Project corridor. Early in the reintroduction program, young condors were released on the Hurricane Cliffs, but that site was terminated (USFWS 2007). About 300 condors now exist in the world, with half of them flying free. By the end of 2010, the total condor population in Arizona and southern Utah numbered 76, including eight birds fledged in the wild (USFWS 2010a, Peregrine fund 2010). Condors released in Arizona are radio and GPS monitored. In the past several years, condors have regularly traveled to the Kolob Plateau region of Utah in Zion National Park, crossing the LPP project alignment alternatives (Peregrine Fund 2010).

3.3.1.3 Life History and Ecology

Condors are a cavity-nesting species with sites ranging from overhung ledges on cliffs, crevices in boulder piles, potholes, caves and (rarely) tree cavities in giant sequoias. The main features are a location at least partly sheltered from weather and a location on a cliff or steep slope or a tall tree allowing easy approach from the air (BNA 2010). Nests are simple scrapes and condors do not bring nesting materials to the nest site. High perches are necessary for roosting as well, to create the strong updrafts required for lift into flight. California condors reach sexual maturity between five to seven years of age. Survival has been estimated to be up to 40 years in the wild (USFWS 2010a). Pairing begins in late fall and may last for several years; lifetime mating is uncertain (BNA 2010). Females lay a single egg, usually in January or February (BNA 2010) and may produce a replacement egg in four to five weeks if the first one is lost. Chicks hatch after 54 to 58 days of incubation (USFWS 2010a); chicks have white down at hatching and their eyes are open (BNA 2010). Fledging occurs at about six months. Chicks remain dependent on their parents for up to two years as they learn to forage in the wild. Because of this, pairs do not breed every year (BNA 2010). All condors are now descended from only 14 founders. There are 3 distinct clans but within each clan there is extreme inbreeding (San Diego Zoo 2010).

Open grasslands or savannahs are important to condors while searching for food (AHDMS 2010). Condors are strictly carrion eaters and tend to prefer larger mammals, (USFWS 2010a), but will also seek food near human habitation (Sibley 2001). Condors may travel up to 150 miles per day while foraging (USFWS 2010a). Foraging occurs mostly in grasslands, including potreritos within chaparral areas, or in oak savannahs (USFWS 2010a).

Potential threats to condors in the wild include illegal poaching, lead poisoning from eating contaminated hunting carcasses, collisions with electrical transmission lines and habituation to humans and dependence on human sources of food (USFWS 2010a). The lead poisoning has partly been managed by regular blood testing and chelation treatment of poisoned birds, but mortality continues (BNA 2010).

3.3.1.4 Designated Critical Habitat

Critical habitat has been designated for the California condor in California, but there is no critical habitat designated in Arizona and Utah (USFWS 2010a).

3.3.2 Mexican Spotted Owl

3.3.2.1 Listing History and Status

The USFWS listed the Mexican spotted owl on March 16, 1993 (58 FR 14248) without critical habitat, effective April 15, 1993. A final rule designating critical habitat for the Mexican spotted owl was published on June 6, 1995 (60 FR 29914). As a result of several court rulings, the USFWS removed critical habitat designation for the Mexican spotted owl on March 25, 1998 (63 FR 14378). On March 13, 2000, the USFWS was again ordered to propose critical habitat within four months of the court order and to complete a final designation by January 15, 2001. The USFWS designated approximately 4.6 million acres of critical habitat for the Mexican spotted owl in Arizona, Colorado, New Mexico and Utah on Federal lands. (66 FR 8530, February 1, 2001). The critical habitat designation was revised with a final rule published on August 31, 2004 (69 FR 53181), effective September 30, 2004.

3.3.2.2 Distribution

Mexican spotted owls range widely across Utah, Colorado, New Mexico and Arizona and in extreme western Texas in disjunct populations (USFWS 2010b).

3.3.2.3 Life History and Ecology

Mexican spotted owls nest, roost, forage, and disperse in a diverse assemblage of biotic communities. Spotted owls nest and roost primarily in closed-canopy forests or canyons. Mixed-conifer forests are commonly used throughout most of the range which may include Douglas-fir and/or white fir, with co-dominant species including southwestern white pine, limber pine, and ponderosa pine. The understory often contains the above coniferous species as well as broadleaved species such as Gambel oak, maples, box elder, and/or New Mexico locust. In the northern part of the range, including southern Utah, southern Colorado, and far northern Arizona and New Mexico, owls occur primarily in rocky canyons. They nest in these areas on cliff ledges, in stick nests built by other birds, on debris platforms in trees, and in tree cavities (USFWS 2010b). Mexican spotted owls are also found in canyon habitat dominated by vertical-walled rocky cliffs within complex watersheds including tributary side canyons (Gutierrez and Rinkevich 1991). Forests used for roosting and nesting often contain mature or old-growth stands with complex structure, are typically uneven-aged, multistoried, and have high canopy closure. A wider variety of trees are used for roosting, but again Douglas-fir is the most commonly used species (USFWS 2010b). Mexican spotted owls may migrate altitudinally to lower elevation pinyon juniper habitat in winter (BNA 2010). Foraging is nocturnal; the spotted owl is a “perch and pounce” predator, taking prey either from the ground or trees (BNA 2010). Prey sources include small forest mammals, mainly woodrats, mice, voles and rabbits, but spotted owls occasionally will take bats (BNA 2010). If prey is abundant, spotted owls will cache surplus kills for later use (BNA 2010).

Pair formation begins in February and March with nesting and egg laying begins in late March through April (BNA 2010). Spotted owls do not build their own nest, but utilize naturally occurring nest sites or nests built by other animals. Nests are located in tree cavities or ledges (BNA 2010). Mexican spotted owls lay one to three eggs and may produce a second clutch if the first is lost. Incubation is about one month. Owlets hatch generally in early May and fledge at four to five weeks (USFWS 2010b). They forage independently by late August or early September, after which parents avoid further contact (BNA 2010).

Primary threats to Mexican spotted owls are loss of habitat from fire, logging or development. Human activity (hiking shooting, off-road vehicles) near nesting or roosting sites may cause abandonment (USFWS 2010b).

3.3.2.4 Designated Critical Habitat

Mexican spotted owl critical habitat Unit CP-10 is designated in northern Arizona in the Kaibab National Forest, Grand Canyon National Park and Marble Canyon National Monument (USFWS 2010c). All of Unit CP-10 is more than 15 miles south of the Project alternative alignments. Mexican spotted owl critical habitat Unit CP-12 is designated in Utah in the Grand Staircase-Escalante National Monument north of the Cockscomb; the study area is more than 2.5 miles south of Unit CP-12. Critical habitat Unit CP-11 includes Zion National Park east of Interstate 15 and north of Utah State Routes 9 and 17. The Cedar Valley Pipeline alignment abuts the western boundary of CP-11 along Interstate 15 (USFWS 2010c).

3.3.3 Southwestern Willow Flycatcher

3.3.3.1 Listing History and Status

The southwestern willow flycatcher is listed as endangered (60 FR 10694, February 27, 1995) with critical habitat (50 CFR 60886, October 19, 2005). A five-year review of the species was announced in 2008 (Federal Register: March 20, 2008; Volume 73, Number 55, 14995-14997)

3.3.3.2 Distribution

The range of the southwestern willow flycatcher is primarily in Arizona, New Mexico, Nevada and southern California. The Virgin River corridor in extreme southwest Utah is also a potential habitat area (USFWS 2010d).

3.3.3.3 Life History and Ecology

The southwestern willow flycatcher nests and forages in dense riparian habitats along streams, rivers, lakesides, and other wetlands. Some of the more common plant species used for nesting are: willow, boxelder, tamarisk, Russian olive, buttonbush, cottonwood, and mesquite. Nests are found in dense thickets of these and other plants species that about 13-23 feet in height. According to Southwest Willow Flycatcher Recovery Plan (USFWS 2010e) "...suitable habitat conditions are generally dense, mesic riparian shrub and tree communities 0.1 ha or greater in size within floodplains large enough to accommodate riparian patches at least 10 m wide (measured perpendicular to the channel)." Migration habitat is believed to primarily occur along riparian corridors. Utilized habitat occurs at elevations below 8,500 feet MSL.

The southwest willow flycatcher arrives on breeding grounds in late April to early May. Nesting begins in late May and early June, with fledging from late June to mid-August. It typically lays 3-4 eggs per clutch at one day intervals and eggs are incubated by the female for about 12 days. Young birds fledge 12-13 days after hatching. Typically the flycatchers only raise one brood per year; however some pairs will raise a second brood after a nest failure (USFWS 2010d). Flycatchers are insectivores and capture their prey on the wing. Southwest willow flycatchers winter in Mexico and Central America, migrating by the end of September (USFWS 2010d).

Loss or degradation of dense riparian nesting habitat is the primary threat to the species (USFWS 2010d).

3.3.3.4 Designated Critical Habitat

Southwestern willow flycatcher critical habitat has been designated along the Virgin River in northwestern Arizona and southwestern Utah (Virgin Management Unit). (USFWS 2010d; USFWS 2010e). This habitat extends from approximately 6.9 miles north of the headwaters of Lake Mead in Nevada to a point approximately 1.4 miles north of the Washington Fields Diversion in Utah (USFWS 2010f).

3.3.4 Utah Prairie Dog

3.3.4.1 Listing History and Status

The Utah prairie dog was listed as an endangered species on June 4, 1974 (38 FR 14678). On November 5, 1979, the Utah Division of Wildlife Resources petitioned the U.S. Fish and Wildlife Service to remove the Utah prairie dog from the U.S. List of Endangered and Threatened Wildlife. The USFWS found that this petition contained substantial data and on May 29, 1984 (49 FR 22330), the species was reclassified from endangered to threatened with a special rule to allow regulated take of the species on agricultural lands. The special rule was amended on June 14, 1991 (56 FR 27438) to increase the amount of regulated take throughout the species' range. On February 21, 2007, the USFWS denied a petition to reclassify the Utah prairie dog as endangered (72FR 7843) and initiated a 5-year review. There are numerous habitat conservation plans (HCP) and agreements for the Utah prairie dog, including the Iron County HCP submitted in June 1998 (USFWS 2010g, 2010h).

3.3.4.2 Distribution

The Utah prairie dog is a colonial ground-dwelling rodent with a limited range in southwestern Utah, including Iron, Garfield, Beaver, Washington, Sevier and Wayne counties. Colonies are known to be present in Iron County within the CVP corridor and proposed new water treatment facility site footprint (USFWS 2010i).

3.3.4.3 Life History and Ecology

The Utah prairie dog is a burrowing member of the *Sciuridae* family of rodents with a limited range in central and southwestern Utah, including Iron, Garfield, Beaver, Piute Sevier, Wayne, Washington and Kane counties. Five primary factors influence the suitability of habitat for the Utah prairie dog: soils, vegetative height and density, vegetative moisture availability, vegetation quantity and vegetation quality (EDF 2010). They require well-drained soils with a water table below three feet to enable burrowing for protection and insulation from environmental extremes (USFWS 2010i). Utah prairie dogs prefer swale-type formations where moist herbaceous vegetation is available even during drought periods. Moisture in plants is highly correlated with Utah prairie dog abundance (Collier 1975). Grasses and forbs are preferred food items during all seasons, and there are indications that prairie dogs select particular forage species rather than choosing foods based on availability (Crocker-Bedford and Spillet 1981). Vegetation quality and quantity are important in helping Utah prairie dogs survive hibernation, lactation and high nutrient demand times (EDF 2010). Plant species richness is correlated with increased weight gain, higher juvenile to adult ratios and higher animal densities (Crocker-Bedford and Spillet 1981, Ritchie and Cheng 2001). Utah prairie dogs will avoid areas where brushy species dominate and will eventually decline or disappear in areas invaded by brush (Collier 1975, Player and Urness 1982). Open habitats are important for foraging, for visual surveillance, to escape predators and for intraspecific interactions (Player and Urness 1982). Utah prairie dogs generally hibernate during the late fall through spring (October to

March), although some above-ground activity may occur in all months, depending on weather (USFWS 2010i).

Threats to the species include loss of habitat to development or agriculture, disease (mainly plague), predation by carnivores and hawks, poisoning and hunting in excess of the allowed annual take (USFWS 2010i).

3.3.4.4 Designated Critical Habitat

There is no designated critical habitat for the Utah prairie dog.

3.3.5 Yellow-billed Cuckoo

3.3.5.1 Listing History and Status

The yellow-billed cuckoo in the western United States was accorded candidate species status in July 2001 (66 FR 38611, July 25, 2001). The USFWS determined that although listing was warranted, it was precluded by higher priority listing actions. The species remains in candidate status at this time.

3.3.5.2 Distribution

The yellow-billed cuckoo is widely but sparsely distributed across the United States west of the Rocky Mountains (USFWS 2010j), restricted to its specific riparian habitat requirements. It is infrequently seen in Utah; the most recent report in the Project area was in 1992 near Cedar City (Birds of Utah 2010). Two remote observations are present in the Utah Conservation Data Center (UCDC) GIS database – 1939 and 1981 in Washington County near what is now Sand Hollow Reservoir (UCDC 2010a and 2010b). In Arizona, recorded occurrences are over 150 miles south of the Project study area (AHDMS 2010).

3.3.5.3 Life History and Ecology

Yellow-billed cuckoo is a medium-sized bird classified in the family *Cuculidae*, containing cuckoos, roadrunners and anis in North America (Sibley 2001). East of the Rocky Mountains, yellow-billed cuckoo breeding range covers most of the United States. West of the Rocky Mountains, its breeding range is spotty and restricted to riparian areas with specific habitat characteristics of a tall overstory of mature trees, particularly cottonwoods (*Populus sp.*) and willows (*Salix sp.*), and a dense understory of shrubs and small trees (Sibley 2001, Wiggins 2005). Ideally, riparian habitat should provide a contiguous area of at least 15 acres (Wiggins 2005) to 25 acres (Sibley 2001) with overstory from 5 to 30 meters and understory of 1 to 6 meters in height. Food sources are primarily slow-moving insects and caterpillars, especially tent caterpillars in the East.

Yellow-billed cuckoos arrive at their breeding territories relatively late compared to other songbirds, generally in late May, and migrate south as early as August (Wiggins 2005). Breeding is stimulated by an abundant local food supply and the breeding cycle is extremely rapid – 17 days from egg laying to fledging (BNA 2010). Clutch size varies from one to five eggs and cuckoos are both intraspecific and interspecific brood parasites. Yellow-billed cuckoo southern migration is to South America.

Factors of decline of the species are most closely related to loss of adequate areas of contiguous riparian habitat, although some unquantified impacts from pesticides and decline of insect food sources could contribute to the species decline (Wiggins 2005). Cuckoos appear sensitive to human disturbance and may abandon the nest during incubation if disturbed (Wiggins 2005).

3.3.5.4 Designated Critical Habitat

There is no critical habitat designated for the yellow-billed cuckoo (66 FR 54807, October 30, 2001).

3.3.6 Greater Sage Grouse

3.3.6.1 Listing History and Status

The USFWS published a 12-month finding in March, 2010 that listing of the greater sage-grouse range-wide was warranted, but precluded by other, higher-priority actions (Federal Register Vol. 75, No. 55, March 23, 2010; 13910 – 14010). The species has candidate status at this time.

3.3.6.2 Distribution

The greater sage-grouse inhabits a broad area of the western United States, including parts of 12 states; these states are divided into seven Management Zones (MZ) (USGS 2010a). Its occurrence is restricted to relatively undisturbed contiguous tracts of sagebrush (*Artemisia spp.*) habitat within this broader range. Although the limits of its range are relatively wide, breeding populations are more fragmented and many are disjunct from each other with little or no connectivity between habitats and populations (USGS 2010a). Greater sage-grouse brooding habitat is present in northwestern Kane County and in northern Iron County (UCDC 2010a and 2010b).

3.3.6.3 Life History and Ecology

The greater sage-grouse is the largest of North American grouse species, weighing up to six pounds (USGS 2010a). Greater sage-grouse males gather in the spring on communal breeding grounds, known as leks. There they conduct an elaborate courtship display for groups of females. Breeding begins in April in Utah (BNA 2010). Females lay their eggs, usually six to nine, in ground nests, usually placed in association with some vertical structure, such as overhanging sagebrush or grass cover (BNA 2010). Nest sites are selected independently of lek location. Only females incubate the eggs over the course of 25 to 29 days before chicks hatch. The chicks are precocial and leave the nest with the female shortly after hatching and follow her around while feeding on insects and plant material (USGS 2010a, BNA 2010). Young chicks can fly strongly by five weeks (BNA 2010).

Greater sage-grouse depend on relatively large expanses of sagebrush-dominated habitat. Individual birds can move over large ranges, with migratory movements often more than 12 miles and annual home ranges more than 230 square miles. The importance of the total amount and arrangement of habitats is unknown (USGS 2010a). Sage-grouse use sagebrush for food, cover, nesting and roosting habitat, although other plants within the sagebrush ecosystem (forbs and grasses) are also important elements of the required habitat (USGS 2010a).

The major threat to greater sage-grouse is degradation of its vital sagebrush ecosystem habitat through fire, grazing, agricultural and urban development, road construction and any disturbance that promotes the spread of invasive vegetation, especially cheatgrass (*Bromus tectorum*) (USGS 2010a). Hunting with current bag limits is not thought to be a significant threat to the species (BNA 2010).

3.3.6.4 Designated Critical Habitat

There is no currently designated critical habitat for greater sage-grouse, although the Management Zones serve as a mechanism to coordinate habitat preservation for the species (USGS 2010a).

3.3.7 Mohave Desert Tortoise

3.3.7.1 Listing History and Status

The Mohave population of the desert tortoise (all desert tortoises north and west of the Colorado River) was listed as threatened in 1990 (55 FR 12178, April 2, 1990) with critical habitat designated in 1994 (59 FR 5820, February 28, 1994). A recovery plan was adopted in June 1994 and a draft recovery plan revision was released for comment in 2008 (USFWS 2010k). Washington County, Utah contains the Upper Virgin River Mohave Desert Tortoise Recovery Unit. A Washington County Habitat Conservation Plan (Washington County Commission 1995) was submitted in December 1995.

3.3.7.2 Distribution

The Mohave population of the desert tortoise occupies habitat in southern California, Nevada, Arizona and Utah. The Upper Virgin River Recovery Unit located immediately north of St. George Utah is the northernmost occupied habitat of the desert tortoise (USFWS 2010f).

3.3.7.3 Life History and Ecology

Desert tortoises occupy a variety of habitats from flats and slopes dominated by *Larrea tridentata* (creosote bush) scrub at lower elevations to rocky slopes in *Coleogyne ramosissima* (blackbrush) and *Juniperus* spp. (juniper) woodland ecotones at higher elevations. Desert tortoises occur from below sea level to an elevation of 2,225 meters (7,300 feet MSL) (USFWS 2010k). Throughout most of the Mojave Desert, tortoises occur most commonly on gently sloping terrain with sandy gravel soils and where there is sparse cover of low-growing shrubs, which allows establishment of herbaceous plants. Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. Typical habitat for the desert tortoise in the Mojave Desert has been characterized as *Larrea tridentata* scrub where precipitation ranges from 5 to 20 centimeters (2 to 8 inches) annually, the diversity of perennial plants is relatively high, and production of ephemerals is high (USFWS 2010k).

Desert tortoises may live 50 or more years in the wild. Their diet consists primarily of wildflowers, grasses and cacti. Desert tortoises derive almost all their water intake from the plants they eat. A large urinary bladder can store over forty percent of the tortoise's body weight in water, urea, uric acid, and nitrogenous wastes. During periods of sufficient rainfall tortoises drink from temporary rain pools. A common defensive behavior when molested or handled is to empty the bladder, leaving the tortoise at a considerable disadvantage during dry periods (USFWS 2010k).

Reproduction begins between ages 12 to 20 years, with clutch sizes of 1 to 14 eggs. In years with low rainfall, females may lay few to no eggs. Females can store sperm for five years or longer, meaning they can reproduce for several years after mating. Nests are built and eggs are laid in late spring or early summer. The hatchlings appear in 90 to 120 days. The mother leaves the nest, so once the hatchlings appear, they must survive on their own (USFWS 2010k).

Tortoises depend on bushes for shade and protection from predators such as ravens and coyotes. Many tortoises live in burrows to escape the temperatures of cold winters and very hot summers. The spring and summer burrows vary from 18 inches to five feet long, but may only be a few inches from the surface. Winter burrows tend to be about eight feet long and may be two to three feet from the surface. They often share burrows and may use multiple burrows scattered across the landscape. Tortoises hibernate for up to nine months each year, becoming most active from March to June and September to October. When

young, they seldom venture more than 150 feet from their burrow. As they get older, they may go as far as 3/4 mile in a day and use a network of burrows. In the most densely populated areas, there may be one tortoise per 2.5 acres; however, typically, tortoise densities are closer to one tortoise per 100 acres (USFWS 2010k).

The tortoise population in the area of St. George, Utah is at the extreme northeastern edge of the species' range and experiences long, cold winters (about 100 freezing days) and mild summers during which the tortoises are continually active. In this habitat the animals live in a complex topography consisting of canyons, mesas, sand dunes, and sandstone outcrops where the vegetation is a transitional mixture of sagebrush (*Artemisia spp.*) scrub, creosote bush scrub and blackbrush scrub in a sandy-soil community. In this area, desert tortoises often use sandstone and lava caves instead of burrows, travel to sand dunes for egg laying, and use still other habitats for foraging. In contrast to populations at more distant parts of the range, two or more desert tortoises often use the same burrow (USFWS 2010k).

Major threats to the Mohave population of the desert tortoise include land development, grazing, human activities (hiking, off-road vehicles), wildfire, predation (ravens, coyotes) and disease (USFWS 2010k).

3.3.7.4 Designated Critical Habitat

The Mohave desert tortoise Upper Virgin River Recovery Unit Critical Habitat Unit includes approximately 54,600 acres of the 62,000 acre Red Cliffs Desert Reserve that was established in 1996 by Washington County, Utah in partnership with the Nature Conservancy, the Bureau of Land Management (BLM), Utah School and Institutional Trust Lands Administration, Snow Canyon State Park, US Fish and Wildlife Service, Utah Department of Natural Resources and the cities of St. George, Washington, Ivins, Hurricane, Santa Clara, Rockville and Springdale (Nature Conservancy 2010). The section of the Reserve east of Interstate 15 and immediately north of the City of Hurricane known as the Hurricane Cinder Knolls is the area closest to Project corridors (USFWS 2010f).

3.3.8 Relict Leopard Frog

3.3.8.1 Listing History and Status

The relict leopard frog is a candidate species under the ESA (67 FR 40657; June 13, 2002).

3.3.8.2 Distribution

Relict leopard frog distribution has historically been characterized as springs, streams, and wetlands within the Virgin River drainage from the vicinity of Hurricane, Utah to the Overton Arm of what is now Lake Mead, Nevada, and along the Muddy River in Nevada. The species may have once been present on the mainstem Colorado River. Populations in Utah appear to have been extinct since the 1950s. The UCDC GIS database (UCDC 2010a and 2010b) records that specimens were taken between 1947 and 1950 at Berry Springs, located at what became the southern shore of Sand Hollow Reservoir. Recent surveys have revealed extant populations at seven sites in four general areas: Surprise Canyon in lower Grand Canyon, Arizona, Sycamore Spring, Arizona (Mohave County); springs near the Overton Arm of Lake Mead, Nevada; and springs in Black Canyon below Hoover Dam, Nevada. The population at the smallest known site, Corral Spring, went extinct in 1995. Frogs were last seen at a wetland near Littlefield, Arizona in 1998. The species was introduced to Sycamore Spring, Arizona in 2003 (USFWS 2010l).

3.3.8.3 Life History and Ecology

Relict leopard frogs inhabit permanent streams, springs and spring-fed wetlands below approximately 1,968 feet. Adults may prefer relatively open shorelines where dense vegetation does not dominate. Breeding habitat includes pools or slow moving side areas of streams, with or without emergent vegetation (USFWS 2010).

Threats to this species include elimination or dramatic alteration of aquatic habitat because of dams, agriculture, marsh draining, and water development and the spread of predator and nonnative bullfrogs, crayfish, and predaceous fishes. A fungal disease, chytridiomycosis, is an additional threat (USFWS 2010).

3.3.8.4 Designated Critical Habitat

There is no designated critical habitat for the relict leopard frog.

3.3.9 Yuma Clapper Rail

3.3.9.1 Listing History and Status

The Yuma clapper rail is listed as endangered (32 FR 4001, March 11, 1967).

3.3.9.2 Distribution

The Yuma clapper rail occurs along the Colorado River (Yuma, La Paz, and Mohave counties, Arizona), from Lake Mead to Mexico; on the Gila and Salt Rivers upstream to the area of the Verde confluence (Maricopa and Pinal counties, Arizona); at Picacho Reservoir (Pinal County, Arizona); and on the Tonto Creek arm of Roosevelt Lake (Gila County, Arizona). It may be expanding into other suitable marsh habitats in western and central Arizona and northern Arizona (USFWS 2010n). The Yuma clapper rail has been observed at the confluence of Beaver Dam Wash with the Virgin River (BLM 2007). It could potentially occur along the Virgin River in southern Washington County (USFWS 2010m); however suitable habitat has not been identified near the Project study area.

3.3.9.3 Life History and Ecology

Yuma clapper rail inhabits freshwater or brackish stream-sides and marshlands under 4,500 feet MSL elevation. It is associated with dense riparian and marsh vegetation and requires a wet substrate, such as a mudflat, sandbar, or slough bottom that supports cattail and bulrush stands of moderate to high density adjacent to shorelines (USFWS 2010n).

3.3.9.4 Designated Critical Habitat

There is no designated critical habitat for the Yuma clapper rail (32 FR 4001, March 11, 1967).

3.3.10 Kanab Ambersnail

3.3.10.1 Listing History and Status

The Kanab ambersnail is listed as endangered (57 FR 13657, April 17, 1992) without critical habitat. A Recovery Plan was published in 1995 (USFWS 1995). The species is currently undergoing a five-year status review.

3.3.10.2 Distribution

Kanab ambersnails are terrestrial land snails with a restricted distribution in Kane County, Utah and Coconino County, Arizona. The species inhabits perennially wet environments in seeps and springs draining sandstone or limestone cliffs with semi-aquatic vegetation (USFWS 2008o). The currently known distribution of the Kanab ambersnail is restricted to three locations: two springs within the Grand Canyon and springs located at Three Lakes approximately six miles north of Kanab, Utah (USFWS 2008o). The Kanab location is within Three Lakes Canyon in Sections 19 and 30, Township 42 South, Range 6 West (USFWS 1995).

3.3.10.3 Life History and Ecology

The Kanab ambersnail is found in semi-aquatic vegetation watered by springs or seeps at the base of sandstone or limestone cliffs at an elevation of approximately 884 m (2,900 ft). It requires either shallow standing water or a perennially wet soil surface. Grass or sedge cover is also necessary (USFWS 2010o).

The ambersnail is vulnerable because of the rarity and small area of its habitat in the southwest and the small number of its populations. Threats include habitat alteration or destruction from development and heavy grazing; and possible illegal collecting; recreation; and high flows from Glen Canyon dam affecting habitat in the Grand Canyon (USFWS 2010o).

3.3.10.4 Designated Critical Habitat

There is no currently designated critical habitat for the Kanab ambersnail.

3.4 Federal, State and Agency Wildlife Species of Concern and Tribal Wildlife Species of Cultural Concern

Table 3-2 summarizes state and agency wildlife species of concern with ranges that encompass the LPP project South, Existing Highway, Southeast Corner and Transmission Line Alternatives alignments or the Cedar Valley Pipeline System or have been recorded in counties crossed by proposed LPP project facilities. In compliance with Presidential Executive Order 13186 (66 FR 3853, January 10, 2001) mandating conservation of migratory birds, Partners in Flight (PIF) Watch List priority species that may potentially nest in southwest Utah and northwest Arizona are included. Wildlife species of special concern with a potential project nexus are highlighted in Table 3-2. The wildlife species of concern that are not highlighted in Table 3-2 represent species that do not have a potential project nexus; these species are briefly addressed as to why the LPP and CVP would not impact them.

**Table 3-2
State and Agency Wildlife Species of Concern**

Page 1 of 3

Common Name	Scientific Name	Status¹
Mammals		
Allen's big-eared bat	<i>Idionycteris phyllotis</i>	USPC
Big free-tailed bat	<i>Nyctinomops macrotis</i>	USPC, AGFD-WSC
California leaf-nosed bat	<i>Macrotus californicus</i>	BLM-S, AGFD-WSC
Dark kangaroo mouse	<i>Microdipodops megacephalus</i>	USPC
Dwarf shrew	<i>Sorex nanus</i>	AGFD-WSC
Fringed myotis bat	<i>Myotis thysanodes</i>	USPC
Greater western mastiff bat	<i>Eumops peroti scalifornicus</i>	AGFD-WSC
House Rock Valley chisel-toothed kangaroo rat	<i>Dipodomys microps leucotis</i>	BLM-S, AGFD-WSC
Kit fox	<i>Vulpes macrotis</i>	USPC
Long-eared myotis bat	<i>Myotis evotis</i>	BLM-S
Pygmy rabbit	<i>Brachylagus idahoensis</i>	USPC
Small-footed myotis bat	<i>Myotis ciliolabrum</i>	BLM-S, AGFD-WSC
Spotted bat	<i>Euderma maculatum</i>	USPC
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	USPC
Western red bat	<i>Lasiurus blossevillii</i>	USPC
Birds		
Abert's towhee	<i>Pipilo aberti</i>	PIF
American avocet	<i>Recurvirostra americana</i>	BCC
American bittern	<i>Botaurus lentiginosus</i>	AGFD-WSC
American three-toed woodpecker	<i>Picoides tridactylus</i>	USPC
American white pelican	<i>Pelecanus erythrorhynchos</i>	USPC
Bald eagle	<i>Haliaeetus leucocephalus</i>	FWS, BLM, NPS
Band-tailed pigeon	<i>Columba fasciata</i>	PIF
Bell's vireo	<i>Vireo bellii</i>	BCC
Belted kingfisher	<i>Ceryle alcyon</i>	AGFD-WSC
Bendire's thrasher	<i>Toxostoma bendirei</i>	BCC
Black swift	<i>Cypseloides niger</i>	USPC, BCC
Black-chinned sparrow	<i>Spizella atrogularis</i>	PIF
Black-throated gray warbler	<i>Dendroica nigrescens</i>	BCC
Blue grouse	<i>Dendragapus obscurus</i>	PIF
Bobolink	<i>Dolichonyx oryzivorus</i>	USPC, BCC
Brewer's sparrow	<i>Spizella breweri</i>	BCC
Burrowing owl	<i>Athene cunicularia</i>	USPC, BCC
Calliope hummingbird	<i>Stellula calliope</i>	PIF
Crissal thrasher	<i>Toxostoma crissale</i>	BCC
Ferruginous hawk	<i>Buteo regalis</i>	USPC, BCC
Flammulated owl	<i>Otus flammeolus</i>	BCC
Fulvus whistling Duck	<i>Dendrocygna bicolor</i>	BLM-S

**Table 3-2
State and Agency Wildlife Species of Concern**

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Common Name	Scientific Name	Status¹
Golden eagle	<i>Aquila chrysaetos</i>	BCC
Grace's warbler	<i>Dendroica graciae</i>	BCC
Gray vireo	<i>Vireo vicinior</i>	BCC
Gunnison sage-grouse	<i>Centrocercus minimus</i>	BCC
Leconte's thrasher	<i>Toxostoma lecontei</i>	PIF
Lewis's woodpecker	<i>Melanerpes lewis</i>	USPC, BCC
Loggerhead shrike	<i>Lanius ludovicianus</i>	BLM-S, BCC
Long-billed curlew	<i>Numenius americanus</i>	USPC, BCC
Lucy's warbler	<i>Vermivora luciae</i>	PIF
Marbled godwit	<i>Limosa fedoa</i>	BCC
Mountain plover	<i>Charadrius montanus</i>	USPC
Northern goshawk	<i>Accipiter gentilis</i>	CS
Northern harrier	<i>Circus cyaneus</i>	BCC
Olive-sided flycatcher	<i>Contopus cooperi</i>	AGFD-WSC
Peregrine falcon	<i>Falco peregrinus anatum</i>	FWS, BLM, NPS
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	BCC
Prairie falcon	<i>Falco mexicanus</i>	BCC
Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>	AGFD-WSC
Sage sparrow	<i>Amphispiza belli</i>	BCC
Sage thrasher	<i>Oreoscoptes montanus</i>	AGFD-WSC
Short-eared owl	<i>Asio flammeus</i>	USPC, BCC
Snowy plover	<i>Charadrius alexandrinus</i>	BCC
Swainson's hawk	<i>Buteo swainsoni</i>	BCC
Virginia's warbler	<i>Vermivora virginiae</i>	BCC
Western grasshopper sparrow	<i>Ammodramus savannarum perpallidus</i>	AGFD-WSC
White-faced Ibis	<i>Plegadis chihi</i>	BLM-S
White-throated swift	<i>Aeronautes saxatalis</i>	PIF
Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>	BCC
Wilson's phalarope	<i>Phalaropus tricolor</i>	BCC
Reptiles		
Common chuckwalla	<i>Sauromalus ater</i>	USPC
Desert iguana	<i>Dipsosaurus dorsalis</i>	USPC
Desert night lizard	<i>Xantusia vigilis</i>	USPC
Gila monster	<i>Heloderma suspectum</i>	USPC
Mojave rattlesnake	<i>Crotalus scutulatus</i>	USPC
Northern sagebrush lizard	<i>Sceloporus graciosus graciosus</i>	BLM-S
Sidewinder	<i>Crotalus cerastes</i>	USPC
Speckled rattlesnake	<i>Crotalus mitchellii</i>	USPC
Utah milk Snake	<i>Lampropeltis triangulum taylori</i>	AGFD-WSC
Western banded gecko	<i>Coleonyx variegatus</i>	USPC
Western threadsnake	<i>Leptotyphlops humilis</i>	USPC
Zebra-tailed lizard	<i>Callisaurus draconoides</i>	USPC

Table 3-2
State and Agency Wildlife Species of Concern

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Common Name	Scientific Name	Status¹
Amphibians		
Arizona toad	<i>Bufo microscaphus</i>	USPC
Great plains toad	<i>Bufo cognatus</i>	USPC
Western toad	<i>Bufo boreas</i>	USPC
Notes: ¹ USPC = Utah Species of Concern; CS = Species with Conservation Agreements; AFGD – WSC = Arizona Fish and Game Department Wildlife Species of Concern; BLM-S = BLM Sensitive Species; BCC = USFWS Birds of Conservation Concern; PIF = Partners in Flight Watch List; FWS = Fish and Wildlife Service; NPS = National Park Service Sources: Utah Conservation Data Center; Bureau of Land Management, Arizona Strip Field Office Proposed Plan/FEIS, 2007; USFWS Birds of Conservation Concern, 2002; Arizona Game and Fish Department Natural Heritage Program and Comprehensive Wildlife Conservation Strategy; Partners in Flight (PIF 2008); US Fish and Wildlife Service. Wildlife species highlighted have a potential Project nexus.		

3.4.1 Wildlife Species of Concern That Do Not Have a Potential Project Nexus

Table 3-3 summarizes those wildlife species of concern without project nexus with a brief description of preferred habitats and reasons why they would not have ecological impacts from LPP project construction or operation and maintenance.

Table 3-3
Summary of Wildlife Species of Concern That Do Not Have a Potential Project Nexus

Page 1 of 5

Species Name	Status^a	Habitat Requirements	Potential for Presence in Project Area
California Leaf-nosed Bat <i>Macrotus californicus</i>	BLM-S, AGFD- WSC	The California leaf-nosed bat occurs widely throughout the southern half of Arizona, with one occurrence recorded in the northwest corner of Mohave County. Mostly found in the Sonoran desertscrub; its primary summer and winter range are essentially the same. It primarily roosts in mines, caves, and rock shelters.	No - although foraging is possible, there are no roosting habitats in the Project Area
Dark kangaroo mouse <i>Microdipodops megacephalus</i>	USPC	The dark kangaroo mouse inhabits the West Desert of Utah, but potential habitat is not recorded in the southwest Utah counties through which the Project alignments pass.	No - habitat is not within the Project Area

Table 3-3
Summary of Wildlife Species of Concern That Do Not Have a Potential Project Nexus

Page 2 of 5

Species Name	Status^a	Habitat Requirements	Potential for Presence in Project Area
House Rock Valley Chisel-toothed Kangaroo Rat <i>Dipodomys microps leucotis</i>	USPC	This kangaroo rat has been recorded only within the House Rock Valley of Coconino County, south and east of the Project alternative alignments.	No – habitat is not within the Project Area
Spotted bat <i>Euderma maculatum</i>	USPC	Spotted bats may be found in a variety of habitats, ranging from deserts to forested mountains; they roost and hibernate in caves and rock crevices.	No - although foraging is possible, there are no roosting habitats in the Project Area
American avocet <i>Recurvirostra americana</i>	BCC	The American avocet is a ground-nesting marsh foraging shorebird that nests in northern Utah and is only transient in the rest of the state.	No - transient only
American Bittern <i>Botaurus lentiginosus</i>	AGFD-WSC	Associated with dense tall stands of cattails (<i>Typha spp.</i>). The species not recorded as nesting in Arizona and is considered a rare transient through the state; the bittern is considered uncommon in Utah.	No
American three-toed woodpecker <i>Picoides tridactylus</i>	USPC	In Utah, three-toed woodpecker nests and winters in coniferous forests, generally above 8,000 feet MSL elevation; preferred habitats are Engelmann spruce, sub-alpine fir, Douglas fir, grand fir, ponderosa pine, tamarack, aspen, and lodgepole pine forests.	No - The Project would not be constructed at the elevation and in the habitats of this species.
American white pelican <i>Pelecanus erythrorhynchos</i>	USPC	White pelicans are found on lakes and large rivers with shallow areas where they fish from the surface in flocks.	No - The Project Area does not include pelican habitat.
Band-tailed pigeon <i>Patagioenas fasciata</i>	PIF	Band-tailed pigeons nest in ponderosa pine and mixed conifer habitats; typical habitat is coniferous forests. Main nesting concentrations in Utah are in the southern pine forests from the Pine Valley Mountains in the west to the La Sal and Blue Mountains in the east. The band-tailed pigeon is migratory and only limited breeding populations occur in southern Utah. In Arizona, band-tailed pigeons nest in higher elevations of the Kaibab Plateau. Project facilities would not be constructed in band-tailed pigeon breeding habitats.	No - minor potential foraging areas along Ash Creek corridor

Table 3-3
Summary of Wildlife Species of Concern That Do Not Have a Potential Project Nexus

Page 3 of 5

Species Name	Status^a	Habitat Requirements	Potential for Presence in Project Area
Black swift <i>Cypseloides niger</i>	USPC, BCC	Nests in steep mountain canyons and prefers sites behind or adjacent to waterfalls (UCDC 2010a and 2010b).	No - There is no breeding habitat for black swifts or recorded nesting occurrence in or near the Project corridors.
Bobolink <i>Dolichonyx oryzivorus</i>	USPC, BCC	Bobolinks do not breed in most of Utah. They occur in low abundance and in isolated patches primarily in the northern half of the state.	No - The Project would not cross the known breeding range of bobolink in Utah.
Calliope hummingbird <i>Stellula calliope</i>	PIF	The calliope hummingbird nests in montane forests and is an uncommon summer resident in Utah. Project facilities would not be constructed in calliope hummingbird nesting habitat.	No
Dusky grouse <i>Dendragapus obscurus</i>	PIF	Open stands of conifer or aspen with an understory of brush are preferred dusky grouse habitat. Winters are spent in dense fir trees, usually at higher elevations. In spring, birds move to lower meadow, brush, or open timber stands for mating. Dusky grouse are found in most mountainous areas of Utah; however, the greatest densities occur in the northern Wasatch Range. In Arizona, blue grouse inhabit higher elevations on the Kaibab Plateau. Project facilities would not be constructed in dusky grouse habitats.	No
Flammulated owl <i>Otus flammeolus</i>	BCC	The flammulated owl nests in ponderosa pine and sub-alpine forests; Project facilities will not be constructed in this habitat.	No
Fulvus Whistling-Duck <i>Dendrocygna bicolor</i>	BLM-S	Ponds, lakes, rivers. The fulvus whistling-duck is an occasional visitor to southern Arizona and has been recorded only four times in Utah	No
Grace's warbler <i>Dendroica graciae</i>	BCC	Grace's warbler nests in ponderosa and mixed pine forests, usually 20 to 60 feet above ground. Project facilities will not be constructed in this habitat.	No
Gunnison sage-grouse <i>Centrocercus minimus</i>	BCC	Associated with sagebrush habitats. The Gunnison sage-grouse's primary range is in Colorado; in Utah it has been recorded only in San Juan County.	No

<p align="center">Table 3-3 Summary of Wildlife Species of Concern That Do Not Have a Potential Project Nexus</p> <p align="right">Page 4 of 5</p>			
Species Name	Status^a	Habitat Requirements	Potential for Presence in Project Area
Leconte's thrasher <i>Toxostoma lecontei</i>	USPC	Only occurs in Utah in Beaver Dam Wash/Slope area.	No – occurrence is not in study area
Lewis's woodpecker <i>Melanerpes lewis</i>	USPC, BCC	The major breeding habitat for Lewis's woodpecker consists of open park-like ponderosa pine forests. Lewis's woodpecker is attracted to burned-over Douglas-fir, mixed conifer, pinyon-juniper, riparian, and oak woodlands, but is also found in the fringes of pine and juniper stands, and deciduous forests, especially riparian cottonwoods. Areas with a good under-story of grasses and shrubs to support insect prey populations are preferred.	No – there is no nesting habitat in the Project Area
Marbled godwit <i>Limosa fedoa</i>	BCC	The marbled godwit is a large long-billed shorebird. It is a migrant in Utah, but is not recorded as nesting in the Project Area.	No
Mountain plover <i>Charadrius montanus</i>	USPC	The mountain plover is typically associated with shortgrass prairie habitat, composed primarily of blue grama (<i>Bouteloua gracilis</i>) and buffalo grass (<i>Buchloe dactyloides</i>). In Utah it has been recorded as a casual migrant in Box Elder, Weber, Salt Lake, and Daggett counties. There are six documented historical sightings in the Uinta Basin. There have been three remote records from Washington County in 1965 – 1966, but none in that area since.	No - historical occurrence only
Northern goshawk <i>Accipiter gentilis</i>	CS, USPC, AGFD-WSC	The northern goshawk prefers mature mountain forest and riparian zone habitats. Nests are constructed in trees in mature forests. In Arizona, goshawk's nest most commonly in ponderosa pine forests along the Mogollon Rim and on the Kaibab Plateau, and in Arizona pine and ponderosa pine forests in the southeastern mountains. Potential habitat is sparsely present in Utah; in Arizona, there are concentrations of northern goshawk observations in northwestern Coconino County.	No –nesting and foraging habitat are not available
Olive-sided flycatcher <i>Contopus cooperi</i>	AGFD-WSC	The olive-sided flycatcher nests in sub-alpine conifer and ponderosa pine forests. Project facilities will not be constructed in this habitat.	No – Project does not cross nesting habitat
Snowy plover <i>Charadrius alexandrinus</i>	BCC	The snowy plover is a tiny shorebird that nests on beaches and inland playas; in Utah the primary nesting range is adjacent to Great Salt Lake. Snowy plover is not recorded as breeding in the Project Area.	No

<p style="text-align: center;">Table 3-3 Summary of Wildlife Species of Concern That Do Not Have a Potential Project Nexus Page 5 of 5</p>			
Species Name	Status^a	Habitat Requirements	Potential for Presence in Project Area
Western toad <i>Bufo boreas</i>	USPC	The western toad inhabits high montane habitats and GAP analysis mapping does not show any predicted habitat in the Project Area.	No
White-faced ibis <i>Plegadis chihi</i>	BLM-S	The white-faced ibis is a marsh bird that is considered as a migratory transient only. In Utah, there are large breeding concentrations around the Great Salt Lake and the species is found along the Colorado River and other large water bodies, but there is no suitable habitat in or near the Project alignments in southern Utah. In Arizona, breeding has not been recorded on the Arizona Strip.	No - transient only
Williamson's sapsucker <i>Sphyrapicus thyroideus</i>	BCC	Williamson's sapsucker nests in sub-alpine conifer or aspen forests; Project facilities will not be constructed in this habitat.	No
Wilson's phalarope <i>Phalaropus tricolor</i>	BCC	Wilson's phalarope is a small shorebird that nests in freshwater wetlands. It breeds in northern Utah, mainly in Great Salt Lake, but not in the Project Area.	No
<p>Notes:</p> <p>^a USPC = Utah Species of Concern; CS = Species with Conservation Agreements; AFGD – WSC = Arizona Fish and Game Department Wildlife Species of Concern; BLM-S = BLM Sensitive Species; BCC = USFWS Birds of Conservation Concern; PIF = Partners in Flight Watch List; FWS = Fish and Wildlife Service; NPS = National Park Service</p> <p>Sources: Utah Conservation Data Center; Bureau of Land Management, Arizona Strip Field Office Proposed Plan/FEIS, 2007; USFWS Birds of Conservation Concern, 2002; Arizona Game and Fish Department Natural Heritage Program and Comprehensive Wildlife Conservation Strategy; Partners in Flight (PIF 2008); US Fish and Wildlife Service.</p>			

3.4.2 Wildlife Species of Concern That Have a Potential Project Nexus

The following sections briefly describe wildlife species of concern with a potential LPP project nexus with their agency designation, preferred habitats, distribution and potential occurrence in the project study area.

3.4.2.1 Allen's Big-Eared Bat

Allen's big-eared bat is a Utah species of concern in Iron and Kane counties and a BLM sensitive species in the Arizona Strip.

Preferred habitats for the species include rocky and riparian areas in woodland and scrubland regions. Little is known about the breeding activity of the species, but females have been found with single young

during the late spring and early summer (UCDC 2010a and 2010b). It has been recorded in Arizona in northern Coconino and Mohave counties (AHDMS 2010). Most Arizona specimens have been taken from the southern Colorado Plateau, the Mogollon Rim and adjacent mountain ranges (AHDMS 2010). Utah GAP analysis mapping shows substantial value habitat scattered through Washington and Kane counties (UCDC 2010b). This bat may roost in or near the LPP project study area.

3.4.2.2 Big Free-tailed Bat

The big free-tailed bat is a Utah species of concern in Washington and Kane counties and a BLM sensitive species in the Arizona Strip. The big free-tailed bat prefers rocky and woodland habitats, where roosting occurs in caves, mines, old buildings, and rock crevices in Utah (UCDC 2010a and 2010b). Arizona habitats are primarily rugged, rocky country and riparian areas (AHDMS 2010). It has been recorded in northern Coconino and Mohave counties. Utah GAP analysis mapping shows substantial value habitat scattered through Washington, Kane and Iron counties (UCDC 2010b). This bat may roost in or near the LPP project study area.

3.4.2.3 Dwarf Shrew

The dwarf shrew is an Arizona Game and Fish Department wildlife species of concern (Category 1b). It lives throughout the southern and central Rocky Mountains and adjacent plains, in habitats from alpine tundra to arid short-grass prairie (Smithsonian 2008) and pinyon-juniper woodlands (NatureServe 2010). Specific data on locality of occurrence, habitat and biology are lacking because field trapping has been limited by the small size of this shrew - too small and light to trigger many traps used in surveys (Smithsonian 2008). In Utah, although potential habitat is widespread, including southwest Kane County, it is known from only two locations: the Uinta Mountains and Abajo Mountains (UCDC 2010a and 2010b); neither is close to the LPP project study area. USGS GAP mapping (USGS 2010b) shows predicted dwarf shrew habitat on both sides of Highway 89 west of the Cockscomb to the point where the South Alternative leaves the highway. From that point west to Kanab on the Existing Highway Alternative alignment, GAP mapping shows potential habitat on the north side of the Project corridor (USGS 2010b). In northern Arizona, GAP mapping shows potential habitat only on upper elevations of the Kaibab Plateau (USGS 2010b). The shrew could occur along the Highway 89 construction corridor in Utah.

3.4.2.4 Fringed Myotis Bat

The fringed myotis is a Utah species of concern in Iron, Kane and Washington counties and a BLM sensitive species in the Arizona Strip. Fringed myotis occur primarily in middle elevation habitats ranging from deserts, grasslands, and woodlands. They are most frequently captured in oak-pinyon woodlands and other open, coniferous, middle-elevation forests but have also been captured in high-elevation habitats and at sea level in coastal areas. It has been recorded in Arizona in northern Coconino and Mohave counties (AHDMS 2010). In Arizona, roost sites have been found in caves, mine tunnels, in large snags, under exfoliating bark, and in buildings (AHDMS 2010). The species is widely distributed throughout Utah, but is not very common in the state; in Utah fringed myotis inhabits caves, mines, and buildings, most often in desert and woodland areas (UCDC 2010a and 2010b). Utah GAP analysis mapping shows substantial to high values habitat in Washington and Kane counties (UCDC 2010b). Roost sites could occur in the LPP project study area.

3.4.2.5 Greater Western Mastiff Bat

The greater western mastiff bat is an Arizona Game and Fish Department wildlife species of concern (Category 1b). This largest North American bat is found in lower and upper Sonoran desertscrub near cliffs, preferring the rugged rocky canyons with abundant crevices. They prefer crowding into tight crevices a foot or more deep and two inches or more wide (AHDMS 2010). The species has been found in northern Coconino County, Arizona (AHDMS 2010) and may roost in or near the LPP project study area.

3.4.2.6 Kit Fox

The kit fox is a Utah species of concern in Iron, Kane and Washington counties. Although the species is not overly abundant in Utah, it does occur in the western, east-central, and southeastern areas of the state (UCDC 2010a and 2010b). Kit fox habitat is usually sparsely vegetated flat areas in the desert. Common range plants such as grey molly, greasewood, shadescale and seepweed are abundant in these areas (UDWLR 2010). Kit foxes live in dens dug in the desert soil. Kit foxes have definite preferences and permanent ties to specific den sites. They tend to select sites in barren areas with silty, clay soil that are higher than the surrounding terrain (UDWLR 2010). Utah GAP analysis mapping shows high to substantial value habitat in Washington and Iron counties (UCDC 2010b). The UCDC GIS database has two observations for kit fox – near U.S. 89 about three miles west of the Big Water and on Utah route 59 south of Hurricane. Den sites may be present in the LPP project study area.

3.4.2.7 Long-eared Myotis Bat

The long-eared myotis is a BLM sensitive species in the Arizona Strip. Long-eared myotis inhabit ponderosa pine or spruce-fir forests of Arizona. During the summer months these bats roost in small groups of 12 to 30 individuals in rock outcroppings, tree cavities, under peeling bark, in stumps, caves, mines, sink holes, lava tubes, or in abandoned buildings. Large diameter trees and snags seem to be the preferred tree roost sites. During winter it is likely that they use caves and abandoned mines as hibernacula. Long-eared myotis are most often captured in mixed coniferous forests but also occur in higher elevation forests, pinyon-juniper woodlands, sagebrush steppe, and in riparian desert scrub habitats (AHDMS 2010). It has been recorded from northern Coconino County, Arizona; roosting in the LPP project study area is unlikely, but possible.

3.4.2.8 Pygmy Rabbit

The pygmy rabbit is a Utah state species of concern in Iron and Washington counties. The pygmy rabbit prefers areas with tall dense sagebrush and loose soils (UCDC 2010a and 2010b) and in winter may use sagebrush for almost all of its food (USFWS 2005). Utah GAP analysis mapping shows critical to high value habitat in Iron County along the Cedar Valley Pipeline corridor. Pygmy rabbit nesting sites may be present in the LPP project study area.

3.4.2.9 Small-footed Myotis Bat

The small-footed myotis is a BLM sensitive species in the Arizona Strip. The small-footed myotis generally inhabits desert, chaparral, western coniferous forest, badland and semiarid habitats, more mesic habitats in southern part of range. In Arizona, it is known from deserts, chaparral, riparian areas and oak-juniper forests (AHDMS 2010). It hibernates in caves and old mines, summers in crevices, cracks, holes, snags, hollow trees, under rocks and in buildings. The species generally tolerates colder and drier hibernacula than other small bats. It has been recorded in northern Coconino and Mohave counties, Arizona and may roost in the LPP project study area (AHDMS 2010).

3.4.2.10 Townsend's Big-eared Bat

Townsend's big-eared bat is a Utah species of concern in Iron, Kane and Washington counties. Townsend's big-eared bats utilize caves and mine shafts near forested areas for roosting and hibernation; they may also roost in abandoned buildings (UCDC 2010a and 2010b, AHDMS 2010). Foraging is thought to be more gleaning from vegetation than in-air hawking; a water source near the roost site is important (Gruver and Keinath 2006). Townsend's big-eared bats occur widely in Utah and Arizona (UCDC 2010a and 2010b, AHDMS 2010) and roost sites may be present in the LPP project study area.

3.4.2.11 Western Red Bat

The western red bat is a Utah species of concern in Washington County. The species is extremely rare in Utah, being known from only a few locations in the state. Western red bats are normally found near water, often in wooded areas (UCDC 2010a and 2010b). It usually roosts in trees during summer and avoids caves and buildings (NatureServe 2010). Utah GAP analysis mapping shows potential critical value habitat in higher elevations areas of Kane and Washington counties (UCDC 2010b). Although unlikely, western red bats could roost in or near the LPP project study area.

3.4.2.12 Abert's Towhee

Abert's towhee is a Partners in Flight watch list species (PIF 2010). Abert's towhee was formerly a year-round resident of the brushy under-story of cottonwood-willow riparian habitat and mesquite bosques along stream sides below 1,220 m (4,000 feet MSL) elevation. Most of this habitat has been modified or eliminated, and Abert's towhees are now found in cottonwood-willow remnants, exotic vegetation such as salt cedar, and mixed exotic/native habitat (NatureServe 2010). In Utah, Abert's towhees are found in salt cedar/willow riparian habitats and have been observed (1996) along the Virgin River drainage south of LaVerkin (UCDC 2010b). Nesting occurs low in trees or brush near water and is maximum in March and April (NatureServe 2010). Its breeding range includes northwestern Arizona (Audubon 2010). Rare nesting sites may be present in riparian zones in the LPP project study area.

3.4.2.13 Bald Eagle

The bald eagle was removed from the federal list of threatened and endangered species in July 2007 (72 FR 37346, July 7, 2007). The bald eagle remains protected under the Bald Eagle Protection Act and the Migratory Bird Treaty Act and remains under post-delisting monitoring. The bald eagle is a Utah species of concern for Iron, Kane and Washington counties and an Arizona Game and Fish Department species of wildlife concern for the Arizona Strip. Bald eagles inhabit coastal areas, estuaries, unfrozen inland waters, and some arid areas of the western interior and southwestern portion of the U.S. They like areas with high water-to-land edge, and areas with unimpeded views including both horizontal and vertical aspects. Areas selected for as wintering habitat will have an adequate food supply, and have open water such as river rapids, impoundments, dam spillways, lakes, and estuaries (AHDMS 2010). Bald eagles are rare nesters in Utah with none recorded in or near the LPP project study area (UCDC 2010a and 2010b); Utah GAP analysis mapping shows potential wintering habitat in Iron, Kane and Washington counties. Bald eagle populations use Washington County from November to April. Important bald eagle habitat includes Leeds Creek, Quail Creek, Quail Creek Reservoir, the Santa Clara and Virgin Rivers, and the Hurricane City sewer lagoons (UDOT 2008). Occurrences recorded in Arizona are generally in the central region of the state (AHDMS 2010). The LPP project study area does not approach suitable water bodies that would provide foraging habitat for bald eagles; however transient eagles could roost near the study area.

3.4.2.14 Bell's Vireo

Bell's vireo is a USFWS bird of conservation concern. Bell's vireos are generally a riparian-nesting species (NatureServe 2010) and have been recorded nesting in small numbers in northern Arizona and southern Washington County in Utah (Birds of Utah 2010). Breeding period is April and May; young fledge 14 days after hatching. Nests may be present in riparian zones of the LPP project study area.

3.4.2.15 Belted Kingfisher

The belted kingfisher is an Arizona Game and Fish Department wildlife species of concern (Category 1b). Belted kingfishers are primarily piscivores (fish-eaters), although they will also take small amphibians and invertebrates (Sibley 2001); because of this their habitat is dependent on perennial water. Kingfishers nest in burrows excavated from vertical sandy banks (Sibley 2001). Nesting is May through June and young leave nest after about 30 days (NatureServe 2010). They could occur on streams supporting fish populations crossed by LPP project features, especially on the Virgin River.

3.4.2.16 Bendire's Thrasher

Bendire's thrasher is a USFWS bird of conservation concern. Bendire's thrasher nests in low desert scrub habitat in Utah and has been observed in Washington County near Sand Hollow Reservoir (Birds of Utah 2010), where nesting is possible.

3.4.2.17 Black-chinned Sparrow

The black-chinned sparrow is a Partners in Flight watch list species (PIF 2008). The black-chinned sparrow inhabits and nests in arid brushlands, such as sagebrush and chaparral, at lower elevations on rugged mountain slopes (NatureServe 2010). Migratory populations utilize similar habitats, but often at even lower elevations (UCDC 2010a and 2010b). Breeding survey maps show small populations on both sides of the Utah-Arizona border in the LPP project study area (Birds of Utah 2010).

3.4.2.18 Black-throated Gray Warbler

Black-throated gray warbler is a USFWS bird of conservation concern. Black-throated gray warblers nest in pinyon-juniper and mountain shrub habitats and are found in both southern Utah and northern Arizona in the project study area (Birds of Utah 2010); nesting is possible in the LPP project study area.

3.4.2.19 Brewer's sparrow

Brewer's sparrow is a USFWS bird of conservation concern. The Brewer's sparrow nests in shrub-steppe and high desert scrub habitats on both sides of the Utah-Arizona border in the Project area. The nesting period is April and May (NatureServe 2010).

3.4.2.20 Burrowing Owl

The burrowing owl is a Utah species of concern for Iron, Kane and Washington counties, a BLM sensitive species, a USFWS bird of conservation concern and an Arizona Game and Fish Department species of wildlife concern for the Arizona Strip. In Utah, it is uncommon during summer in proper habitat throughout the state. Its habitats are open grassland and prairies, but it also utilizes other open situations, such as golf courses, cemeteries, and airports. The nest is in a mammal burrow, usually that of

a prairie dog, ground squirrel or badger; if a mammal burrow is not available the owls will sometimes excavate their own nest burrow (UCDC 2010a and 2010b). Utah GAP analysis mapping shows critical value habitat throughout much of the state (UCDC 2010b). The UCDC GIS database contains several records for the 1980's and 1999 in Washington County between the Hurricane Cliffs afterbay and the Sand Hollow Reservoir area (UCDC 2010a). In Arizona, it has been reported in northern Coconino and Mohave counties (AHDMS 2010). Burrowing owl burrows may be present in the LPP project study area.

3.4.2.21 *Crissal Thrasher*

Crissal thrasher is a USFWS bird of conservation concern. Crissal thrashers nest in low desert scrub and riparian areas (Birds of Utah 2010). Their nesting range includes Washington County, Utah and northwestern Mohave County, Arizona; nesting territories are potential in the LPP project study area.

3.4.2.22 *Golden Eagle*

The golden eagle is a USFWS bird of conservation concern. Golden eagles nest on cliffs near open country (UCDC 2010) and in high desert scrub (Birds of Utah 2010). High value habitat is located widely through southern Utah and northern Arizona (UCDC 2010a and 2010b, Birds of Utah 2010). Nesting, roosting and foraging may occur throughout the project area.

3.4.2.23 *Gray Vireo*

The gray vireo is a USFWS bird of conservation concern. Gray vireos nest in pinyon-juniper and oak habitats on both sides of the Utah-Arizona border (Birds of Utah 2010) and nests are possible in the LPP project study area.

3.4.2.24 *Leconte's Thrasher*

Le Conte's thrasher is a Utah species of concern. In Utah, it is known only from the Beaver Dam Wash and Slope area in the extreme southwestern corner of the state, where it occurs in small numbers (Birds of Utah 2010). It is a bird of desert scrub habitats. This species does not migrate. The nest is constructed about two to four feet above the ground and is usually placed in a cactus or spiny shrub. Occurrence in the LPP project study area is not likely.

3.4.2.25 *Lewis's Woodpecker*

Lewis's woodpecker is a Utah species of concern for Iron and Washington counties and a USFWS bird of conservation concern. The major breeding habitat for Lewis's woodpecker consists of open park-like ponderosa pine forests. Lewis's woodpecker is attracted to burned-over Douglas-fir, mixed conifer, pinyon-juniper, riparian, and oak woodlands, but is also found in the fringes of pine and juniper stands, and deciduous forests, especially riparian cottonwoods. Areas with a good under-story of grasses and shrubs to support insect prey populations are preferred. Dead trees and stumps are required for nesting. Wintering grounds are over a wide range of habitats, but oak woodlands are preferred (UCDC 2010a). High to critical value potential habitat is sparsely present in Iron and Washington counties. The LPP project study area does not contain the preferred old-growth ponderosa pine nesting habitat, but the species may nest in lower elevation riparian areas crossed by project corridors.

3.4.2.26 Loggerhead Shrike

The loggerhead shrike is a BLM sensitive species for the Arizona Strip. Loggerhead shrikes utilize open country with scattered trees and shrubs, savanna, desert scrub and occasionally open woodland (AHDMS 2010). Nesting period is May through June; young fledge about 36 to 40 days after eggs are laid (NatureServe 2010). Nesting is possible in desert scrub habitat in the LPP project study area.

3.4.2.27 Long-billed Curlew

The long-billed curlew is a Utah species of concern for Iron and Washington counties and a USFWS bird of conservation concern. Long-billed curlews have four essential nesting habitat requirements in the northwestern United States: (1) short grass (less than 30 cm tall), (2) bare ground components, (3) shade, and (4) abundant vertebrate prey (UCDC 2010a). They seem to be most successful nesting in mixed fields with adequate, but not tall, grass cover and fields with elevated points. Uncultivated rangelands and pastures support most of the continental long-billed curlew breeding population (UCDC 2010a). Potential primary and secondary breeding habitat are mapped by the Utah GAP analysis in northern Washington County and Iron County (UCDC 2010a). Nesting begins in early April; young fledge about 70 days after eggs are laid (NatureServe 2010). Analysis of aerial photography indicates the only potential nesting areas in agricultural fields or grasslands would be south of Colorado City in Arizona and on the Cedar Valley Pipeline alignment near Toquerville, Utah.

3.4.2.28 Lucy's Warbler

Lucy's warbler is a Partners in Flight watch list species (PIF 2008). Lucy's warbler nests in mesquite and desert brush habitats and in riparian areas with willow and cottonwoods (UCDC 2010a). Breeding survey maps show its range extending into northwestern Arizona and southwestern Utah (Birds of Utah 2010). Nesting begins in April (NatureServe 2010). Nesting is possible in the LPP project study area.

3.4.2.29 Northern Goshawk

The northern goshawk is a Utah species of concern for Iron, Kane, and Washington counties and an Arizona Game and Fish Department species of wildlife concern for the Arizona Strip. The northern goshawk prefers mature mountain forest and riparian zone habitats. Nests are constructed in trees in mature forests (UCDC 2010a). In Arizona, goshawk's nest most commonly in ponderosa pine forests along the Mogollon Rim and on the Kaibab Plateau, and in Arizona pine and ponderosa pine forests in the southeastern mountains (AHDMS 2010). Potential habitat is sparsely present in Utah; in Arizona, there are concentrations of northern goshawk observations in northwestern Coconino County. Nesting begins late March to mid-April and young become independent in about three months. The LPP project study area does not include prime nesting habitat for the goshawk, but they could potentially nest in riparian areas on the Paria and Virgin rivers.

3.4.2.30 Northern Harrier

Northern harrier is a USFWS bird of conservation concern. Harriers are ground-nesters in marshes, fields, grasslands and desert scrub (UCDC 2010a, Birds of Utah 2010). It is an uncommon nester in southern Utah, but could potentially nest in the LPP project study area.

3.4.2.31 Peregrine Falcon

The peregrine falcon was removed from the federal list of threatened and endangered species in August 1999 (64 FR 46542, August 25, 1999). The peregrine falcon is an Arizona Game and Fish Department species of wildlife concern for the Arizona Strip and a USFWS bird of conservation concern and remains under post-delisting monitoring. The peregrine falcon is found in Arizona wherever sufficient prey is found near cliffs. Optimum peregrine habitat is generally considered to be steep, sheer cliffs overlooking woodlands, riparian areas or other habitats supporting avian prey species in abundance. As Arizona's population grows, peregrines seem to be breeding in less optimal habitat; either small broken cliffs in ponderosa pine forest or large, sheer cliffs in very xeric areas. The presence of an open expanse is critical (AHDMS 2010). Multiple occurrences are recorded for northern Coconino and Mohave counties. The only potential nesting area in the LPP project study area would be the Hurricane Cliffs.

3.4.2.32 Pinyon Jay

The pinyon jay is a USFWS bird of conservation concern. It is a non-migrant. Pinyon jays nest in pinyon-juniper and conifer habitats (Birds of Utah 2010); they are fairly common across the Utah-Arizona border in the LPP project study area.

3.4.2.33 Prairie Falcon

Prairie falcon is a USFWS bird of conservation concern. Prairie falcons nest on cliffs in high desert scrub habitats. Nesting starts in April, young fledge about 70 days after egg laying. They are uncommon but possible in the LPP project study area on the Hurricane Cliffs (Birds of Utah 2010).

3.4.2.34 Red-naped Sapsucker

Red-naped sapsucker is an Arizona Game and Fish Department wildlife species of concern. The red-naped sapsucker nests in coniferous or deciduous woodlands, especially aspens, and is found in Utah in summer in mid-elevation woodlands and riparian areas (UCDC 2010a, Birds of Utah 2010). Nesting and fledging period is May through July (NatureServe 2010). USGS GAP mapping shows widespread predicted species distribution across the project area, although their primary habitat is not present in most of the LPP project study area.

3.4.2.35 Sage Sparrow

The sage sparrow is a USFWS bird of conservation concern. Sage sparrows nest in shrublands, grasslands and desert habitats, often on the ground (UCDC 2010a). They nest on both sides of the Utah-Arizona border in the LPP project study area (Birds of Utah 2010).

3.4.2.36 Sage Thrasher

The sage thrasher is an Arizona Game and Fish Department wildlife species of concern (Category 1b). As their name implies, the sage thrasher inhabits sagebrush communities in low deserts (UCDC 2010a). They are potential nesters throughout much of the LPP project study area.

3.4.2.37 Short-eared Owl

The short-eared owl is a Utah species of concern for Iron and Washington counties. The short-eared owl is a medium-sized owl that frequently flies during daylight, especially at dusk and dawn, as it forages for rodents. This owl is usually found in grasslands, shrublands, and other open habitats; it nests on the ground, usually under a bush or clump of grass (NatureServe 2010). Nesting may occur from March through August as more than one brood per year is not unusual (NatureServe 2010). It is nomadic, often choosing a new breeding site each year, depending on local rodent densities (UCDC 2010a). Potential high to critical value habitat is mapped for Washington and Iron counties (UCDC 2010).

3.4.2.38 Swainson's Hawk

Swainson's hawk is a USFWS bird of conservation concern. Swainson's hawks nest in shrub, grassland and juniper habitats (UCDC 2010a); nesting period is April and May, young fledge in about 40 days (NatureServe 2010). They would be uncommon in the Project area as nesters, but potential winter habitat is located throughout southern Utah and northern Arizona (UCDC 2010a, Birds of Utah 2010).

3.4.2.39 Virginia's Warbler

Virginia's warbler is a USFWS bird of conservation concern. Virginia's warbler nesting habitat includes chaparral and pinyon-juniper and scrub oak (UCDC 2010a); they may breed in small numbers in northwest Arizona and southwest Utah (Birds of Utah 2010) and are potential nesters in the LPP project study area.

3.4.2.40 Western Grasshopper Sparrow

The western grasshopper sparrow is an Arizona Game and Fish Department wildlife species of concern (Category 1b). The grasshopper sparrow, *Ammodrammus savannarum*, has a number of subspecies; western subspecies generally inhabit grasslands, as their name would imply. *A. s. perpallidus* is broadly distributed across the west and Great Plains, from southern Canada to the Mexican border states. Its range overlaps with that of the eastern race, *A. s. pratensis*. Habitat requirements for *A. s. perpadillus* are generally open grasslands with some bare ground and limited shrubs, hayfields and other agricultural lands (NMPIF 2010). They are ground nesters (Birds of Utah 2010). There is minimal potential nesting habitat in the LPP project study area.

3.4.2.41 White-throated Swift

The white-throated swift is a Partners in Flight watch list species (PIF 2010). Preferred habitats of the white-throated swift include rocky cliffs and canyons in mountainous areas (UCDC 2010a) where it nests in crevices in rock faces (NatureServe 2010). GAP analysis mapping shows predicted species occurrence in southern Utah and northern Arizona near the LPP project alignments (USGS 2008), although the only likely nesting area would be on the Hurricane Cliffs.

3.4.2.42 Common Chuckwalla

The common chuckwalla is a Utah species of concern in Iron, Kane and Washington counties and a BLM sensitive species in the Arizona Strip. The chuckwalla is predominantly found near cliffs, boulders or rocky slopes where they use rocks as basking sites and rock crevices for shelter. They can be found in rocky desert, lava flows, hillsides and outcrops. Creosote bush occurs throughout most of range. The common chuckwalla potential habitat range is predominantly in the far southwest corner of Washington

County and adjacent Mohave County (UCDC 2010a, AHDMS 2010). The UCDC database has records of common chuckwalla in Washington County – two observations west of Interstate 15 and one near Utah Route 9 about one mile northeast of Hurricane (UCDC 2010a).

3.4.2.43 Gila Monster

The Gila monster is a Utah species of concern in Washington County. The banded Gila monster is a BLM sensitive species in the Arizona Strip. In Utah, preferred habitats for the Gila monster include large rocky shelves, sandy areas, and creosote-sagebrush areas. Gila monsters in Utah are most active during the spring and summer months, although they do spend about 95 percent of the active season in burrows or under rocks (UCDC 2010a), making them hard to locate in surveys. In Arizona, the banded gila monster occurs primarily in the Sonoran Desert and extreme western edge of Mohave Desert, is less frequently found in desert-grassland and rare in oak woodland, to 5,000 feet. It is most common in undulating rocky foothills, bajadas and canyons and less frequent or absent on open sandy plains (AHDMS 2010). The potential habitats of the Gila monster and banded gila monster are in the southwest corner of Washington County and adjacent Mohave County (UCDC 2010b, AHDMS 2010); GAP analysis mapping shows predicted habitat along the base of the Hurricane Cliffs and near Sand Hollow Reservoir. The UCDC GIS database has two occurrences between Sand Hollow Reservoir and Quail Creek Reservoir, the most recent being 1986 (UCDC 2010a).

3.4.2.44 Northern Sagebrush Lizard

The northern sagebrush lizard is a BLM sensitive species in the Arizona Strip. The species is chiefly a ground-dweller, usually found near bushes, brush heaps, logs, or rocks and occasionally in trees. A sagebrush habitat lizard over much of its range, it also occurs in manzanita and ceanothus brushland, pinyon-juniper woodlands, pine and fir forests of canyon bottoms, and boulder fields within oak thickets. Northern sagebrush lizards are sometimes found abundantly in association with prairie dog towns (AHDMS 2010). Its range includes northern Coconino County and occurrence is possible to likely in the LPP project study area.

3.4.2.45 Sidewinder

The sidewinder is a Utah species of concern in Washington County. Sidewinders prefer sandy open terrain. They are mainly nocturnal, avoiding the extreme heat of the day, and are also inactive during cold weather. When inactive, sidewinders take refuge in the burrows of tortoises or small mammals (UCDC 2010a). Their potential habitat range is southwestern Washington County; the UCDC GIS database has two observations in 2004 on the south side of Sand Hollow Reservoir (UCDC 2010a).

3.4.2.46 Utah Milk Snake

The Utah milksnake is an Arizona Game and Fish Department wildlife species of concern (Category 1b). A subspecies of *Lampropeltis triangulum*, the Utah milk snake is found in a variety of habitats including grasslands, desert scrub, pinyon-juniper and scrub oak (Utah Herps 2010). Their potential habitat is present in the LPP project study area.

3.4.2.47 Western Banded Gecko

The western banded gecko is a Utah species of concern in Washington County. Banded geckos are abundant in the deserts, occupying a wide range of habitats, especially rocky or sandy desert and semiarid

locales into oak and pinyon-juniper woodlands up to 5,000 feet (Desert USA 2008). Their mapped critical habitat covers much of Washington County (UCDC 2010a).

3.4.2.48 Western Threadsnake

The western threadsnake is a Utah species of concern in Washington County. The western threadsnake is a secretive burrowing species, often living in moist loose soil. Because the species spends so much time under the ground, the western threadsnake's eyes are vestigial, meaning that they no longer function (UCDC 2010a). Their potential habitat range is southwestern Washington County (UCDC 2010a). The threadsnake would be a possible, but unlikely resident of the LPP project study area.

3.4.2.49 Zebra-tailed Lizard

The zebra-tailed lizard is a Utah species of concern in Washington County. The zebra-tailed lizard prefers sparsely vegetated desert areas with hard packed soils (UCDC 2010a). Their potential habitat range is southwestern Washington County and it was observed during plant field studies in the LPP project study area.

3.4.2.50 Arizona Toad

The Arizona toad is listed as a Utah species of concern in Iron, Kane and Washington counties (UCDC 2010). This species inhabits streams, washes, irrigated crop lands, reservoirs, and uplands adjacent to water. It is inactive in cold weather, and adults are mainly nocturnal, whereas the newly metamorphosed young are active during daylight hours (UCDC 2010a). Potential habitat is sparse and scattered through southwestern Utah (UCDC 2010a). The UCDC GIS database has records of the Arizona toad in Washington County near Quail Creek Reservoir and the Virgin River and along the alignment of the Cedar Valley Pipeline. The Arizona Department of Fish and Game GIS database has occurrences of Arizona toad along the pipeline alignment at Colorado City.

3.4.2.51 Great Plains Toad

The Great Plains toad is listed as a Utah species of concern for Kane County. In Utah, the Great Plains toad occurs in scattered areas throughout the state, where it prefers desert, grassland, and agricultural habitats. In cold winter months, the Great Plains toad burrows underground and becomes inactive. This species breeds in shallow water after rains during spring and summer months (UCDC 2010a). Potential substantial to high value habitat is present throughout much of Kane County (UCDC 2010a), including the LPP project study area.

3.4.3 Tribal Wildlife Species of Cultural Concern

Table 3-4 summarizes the Kaibab Band of Paiute Indians wildlife of cultural concern.

Table 3-4
Kaibab Band of Paiute Indians Wildlife of Cultural Concern

Mule Deer	Lizards	Rabbits	Gophers
Cotton Tails	Owls	Chipmunks	Morning Doves
Coyotes	Crickets	Fox	Grasshoppers
Badgers	Bighorn sheep	Squirrels (flying and non-flying)	Buffalo
Eagles	Wood peckers	Mice/Rats	Antelope
Porcupine	Ducks	Bats	Mountain Lions
Crows/Ravens	Bobcats/Lynx	Snakes (all)	Hawks (all)
Condors	Prairie Dogs	Skunks	Frogs
Raccoons			

The Kaibab Band of Paiute Indians list of wildlife of cultural concern contains multiple general categories of wildlife, generally without specific species designation. Representatives of some of the categories of species of tribal concern are included in the species discussed in the preceding sections. Most of the categories do not contain specifically listed state or agency species of concern and they will not be individually described for the purposes of this analysis. Impacts are analyzed on the same basis as the described wildlife species in the preceding sections.

Chapter 4

Environmental Consequences (Effects and Impacts)

4.1 Introduction

This chapter analyzes Lake Powell Pipeline (LPP) project effects on federally listed threatened, endangered and candidate wildlife species and impacts on federal, state, agency wildlife species of concern and tribal wildlife species of cultural concern.

4.2 Effects Determinations and Significance Criteria

4.2.1 Federally Listed Species

This section describes the criteria used to determine the magnitude of effects from the Project alternatives. The Endangered Species Act of 1973 (ESA) establishes the legal criteria for determining effects on federally threatened, endangered and candidate wildlife species. The following are accepted determinations of effects on listed species:

- No Effect: no effect on the listed species or designated critical habitat
- May Affect, Not Likely to Adversely Affect: effects on the listed species or designated critical habitat are insignificant and/or discountable
- Likely to Adversely Affect: effects that would result in a short- or long-term incidental take of the listed species or designated critical habitat

Adverse effects on listed species include the following:

- Taking of threatened or endangered species
- Loss or degradation of utilized or potentially utilized habitat that would exceed the estimated level necessary to maintain viable populations or sub-populations of each species
- Actions that lead to long-term disturbance in species migration and dispersal, breeding behavior or pollination that would threaten the viability of the population or sub-population

Take is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.” Through regulations, the term “harm” is defined as “an act which actually kills or injures wildlife.” Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.” (USFWS 2010p)

Under ESA Section 7, federally listed species must be analyzed in a Biological Assessment (BA) and the findings submitted to the USFWS, which then makes a determination of effect and if there is an affect issues a Biological Opinion (BO). If there is no effect and USFWS concurs, then no BO is issued. Incidental take – take that results from a Federal action, but is not the purpose of the action – may be allowed when the USFWS approves it through an incidental take statement. The statement includes the amount or extent of anticipated take due to the Federal action, reasonable and prudent measures to minimize the take, and terms and conditions that must be observed when implementing those measures (USFWS 2010p).

After the USFWS issues its biological opinion, the [sponsoring] Federal agency then decides how to proceed. If the BO determines that adverse effects would occur from the Proposed Action, the sponsoring agency can adopt the reasonable and prudent measures described in a BO incidental take statement and proceed with the project. If the USFWS makes a jeopardy determination, the Federal agency has several options (USFWS 2010p):

- implement one of the reasonable and prudent alternatives
- modify the proposed project and consult again with the USFWS
- decide not to undertake (or fund, or authorize) the project
- disagree with the opinion and proceed
- apply for an exemption

4.2.2 Federal, State, Agency Wildlife Species of Concern and Tribal Wildlife Species of Cultural Concern

Significance criteria for wildlife species of concern and tribal wildlife species of cultural concern would be the same as those for general wildlife :

- Project activities resulting in substantial disturbance to wildlife habitat or populations. A substantial disturbance is one that destroys a large area of utilized habitat, disturbs or displaces a resident population or sub-population, or results in losses of a large number of individuals of the species within the LPP project study area. Disturbance may arise from direct construction impacts on habitat or indirectly by noise or human activity that would reduce wildlife habitat values. Substantial disturbance is based on the status, population dynamics, behavior, habitat availability and quality for each species group relative to the type, intensity and duration of a specific impact. Species that are locally common or have a high reproductive potential and ability to re-colonize previously disturbed sites rapidly would have less potential impacts than species with small populations, restricted to limited habitats, have low reproductive potential or limited ability to disperse out of or back into previously disturbed habitats.

Two acts of Congress impose special protections and definitions of significance criteria for birds. The Migratory Bird Treaty Act of 1918, as amended, (MBTA) (16 U.S.C. 703-712; Ch. 128; July 13, 1918) prohibits hunting or take of all migratory birds, including nests and eggs. Removal of unoccupied nests or bird mortality resulting indirectly from a project is not considered a violation of the MBTA. The Bald Eagle Protection Act (BEPA) of 1940, as amended, (16 U.S.C. §§ 668-668d, June 8, 1940) prohibits any

take of bald or golden eagles. The definition of “take” in each of these Acts is the same as described in Section 4.2.1.

4.3 Potential Effects and Impacts Eliminated From Further Analysis

4.3.1 Federally Listed Species

The following potential effects were eliminated from further analysis.

- Noise from operating booster pump stations or hydro generation stations would not impact threatened, endangered or candidate wildlife species. All operating equipment in the pump stations and hydro stations would be contained within buildings with acoustical shielding and noise levels outside the structures would not exceed ambient sound levels at 100 feet from the structure (UBWR 2011d) (Study Report 7, Noise).
- Noise from operating electrical substations and transmission lines would not impact threatened, endangered or candidate wildlife species; electrically-generated sound would not exceed 60 dBA outside of the perimeter of substations or 100 feet from transmission lines (Aspen 2010).

4.3.2 Wildlife Species of Concern

The following potential impacts on wildlife species of concern were eliminated from further analysis:

- Noise from operating booster pump stations or hydro generation stations would not impact wildlife species of concern habitat and populations. All operating equipment in the pump stations and hydro stations would be contained within buildings with acoustical shielding and noise levels outside the structures would not exceed ambient sound levels at 100 feet from the structure (UBWR 2011d) (Study Report 7, Noise).
- Noise from operating electrical substations and transmission lines would not impact wildlife species of concern habitat and populations; electrically-generated sound would not exceed 60 dBA outside of the perimeter of substations or 100 feet from transmission lines (Aspen 2010).

4.3.3 Virgin River Return Flows From LPP Water

Special status wildlife species and critical habitat along the Virgin River would not be directly or indirectly affected by the Lake Powell Pipeline construction or operation. LPP construction activities would terminate at Sand Hollow Reservoir more than three miles east of the Virgin River. LPP project operation would supply raw water to Sand Hollow Reservoir for treatment in the Quail Creek Water Treatment Plant before distribution throughout the Washington County Water Conservancy District (WCWCD) service area. Following water use in homes, businesses and institutions, the wastewater would be treated in wastewater treatment facilities and then further treated in the wastewater reclamation facility for reuse as secondary irrigation water. This water would be stored in existing and approved reservoirs in the St. George metropolitan area and used for outdoor watering. The Utah Division of Water Resources (UDWR) has modeled the Virgin River using the Virgin River Daily Simulation Model (VRDSM) for scenarios involving no LPP water (Base Case) and with LPP water to determine the potential for return flows to the Virgin River that could potentially affect special status wildlife species and critical habitat. The VRDSM results indicate that LPP return flows to the Virgin River would be within the measurement

accuracy of the USGS gages on the Virgin River and changes in river flows would not be measurable. Therefore, potential effects on special status wildlife species and critical habitat along the Virgin River are eliminated from further analysis. A detailed analysis of the VRDSM model results is included in the draft Surface Water Resources Study Report (UBWR 2011).

4.4 South Alternative

The South Alternative would involve constructing, operating and maintaining the features and facilities described in Chapter 1, Section 1.2.1 and shown in Figures 1-1, 1-2 and 1-3. Pipelines (water delivery system and penstocks) would have a 60-foot permanent disturbance corridor over the length of the features, including a single lane inspection and service road, and 30-foot temporary construction disturbance corridors on either side of the permanent disturbance area (total 60-foot temporary disturbance corridor). The Cedar Valley Pipeline would have a 30-foot permanent disturbance corridor over the length of the feature and 30-foot temporary construction corridors on either side of the permanent disturbance area (total 60-foot temporary disturbance corridor). Footprints of booster pump stations, hydro generation stations, regulating tanks, forebays and afterbays, and access roads associated with those features are included in the permanent disturbance area. The backfilled trench and access road shoulders would be revegetated with native forbs, but would be kept clear of trees and shrubs. The 30-foot wide temporary access and construction corridors on each side of the pipeline corridor would be restored and revegetated with native species; shrubs and trees would be allowed to revegetate naturally in these corridors. Construction staging areas would be revegetated with native species after construction is completed.

4.4.1 Threatened, Endangered and Candidate Species

4.4.1.1 California Condor

4.4.1.1.1 Construction Effects. California condors do not nest in and are not reintroduced in the LPP project study area, although they over fly the study area regularly. Condors were not recorded during vegetation mapping and wildlife field surveys. Foraging condors would not normally be at risk of direct LPP project construction mortality. Construction of South Alternative features at the top of the Hurricane Cliffs could affect potential condor roosting in that area, although use of this area by condors is not known and has not been recorded.

Condors that are attracted to construction sites during foraging could become habituated to human garbage and then could alight in construction zones where they could be injured or killed by construction equipment. Although this occurrence would be unlikely, construction managers and environmental supervisors should be alert to this possibility and should coordinate with the condor re-introduction team to monitor condor locations and to follow established procedures if condors begin to utilize LPP project sites. Strict waste control and hazardous or toxic substance spill prevention and remediation should be enforced in all construction areas. Firearms should be prohibited for all construction personnel.

Project construction would not affect condor primary reintroduction sites or nesting habitat.

There would be no effect on designated critical habitat for the California condor.

Construction would permanently disturb 1,486.8 acres of habitat within the LPP project study area, but this would not be a significant effect because of the vast area of available foraging habitat available to

condors in the region surrounding the study area. The South Alternative would not change the available food sources for condors. Indirect effects of construction would not be significant.

4.4.1.1.2 Operation and Maintenance Effects. There would be no direct effects on California condors from operations and maintenance or LPP project facilities. Environmental hygiene should be maintained to prevent condors from seeking garbage as a food source near project facilities. Consultation from the condor reintroduction team should be initiated if condors begin to frequent any LPP project facility site.

Indirect effects such as increased garbage and toxic spills could occur from off-road vehicles (ORV) utilizing pipeline ROWs or access roads; access controls should be employed to limit access to authorized personnel who have been trained in environmental hygiene.

4.4.1.1.3 Effects Summary. The South Alternative may affect, but is not likely to adversely affect, the California condor.

4.4.1.2 Mexican Spotted Owl

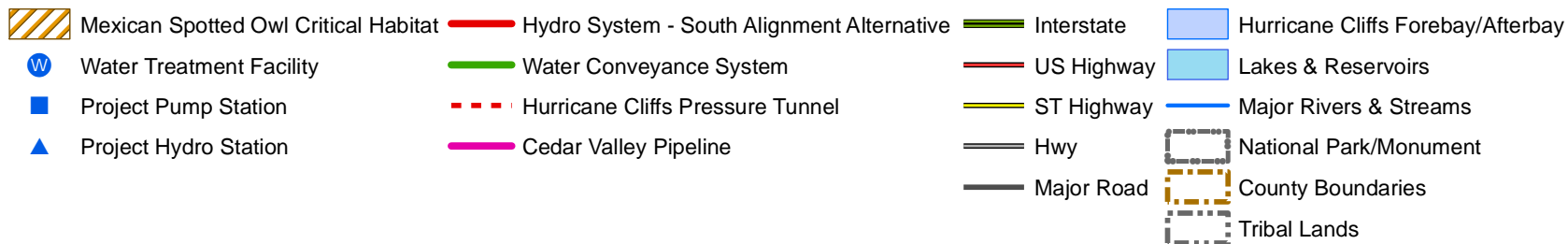
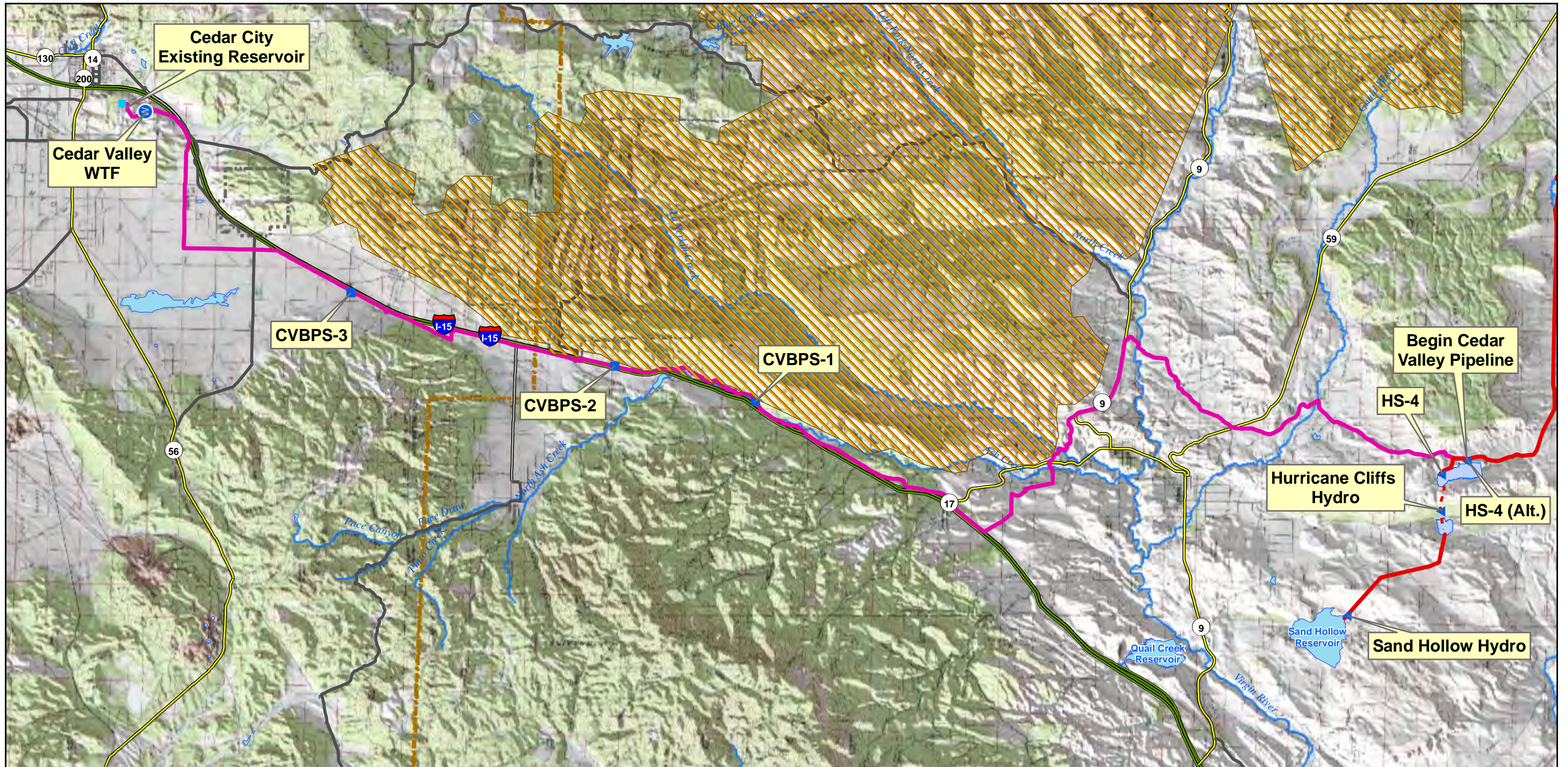
4.4.1.2.1 Construction Effects. South Alternative features would not be constructed, operated or maintained in Mexican spotted owl preferred nesting habitat. Although there may be temporary disturbance in potential Mexican spotted owl foraging habitat, these disturbances would not likely place any individuals or populations at risk. Pre-construction consultation with wildlife agencies would be appropriate to determine if recent occurrences of Mexican spotted owl had been reported within or near the LPP project study area.

Approximately 2.4 miles of the Cedar Valley Pipeline would be constructed across the western edge of designated Mexican spotted owl critical habitat unit CP-11 beginning approximately 3.8 miles north of the Pintura I-15 interchange and extending to just north of Ash Creek Reservoir, shown in Figure 4-1. There would be permanent alteration of approximately 8.7 acres of Habitat Unit CP-11. This would be 0.0025 percent of Unit CP-11. The furthest incursion of the pipeline would be about 1,450 feet into the designated critical habitat and would be within 1,800 feet of the north bound traffic lanes of Interstate 15. It is unlikely that this area would be prime spotted owl nesting habitat, but construction should be scheduled outside of the owl nesting and fledging period. In that case, construction effects would not likely adversely affect the spotted owl.

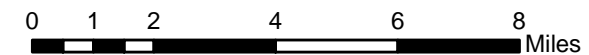
Estimated maximum construction noise is estimated to be 100 dBA (UBWR 2011d) (Noise, Study Report 7) and would be considered a “point” source which would decay at 3 dBA with doubling of distance from the source (FHA 1995). Existing noise from heavy trucks on the uphill northbound lanes of Interstate 15 would be approximately 85dBA (FHA 1995). Traffic noise is considered a “linear” sound source and decays at approximately 4.5 dBA per doubling of distance from the source over landscape (as opposed to paved or “hard” surfaces) (FHA 1995). The decay curves for construction noise and highway noise merge at a distance of 2,500 feet from the source and beyond that distance, the background noise from the Interstate would exceed that of construction. Temporary noise disturbance from pipeline construction would add very little to the existing noise contours of Interstate 15 vehicular traffic and would not be a significant effect on spotted owls or their critical habitat.

The area of permanently disturbed critical habitat is a tiny fraction of the available foraging habitat for spotted owls in Unit CP-11; construction of the South Alternative would not change the prey population for the spotted owl. Indirect effects from the South Alternative would not be significant.

4.4.1.2.2 Operation and Maintenance Effects. There would be occasional inspection and maintenance activity along approximately 2.4 miles of Cedar Valley Pipeline in designated Mexican spotted owl



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Lake Powell Pipeline Project
Spatial Reference: UTM Zone 12N, NAD-83
 UDWR Figure 4-1 **MWH**
Cedar Valley Pipeline System
Mexican Spotted Owl
Critical Habitat

critical habitat unit CP-11. If possible, this activity should be scheduled outside of the spotted owl breeding and fledging season; in that case disturbance effects would be minimal and not likely to adversely affect the spotted owl.

Indirect effects from exterior lighting at pump stations and hydro stations would not be significant because they would not be located in prime spotted owl nesting, roosting or foraging habitat, and pump station lighting would be controlled using motion detectors.

4.4.1.2.3 Effects Summary. The South Alternative may affect, but is not likely to adversely affect, the Mexican spotted owl.

4.4.1.3 Southwestern Willow Flycatcher

4.4.1.3.1 Construction Effects. Potential southwestern willow flycatcher nesting habitat within the LPP project study area was surveyed following USFWS defined field survey protocols during May 2010 (LSD 2010a and 2010b) (See Appendices B and C). Seven potential willow flycatcher sites were evaluated. The only site meeting protocol criteria was the Paria River crossing within the study area. No breeding southwestern willow flycatchers were detected; one transient willow fly catcher was detected, but confirmation of the southwestern subspecies was not possible. The habitat at the Paria River crossing was evaluated as being suboptimal for southwest willow flycatcher breeding habitat. Clearing of the construction corridor and construction of the pipeline at the Paria River crossing should be performed outside of the willow flycatcher breeding season.

The pipeline corridor would cause permanent disturbance to a small area of potential southwest willow flycatcher nesting habitat; however, that habitat would be immediately adjacent to U.S. 89 and likely would not be utilized for nesting in the absence of the LPP project. The South Alternative would not cause direct effects on the southwest willow flycatcher.

South Alternative construction would not materially change the foraging habitat or potential prey population of the southwestern willow flycatcher. The LPP project features at the Paria River crossing would not change human activity in the area. Indirect effects from the South Alternative would not be significant.

South Alternative construction would not approach or cross designated southwest willow flycatcher critical habitat; there would be no effect on southwest willow flycatcher critical habitat.

4.4.1.3.2 Operation and Maintenance Effects. Occasional maintenance at the Paria River crossing should be scheduled outside of the willow flycatcher breeding season. With this mitigation measure, operation and maintenance would not affect the southwestern willow flycatcher.

Project water delivery to end users would not materially affect existing or potential riparian habitat for the southwest willow flycatcher in the LPP project study area (UBWR 2011c) (Surface Water Resources, Study Report 18). LPP project return flows to the Virgin River via treated wastewater effluent pathways would not measurably change the Virgin River flows.

Night time lighting at pump stations or hydro stations would not cause indirect effects on the southwest willow flycatcher because these facilities would not be located in or near critical habitat and the exterior lighting would be controlled by motion detectors.

4.4.1.3.3 Effects Summary. The South Alternative would have no effect on the southwestern willow flycatcher.

4.4.1.4 Utah Prairie Dog

4.4.1.4.1 Construction Effects. Field surveys for the Utah prairie dog (UPD) were conducted in Iron County in consultation with the USFWS and in compliance with the *Utah Prairie Dog Occupancy and Habitat Survey Protocol for Federal Section 7 Consultations* (LSD 2010d) (See Appendix E). Potentially suitable habitat was identified from the northern terminus of the pipeline corridor at Cedar City southwest to milepost 38 along Interstate 15 (Figure 4-2). Full coverage transect studies were performed where property access was granted and binocular surveys were performed in areas where access was not possible. The survey area included the 150-foot construction right-of-way (ROW) and a 350-foot buffer zone on each side of the ROW. The UPD survey area encompassed 3,665 acres; 1,954 acres were surveyed with 100 percent coverage, while 1,711 acres were inaccessible and were surveyed with binoculars where public right-of-ways existed (LSD 2010d).

UPD counts were conducted at all occupied sites detected during surveys in accordance with the 2010 USFWS UPD survey protocol. A follow-up visit was made, on another day than when the site was initially detected, during the early morning when cloud cover was less than 40 percent and the wind was less than 12 miles per hour. Where possible, a colony was counted from a single vantage point that provided an unobstructed view of the entire colony. Where the colony size was too large, multiple vantage points were required, taking care not to double count UPDs. Counts were repeated until the number of UPDs reached a plateau or began to decrease, with a minimum of three counts at each colony. The maximum number of UPDs counted at each colony was recorded on the data sheet (LSD 2010d). Four occupied UPD colonies were found during surveys as shown in Figures 4-3, 4-4 and 4-5. The type of sign detected at these colonies includes UPDs, mounds, burrows, scat, vocalizations, and fresh digging.

Twenty unoccupied UPD colonies were found during surveys (Figures 4-3, 4-4, 4-5). The type of sign detected at these colonies included mounds and burrows.

The possibility of UPD take is very high because they are present within the CVP construction corridor. “Trap and transplant” programs are extremely complex and have survival rates of transplanted prairie dogs of less than 50 percent (Roe and Roe 2004). Re-survey of these areas should be performed before construction in the UPD study area because observed occupied colonies may change and unoccupied colonies may become occupied over time. Adverse effects on UPD populations are likely.

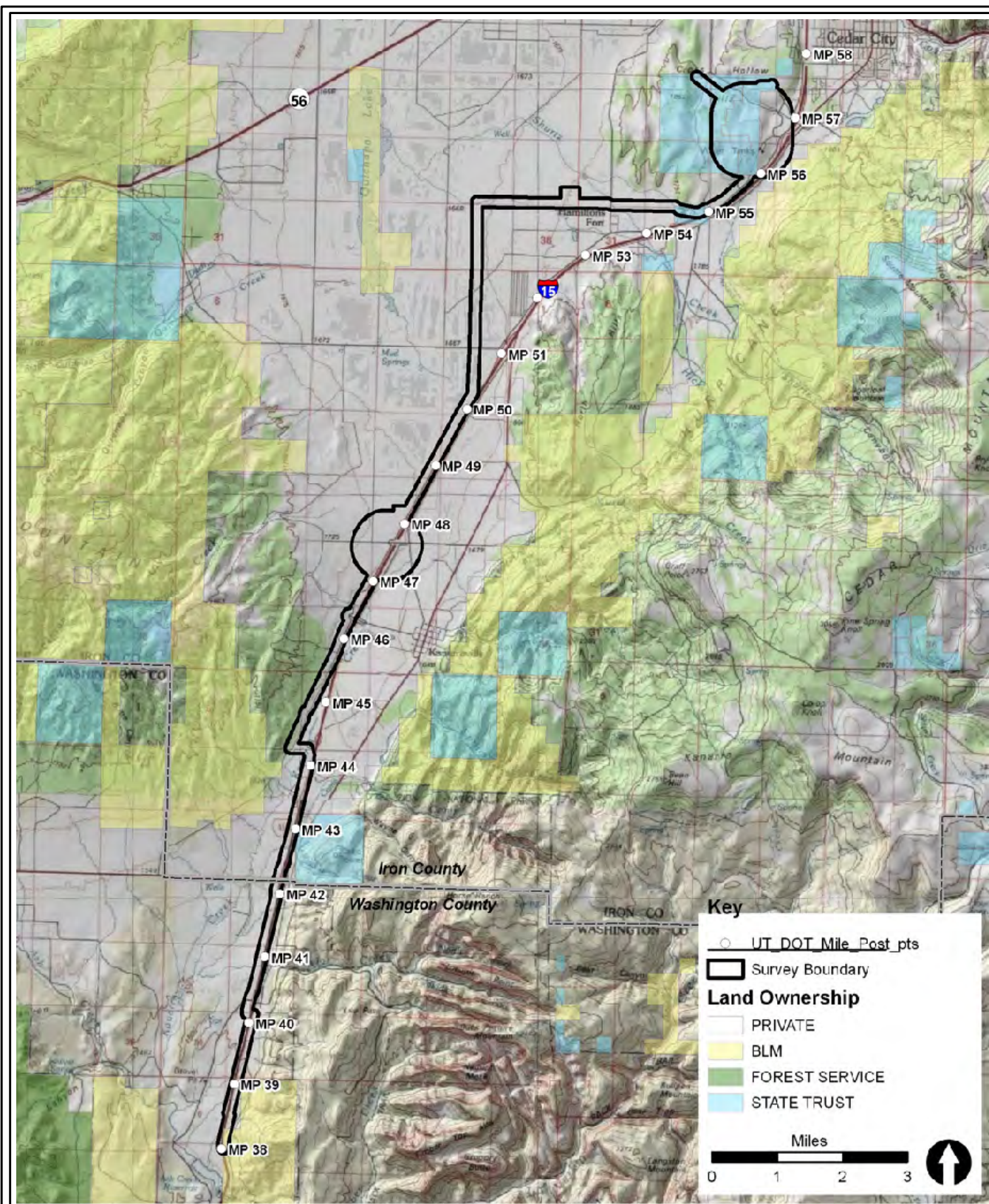
There is no UPD designated critical habitat.

4.4.1.4.2 Operation and Maintenance Effects. Ongoing human presence and vehicle traffic near UPD occupied colonies may introduce vehicular mortality of the species. UPD are tolerant of human presence, as evident on the Cedar City Golf Course (Deseret News 2009), therefore human activity at LPP project facilities likely would not affect UPD breeding.

4.4.1.4.3 Effects Summary. The South Alternative would likely adversely affect the Utah prairie dog.

4.4.1.5 Yellow-billed Cuckoo

4.4.1.5.1 Construction Effects. Potential yellow-billed cuckoo nesting habitat within the LPP project study area was surveyed coincident with southwest willow flycatcher surveys (LSD 2010a) (See Appendix B). The Paria River crossing site was the only location that met criteria for potential cuckoo nesting habitat. Field surveys using the USFWS survey protocols were performed during May 2010. No cuckoos were detected. The habitat was considered to be inadequate for the specific habitat elements required for cuckoo nesting (LSD 2010a).



Source:

This map is from the
 "Draft Lake Powell Pipeline Project
 Prairie Dog Survey Report"
 Prepared by Logan Simpson Design.

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 BLM Serial Numbers:
 AZA-34941
 UTU-85472



Lake Powell Pipeline Project

Spatial Reference: UTM Zone 12N, NAD-83

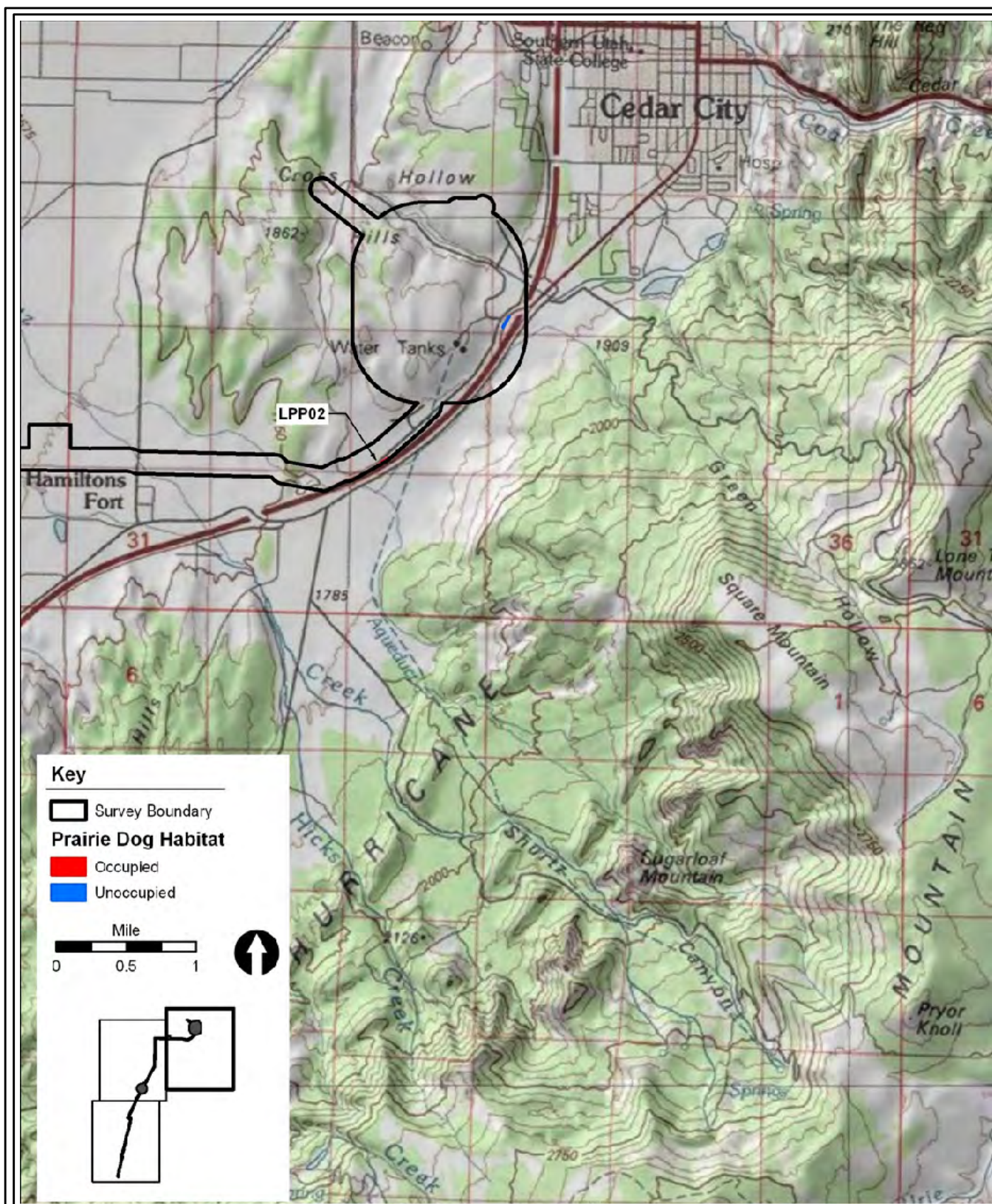


Figure 4-2



MWH

Utah Prairie Dog Survey Report
 Vicinity Map



Source:

This map is from the
 "Draft Lake Powell Pipeline Project
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 Prepared by Logan Simpson Design.

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Spatial Reference: UTM Zone 12N, NAD-83



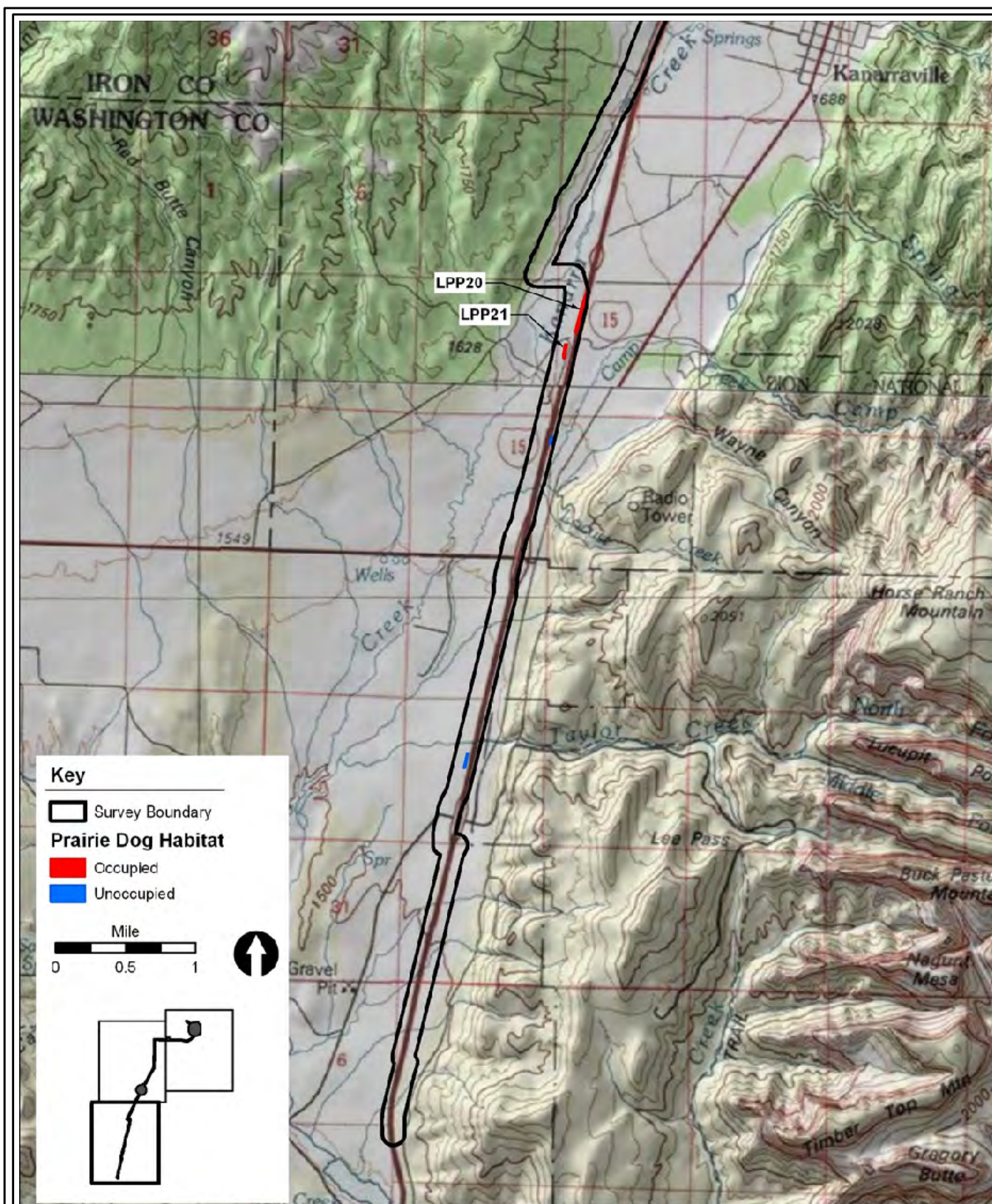
UDWR

Figure 4-3



MWH

**Utah Prairie Dog
 Habitat Map**



Source:

This map is from the
"Draft Lake Powell Pipeline Project
Prairie Dog Survey Report"
Prepared by Logan Simpson Design.

FERC Project Number:

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Spatial Reference: UTM Zone 12N, NAD-83



UDWR

Figure 4-5



MWH

**Utah Prairie Dog
Habitat Map**

There is no designated critical habitat for the yellow-billed cuckoo.

Construction of the South Alternative would not materially change the potential foraging habitat or prey base for the yellow-billed cuckoo. Indirect effects of the South Alternative on the yellow-billed cuckoo would not be significant.

4.4.1.5.2 Operation and Maintenance Effects. Occasional maintenance at the Paria River crossing site would not affect yellow-billed cuckoos.

Project water delivery to end users would not materially affect existing or potential riparian habitat for the yellow-billed cuckoo in the LPP project study area (UBWR 2011c)(Surface Water Resources, Study Report 18). LPP project return flows to the Virgin River via treated wastewater effluent pathways would not measurably change the Virgin River flows.

4.4.1.5.3 Effects Summary. The South Alternative would have no effect on the yellow-billed cuckoo.

4.4.1.6 Greater Sage-grouse

4.4.1.6.1 Construction Effects. Essential greater sage-grouse nesting habitat is approximately 15 miles (north) from any Project features and essential wintering habitat is approximately 46 miles (north) from any Project features. Although fringe populations may occur closer to the study area, the generally disturbed character of habitat within or adjacent to the study area would not likely support sage-grouse populations; direct or indirect effects on these populations would be unlikely.

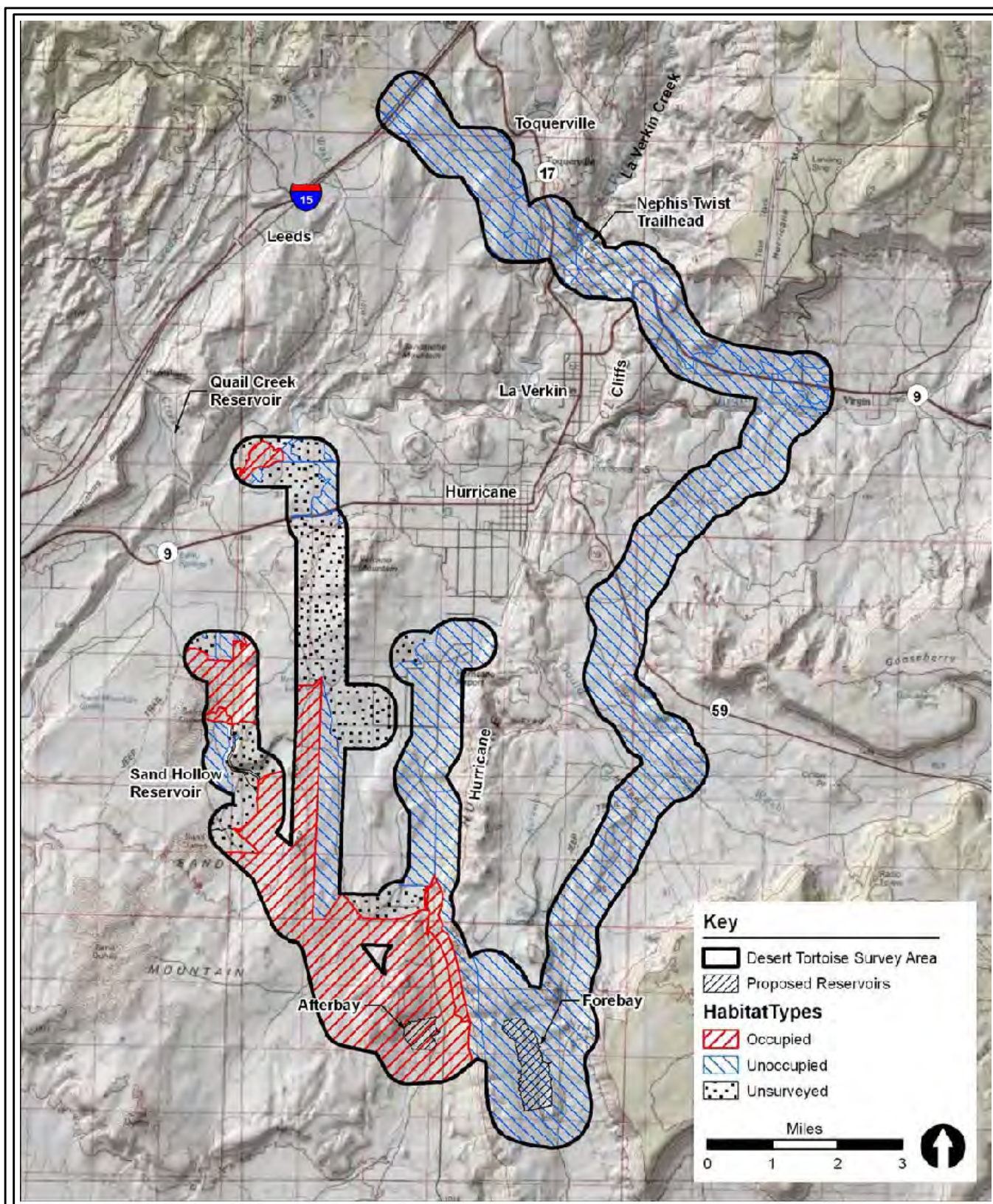
There is no designated critical habitat for the greater sage-grouse.

4.4.1.6.2 Operation and Maintenance Effects. No South Alternative facilities would be operated or maintained in primary greater sage-grouse habitat; there would be no operation and maintenance effects.

4.4.1.6.3 Effects Summary. The South Alternative would have no effect on the greater sage-grouse.

4.4.1.7 Mohave Desert Tortoise

4.4.1.7.1 Construction Effects. The Mohave population of the desert tortoise (MDT) was surveyed in Washington County, Utah. Surveys were performed according to the USFWS protocol as provided in *2010 Preparing for Any Action That May Occur Within the Range of the Mojave Desert Tortoise (Gopherus agassizii)* (LSD 2010c) (See Appendix D). The survey area is shown in Figure 4-6. The LPP corridor, whether for pipeline or transmission line construction, has a defined width of 130 feet. This construction corridor, as well as all equipment and facilities sites, and forebay and afterbay reservoirs, required 100 percent survey coverage. This coverage is achieved by one person surveying no more than a 30-foot wide belt transect. Additional transects outside of the construction corridor, referred to as buffer transects, were surveyed at 200-, 400-, and 600-meter intervals parallel to or encircling the LPP corridor and construction sites. All transect routes were surveyed to the extent possible unless precluded by private property or where impassable terrain limited access. Overall, unsurveyed lands would not be expected to provide suitable tortoise habitat, and included steep slopes adjacent to the Hurricane Cliffs; private residential and commercial developments adjacent to Highway 17 in Toquerville, south of Highway 9 at Sheep Bridge Road, within the City of Hurricane, and adjacent to Sky Ranch Airport Community; private agricultural and ranch developments south of Highway 9 to Sand Hollow State Park, along 1500 West; and south of Highway 9 along the Honeymoon Trail (LSD 2010c).



Source:

This map is from the
 "Draft Lake Powell Pipeline Project
 Mojave Desert Tortoise Survey Report"
 Prepared by Logan Simpson Design.

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Lake Powell Pipeline Project

Spatial Reference: UTM Zone 12N, NAD-83

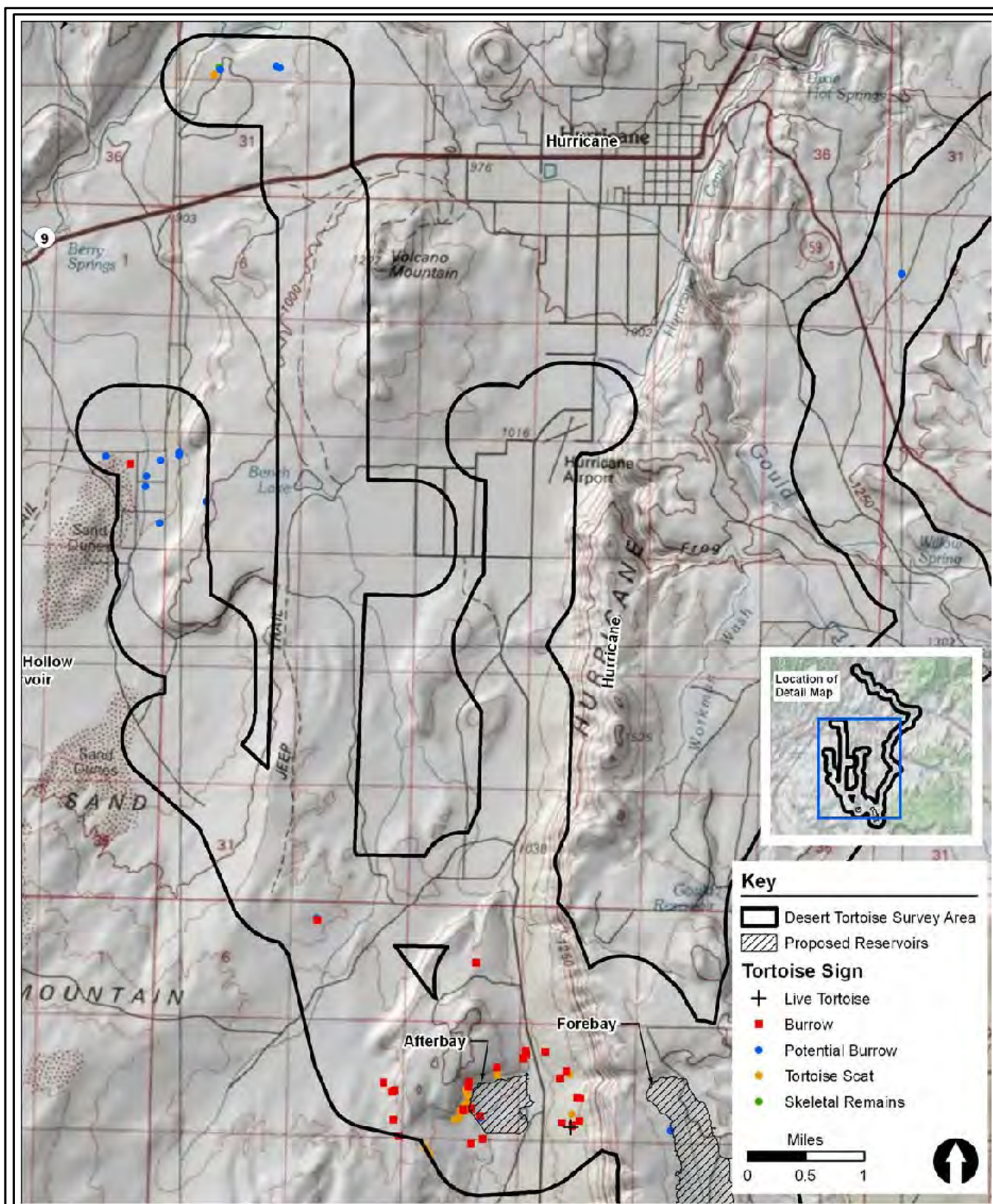


Figure 4-6



MWH

**Mohave Desert Tortoise
 Habitat Map**



Source:

This map is from the
 "Draft Lake Powell Pipeline Project
 Mojave Desert Tortoise Survey Report"
 Prepared by Logan Simpson Design.

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Lake Powell Pipeline Project

Spatial Reference: UTM Zone 12N, NAD-83



UDWR

Figure 4-7



MWH

**Mohave Desert Tortoise
 Sign Location Map**

Based on the presence of tortoises, tortoise sign, and habitat evaluations, the survey identified 5,894 acres of occupied MDT habitat and 17,164 acres of unoccupied desert scrub habitat shown in Figure 4-6 within the LPP tortoise survey area. Occupied habitat is identified as lands where tortoises or tortoise sign was observed and the lands contiguous with this area that share similar habitat features important to tortoise (e.g. topography and vegetation). Tortoise sign was not located in areas mapped as unoccupied, and these areas lacked topographic, soil characteristics, and/or vegetative features necessary to support MDT. Locations of observed tortoise sign are shown on Figure 4-7.

The Red Cliffs Desert Reserve (Reserve) has defined “take areas” that are designated MDT habitat outside of the Reserve boundaries; any development or habitat disturbance within a take area must be coordinated with the Desert Reserve administration (Red Cliffs 2011a). Take Area 10, South Hurricane, covers part of the proposed Hurricane Cliffs afterbay (Red Cliffs 2011b). The Cedar Valley Pipeline would be constructed south and east of Take Area 7, Hurricane, and does not appear to cross the take area.

Because MDTs are mobile, re-survey of the study area should be performed prior to construction and the Desert Tortoise Council *Guidelines for Handling Desert Tortoises During Construction Projects* (Desert Tortoise Council 1999) and USFWS *Guidelines For Handling Desert Tortoises- Mojave Population And Their Eggs* (USFWS 2009) should be rigorously adhered to. A tortoise biologist should be present or immediately available during construction to manage any tortoises encountered during construction. Onsite precautions such as speed limits, checking under all parked vehicles before they are moved, protection of excavations and trenches, observation of excavations and trenches before backfilling, site cleanliness (to avoid trash that could attract ravens), hazardous materials management and education of all personnel should be implemented.

Filling of the forebay and afterbay reservoirs could drown MDTs in their dens or if they were unable to disperse rapidly enough. Burrows, tortoise scat and one live tortoise were observed in or near Take Area 10 during field surveys. All construction activity in or near Take Area 10 would require coordination with the Desert Reserve administration. The area should be re-surveyed before any filling of the reservoirs, with particular attention to potentially occupied dens, and the waterline should be observed daily to locate any tortoises at risk of inundation so they can be relocated by the tortoise biologist.

Desert Reserve administration should be consulted before any construction on the Cedar Valley Pipeline to confirm that the pipeline corridor does not cross Take Area 7.

Permanent clearing and access roads over the pipeline would alter a small area of potential tortoise foraging habitat and changes in vegetation may affect preferred tortoise food plant availability.

Because the MDT occupies habitat in the South Alternative and habitat would be permanently disturbed, construction of South Alternative features would likely adversely affect the MDT.

No designated MDT critical habitat would be disturbed by pipeline or transmission line construction. Forebay and afterbay reservoirs would not be located in designated critical habitat.

4.4.1.7.2 Operation and Maintenance Effects. South Alternative facilities would be staffed, operated and maintained in MDT habitat and would increase vehicular traffic, placing tortoises at risk of vehicular mortality. Operations and maintenance activity in or near Take Area 10 should be coordinated with Desert Reserve administration. Precautions, such as outlined above should be included in all operation and maintenance plans and would help to minimize potential tortoise mortality. Adverse effects would still be possible, however.

4.4.1.7.3 Effects Summary. The South Alternative would likely adversely affect the MDT.

4.4.1.8 Relict Leopard Frog

4.4.1.8.1 Construction Effects. No known population of the relict leopard frog exists within or near the South Alternative study area. There would be no construction effects on the relict leopard frog.

4.4.1.8.2 Operation and Maintenance Effects. No South Alternative facilities would be operated in primary relict leopard frog habitat. There would be no operation or maintenance effects.

4.4.1.8.3 Effects Summary. The South Alternative would have no effect on the relict leopard frog.

4.4.1.9 Yuma Clapper Rail

4.4.1.9.1 Construction Effects. There have been no recorded occurrences of the Yuma clapper rail within or near the South Alternative study area, although potential habitat may occur along the Virgin River in far southwestern Washington County. The only feature of the South Alternative that crosses the Virgin River would be the Cedar Valley Pipeline and the aerial pipeline crossing would be located adjacent to an existing road bridge (Sheep Bridge Road) near the town of Virgin. The Virgin River runs through a deeply incised small canyon at this bridge and analysis of aerial photography indicates that there is no marsh habitat that would support Yuma clapper rail. This area would be scoured by high river flows and development of even seasonal marshes would not be likely. Human activity arising from the South Alternative would not affect Yuma clapper rail breeding or foraging habitat or change its prey base. Primary Yuma clapper rail habitat would not be affected by the South Alternative and the South Alternative would not cause direct or indirect effects on the Yuma clapper rail.

4.4.1.9.2 Operation Effects. Operation or maintenance of South Alternative facilities would not affect primary Yuma clapper rail habitat. Project water delivery to end users would not materially affect existing or potential riparian habitat for the Yuma clapper rail in the LPP project study area (UBWR 2011c) (Surface Water Resources, Study Report 18). LPP project return flows to the Virgin River via treated wastewater effluent pathways would not measurably change the Virgin River flows.

Operation and maintenance of the South Alternative would not affect the Yuma clapper rail.

4.4.1.9.3 Effects Summary. The South Alternative would have no effect on the Yuma clapper rail.

4.4.1.10 Kanab Ambersnail

4.4.1.10.1 Construction Effects. There is no known population of the Kanab ambersnail within or near the South Alternative study area and existing populations and habitat would not be affected by water delivery from the South Alternative. There would be no construction effects on the Kanab ambersnail.

4.4.1.10.2 Operation and Maintenance Effects. No South Alternative facilities would be operated or maintained in primary Kanab ambersnail habitat. There would be no operation and maintenance effects on the Kanab ambersnail.

4.4.1.10.3 Effects Summary. The South Alternative would have no effect on the Kanab ambersnail.

4.4.2 Wildlife Species of Concern

Wildlife species of concern are discussed as a group in each class: mammals, birds, reptiles, amphibians and by order (bats) as appropriate because impacts would be similar for members of a given class and order of wildlife. If certain species have particular characteristics that could make them particularly vulnerable to impacts, these species are analyzed individually.

4.4.2.1 *Mammals*

4.4.2.1.1 Construction Impacts. Generally, adult mammals included in the wildlife species of concern would not be vulnerable to direct mortality impacts from construction of South Alternative features. They would have sufficient mobility to disperse from construction areas. Subterranean and ground denning species such as pygmy rabbit and kit fox could be vulnerable to den destruction and loss of young still in the den. Construction of pipeline segments across open terrain away from highway right-of- ways should be scheduled outside of the denning season of these species (February through June) if possible. Dwarf shrew may occur along the U.S. 89 pipeline corridor west of the Cockscomb and could be subject to construction mortality, although the number of shrews killed cannot be estimated. Free flying bats would not be impacted by construction of South Alternative features, but roost sites and hibernacula could be temporarily disrupted by construction disturbance and noise. Direct construction impact on mammal species of concern is not likely to exceed the significance criteria.

Overall permanent disturbance of potential wildlife habitat, 1,486.8 acres (UBWR 2011a) (See Draft Wildlife Resources Study Report, Chapter 4) would not be sufficient to place any species at risk because of the large area of equivalent habitats surrounding the LPP project study area. Temporary construction disturbance of foraging areas and home ranges would be temporary and unlikely to place any species at risk.

Direct and indirect impacts from LPP project construction would not place any mammal species at risk or exceed the significance criteria.

4.4.2.1.2 Operation and Maintenance Impacts. Mammals would be at minimal risk of impacts from operations and maintenance activities; mainly from potential road kills on access roads. Enforcement of speed limits on access roads and entry controls to limit public travel on access roads would minimize these impacts. Impacts from operation and maintenance would not place any mammal species at risk or exceed the significance criteria.

4.4.2.1.3 Impacts Summary. Construction, operation and maintenance of the South Alternative would not cause significant impacts on mammal wildlife species of concern.

4.4.2.2 *Birds*

4.4.2.2.1 Construction Impacts. Adult birds would not be at risk of direct mortality from construction of South Alternative features. Nests with eggs or nestlings could be destroyed by construction; construction corridors, including riparian zones, should be cleared of vegetation outside of the nesting season (typically March through July) thus preventing nesting prior to or during subsequent active construction. Raptor nests and roost sites should be surveyed and monitored and no construction activity should be performed within one-quarter mile of occupied nests or roosts, including those of bald and golden eagles. Ground-nesting species, such as burrowing owl, long-billed curlew, western grasshopper sparrow, northern harrier, sage sparrow and short-eared owl would be at risk from vehicles and construction equipment and construction should be scheduled outside of these species' nesting periods. These

measures would ensure compliance with the Migratory Bird Treaty Act and Bald Eagle Protection Act and impacts on bird wildlife species of concern would not exceed the significance criteria.

Appropriate protection and mitigation of jurisdictional waters and wetlands and their associated habitats would be required under the applicable permitting procedures.

Permanent habitat loss of 1,486.8 acres of potential habitat would not be sufficient to place any species survival at risk because of the large area of equivalent habitat surrounding the LPP project study area.

4.4.2.2.2 Operation and Maintenance Impacts. Occasional inspection and maintenance activity along South Alternative pipeline corridors would take place on established roads or access ways that would not impact bird nesting habitat. To ensure protection of migratory birds and eagles, this activity should take place outside the nesting season or winter roosting season, if possible. Access to pump stations or hydro stations would be on permanently surfaced roads and would not impact birds. Impacts from operation and maintenance of the South Alternative would not exceed the significance criteria.

4.4.2.2.3 Impacts Summary. Construction, operation and maintenance of the South Alternative would not cause significant impacts on avian wildlife species of concern.

4.4.2.3 Reptiles

4.4.2.3.1 Construction Impacts. Reptiles would be vulnerable to construction mortality by crushing under vehicles and construction equipment. Some individuals could be killed by backfilling of trenches if they had fallen in and were unable to escape. Reptile densities are not expected to be high in the LPP project study area because most of the alternative features would be constructed in previously disturbed habitat. Construction mortality could be mitigated by capture and relocation of reptiles immediately in the path of construction activities, removal and relocation of any reptiles observed in trenches before backfilling and searching for reptiles under parked vehicles and equipment before they are moved. The permanent disturbance of 1,486.8 acres of potential habitat would not be sufficient to place any species at risk and impacts would not exceed the significance criteria.

4.4.2.3.2 Operation and Maintenance Impacts. Vehicular traffic on access roads could cause vehicular mortality of reptiles during operations and maintenance activity. The magnitude of this mortality is not quantifiable at this time; however, it is unlikely that it would place any population at risk, or exceed the significance criteria.

4.4.2.3.2.3 Impacts Summary. Construction, operation and maintenance of the South Alternative would not cause significant impacts on reptile wildlife species of concern.

4.4.2.4 Amphibians

4.4.2.4.1 Construction Impacts. Amphibians, like reptiles, would be at risk of construction mortality by crushing under vehicles and construction equipment. Mitigation measures similar to those described in Section 4.4.2.3 for reptiles would limit direct construction mortality. With appropriate protection and mitigation of jurisdictional waters and wetlands, loss of habitat would not likely place any population at risk. Construction impacts would not exceed the significance criteria.

4.4.2.4.2 Operation and Maintenance Impacts. Impacts and mitigation from operation and maintenance would be the same as described in Section 4.4.2.1, and would not exceed the significance criteria.

4.4.2.4.3 Impacts Summary. Construction, operation and maintenance of the South Alternative would not cause significant impacts on amphibian wildlife species of concern.

4.4.2.5 Tribal Wildlife Species of Cultural Concern

Wildlife species listed by the federal government under the ESA and state and agency lists of wildlife species of concern include a number of individual species included in the categories of wildlife categories of tribal cultural concern. Habitat and species assessments and field studies for federally listed species or state and agency wildlife species of concern have been described in previous sections of this document. The Wildlife Resources Study Report (UBWR 2011a) analyzes impacts on wildlife species of tribal cultural concern that are not listed by the federal government, states or agencies. Measures to protect wildlife species in general and to minimize impacts on wildlife, including wildlife species of tribal cultural concern, from LPP project construction, operation and maintenance are described in the Wildlife Resources Study Report and are further discussed in Chapter 5 of this study report.

4.4.2.5.1 Construction Impacts. There would be potential mortality of individuals of tribal wildlife species of cultural concern from construction of the South Alternative and 1,486.8 acres of potential habitat for these species would be permanently disturbed. It is unlikely that any species would be placed at risk because of mortality or habitat loss and impacts would not exceed the significance criteria.

4.4.2.5.2 Operation and Maintenance Impacts. There would be potential mortality of individuals of tribal wildlife species of cultural concern, but that mortality would not likely place any species at risk and impacts would not exceed the significance criteria.

4.4.2.5.3 Impact Summary. Construction, operation and maintenance of the South Alternative would not cause significant impacts on tribal wildlife species of cultural concern.

4.5 Existing Highway Alternative

The Existing Highway Alternative would construct, operate and maintain the features and facilities described in Chapter 1, Section 1.2.2 and shown in Figure 1-4. It would be similar to the South Alternative except that the penstock would be constructed in the S.R. 389 ROW instead of south of the Kaibab-Paiute Indian Reservation.

4.5.1 Threatened, Endangered and Candidate Species

4.5.1.1 California Condor

4.5.1.1.1 Construction Effects. Effects would be the same as described in Section 4.4.1.1.1.

4.5.1.1.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.1.2.

4.5.1.1.3 Effects Summary. The Existing Highway Alternative may affect, but is not likely to adversely affect the California condor.

4.5.1.2. Mexican Spotted Owl

4.5.1.2.1 Construction Effects. Effects of the Cedar Valley Pipeline component of the Existing Highway Alternative would be the same as described in Section 4.4.1.2.1. Construction of the penstock in S.R. 389 ROW would not affect spotted owls.

4.5.1.2.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.2.2.

4.5.1.2.3 Effects Summary. The Existing Highway Alternative may affect, but is not likely to adversely affect the Mexican spotted owl.

4.5.1.3 Southwest Willow Flycatcher

4.5.1.3.1 Construction Effects. Effects would be the same as described in Section 4.4.1.3.1.

4.5.1.3.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.3.2

4.5.1.3.3 Effects Summary. The Existing Highway Alternative may affect, but is not likely to adversely affect the southwestern willow flycatcher.

4.5.1.4 Utah Prairie Dog

4.5.1.4.1 Construction Effects. Effects of the Cedar Valley Pipeline component of the Existing Highway Alternative would be the same as described in Section 4.4.1.4.1. Construction of the penstock in S.R. 389 ROW would not affect Utah prairie dogs.

4.5.1.4.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.4.2.

4.5.1.4.3 Effects Summary. The Existing Highway Alternative would likely adversely affect the Utah prairie dog.

4.5.1.5 Yellow-billed Cuckoo

4.5.1.5.1 Construction Effects. Effects would be the same as described in Section 4.4.1.5.1.

4.5.1.5.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.5.2.

4.5.1.5.3 Effects Summary. The Existing Highway Alternative would have no effect on the yellow-billed cuckoo.

4.5.1.6 Greater Sage-grouse

4.5.1.6.1 Construction Effects. Effects would be the same as described in Section 4.4.1.6.1.

4.5.1.6.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.6.2.

4.5.1.6.3 Effects Summary. The Existing Highway Alternative would have no effect on the greater sage-grouse.

4.5.1.7 Mohave Desert Tortoise

4.5.1.7.1 Construction Effects. Effects would be the same as described in Section 4.4.1.7.1. Construction of the penstock in S.R. 389 would not affect desert tortoises.

4.5.1.7.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.7.2.

4.5.1.7.3 Effects Summary. The Existing Highway Alternative would likely adversely affect the Mohave desert tortoise.

4.5.1.8 Relict Leopard Frog

4.1.1.8.1 Construction Effects. Effects would be the same as described in Section 4.4.1.8.1.

4.5.1.8.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.8.2.

4.5.1.8.3 Effects Summary. The Existing Highway Alternative would have no effect on the relict leopard frog.

4.5.1.9 Yuma Clapper Rail

4.5.1.9.1 Construction Effects. Effects would be the same as described in Section 4.4.1.9.1.

4.5.1.9.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.9.2.

4.5.1.9.3 Effects Summary. The Existing Highway Alternative would have no effect on the Yuma clapper rail.

4.5.1.10 Kanab Ambersnail

4.5.1.10.1 Construction Effects. Effects would be the same as described in Section 4.4.1.10.1.

4.5.1.10.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.10.2

4.5.1.10.3 Effects Summary. The Existing Highway Alternative would have no effect on the Kanab ambersnail.

4.5.2 Wildlife Species of Concern

4.5.2.1 Mammals

4.5.2.1.1 Construction Impacts. Impacts would be generally the same as described in Section 4.4.2.1.1.; construction of the penstock in the S.R. 389 ROW would be less likely to impact ground nesting or subterranean species than the overland corridor of the South Alternative. There would be approximately 426 fewer acres of permanent disturbance of potential wildlife habitat than the South Alternative. Impacts would not exceed the significance criteria.

4.5.2.1.2 Operation and Maintenance Impacts. Impacts would be the same as described in Section 4.4.2.1.2 and would not exceed the significance criteria.

4.5.2.1.3 Impact Summary. Construction, operation and maintenance of Existing Highway Alternative facilities could cause some mortality of individual mammals, but would not exceed the significance criteria for impacts on populations of mammal wildlife species of concern. Habitat impacts would not be significant because of the large area of equivalent habitat in the surrounding region.

4.5.2.2 Birds

4.5.2.2.1 Construction Impacts. Impacts would be generally the same as described in Section 4.4.2.2.1; construction of the penstock in the S.R. 389 ROW would be less likely to impact nesting birds than the overland corridor of the South Alternative. Mitigation procedures described in Section 4.4.2.2.1 should be followed. There would be approximately 426 fewer acres of permanent disturbance of potential wildlife habitat than the South Alternative. Impacts would not exceed the significance criteria.

4.5.2.2.2 Operation and Maintenance Impacts. Impacts would be the same as described in Section 4.4.2.2.2 and would not exceed the significance criteria.

4.5.2.2.3 Impact Summary. Construction, operation and maintenance of the Existing Highway Alternative would not cause significant impacts on bird wildlife species of concern.

4.5.2.3 Reptiles

4.5.2.3.1 Construction Impacts. Impacts would be generally the same as described in Section 4.4.2.3.1; construction of the penstock in the S.R. 389 ROW would be less likely to impact reptiles than the overland corridor of the South Alternative. There would be approximately 426 fewer acres of permanent disturbance of potential wildlife habitat than the South Alternative. Impacts would not exceed the significance criteria.

4.5.2.3.2 Operation and Maintenance Impacts. Impacts would be the same as described in Section 4.5.2.3.2 and would not exceed the significance criteria.

4.5.2.3.3 Impact Summary. Construction, operation and maintenance of the Existing Highway Alternative would not cause significant impacts on reptile wildlife species of concern.

4.5.2.4 Amphibians

4.5.2.4.1 Construction Impacts. Impacts would be generally the same as described in Section 4.4.2.3.1; construction of the penstock in the S.R. 389 ROW would be less likely to impact amphibians than the

overland corridor of the South Alternative. There would be approximately 426 fewer acres of permanent disturbance of potential wildlife habitat than the South Alternative. Impacts would not exceed the significance criteria.

4.5.2.4.2 Operation and Maintenance Impacts. Impacts would be the same as described in Section 4.4.2.4.2 and would not exceed the significance criteria.

4.5.2.4.3 Impact Summary. Construction, operation and maintenance of the Existing Highway Alternative would not cause significant impacts on amphibian wildlife species of concern.

4.5.2.5 Tribal Wildlife Species of Cultural Concern

4.5.2.5.1 Construction Impacts. Impacts would be generally the same as described in Section 4.4.2.5.1; construction of the penstock in the S.R. 389 ROW would be less likely to impact species than the overland corridor of the South Alternative. There would be approximately 426 fewer acres of permanent disturbance of potential wildlife habitat than the South Alternative. Impacts would not exceed the significance criteria.

4.5.2.5.2 Operation and Maintenance Impacts. Impacts would be the same as described in Section 4.4.2.5.2 and would not exceed the significance criteria.

4.5.2.5.3 Impact Summary. Construction, operation and maintenance of the Existing Highway Alternative would not cause significant impacts on tribal wildlife species of cultural concern.

4.6 Southeast Corner Alternative

The Southeast Corner Alternative would construct, operate and maintain the features and facilities described in Chapter 1, Section 1.2.3 and shown in Figure 1-5. This alternative would be the same as the South Alternative except that the penstock would be constructed across the southeast corner of the Kaibab-Paiute Indian Reservation.

4.6.1 Threatened, Endangered and Candidate Species

4.6.1.1 California Condor

4.6.1.1.1 Construction Effects. Effects would be the same as described in Section 4.4.1.1.1.

4.6.1.1.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.1.2.

4.6.1.1.3 Effects Summary. The Southeast Corner Alternative may affect, but is not likely to adversely affect the California condor.

4.6.1.2 Mexican Spotted Owl

4.6.1.2.1 Construction Effects. Effects would be the same as described in Section 4.4.1.2.1.

4.6.1.2.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.2.2.

4.6.1.2.3 Effects Summary. The Southeast Corner Alternative may affect, but is not likely to adversely affect the Mexican spotted owl.

4.6.1.3 Southwest Willow Flycatcher

4.6.1.3.1 Construction Effects. Effects would be the same as described in Section 4.4.1.3.1.

4.6.1.3.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.3.2.

4.6.1.3.3 Effects Summary. The Southeast Corner Alternative may affect, but is not likely to adversely affect the southwest willow flycatcher.

4.6.1.4 Utah Prairie Dog

4.6.1.4.1 Construction Effects. Effects would be the same as described in Section 4.4.1.4.1.

4.6.1.4.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.4.2.

4.6.1.4.3 Effects Summary. The Southeast Corner Alternative would likely adversely affect the Utah prairie dog.

4.6.1.5 Yellow-billed Cuckoo

4.6.1.5.1 Construction Effects. Effects would be the same as described in Section 4.4.1.5.1.

4.6.1.5.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.5.2.

4.6.1.5.3 Effects Summary. The Southeast Corner Alternative would have no effect on the yellow-billed cuckoo.

4.6.1.6 Greater Sage-grouse

4.6.1.6.1 Construction Effects. Effects would be the same as described in Section 4.4.1.6.1.

4.6.1.6.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.6.2.

4.6.1.6.3 Effects Summary. The Southeast Corner Alternative would have no effect on the greater sage-grouse.

4.6.1.7 Mohave Desert Tortoise

4.6.1.7.1 Construction Effects. Effects would be the same as described in Section 4.4.1.7.1.

4.6.1.7.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.7.2.

4.6.1.7.3 Effects Summary. The Southeast Corner Alternative would likely adversely affect the Mohave desert tortoise.

4.6.1.8 Relict Leopard Frog

4.6.1.8.1 Construction Effects. Effects would be the same as described in Section 4.4.1.8.1.

4.6.1.8.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.8.2.

4.6.1.8.3 Effects Summary. The Southeast Corner Alternative would have no effect on the relict leopard frog.

4.6.1.9 Yuma Clapper Rail

4.6.1.9.1 Construction Effects. Effects would be the same as described in Section 4.4.1.9.1.

4.6.1.9.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.9.2.

4.6.1.9.3 Effects Summary. The Southeast Corner Alternative would have no effect on the Yuma clapper rail.

4.6.1.10 Kanab Ambersnail

4.6.1.10.1 Construction Effects. Effects would be the same as described in Section 4.4.1.10.1.

4.6.1.10.2 Operation and Maintenance Effects. Effects would be the same as described in Section 4.4.1.10.2.

4.6.1.10.3 Effects Summary. The Southeast Corner Alternative would have no effect on the Kanab ambersnail.

4.6.2 Wildlife Species of Concern

4.6.2.1 Mammals

4.6.2.1.1 Construction Impacts. Impacts would generally be the same as described in Section 4.4.2.1.1; the Southeast Corner Alternative would permanently disturb approximately 68 fewer acres of potential wildlife habitat than the South Alternative. Impacts would not exceed the significance criteria.

4.6.2.1.2 Operation and Maintenance Impacts. Impacts would be the same as described in Section 4.4.2.1.2 and would not exceed the significance criteria.

4.6.2.1.3 Impact Summary. Construction, operation and maintenance of the Southeast Corner Alternative Existing Highway Alternative facilities could cause some mortality of individual mammals, but would not exceed the significance criteria for impacts on populations of mammal wildlife species of concern. Habitat impacts would not be significant because of the large area of equivalent habitat in the surrounding region.

4.6.2.2 Birds

4.6.2.1.1 Construction Impacts. Impacts would be generally the same as described in Section 4.4.2.2.1; the Southeast Corner Alternative would permanently disturb approximately 68 fewer acres of potential wildlife habitat than the South Alternative. Mitigation measures described in Section 4.4.2.2.1 should be followed. Impacts would not exceed the significance criteria.

4.6.2.2.2 Operation and Maintenance Impacts. Impacts would be the same as described in Section 4.4.2.2.2 and would not exceed the significance criteria.

4.6.2.2.3 Impact Summary. Construction, operation and maintenance of the Southeast Corner Alternative would not cause significant impacts on avian wildlife species of concern.

4.6.2.3 Reptiles

4.6.2.3.1 Construction Impacts. Impacts would be generally the same as described in Section 4.4.2.3.1; the Southeast Corner Alternative would permanently disturb approximately 495 fewer acres of potential wildlife habitat than the South Alternative. Impacts would not exceed the significance criteria.

4.6.2.3.2 Operation and Maintenance Impacts. Impacts would be the same as described in Section 4.4.2.3.2 and would not exceed the significance criteria.

4.6.2.3.3 Impact Summary. Construction, operation and maintenance of the Southeast Corner Alternative would not cause significant impacts on reptile wildlife species of concern.

4.6.2.4 Amphibians

4.6.2.4.1 Construction Impacts. Impacts would be generally the same as described in Section 4.4.2.4.1; the Southeast Corner Alternative would permanently disturb approximately 68 fewer acres of potential wildlife habitat than the South Alternative. Impacts would not exceed the significance criteria.

4.6.2.4.2 Operation and Maintenance Impacts. Impacts would be the same as described in Section 4.4.2.4.2 and would not exceed the significance criteria.

4.6.2.4.3 Impact Summary. Construction, operation and maintenance of the Southeast Corner Alternative would not cause significant impacts on amphibian wildlife species of concern.

4.6.2.5 Tribal Wildlife Species of Cultural Concern

4.6.2.5.1 Construction Impacts. Impacts would be generally the same as described in Section 4.4.2.5.1; the Southeast Corner Alternative would permanently disturb approximately 68 fewer acres of potential wildlife habitat than the South Alternative. Impacts would not exceed the significance criteria.

4.6.2.5.2 Operation and Maintenance Impacts. Impacts would be the same as described in Section 4.4.2.5.2 and would not exceed the significance criteria.

4.6.2.5.3 Impact Summary. Construction, operation and maintenance of the Southeast Corner Alternative would not cause significant impacts on tribal wildlife species of cultural concern.

4.7 Transmission Line Alternatives

The Transmission Line Alternatives would construct, operate and maintain the features and facilities described in Chapter 1, Section 1.2.4 and shown in Figures 1-6, 1-7 and 1-8.

All of the aerial transmission lines to be constructed are high voltage lines with voltages ranging from 34.5 kV (one line) to 345 kV (one line). Depending on alternative alignments selected, up to a maximum of approximately 123.4 miles or a minimum of 99.6 miles of new transmission lines would be constructed. Most of the aerial lines would be 138 kV (nine lines) or 69 kV (five lines). Two potential new underground lines totaling 4.7 miles would be constructed (4.1 miles of 24.9 kV and 0.6 mile of 12.47kV). Each underground transmission line would require a 30-foot temporary disturbance construction corridor and a 2-foot permanent disturbance corridor. Aerial transmission line supports would be 75 to 100 foot tall steel single-poles. Foundations for the poles would be constructed by ground crews and the towers would be delivered to each foundation by helicopter for installation. Pole foundations would be approximately 8 by 8 feet square and spaced approximately 450 feet apart (12 per mile). Total permanent tower base disturbance would be approximately 0.02 acres per line mile. Each new transmission line would have a double track 10-foot wide access road constructed parallel to the line; new lines would use existing access road alignments where possible. Total permanent disturbance for new or upgraded access roads would be approximately 1.2 acres per line mile; total permanent disturbance for transmission lines would be approximately 1.22 acres per line mile. Conductors would be pulled by helicopter and would not require additional disturbance area for installation.

New proposed underground transmission lines would require temporary disturbance in a 30-foot corridor and a permanent disturbance in a 2-foot corridor, not including access roads. Underground transmission line alternatives would cause approximately 3.6 acres of temporary habitat disturbance and 1.44 acres of permanent disturbance per line mile.

A transmission line ROW requires an area cleared of trees sufficient to protect the conductor wires from hazards from falling trees and arcing. The required distance of clearing from the centerline of the ROW is variable because of the variable sag of conductors between support poles, the greatest sag occurring at the midpoint between support poles. Conductor sag is greater with higher loads and during hot weather. Conductors sway laterally because of wind pressure. Any trees within the conductor cross-section of the line that would potentially contact or arc to the conductors at maximum sag, load and sway would be removed from the ROW; certain tall “danger trees” outside of the ROW would be removed if there were risk to the conductors if the trees fell. In general, for a 75-foot support tower pole line, vegetation over 25 feet in height would be required to be cleared to a distance of 50 feet from the center line only in the region surrounding maximum sag. It is not possible to estimate the necessary area of ROW clearing because of the patchy distribution of trees along most of the new transmission lines and varying topography.

New switch stations and substations would be constructed and existing substations would be upgraded to handle the increased line voltages. Upgraded substations would require about five acres of additional permanent land disturbance outside of the existing substation footprint. New switch stations and substations would require a footprint of approximately five acres of permanent land disturbance.

There are three possible scenarios for calculation of impacts because of multiple alternative transmission line configurations. The “basic” scenario includes all transmission lines that are not described as “alternative” (Alt.). The “minimum” scenario includes lines described as alternative (Alt.) that are shorter than the basic lines. The “maximum” scenario includes alternative lines (Alt.) that are longer than the basic lines.

Table 4.2 Permanent Aerial Transmission Line Habitat Disturbance (acres)			
Transmission Lines		Sub-stations	Total
Basic	132.9	25	157.9
Minimum	116	25	141.0
Maximum	145.0	25	170

Underground transmission lines would be placed in the U.S. 89 ROW or existing streets and roads and would not affect or impact primary wildlife habitat.

4.7.1 Threatened, Endangered and Candidate Species

4.7.1.1 California Condor

4.7.1.1.1. Construction Effects. Project transmission lines and associated substations, switch stations and access roads would not be constructed in or near condor re-introduction sites or primary breeding or roosting habitat. Effects would be similar to those described in Section 4.4.1.1.1 and the same precautions should be employed to prevent condors from being attracted to construction sites.

California condor designated critical habitat would have no effects from Transmission Line Alternative construction.

4.7.1.1.2 Operation and Maintenance Effects. Injury or electrocution of condors by transmission lines is a recognized hazard (USFWS 2001) and as of 2001, seven condors had died from transmission line accidents (USFWS 2001). The Edison Electrical Institute (EEI) Avian Protection Plan Guidelines and Suggested Practices for Avian Protection on Power Lines should be employed on all Project transmission lines (EEI 2006, EEI 2010). Power line collisions and electrocutions represented a significant threat to the reintroduced population of condors during the first two years of release efforts.

Indirect effects may occur because of increased off-road vehicle traffic on transmission line access roads and subsequent increased litter, toxic substance spills and shooting, particularly if carcasses with lead bullets are left in the field. Access control measures should be employed to restrict traffic to authorized maintenance personnel.

4.7.1.1.3 Effects Summary. The Transmission Line Alternatives would likely adversely affect the California condor.

4.7.1.2 Mexican Spotted Owl

4.7.1.2.1. Construction Effects. No Transmission Line Alternatives features would be constructed in Mexican spotted owl primary nesting and foraging habitat.

Two transmission lines would be constructed just outside (west) of spotted owl designated critical habitat (Unit CP-11) along the Cedar Valley Pipeline.

4.7.1.2.2 Operation and Maintenance Effects. Injury or electrocution of spotted owls by transmission lines is a potential hazard. The Edison Electrical Institute (EEI) Avian Protection Plan Guidelines and Suggested Practices for Avian Protection on Power Lines should be employed on all Project transmission lines (EEI 2006, 2010). The potential for spotted owl electrocution or injury from transmission conductors or supports is probably lower than open country raptors because their preferred roosting and foraging habitat is in closed cover forests, where power lines are less frequent. Effects from operation and maintenance of the Transmission Line Alternatives on the Mexican spotted owl are unlikely.

4.7.1.2.3 Effects Summary. The Transmission Line Alternatives may affect, but are unlikely to adversely affect the Mexican spotted owl.

4.7.1.2.3 Southwest Willow Flycatcher

4.7.1.3.1. Construction Effects. Transmission lines could be constructed crossing the Paria River at two locations: the U.S. 89 crossing and a second site approximately 3.9 miles downstream (south). The southern crossing does not have suitable breeding habitat for the willow flycatcher. Breeding southwest willow flycatchers were not identified during field surveys of the U.S. 89 crossing site, although marginal potential habitat was identified. If re-survey of the Paria River is not performed prior to transmission line construction, the construction should be conducted outside of the willow flycatcher breeding and fledging period.

4.7.1.3.2 Operation and Maintenance Effects. Electrocution or injury of willow flycatchers by transmission lines would be unlikely. Avian protection measures (EEI 2006, 2010) should be employed on all LPP project transmission lines.

4.7.1.3.3 Effects Summary. The Transmission Line Alternatives may affect, but are not likely to adversely affect the southwest willow flycatcher.

4.7.1.4. Utah Prairie Dog

4.7.1.4.1. Construction Effects. Two transmission lines would be constructed in potential UPD habitat. CBPS-3 would be constructed through an occupied UPD colony near Kanarraville (LSD 2010d) (See Appendix E). There would be potential mortality of UPD from construction of this line.

The Cedar Valley Water Treatment Facility Transmission Line would be constructed north and west of an unoccupied colony located to the east of the planned new Cedar Valley Water Treatment Facility. No identified colonies were located within the Water Treatment Facility Transmission Line disturbance area.

4.7.1.4.2 Operation and Maintenance Effects. Periodic inspection and maintenance of the CBPS-3 transmission line could affect UPD by vehicular mortality. No operation and maintenance effects would be likely from the Cedar Valley Water Treatment Facility Transmission Line.

4.7.1.4.3 Effects Summary. The Transmission Line Alternatives would likely adversely affect the Utah prairie dog.

4.7.1.5 Yellow-billed Cuckoo

4.7.1.5.1. Construction Effects. One transmission line would be constructed over potential yellow-billed cuckoo habitat at the U.S. 89 crossing of the Paria River. No cuckoos were identified during field survey of this site (LSD 2010a) (See Appendix B) and the habitat was considered to not meet cuckoo nesting

requirements. No other yellow-billed cuckoo potential habitat is present in any transmission line alignments.

4.7.1.5.2 Operation and Maintenance Effects. Electrocuting or injury of yellow-billed cuckoos by transmission line conductors or supports is possible, but highly unlikely.

4.7.1.5.3 Effects Summary. The Transmission Line Alternatives would have no effect on the yellow-billed cuckoo.

4.7.1.6 Greater Sage-grouse

4.7.1.6.1. Construction Effects. No transmission line facilities would be constructed through primary greater sage-grouse nesting or wintering habitat.

4.7.1.6.2 Operation and Maintenance Effects. There would be no operation or maintenance of transmission line facilities in greater sage-grouse habitat

4.7.1.6.3 Effects Summary. The Transmission Line Alternatives would have no effect on the greater sage-grouse.

4.7.1.7 Mohave Desert Tortoise

4.7.1.7.1. Construction Effects. Three transmission lines would be constructed in potential Mohave desert tortoise habitat that was classified as “occupied” in the tortoise field survey (LSD 2010c) (See Appendix D). Construction could cause adverse effects on desert tortoises. Precautionary measures outlined in Section 4.4.1.7.1 should be implemented to minimize potential mortality or disturbance of tortoises.

4.7.1.7.2 Operation and Maintenance Effects. Three transmission lines would be subject to periodic inspection and maintenance in occupied Mohave desert tortoise habitat; this activity could cause adverse effects on desert tortoises.

4.7.1.7.3 Effects Summary. The Transmission Line Alternatives would likely adversely affect the Mohave desert tortoise.

4.7.1.8 Relict Leopard Frog

4.7.1.8.1. Construction Effects. No transmission line facilities would be constructed in relict leopard frog habitat.

4.7.1.8.2 Operation and Maintenance Effects. No transmission line facilities would be operated or maintained in relict leopard frog habitat.

4.7.1.8.3 Effects Summary. The Transmission Line Alternatives would have no effect on the relict leopard frog.

4.7.1.9 Yuma Clapper Rail

4.7.1.9.1. Construction Effects. No transmission line alternatives would be constructed through primary Yuma clapper rail habitat.

4.7.1.9.2 Operation and Maintenance Effects. No transmission line facilities would be operated or maintained in primary Yuma clapper rail habitat.

4.7.1.9.3 Effects Summary. The Transmission Line Alternatives would have no effect on the Yuma clapper rail.

4.7.1.10 Kanab Ambersnail

4.7.1.10.1. Construction Effects. No transmission line facilities would be constructed in Kanab ambersnail habitat.

4.7.1.10.2 Operation and Maintenance Effects. No transmission line facilities would be operated or maintained in Kanab ambersnail habitat.

4.7.1.10.3 Effects Summary. The Transmission Line Alternatives would have no effect on the Kanab ambersnail.

4.7.2 Wildlife Species of Concern

4.7.2.1 Mammals

4.7.2.1.1 Construction Impacts. Some ground nesting or burrowing species could suffer individual mortality of young from construction vehicles and equipment; most adult mammals would temporarily disperse from the construction corridor. Bats would not be impacted because transmission lines and substations would not be constructed in roosting areas or hibernacula. Under maximum transmission line construction, an estimated 170 acres of potential habitat would be permanently disturbed by support tower footings, sub-stations and access roads; under minimum transmission line alternative construction, an estimated 141 acres of potential habitat would be permanently disturbed. This habitat impact would not be significant because of the large area of equivalent habitat adjoining the study area. Construction impacts would not place any species at risk and would not exceed the significance criteria.

4.7.2.1.2 Operation and Maintenance Impacts. Periodic transmission line inspection and maintenance could cause some individual mammal mortality from vehicle traffic, but the number of animals lost would not place any species at risk and impacts would not exceed the significance criteria.

4.7.2.1.3 Impact Summary. The Transmission Line Alternatives would not cause significant impacts on mammal wildlife species of concern.

4.7.2.2 Birds

4.7.2.2.1 Construction Impacts. Preconstruction clearing of planned transmission line access roads, tower support sites, switch stations and substations should be done outside of the nesting period, generally March through July. Measures to protect ground-nesting species and eagles described in Section 4.4.2.2.1 should be followed.

Under maximum transmission line construction, an estimated 170 acres of potential habitat would be permanently disturbed by support tower footings, sub-stations and access roads; under minimum transmission line alternative construction, an estimated 141 acres of potential habitat would be

permanently disturbed. This habitat impact would not be significant because of the large area of equivalent habitat adjoining the study area.

4.7.2.2.2 Operation and Maintenance Impacts. Occasional transmission line inspection and maintenance would be unlikely to cause impacts on birds.

Electrocution or injury by collisions with transmission line conductors or support towers could cause mortality of birds, mainly raptors. The numbers of birds killed can not be estimated, but it would be unlikely that any species would be placed at risk. The Edison Electric Institute guidelines (EEI 2006, 2010) should be followed for all new aerial transmission lines.

4.7.2.2.3 Impact Summary. The Transmission Line Alternatives would not cause significant impacts on avian wildlife species of concern.

4.7.2.3 Reptiles

4.7.2.3.1 Construction Impacts. Construction vehicles and equipment could cause mortality of some individual reptiles, but it is unlikely that this mortality would place any species at risk. Under maximum transmission line construction, an estimated 170 acres of potential habitat would be permanently disturbed by support tower footings, sub-stations and access roads; under minimum transmission line alternative construction, an estimated 141 acres of potential habitat would be permanently disturbed. This habitat impact would not be significant because of the large area of equivalent habitat adjoining the study area.

4.7.2.3.2 Operation and Maintenance Impacts. Occasional inspection and maintenance of transmission lines and substations could cause vehicular mortality of individual reptiles, but it is unlikely that this would place any species at risk.

4.7.2.3.3 Impact Summary. The Transmission Line Alternatives would not cause significant impacts on reptile wildlife species of concern.

4.7.2.4 Amphibians

4.7.2.4.1 Construction Impacts. Construction vehicles and equipment could cause mortality of some individual amphibians, but it is unlikely that this mortality would place any species at risk. Jurisdictional waters and wetlands would be protected and mitigated under applicable procedures.

Under maximum transmission line construction, an estimated 170 acres of potential habitat would be permanently disturbed by support tower footings, sub-stations and access roads; under minimum transmission line alternative construction, an estimated 141 acres of potential habitat would be permanently disturbed. This habitat impact would not be significant because of the large area of equivalent habitat adjoining the study area.

4.7.2.4.2 Operation and Maintenance Impacts. Occasional inspection and maintenance of transmission lines and substations could cause vehicular mortality of individual amphibians, but it is unlikely that this would place any species at risk.

4.7.2.4.3 Impact Summary. The Transmission Line Alternatives would not cause significant impacts on amphibian wildlife species of concern.

4.7.2.5 Tribal Wildlife Species of Cultural Concern

4.7.2.5.1 Construction Impacts. Impacts would be generally the same as described in Sections 4.7.2.1.1, 4.7.2.2.1, 4.7.2.3.1 and 4.7.2.4.1 and would not exceed the significance criteria.

4.7.2.5.2 Operation and Maintenance Impacts. Impacts would be generally the same as described in Sections 4.7.2.1.2, 4.7.2.2.2, 4.7.2.3.2 and 4.7.2.4.2 and would not exceed the significance criteria.

4.7.2.5.3 Impact Summary. Construction, operation and maintenance of the Transmission Line Alternatives would not cause significant impacts on tribal wildlife species of cultural concern.

4.8 No Lake Powell Water Alternative

The No Lake Powell Water Alternative would not deliver Lake Powell water to the WCWCD, CICWCD or KCWCD. There would be no construction of the LPP project water intake, water transmission or water hydro systems or their associated electrical transmission lines. Water supplies for the WCWCD, CICWCD and KCWCD would be obtained by a combination of developing remaining available surface water and groundwater supplies, developing reverse osmosis treatment of existing low quality water supplies (WCWCD only), and reducing residential outdoor water use.

Currently planned construction projects for the WCWCD include the Ash Creek Pipeline and Reservoir (5,000 acre-feet per year), the Anderson Junction Reservoir and the Crystal Creek Pipeline (2,000 acre-feet per year). A future potential WCWCD project would be construction of a reverse-osmosis (RO) treatment plant near the Washington Fields Diversion to treat poor-quality Virgin River water to culinary use standards. This would require a brine treatment facility for disposal of RO filtration by-product. A high voltage transmission line would be constructed to bring electric power to the RO treatment plant. The CICWCD would not construct new water supply facilities. Shortfalls in water supplies would be met in the WCWCD and CICWCD by conservation measures involving restrictions on residential outdoor watering and conversion of agricultural water to municipal and industrial (M&I) uses.

4.8.1 Threatened, Endangered and Candidate Species

4.8.1.1 California Condor

4.8.1.1.1 Construction Effects. The facilities proposed under the No Lake Powell Water Alternative would not be constructed in primary California condor nesting, foraging or roosting habitats or near reintroduction sites. Potential facilities would be constructed in areas not normally utilized for foraging by California condors, but environmental hygiene should be maintained in all construction areas to prevent garbage collections that might attract condors and prevent harm to condors from toxic substances. The No Lake Powell Water Alternative would have no direct effect on the California condor. This alternative would not affect condor food sources and human activities associated with the constructed features would not likely cause indirect effects on the California condor because the condor is an obligate scavenger.

The No Lake Powell Water Alternative would have no effect on California condor critical habitat.

4.8.1.1.2 Operation and Maintenance Effects. Operation and occasional maintenance of proposed facilities would not affect the California condor.

4.8.1.1.3 Effects Summary. The No Lake Powell Water Alternative would have no effect on the California condor.

4.8.1.2 Mexican Spotted Owl

4.8.1.2.1 Construction Effects. No Lake Powell Water Alternative facilities would not be constructed in or near Mexican spotted owl nesting, foraging or roosting habitat. The No Lake Powell Water Alternative would have no direct or indirect effects on the Mexican spotted owl.

The No Lake Powell Water Alternative would not be constructed in Mexican spotted owl critical habitat; the No Lake Powell Water Alternative would have no effect on Mexican spotted owl critical habitat.

4.8.1.2.2 Operation and Maintenance Effects. No Lake Powell Water Alternative facilities would not be operated or maintained in Mexican spotted owl habitat; operation or maintenance of the No Lake Powell Water Alternative would have no effect on the Mexican spotted owl.

4.8.1.2.3 Effects Summary. The No Lake Powell Water Alternative would have no effect on the Mexican spotted owl.

4.1.1.3 Southwest Willow Flycatcher

4.8.1.3.1 Construction Effects. No Lake Powell Water Alternative facilities would not be constructed in or near southwest willow flycatcher nesting or foraging habitat. The No Lake Powell Water Alternative would have no direct or indirect effects on the southwest willow flycatcher.

The No Lake Powell Water Alternative would not be constructed in southwest willow flycatcher critical habitat; the No Lake Powell Water Alternative would have no effect on southwest willow flycatcher critical habitat.

4.8.1.3.2 Operation and Maintenance Effects. No Lake Powell Water Alternative facilities would not be operated or maintained in southwest willow flycatcher habitat; operation or maintenance of the No Lake Powell Water Alternative would have no effect on the southwest willow flycatcher.

4.8.1.3.3 Effects Summary. The No Lake Powell Water Alternative would have no effect on the southwest willow flycatcher.

4.8.1.4 Utah Prairie Dog

4.8.1.4.1 Construction Effects. No Lake Powell Water Alternative facilities would not be constructed in Utah prairie dog habitat; the No Lake Powell Water Alternative would have no direct or indirect effects on the Utah prairie dog.

4.8.1.4.2 Operation and Maintenance Effects. No Lake Powell Water Alternative facilities would not be operated or maintained in Utah prairie dog habitat; the No Lake Powell Water Alternative would have no effect on the Utah Prairie dog.

4.8.1.4.3 Effects Summary. The No Lake Powell Water Alternative would have no effect on the Utah prairie dog.

4.8.1.5 Yellow-billed Cuckoo

4.8.1.5.1 Construction Effects. No Lake Powell Water Alternative facilities would not be constructed in or near yellow-billed cuckoo nesting or foraging habitat. The No Lake Powell Water Alternative would have no direct or indirect effects on the yellow-billed cuckoo.

4.8.1.5.2 Operation and Maintenance Effects. No Lake Powell Water Alternative facilities would not be operated or maintained in yellow-billed cuckoo habitat; operation or maintenance of the No Lake Powell Water Alternative would have no effect on the yellow-billed cuckoo.

4.8.1.5.3 Effects Summary. The No Lake Powell Water Alternative would have no effect on the yellow-billed cuckoo.

4.8.1.6 Greater Sage-grouse

4.8.1.6.1 Construction Effects. No Lake Powell Water Alternative facilities would not be constructed in or near primary greater sage-grouse nesting or foraging habitat. The No Lake Powell Water Alternative would have no direct or indirect effects on the greater sage-grouse.

4.8.1.6.2 Operation and Maintenance Effects. No Lake Powell Water Alternative facilities would not be operated or maintained in greater sage-grouse habitat; operation or maintenance of the No Lake Powell Water Alternative would have no effect on the southwest willow flycatcher.

4.8.1.6.3 Effects Summary. The No Lake Powell Water Alternative would have no effect on the greater sage-grouse.

4.8.1.7 Mohave Desert Tortoise

4.8.1.7.1 Construction Effects. Defined construction footprints are not currently available for the pipelines, reservoirs, RO treatment plant and brine management facilities proposed to be constructed by the WCWCD under the No Lake Powell Water Alternative. It is probable that some or all of these facilities would be constructed in occupied or potential Mohave desert tortoise habitat. Direct and indirect construction effects and mitigation measures would be the same as described in Section 4.4.1.7.1 and would likely adversely affect the Mohave desert tortoise.

4.8.1.7.2 Operation and Maintenance Effects. Operation and maintenance effects of the No Lake Powell Water Alternative would be the same as described in Section 4.4.1.7.2 and would likely adversely affect the Mohave desert tortoise.

4.8.1.7.3 Effects Summary. The No Lake Powell Water Alternative would likely adversely affect the Mohave desert tortoise.

4.8.1.8 Relict Leopard Frog

4.8.1.8.1 Construction Effects. No Lake Powell Water Alternative facilities would not be constructed in or near relict leopard frog habitat or known populations. The No Lake Powell Water Alternative would have no direct or indirect effects on the relict leopard frog.

4.8.1.8.2 Operation and Maintenance Effects. No Lake Powell Water Alternative facilities would not be operated or maintained in relict leopard frog habitat; operation or maintenance of the No Lake Powell Water Alternative would have no effect on the relict leopard frog.

4.8.1.8.3 Effects Summary. The No Lake Powell Water Alternative would have no effect on the relict leopard frog.

4.8.1.9 Yuma Clapper Rail

4.8.1.9.1 Construction Effects. No Lake Powell Water Alternative facilities would not be constructed in or near Yuma clapper rail nesting or foraging habitat. The No Lake Powell Water Alternative would have no direct or indirect effects on the Yuma clapper rail.

4.8.1.9.2 Operation and Maintenance Effects. No Lake Powell Water Alternative facilities would not be operated or maintained in Yuma clapper rail habitat; operation or maintenance of the No Lake Powell Water Alternative would have no effect on the Yuma clapper rail.

4.8.1.9.3 Effects Summary. The No Lake Powell Water Alternative would have no effect on the Yuma clapper rail.

4.8.1.10 Kanab Ambersnail

4.8.1.10.1 Construction Effects. No Lake Powell Water Alternative facilities would not be constructed in or near Kanab ambersnail habitat or known populations. The No Lake Powell Water Alternative would have no direct or indirect effects on the Kanab ambersnail.

4.8.1.10.2 Operation and Maintenance Effects. No Lake Powell Water Alternative facilities would not be operated or maintained in Kanab ambersnail habitat; operation or maintenance of the No Lake Powell Water Alternative would have no effect on the Kanab ambersnail.

4.8.1.10.3 Effects Summary. The No Lake Powell Water Alternative would have no effect on the Kanab ambersnail.

4.8.2 Special Status Species

4.8.2.1 Construction Impacts

Construction impacts would be related to pipelines, reservoirs, RO plant and brine disposal facility. The footprint of these facilities and potential area of habitat disturbance are not defined at this time. Impacts on all animal classes would be similar to those described in Sections 4.4.2.1.1, 4.4.2.1.2, 4.4.2.1.3 and 4.4.2.1.4. Impacts on tribal wildlife species of cultural concern would be similar to those described in Section 4.4.2.5.1. Impacts would not exceed the significance criteria.

4.8.1.2.2 Operation and Maintenance Impacts

Impacts would be similar to those described in Sections 4.4.2.2.1, 4.4.2.2.2, 4.4.2.2.3 and 4.4.2.2.4. Impacts on tribal wildlife species of cultural concern would be similar to those described in Section 4.4.2.5.2. Impacts would not exceed the significance criteria.

4.9 No Action Alternative

Under the No Action Alternative, the WCWCD, KCWCD and CICWCD would not build new water supply facilities and water needs would be met by water conservation, water reuse and conversion of agricultural water to M&I use.

4.9.1 Threatened, Endangered and Candidate Species

There would be no effects on threatened, endangered and candidate wildlife species or their designated critical habitats.

4.9.2 Wildlife Species of Concern

There would be no impacts on wildlife species of concern, including tribal wildlife species of cultural concern.

Chapter 5

Mitigation and Monitoring

This chapter describes mitigation and monitoring methods to reduce impacts of LPP construction and operation and maintenance on wildlife habitats and wildlife populations. Many of these methods would be incorporated into project “Standard Construction Procedures” (SCPs) and “Standard Operating Procedures” (SOPs) to be used in the field as LPP features and facilities are being constructed, operated and maintained.

5.1 General Mitigation Measures

The following measures would be applicable to all LPP project features and facilities during construction, operation and maintenance.

- To the extent feasible, construction, operation and maintenance activities on or around important wildlife habitat should be scheduled to avoid the periods of greatest use, including breeding and rearing periods. Clearing of pipeline corridors should be performed outside of the avian nesting season (generally March through July) to prevent nesting in the study area during construction.
- Vehicular speeds should be limited to safe speeds in construction zones or on construction access roads during construction, operation and maintenance of LPP project facilities.
- The area directly ahead of trenching equipment should be monitored for small animals and, to the extent possible, any small animals observed should be gently hazed from the construction corridor by a qualified wildlife biologist, or captured and relocated to a safe distance from the construction corridor by a qualified wildlife biologist.
- Trenches should be covered, backfilled, or barriers and working lights placed along open trenches at the completion of each day and no more than 1,000 feet of trench should be open at any one location. All open trenches should be constructed with escape ramps for trapped wildlife to exit the trenches.
- Open trenches should be observed before beginning construction activities daily and small animals in the trenches should be captured if possible by a qualified wildlife biologist and relocated before active construction commences.
- Impacts on wildlife resources can be avoided and minimized by following environmental hygiene and standard hazardous materials control procedures, restoration and erosion control procedures, air pollution prevention procedures surface water protection procedures, noxious weed control procedures and wetland protection procedures.
- Construction sites should be kept free of trash, garbage and food refuse.
- New and upgraded overhead power transmission lines should be constructed to meet the most current edition of *Suggested Practices for Raptor Protection on Power Lines* (EEI 2006).

- Access roads and transmission line roads should have access controlled to only authorized personnel who have been instructed in environmental hygiene to limit trash and toxic substances along the roads.

5.2 California Condor

In addition to the general mitigation procedures described in Section 5.1, the following measures should be employed to protect California condors:

5.2.1 Construction

- Protocols for managing any condors that approach construction sites should be coordinated with the condor re-introduction team and no action should be taken if a condor visits a construction area until the team has been contacted and either approves an action or a team member comes to the site to personally manage the situation.

5.2.2 Operation and Maintenance

Mitigation would be the same as described in Sections 5.1 and 5.2.1.

5.3 Mexican Spotted Owl

In addition to the general mitigation procedures described in Section 5.1, the following measures should be employed to protect Mexican spotted owls:

5.3.1 Construction

- Construction of the Cedar Valley Pipeline in the segment within Mexican spotted owl critical habitat Unit CP-11 should be scheduled for outside of the owl's breeding and fledging period, generally January through April.
- "Perch discouragers" should be incorporated into new transmission lines in Mexican spotted owl critical habitat to restrict perching or nesting by competitive or predator raptors species, such as great horned owls.

5.3.2 Operation and Maintenance

- Periodic maintenance of the Cedar Valley Pipeline in the segment within Mexican spotted owl critical habitat Unit CP-11 should be scheduled outside of the owl's breeding and fledging period, generally January through April.

5.4 Southwest Willow Flycatcher

In addition to the general mitigation procedures described in Section 5.1, the following measures should be employed to protect southwest willow flycatchers:

5.4.1 Construction

- Clearing of the pipeline construction corridor through riparian areas near the Paria River should be scheduled outside of the willow flycatcher breeding and nesting season, generally May through July.

5.4.2 Operation and Maintenance

- Occasional maintenance of the pipeline at the Paria River should be scheduled outside of the willow flycatcher breeding and nesting season, generally May through July.

5.5 Utah Prairie Dog

In addition to the general mitigation procedures described in Section 5.1, the following measures should be employed to protect Utah prairie dogs:

5.5.1 Construction

- The contractor should comply with Utah Division of Wildlife Resources Administrative Rules R657-19-6, R657-19-7 and R657-19-8, Utah Prairie Dog Provisions.
- The Utah Division of Water Resources should establish a Utah prairie dog Habitat Conservation Plan (HCP) in cooperation with the Utah Division of Wildlife Resources, the U.S. Fish and Wildlife Services, the Central Iron County Water Conservancy District and the Iron County Commission to mitigate for lethal and non-lethal take arising from construction of the Cedar Valley Pipeline and associated transmission lines.
- “Perch discouragers” should be incorporated into new transmission lines constructed within one-half mile of Utah prairie dog colonies to restrict predation by raptors.
- A qualified prairie dog biologist should be employed to monitor construction through Utah prairie dog habitat and ensure compliance with administrative rules and conservation plans.

5.5.2 Operation and Maintenance

- The Utah Division of Water Resources should establish a Utah prairie dog Habitat Conservation Plan (HCP) in cooperation with the Utah Division of Wildlife Resources, the U.S. Fish and Wildlife Services, the Central Iron County Water Conservancy District and the Iron County Commission to mitigate for lethal and non-lethal take arising from operation and maintenance of the Cedar Valley Pipeline and associated transmission lines.

5.6 Yellow-billed Cuckoo

No other measures would be required because yellow-billed cuckoos were not identified during field surveys and the only potential habitat surveyed did not meet the primary nesting criteria for cuckoos.

5.7 Greater Sage Grouse

No other measures would be required because primary breeding and wintering habitat does not occur in the LPP project study area.

5.8 Mohave Desert Tortoise

5.8.1 Construction

In addition to the general mitigation procedures described in Section 5.1, the following measures should be employed to protect the Mohave desert tortoise:

- All construction personnel should be given basic instruction on Mohave desert tortoise protected status, habitat requirements, distribution, expectation of encounter in the Project area and procedures to follow if a desert tortoise is encountered.
- A qualified desert tortoise biologist should be employed and on site for all construction activities in potential Mohave desert tortoise habitat, whether previously surveyed as occupied or unoccupied. The Project desert tortoise biologist should monitor all construction activities and Project personnel should be instructed to take no action regarding any Mohave desert tortoise encountered in or near construction zones until authorized to do so by the tortoise biologist.
- All vehicles and construction equipment should be inspected on all sides and underneath before moving the vehicle or equipment. If a Mohave desert tortoise is under or adjacent to any vehicle or equipment, that vehicle or equipment should not be operated or moved until the tortoise biologist has personally determined how to move the vehicle or equipment safely or has relocated the tortoise to safety.
- Other detailed procedures for protecting desert tortoises are contained in the “Guidelines For Handling Desert Tortoises – Mojave Population And Their Eggs” (USFWS 2009) and a copy of this document should be available at each construction site in potential Mohave desert tortoise habitat.
- Equipment and supplies for safely handling, rehydrating, transporting and excluding Mohave desert tortoises, as specified in the “Guidelines” should be available at each construction site in potential Mohave desert tortoise habitat.
- Coordination with Red Cliffs Desert Reserve administration should be performed before any construction in or near designated Take Areas 7 (Hurricane) and 10 (South Hurricane).

5.8.2 Operation and Maintenance

- All operating and maintenance personnel should be given basic instruction on Mohave desert tortoise protected status, habitat requirements, distribution, expectation of encounter in the Project area and procedures to follow if a desert tortoise is encountered.
- A *Mohave Desert Tortoise Protection Plan* for operating and maintaining Project facilities and features should be developed in consultation with a qualified desert tortoise biologist. The plan should incorporate vehicular safety measures described in Section 5.8.1 and appropriate measures from the “Guidelines.” The plan should be available at all facilities in potential Mohave desert tortoise habitat. Equipment and supplies for safely handling, rehydrating, transporting and excluding Mohave desert tortoises, as specified in the “Guidelines” should be available at each operating site in potential Mohave desert tortoise habitat.
- All operation and maintenance personnel should be provided with contact information for appropriate resources (project biologist, USFWS biologist, Red Cliffs Preserve biologist, etc.) that can be contacted in case of encounters with Mohave desert tortoises during operation and maintenance activities.

5.9 Relict Leopard Frog

No other measures would be required because no Project features or facilities would be constructed, operated or maintained in relict leopard frog habitat or near any known population.

5.10 Yuma Clapper Rail

No other measures would be required because no Project features or facilities would be constructed, operated or maintained in Yuma clapper rail habitat or near any known population.

5.11 Kanab Ambersnail

No other measures would be required because no Project features or facilities would be constructed, operated or maintained in Kanab ambersnail habitat or near any known population.

Chapter 6

Unavoidable Adverse Effects and Impacts

This chapter summarizes unavoidable adverse effects on threatened, endangered and candidate wildlife species and unavoidable adverse impacts on wildlife species of concern and tribal wildlife species of cultural concern. Unavoidable adverse effects or impacts may or may not be significant.

6.1 South Alternative

6.1.1 Construction

6.1.1.1 Threatened, Endangered and Candidate Species

- Incidental take of any listed or candidate species would be an unavoidable adverse effect.
- Permanent disturbance of 8.7 acres of Mexican spotted owl designated critical habitat in Unit CP-11 would be an unavoidable adverse effect.
- Permanent disturbance of Utah prairie dog habitat would be an unavoidable adverse effect.
- Permanent disturbance of Mohave desert tortoise habitat would be an unavoidable adverse effect.

6.1.1.2 Wildlife Species of Concern

- Permanent disturbance of 1,486.8 acres of potential wildlife habitat would be an unavoidable adverse impact.
- Incidental substantial disturbance of any wildlife species of concern or tribal wildlife species of cultural concern would be an unavoidable adverse impact.

6.1.2 Operation and Maintenance

6.1.2.1 Threatened, Endangered and Candidate Species

- Incidental take of any listed or candidate species would be an unavoidable adverse effect.

6.1.2.2 Wildlife Species of Concern

- Incidental substantial disturbance of any wildlife species of concern or tribal wildlife species of cultural concern would be an unavoidable adverse impact.

6.2 Existing Highway Alternative

6.2.1 Construction

6.2.1.1 Threatened, Endangered and Candidate Species

Unavoidable adverse effects would be the same as described in Section 6.1.1.1.

6.2.1.2 Wildlife Species of Concern

Unavoidable adverse impacts would be generally the same as described in Section 6.1.1.1; there would be 426 fewer acres of permanent wildlife habitat disturbance.

6.2.2 Operation and Maintenance

6.2.2.1 Threatened, Endangered and Candidate Species

Unavoidable adverse effects would be the same as described in Section 6.1.1.2

6.1.2.2 Wildlife Species of Concern

Unavoidable adverse impacts would be the same as described in Section 6.1.2.2.

6.3 Southeast Corner Alternative

6.3.1 Construction

6.3.1.1 Threatened, Endangered and Candidate Species

Unavoidable adverse effects would be the same as described in Section 6.1.1.1.

6.3.1.2 Wildlife Species of Concern

Unavoidable adverse impacts would be generally the same as described in Section 6.1.1.2; there would be 68 fewer acres of permanent wildlife habitat disturbance.

6.3.2 Operation and Maintenance

6.3.2.1 Threatened, Endangered and Candidate Species

Unavoidable adverse effects would be the same as described in Section 6.1.1.2.

6.3.2.2 Wildlife Species of Concern

Unavoidable adverse impacts would be the same as described in Section 6.1.2.2.

6.4 Transmission Line Alternatives

6.4.1 Construction

6.4.1.1 Threatened, Endangered and Candidate Species

- Incidental take of any listed or candidate species would be an unavoidable adverse effect.
- Permanent disturbance of Utah prairie dog habitat would be an unavoidable adverse effect.
- Permanent disturbance of Mohave desert tortoise habitat would be an unavoidable adverse effect.

6.4.1.2 Wildlife Species of Concern

- Incidental substantial disturbance of any wildlife species of concern or tribal wildlife species of cultural concern would be an unavoidable adverse impact.
- Permanent disturbance of 141 to 170 acres of potential wildlife habitat would be an unavoidable adverse impact.

6.4.2 Operation and Maintenance

6.4.2.1 Threatened, Endangered and Candidate Species

Unavoidable adverse effects would be the same as described in Section 6.1.2.1.

6.4.2.2 Wildlife Species of Concern

Unavoidable adverse impacts would be the same as described in Section 6.1.2.2.

6.5 No Lake Powell Water Alternative

6.5.1 Construction

6.5.1.1 Threatened, Endangered and Candidate Species

- Incidental take of any listed or candidate species would be an unavoidable adverse effect.
- Permanent disturbance of Mohave desert tortoise habitat would be an unavoidable adverse effect.

6.5.1.2 Wildlife Species of Concern

- Incidental substantial disturbance of any wildlife species of concern or tribal wildlife species of cultural concern would be an unavoidable adverse impact.
- Permanent disturbance of potential wildlife habitat would be an unavoidable adverse impact.

6.1.2 Operation and Maintenance

6.5.2.1 Threatened, Endangered and Candidate Species

- Incidental take of any listed or candidate species would be an unavoidable adverse effect.
- Permanent disturbance of potential wildlife habitat would be an unavoidable adverse effect.

6.5.2.2 Wildlife Species of Concern

- Incidental substantial disturbance of any wildlife species of concern or tribal wildlife species of cultural concern would be an unavoidable adverse impact.
- Permanent disturbance of potential habitat would be an unavoidable adverse impact.

6.6 No Action Alternative

No water transmission, power generation or transmission facilities or features would be constructed, operated or maintained under the No Action Alternative. There would be no unavoidable adverse impacts.

Chapter 7

Cumulative Effects and Impacts

This chapter analyzes cumulative effects and impacts that may occur from construction and operation of the proposed LPP project when combined with the impacts of other past, present, and reasonably foreseeable future actions and projects after all proposed mitigation measures have been implemented. Only those resources with the potential to cause cumulative effects and impacts are analyzed in this chapter.

7.1 South Alternative

(The cumulative impacts analysis is pending completion for identification of inter-related projects that would cause cumulative impacts with the LPP project.)

7.2 Existing Highway Alternative

(The cumulative impacts analysis is pending completion for identification of inter-related projects that would cause cumulative impacts with the LPP project.)

7.3 Southeast Corner Alternative

(The cumulative impacts analysis is pending completion for identification of inter-related projects that would cause cumulative impacts with the LPP project.)

7.4 Transmission Line Alternatives

(The cumulative impacts analysis is pending completion for identification of inter-related projects that would cause cumulative impacts with the LPP project.)

7.5 No Lake Powell Water Alternative

(The cumulative impacts analysis is pending completion for identification of inter-related projects that would cause cumulative impacts with the LPP project.)

7.6 No Action Alternative

The No Action Alternative would have no cumulative impacts.

References Cited

A note on Internet portal reference sites: several cited references are Internet portals at which species information is available by search from the portal web cover page. These sites include the U.S. Fish and Wildlife Service (USFWS) Critical Habitat Portal, Nature Serve, Birds of North America Online, the Utah Conservation Data Center (UCDC), the Arizona Natural Heritage Program Data Management System (AHDMS), Partners in Flight (PIF) and Birds of Utah. In an effort to shorten the References Cited list, these portals are cited as the web cover page rather than the individual species page within the portal. The cited information for each species is easily retrieved by the search function at the portal web cover page.

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Glossary

Adverse. Negative.

Affect, affected. To change or be changed by an action arising from the proposed project.

Afterbay. A body of water or reservoir of a hydroelectric power plant at the outlet of the turbines.

Alternative. One of a number of proposals for completion of the project.

Ambient. The normal conditions in an area.

Avian. Pertaining to birds.

Baseline. Existing conditions before any action by the proposed project.

Booster Pump Station. A pump facility to move water in a pipeline to a higher elevation.

Candidate. A species deemed eligible for listing under the Endangered Species Act, but precluded from action by higher priority species and/or insufficient resources.

Carrion. Dead animal bodies or carcasses.

Chaparral. An area of dense growth of shrubs or small trees.

Chelation. A method of removing heavy metals from the body.

Clutch. The group of eggs laid at one time or in a short period of time, usually a few days.

Contiguous. Areas immediately adjoining each other, having a common boundary.

Corridor. A linear area containing the construction of a pipeline or transmission line, including temporary and permanent roads and staging areas for materials or equipment.

Critical habitat. Critical habitat consists of the specific areas within the geographical area occupied by a species at the time it is listed on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection.

Decibel (dBA). A-weighted decibel, a standard measure of the loudness of sound.

Dispersal. Movement of wildlife species out of one habitat area into another habitat area.

Diurnal. Referring to wildlife species that are active during daylight hours.

Disjunct population(s). Populations that are not connected spatially and do not interbreed.

Ecological Region. A large area that has the same general physical and vegetation characteristics.

Ecotone. The boundary between two vegetation communities where the differing vegetation composition and structure create a new zone of habitat that may be utilized by wildlife.

Effect. Result or consequence of a proposed action.

Endangered species. Any species which is in danger of extinction throughout all or a significant portion of its range.

Ephemerals. Plants with a short life cycle of leaf production and flowering, usually six to eight weeks.

Fledge, fledgling. The process by which a young bird acquires flight feathers, a young bird that has acquired flight feathers and is ready to leave the nest.

Footprint. The area occupied by a constructed project feature or facility (building, substation, transmission tower base).

Foraging. The act of seeking food.

Forb. An herbaceous plant that is not a grass.

Forebay. A body of water or reservoir of a hydroelectric power plant at the inlet of the turbines.

Friable. Soil that is soft and crumbly, not dense and compacted.

Geographic Information Systems (GIS). A computer mapping system used to depict and analyze spatial data.

Global Positioning System (GPS). A system of recording spatial data using multiple satellites; the data is often depicted in a GIS

Growing Season. A defined annual period of plant growth at any location, based on days without frost.

Habitat. The environment normally utilized by an animal or group of animals.

Hawking. Taking prey in flight from the air.

Herbaceous. Low-growing vegetation with no permanent leaves or stems, leaves and stems die at the end of the growing season each year.

Hibernacula. Hibernation or wintering sites for bats.

Hydro Station. A facility to generate electrical power from turbines powered by water.

Hygiene. A practice of cleanliness.

Impact. A change in environmental conditions caused by construction or operation of project features and facilities. An impact may be either positive or negative.

Interspecific. Between different species.

Intraspecific. Within a species.

Kilovolt (kV). A unit of electromotive force equal to 1,000 volts.

Lek. A breeding ground for birds of the grouse family.

Listing, listed. Referring to species declared as threatened, endangered or candidate under the Endangered Species Act of 1973, as amended.

Migration, migratory. Movement of a group of animals from one habitat to another, usually seasonally; a species that migrates.

Mitigate, Mitigation. To cause to become less severe or harmful; to reduce, avoid, minimize or rectify impacts on resources.

Monitor. To systematically and repeatedly measure conditions in order to track changes.

Mortality. The sum or number of deaths in a given time in a given population.

Mosaic (of vegetation). A varying pattern of plant communities along a construction corridor, both laterally and longitudinally.

Municipal & Industrial. Water supplies used for domestic and commercial use, as opposed to agricultural irrigation.

Nexus. A connection or relationship.

Nocturnal. Referring to wildlife species that are active during nighttime hours.

Penstock. A pipeline that conveys water to an electrical generating station (hydro station).

Permanent (Impacts). A change in environmental conditions that would never revert to baseline conditions.

Perennial. Referring to plants that live for more than two years, as opposed to annuals (one year) or biennials (two year) plants.

Piscivore. Fish-eating.

Plant Community. A group of plant species that are usually found together in a geographic area.

Potrero. A pasture of grassy area.

Precocial. Birds that are feathered at hatching and able to run and forage within minutes of hatching.

Raptor. Bird species that consume animal flesh as the major part of their diet.

Regulating Tank. A tank constructed for the purpose of regulating water pressures and volumes within an acceptable range over a particular segment of a pipeline or penstock.

Revegetation. Replanting or reseeding of disturbed land.

Reverse Osmosis. A process of water purification using membranes to separate unwanted substances from the source water.

Right-of-way. A linear area containing a road or power line, including shoulders and open land on each side of the road or power line that is legally restricted in use for the road or utilities.

Riparian. Vegetation adjacent to a permanent or intermittent waterway.

Savannah. A grass land with limited tree growth.

Staging Area. An area used to store construction materials or equipment.

Standard Construction Procedures (SCPs). Measures followed during construction of a project to avoid, minimize or rectify adverse impacts on natural resources.

Steppe. A grass land.

Substation. An electrical facility where voltage is stepped up or down.

Substrate. The natural habitat or ground surface an organism grows on or utilizes.

Take. A definition under the Endangered Species Act of actions that would harass, harm, pursue, hunt, wound, shoot, trap, capture, or collect any species listed under the Act.

Temporary (Impact). A change in environmental conditions that will revert to baseline conditions.

Threatened species. Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Topography. The contour of land, changes in elevation of the ground surface.

Transmission Line. Large electrical lines that conduct high voltage current over long distances.

Tribal. Referring to any Native American nation or tribe.

Universal Transverse Mercator (UTM). A system of measurement of the earth's surface based on meters north-south and east-west of defined reference points and lines.

Vertebrate. Any animal with a bony vertebral column.

Vestigial. An organ of reduced size or function because of evolution.

Water Conveyance. A pipeline for moving water from one location to another.

Wildlife. Animal species normally existing in the wild that are not domesticated

Xeric. Dry, arid.

Acronyms and Abbreviations

Acronym or Abbreviation	Meaning
AFGD	Arizona Fish and Game Department
AFGD-WSC	Arizona Fish and Game Department Wildlife Species of Concern
Alt.	Alternative
AZ	Arizona
AZNHP	Arizona Natural History Program
BA	Biological Assessment
BCC	U.S. Fish and Wildlife Service Bird of Conservation Concern
BEPA	Bald Eagle Protection Act
BLM	Bureau of Land Management
BLM-S	Bureau of Land Management Sensitive Species
BO	Biological Opinion
BPS	Booster Pump Station
C	Candidate
CBPS	Cedar Booster Pump Station
CICWCD	Central Iron County Water Conservancy District
Commission	Federal Energy Regulatory Commission
CS	Species with Conservation Agreements
CVP	Cedar Valley Pipeline
dBA	A-Weighted Decibel
E	Endangered
EEI	Edison Electrical Institute
ESA	Endangered Species Act
EXPN	Experimental, Non-essential
FEIS	Final Environmental Impact Statement
FR	Federal Register
FWS	[U.S.] Fish and Wildlife Service
GAP	Gap analysis of species distribution
GCNRA	Glen Canyon National Recreation Area
GIS	Geographic Information System
GOPB	Governor's Office of Planning and Budget
gpcd	Gallons per Capita per Day
GPS	Global Positioning System
GSENM	Grand Staircase-Escalante National Monument
HCP	Habitat Conservation Plan
HS	Hydro Generating Station
KCWCD	Kane County Water Conservancy District
kV	Kilovolts
LPP	Lake Powell Pipeline
LPPP	Lake Powell Pipeline Project
LSD	Logan Simpson Design
M&I	Municipal and Industrial
MBTA	Migratory Bird Treaty Act
MDT	Mohave desert tortoise
mph	miles per hour
MSL	Mean Sea Level
MZ	Management Zone
NPS	National Park Service Species of Concern

Acronym or Abbreviation	Meaning
ORV	Off-road Vehicle
PIF	Partners in Flight
RO	Reverse Osmosis
ROW	Right-of-way
SCP	Standard Construction Procedures
SITLA	Utah School and Institutional Trust Lands Administration
SOP	Standard Operating Procedure
SR	State Route
T	Threatened
TDS	Total Dissolved Solids
TES	Threatened, Endangered Species
U.S.	United States
UCDC	Utah Conservation Data Center
UDWLR	Utah Division of Wildlife Resources
UDWR	Utah Division of Water Resources
UPD	Utah prairie dog
USC	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service
USPC	Utah species of concern
UT	Utah
UTM	Universal Transverse Mercator
WCWCD	Washington County Water Conservancy District

List of Preparers

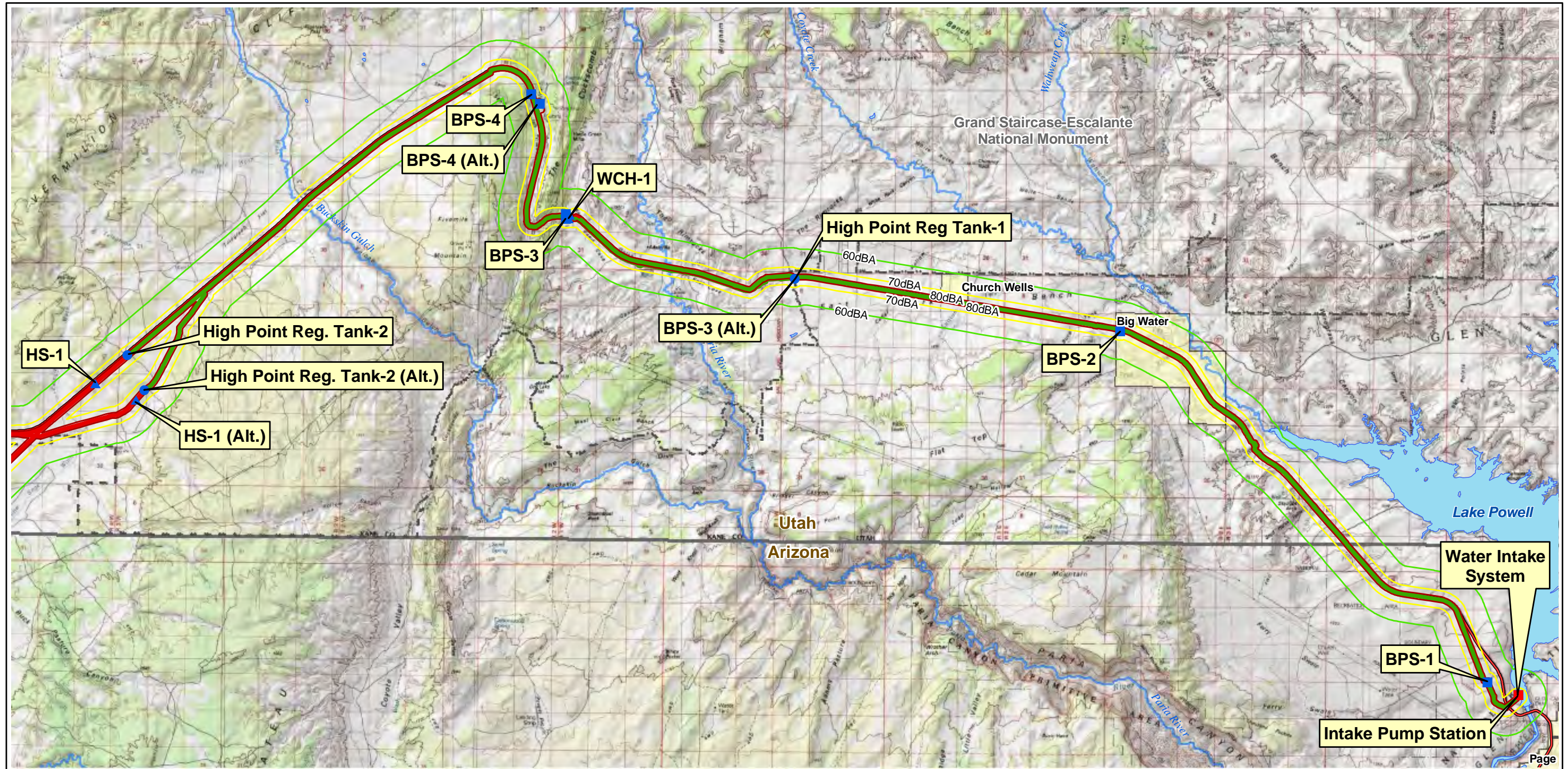
Name	Degree(s)	Role
Strobilus Environmental, L.L.C.		
Stephen Cox	M.S. – Environmental Biology M.B.A. – Business Administration M.D. – Medicine B.A. - Arts	Special Status Wildlife Species
MWH Americas, Inc.		
Brian Liming MWH, Inc.	M.S. – Civil and Environmental Engineering B.S. – Ecosystems Analysis	Report QA/QC Review
Eric Zimmerman MWH, Inc.	M.A. – Geography (Cartography) B.A. – Geography B.A. – Mass Communication	GIS Analysis
Diana Barnes MWH, Inc.	A.A. – Secretarial Science	Word Processing and Formatting

Lake Powell Pipeline

Special Status Wildlife Species Study Report

Appendix A

Noise Buffer Zone Maps



Noise Contour dBA Levels

80 dBA
70 dBA
60 dBA

- Project Intake Pump Station
- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- Water Conveyance System
- Hydro System - South Alignment Alternative

- Interstate
- US Highway
- ST Highway
- Hwy
- Major Road
- Lakes & Reservoirs
- Major Rivers & Streams
- National Park/Monument
- GSENM Boundary
- State Boundaries
- Cities

FERC Project Number:
12966-001
BLM Serial Numbers:
AZA-34941
UTU-85472

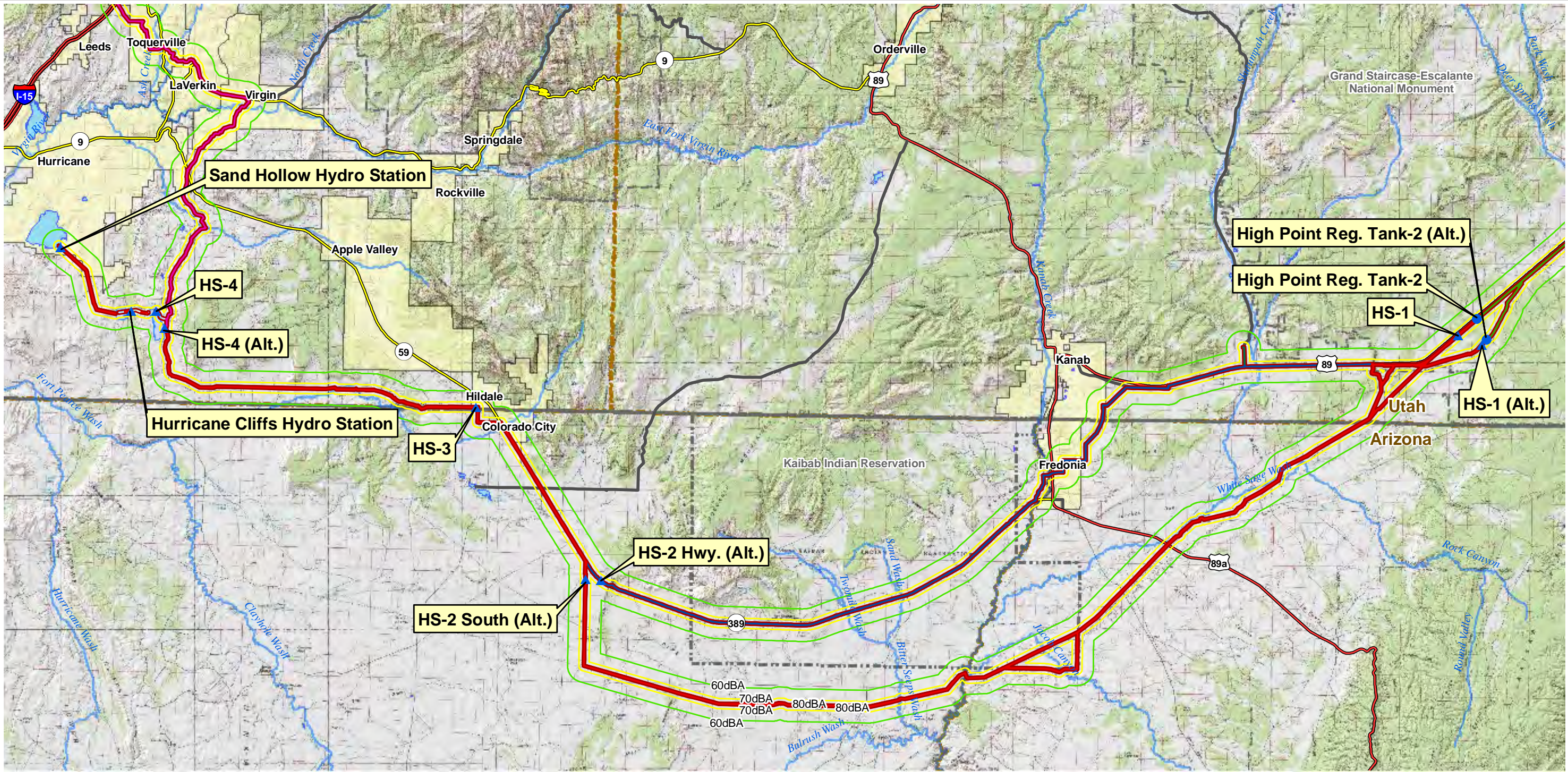
0 0.5 1 2 3 4 Miles

Lake Powell Pipeline Project

Spatial Reference: UTM Zone 12N, NAD-83

UDWR Figure A-1 MWH

Lake Powell Pipeline
Water Conveyance System
Noise Buffer Zone Map



Noise Contour dBA Levels

- 80 dBA
- 70 dBA
- 60 dBA

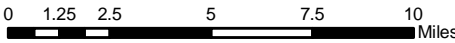
- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- Water Conveyance System
- Hydro System - South Alignment Alternative

- Hurricane Cliffs Forebay/Afterbay
- Lakes & Reservoirs
- Major Rivers & Streams

- Interstate
- US Highway
- ST Highway
- Hwy
- Major Road

- National Park/Monument
- GSENM Boundary
- Tribal Lands
- State Boundaries
- Cities
- County Boundaries

FERC Project Number:
12966-001
BLM Serial Numbers:
AZA-34941
UTU-85472

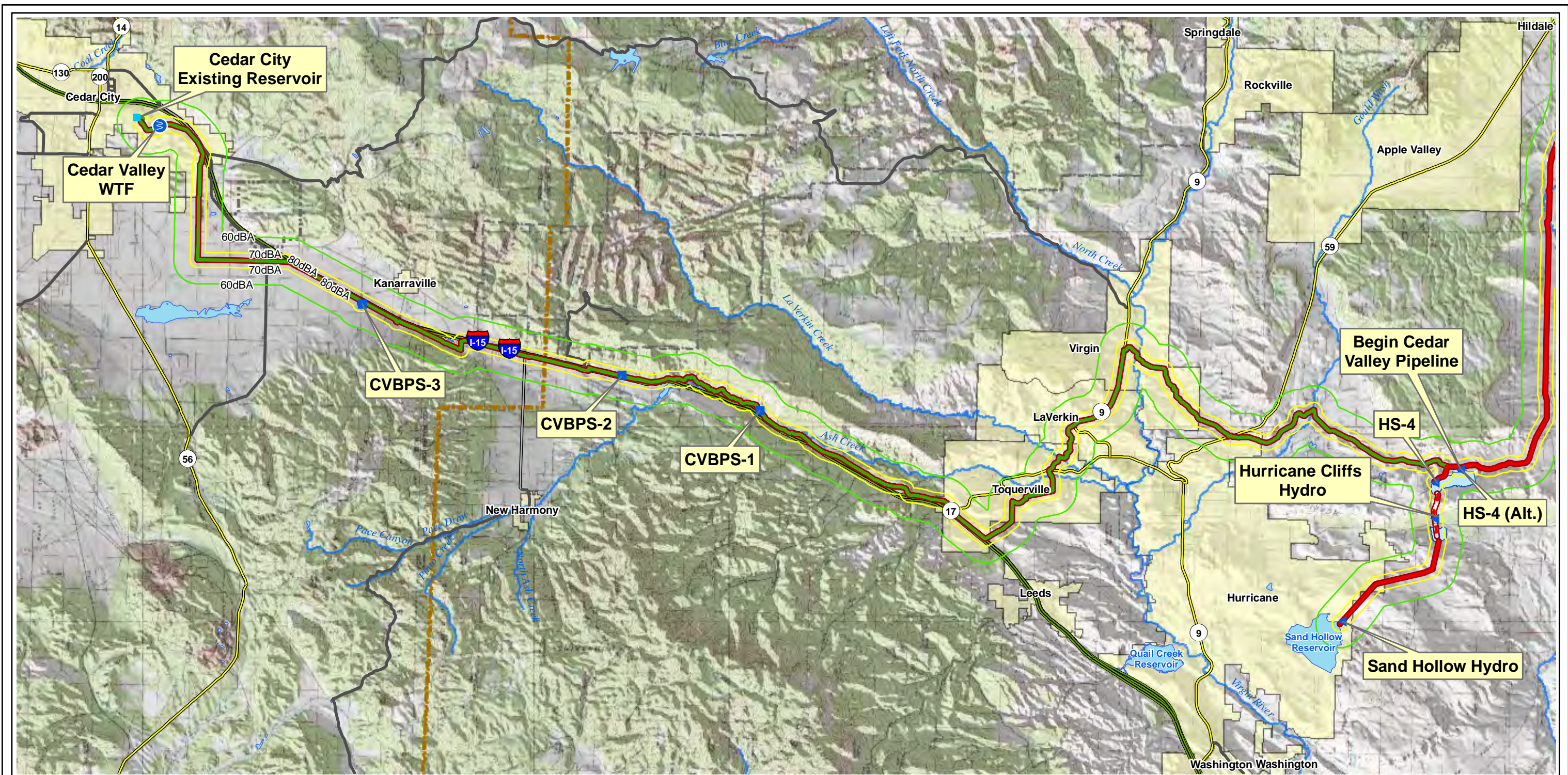


Lake Powell Pipeline Project

Spatial Reference: UTM Zone 12N, NAD-83

UDWR Figure A-2 MWH

**Lake Powell Pipeline
Hydro System
Noise Buffer Zone Map**



Noise Contour dBA Levels 80 dBA 70 dBA 60 dBA	Water Treatment Facility Project Pump Station Project Hydro Station Hydro System Lake Powell Pipeline Hurricane Cliffs Pressure Tunnel Cedar Valley Pipeline	Interstate US Highway ST Highway Hwy Major Road Hurricane Cliffs Forebay/Afterbay Lakes & Reservoirs Major Rivers & Streams National Park/Monument County Boundaries Cities Tribal Lands	FERC Project Number: 12966-001 BLM Serial Numbers: AZA-34941 UTU-85472	 0 1.25 2.5 5 7.5 10 Miles	Lake Powell Pipeline Project Spatial Reference: UTM Zone 12N, NAD-83 Figure A-3 Cedar Valley Pipeline System Noise Buffer Zone Map
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