Lake Powell Pipeline

Draft Study Report 9 Recreation Resources

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Recreation Resources Study Report Executive Summary

ES-1 Introduction

This study report describes the results and findings of an analysis to evaluate recreation resources along the proposed alternative alignments of the Lake Powell Pipeline (LPP) Project, No Lake Powell Water Alternative, and No Action Alternative. The purpose of the analysis, as defined in the 2008 Recreation Resources Study Plan prepared for the Federal Energy Regulatory Commission (Commission), was to identify potential impacts from construction and operations of the alternatives, and identify and document measures to mitigate impacts from the LPP Project as necessary.

ES-2 Methodology

The analysis of impacts on recreation resources follows methodology identified and described in the Preliminary Application Document, Scoping Document No. 1 and the revised Recreation Resources Study Plan filed with the Commission.

ES-3 Key Results of the Recreation Resources Impact Analyses

Construction and operation activities associated with the LPP project alternatives would occur on federal, state, and private lands in Utah's Kane, Washington, and Iron counties, and in Arizona's Coconino and Mohave counties. The potential construction and operation impacts on recreation areas, facilities and use within these management areas are described below.

ES-3.1 LPP Project Alternative

Most of the direct construction impacts on recreation resources along the alternative alignments of the LPP Project would involve temporary delay or closure of access to recreation areas, facilities, trails, sites, overlooks, highway pull-outs and visitor centers during pipeline, penstock and transmission line construction at specific crossings along rights-of-way. Construction of the Hurricane Cliffs afterbay reservoir within the Sand Mountain Special Recreation Management Area (SRMA) under all of the LPP action alternatives would result in permanent loss of 200 acres of designated recreation land, which would be a significant impact on recreation resources in the SRMA. The reservoir could not be used for public recreation because of rapidly fluctuating water levels. Most of the indirect impacts on recreation resources would involve temporary noise, air pollutants, traffic congestion and changes in views during the pipeline, penstock, transmission line, and facility construction along the rights-of-way.

Most of the LPP operations would have no direct impacts on recreation resources. Operation of the Hurricane Cliffs afterbay reservoir within the Sand Mountain SRMA would be a significant impact on recreation resources because the reservoir area could not be used for any recreational activities. Indirect impacts of the LPP operations would involve occasional traffic congestion for recreational vehicles near LPP facilities and changed views could be experienced by recreation users in the vicinity of LPP facilities and reservoirs.

ES-3.2 No Lake Powell Water Alternative

The No Lake Powell Water Alternative would have direct impacts on about 800 acres of the Sand Mountain Special Recreation Management Area from the construction and operation of the reverse osmosis water treatment plant, Warner Valley Dam and Reservoir, and brine evaporation ponds. This would be a significant impact because the affected area would be closed to recreational activities.

ES-3.3 No Action Alternative

The No Action Alternative would not have any construction or operation impacts on recreation resources within the LPP study area.

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 Recreation Resources 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 (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 Indian Reservation. The Existing Highway Alternative follows an Arizona state highway through the Kaibab Indian Reservation. The Southeast Corner Alternative follows the Navajo-McCullough Transmission Line corridor through the southeast corner of the Kaibab 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 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 (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 inline 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 Congressionallydesignated 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 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 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 (Alt.) 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 penstock conveying 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 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 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 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.

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 substation. This 69 kV transmission line 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 substation. This 69 kV transmission line alternative alignment would bifurcate from an existing transmission line and run west, then 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 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 3ring 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 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).





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 97.4 gallons per capita per day (gpcd) (UDWR 2009). This culinary water use rate is reduced by 30.5 gpcd to account for water conservation attained from 2005 through 2020, yielding 66.9 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 10.3 gpcd, or an 89.4 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 inmigration.

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 identified for this assessment through the scoping process:

- Impacts in tourist use areas
- Impacts on locations of perceived aesthetic value
- Impacts on reservoirs, waterways and surrounding area (e.g. Lake Powell and Sand Hollow Reservoir)
- Impacts on National recreation areas, parks, and monuments (e.g. GCNRA, Pipe Springs National Monument, GSENM, and Zion National Park)

1.6 Impact Topics

The following impact topics are analyzed in this study report:

• Existing and proposed recreation areas, facilities, and use

Information concerning these impact topics was obtained from available literature, management plans, Geographic Information Systems (GIS data layers), field reconnaissance, and meetings with resource agency personnel.

Chapter 2 Methodology

2.1 Introduction

This chapter presents the goals and objectives of the recreation resources study, identifies the recreation resources study area and summarizes the methodology for assessing impacts of the action alternatives and no action alternative on recreation resources in the Lake Powell Pipeline project (LPP) study area.

2.2 Goals and Objectives

The goals of the recreation resources study are to identify and determine recreation resource impacts resulting from LPP project construction and operation, as described in the Revised Recreation Resources Study Plan (UBWR 2008). Information regarding potential recreation resource impacts will guide decisions in the LPP project design, construction, operation, and maintenance, so that impacts on recreation resources may be minimized and/or mitigated.

Specific recreation-related objectives include determination of how the LPP project construction, operation, and maintenance would affect local, regional, and statewide recreation resources along the alternative alignments. The primary objectives of the recreation resource study are as follows:

- Identify recreation resources within the study area
- Address recreation resource management goals of the State of Utah, State of Arizona, National Park Service (NPS), Bureau of Land Management (BLM), and other agencies (such as county, city, or tribal entities with jurisdiction over recreation resources)
- Identify potential impacts from Project construction on Utah and Arizona State Comprehensive Outdoor Recreation Plans (SCORPs), NPS plans, and BLM plans within and surrounding the study area
- Evaluate cumulative recreation resource impacts from LPP project construction and operation
- Evaluate whether recreation resource impacts from the LPP project along the alternative alignments can be mitigated by design, construction, or operations and maintenance practices

2.3 Recreation Resources Study Area

The recreation resources study area includes the entire length of the alternative alignments, locations of ancillary facilities, and construction work areas. Particular attention was focused on the following features located within one mile of proposed LPP project facilities:

- Tourist use areas
- Locations of perceived aesthetic value
- Reservoirs, waterways and surrounding areas (e.g. Lake Powell and Sand Hollow Reservoir)
- National recreation areas, parks, and monuments (e.g. GCNRA, Pipe Springs National Monument, GSENM, and Zion National Park)

The recreation resources study area (Figure 2-1) includes nearly 388,000 acres of public and private land. Approximately 27 percent (105,701 acres) of the study area is privately owned, while the remainder is managed by federal and state agencies.

2.4 Recreation Resources Study Methods

Management goals for the LPP project include avoiding, reducing, and mitigating conflicts with existing recreational resources. Resource management goals for agencies with jurisdiction over lands to be affected by the LPP project are defined in existing management plans. Consultation with federal, state, and local agencies, as well as Tribes and private landowners, further identified resource management goals for lands associated with the LPP project.

Existing recreation resource data and information relevant to the LPP project was reviewed in current published reports, studies, and literature. This literature review included information from established agency sources such as the NPS, BLM, State of Utah, State of Arizona, and other sources.

Field reconnaissance was performed in late August and early September 2009. This work included a physical inspection of existing recreation facilities, travel routes, and use patterns in the LPP project recreation study area.

Data collected from the literature review and field reconnaissance were compiled and evaluated. These evaluations were used to determine the recreation resource impacts generated from LPP project construction activities and operations.

Impacts on recreation were analyzed for each of the LPP project alternatives, relative to the affected environment (baseline conditions) for the impact topics listed in Chapter 1 of this study report. The amount of change between the baseline conditions and conditions under the alternatives was documented as impact.

Determination of impacts involved identifying the existing and proposed recreation areas, facilities, and use. Changes in these resources were evaluated using best professional judgment and past experience.

Cumulative impacts are defined as those impacts result from the incremental impacts upon a resource from interaction of two or more individual actions. For the purposes of this study report, the cumulative impact analysis was based on the identification of future projects that may occur in and around the study area. These projects were examined to determine if they would impact recreation resources in the study area when combined with impacts of the LPP project.

Mitigation measures were developed to offset potential significant impacts, whenever possible. These measures were based on applicable state and federal statutes and regulations, past experience, and best professional judgment to satisfy a legal and/or public interest requirement.



Chapter 3 Affected Environment

3.1 Introduction

This chapter describes the affected environment of recreation resources for the Lake Powell Pipeline (LPP) project. It identifies recreation areas, facilities and use on lands managed by federal, state and local government agencies and on privately owned land. It reviews identified recreation needs documented in federal land management plans and State Comprehensive Outdoor Recreation Plans (SCORP) for Utah and Arizona.

3.2 Recreation Areas, Facilities and Use

Construction and operation activities associated with the LPP project would occur on federal, state, and private lands in Utah's Kane, Washington, and Iron counties, and in Arizona's Coconino and Mohave counties. The following recreation areas and facilities on public, tribal and private lands are located in the recreation resources study area:

- Glen Canyon National Recreation Area
- Vermilion Cliffs National Monument
- Grand Staircase Escalante National Monument (GSENM)
- BLM Kanab Field Office
- BLM Arizona Strip Field Office
- Kaibab-Paiute Indian Reservation
- Pipe Springs National Monument
- BLM St. George Field Office
- Sand Hollow State Park (Utah)
- Quail Creek State Park (Utah)
- Dixie National Forest
- Zion National Park
- Private Recreational Facilities

3.2.1 Glen Canyon National Recreation Area

The Glen Canyon National Recreation Area (GCNRA) encompasses more than 1.2 million acres, stretching from Lees Ferry in northern Arizona to the Orange Cliffs in southern Utah (NPS, 2009). Approximately four percent (16,687 acres) of the recreation resources study area lies within the GCNRA.

The National Park Service (NPS) administers, operates and maintains the GCNRA, which offers waterbased and backcountry recreational opportunities, and includes scenic vistas, unique geologic features, and a vast panorama of human history. The GCNRA includes Glen Canyon Dam and Lake Powell, the second largest manmade lake in North America (see Recreation Study Area Photographs, Appendix A).

The GCNRA was established to provide for the management of public outdoor recreation use and the enjoyment of Lake Powell and adjacent lands in Arizona and Utah. In 2003, there were 1.9 million

visitors and more than 1.2 million overnight stays. Recreation uses range from those activities that require solitude and an undisturbed setting to those that require mechanical means, such as power boating and four-wheel driving. The most popular forms of recreation are water-based activities such as boating, fishing, water skiing, and boat camping. The City of Page, Arizona, provides a significant portion of the infrastructure required to support these recreational activities in the form lodging, restaurants, and permanent housing for people employed by these businesses and the lake concessionaires.

According to NPS policies, the enjoyment of park resources and values by people is part of the fundamental purpose and all park units (NPS, 2007). The NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks, and will maintain within the parks an atmosphere that is open, inviting, and accessible to every segment of society. Further, the NPS will provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in the parks. NPS policies also state that scenic views and visual resources are considered highly valued associated characteristics that the NPS strives to protect.

Tourist traffic to GCNRA is heavier during the summer than during the winter months (NPS, 2007). However, traffic in the vicinity is characterized as light throughout the year, and all roads operate well below their design capacities throughout the year.

GCNRA points of interest in the vicinity of the LPP project are shown on Figure 3-1. Recreation areas and facilities within the recreation resources study area are described in the following subsections.

3.2.1.1 "Dead Dog" and "Ropes" Recreation Areas

The "Dead Dog" dispersed recreational area and "The Ropes" trail are located south of Glen Canyon Dam and west of the Colorado River. These areas are accessible from US Highway 89 and unpaved roads, just south and west of the dam. These recreational areas are frequented by local OHV enthusiasts (Hughes, pers. comm.). The Ropes area contains a designated, but unmarked camping area.

3.2.1.2 Colorado River Discovery Rafting Tours

Colorado River Discovery offers rafting tours of the Colorado River below Glen Canyon Dam. Half-day float trips are offered annually from March 1 through November 30. Full-day rowing trips were also available in 2009 (CRD, Undated). Rafting trips depart from Page, Arizona, and include a drive through the two-mile-long Glen Canyon Dam access tunnel, a stop to view ancient petroglyphs, and conclude at Lees Ferry. Prices for the trips include a river usage fee.

3.2.1.3 US Highway 89

US Highway 89 serves as a connector between Interstates 17 and 40 to the south, and Interstate 15 to the north and west. The mix of traffic on U.S. Highway 89 includes a substantial portion of heavy trucks, which provide both local services and long-haul transportation of goods. US Highway 89 connects Kanab, Utah, and Page, Arizona, with 72 paved miles. This highway, including the portion located in GCNRA, is designated "Scenic".



3.2.1.4 Carl Hayden Visitor Center

The Carl Hayden Visitor Center is located on Highway 89, on the west side of the Glen Canyon Dam. Attractions at the visitor center include tours of the dam (fee required and security measures in place), exhibits, video shows, and a relief map of the entire Glen Canyon area. The facility is owned and operated by the Bureau of Reclamation, who, in turn, provides space for NPS staff and exhibits (Hughes, pers. comm.). Ranger talks are presented daily on a variety of subjects throughout the year. Ranger programs are presented three times a week from Memorial Day through mid-September, and opportunities for solar telescope viewing are offered outside the visitor center several times a week from April through October. A bookstore and restrooms are located in the Carl Hayden Visitor Center. NPS staff reported visitor numbers of 405,031 at the Carl Hayden Visitor Center for the 2008 calendar year (Sweatland, pers. comm.).

3.2.1.5 Glen Canyon Dam Overlook

The Glen Canyon Dam Overlook, located on Scenic View Drive off of Highway 90, provides a spectacular view of the dam and Colorado River from just downstream. From the paved (asphalt) parking area a 5 to 10 minute walk leads downhill over uneven, sandy, and rocky terrain. There is a handrail halfway down the trail. NPS staff reported visitor numbers of 63,271 at the Glen Canyon Dam Overlook for the 2008 calendar year (Sweatland, pers. comm.). The NPS categorizes this day hike trail as "easy."

3.2.1.6 "Chains" Recreation Area and "Hanging Garden" Trail

East of Glen Canyon Dam and adjacent to the town of Page, Arizona, an unpaved road heading north off of Highway 89 leads to an area known as "The Chains." This area provides scenic views of Lake Powell and the upstream side of the dam. This day-use, publicly accessible area includes a large gravel parking lot, two unisex pit toilets (no water provided), and some signage. No safety fencing currently exists at this location. The Chains area is used by local residents for fishing and swimming (Hughes, pers. comm.). NPS staff reported visitor numbers of 50,597 at the Chains area for the 2008 calendar year (Sweatland, pers. comm.). Lake shore access is possible at the Chains area, depending on the lake elevation. The lake is very deep at this location, and good swimming skills are required. In The Chains area, visitors may take partake in a self-guided tour through slick rock sand formations (NPS, 2009). The NPS categorizes this day hike trail as "easy to moderate."

The Hanging Garden Trail is adjacent to the Chains area. This one mile roundtrip hike leads visitors to the Hanging Gardens area, a "desert oasis on the mesa top high above the Colorado River and Lake Powell." Obscured by Jurassic Navajo sandstone, this seep spring quickly absorbs rainwater, and slowly releases it over time to create a surprisingly lush plant and animal habitat. A free guide is available for the Hanging Garden trail. The trail is poorly signed, and no formal parking area is provided at the trailhead. The NPS categorizes this day hike trail as "easy to moderate" (NPS, 2009).

3.2.1.7 Wahweap Recreation Area

The Wahweap Recreation Area can be reached from US Highway 89 via a south access road (Lakeshore Drive) or via a north access road (Wahweap Drive) (Figure 3-1). These access roads are paved (asphalt). Pay stations are located along both access roads in the vicinity of US Highway 89. Lakeshore Drive receives more use than does Wahweap Drive, as it is located closer to the Town of Page and provides easier access to Phoenix (Hughes, pers. comm.). The Wahweap Recreation Area is heavily developed and heavily used. Facilities at this location include:

- Lake Powell Resort (lodge, restaurant, boat tours, gift shop)
- Boat Rentals and Repairs
- Boat Launches and Marina
- Fuel Pumps and Docks
- Stores, Showers, Laundry Facilities
- Picnic Area
- Campground
- Amphitheater
- Ranger Station
- Fishing, Swimming, and Hiking Areas

NPS staff reported visitor numbers of 1,383,000 at the Wahweap Recreation Area for the 2008 calendar year (Sweatland, pers. comm.).

3.2.1.8 Wahweap Overlook

Located between the north and south Wahweap Recreation Area access road intersections with US Highway 89 is the Wahweap Overlook access road (Figure 3-1). This graveled roadway, which is in fair condition, leads to a large, graveled parking area and high point that offers a 360-degree panorama of the GCNRA. A rustic shelter and bench are provided for visitors, but there is no railing at the viewpoint. Visitors must pack garbage out and keep pets on leashes. NPS staff reported visitor numbers of 36,250 at the Wahweap Overlook for the 2008 calendar year (Sweatland, pers. comm.).

3.2.1.9 Lone Rock Recreation Area

Located along US Highway 89, near the western boundary of the GCNRA (Figure 3-1), is the Lone Rock access road. This paved (asphalt) access road leads northeast to a fee station and then to Lone Rock Recreation Area. The area consists of an informal boat launch and primitive campsites. Four micro-flush toilets, six vault toilets, one wheelchair accessible comfort station, an outdoor (cold water) shower, OHV use area, dump station, potable water (seasonal), and a day use area are provided. No reservations are required. Lone Rock is officially closed to the public during the winter months, but still receives some use (Hughes, pers. comm.). NPS staff reported visitor numbers of 43,241 at the Lone Rock Recreation Area for the 2008 calendar year (Sweatland, pers. comm.).

3.2.2 Vermilion Cliffs National Monument

The Vermilion Cliffs National Monument (VCNM) was established on November 9, 2000, by President Clinton to "protect an array of scientific, biological, geological, hydrological, cultural, and historical objects" (BLM, 2008a). Located in northern Coconino County, Arizona, the VCNM contains 279,566 acres of BLM-administered lands, 13,438 acres of Arizona State Trust lands, and 683 acres of private land. Approximately one percent (4,124 acres) of the recreation resources study area lies in the VCNM.

The VCNM borders the GCNRA, Grand Staircase-Escalante National Monument, the BLM's Kanab (Utah) Field Office, and the BLM's Arizona Strip Field Office (Figure 3-2). Located in a remote section of northern Arizona, accessible from US highways 89 and 89A via House Rock Valley Road, this area includes spectacular geologic formations.

The scenic beauty of the VCNM's Paria Canyon and Coyote Buttes is known internationally. The colorful and winding corridors, narrow constricted gorges, and multilayered displays of vibrantly colored



sandstone attract hikers and photographers. There are no designated trails and permits are required. Other recreational opportunities and features in the Paria Canyon/Coyote Buttes include wildlife viewing, geologic viewing, a cultural/historic site, dispersed camping, and an interpretive site.

3.2.3 Paria Canyon – Vermilion Cliffs Wilderness

Located in Utah, just north of the VCNM and just southeast of the Grand Staircase-Escalante National Monument is the Paria Canyon – Vermilion Cliffs Wilderness Area (PCVCW). This area is accessible from US highways 89 and 89A via House Rock Valley Road. The BLM's Kanab Field Office manages this designated wilderness for the use and enjoyment of visitors in a manner that leaves the area unimpaired for future use and enjoyment as wilderness (BLM, 2008b). BLM staff reported dispersed visitor use numbers of 40,256 for the VCNM between October 1, 2008, and September 30, 3009 (Kiel, pers. comm.).

3.2.4 Grand Staircase-Escalante National Monument

The Grand Staircase-Escalante National Monument (GSENM), located in southern Utah, encompasses the spectacular Grand Staircase of cliffs and terraces, stretches across the rugged Kaiparowits Plateau, and includes the Escalante River Canyons. Managed by the BLM, the GSENM includes approximately 1,870,000 acres of public lands and 15,000 acres of private lands, with 68 percent of the national monument located in Kane County and 32 percent in Garfield County (BLM, 2000). The GSENM is partially bordered on the east by the GCNRA and on the south by the PCVCWA and VCNM (Figure 3-3). Approximately 14 percent (54,000 acres) of the recreation resources study area lies in the GSENM.

Visitor development in the GSENM is limited to minor facilities, such as interpretive kiosks and pullouts located in small areas of the monument's periphery (BLM, 2000). The major BLM visitor centers are located outside of the GSENM's boarders, in surrounding towns. Additionally, motorized access is limited in the monument, and designated road networks are mostly unimproved. The GSENM does not contain any designated wilderness areas (Stewart, pers. comm.).

The monument's vast, rugged, and remote landscape offers exposed geologic formations, and a record of Late Cretaceous paleontological life, with significant ancient dinosaurs, fish, and mammal fossils. Protected in its primitive, frontier state and valued as an outdoor laboratory, scientist from throughout the United States and around the world converge on the monument annually.

3.2.4.1 Guided Trips

For visitors preferring guided trips, the GSENM has over 50 authorized providers offering services for: auto tours, hiking, backpacking, bicycling, horseback riding, ranch recreation, hunting, fishing, and therapeutic recreation (KCOTFC, 2005). Geology and natural history tours, photography classes, environmental education, and pack trips are also available.

3.2.4.2 Cockscomb Wilderness Study Area

The Cockscomb Wilderness Study Area (WSA), located on the north side of US Highway 89 between the Cockscomb on the west and the GSENM east boundary (Figure 3-4), provides opportunities for primitive recreation. Visitors can explore the Paria River by foot or horseback (BLM, Undated). The aesthetic Cockscomb, a jagged sandstone ridge, affords visitors with a challenging and scenic trek to the top, which can be accomplished by rock scrambling or by following a side canyon to the summit.





Sightseeing, cultural site investigation, photography, nature study, day hiking, outdoor art work, bird watching, and other pursuits are possible recreation endeavors within the Cockscomb WSA.

3.2.4.3 Wahweap Wilderness Study Area

The Wahweap WSA is located north of US Highway 89 and east of the Cockscomb WSA (Figure 3-5). This WSA, which includes the White Rocks "Point of Interest" can be reached via US Highway 89 at Church Wells and a series of rugged OHV roads.

3.2.4.4 US Highway 89 Special Recreation Management Area

The U.S. Highway 89 corridor is a Special Recreation Management Area (SRMA) where more intense recreation management is needed because it is a focal point for visitation. The Highway 89 SRMA encompasses the highway corridor within the GSENM, and includes features such as the old Pahreah Townsite, BLM Paria Contact Station, White House Campground, and White House Trail (see Section 3.2.4.8). Recreation opportunities along the Highway 89 SRMA include scenic driving, day-use hiking, camping, road and mountain bicycling, scenic and interpretive viewing.

SRMAs are "well-defined land units that support a combination of natural features that make them attractive and management for interrelated recreation opportunities on a sustained basis" (BLM, 1999). In SMRAs, emphasis is placed on maintaining specific features or recreation opportunities that make the SMRA unique or particularly desirable to recreationalists and other members of the public.

3.2.4.5 Historic Trails

The general alignments of several historic trails (Old Spanish Trail, Honeymoon Trail, Dominguez – Escalante Trail) are believed to follow the US Highway 89 right-of-way through the GSENM.

The Old Spanish National Historic Trail links Santa Fe and Los Angeles, traveling 2,700 miles across six states (BLM, Undated 1). Designated by Congress as a National Historic Trail in 2002, it is jointly administered by the BLM and NPS in partnership with other federal, state, and local government entities, as well as private landowners that manage or own lands along the trail route. Only a few remnant traces of the rugged trail remain. Recreational opportunities along the trail include camping, hiking, and wildlife viewing; many points of historical or cultural interest can be found along the trail as well. Vehicles must remain on existing roads. The trail does not currently have any visitor facilities or services.

The Honeymoon Train is located between St. George, Utah, and Lee's Ferry, Arizona. This historic wagon route was used for several years by young married couples from Arizona seeking a "temple" marriage in what was the only Mormon temple west of the Mississippi River, hence its interesting name. The trail is 138 miles one-way, with elevations ranging from 3,000 feet to 5,000 feet mean sea level (MSL). Permitted uses on the trail include hiking, equestrian use, and some vehicle use. The trail can be used in any season, as long as it is dry. The BLM categorizes the Honeymoon Trail as easy-to-moderate, and notes that, while much of the trail is still visible, it is only sporadically marked (BLM, 2002).

Fathers Francisco Dominguez and Silvestre Escalante, Spanish priests, traveled on foot from Sante Fe, New Mexico, through western Colorado, to Spanish Fork, Utah, and then down through northern Arizona and back to Sante Fe in 1776. While the exact route of the Dominguez-Escalante Trail in the Recreation Study Area is unknown, the priests may have followed the present day US Highway 89 right-of-way.



3.2.4.6 Paria Canyons and Plateaus Special Recreation Management Area

The Paria Canyons and Plateaus SRMA includes lands south of the US Highway 89 SRMA and east of House Rock Valley Road. Recreational activities available in the Paria Canyons and Plateaus SRMA include canyoneering, equestrian use, backpacking, hiking, hunting, and scenic touring (BLM, 2000). Access to this area is available primarily from House Rock Valley Road and the Paria Contact Station turnoff. In the 2000 GSENM Management Plan, the BLM stated that this SRMA will be managed to provide continued primitive, uncrowded, and remote recreational experiences. While overall social encounters will remain comparatively low, the Paria Canyons and Plateaus SRMA will be managed to create opportunities for a range of social encounters.

3.2.4.7 Big Water Visitor Center

The BLM's Big Water Visitor Center is located east of the GSENM, on the south side of US Highway 89 near the Town of Big Water (Figure 3-3). Constructed in 2002, this modern structure includes indoor and outdoor paleontology exhibits, interpretive signage, outdoor amphitheater, restrooms with running water, water fountains, a bookstore, and a sizable, lighted parking lot that can accommodate RVs and includes two universally accessible parking spaces. The center is open daily.

Staff at the Big Water Visitor Center stated that approximately 70 to 80 percent of the visitors received are foreigners (Beasley, pers. comm.). Staff members also estimated that 100 to 200 patrons visit the center daily, and reported receiving over 35,000 visitors in 2008. It is anticipated that in the near future the BLM will install picnic tables at the Big Water Visitor Center, and construct a loop road to allow large RVs and buses to turn-around.

3.2.4.8 Paria Contact Station, White House Campground, and White House Trail

The BLM's Paria Contact Station is located along the south side of US Highway 89, west of Church Wells and east of the Cockscomb (Figure 3-3). The rustic contact station includes a gravel entrance road and parking lot, outhouses, trash and recycling containers, and a water pump. Interpretive signage is also provided near the entryway. The Paria Contact Station is the trailhead for the White House Trail, and includes directional signage to the White House Campground. Information regarding the PCVCWA, which is accessible from the White House Trail, is available at the contact center, along with hiking and overnight permits.

To access the White House Campground and Trail (Figure 3-3), visitors use the turnoff for Paria Contact Station and a two mile unpaved road that crosses the Paria River bed. Tucked up against a rock bluff to the north, the White House Campground consists of a gravel cul-de-sac with: five walk-in tent sites; two vault toilets; picnic tables, grills and fire pits; interpretive signage; and a self-pay station. No water, telephones, or trash collection is available at the campground. The White House Campground is open year-round. While there is no campground host, the area is patrolled. The White House Campground and Trail receive high use during the spring and throughout the fall, with some use in the summer (Stewart, pers. comm.). BLM staff reported use numbers of 881 and 1,396 for the White House Campground and trailhead, respectively, between October 1, 2008, and September 30, 2009 (Kiel, pers. comm.).

3.2.4.9 Toadstools Trailhead

The Toadstools Trailhead, located on the north side of US Highway 89, just east of the Paria Contact Station (Figure 3-3). The graveled trailhead provides parking for about ten vehicles and several interpretive signs. The 1.5 mile roundtrip Toadstools Trail receives heavy use. BLM staff describes the

trail as being "kid and family-friendly", stating that the trail can still be hiked during inclement weather (Stewart, pers. comm.). The sandy trail, which has a change in elevation gain of only 100 feet, leads hikers through colorful "hoodoos" and unusual rock formations. BLM staff reported use numbers of 5,232 for the Toadstools Trailhead between October 1, 2008, and September 30, 2009 (Kiel, pers. comm.).

3.2.4.10 Catstair Canyon Trailhead

The Catstair Canyon Trailhead is located on the south side of US Highway 89, at the hairpin turn just east of the Cockscomb (Figure 3-3). Sight lines for vehicles entering and exiting the trailhead are very poor. No signage is present on US Highway 89, even though the trailhead is identified on GSENM maps. Gravel parking for a few vehicles is available and the area receives occasional visitation (Stewart, pers. comm.). This trailhead provides access to the same area as does House Rock Valley Road (see Section 3.2.4.11).

3.2.4.11 House Rock Valley Road

House Rock Valley Road intersects with US Highway 89 just west of the Cockscomb (Figure 3-3) and runs south for 30 miles until it intersects with Highway 89A in Arizona. Driving time is approximately one hour. When dry, this dirt and gravel road is usually passable for high clearance two-wheel-drive vehicles, but is not recommended for RVs or travel trailers. Visitors from around the world use this road to access Coyote Butte (Kiel, pers. comm. 2). This road, which receives heavy use and is in fair condition, provides access to Five Mile Mountain Road (which intersects with Highway 89 west of the Paria Point of Interest and is popular with OHVs), Buckskin Gulch Trailhead, Wire Pass Trailhead, and Stateline Campground. The majority of recreational activities take place to the east (Stewart, pers. comm.) of the road in the PCVCWA and VCNM. BLM staff reported use numbers of 463 and 5,361 for the Buckskin Gulch and Wire Pass trailheads between October 1, 2008, and September 30, 2009 (Kiel, pers. comm.).

3.2.4.12 Paria Movie Set and Pahreah Townsite Point of Interest

The Paria Movie Set and Pahreah Townsite historical marker is located along the north side of US Highway 89 just west of the Cockscomb (Figure 3-3). An unpaved parking area allows visitors to view the historical marker and read several interpretive signs. From Highway 89 an unpaved road leads about five miles to the movie set and townsite. This site is day-use only; a toilet and picnic area is located at the site but camping is prohibited. The last two to three miles of the dirt road are narrow, steep, and winding. It is passable with most normal-to-high clearance vehicles, except in wet weather. The Paria River bed in this vicinity is a closed to vehicles, but can be experienced on foot or horseback.

The Paria Movie Set was previously located at this site as well. The original Paria Movie Set was torn down, and replaced with a replica (Stewart, pers. comm.). The replica movie set was burned-down by vandals in 2006.

3.2.4.13 Off Highway Vehicle Use and Hunting

To access OHV roads in the southern portion of the GSENM, visitors typically use US Highway 89. BLM staff reported dispersed visitor use numbers of 68,086 for the Highway 89 corridor between October 1, 2008, and September 30, 2009 (Kiel, pers. comm.).

Several OHV roads intersect with US Highway 89 west of the Cockscomb. These roads, which are popular with recreational OHV users year round and with rifle/muzzleloader deer hunters in the fall, lead

north and south (to Buckskin Mountain) from Highway 89. This area is part of the Paunsaugunt hunting unit, well known for trophy-sized mule deer. Popular roads include Five Mile Mountain, 580, 721, 720, and 717.

3.2.4.14 Great Western Trail

The Great Western Trail is to be a 4,000-mile, multiple use pathway that crosses BLM and US Forest Service lands in Arizona, Utah, Idaho, Wyoming, and Montana. Portions of the trail have been designated, including that portion that crosses US Highway 89 west of the Cockscomb near milepost 45 (Figure 3-3). Although not signed on Highway 89, the trail is signed just off the highway on both the north and south sides. Small, dirt parking areas are provided on both sides of the highway. Beyond the Great Western Trail signage on the south side of Highway 89, there is a gravel pullout/turn-around area with split-rail fencing and a trail sign-in station. From here the trail leads south (Road 730) to the Eagle Sink "Point of Interest". The Great Western Trail in this vicinity is mostly used by motorized vehicles, with some equestrian use (Stewart, pers. comm.).

3.2.4.15 Kanab Visitor Center

The BLM's Kanab Visitor Center is located on the north side of Highway 89, just east of the Town of Kanab and several miles west of the GSENM. The modern center includes ample, asphalt parking with space for cars and trailers, restrooms with running water, and signage. Indoor exhibits provide information regarding the geology, archaeology, and anthropology of the GSENM. Hiking permits, overnight camping permits, and rock collecting permits can be obtained at this visitor center.

Staff at the Kanab Visitor Center commented that the number of visitors received at the center annually had decreased in 2009 from previous years. Approximately 80 to 100 guests would typically visit the center each day in past years, but recently only 40 to 60 visitors are expected per day. The staff estimated that 80 percent of the visitors received at the Kanab Visitor Center are European. Many visitors come to the center seeking permits to the geologic feature in Coyote Buttes known as "The Wave."

3.2.5 BLM – Kanab Field Office

The BLM's Kanab Field Office manages lands located in south-central Utah (Figure 3-6). This area is bordered by: Piute and Wayne counties to the north; Washington County and Zion National Park in the west; Arizona state line (including a boundary with the Kaibab-Paiute Indian Reservation) to the south; and Capitol Reef National Park and GCNRA to the east. A portion of the PCVCWA and GSENM is also under the jurisdiction of the BLM Kanab Field Office. Approximately two percent (8,543 acres) of recreation resources study area lands are managed by the Kanab Field Office.

Those areas of the Kanab Field Office west of the GSENM are used primarily by OHVs, dispersed campers, and wood cutters. Deer hunting is also popular in fall (Christensen, pers. comm.). The general alignments of several historic trails (Honeymoon Trail, Old Spanish Trail, Dominguez – Escalante Trail) are believed to pass through this same area.

3.2.6 BLM - Arizona Strip Field Office

The BLM's Arizona Strip Field Office (ASFO) encompasses roughly 1.98 million acres of land between the VCNM to the east and the Grand Canyon-Parashant National Monument to the west (Figure 3-7). The ASFO also borders the GCNRA and the GSENM. The ASFO is located in both Coconino and Mohave Counties, Arizona, with: 1,679,896 acres of BLM lands, 170,165 acres of Arizona State Trust lands, and





130,962 acres of private lands. The communities of Fredonia and Colorado City, Arizona, are located on enclaves of private lands within the ASFO, with the communities of St. George, Big Water, Hurricane, Hildale, and Kanab, Utah, directly across state line. Since the ASFO includes several communities within the Planning Area that are linked via US 89A, Arizona 389, and Interstate 15, together with large portions of the area being easily accessible via a number of unpaved county roads, it receives a fair amount of recreational use (BLM, 2008c). Approximately 21 percent (81,240 acres) of the recreation resources study area is managed by the ASFO.

The ASFO attracts visitors interested in wildlife hunting and viewing opportunities. The region has long been known for its trophy-size mule deer, as well as populations of pronghorn antelope, coyotes, Kaibab squirrel, quail, dove, rabbits, waterfowl, and the seldom seen mountain lion. Bighorn sheep are also seen in portions of the ASFO. In contrast, many of the public lands in the region are near to and thus readily accessible from communities, making community interface lands extremely important for day-use recreation and organized group activities (BLM, 2008c).

Probably the most popular activities in the region involve some form of OHV driving for pleasure. Exploring or sightseeing constitutes the activity of choice for many visitors and can involve various modes of transportation, such as sports-utility vehicle, equestrian, small aircraft, walking, OHV, hiking, motorcycle, bicycle, sedan, or motor home. Other popular activities include visiting cultural sites, bird watching, viewing wildflowers, camping, hiking, backpacking, climbing, and seasonal whitewater boating. Flying radio-controlled aircraft, rock crawling, parasailing, and geocaching are also growing in popularity.

The majority of lands in the ASFO are essentially a transition between the two extremes of urban and wilderness settings. These transitional lands offer a moderate to high degree of challenge and risk for visitors seeking outdoor adventures of many sorts. Opportunities for the public to enjoy a wide variety of motorized, mechanized, and nonmotorized recreation activities are very good because of the ample supply of unpaved roads, primitive roads, trails, and a handful of backcountry airstrips. These lands contain a mix of trailheads (ranging from well developed with facilities to backcountry airstrips), information/safety signs, and rudimentary recreation facilities that provide modest, setting-appropriate convenience for visitors. The near-urban public lands tend to be subjected to the greatest variety of simultaneous visitor use in the most confined space. While challenge and risk are typically not as important as in more remote settings, these lands can be important for competitive and challenge events. Many of the primary routes provide de facto "backcountry byway" opportunities, as no official backcountry byway designations exist.

3.2.6.1 Sand Hills Special Recreation Management Area and Uplands Recreation Management Zone

The BLM ASFO has identified several SRMAs within the recreation resources study area. These areas have a distinct primary recreation-tourism market (the targeted visitors and where they come from), as well as a corresponding and distinguishing recreation management strategy. Within each SRMA, one or more potential Recreation Management Zones (RMZs) were identified, with each zone providing a particular recreation niche within the larger targeted recreation-tourism market strategy.

The Sand Hills SRMA and Uplands RMZ are located at the east end of the recreation resources study area. These areas, which overlap with the VCNM, are adjacent to the GCNRA. Approximately 8,500 acres of the Sand Hills SRMA and Uplands RMA are managed by the ASFO (Figures 3-8 and 3-9).





3.2.6.2 Fredonia Special Recreation Management Area and Associated Recreation Management Zones

The Fredonia SRMA (14,969 acres), Shinarump Cliffs RMZ (3,965 acres), Badlands RMZ (5,151 acres), and Fredonia Rural Park RMZ (5,853 acres) are located east of the Town of Fredonia (Figures 3-8 and 3-9).

The primary strategy for the Fredonia SRMA is to target a demonstrated community recreation-tourism market demand from primarily local communities (dependent on public lands recreation and/or related tourism use, growth, and/or development), as well as some regional visitors, for motorized/mechanized/non-mechanized exploring, managed target shooting, fitness activities, sightseeing, equestrian, hiking, competitive and organized events, viewing and appreciating natural landscapes and cultural sites. This demand is supported by the area's distinctive landscape and its close proximity to the communities of Fredonia, AZ and Kanab, Utah; local recreation-tourism visitors value these public lands as their own 'back-yard' recreation settings (BLM, 2008c).

The Badlands RMZ is managed for self-directed, primitive, adventure, challenge, exploration in a natural setting close to town. The Shinarump Cliffs RMZ is managed for close-to-home, self-directed motorized/mechanized adventure for scenic, natural, and historic appreciation. The Fredonia Rural Park RMZ is managed for quick, easy access from town to sustainable day-use adventure, challenge, exercise, social, and outdoor recreation (BLM, 2008c).

3.2.6.3 Cottonwood Point Wilderness

The Cottonwood Point Wilderness is part of the impressive Navajo Sandstone plateau overlooking the Arizona Strip to the south. The 1,000-foot multicolored Vermilion Cliffs, wooded canyons, craggy pinnacles, and alcoves dominate the landscape and are visible from scenic State Highway 389. The wilderness is contiguous to the southern end of the BLM's Canaan Mountain WSA in Utah (St. George Field Office, see Section 3.2.9) which has been recommended for wilderness designation. The wilderness is adjacent to the small communities of Colorado City, Arizona, and Hildale, Utah, and the rural settlement of Cane Beds. Urban sights and sounds are readily noticeable from much of the wilderness. The exterior wilderness boundary encompasses various parcels of private lands, primarily around the southern periphery of Lyon Point.

3.2.6.4 Fredonia Welcome Center

Located on Highway 89A, north of its intersection with Highway 389 is the Fredonia Welcome Center. This development, which is in good condition, includes a lighted parking lot with 20 parking spaces, four trailer spaces, four shaded picnic tables, restrooms, interpretive signage, a pet exercise area, an outdoor exhibit including a historic log cabin (built circa 1930), and a shop.

3.2.6.5 Historic Trails

The general alignments of several historic trails (Honeymoon Trail, Old Spanish Trail, Dominguez – Escalante Trail) are believed to pass through the ASFO portion of the recreation resources study area. Additionally, portions of the Great Western Trail are located in this area.

3.2.6.6 Fredonia – Vermilion Cliffs Scenic Drive

Fredonia is a western point of departure for the Highway 89 and Highway 89A loop (BLM, 2009), which has been designated "Scenic". This loop proceeds east on Highway 89A from Fredonia through wide landscapes of rolling sage plains that slowly rise to the approach of the Kaibab Plateau, or west to the Kaibab Monocline. To the north, the GSENM can be seen rising to elevations of over 11,000 feet above MSL. The loop circles the massive Paria Plateau and northern Kaibab Plateau Uplift. These routes continue through the Kaibab Plateau, Marble Canyon, Glen Canyon, and the Cockscomb.

3.2.6.7 Vermilion Cliffs Highways Scenic Drive

The Vermilion Cliffs Highways Scenic Drive encompasses parts of Interstate 15; Utah State Highways 9 and 59; Arizona State Highway 389; and US Highways 89 and 89A (BLM, 2009). The Vermilion Cliffs Highways is a project involving partnerships between 40 public and private entities, which provide a total of 21 interpretive sites and scenic overlooks along 277 miles of state highways in northern Arizona and southern Utah. These highways traverse some of the most scenic landforms in the western U.S. In many cases the highways are also historic transportation routes, used for centuries by succeeding waves of humanity in the region.

The best time for traveling along the Vermilion Cliffs Highways is between May and October (BLM, 2009). The roads may not be passable in winter months. Scenic overlooks from the Vermilion Cliffs Highways Scenic Drive include: Highway 59; pullout viewing Dixie Resource Area; Highway 389; pullout viewing Arizona Strip (see Section 3.2.6.8); Highway 89A; LeFevre Overlook; House Rock Valley Overlook; Highway 89; Antelope Pass Scenic Overlook; Navajo Scenic Overlook; and Shinarump Cliffs.

3.2.6.8 Arizona Strip Pull-Off

The Arizona Strip Pull-off is located on the west side of Arizona Highway 389 near milepost 9. The graveled pull-off is capable of accommodating about 20 cars, and includes interpretive signage on the Vermilion Cliffs and Honeymoon Trail.

3.2.7 Kaibab – Paiute Indian Reservation

The Kaibab-Paiute Indian Reservation encompasses more than 120,000 acres of plateau and desert grassland in northern Arizona, just southwest of Fredonia. Arizona Highway 389, which has been designated "Scenic", bisects the Reservation. Pipe Spring National Monument (described below) is adjacent to Highway 389 and surrounded by the Reservation. The Kaibab Band of Paiute Indians offers interpretive programs and leads tours of ancient rock art sites. Kaibab band members work as seasonal rangers and help tell the Pipe Spring story from the Paiute point of view. Seasonal hunting and fishing is available to the general public by permit. Public travel on the Reservation is limited to the existing country roads (Moccasin and Mt. Trumball/Toroweap). Travel elsewhere requires a permit and/or guide services. Approximately nine percent (33,561 acres) of the recreation resources study area lies on the Kaibab-Paiute Indian Reservation.

The Kaibab Band of Paiute Indians tribal headquarters is located along Highway 389, adjacent to Pipe Spring National Monument.

3.2.7.1 Kaibab-Paiute Tribe Campground and RV Park

The Kaibab-Paiute Tribe Campground and RV Park is located off of Highway 389, on Moccasin Road in the Pipe Spring National Monument. The 47 unit campground is open from April through October. Operated on a first-come-first serve basis, the campground includes amenities such as: potable water, vault restrooms, showers, grills, picnic tables, and fire rings. No utility hook-ups or waste disposal is available, and ATV use is prohibited. The Kaibab-Paiute Tribe Campground and RV Park charges user fees.

3.2.7.2 Trails

The general alignments of several historic trails (Old Spanish Trail, Honeymoon Trail, Dominguez – Escalante Trail) are believed to pass through the Kaibab-Paiute Indian Reservation.

Visitors to the Kaibab-Paiute Indian Reservation can hike the Heart (or Mu'uputs) Canyon Trail for a fee, using a guide arranged in advance. This trail is located several miles north of Highway 389.

3.2.8 Pipe Spring National Monument

Surrounded by the Kaibab-Paiute Indian Reservation and located just north of Arizona Highway 389, the Pipe Spring National Monument is a historic Mormon settlement that is part of the National Park system. Designated as a national monument since 1923, Pipe Spring commemorates western pioneer settlement and American Indian-pioneer interactions on the frontier. Living history in the monument depicts how an early Mormon settlement looked and worked in the 1800s. Approximately 40 acres of the recreation resources study area is on land administered and managed by the Pipe Spring National Monument.

The Monument is a day-use park that includes a visitor center, bookstore, museum, ranch building and grounds (including corrals, an orchard, a seasonal garden, and cabins), the Winsor Castle fort, and a one-half mile loop known as Ridge Trail. The ranch and buildings are open daily and tours are offered at the historic fort every 30 minutes. In the summer, rangers also give 'living history' demonstrations (KCOTFC, 2005). Scenic views of the Arizona Strip can be observed along the Ridge Trail. Approximately 55,000 people visit Pipe Spring National Monument annually.

3.2.9 BLM – St. George Field Office

The 629,000 acres of public lands administered by the BLM's St. George Field Office (SGFO) lie almost entirely within Washington County, Utah (Figure 3-10). Situated in the southwestern corner of Utah, the area lies astride the transition between three major physiographic provinces including the Colorado Plateau, the Great Basin, and the Mojave Desert. This unique blend of geologic landforms creates a wealth of varying landscapes, open vistas, and spectacular scenery that is recognized in national and international sectors. Interstate 15 provides the primary north-south access through the St. George Field Office. Utah highways 9 and 59, which have been designated "Scenic", provide the primary east-west access. Zion National Park and the Pine Valley Mountains of the Dixie National Forest define the eastern and northern boundaries of the St. George Filed Office. To the west lie the desert valleys and mountains of Nevada, while the broad, undeveloped expanses and rugged topography of the Arizona Strip lie immediately to the south (BLM, 1999). Approximately 10 percent (38,746 acres) of the Recreation Study Area is managed by the SGFO.

In its 1999 *St. George Field Office Record of Decision and Resource Management Plan*, the BLM stated that its objective for recreation management was to "...provide an array of quality recreation experiences



within the agency's capability logical recreation niche to meet the reasonable needs and expectations of local residents and visitors from outside the area" (BLM, 1999). In its plan, the BLM also asserted that public lands in Washington County would generally remain open (excepts as otherwise prescribed) to most forms of outdoor recreation including, but not limited to: hiking, touring, camping, hunting, picnicking, sightseeing, rock hounding, mountain biking, equestrian use, swimming, fishing, rafting/kayaking, rock climbing, target shooting, and various forms of motorized recreation.

3.2.9.1 Off-Highway Vehicle Use

Statewide OHV issues within Utah are addressed in a comprehensive fashion by the Utah Division of Parks and Recreation (UDPR) through the OHV Advisory Council. The approximately 629,000 acres of public land within the administrative boundary of the SGFO are designated as "open to OHV use", "open for OHV use on existing or designated roads/trails", or "closed to OHO use". Approximately 14 percent (89, 000 acres) of these lands are open to OHV use; approximately 71 percent (448,000 acres), are open for OHV use on existing or designated roads/trails; and approximately 15 percent (92,000 acres) are closed to OHV use (BLM, 1999).

Public lands in Washington County are, in large part, open to OHV use on existing roads and trails. Several special management areas and watersheds are open on designated roads and trails only. The Sand Mountain SRMA (see Section 3.2.9.2) is open to OHV use without limitation. Portions of the LaVerkin/Black Ridge SRMA and Red Cliffs Desert Reserve (see Sections 3.2.9.6 and 3.2.9.3) are closed to OHV use.

3.2.9.2 Sand Mountain Special Recreation Management Area

The Sand Mountain SRMA encompasses 40,725 acres of public land just to the south and east of St. George, Utah (Figure 3-11). The SRMA is south of the towns of Washington and Hurricane, and immediately adjacent to Sand Hollow State Park (see Section 3.2.10). Primary recreation activities in the Sand Mountain SRMA include: OHV riding, competitive events (such as the OHV Rhino Rally and horseback endurance rides in Warner Valley), horseback riding, scenic driving and viewing, visiting historic and paleontological sites, natural history education, semi-private recreation, undeveloped camping, picnicking, guided tours, and recreation instruction. Approximately 12 percent of the Sand Mountain SRMA (5,057 acres) lies within the recreation resources study area.

The Sand Mountain SRMA is both a local and regional destination (Kiel, pers. comm. 2). Sand Mountain dunes are patrolled for the BLM by Utah State Park law enforcement staff. The area attracts people in early spring and late fall. BLM staff reported use numbers of 5,237 and 19,214 for dispersed use areas and active use areas of the Sand Mountain SRMA, respectively, between October 1, 2008, and September 30, 3009 (Kiel, pers. comm.).

3.2.9.3 Red Cliffs Desert Reserve

Set aside for the protection of desert tortoises and other rare and sensitive plants and animals, the Red Cliffs Desert Reserve includes 62,000 acres of scenic wildlife reserve. The reserve is located both east and west of Interstate 15, between the Town of Leeds on the north and Quail Creek State Park (described below) on the south (Figure 3-12). Approximately one percent (808 acres) of the Red Cliffs Desert Reserve lies within the Recreation Study Area.

The reserve is a popular recreation area as it is immediately adjacent to several growing communities, and provides a scenic red rock backdrop. Recreational opportunities in the reserve include mountain biking,





hiking, horseback riding, wildlife viewing, geologic viewing, dispersed camping, and rock climbing. Within the recreation study area portion of the Red Cliffs Desert Reserve are portions of the Virgin River Trail, Arch Trail, West Cinder Knoll Trail, and East Cinder Knoll Trail (Figure 3-13).

3.2.9.4 Hurricane Cliffs Non-Motorized Trail System

The Hurricane Cliffs Non-Motorized Trail System is located east of the Red Cliffs Desert Reserve and south of Utah Highway 9 (Figure 3-14). The primary access to the trail system is from Utah Highway 59. The trail system traverses 23 miles of the Mojave Desert and is bordered by Gooseberry Mesa to the east, the Virgin River to the north, and Hurricane Cliffs to the west (BLM, Undated 2). This trail system affords visitors spectacular views of the surrounding geographic features. At an elevation of 4,000 feet MSL, scenes include the face of Hurricane Mesa, the spires of Zion National Park, and chasms of the Virgin River and its tributaries.

The Hurricane Cliffs Trail System includes six trails: Jem, Chinatown Wash, Rim, Canal, Gould's Rim, and Gould's. As implied, only non-motorized users are permitted on the trail system. Equestrians are limited to the Chinatown Wash and the Rim Trail, between the Chinatown Wash and the Virgin Dam Trailhead. The Canal Trail, a route that consists of a 1904 historic water canal, is open to hikers only. All trails are managed by the BLM, except the Canal Trail which is managed by the Hurricane City Historical Preservation Association. All trail intersections are signed, and some "reassurance" signs can be found along the trails as well.

Dispersed camping is allowed, but campers are asked to use only those sites where previous camping use is evident. Campfires are permitted, but are generally discouraged. There is no trash collection in the area.

3.2.9.5 Frog Hollow OHV Area

The "Frog Hollow" OHV area is located south of the Goulds Rim and Goulds trails (see Section 3.2.9.4). Primary access to this area, which is very popular with mountain bikers and slow OHV users (Kiel, pers. comm. 2), is from Utah Highway 59 near Hurricane.

3.2.9.6 LaVerkin Creek/Black Ridge Special Recreation Management Area

The LaVerkin Creek/Black Ridge SRMA (Figure 3-11) encompasses 20,180 acres of public land east of Interstate 15, north of the Town of LaVerkin, and south of Zion National Park's (see Section 3.2.13) Kolob Canyons area. Main attractions in the LaVerkin Creek/Black Ridge SMRA include: scenic vistas and landforms, Red Butte, LaVerkin Creek Falls, LaVerkin Creek Trail, LaVerkin Creek Canyon, and Black Ridge Overlook. Primary recreation activities include: stream-based recreation, hiking, sightseeing, picnicking, horseback riding, touring, geologic interpretation, and primitive recreation. Approximately 23 percent (4,554 acres) of the LaVerkin Creek/Black Ridge SRMA lies within the recreation resources study area.

3.2.10 Sand Hollow State Park

Located about 10 miles east of St. George and about 5 miles southwest of Hurricane, the Sand Hollow Reservoir and surrounding lands have been designated one of Utah's newest state park. Warm water fishing and boating opportunities are found here. Patrons also engage in OHV use on the Sand Mountain dunes, as well as RV and tent camping. This 20,000 acre park resides mostly on BLM land, and is one of the most visited destinations in the Utah State Park System (USP, 2009). Approximately seven percent (1,315 acres) of Sand Hollow State Park lies within the recreation resources study area.





The park (Figure 3-15) includes an entry station and large parking lot next to the Sand Hollow Reservoir, along with a modern comfort station. The parking lot and comfort station are well-signed and well-lit, with ample trash facilities. A permit is required for watercraft launches and OHV access to the south and east sides of the reservoir. Sand Mountain is accessible by a tunnel located south of an OHV staging area.

Overnight camping facilities are available for a fee. The Westside Campground offers full hookups (water, sewer, and electric), barbeques, fire pits, tables, and cabanas (UTI, 2009). "Sandpit" is the new OHV accessible campground located along the south shore of the reservoir. The 30 site campground includes six sites with water and electrical hookups and five large group sites. Restrooms and showers are provided. Primitive camping is available along the east and south shores of the reservoir. Up to eight people are allowed per vehicle, per site (USP, 2009). Picnic tables and pit toilets are available, but this area is largely undeveloped.

3.2.11 Quail Creek State Park

Quail Creek State Park and Reservoir, completed in 1985, is located about three miles east of Interstate 15, at the Hurricane exit on State Route 9. This state park is just west of the recreation resources study area.

Recreational opportunities such as year-round camping, picnicking, boating, and trout and bass fishing are available in the park. The main dam is currently being rehabilitated. The maximum depth of Quail Creek Reservoir is 120 feet, so the water is cold enough to sustain stocked rainbow trout, bullhead catfish, and crappie. Largemouth bass, which are also stocked, and bluegill thrive in the warmer, upper layers of the reservoir.

Quail Creek State Park (Figure 3-16) includes a sizeable day use parking area. Three hiking trails (South Dam Trail, Overlook Trail, and Short Trail) begin at this location and OHV trails are in close proximity. Interpretive signage in the parking area shows the geological highlights of Quail Creek State Park and southwestern Utah, storage capacity curves for the reservoir, and information regarding the construction of the reservoir and dams. No fees are required for use of the day use area. A visitor center is currently under construction in the parking lot area. Located along the west shore of the reservoir, Quail Creek Campground includes 23 RV sites with attractive cabanas, modern restrooms, boat launch, fish cleaning station, and two covered group-use pavilions. Fees are required for camping and boat launching.

3.2.12 Dixie National Forest

The Dixie National Forest (DNF) occupies almost two million acres, and stretches for about 170 miles across southern Utah (Figure 3-17). Pursuant to the U.S. Forest Service's multiple-use mandate, the Dixie National Forest is used for timber production, grazing, mining, and recreation.

About 840 acres of the DNF are within the recreation resources study area. These areas are located north of St. George and west of Interstate 15, and include the lower reaches of the Wet Sandy Trail, which provides access to the Pine Valley Mountain Wilderness. No proposed LPP project features or facilities would be sited within the DNF.

3.2.13 Zion National Park

Designated in 1919, Zion National Park is the oldest national park in Utah. With approximately three million visitors annually, Zion is also Utah's most heavily used park. The park is known for its canyons, including The Narrows, which attract canyoneers from around the world. Zion National Park includes






four main sections: Zion Canyon, Kolob Canyons, Kolob Terrace, and Highway 9. Most park facilities are located in the Zion Canyon area (UTI, 2009a). Approximately 970 acres of Zion's Kolob Canyon area lie within the recreation resources study area. No proposed LPPP features or facilities would be sited within or adjacent to Zion National Park.

Zion's Kolob Canyon Visitor Center, located north of St. George and just east of Interstate 15 at exit 40 (Figure 3-18), is open daily. The visitor center includes asphalt parking, outdoor interpretive signage, indoor exhibits, a gift shop, and a restroom. According to NPS staff, about 10 percent of Zion's annual visitors (300,000) enter the park through the Kolob Canyons Visitor Center. Visitors may pay a fee at the visitor center to drive the Kolob Canyons Road. Interpretive signage and pullouts mark points of interest along the road, which ends at Timber Creek Overlook and offers a spectacular view of Kolob Terrace.

3.2.14 Private Recreational Facilities

Several privately owned and operated recreational facilities are located within the recreation resources study area. These facilities are described in the following sections.

3.2.14.1 Amangiri Resort Spa and Villas at Lake Powell

The upscale, 600-acre Amangiri Resort Spa and Villas are located about a mile south of US Highway 89 in Canyon Point, Utah, about three miles from the Arizona border. The resort, which opened in October 2009, is a 25 minute drive from Page, Arizona. Visitors to the resort enjoy scenic views of the GSENM. Architecturally, the resort has been designed to blend into the landscape with natural hues, materials, and textures. Features at the resort include: pavilion, living room, gallery, library, dining room, private dining room, cellar, spa and beauty salon, fitness center, pool, and 34 suites (Amangiri, no date).

3.2.14.2 Paria Outpost Resort

The Paria Outpost Resort is located just south of US Highway 89 and less than a mile west of the GSENM's Paria Contact Station (see Section 3.2.4.8). The resort offers rustic, yet comfortable bed and breakfast accommodations, a restaurant, RV camping in the resort parking lot, and tent camping (Paria Outpost, 2009). Guide and shuttle services are also available. On-site recreational activities include horseback riding, a climbing wall, wading fountain, outdoor volleyball area, and horseshoes.

3.2.14.3 Diamond Ranch Academy

The Diamond Ranch Academy is located on 200 acres near Hurricane, Utah. The academy is reached by turning south from Utah Highway 59 (milepost 19) and traveling south on gravel road for approximately two miles. This road also serves those using the BLM SGFO's Hurricane Cliffs trail system and the Frog Hollow OHV area (see Section 3.2.9.5). Founded in 1999, the Diamond Ranch Academy is a youth residential treatment center for troubled teenagers. Students are enrolled year-round. Recreational facilities at the ranch include fishing ponds, a fitness center, and equine facilities (DRA, 2008).

3.2.14.4 Willowwind RV Park

The Willowind RV Park is located on Utah Highway 9, just west of Hurricane, Utah. Open year-round, the 165-site RV park includes the following amenities for a fee: dumping facilities, flush toilets, full hook-ups, hot and cold running water, restrooms, a clubhouse/library, laundry facilities, picnic tables, cable television and television hook-ups, group sites, phones and phone hook-ups, and tent sites (Willowwind RV Park, 2006).



3.3 Identified Recreation Needs

Recreation needs identified for the areas and facilities described in Section 3.2 are listed in this section, as are recreation trends and needs identified for those portions of Arizona and Utah that lie within the recreation resources study area.

3.3.1 Arizona State Comprehensive Outdoor Recreation Plan

Pursuant to the 1964 Land and Water Conservation Fund Act, Arizona prepared an update to its Statewide Comprehensive Outdoor Recreation Plan (SCORP) in 2008. The purpose of the 2008 SCORP (Arizona State Parks [ASP], 2007) was to encourage greater recreation opportunities for the public. Arizona's SCORP provides, among other information, county profiles detailing existing and needed outdoor recreation opportunities. Relevant information regarding the State, Coconino County, and Mohave County is discussed in Sections 3.3.1.1 through 3.3.1.3.

3.3.1.1 State of Arizona

The 2000 U.S. Census reported that Arizona had a population of less than 5 million. Conservative estimates place the Arizona population at 7.7 million by 2025, and at 11 million by 2050. As the Arizona population grows, so will the number of people participating in outdoor recreation activities. The anticipated population growth in the state will include an increase in the elderly population from 13.3 percent in 1995, to an estimated 21.3 percent in 2025. This elderly population increase may influence the demand in Arizona for different types of outdoor recreation.

Arizona outdoor recreation trends identified in the SCORP include the following:

- Visitation trends indicate parks, campgrounds, other recreation areas that used to have plenty of room for weekend visitors are now filling up by Thursday or Friday mornings.
- People are frequently choosing weekend destination points that are more than two hours away from home.
- More people are using sport utility vehicles and OHVs to access back country areas.
- Previously remote areas are now experiencing crowding or overuse.
- While there are still considerable open spaces and public lands in Arizona today, urban sprawl is rapidly reducing the amount of open space around cities and cutting off access to trails, roads, and public lands close to the cities.
- Rural areas are also experiencing substantial growth/development, reducing or eliminating access to public lands, recreational trials, and roads.
- Without adequate funding and local, regional, and statewide planning for the increasing demands for outdoor recreation opportunities, Arizona will find itself unable to meet demands for outdoor recreation opportunities.

3.3.1.2 Coconino County

The Arizona SCORP included a survey of Coconino County residents. In the survey, approximately 74 percent of Coconino households stated they had visited a park or recreation area an average of 8.9 times within the last 3 months; with a population of 116,320 (based on the 2000 U.S. Census), this equates to 766,083 visits. According to the survey, 40 percent of county residents believe nature-oriented parks should be a priority when determining the allocation of funding, followed by open space areas (31

percent), neighborhood parks (16 percent), and multi-use parks (13 percent). With regards to prioritizing park projects, 48 percent of Coconino residents believe existing facilities should be repaired, 32 percent would like to see new parks created, and 20 percent want new facilities developed. When asked about major problems parks and recreation areas face, the top issue reported by Coconino residents was "too much litter", followed by "not enough funding", "too crowded", "not well maintained", and "no problems."

3.3.1.3 Mohave County

The Arizona SCORP included a survey of Mojave County residents. This survey indicates that approximately 66 percent of Mojave households stated they had visited a park or recreation area an average of 7.2 times within the last 3 months; with a population of 155,032 (based on the 2000 U.S. Census), this equates to 736,712 visits. According to the survey, 40 percent of county residents believe nature-oriented parks should be a priority when determining the allocation of funding, followed by neighborhood parks (23 percent), open space (23 percent), and multi-use parks (14 percent). With regards to prioritizing park projects, 49 percent of Mojave residents believe existing facilities should be repaired, 30 percent would like to see new parks created, and 21 percent want new facilities developed. When asked about major problems parks and recreation areas face, the top issue reported by Mohave residents was "not well maintained", followed by "no problems", "too much litter", "not enough parks", and lastly, "not enough funding."

3.3.2 Utah State Comprehensive Outdoor Recreation Plan

In the 2003 Utah SCORP (Utah Division of Parks and Recreation [UDPR], 2003), it was reported that the perceived need for and use of urban and wildland trails has significantly increased since 1993. The SCORP stated that Utah residents were greatly concerned about ensuring public access to public lands, and wanted to know more about their lands. Additional concerns identified in the Utah SCORP include: the need to renovate and repair local parks in rural areas; a desire to expand parks, trails, and recreation centers in urban areas; and issues involving the significant costs associated with operating and maintaining urban facilities compared to rural facilities.

The Utah SCORP included a survey of state districts. A common theme throughout all districts involved the need for more water-related projects and linear-shaped open spaces, including recreational corridors (e.g., trails, bikeways, OHV routes), riparian corridors, riverways, stream and canyon protection, canyon access, corridors between subdivisions/town, and wildlife corridors. More funding for open spaces was also identified as a need. Officials in local areas reported that they would like to see more local control in the decision process, and greater focus on projects that address local concerns. A summary of outdoor recreation priorities, as expressed by Utah residents, is provided on the table below.

Outdoor recreation priorities identified for the St. George Planning District in the Utah SCORP include:

- Regulate boating on busy waters for good/safe experience.
- Designate areas for OHVs.
- Need more trails that go places or connect-including horse trails.
- Protect river corridors.
- Develop areas for displaced federal land/national park users (overflow)-camp, day use, OHVs.
- Improve existing parks and services.

3.3.3 Glen Canyon National Recreation Area

No recreation needs relevant to the LPP project or hydropower system have been identified during review of existing GCNRA documents or during discussions with GCNRA personnel. A new management plan for the GCNRA will be completed in 2011 (Hughes, pers. comm.).

3.3.4 Vermilion Cliffs National Monument and Paria Canyon – Vermilion Cliffs Wilderness

No recreation needs relevant to the LPP project or hydropower system have been identified.

3.3.5 Grand Staircase-Escalante National Monument

The 1999 GSENM Management Plan states that the BLM and Utah Department of Transportation will explore the possibility of developing bicycle lanes or parallel bicycle routes along Utah Highway 89. Furthermore, additional recreational opportunities may be developed to accommodate all visitors, and focus on learning about geology, history, archaeology, biology, paleontology, and scenic viewing. Short interpretive trails and scenic overlooks will be developed as well. Recreation opportunities developed will be coordinated with the Vermilion Cliffs Highway Project.

According the 1999 Management Plan, the BLM will look for appropriate opportunities to highlight GSENM resources along Highway 89, around the communities of Church Wells and Big Water.

In addition, the BLM currently has plans for developing a pullout in Church Wells, which will include an OHV use area, camping, and a picnic day-use area (Stewart, pers. comm.).

The BLM currently has plans to replace existing picnic tables and grills at the White House Campground. If the existing road to the campground is washed out, it will be converted to walk-in, tent campground (Stewart, pers. comm.).

Within the BLM, it has been proposed to make Catstair Canyon an official trailhead; however, the further development of the area has received resistance because of associated safety issues (Stewart, pers. comm.).

There are ongoing public efforts to fund the construction of another replica set at the Paria Movie site. The BLM has plans to expand this site by improving interpretive exhibits, and ultimately intends to make it an equestrian trailhead (Stewart, pers. comm.).

The BLM plans to host weekend OHV gatherings on the Great Western Trail. (Christensen, pers. comm.).

3.3.6 BLM – Kanab Field Office and BLM – Arizona Strip Field Office

No recreation needs relevant to the LPPP or hydropower system have been identified.

3.3.7 Kaibab – Paiute Indian Reservation and Pipe Springs National Monument

No recreation needs relevant to the LPP project or hydropower system have been identified.

3.3.8 BLM – St. George Field Office

BLM will use innovative partnerships, pursue grant monies, and work with volunteers, organized user groups, and other recreation providers in developing and managing selected recreation opportunities on the public lands managed by the SGFO because the fiscal and staffing resources available to BLM are likely to remain inadequate to fully accomplish this objective (BLM, 1999).

The BLM's 1999 resource management plan also states that the BLM will work towards, among other things, the development of a 48 mile-long, multi-user trail system between Zion National Park and Gunlock Reservoir, and up to 50 miles of equestrian trails near Sand Mountain to meeting growing demands. The plan also indicates that the BLM will assist in marking and signing portions of the Old Spanish Trail that cross public lands in Washington County.

3.3.9 Sand Hollow State Park and Quail Creek State Park

No recreation needs relevant to the LPP project or hydropower system have been identified.

3.3.10 Dixie National Forest

No recreation needs relevant to the LPP project or hydropower system have been identified.

3.3.11 Zion National Park

No recreation needs relevant to the LPP project or hydropower system have been identified.

3.3.12 Private Recreation Facilities and Use

No recreation needs relevant to the LPP project or hydropower system have been identified.

Chapter 4 Environmental Consequences

4.1 Introduction

This chapter describes the environmental consequences of the Lake Powell Pipeline (LPP) project alternatives on recreation resources. It identifies the construction (short term) and operation (long term) impacts on recreation areas, facilities and use on lands managed by federal, state and local government agencies and on privately owned land. The following LPP project alternatives are described in Chapter 1:

- South Alternative
- Existing Highway Alternative
- Southeast Corner Alternative
- Transmission Line Alternatives
- No Lake Powell Water Alternative
- No Action Alternative

The significance criterion for determining if impacts on recreation resources are significant is permanent loss of recreation resource area, facility or use as a result of the LPP Project construction or operation.

4.2 Recreation Areas, Facilities and Use

Construction and operation activities associated with the LPP project alternatives would occur on federal, state, and private lands in Utah's Kane, Washington, and Iron counties, and in Arizona's Coconino and Mohave counties. This section identifies the potential construction and operation impacts on recreation areas, facilities and use in the following management areas:

- Glen Canyon National Recreation Area
- Vermilion Cliffs National Monument
- State of Arizona Trust Lands
- Grand Staircase Escalante National Monument (GSENM)
- BLM Kanab Field Office
- BLM Arizona Strip Field Office
- Kaibab Indian Reservation
- Pipe Springs National Monument
- BLM St. George Field Office
- Sand Hollow State Park (Utah)
- Quail Creek State Park (Utah)
- BLM Cedar City Field Office
- Dixie National Forest
- Zion National Park
- Private Recreational Facilities

4.2.1 South Alternative

4.2.1.1 Glen Canyon National Recreation Area

4.2.1.1.1 "Dead Dog" and "Ropes" Recreation Areas.

4.2.1.1.1 Construction Impacts. The Water Conveyance System South Alternative, including BPS-1, would be constructed about 2,000 feet west of US Highway 89 and in the vicinity of the "Dead Dog" dispersed recreational area and "The Ropes" trail. Heavy equipment used to construct the LPP project facilities could result in minor temporary air pollutants, noise, and traffic congestion impacts on recreation use and would pose temporary safety risks to OHV enthusiasts and other recreationists. The temporary direct and indirect impacts on recreation would be minor in the "Dead Dog" dispersed recreation area and "The Ropes" trail.

4.2.1.1.1.2 Operation Impacts. Following construction and restoration, BPS-1 would be visible to recreationists accessing the "Dead Dog" and "Ropes" areas. This would be a minor indirect impact on recreation. See the Visual Resources Study Report 16 (UBWR 2010a) for additional impact analysis concerning the appearance of the booster pump station. BPS-1 operation and maintenance activities could occasionally disrupt recreational access to the "Dead Dog" and "Ropes" areas. This would be a minor direct impact on recreation use for short periods of time.

4.2.1.1.2 Colorado River Discovery Rafting Tours.

4.2.1.1.2.1 Construction Impacts. The Water Conveyance System South Alternative would have no measurable impact on the Colorado River Discovery Rafting Tours. Minor temporary air pollutants and noise impacts associated with construction of the substation upgrade at the existing Glen Canyon Substation could occur.

4.2.1.1.2.2 *Operation Impacts.* There would be no change in annual river flows downstream of Glen Canyon Dam and therefore no impacts on the operations of Colorado River Discovery Rafting Tours. The U.S. Bureau of Reclamation would continue to release 8.23 million acre-feet annually from Glen Canyon Dam during LPP project operation.

4.2.1.1.3 US Highway 89.

4.2.1.1.3.1 *Construction.* BPS-1 would be constructed west of Scenic US Highway 89. About 2,000 feet north of the Carl Hayden Visitor Center, the pipeline from the Intake Pump Station would cross the highway and head northwest to BPS-1. Heavy equipment used to construct these LPP project facilities could result in temporary air pollutants, noise, and traffic congestion impacts on recreation use and pose temporary traffic safety risks to recreationists on the highway.

4.2.1.1.4 Carl Hayden Visitor Center.

4.2.1.1.4.1 *Construction Impacts.* The buried pipeline from the Intake Pump Station would cross the US Highway 89 about 2,000 feet north of the Carl Hayden Visitor Center. Heavy equipment used to construct these facilities could result in minor temporary air pollutants, noise, and traffic congestion indirect impacts on recreational traffic, and could cause minor temporary traffic safety risks (indirect impacts) on recreationists accessing the visitor center.

4.2.1.1.4.2 *Operation Impacts.* LPP operations would have no direct or indirect impacts on recreational use at the Carl Hayden Visitor Center.

4.2.1.1.5 Glen Canyon Dam Overlook.

4.2.1.1.5.1 Construction Impacts. Construction of the LPP project South Alternative would have no direct or indirect impacts on recreational use at the Glen Canyon Dam Overlook during construction.

4.2.1.1.5.2 *Operation Impacts.* LPP operations would have no direct or indirect impacts on recreational use at the Glen Canyon Dam Overlook.

4.2.1.1.6 "Chains" Recreation Area and "Hanging Garden" Trail.

4.2.1.1.6.1 Construction Impacts. The Water Intake System would be constructed on the Lake Powell shoreline directly opposite the "Chains" Recreation Area about 1,600 feet away. Heavy equipment used to construct these facilities could result in temporary negligible PM_{10} concentrations and noise levels in the "Chains" area. Most of the PM_{10} , carbon monoxide, nitrogen dioxide and sulfur dioxide generated from the intake pump station construction would disperse within the work site to levels below the National Ambient Air Quality Standards (NAAQS) concentrations and prevailing southwest winds would transport any residual pollutants north of the "Chains" area and over Lake Powell. The highest sound pressure levels generated at the Water Intake System site (94 dBA) during construction would attenuate to 64 dBA at the "Chains" area, which is equivalent to moderate conversational speech. These temporary noise levels could have minor indirect impacts on recreational users in the "Chains" area and at the "Hanging Gardens" trailhead.

4.2.1.1.6.2 *Operation Impacts.* LPP operations would have no direct or indirect impacts on recreational use at the "Chains" area and "Hanging Gardens" Trail.

4.2.1.1.7 Wahweap Recreation Area

4.2.1.1.7.1 *Construction Impacts.* The Water Conveyance System and BPS-1 would be constructed about 2,500 feet south of the Wahweap Recreation Area south access road (Lakeshore Drive) intersection with US Highway 89. The conveyance system also would be constructed just south of the heavily used Wahweap north recreation access road (Wahweap Drive) intersection with US Highway 89. Heavy equipment used to construct these facilities could result in minor temporary air pollutants, noise, and traffic congestion indirect impacts on recreational traffic, and could cause minor temporary traffic safety risks (indirect impacts) on recreationists accessing the Wahweap Recreation area via Lakeshore Drive. Traffic congestion and safety risks could occur in the vicinity of the Wahweap Drive intersection with US Highway 89. These indirect impacts would be minor on recreational traffic.

4.2.1.1.7.2 *Operation Impacts.* LPP operations would have no direct impacts on recreational use of the Wahweap Recreation Area. Minor indirect impacts could occur on recreationists in portions of the Wahweap Recreation Area because of the visibility of BPS-1 from Lakeshore Drive.

4.2.1.1.8 Wahweap Overlook

4.2.1.1.8.1 Construction Impacts. The Water Conveyance System would be constructed about 1,000 feet south of the Wahweap Overlook access road intersection with US Highway 89. There would be no direct or indirect impacts on recreational traffic accessing or use of the Wahweap Overlook.

4.2.1.1.8.2 *Operation Impacts.* LPP operations would have no direct or indirect impacts on recreational use in the Wahweap Overlook.

4.2.1.1.9 Lone Rock Recreation Area

4.2.1.1.9.1 Construction Impacts. The Water Conveyance System would be constructed south of the Lone Rock recreation access road intersection with US Highway 89. Heavy equipment used to construct these facilities could result in minor temporary air pollutant, noise, and traffic congestion indirect impacts on recreational traffic, and could cause minor temporary traffic safety risks (indirect impacts) on recreationists accessing the Lone Rock Recreation Area via the Lone Rock access road at the intersection with U.S. 89.

4.2.1.1.9.2 *Operation Impacts.* LPP operations would have no direct or indirect impacts on recreational use in the Lone Rock Recreation Area.

4.2.1.2 Vermilion Cliffs National Monument

4.2.1.2.1 Construction. The Water Conveyance System construction could have minor temporary direct impacts on recreational users accessing the Vermilion Cliffs National Monument (VCNM) via the Cottonwood Canyon Road (south from US Highway 89), the White House Trail road, and the House Rock Valley Road. Temporary direct impacts would occur on recreational users as the pipeline construction blocks access from US Highway 89 to these roads. These temporary direct impacts would have a maximum duration of 8 hours at each road crossing of the pipeline. Temporary indirect impacts from noise could occur on recreational users of these roads where they intersect with US Highway 89. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment.

4.2.1.2.2 Operation. LPP operations would have no direct or indirect impacts on recreation resources in the VCNM.

4.2.1.3 Paria Canyon – Vermilion Cliffs Wilderness

4.2.1.3.1 Construction. The Water Conveyance System construction could have minor temporary direct impacts on recreational users accessing the Paria Canyon – Vermilion Cliffs Wilderness (PCVCW) via the Cottonwood Canyon Road (south from US Highway 89), the White House Trail road, and the House Rock Valley Road. Temporary direct impacts would occur on recreational users as the pipeline construction blocks access from US Highway 89 to these roads. These temporary direct impacts would have a maximum duration of 8 hours at each road crossing of the pipeline. Temporary indirect impacts from noise could occur on recreational users of these roads where they intersect with US Highway 89. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment.

4.2.1.3.2 Operation. LPP operations would have no direct or indirect impacts on recreation resources in the PCVCW.

4.2.1.4 Grand Staircase-Escalante National Monument

4.2.1.4.1 Guided Trips.

4.2.1.4.1.1 *Construction.* The Water Conveyance System and Hydro System construction would have minor direct and indirect impacts on guided trip providers and participants in the Grand Staircase-Escalante National Monument (GSENM). Temporary direct impacts would occur on guided trip providers and participants as the pipeline construction blocks access from US Highway 89 to trailheads, interpretive sites, access roads and visitor centers. These temporary direct impacts would have a maximum duration of 8 hours at a specific site. Temporary indirect impacts from noise, air pollutants and visual changes could occur on guided trip providers and participants. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment and at facility locations. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Specific visual resource impacts are documented for facility sites in the Visual Resource Study Report 16 (UBWR 2010a). Indirect impacts from noise, air pollutants and visual changes would not occur on guided trip providers and participants are pollutants and visual changes would not occur on guided trip providers and participants are pollutants and visual changes would not occur on guided trip providers and participants are pollutants and visual changes would not occur on guided trip providers and participants under the High Point Alignment Alternative in the GSENM.

4.2.1.4.1.2 *Operation.* LPP operations would have no direct impacts on guided trip providers and participants in the GSENM. Guided trip providers and participants could experience indirect impacts as they view specific LPP facilities (pump stations and hydro stations) along US Highway 89. Specific visual resource impacts are documented for facility sites in the Visual Resource Study Report 16 (UBWR 2010a).

4.2.1.4.2 Cockscomb Wilderness Study Area.

4.2.1.4.2.1 *Construction.* The Water Conveyance System, BPS-3/WCH-1, and BPS-4 or BPS-4 Alt. would have minor indirect impacts on recreational users of the nearby Cockscomb Wilderness Study Area (WSA) during construction of these features. Noise generated during construction activities would attenuate to background levels within 3,000 feet of the BPS-3/WCH-1, BPS-4 or BPS-4 Alt. sites and could disrupt recreational experiences of users in the southwest corner of the WSA. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users in the WSA may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several dispersed access points for the WSA could be temporarily affected by construction activities and traffic during construction. There would be no direct impacts on recreational users of the WSA.

4.2.1.4.2.2 *Operation.* LPP operations would have no direct impacts on recreation resources in the Cockscomb WSA. Recreational users of the WSA could experience minor indirect impacts from viewing BPS-3/WCH-1, BPS-4 or BPS-4 Alt. facilities because of their close proximity to the WSA boundaries. Specific visual resource impacts are documented for facility sites in the Visual Resource Study Report 16 (UBWR 2010a).

4.2.1.4.3 Wahweap Wilderness Study Area.

4.2.1.4.3.1 *Construction.* The Water Conveyance System and BPS-3 Alt. could have minor indirect impacts on recreational users of the nearby Wahweap WSA during construction of these features. Noise generated during construction activities would attenuate to background levels within 3,000 feet of the pipeline alignment and BPS-3 Alt. site and could disrupt recreational experiences of users in Unit 13 of the WSA. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users in the WSA may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several dispersed access points for the WSA could be

temporarily affected by construction activities and traffic during construction. There would be no direct impacts on recreational users of the WSA.

4.2.1.4.3.2 *Operation.* LPP operations would have no direct impacts on recreation resources in the Wahweap WSA. Recreational users of the WSA could experience minor indirect impacts from viewing BPS-3 Alt. facility because of its proximity to the WSA boundaries. Specific visual resource impacts are documented for facility sites in the Visual Resource Study Report 16 (UBWR 2010a).

4.2.1.4.4 US Highway 89 Special Recreation Management Area.

4.2.1.4.4.1 *Construction.* The Water Conveyance System, Hydro System, BPS-3/WCH-1, BPS-4 or BPS-4 Alt., High Point Regulating Tank-2 and HS-1 would have minor temporary direct impacts on recreational users of the nearby US Highway 89 Special Recreation Management Area (SRMA) during construction of these features. Temporary direct impacts would occur on recreational users as the pipeline construction blocks access from US Highway 89 to trailheads, interpretive sites, access roads and visitor centers. These temporary direct impacts would have a maximum duration of 8 hours at a specific site.

The Water Conveyance System, Hydro System, BPS-3/WCH-1, BPS-4 or BPS-4 Alt., High Point Regulating Tank-2 and HS-1 could have minor indirect impacts on recreational users of the nearby US Highway 89 SRMA during construction of these features. Noise generated during construction activities would attenuate to background levels within 3,000 feet of the pipeline alignment and facility sites and could disrupt recreational experiences of users within the SRMA. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users in the SRMA may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several dispersed access points for the SRMA could be temporarily affected by construction activities and traffic during construction.

Indirect impacts from noise, air pollutants and visual changes would not occur on recreational users of the US Highway SRMA under the High Point Alignment Alternative.

4.2.1.4.4.2 *Operation.* LPP operations would have no direct impacts on recreation resources in the US Highway 89 SRMA. Recreational users of the SRMA could experience minor indirect impacts from viewing facility sites because of their proximity to the SRMA. Specific visual resource impacts are documented for facility sites in the Visual Resource Study Report 16 (UBWR 2010a).

4.2.1.4.5 Historic Trails.

4.2.1.4.5.1 *Construction.* The Water Conveyance System, Hydro System, BPS-3/WCH-1, BPS-4 or BPS-4 Alt., High Point Regulating Tank-2 and HS-1 would have minor temporary direct impacts on recreational users of the GSENM historic trails during construction of these features. Temporary direct impacts would occur on recreational users as the pipeline construction blocks access from US Highway 89 to trailheads and trails. These temporary direct impacts would have a maximum duration of 8 hours at a specific site.

The Water Conveyance System, Hydro System, BPS-3/WCH-1, BPS-4 or BPS-4 Alt., High Point Regulating Tank-2 and HS-1 could have minor indirect impacts on recreational users of the GSENM historic trails during construction of these features. Noise generated during construction activities would attenuate to background levels within 3,000 feet of the pipeline alignment and facility sites and could disrupt recreational experiences of historic trail users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users along the trails may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several

dispersed access points for the historic trails could be temporarily affected by construction activities and traffic during construction.

Indirect impacts from noise, air pollutants and visual changes would not occur on recreational users of the GSENM historic trails under the High Point Alignment Alternative.

4.2.1.4.5.2 *Operation.* LPP operations would have no direct impacts on recreation resources of the GSENM historic trails. Recreational users of the historic trails could experience minor indirect impacts from viewing facility sites. Specific visual resource impacts are documented for facility sites in the Visual Resource Study Report 16 (UBWR 2010a).

4.2.1.4.6 Paria Canyons and Plateaus Special Recreation Management Area.

4.2.1.4.6.1 *Construction.* The Water Conveyance System construction could have minor temporary direct impacts on recreational users accessing the Paria Canyons and Plateaus Special Recreation Management Area (SRMA) via the Cottonwood Canyon Road (south from US Highway 89), the White House Trail road, and the House Rock Valley Road. Temporary direct impacts would occur on recreational users as the pipeline construction blocks access from US Highway 89 to these roads. These temporary direct impacts would have a maximum duration of 8 hours at each road crossing of the pipeline. Temporary indirect impacts from noise could occur on recreational users of these roads where they intersect with US Highway 89. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment.

4.2.1.4.6.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Paria Canyons and Plateaus SRMA.

4.2.1.4.7 Big Water Visitor Center.

4.2.1.4.7.1 *Construction.* The Water Conveyance System construction would have minor direct and indirect impacts on recreational users accessing the Big Water Visitor Center. Temporary direct impacts would occur on recreational users as the pipeline construction blocks access from US Highway 89 to the visitor center. These temporary direct impacts would have a maximum duration of 8 hours. Temporary indirect impacts from noise could occur on recreational users of the visitor center. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment. Prevailing winds from the southwest would disperse air pollutants away from the visitor center.

4.2.1.4.7.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Big Water Visitor Center.

4.2.1.4.8 Paria Contact Station, White House Campground, and White House Trail.

4.2.1.4.8.1 *Construction.* The Water Conveyance System construction would have minor direct impacts on recreational users accessing the Paria Contact Station, White House Campground and White House Trail. Temporary direct impacts would occur on recreational users as the pipeline construction blocks access from US Highway 89 to the Paria Contact Station, White House Campground and White House Trail. These temporary direct impacts would have a maximum duration of 8 hours. Temporary indirect impacts from noise could occur on recreational users of the Paria Contact Station. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment. Prevailing winds from the southwest would disperse air pollutants away from the Paria Contact Station.

4.2.1.4.8.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Paria Contact Station, White House Campground and White House Trail.

4.2.1.4.9 Toadstools Trailhead.

4.2.1.4.9.1 *Construction.* The Water Conveyance System construction could have minor temporary indirect impacts on recreational users accessing the Toadstools Trailhead and trail. Temporary indirect impacts from noise, air pollutants and traffic congestion could occur on recreational users of the Toadstools Trailhead and trail. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users and the trailhead and along the trail may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Traffic congestion could occur along US Highway 89 during pipeline construction and could slightly delay recreational users in their vehicles.

There would be no direct impacts on recreation resources from the Water Conveyance System at the Toadstools Trailhead.

4.2.1.4.9.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Toadstools Trailhead and trail.

4.2.1.4.10 Catstair Canyon Trailhead.

4.2.1.4.10.1 *Construction.* The Water Conveyance System construction would have minor direct impacts on recreational users accessing the Catstair Canyon Trailhead. Temporary direct impacts would occur on recreational users as the pipeline construction blocks access from US Highway 89 to the access road and trailhead. These temporary direct impacts would have a maximum duration of 8 hours. Temporary indirect impacts from noise could occur on recreational users of the Catstair Canyon Trailhead. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment. Prevailing winds from the southwest would disperse air pollutants away from the trailhead.

4.2.1.4.10.2 *Operation.* LPP operations would have no direct impacts on recreational users of the Catstair Canyon Trailhead. Recreational users of the Catstair Canyon Trailhead and trail could experience indirect impacts from viewing BPS-3/WCH-1 in the foreground and middle-ground distance zones.

4.2.1.4.11 House Rock Valley Road.

4.2.1.4.11.1 *Construction.* The Water Conveyance System construction would have minor direct impacts on recreational users accessing the House Rock Valley Road. Temporary direct impacts would occur on recreational users as the pipeline construction blocks access from US Highway 89 to the House Rock Road. These temporary direct impacts would have a maximum duration of 8 hours. Temporary indirect impacts from noise could occur on recreational users of the House Rock Valley Road where it intersects with US Highway 89. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment.

4.2.1.4.11.2 Operation. LPP operations would have no direct or indirect impacts on recreational users of the House Rock Valley Road.

4.2.1.4.12 Paria Movie Set and Pahreah Townsite Point of Interest.

4.2.1.4.12.1 *Construction.* The Water Conveyance System construction would have minor direct impacts on recreational users accessing the Paria Movie Set and Pahreah Townsite Point of Interest. Temporary direct impacts would occur on recreational users as the pipeline construction blocks access from US Highway 89 to the access road. These temporary direct impacts would have a maximum duration of 8 hours. Temporary indirect impacts from noise could occur on recreational users of the access road where it intersects with US Highway 89. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment.

4.2.1.4.12.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the House Rock Valley Road.

4.2.1.4.13 Off-Highway Vehicle Use and Hunting.

4.2.1.4.13.1 *Construction.* The Water Conveyance System and Hydro System construction would have minor direct and indirect impacts on off-highway vehicle (OHV) use and hunting in the Grand Staircase-Escalante National Monument (GSENM). Temporary direct impacts would occur on OHV users and hunters as the pipeline construction blocks access from US Highway 89 to trailheads, interpretive sites, access roads and visitor centers. These temporary direct impacts would have a maximum duration of 8 hours at a specific site. Temporary indirect impacts from noise, air pollutants and visual changes could occur on OHV users and hunters. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment and at facility locations. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Specific visual resource impacts are documented for facility sites in the Visual Resource Study Report 16 (UBWR 2010a).

4.2.1.4.13.2 Operation. LPP operations would have no direct impacts on OHV users and hunters in the GSENM. Guided trip providers and participants could experience indirect impacts as they view specific LPP facilities (pump stations and hydro stations) along US Highway 89. Specific visual resource impacts are documented for facility sites in the Visual Resource Study Report 16 (UBWR 2010a).

4.2.1.4.14 Great Western Trail.

4.2.1.4.14.1 *Construction.* The Water Conveyance System and Hydro System construction would have minor direct and indirect impacts on recreational users of the Great Western Trail (GWT). Temporary direct impacts would occur on GWT users as the pipeline and penstock construction blocks access from US Highway 89 to the trail and hikers along the trail. These temporary direct impacts would have a maximum duration of 8 hours at the GWT crossing of the buried pipeline/penstock. Temporary indirect impacts from noise and air pollutants could occur on GWT users. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline/penstock alignment. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW.

4.2.1.4.14.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Great Western Trail.

4.2.1.4.15 Kanab Visitor Center.

4.2.1.4.15.1 Construction. The South Alternative would have no direct or indirect impacts on the Kanab Visitor Center.

4.2.1.4.15.2 *Operation.* LPP operations would have no direct or indirect impacts on the Kanab Visitor Center.

4.2.1.5 BLM – Kanab Field Office

4.2.1.5.1 Construction. The Water Conveyance System and Hydro System construction would have minor temporary direct impacts on recreation resources within the public lands administered by the BLM Kanab Field Office. Temporary direct impacts would occur on recreational users at BPS-3 Alt./Road 400 (south of US Highway 89 at the GSENM east boundary), and Road 705 as the penstock construction blocks access from US Highway 89 to these roads. These temporary direct impacts would have a maximum duration of 8 hours at the Road 400 crossing of the buried pipeline and at the Road 705 crossing of the buried penstock. Other BLM access roads intersecting with US Highway 89 between the GSENM west boundary and Johnson Canyon Road would be temporarily blocked by the Kane County Pipeline construction, with a maximum duration of 4 hours at each road crossing of the 24-inch diameter buried pipeline.

Minor temporary indirect impacts from noise, air pollutants and traffic congestion could occur on recreational users of Road 400 (north and south of US Highway 89), Road 705, Road 563 and other BLM roads intersecting with US Highway 89 between the GSENM west boundary and Johnson Canyon Road. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the pipeline/penstock alignments. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Traffic congestion could temporarily delay recreational users in vehicles accessing sites along US Highway 89.

4.2.1.5.2 Operation. LPP operations would have no direct or indirect impacts on recreation resources in the Kanab Field Office-administered lands.

4.2.1.6 BLM - Arizona Strip Field Office

4.2.1.6.1 Sand Hills Special Recreation Management Area and Uplands Recreation Management Zone.

4.2.1.6.1.1 *Construction.* The Water Conveyance System construction could have minor temporary direct impacts on recreational users accessing the Sand Hills Special Recreation Management (SRMA) and Uplands Recreation Management Zone (RMZ) via the Cottonwood Canyon Road (south from US Highway 89), the White House Trail road, and the House Rock Valley Road. Temporary direct impacts would occur on recreational users as the pipeline construction blocks access from US Highway 89 to these roads. These temporary direct impacts would have a maximum duration of 8 hours at each road crossing of the pipeline. Temporary indirect impacts from noise could occur on recreational users of these roads where they intersect with US Highway 89. Indirect impacts from noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment.

4.2.1.6.1.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Cottonwood Canyon Road, the White House Trail road, or the House Rock Valley Road.

4.2.1.6.2 Fredonia Special Recreation Management Area and Associated Recreation Management Zones.

4.2.1.6.2.1 *Construction.* The Hydro System construction would have no direct or indirect impacts on the Fredonia Special Recreation Management Area (SRMA) and associated Recreation Management Zones (RMZ).

4.2.1.6.2.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Fredonia SMRA and associated RMZ.

4.2.1.6.3 Cottonwood Point Wilderness.

4.2.1.6.3.1 *Construction.* The Hydro System construction would have no direct impacts on the Cottonwood Point Wilderness. Facility sites including HS-2 and HS-3 could be visible from portions of the Cottonwood Point Wilderness; however, the potential indirect visual impacts on recreation users would be minimal because of distance and blending of the structures into surrounding developed areas.

4.2.1.6.3.2 Operation. LPP operations would have no direct or indirect impacts on recreational users of the Cottonwood Point Wilderness.

4.2.1.6.4 Fredonia Welcome Center.

4.2.1.6.4.1 *Construction.* The Hydro System construction would have no direct or indirect impacts on the recreation resources of the Fredonia Welcome Center.

4.2.1.6.4.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Fredonia Welcome Center.

4.2.1.6.5 Historic Trails.

4.2.1.6.5.1 *Construction.* The Hydro System, including HS-2, could have minor temporary direct impacts on recreational users of the historic trails during construction of these features. Temporary direct impacts would occur on recreational users as the penstock construction crosses the historic trails. These temporary direct impacts would have a maximum duration of 8 hours at each trail crossing.

The Hydro System, including HS-2, could have minor temporary indirect impacts on historic trails during construction of these features. Noise generated during construction activities would attenuate to background levels within 800 feet of the penstock alignment and facility sites and could disrupt recreational experiences of historic trail users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users along the trails may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several dispersed access points for the historic trails could be temporarily affected by construction activities and traffic during construction.

4.2.1.6.5.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the historic trails on public lands administered by the BLM ASFO.

4.2.1.6.6 Fredonia – Vermilion Cliffs Scenic Drive.

4.2.1.6.6.1 *Construction.* The Hydro System construction would have minor temporary direct impacts on recreation resources where the penstock would cross Highway 89A along the Fredonia – Vermilion Cliffs

Scenic Drive. Temporary direct impacts would occur on recreational users at the penstock crossing of Highway 89A, with a maximum road closure duration of 8 hours.

Minor temporary indirect impacts from noise, air pollutants and traffic congestion could occur on recreational users of the Fredonia – Vermilion Cliffs Scenic Drive where the buried penstock would cross under US Highway 89A. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the pipeline/penstock alignments. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Traffic congestion could temporarily delay recreational users in vehicles traveling along US Highway 89A.

4.2.1.6.6.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Fredonia – Vermilion Cliffs Scenic Drive.

4.2.1.6.7 Vermilion Cliffs Highways Scenic Drive.

4.2.1.6.7.1 *Construction.* The Water Conveyance System and Hydro System construction would have minor temporary direct impacts on recreation resources where the pipeline/penstock would be constructed across the Vermilion Cliffs Highways Scenic Drive. Temporary direct impacts would occur on recreational users at the pipeline/penstock crossings of US Highway 89, US Highway 89A, Utah State Route 59, and Utah State Route 9with either traffic delays or road closure with a maximum duration of up to 8 hours. The pipeline/penstock construction would not directly affect overlooks, pull-outs and interpretive sites along these highways that are part of the Vermilion Cliffs Highways Scenic Drive.

Minor temporary indirect impacts from noise, air pollutants and traffic congestion could occur on recreational users of the Vermilion Cliffs Highways Scenic Drive where the buried pipeline/penstock would be parallel to or cross under the highways. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the pipeline/penstock alignments. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Traffic congestion could temporarily delay recreational users in vehicles traveling along the highways.

4.2.1.6.7.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Vermilion Cliffs Highways Scenic Drive.

4.2.1.6.8 Arizona Strip Pull-Off.

4.2.1.6.8.1 *Construction.* The Hydro System construction would have no direct impacts on recreation resources at the Arizona Strip Pull-Off on Arizona Route 389. Recreational users of the pull-off could experience minor temporary indirect visual impacts from viewing penstock construction and HS-2 construction along Yellowstone Road.

4.2.1.6.8.2 *Operation.* LPP operations would have no direct impacts on recreational users of the Arizona Strip Pull-Off. Recreational users of the pull-off could experience minor indirect impacts from viewing HS-2 in the middleground distance zone.

4.2.1.7 Kaibab – Paiute Indian Reservation

4.2.1.7.1 Kaibab-Paiute Tribe Campground and RV Park.

4.2.1.7.1.1 *Construction.* The Hydro System construction would have no direct or indirect impacts on recreation resources at the Kaibab-Paiute Tribe Campground and RV Park.

4.2.1.7.1.2 Operation. LPP operations would have no direct or indirect impacts on recreational users of the Kaibab-Paiute Tribe Campground and RV Park.

4.2.1.7.2 Historic Trails.

4.2.1.7.2.1 *Construction.* The Hydro System construction would have no direct or indirect impacts on recreation resources associated with historic trails crossing through the Kaibab-Paiute Indian Reservation.

4.2.1.7.2.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of historic trails crossing through the Kaibab-Paiute Indian Reservation.

4.2.1.8 Pipe Spring National Monument

4.2.1.8.1 Construction. The Hydro System construction would have no direct or indirect impacts on recreation resources of the Pipe Spring National Monument within the boundaries of the Kaibab-Paiute Indian Reservation.

4.2.1.8.2 Operation. LPP operations would have no direct or indirect impacts on recreational use of the Pipe Spring National Monument within the boundaries of the Kaibab-Paiute Indian Reservation.

4.2.1.9 BLM – St. George Field Office

4.2.1.9.1 Off-Highway Vehicle Use.

4.2.1.9.1.1 *Construction.* The Hydro System and Cedar Valley Pipeline (CVP) construction would have minor temporary direct impacts on off-highway vehicle (OHV) use and access on public lands administered by the BLM St. George Field Office. These impacts would include temporary access closures or restrictions along gravel and dirt roads and trails crossing the penstock and pipeline alignments. Roads and trails crossed by the penstock and pipeline construction would be closed up to a maximum of 8 hours at each crossing site. Direct impacts would occur on recreational users of the 2800 South road below the Hurricane Cliffs as construction occurs on the afterbay reservoir, penstock, hydropower plant, tailrace channel, and access bridge. Temporary road detours would provide access to recreational users of the valley below the Hurricane Cliffs. Direct impacts would occur on recreational users of Antelope Road/Branham Ranch Road (south of Utah State Route 59) and Sheep Bridge Road (between Utah State routes 59 and 9) during CVP construction along these roads. Temporary detours and closures would affect access to BLM trails and other dispersed recreation sites as the pipeline construction proceeds along these roads.

Temporary indirect impacts including noise, air pollutants and traffic congestion would occur on recreational resources along and users of the 2800 South road, Antelope Road/Branham Ranch Road, and Sheep Bridge Road. Noise generated during construction activities would attenuate to background levels within 800 to 1,600 feet of the pipeline alignment and facility sites and could disrupt recreational experiences of OHV and trail users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users along the roads and trails may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Traffic congestion would occur along the roads and OHV recreational users could experience delays.

4.2.1.9.1.2 *Operation.* LPP operations would have no direct impacts on OHV use of the 2800 South road, Antelope Road/Branham Ranch Road, and Sheep Bridge Road. LPP operations involving access to the hydropower generation facilities along the 2800 South road and Antelope Road/Branham Ranch Road

could cause minor temporary impacts on OHV recreational users of these roads because of occasional traffic delays.

4.2.1.9.2 Sand Mountain Special Recreation Management Area.

4.2.1.9.2.1 *Construction.* The Hydro System construction would have direct impacts on recreation resources in the Sand Mountain Special Recreation Management Area (SRMA). The Hurricane Cliffs afterbay reservoir and the penstock to Sand Hollow Hydro Station would be constructed within the SRMA boundary. The afterbay reservoir construction would permanently remove about 200 acres from recreational use as part of the Sand Mountain SRMA. This would be a significant impact on recreation resources. The penstock construction would have minor temporary direct impacts on recreation use of about 60 acres along 3.8 miles of the Sand Mountain SRMA as the construction occurs along the penstock ROW. Dispersed recreation and recreational access at penstock crossings of gravel and dirt roads would be closed until construction activities are completed.

Temporary indirect impacts including noise, air pollutants and traffic congestion would occur on recreational resources within the Sand Mountain SRMA near the afterbay reservoir and along the penstock alignment. Noise generated during construction activities would attenuate to background levels within 800 to 1,600 feet of the penstock alignment and afterbay site and could disrupt recreational experiences of SRMA users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor. Traffic congestion would occur along the roads and recreational users could experience delays.

4.2.1.9.2.2 Operation. LPP operations would have direct impacts on recreational use of the Sand Mountain SRMA near the afterbay reservoir and hydropower generation facilities associated with the Hurricane Cliffs pumped storage project. The afterbay reservoir would not be available for recreational use because the water levels would fluctuate rapidly and would be unsafe for public recreation activities. The permanent removal of the afterbay reservoir area from recreational use would be a significant impact on recreation resources. The afterbay reservoir would not be designed for regular water discharge through a spillway; however, the afterbay reservoir would have an emergency spillway that could discharge water during emergency conditions and cause temporary flooding down-gradient (south) of the afterbay and affect recreational use of that portion of the Sand Mountain SRMA.

LPP operations could have temporary indirect impacts on recreational users accessing the Sand Mountain SRMA. Traffic congestion could occur along the 2800 South road as recreational traffic passes through the area of the hydro facilities, resulting in slight delays.

4.2.1.9.3 Red Cliffs Desert Reserve.

4.2.1.9.3.1 Construction. The Hydro System and CVP construction would have no direct or indirect impacts on recreation resources in the Red Cliffs Desert Reserve.

4.2.1.9.3.2 *Operation.* CVP operations would have no direct or indirect impacts on recreation resources in the Red Cliffs Desert Reserve.

4.2.1.9.4 Hurricane Cliffs Non-Motorized Trail System.

4.2.1.9.4.1 *Construction.* The CVP construction would have minor temporary direct impacts on portions of the Hurricane Cliffs Non-Motorized Trail System. The CVP would be constructed along the Antelope Road/Branham Ranch Road and the Gould's Rim Trail and Gould's Trail would be temporarily closed for a maximum of up to 8 hours where it would cross the pipeline alignment. The CVP would be constructed

along the Sheep Bridge Road, and the Chinatown Wash Trail and Jem Trail would be temporarily closed for a maximum of up to 8 hours at each pipeline crossing.

Temporary indirect impacts including noise, air pollutants and traffic congestion would occur on recreational resources during CVP construction. Recreational users of the Gould's Rim Trail, Gould's Trail, Chinatown Wash Trail and Jem Trail could be temporarily affected as the CVP construction progresses. Noise generated during CVP construction activities would attenuate to background levels within 800 to 1,600 feet of the pipeline alignment and could disrupt recreational experiences of trail users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users along the roads and trails may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Traffic congestion would occur along the roads and recreational users could experience delays.

4.2.1.9.4.2 *Operation.* LPP and CVP operations would have no direct or indirect impacts on recreation resources of the Hurricane Cliffs Non-Motorized Trail System.

4.2.1.9.5 Frog Hollow OHV Area.

4.2.1.9.5.1 *Construction.* The CVP construction would have no direct impacts on recreation resources of the Frog Hollow OHV area. Minor temporary indirect impacts including noise, air pollutants and traffic congestion could occur on recreational resources and users of the Frog Hollow OHV area during CVP construction. Noise generated during CVP construction activities would attenuate to background levels within 800 to 1,600 feet of the pipeline alignment and could disrupt recreational experiences of Frog Hollow OHV users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; prevailing winds from the southwest would disperse air pollutants away from the Frog Hollow area. Traffic congestion would occur along the Antelope Road/Branham Ranch Road and recreational users could experience delays during CVP construction.

4.2.1.9.5.2 *Operation.* LPP and CVP operations would have no direct impacts on recreation resources of the Frog Hollow OHV area. LPP operations involving access to the hydropower generation facilities along the Antelope Road/Branham Ranch Road could cause minor temporary impacts on OHV recreational users of these roads because of occasional traffic delays.

4.2.1.9.6 LaVerkin Creek/Black Ridge Special Recreation Management Area.

4.2.1.9.6.1 *Construction.* The CVP construction would have minor temporary direct impacts on recreation resources in the LaVerkin Creek/Black Ridge Special Recreation Management Area (SRMA). The CVP alignment would follow an existing road near the northwest boundary of the SRMA. The road would be temporarily closed to recreation uses during the CVP construction through this portion of the SRMA.

Minor temporary indirect impacts including noise and air pollutants could occur on recreational resources and users of the LaVerkin Creek/Black Ridge SRMA during CVP construction. Noise generated during CVP construction activities would attenuate to background levels within 800 feet of the pipeline alignment and could disrupt recreational experiences of SRMA users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor.

4.2.1.9.6.2 *Operation.* CVP operations would have no direct or indirect impacts on recreation resources of the LaVerkin Creek/Black Ridge SRMA.

4.2.1.10 Sand Hollow State Park

4.2.1.10.1 Construction. The Hydro System construction would have direct impacts on recreation resources within Sand Hollow State Park. The penstock construction would temporarily restrict dispersed recreation activities along the penstock alignment ROW, and would temporarily close the Sand Hollow Road for up to a maximum of 8 hours. The Sand Hollow Hydro Station would permanently displace dispersed camping sites along the east shore of Sand Hollow Reservoir.

Minor temporary indirect impacts including noise, air pollutants and traffic congestion could occur on recreational resources and users within Sand Hollow State Park. Noise generated during CVP construction activities would attenuate to background levels within 800 to 1,600 feet of the pipeline alignment and could disrupt recreational experiences of Sand Hollow State Park users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; prevailing winds from the southwest would disperse air pollutants away from Sand Hollow State Park primary use areas. Traffic congestion would occur along the Sand Hollow Road and recreational users in vehicles could experience delays during Hydro System construction.

4.2.1.10.2 Operation. LPP operations would have no measurable direct impacts on recreational use of Sand Hollow State Park. Sand Hollow Reservoir levels would not fluctuate measurably with the regular discharge of LPP water from the Sand Hollow Hydro Station. LPP operations would have minor indirect impacts on recreation resources within Sand Hollow State Park. Recreational boating and water sports would be restricted in the immediate area of the Sand Hollow Hydro Station tailrace.

4.2.1.11 Quail Creek State Park

4.2.1.11.1 Construction. The Hydro System and CVP construction would have no direct or indirect impacts on recreation resources of Quail Creek State Park.

4.2.1.11.2 Operation. LPP operations would have no measurable direct or indirect impacts on recreational use of Quail Creek State Park. Quail Creek Reservoir levels could change seasonally because LPP water would be stored in Sand Hollow Reservoir and more Virgin River water would be available for storage in Quail Creek Reservoir by WCWCD.

4.2.1.12 Dixie National Forest

4.2.1.12.1 Construction. The CVP construction would have no direct or indirect impacts on recreation resources of the Dixie National Forest.

4.2.1.12.2 Operation. CVP operations would have no direct or indirect impacts on recreation resources of the Dixie National Forest.

4.2.1.13 Zion National Park

4.2.1.13.1 Construction. The CVP construction would have no direct or indirect impacts on recreation resources of Zion National Park.

4.2.1.13.2 Operation. CVP operations would have no direct or indirect impacts on recreation resources of Zion National Park.

4.2.1.14 Private Recreational Facilities

4.2.1.14.1 Amangiri Resort Spa and Villas at Lake Powell.

4.2.1.14.1.1 *Construction.* The LPP construction would have minor temporary direct impacts on access to the Amangiri Resort Spa and Villas at Lake Powell. Pipeline construction along US Highway 89 at the access road intersection would temporarily delay or disrupt access to and from the resort for up to a maximum of 8 hours.

Indirect impacts including noise, air pollutants and traffic congestion could temporarily affect recreational traffic at the resort access road intersection with US Highway 89. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW; prevailing winds from the southwest would disperse residual air pollutants away from the resort. Traffic congestion could temporarily delay recreational users in vehicles at the intersection of the resort access road and US Highway 89.

4.2.1.14.1.2 *Operation.* LPP operations would have no direct or indirect impacts on recreation resources of the Amangiri Resort Spa and Villas at Lake Powell.

4.2.1.14.2 Paria Outpost Resort.

4.2.1.14.2.1 *Construction.* The LPP construction would have minor temporary direct impacts on access to the Paria Outpost Resort. Pipeline construction along US Highway 89 at each access road intersection would temporarily delay or disrupt access to and from the resort for up to a maximum of 8 hours.

Indirect impacts including noise, air pollutants and traffic congestion could temporarily affect recreational traffic at each access road intersection with US Highway 89. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW; prevailing winds from the southwest would disperse residual air pollutants away from the resort. Traffic congestion could temporarily delay recreational users in vehicles at each resort access road intersection with US Highway 89.

4.2.1.14.2.2 *Operation.* LPP operations would have no direct or indirect impacts on recreation resources of the Paria Outpost Resort.

4.2.1.14.3 Diamond Ranch Academy.

4.2.1.14.3.1 *Construction.* The LPP and CVP construction would have minor temporary direct impacts on access to the Diamond Ranch Academy along the Antelope Road/Branham Ranch Road. Pipeline construction along this road and pipeline crossing of the Diamond Ranch Academy access points would temporarily delay or disrupt access to and from the academy for up to a maximum of 4 hours at each access point.

Indirect impacts including noise, air pollutants and traffic congestion could temporarily affect recreational traffic along the Antelope Road/Branham Ranch Road between the Diamond Ranch Academy and Utah State Route 59. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW; prevailing winds from the southwest would disperse residual air pollutants away from the academy. Traffic congestion could temporarily delay academy users

in vehicles at each access road intersection with Antelope Road/Branham Ranch Road and along the road during CVP construction.

4.2.1.14.3.2 *Operation.* LPP operations would have no direct impacts on Diamond Academy Ranch use of the Antelope Road/Branham Ranch Road. LPP operations involving access to the hydropower generation facilities along the Antelope Road/Branham Ranch Road could cause minor temporary impacts on vehicles accessing the Diamond Ranch Academy because of occasional traffic delays.

4.2.1.14.4 Willowwind RV Park.

4.2.1.14.4.1 Construction. The LPP and CVP construction would have no direct or indirect impacts on the Willowwind RV Park.

4.2.1.14.4.2 *Operation.* LPP and CVP operations would have no direct or indirect impacts on the Willowwind RV Park.

4.2.2 Existing Highway Alternative

The construction and operation impacts of the Existing Highway Alternative would be the same as the South Alternative (Section 4.2.1) except for the alignment segment from the west boundary of the GSENM to Yellowstone Road west of the Kaibab-Paiute Indian Reservation. The impacts of constructing and operating the LPP project Existing Highway Alternative on recreation resources are presented in the following sections.

4.2.2.1 BLM – Kanab Field Office

4.2.2.1.1 Construction. The Hydro System construction would have minor temporary direct impacts on recreation resources within the public lands administered by the BLM Kanab Field Office. BLM access roads intersecting with US Highway 89 between the GSENM west boundary and the road leading to Lost Spring Gap would be temporarily blocked by the penstock construction, with a maximum duration of 8 hours at each road crossing.

Minor temporary indirect impacts from noise, air pollutants and traffic congestion could occur on recreational users of BLM roads intersecting with US Highway 89 between the GSENM west boundary and the road leading to Lost Spring Gap. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the pipeline/penstock alignments. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Traffic congestion could temporarily delay recreational users in vehicles accessing sites along US Highway 89.

4.2.2.1.2 Operation. LPP operations would have no direct or indirect impacts on recreation resources in the Kanab Field Office-administered lands.

4.2.2.2 BLM - Arizona Strip Field Office

4.2.2.2.1 Fredonia Special Recreation Management Area and Associated Recreation Management Zones.

4.2.2.1.1 *Construction.* The Hydro System construction would have minor temporary direct impacts on the Fredonia Special Recreation Management Area (SRMA) and associated Recreation Management Zones (RMZ). The penstock construction would occur for 0.8 mile along the northwest boundary of the

SRMA and Fredonia Rural Park RMZ. Public access to the construction area within the SRMA and RMZ would be restricted for up to one week.

Indirect impacts including noise and air pollutants could temporarily affect recreational use of portions of the SRMA and RMZ. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW; prevailing winds from the southwest would disperse residual air pollutants along the northwest boundary of the SRMA, Fredonia Rural Park RMZ and Shinarump Cliffs RMZ.

4.2.2.2.1.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Fredonia SMRA and associated RMZs.

4.2.2.2.2 Cottonwood Point Wilderness.

4.2.2.2.1 *Construction.* The Hydro System construction would have no direct impacts on the Cottonwood Point Wilderness. Facility sites including HS-2 and HS-3 could be visible from portions of the Cottonwood Point Wilderness; however, the potential indirect visual impacts on recreation users would be minimal because of distance and blending of the structures into surrounding developed areas.

4.2.2.2.2 Operation. LPP operations would have no direct or indirect impacts on recreational users of the Cottonwood Point Wilderness.

4.2.2.3 Fredonia Welcome Center.

4.2.2.3.1 *Construction.* The Hydro System construction could have direct impacts on the recreation resources of the Fredonia Welcome Center. The penstock would cross US Highway 89A about 300 feet north of the Fredonia Welcome Center and recreational access to the center could be temporarily closed during construction. The resulting impact could be lost recreational opportunity during construction in the vicinity of the center.

Minor temporary indirect impacts from noise, air pollutants and traffic congestion would temporarily affect recreational use of the Fredonia Welcome Center. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the pipeline alignment. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW; prevailing winds from the southwest would disperse residual air pollutants away from the center. Traffic congestion would temporarily delay recreational users in vehicles accessing the Fredonia Welcome Center from US Highway 89A.

4.2.2.3.2 Operation. LPP operations would have no direct or indirect impacts on recreational users of the Fredonia Welcome Center.

4.2.2.2.4 Historic Trails.

4.2.2.4.1 *Construction.* The Hydro System, including HS-2, could have minor temporary direct impacts on recreational users of the historic trails during construction of these features. Temporary direct impacts would occur on recreational users as the penstock construction crosses the historic trails. These temporary direct impacts would have a maximum duration of 8 hours at each trail crossing.

The Hydro System, including HS-2, could have minor temporary indirect impacts historic trails during construction of these features. Noise generated during construction activities would attenuate to

background levels within 800 feet of the pipeline alignment and facility sites and could disrupt recreational experiences of historic trail users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users along the trails may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several dispersed access points for the historic trails could be temporarily affected by construction activities and traffic during construction.

4.2.2.4.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the historic trails on public lands administered by the BLM ASFO.

4.2.2.2.5 Fredonia – Vermilion Cliffs Scenic Drive.

4.2.2.5.1 Construction. The Hydro System construction would have minor temporary direct impacts on recreation resources where the penstock would cross Highway 89A along the Fredonia – Vermilion Cliffs Scenic Drive. Temporary direct impacts would occur on recreational users at the penstock crossing of Highway 89A in north Fredonia.

Minor temporary indirect impacts from noise, air pollutants and traffic congestion could occur on recreational users of the Fredonia – Vermilion Cliffs Scenic Drive where the buried penstock would cross under US Highway 89A. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the pipeline/penstock alignments. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Traffic congestion could temporarily delay recreational users in vehicles traveling along US Highway 89A.

4.2.2.5.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Fredonia – Vermilion Cliffs Scenic Drive.

4.2.2.2.6 Vermilion Cliffs Highways Scenic Drive.

4.2.2.6.1 *Construction.* The Hydro System construction would have minor temporary direct impacts on recreation resources where the penstock would be constructed across the Vermilion Cliffs Highways Scenic Drive. Temporary direct impacts would occur on recreational users at the penstock crossings of US Highway 89A, Arizona Highway 389, Utah State Route 59, and Utah State Route 9with traffic delays. The penstock construction could temporarily directly affect overlooks, pull-outs and interpretive sites along these highways that are part of the Vermilion Cliffs Highways Scenic Drive.

Minor temporary indirect impacts from noise, air pollutants and traffic congestion could occur on recreational users of the Vermilion Cliffs Highways Scenic Drive where the buried penstock would be parallel to or cross under the highways. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the pipeline/penstock alignments. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Traffic congestion could temporarily delay recreational users in vehicles traveling along the highways.

4.2.2.2.6.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Vermilion Cliffs Highways Scenic Drive.

4.2.2.2.7 Arizona Strip Pull-Off.

4.2.2.7.1 *Construction.* The Hydro System construction would have no direct impacts on recreation resources at the Arizona Strip Pull-Off on Arizona Route 389.

Minor temporary indirect impacts from noise, air pollutants and traffic congestion could occur on recreational users of the Arizona Strip Pull-Off. Indirect impacts from construction noise would attenuate to background levels within 800 feet of the sources along the penstock alignment. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Traffic congestion could temporarily delay recreational users in vehicles traveling along Arizona Route 389 near the pull-off. Recreational users of the pull-off would experience minor temporary indirect visual impacts from viewing penstock construction and HS-2 construction along Arizona Route 389.

4.2.2.7.2 *Operation.* LPP operations would have no direct impacts on recreational users of the Arizona Strip Pull-Off. Recreational users of the pull-off could experience minor indirect impacts from viewing HS-2 in the middleground distance zone.

4.2.2.3 Kaibab – Paiute Indian Reservation

4.2.2.3.1 Kaibab-Paiute Tribe Campground and RV Park.

4.2.2.3.1.1 *Construction.* The Hydro System construction would have no direct impacts on recreation resources at the Kaibab-Paiute Tribe Campground and RV Park. Minor temporary indirect impacts from residual air pollutants could occur on recreational users of the Kaibab-Paiute Tribe Campground and RV Park. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Recreational users at the campground and RV park may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions.

4.2.2.3.1.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of the Kaibab-Paiute Tribe Campground and RV Park.

4.2.2.3.2 Historic Trails.

4.2.2.3.2.1 *Construction.* The Hydro System could have minor temporary direct impacts on recreational users of the historic trails during construction of penstock and hydro station features. Temporary direct impacts would occur on recreational users as the penstock construction crosses the historic trails. These temporary direct impacts would have a maximum duration of 8 hours at each trail crossing through the Kaibab-Paiute Indian Reservation.

The Hydro System could have minor temporary indirect impacts on historic trails during construction of these features. Noise generated during construction activities would attenuate to background levels within 800 feet of the penstock alignment and facility sites and could disrupt recreational experiences of historic trail users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users along the trails may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several dispersed access points for the historic trails could be temporarily affected by construction activities and traffic during construction.

4.2.2.3.2.2 *Operation.* LPP operations would have no direct or indirect impacts on recreational users of historic trails crossing through the Kaibab-Paiute Indian Reservation.

4.2.2.4 Pipe Spring National Monument

4.2.2.4.1 Construction. The Hydro System construction would have no direct impacts on recreation resources of the Pipe Spring National Monument within the boundaries of the Kaibab-Paiute Indian Reservation. The Hydro System construction could have minor temporary indirect impacts on Pipe Spring

National Monument and associated recreation. Noise generated during construction activities would attenuate to background levels within 800 feet of the penstock alignment. The Pipe Spring National Monument south boundary is 1,000 feet from the penstock alignment. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users at the Pipe Spring National Monument may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Recreational vehicle access to Pipe Spring National Monument from Arizona Route 389 traffic turning and traveling north on Pipe Springs Road could be temporarily affected by construction activities and traffic during penstock construction.

4.2.2.4.2 Operation. LPP operations would have no direct or indirect impacts on recreational use of the Pipe Spring National Monument within the boundaries of the Kaibab-Paiute Indian Reservation.

4.2.3 Southeast Corner Alternative

The construction and operation impacts of the Southeast Corner Alternative would be the same as the South Alternative (Section 4.2.1) except for the alignment segment crossing the southeast corner of the Kaibab-Paiute Indian Reservation.

4.2.3.1 Kaibab – Paiute Indian Reservation

4.2.3.1.1 Construction. The Hydro System construction would have no direct impacts on recreation resources. This portion of the penstock alignment would roughly parallel an existing single-track dirt and gravel road along the Navajo-McCullough Transmission Line. Dispersed recreation activities that may occur along the penstock alignment could be temporarily disrupted during construction through the southeast corner of the Kaibab-Paiute Indian Reservation. Minor temporary indirect impacts from noise and air pollutants could occur on dispersed recreation activities in close proximity to the penstock construction. Noise generated during construction activities would attenuate to background levels within 800 feet of the penstock alignment. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; dispersed recreation users may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions.

4.2.3.1.2 Operation. LPP operations would have no direct or indirect impacts on recreational use along the Southeast Corner Alternative alignment within the boundaries of the Kaibab-Paiute Indian Reservation.

4.2.4 Transmission Line Alternatives

The construction and operation impacts of the Transmission Line Alternatives on recreation resources would be the same as the South Alternative (Section 4.2.1) for all transmission lines paralleling the Water Conveyance System pipeline and Hydro System penstock. All constructed transmission lines along pipeline and penstock alignments could be viewed by recreational users at various recreation sites, resulting in minor indirect construction and operations impacts, described in the Visual Resources Study Report 16 (UBWR 2010a). Transmission Line Alternative alignments that are independent of the Water Conveyance System pipeline and Hydro System penstock alignments are presented in the following sections.

4.2.4.1 Glen Canyon National Recreation Area

4.2.4.1.1 "Dead Dog" and "Ropes" Recreation Areas.

4.2.4.1.1.1 Construction Impacts. Transmission lines would be constructed about 2,000 feet west of US Highway 89 and in the vicinity of the "Dead Dog" dispersed recreational area and "The Ropes" trail. Heavy equipment used to construct the LPP project transmission lines could result in minor temporary air pollutants, noise, and traffic congestion impacts on recreation use and would pose temporary safety risks to OHV enthusiasts and other recreationists. The temporary direct and indirect impacts on recreation would be minor in the "Dead Dog" dispersed recreation area and "The Ropes" trail.

4.2.4.1.1.2 *Operation Impacts.* Following construction and restoration, the transmission line would be visible to recreationists accessing the "Dead Dog" and "Ropes" areas. This would be a minor indirect impact on recreation. See the Visual Resources Study Report 16 (UBWR 2010a) for additional impact analysis concerning the transmission line appearance.

4.2.4.1.2 Colorado River Discovery Rafting Tours.

4.2.4.1.2.1 *Construction Impacts.* The Transmission Line Alternatives would have no measurable impact on the Colorado River Discovery Rafting Tours. Minor temporary air pollutant and noise impacts could result from construction of the substation upgrade at the existing Glen Canyon Substation. Noise generated during construction activities would attenuate to background levels within 1,600 feet of the Glen Canyon substation upgrade. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW.

4.2.4.1.2.2 *Operation Impacts.* LPP transmission line operations would have no direct or indirect impacts on recreation resources associated with Colorado River Discovery Rafting Tours.

4.2.4.1.3 US Highway 89.

4.2.4.1.3.1 *Construction.* A transmission line would be constructed west of and parallel to Scenic US Highway 89 west of Glen Canyon Dam. About 2,000 feet north of the Carl Hayden Visitor Center, the transmission line serving the Intake Pump Station would cross the highway and head northwest to BPS-1. Heavy equipment used to construct these transmission lines could result in minor temporary indirect impacts on recreation resources. Noise generated during construction activities would attenuate to background levels within 1,600 feet of the transmission line ROW. Most air pollutants would disperse to below NAAQS concentrations within the transmission line ROW. Traffic congestion could delay recreational vehicles on US Highway 89 and pose temporary traffic safety risks to recreationists on the highway.

4.2.4.1.3.2 *Operation Impacts.* Following construction and restoration, the transmission line would be visible to recreationists traveling along US Highway 89. This would be a minor indirect impact on recreation. See the Visual Resources Study Report 16 (UBWR 2010a) for additional impact analysis concerning the transmission line appearance.

4.2.4.1.4 Carl Hayden Visitor Center.

4.2.4.1.4.1 *Construction Impacts.* The transmission line serving the Intake Pump Station would cross US Highway 89 about 2,000 feet north of the Carl Hayden Visitor Center. Heavy equipment used to construct the transmission line could result in minor temporary air pollutants, noise, and traffic congestion indirect

impacts on recreational traffic, and could cause minor temporary traffic safety risks (indirect impacts) on recreationists accessing the visitor center.

4.2.4.1.4.2 Operation Impacts. LPP transmission line operations would have no direct or indirect impacts on recreational use at the Carl Hayden Visitor Center.

4.2.4.1.5 Glen Canyon Dam Overlook.

4.2.4.1.5.1 Construction Impacts. Construction of the Transmission Line Alternatives would have no direct impacts on recreational use at the Glen Canyon Dam Overlook during construction. Minor temporary indirect impacts from noise, air pollutants and visual resources could occur on recreational users of the Glen Canyon Dam Overlook. Indirect impacts from construction noise would attenuate to background levels within 1,600 feet of the Glen Canyon substation. Most air pollutants would disperse to below NAAQS concentrations within the substation area. Construction of the transmission line connections to the Glen Canyon substation could be viewed from the overlook and result in temporary visual impacts in the middle-ground distance zone.

4.2.4.1.5.2 Operation Impacts. Following construction and restoration, the additional transmission lines would be visible to recreation users viewing the substation from the overlook. This would be a minor indirect impact on recreation. The new transmission lines would match the line and form of numerous existing transmission lines entering and connecting to the Glen Canyon substation.

4.2.4.1.6 "Chains" Recreation Area and "Hanging Garden" Trail.

4.2.4.1.6.1 *Construction Impacts.* A transmission line would be constructed to the Water Intake System on the Lake Powell shoreline directly opposite the "Chains" Recreation Area about 1,600 feet away. Heavy equipment used to construct these facilities could result in temporary noise and air pollutants in the "Chains" area. The highest sound pressure levels generated at the Water Intake System site (94 dBA) during construction would attenuate to 64 dBA at the "Chains" area, which is equivalent to moderate conversational speech. These temporary noise levels could have minor indirect impacts on recreational users in the "Chains" area and at the "Hanging Gardens" trailhead. Most of the air pollutants would disperse within the work site to levels below the NAAQS concentrations and prevailing southwest winds would transport any residual pollutants north of the "Chains" area and over Lake Powell.

4.2.4.1.6.2 *Operation Impacts.* Following construction and restoration, the additional transmission lines would be visible to recreation users viewing the Water Intake System from the "Chains" area and "Hanging Gardens." This would be a minor indirect impact on recreational use at the "Chains" area and "Hanging Gardens" Trail. See the Visual Resources Study Report 16 (UBWR 2010a) for additional impact analysis concerning the transmission line appearance.

4.2.4.2 Vermilion Cliffs National Monument

4.2.4.2.1 Construction. Transmission lines serving BPS-2, BPS-3, and other Water Conveyance System facilities would be constructed north of the Vermilion Cliffs National Monument (VCNM) and would have no direct impacts on recreation resources. Heavy equipment used to construct the transmission lines could result in minor temporary noise indirect impacts on VCNM users. Peak noise levels would attenuate to background sound levels within 1,600 feet of the sources. Prevailing winds from the southwest would prevent any temporary air pollutants from dispersing within the VCNM.

4.2.4.2.2 Operation. There would be no direct impacts on recreation resources during operation of the transmission lines serving LPP facilities. The new transmission lines, mostly constructed adjacent to

existing transmission lines, could be visible to recreationists using the VCNM and result in minor indirect impacts.

4.2.4.3 Paria Canyon – Vermilion Cliffs Wilderness

4.2.4.3.1 Construction. Transmission Line Alternatives construction would have no direct impacts on recreation resources in the Paria Canyon – Vermilion Cliffs Wilderness (PCVCW). The transmission lines serving BPS-2, BPS-3, and other Water Conveyance System facilities would be constructed north of the PCVCW. Temporary indirect impacts from noise could occur on recreational users of the PCVCW. Indirect impacts from construction noise would attenuate to background levels within 1,600 feet of the heavy equipment sources along the transmission line alignments.

4.2.4.3.2 Operation. There would be no direct impacts on recreation resources during operation of the transmission lines serving LPP facilities. The new transmission lines, mostly constructed adjacent to existing transmission lines, could be visible to recreationists using the PCVCW and could result in minor indirect impacts.

4.2.4.4 Grand Staircase-Escalante National Monument

4.2.4.4.1 Guided Trips.

4.2.4.4.1.1 *Construction.* The Transmission Line Alternatives construction would have no direct impacts on guided trip providers and participants in the Grand Staircase-Escalante National Monument (GSENM). Minor temporary indirect impacts from noise, air pollutants and visual changes could occur on guided trip providers and participants along transmission line alignments. Indirect impacts from noise would attenuate to background levels within 1,600 feet of the sources along the transmission line alignments. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Transmission line construction could be visible from vantage points used by guided trip providers and participants.

4.2.4.4.1.2 *Operation.* LPP transmission line operations would have no direct impacts on guided trip providers and participants in the GSENM. Guided trip providers and participants could experience minor indirect impacts as they view specific transmission lines along US Highway 89, adjacent to the Navajo-McCullough Transmission Line, and near the GSENM south boundary.

4.2.4.4.2 Cockscomb Wilderness Study Area.

4.2.4.4.2.1 *Construction.* The Transmission Line Alternatives would have minor indirect impacts on recreational users of the nearby Cockscomb Wilderness Study Area (WSA) during construction of these features. Noise generated during construction activities would attenuate to background levels within 1,600 feet of the BPS-3/WCH-1 Transmission Line and could temporarily disrupt recreational experiences of users in the southwest corner of the WSA. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users in the WSA may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several dispersed access points for the WSA could be temporarily affected by construction activities and traffic during construction. There would be no direct impacts on recreational users of the WSA.

4.2.4.4.2.2 *Operation.* LPP transmission line operations would have no direct impacts on recreation resources in the Cockscomb WSA. Recreational users of the WSA could experience minor indirect impacts from viewing the transmission lines because of their close proximity to the WSA boundaries.

Specific visual resource impacts are documented for facility sites in the Visual Resource Study Report 16 (UBWR 2010a).

4.2.4.3 Wahweap Wilderness Study Area.

4.2.4.4.3.1 *Construction.* The transmission lines serving BPS-3 Alt. could have minor indirect impacts on recreational users of the nearby Wahweap WSA during construction of these features. Noise generated during construction activities would attenuate to background levels within 1,600 feet of the transmission line ROW and could disrupt recreational experiences of WSA users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users in the WSA may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several dispersed access points for the WSA could be temporarily affected by construction activities and traffic during construction. There would be no direct impacts on recreational users of the WSA.

4.2.4.4.3.2 *Operation.* LPP transmission line operations would have no direct impacts on recreation resources in the Wahweap WSA. Recreational users of the WSA could experience minor indirect impacts from viewing transmission lines in the middle-ground distance zone because of their proximity to the WSA.

4.2.4.4 US Highway 89 Special Recreation Management Area.

4.2.4.4.1 *Construction.* The transmission lines serving BPS-3/WCH-1, BPS-4 or BPS-4 Alt., High Point Regulating Tank-2 and HS-1 would have no direct impacts on recreational users of the nearby US Highway 89 Special Recreation Management Area (SRMA) during construction of these features.

The transmission lines serving BPS-3/WCH-1, BPS-4 or BPS-4 Alt., High Point Regulating Tank-2 and HS-1 could have minor indirect impacts on recreational users of the nearby US Highway 89 SRMA during construction of these features. Noise generated during construction activities would attenuate to background levels within 1,600 feet of the transmission line alignments and could disrupt recreational experiences of users within the SRMA. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users in the SRMA may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several dispersed access points for the SRMA could be temporarily affected by construction activities and traffic during construction.

4.2.4.4.2 *Operation.* LPP transmission line operations would have no direct impacts on recreation resources in the US Highway 89 SRMA. Recreational users of the SRMA could experience minor indirect impacts from viewing transmission lines because of their proximity to the SRMA.

4.2.4.4.5 Historic Trails.

4.2.4.4.5.1 *Construction.* The transmission lines serving BPS-3/WCH-1, BPS-4 or BPS-4 Alt., High Point Regulating Tank-2 and HS-1 could have minor temporary direct impacts on recreational users of the GSENM historic trails during construction of these features. Temporary direct impacts would occur on recreational users as the transmission line construction progresses across trails. These temporary direct impacts would have a maximum duration of 8 hours at a specific trail crossing.

The transmission lines serving BPS-3/WCH-1, BPS-4 or BPS-4 Alt., High Point Regulating Tank-2 and HS-1 could have minor indirect impacts on recreational users of the GSENM historic trails during construction of these features. Noise generated during construction activities would attenuate to background levels within 1,600 feet of the pipeline alignment and facility sites and could disrupt

recreational experiences of historic trail users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users along the trails may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several dispersed access points for the historic trails could be temporarily affected by construction activities and traffic during construction.

4.2.4.4.5.2 *Operation.* LPP transmission line operations would have no direct impacts on recreation resources of the GSENM historic trails. Recreational users of the historic trails could experience minor indirect impacts from viewing transmission lines.

4.2.4.4.6 Paria Canyons and Plateaus Special Recreation Management Area.

4.2.4.4.6.1 *Construction.* The Transmission Line Alternatives construction would have no direct impacts on recreational users accessing the Paria Canyons and Plateaus Special Recreation Management Area (SRMA) via the Cottonwood Canyon Road (south from US Highway 89), the White House Trail road, and the House Rock Valley Road. Temporary indirect impacts from noise could occur on recreational users of these roads where they intersect with US Highway 89. Indirect impacts from noise would attenuate to background levels within 1,600 feet of the sources along the transmission line ROWs.

4.2.4.4.6.2 *Operation.* LPP transmission line operations would have no direct or indirect impacts on recreational users of the Paria Canyons and Plateaus SRMA.

4.2.4.4.7 Paria Contact Station, White House Campground, and White House Trail.

4.2.4.4.7.1 *Construction.* The BPS-3 Transmission Line North construction would have no direct impacts on recreational users accessing the Paria Contact Station, White House Campground and White House Trail. Temporary indirect impacts from noise could occur on recreational users of the Paria Contact Station. Indirect impacts from noise would attenuate to background levels within 1,600 feet of the heavy equipment sources along the transmission line ROW. Prevailing winds from the southwest would disperse air pollutants away from the Paria Contact Station.

4.2.4.4.7.2 *Operation.* LPP transmission line operations would have no direct impacts on recreation resources of the Paria Contact Station, White House Campground and White House Trail. Recreational users of the Paria Contact Station, White House Campground and White House Trail could experience minor indirect impacts from viewing transmission lines.

4.2.4.4.8 Toadstools Trailhead.

4.2.4.4.8.1 *Construction.* The BPS-3 Transmission Line North construction could have minor temporary indirect impacts on recreational users accessing the Toadstools Trailhead and trail. Temporary indirect impacts from noise, air pollutants and traffic congestion could occur on recreational users of the Toadstools Trailhead and trail. Indirect impacts from noise would attenuate to background levels within 1,600 feet of the sources along the transmission line ROW. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users and the trailhead and along the trail may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Traffic congestion could occur along US Highway 89 during pipeline construction and could slightly delay recreational users in their vehicles.

There would be no direct impacts on recreation resources from the BPS-3 Transmission Line North at the Toadstools Trailhead.

4.2.4.4.8.2 *Operation.* LPP transmission line operations would have no direct impacts on recreational users of the Toadstools Trailhead and trail. Recreational users of the Toadstools Trailhead and trail could experience minor indirect impacts from viewing transmission lines.

4.2.4.4.9 Catstair Canyon Trailhead.

4.2.4.4.9.1 *Construction.* The BPS-3 Transmission Line North construction would have minor indirect impacts on recreational users accessing the Catstair Canyon Trailhead. Indirect impacts from noise would attenuate to background levels within 1,600 feet of the heavy equipment sources along the transmission line ROW. Prevailing winds from the southwest would disperse air pollutants away from the trailhead.

4.2.4.4.9.2 *Operation.* LPP transmission line operations would have no direct impacts on recreational users of the Catstair Canyon Trailhead. Recreational users of the Catstair Canyon Trailhead and trail could experience indirect impacts from viewing the transmission line in the foreground and middle-ground distance zones.

4.2.4.4.10 House Rock Valley Road.

4.2.4.4.10.1 *Construction.* The BPS-3 Underground Transmission Line construction would have minor direct impacts on recreational users accessing the House Rock Valley Road. Temporary direct impacts would occur on recreational users as the underground transmission line construction blocks access from US Highway 89 to the House Rock Road. These temporary direct impacts would have a maximum duration of 8 hours. Temporary indirect impacts from noise could occur on recreational users of the House Rock Valley Road where it intersects with US Highway 89. Indirect impacts from noise would attenuate to background levels within 1,600 feet of the heavy equipment sources along the transmission line ROW.

4.2.4.4.10.2 *Operation.* LPP transmission line operations would have no direct or indirect impacts on recreational users of the House Rock Valley Road.

4.2.4.4.11 Off-Highway Vehicle Use and Hunting.

4.2.4.4.11.1 *Construction.* The Transmission Line Alternatives construction could have minor direct and indirect impacts on off-highway vehicle (OHV) use and hunting in the GSENM. Temporary direct impacts would occur on OHV users and hunters as the transmission line construction blocks access from US Highway 89 to trailheads, interpretive sites, access roads and visitor centers. These temporary direct impacts would have a maximum duration of 8 hours at a specific site. Temporary indirect impacts from noise, air pollutants and visual changes could occur on OHV users and hunters. Indirect impacts from noise would attenuate to background levels within 1,600 feet of the sources along the transmission line ROWs. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW.

4.2.4.4.11.2 Operation. LPP transmission line operations would have no direct impacts on OHV users and hunters in the GSENM. Guided trip providers and participants could experience indirect impacts as they view transmission lines.

4.2.4.4.12 Great Western Trail.

4.2.4.4.12.1 *Construction.* The HS-1 Alt. transmission line construction would have minor direct and indirect impacts on recreational users of the Great Western Trail (GWT). Temporary direct impacts would occur on GWT users as the transmission line construction blocks access along the High Point Alternative

Alignment. These temporary direct impacts would have a maximum duration of 8 hours at the GWT crossing under the transmission line alignment. Temporary indirect impacts from noise and air pollutants could occur on GWT users. Indirect impacts from noise would attenuate to background levels within 1,600 feet of the sources along the transmission line ROW. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW.

4.2.4.4.12.2 *Operation.* LPP transmission line operations would have no direct impacts on recreational users of the Great Western Trail. Trail users could experience indirect impacts as they view the HS-1 Alt. transmission line.

4.2.4.5 BLM - Arizona Strip Field Office

4.2.4.5.1 Historic Trails.

4.2.4.5.1.1 *Construction.* The HS-2 South Transmission Line could have minor temporary direct impacts on recreational users of the historic trails during construction of these features. Temporary direct impacts would occur on recreational users as the transmission line construction crosses the historic trails. These temporary direct impacts would have a maximum duration of 8 hours at each trail crossing.

The HS-2 South Transmission Line construction could have minor temporary indirect impacts on historic trail users. Noise generated during construction activities would attenuate to background levels within 1,600 feet of the transmission alignment and could disrupt recreational experiences of historic trail users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users along the trails may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Several dispersed access points for the historic trails could be temporarily affected by construction activities and traffic during construction.

4.2.4.5.1.2 *Operation.* LPP transmission line operations would have no direct impacts on recreational users of the historic trails on public lands administered by the BLM Arizona Strip Field Office (ASFO). Historic trails users could experience indirect impacts as they view the HS-1 Alt. transmission line.

4.2.4.5.2 Vermilion Cliffs Highways Scenic Drive.

4.2.4.5.2.1 *Construction.* The Transmission Line Alternatives construction may have minor temporary direct impacts on recreation resources where the transmission lines would be constructed across features of the Vermilion Cliffs Highways Scenic Drive. Temporary direct impacts may occur on recreational users at the Vermilion Cliffs Highways Scenic Drive features along US Highway 89, US Highway 89A, Utah State Route 59, and Utah State Route 9with closure of pull-outs and interpretive sites for a maximum duration of up to 8 hours.

Minor temporary indirect impacts from noise, air pollutants and traffic congestion could occur on recreational users of the Vermilion Cliffs Highways Scenic Drive where the transmission line would be parallel to or cross over the highways. Indirect impacts from construction noise would attenuate to background levels within 1,600 feet of the sources along the transmission line ROWs. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW. Traffic congestion could temporarily delay recreational users in vehicles traveling along the highways.

4.2.4.5.2.2 *Operation.* LPP transmission line operations would have no direct impacts on recreational users of the Vermilion Cliffs Highways Scenic Drive. Recreation vehicle users could experience indirect impacts as they view transmission lines from the pull-outs and interpretive sites associated with the Vermilion Cliff Highways Scenic Drive.
4.2.4.5.3 Arizona Strip Pull-Off.

4.2.4.5.3.1 *Construction.* The HS-2 South Transmission Line construction would have no direct impacts on recreation resources at the Arizona Strip Pull-Off on Arizona Route 389. Recreational users of the pull-off could experience minor temporary indirect visual impacts from viewing transmission line construction along Yellowstone Road.

4.2.4.5.3.2 *Operation.* LPP transmission line operations would have no direct impacts on recreational users of the Arizona Strip Pull-Off. Recreational users of the pull-off could experience minor indirect impacts from viewing HS-2 South Transmission Line in the middle-ground distance zone.

4.2.4.6 BLM – St. George Field Office

4.2.4.6.1 Off-Highway Vehicle Use.

4.2.4.6.1.1 *Construction.* The HS-4/HS-4 Alt. Transmission Line construction would have minor temporary direct impacts on off-highway vehicle (OHV) use and access on public lands administered by the BLM St. George Field Office. These impacts would include temporary access closures or restrictions along gravel and dirt roads and trails crossing the transmission line ROW. Roads and trails crossed by the transmission line construction would be closed up to a maximum of 8 hours at each crossing site. Direct impacts would occur on recreational users of Antelope Road/Branham Ranch Road (south of Utah State Route 59) during transmission line construction along the road. Temporary detours and closures would affect access to BLM trails and other dispersed recreation sites as the transmission line construction proceeds along the road.

Temporary indirect impacts including noise, air pollutants and traffic congestion would occur on recreational resources along and users of the Antelope Road/Branham Ranch Road. Noise generated during construction activities would attenuate to background levels within 1,600 feet of the transmission line ROW and could disrupt recreational experiences of OHV and trail users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users along the roads and trails may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Traffic congestion would occur along the roads and OHV recreational users could experience delays.

4.2.4.6.1.2 *Operation.* LPP transmission line operations would have no direct impacts on OHV use of the Antelope Road/Branham Ranch Road. OHV users could experience minor indirect impacts from viewing the HS-4/HS-4 Alt. transmission line.

4.2.4.6.2 Sand Mountain Special Recreation Management Area.

4.2.4.6.2.1 *Construction.* The Hurricane Cliffs Afterbay to Hurricane West transmission line and Hurricane Cliffs Afterbay to Sand Hollow transmission line construction would have direct impacts on recreation resources in the Sand Mountain Special Recreation Management Area (SRMA). These transmission lines would be constructed within the SRMA boundary. The transmission line construction would have minor temporary direct impacts on recreation use of about 60 acres along 3.8 miles of the Sand Mountain SRMA as the construction occurs along the transmission line ROW. Dispersed recreation and recreational access at transmission line crossings of gravel and dirt roads would be closed until construction activities are completed.

Temporary indirect impacts including noise, air pollutants and traffic congestion would occur on recreational resources within the Sand Mountain SRMA along the transmission line ROWs. Noise

generated during construction activities would attenuate to background levels within 1,600 feet of the transmission line ROWs and could disrupt recreational experiences of SRMA users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor. Traffic congestion would occur along the roads and recreational users could experience delays.

4.2.4.6.2.2 *Operation.* LPP transmission line operations would have no direct impacts on recreational use of the Sand Mountain SRMA along the transmission lines associated with either the Hurricane Cliffs pumped storage facility or the Hurricane Cliffs peaking power facility.

LPP transmission line operations could have minor indirect impacts on recreational users in the Sand Mountain SRMA. Recreation resource users within the SRMA could experience minor indirect impacts as they view the transmission lines.

4.2.4.6.3 Hurricane Cliffs Non-Motorized Trail System.

4.2.4.6.3.1 *Construction.* The HS-4/HS-4 Alt. transmission line construction would have minor temporary direct impacts on portions of the Hurricane Cliffs Non-Motorized Trail System. The transmission line would be constructed along the Antelope Road/Branham Ranch Road and the Gould's Rim Trail would be temporarily closed for a maximum of up to 8 hours where it would cross the transmission line ROW.

Temporary indirect impacts including noise, air pollutants and traffic congestion would occur on recreational resources during transmission line construction. Recreational users of the Gould's Trail could be temporarily affected as the transmission line construction progresses. Noise generated during transmission line construction activities would attenuate to background levels within 1,600 feet of the transmission line ROW and could disrupt recreational experiences of trail users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; recreational users along the roads and trails may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Traffic congestion would occur along the roads and recreational users could experience delays.

4.2.4.6.3.2 *Operation.* LPP transmission line operations would have no direct impacts on recreation resources of the Hurricane Cliffs Non-Motorized Trail System. Recreation resource users of the Gould's Rim Trailhead and Gould's Trail could experience minor indirect impacts as they view the transmission line.

4.2.4.6.4 Frog Hollow OHV Area.

4.2.4.6.4.1 *Construction.* The HS-4/HS-4 Alt. transmission line construction would have no direct impacts on recreation resources of the Frog Hollow OHV area. Minor temporary indirect impacts including noise, air pollutants and traffic congestion could occur on recreational resources and users of the Frog Hollow OHV area during HS-4/HS-4 Alt. transmission line construction. Noise generated during CVP construction activities would attenuate to background levels within 1,600 feet of the transmission line ROW and could disrupt recreational experiences of Frog Hollow OHV users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; prevailing winds from the southwest would disperse air pollutants away from the Frog Hollow area. Traffic congestion would occur along the Antelope Road/Branham Ranch Road and recreational users could experience delays during transmission line construction.

4.2.4.6.4.2 *Operation.* LPP transmission line operations would have no direct impacts on recreation resources of the Frog Hollow OHV area. Recreation resource users of the Frog Hollow OHV area could experience minor indirect impacts as they view the transmission line.

4.2.4.6.5 LaVerkin Creek/Black Ridge Special Recreation Management Area.

4.2.4.6.5.1 *Construction.* The Cedar Valley Booster Pump Station (CVBPS) 1 and 2 transmission lines construction would have no direct impacts on recreation resources in the LaVerkin Creek/Black Ridge Special Recreation Management Area (SRMA).

Minor temporary indirect impacts including noise, air pollutants and changes in views could occur on recreational resources and users of the LaVerkin Creek/Black Ridge SRMA during transmission line construction. Noise generated during CVP construction activities would attenuate to background levels within 1,600 feet of the transmission line ROWs and could disrupt recreational experiences of SRMA users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridors. Recreation resource users of the SRMA could experience minor indirect impacts as they view the transmission lines construction.

4.2.4.6.5.2 *Operation.* CVBPS transmission line operations would have no direct impacts on recreation resources of the LaVerkin Creek/Black Ridge SRMA. Recreation resource users of the SRMA could experience minor indirect impacts as they view the transmission lines.

4.2.4.7 Sand Hollow State Park

4.2.4.7.1 Construction. The Hurricane Cliffs Afterbay to Sand Hollow transmission line and Sand Hollow to Dixie Springs transmission line construction would have direct impacts on recreation resources within Sand Hollow State Park. The construction would temporarily restrict dispersed recreation activities along the transmission line ROWs, and would temporarily close the Sand Hollow Road.

Minor temporary indirect impacts including noise, air pollutants and traffic congestion could occur on recreational resources and users within Sand Hollow State Park. Noise generated during transmission line construction activities would attenuate to background levels within 1,600 feet of the transmission line ROWs and could disrupt recreational experiences of Sand Hollow State Park users. Air pollutants would mostly disperse to below NAAQS concentrations within the ROW corridor; prevailing winds from the southwest would disperse air pollutants away from Sand Hollow State Park primary use areas. Traffic congestion would occur along the Sand Hollow Road and recreational users in vehicles could experience delays during transmission line construction.

4.2.4.7.2 Operation. LPP transmission operations would have no direct impacts on recreational use of Sand Hollow State Park. Recreation resource users of the park could experience minor indirect impacts as they view the transmission lines.

4.2.4.8 Quail Creek State Park

4.2.4.8.1 Construction. The transmission line construction would have no direct or indirect impacts on recreation resources of Quail Creek State Park.

4.2.4.8.2 Operation. LPP transmission line operations would have no measurable direct impacts on recreational use of Quail Creek State Park. Recreation resource users of the park could experience minor indirect impacts as they view the Hurricane Cliffs Afterbay to Hurricane West Transmission Line.

4.2.4.9 Dixie National Forest

4.2.4.9.1 Construction. The CVBPS transmission lines construction would have no direct or indirect impacts on recreation resources of the Dixie National Forest.

4.2.4.9.2 Operation. CVBPS transmission lines operation would have no direct or indirect impacts on recreation resources of the Dixie National Forest.

4.2.4.10 Zion National Park

4.2.4.10.1 Construction. The CVBPS transmission lines construction would have no direct or indirect impacts on recreation resources of Zion National Park.

4.2.4.10.2 Operation. CVBPS transmission lines operation would have no direct or indirect impacts on recreation resources of Zion National Park.

4.2.4.11 Private Recreational Facilities

4.2.4.11.1 Paria Outpost Resort.

4.2.4.11.1.1 Construction. The BPS-3 Transmission Line North construction would have minor temporary direct impacts on access to the Paria Outpost Resort. Transmission line construction along US Highway 89 at each access road intersection would temporarily delay or disrupt access to and from the resort for up to a maximum of 8 hours.

Indirect impacts including noise, air pollutants and traffic congestion could temporarily affect recreational traffic at each access road intersection with US Highway 89. Indirect impacts from construction noise would attenuate to background levels within 1,600 feet of the sources along the transmission line ROW. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW; prevailing winds from the southwest would disperse residual air pollutants away from the resort. Traffic congestion could temporarily delay recreational users in vehicles at each resort access road intersection with US Highway 89.

4.2.4.11.1.2 Operation. LPP transmission line operations would have no direct impacts on recreation resources of the Paria Outpost Resort. Recreation resource users of the Paria Outpost Resort could experience indirect impacts as they view the BPS-3 Transmission Line North.

4.2.4.11.2 Diamond Ranch Academy.

4.2.4.11.2.1 *Construction.* The HS-4/HS-4 Alt. transmission line construction would have minor temporary direct impacts on access to the Diamond Ranch Academy along the Antelope Road/Branham Ranch Road. Transmission line construction along this road and crossings of the Diamond Ranch Academy access points would temporarily delay or disrupt access to and from the academy for up to a maximum of 4 hours at each access point.

Indirect impacts including noise, air pollutants and traffic congestion could temporarily affect recreational traffic along the Antelope Road/Branham Ranch Road between the Diamond Ranch Academy and Utah State Route 59. Indirect impacts from construction noise would attenuate to background levels within 1,600 feet of the sources along the transmission line ROW. Most air pollutants would disperse to below NAAQS concentrations within the construction ROW; prevailing winds from the southwest would

disperse residual air pollutants away from the academy. Traffic congestion could temporarily delay academy users in vehicles at each access road intersection with Antelope Road/Branham Ranch Road and along the road during transmission line construction.

4.2.4.11.2.2 *Operation.* LPP transmission line operations would have no direct impacts on Diamond Academy Ranch use of the Antelope Road/Branham Ranch Road. Employees and users of the Diamond Academy Ranch could experience indirect impacts as they view the HS-4/HS-4 Alt. transmission line.

4.2.5 No Lake Powell Water Alternative

The No Lake Powell Water Alternative would involve construction and operation of reverse osmosis water treatment facilities and associated infrastructure near the Washington Fields Diversion and Warner Valley in the St. George metropolitan area, and restricting residential outdoor watering in the St. George metropolitan area and Cedar Valley. Several of the recreation resources that could be affected by the Hydro System alternatives would be affected by the No Lake Powell Water Alternative. The following sections describe the direct and indirect impacts of constructing and operating the No Lake Powell Water Alternative on recreation resources.

4.2.5.1 BLM – St. George Field Office

4.2.5.1.1 Off-Highway Vehicle Use.

4.2.5.1.1.1 Construction. The No Lake Powell Water Alternative construction would have direct impacts on off-highway vehicle (OHV) use and access on public lands administered by the BLM St. George Field Office. The Warner Valley Reservoir, the reverse osmosis water treatment facilities, and brine evaporation ponds would permanently remove about 800 acres of public land from OHV recreational use in the Warner Valley area. These impacts would include permanent access closures and restrictions along gravel and dirt roads and trails in the Warner Valley area. Direct impacts also would occur on OHV recreational users during transmission line construction from the proposed Hurricane West Substation to the reverse osmosis water treatment plant site. Temporary detours and closures would affect access to dispersed recreation sites as the transmission line construction proceeds parallel to the Virgin River.

Temporary indirect impacts including noise, air pollutants, traffic congestion and changes in visual resources would occur on recreational resources along and users of Pecon Road. Noise generated during construction activities would attenuate to background levels within 1,600 feet of the transmission line ROW and could disrupt recreational experiences of OHV and trail users. Air pollutants would mostly disperse to below NAAQS concentrations within the transmission line ROW and work areas; OHV users along the roads and trails surrounding the Warner Valley area may temporarily detect nitrogen dioxide from construction equipment emissions under worst-case conditions. Traffic congestion would occur along the roads and OHV recreational users could experience delays. Off-highway vehicle users could experience minor indirect impacts as they view construction of the transmission lines, Warner Valley Dam and reservoir, brine evaporation ponds and reverse osmosis water treatment plant.

4.2.5.1.1.2 Operation. The No Lake Powell Water Alternative operations would have direct impacts on OHV use of roads and trails in the Warner Valley area because some roads and trails would be permanently closed. OHV users could experience minor indirect impacts from viewing the transmission line, Warner Valley Dam and reservoir, brine evaporation ponds and reverse osmosis water treatment plant.

4.2.5.1.2 Sand Mountain Special Recreation Management Area.

4.2.5.1.2.1 *Construction.* The No Lake Powell Water Alternative construction would have direct impacts on recreation resources in the Sand Mountain Special Recreation Management Area (SRMA). The reverse osmosis water treatment plant, Warner Valley Dam and Reservoir, and brine evaporation ponds would be constructed within the SRMA boundary. Construction of these features would have permanent direct impacts on recreation use of about 800 acres of the Sand Mountain SRMA as the construction occurs in the Warner Valley area. No recreation activities would be allowed in the area surrounding the reverse osmosis water treatment plant, Warner Valley Reservoir, and the brine evaporation ponds. This would be a significant impact on recreation resources.

Temporary indirect impacts including noise, air pollutants, traffic congestion and changes in visual resources would occur on recreational resources within the Sand Mountain SRMA. Noise generated during construction activities would attenuate to background levels within 1,600 feet of the heavy equipment construction sources and could disrupt recreational experiences of SRMA users. Air pollutants would mostly disperse to below NAAQS concentrations within the construction area and along the transmission line corridor. Traffic congestion would occur along Pecon Road and recreational users could experience delays.

4.2.5.1.2.2 *Operation.* The No Lake Powell Water Alternative operation would have direct impacts on recreational use of the Sand Mountain SRMA. Approximately 800 acres of the SRMA would be permanently removed from recreational access and use. This would be a significant impact on recreation resources.

The No Lake Powell Water Alternative operation could have minor indirect impacts on recreational users in the Sand Mountain SRMA. Recreation resource users within the SRMA could experience indirect impacts as they view the transmission lines, reverse osmosis water treatment plant, Warner Valley Dam and Reservoir and the brine evaporation ponds. Recreation resource users of the SRMA in the vicinity of the brine evaporation ponds would detect odors in the air as the brine evaporates from the ponds.

4.2.5.2 Private Recreational Facilities

4.2.5.2.1 Sand Hollow Resort.

4.2.5.2.1.1 Construction. The No Lake Powell Water Alternative features and facilities construction would have minor temporary direct impacts on the Sand Hollow Resort. Transmission line construction along Pecon Road adjacent to the resort would temporarily close portions of the golf course during transmission tower placement and conductor installation.

Indirect impacts including noise, air pollutants, traffic congestion and changes in visual resources could temporarily affect recreational use of the Sand Hollow Resort. Indirect impacts from construction noise would attenuate to background levels within 1,600 feet of the sources along the transmission line ROW. Most air pollutants would disperse to below NAAQS concentrations within the transmission line ROW and construction areas; however, prevailing winds from the southwest would disperse residual air pollutants including nitrogen dioxide toward the resort. Traffic congestion could temporarily delay recreational users in vehicles along Pecon Road. Recreation users of the resort could experience temporary indirect impacts as they view construction of the transmission line and Warner Valley Dam.

4.2.5.2.1.2 *Operation.* The No Lake Powell Water Alternative operation would have no direct impacts on recreation resources of the Sand Hollow Resort. Recreation resource users of the Sand Hollow Resort

could experience indirect impacts as they view the transmission line paralleling the resort boundary along Pecon Road.

4.2.5.3 Residential Landscapes, Public Parks and Landscaped Common Areas

Restrictions on residential outdoor watering would have significant indirect impacts on recreation throughout the St. George metropolitan area and Cedar Valley. All existing and future residential landscapes would be converted to xeriscape landscapes with no shade trees, no ornamental and other shrubs, no lawns and no other vegetative cover typically growing in residential areas within the St. George metropolitan area and the Cedar Valley. Recreational pursuits including walking, running, playing games, and sports activities on residential lots and in public parks and landscaped common areas would be adversely impacted because the vegetation supporting these areas would become xeriscapes. Public parks with artificial turf would not be affected by restricting outdoor watering.

4.2.6 No Action Alternative

The No Action Alternative would not have any construction or operation impacts on recreation resources within the LPP study area. No construction would occur and no operational activities would occur.

Chapter 5 Mitigation and Monitoring

This chapter describes mitigation and monitoring measures to avoid, minimize or reduce impacts of LPP Project construction and operation and maintenance on recreation resources. Many of these measures would be incorporated into project "Standard Construction Procedures" (SCPs) to be used in the field as LPP Project features and facilities are being constructed.

5.1 General Mitigation Measures

The following mitigation measures would be applicable to all LPP Project features and facilities during construction:

- Construction area fencing, signage, temporary road closures (as needed), and implementation of best management practices, would decrease the safety risks associated with LPP project construction along roadways.
- To the maximum extent possible, construction activities would be performed in recreational "off-seasons", which vary by facility and use.
- Pipeline rights-of-way, transmission line rights-of-way, and LPP project access roads would be closed to OHV and other recreational users to minimize environmental impacts and enhance LPP project security.
- Identified recreation needs would be considered, as appropriate and agreed to in consultation with resource agencies, during LPP project design and construction.
- Where appropriate (such as in the Hurricane Cliffs Non-Motorized Trail System area and Frog Hollow OHV area) and agreed to in consultation with resource management agencies, pipelines would be installed beneath existing roads to minimize visual impacts, environmental impacts, and environmental restoration work.
- Some recreation access roads would require permanent closure because they lead to LPP project facilities. Permanently closed recreation access roads would be rerouted prior to the commencement of construction in consultation with resource management agencies to facilitate continued recreation use in the vicinity following LPP project completion.

5.2 South Alternative

5.2.1 Construction

• Construction of South Alternative features at or near recreation sites and across access roads to recreation sites should be scheduled outside of high-use recreation periods if possible.

• Construction flaggers should be used to manage public vehicle access during construction activities at and near recreation sites to avoid or minimize risks to recreationists and construction personnel.

5.2.2 Operation and Maintenance

- LPP access roads to surface facilities and following pipeline and transmission line right-of-way should have access controls (locked gates) wherever possible.
- LPP Project monitoring or maintenance vehicles should be restricted to safe operating speeds according to road locations.

5.3 Existing Highway Pipeline Alternative

5.3.1Construction

Same as Section 5.2.1.

5.3.2 Operation and Maintenance

Same as Section 5.2.2.

5.4 Southeast Corner Pipeline Alternative

5.4.1 Construction

Same as Section 5.2.1.

5.4.2 Operation and Maintenance

Same as Section 5.2.2.

5.5 Transmission Line Alternatives

5.5.1 Construction

Same as Section 5.2.1.

5.5.2 Operation and Maintenance

Same as Section 5.2.2.

5.6 No Lake Powell Water Alternative

5.6.1 Construction

Same as Section 5.2.1.

5.6.2 Operation and Maintenance

Same as Section 5.2.2.

5.7 No Action Alternative

No features or facilities would be constructed, operated or maintained under the No Action Alternative, therefore no mitigation or monitoring would be required.

Chapter 6 Unavoidable Adverse Impacts

This chapter describes unavoidable adverse impacts from construction, operation and maintenance of the LPP Project alternatives. Unavoidable adverse impacts are those remaining after application of mitigation and monitoring measures described in Chapter 5. Only resources that would have unavoidable adverse impacts are described here. Unavoidable adverse impacts may not meet or exceed the significance criterion.

6.1 South Alternative

6.1.1 Construction Phase

6.1.1.1 Existing and Proposed Recreation Facilities and Use

6.1.1.1 Direct Impacts. Construction of the Hurricane Cliffs afterbay reservoir would permanently remove about 200 acres of the Sand Mountain Special Recreation Management Area from recreation use. Construction of the penstock from the Hurricane Cliffs afterbay reservoir to the Sand Hollow Hydro Station would temporarily restrict recreational use of 60 acres of the Sand Mountain Special Recreation Management Area for about 3.8 miles along the penstock right-of-way. The permanent removal of 200 acres of the Sand Mountain Special Recreation Management Area from recreational use would be an unavoidable adverse impact on recreation resources.

Recreation access to existing and proposed recreation facilities from US Highway 89, US Highway 89A, Arizona Route 389, Utah State Route 59 and Utah State Route 9 could be temporarily restricted or closed during pipeline and facility construction at the access points. Recreation users would be delayed or unable to access specific recreation sites for up to a maximum of 8 hours, which would be an unavoidable adverse impact on recreation resources.

6.1.1.2 Indirect Impacts. Recreation resource users could experience residual noise, air pollutants from heavy equipment emissions, traffic congestion along highways and roads, and changes in views during recreational activities pursued adjacent to active construction at specific facility sites and along pipeline rights-of-way. These indirect impacts could be unavoidable adverse impacts on recreation resource users.

6.1.2 Operation Phase

6.1.2.1 Existing and Proposed Recreation Facilities and Use

6.1.2.1.1 Direct Impacts. Operation of the Hurricane Cliffs afterbay reservoir and hydropower station would have direct impacts on recreational use of the Sand Mountain Special Recreation Management Area. The afterbay reservoir would not be available for recreational use because the water levels would fluctuate rapidly and would be unsafe for public recreation activities. This would be an unavoidable adverse impact on recreation resources. The afterbay reservoir would not be designed for regular water discharge through a spillway; however, the afterbay reservoir would have an emergency spillway that could discharge water during emergency conditions and cause temporary flooding down-gradient (south) of the afterbay and affect recreational use of that portion of the Sand Mountain SRMA. This could be an unavoidable adverse impact on recreation resources.

6.1.2.1.2 Indirect Impacts. Recreation resource users could experience traffic congestion and changes in views during recreational activities pursued adjacent to LPP Project pump stations, hydro stations, regulating tanks, the forebay reservoir, and afterbay reservoir. These indirect impacts could be unavoidable adverse impacts on recreation resource users.

6.2 Existing Highway Alternative

6.2.1 Construction Phase

6.2.1.1 Existing and Proposed Recreation Facilities and Use

The unavoidable adverse direct and indirect impacts described in Section 6.1.1.1 for the South Alternative would be the same for the Existing Highway Alternative. Additional unavoidable adverse impacts of the Existing Highway Alternative on recreation resources are presented in the following sections.

6.2.1.1.1 Direct Impacts. Construction of the penstock adjacent to the Fredonia Welcome Center would temporarily close recreational access to the center. The lost recreational opportunity during closure of the Fredonia Welcome Center would be an unavoidable adverse impact on recreation resources.

6.2.2.1.2 Indirect Impacts. Recreation resource users at Pipe Spring National Monument could experience residual air pollutants such as nitrogen dioxide and sulfur dioxide from heavy equipment emissions during penstock construction near the Pipe Spring area. Recreationists accessing Pipe Springs Road from US Highway 89 could experience temporary delays during penstock construction across Pipe Springs Road. These indirect impacts could be unavoidable adverse impacts on recreation resources users.

6.2.2 Operation Phase

6.2.2.1 Existing and Proposed Recreation Facilities and Use

6.2.2.1.1 Direct Impacts. LPP operations would have no unavoidable adverse direct impacts on recreation resources.

6.2.2.1.2 Indirect Impacts. Recreation resource users could experience a change in views toward Hydro Station 2 from the Arizona Strip Pull-Off and Arizona Route 389. This indirect impact would be an unavoidable adverse impact on recreation resource users.

6.3 Southeast Corner Pipeline Alternative

Unavoidable adverse impacts would be the same as described in Section 6.1.

6.4 Transmission Line Alternatives

6.4.1 Construction Phase

6.4.1.1 Existing and Proposed Recreation Facilities and Use

6.4.1.1.1 Direct Impacts. Construction of the Transmission Line Alternatives would result in temporary access delays or closures to recreation resource sites where access roads would be crossed by the transmission lines. These temporary direct impacts would be unavoidable adverse impacts.

6.4.1.1.2 Indirect Impacts. Recreation resource users could experience residual noise, air pollutants from heavy equipment emissions, traffic congestion along highways and roads, and changes in views during recreational activities pursued adjacent to active construction at specific facility sites and along transmission line rights-of-way. These indirect impacts could be unavoidable adverse impacts on recreation resource users.

6.4.2 Operation Phase

6.4.2.1 Existing and Proposed Recreation Facilities and Use

6.4.2.1.1 Direct Impacts. LPP operations of transmission lines would have no unavoidable adverse direct impacts.

6.4.2.1.2 Indirect Impacts. Recreation resource users of recreation sites along transmission line rightsof-way could experience minor indirect impacts as they view the transmission lines.

6.5 No Lake Powell Water Alternative

6.5.1 Construction Phase

6.5.1.1 Existing and Proposed Recreation Facilities and Use

6.5.1.1.1 Direct Impacts. Construction of the No Lake Powell Water Alternative including the Warner Valley Reservoir, brine evaporation ponds and a reverse osmosis water treatment plant would permanently remove 800 acres of BLM St. George District off-highway vehicle (OHV) area and recreation resource use from the Sand Mountain Special Recreation Management Area (SRMA). This would be an unavoidable adverse impact on recreation resources.

6.5.1.1.2 Indirect Impacts. Temporary indirect impacts including noise, air pollutants, traffic congestion and changes in visual resources would occur on recreational resources within the Sand Mountain SRMA, which would be unavoidable adverse impacts on recreation resource users.

Permanent indirect impacts would occur on recreation activities involving use of residential yards, properties, public parks and landscaped common areas from restricting outdoor watering and converting residential landscapes to xeriscapes. These permanent indirect impacts would be unavoidably adverse.

6.5.2 Operation Phase

6.5.2.1 Existing and Proposed Recreation Facilities and Use

6.5.2.1.1 Direct Impacts. Operation of the No Lake Powell Water Alternative would permanently remove 800 acres of the Sand Mountain SRMA from recreation resource use, which would be an unavoidable adverse impact.

6.5.2.1.2 Indirect Impacts. Recreation resource users within the Sand Mountain SRMA could experience indirect impacts as they view the transmission lines, the reverse osmosis water treatment plant, Warner Valley Dam and Reservoir and the brine evaporation ponds. Recreation resource users of the Sand Mountain SRMA in the vicinity of the brine evaporation ponds would detect odors in the air as the brine evaporates from the ponds. These indirect impacts would be unavoidable adverse impacts.

Restricting residential outdoor watering would have permanent unavoidable adverse indirect impacts on recreation use of residential properties, public parks and landscaped common areas. The outdoor watering restrictions would lead to replacing traditional residential landscapes with xeriscapes that would not support typical residential outdoor recreation activities.

6.6 No Action Alternative

The No Action Alternative would not cause unavoidable adverse impacts.

Chapter 7 Cumulative Impacts

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

Cumulative impacts may be defined as those that result from the incremental impacts upon a resource from interaction of two or more individual actions. For the purposes of this study report, the cumulative impact analysis is based on identifying past, present and future projects that may occur in and around the recreation resources study area. Past, present and reasonably foreseeable future projects are examined to determine if they would have cumulative impacts on recreation resources in the study area when combined with impacts of the LPP Project.

The Arizona and Utah SCORPs indicate that the resident population will continue to grow in the counties comprising the recreation resources study area. Population growth is expected to be especially rapid in the areas surrounding St. George, Utah. As the population grows, so will its demand for outdoor recreation. Population growth and a corresponding increase in demand for recreation would result in higher occupancy rates for existing recreation facilities in the LPP recreation resources study area. This cumulative effect would apply to all of the geographic areas and alternatives evaluated in Chapter 4 (Environmental Consequences) of this study report.

Surveys performed as part of the SCORP process revealed that residents in the counties comprising the recreation resources study area desired trails, water-related parks, OHV use areas, and interpretive features. It is expected that these facilities would be built over time in the recreation resources study area, which would alleviate crowding at existing facilities.

Past, present and future projects included in the cumulative impact analysis are described in Section 7.1.

7.1 Actions and Projects Included in the Cumulative Impact Analysis

7.1.1 Past Actions and Projects

To be determined.

7.1.2 Present Actions

To be determined.

7.1.3 Foreseeable Future Actions and Projects

7.1.3.1 Glen Canyon National Recreation Area

The National Park Service issued an Environmental Assessment in April 2004, analyzing potential impacts from proposed development of a new pump station that would be located in the Chains

Recreation Area (NPS, 2009a). The pump station and associated conveyance pipeline would be constructed and operated by the City of Page, Arizona, to augment its existing water supply system.

7.1.3.2 Grand Staircase-Escalante National Monument

The 1999 GSENM Management Plan states that the BLM and Utah Department of Transportation will explore the possibility of developing bicycle lanes or parallel bicycle routes along US Highway 89. The BLM will look for appropriate opportunities to highlight GSENM resources along US Highway 89, around the communities of Church Wells and Big Water. Furthermore, additional recreational opportunities may be developed to accommodate all visitors, and focus on learning about geology, history, archaeology, biology, paleontology, and scenic viewing. Short interpretive trails and scenic overlooks will be developed as well.

There are ongoing public efforts to fund construction of another replica set at the Paria Movie site. The BLM has plans to expand this site by improving interpretive exhibits, and ultimately intends to make it an equestrian trailhead.

7.1.3.3 BLM St. George Field Office

Rapid population growth and urban development in the vicinity of St. George, Utah, is displacing OHV use. These OHV users, in turn, are recreating on other portions of the St. George Field Office frequented by mountain bikers, hikers, and other non-motorized users. Conflicts between these user groups are increasing.

The BLM's 1999 resource management plan states that it may develop a 48 mile-long, multi-user trail system between Zion National Park and Gunlock Reservoir, and up to 50 miles of equestrian trails near Sand Mountain to meeting growing demands. The plan indicates that the BLM will assist in marking and signing portions of the Old Spanish Trail that cross public lands in Washington County.

7.2 South Pipeline Alternative

To be determined.

7.3 Existing Highway Pipeline Alternative

To be determined.

7.4 Southeast Corner Pipeline Alternative

To be determined.

7.5 Transmission Line Alternatives

To be determined.

7.6 No Lake Powell Water Alternative

To be determined.

7.7 No Action Alternative

There would be no cumulative impacts because the LPP Project would not be constructed or operated, resulting in no impacts to be combined with the impacts of other projects.

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Abbreviations and Acronyms

Abbreviation/Acronym	Meaning/Description	
Alt	Alternative	
ASFO	Arizona Strip Field Office	
ASFO	Arizona Strip Field Office	
ASP	Arizona's State Parks	
ATV	All Terrain Vehicle	
BLM	U.S. Bureau of Land Management	
BMP	Best Management Practices	
BPS	Booster Pump Station	
CBPS	Cedar Booster Pump Station	
CICWCD	Central Iron County Water Conservancy District	
Commission	Federal Energy Regulatory Commission	
CRD	Colorado River Discovery	
CVBSP	Cedar Valley Booster Pump Station	
CVP	Cedar Valley Pipeline	
dBA	Decibels	
DNF	Dixie National Forrest	
GCNRA	Glen Canyon National Recreation Area	
GIS	Geographic Information System	
gpcd	gallons per capita per day	
GSENM	Grand Staircase-Escalante National Monument	
GWT	Great Western Trail	
HS	Hydro System	
KCOTFC	Kane County Office of Tourism and Film Commission	
KCWCD	Kane County Water Conservancy District	
Kv	Kilovolt	
LPP	Lake Powell Pipeline	
M&I	Municipal and Industrial	
MSL	Mean Sea Level	
NAAQS	National Ambient Air Quality Standards	
NPS	National Park Service	
O&M	Operations and Maintenance	
OHV	Off-highway Vehicle	
PAD	Preliminary Application Document	
PCVCW	Paria Canyon Vermillion Cliffs Wilderness	
RMZ	Recreation Management Zones	
RO	Reverse Osmosis	
ROW	Rights of Way	
RV	Recreational Vehicle	
SCORP	State Comprehensive Outdoor Recreation Plans	

Abbreviation/Acronym	Meaning/Description
SCP's	Standard Construction Procedures
SGFO	Saint George Field Office
SITLA	School and Institutional Trust Lands Administration
SRMA	Special Recreation Management Area
TDS	Total Dissolved Solids
UBWR	Utah Board of Water Resources
UDPR	Utah Division of Parks and Recreation
UDWR	Utah Division of Water Resources
USP	United States Park System
UTI	Utah Travel Industry
VCNM	Vermilion Cliffs National Monument
WCH	Water Conveyance Hydro
WCWCD	Washington County Water Conservancy District
WSA	Wilderness Study Area

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Appendix A

Recreation Facility Photographs

<u>Glen Canyon National Recreation Area (Arizona, Utah)</u> Lake Powell in vicinity of Glen Canyon Dam (looking upstream from Wahweap North Entrance Road)



Lake Powell in vicinity of Glen Canyon Dam (looking upstream from "Chains" Area)





Entry to "Ropes" and "Dead Dog" Areas (looking south from US Highway 89)

"Dead Dog" Area (looking northwest along US Highway 89)





Colorado River, just below Glen Canyon Dam (looking downstream)

Colorado River Discovery rafts, below Glen Canyon Dam



Carl Hayden Visitor Center (looking south from parking lot)



Carl Hayden Visitor Center (looking north from parking lot)



Glen Canyon Dam Overlook (looking upstream)



Glen Canyon Dam (looking southwest from "Chains" Area)



A-5



Glen Canyon Dam Overlook, looking southwest (downstream)

Glen Canyon Dam Overlook (looking north from parking lot)





Chains Recreation Area, vault toilet and garbage facilities

Hanging Garden Trailhead (looking northwest)



Hanging Garden Trail, near "Chains" Trailhead (looking west)



Wahweap Road North Pay Station (looking east)





Wahweap Overlook (looking west)



Wahweap Marina from Wahweap Overlook



Lone Rock Access Road (looking north from US Highway 89)



Looking south from Lone Rock Access Road intersection with US Highway 89



Vermilion Cliffs National Monument (Arizona): Buckskin Gulch



Source: Crossly, John (Undated). "The American Southwest." Online: <u>http://www.americansouthwest.net/slot_canyons/buckskin_gulch/canyon.html</u> <u>Grand Staircase – Escalante National Monument (Utah)</u> Wahweap Wilderness Study Area (looking north from end of Church Wells Road)



Highway 89 at the "Cockscomb" (looking north from House Rock Valley Road)





Big Water Visitor Center, outdoor exhibits and amphitheatre






Paria Contact Station



White House Campground (looking north)



White House Campground (looking east)



White House Trail (looking southeast)



White House Trail (looking south to Wilderness)





Toadstools Trailhead (looking north from US Highway 89 parking area)

Toadstools Trailhead (looking south across US Highway 89)







Catstair Canyon Trailhead (looking south from US Highway 89)



Pahreah Point of Interest (looking north from US Highway 89 parking area)



Pahreah Point of Interest (looking northeast from US Highway 89 parking area)



Intersection of US Highway 89 (left) and House Rock Valley Road (right), looking south



House Rock Valley Road signage (looking southwest)







House Rock Valley Road at Buckskin Gulch Trailhead (looking east)



House Rock Valley Road at Buckskin Gulch Trailhead (looking north)



South Great Western Trailhead (looking southeast)



North Great Western Trailhead (looking northwest, US Highway 89 in foreground)



730 Road near Eagle Sink Point of Interest (looking northeast)



Kanab Visitor Center (looking northeast)



Kanab Visitor Center parking area (looking northwest)



BLM - Kanab Field Office (Utah)

Johnson Canyon Road (looking north from intersection with US Highway 89)



<u>BLM – Arizona Strip Field Office (Arizona)</u> South Alignment at US Highway 89A (looking northeast)



Arizona Strip (Highway 389) Pull-Off (looking west to Hydro Station 2 South)



Arizona Strip Pull-Off (looking southeast to Hydro Station 2 on left)



Kaibab - Paiute Indian Reservation (Arizona)



Tribal Headquarters (looking west from Moccasin Road near 389)

Tribal Headquarters (looking south from Moccasin Road at 389)



Pipe Spring National Monument (Arizona)

Visitor Center (looking west from parking area)



Visitor Center (looking southwest from parking area)



BLM - St. George Field Office (Utah)

Sand Mountain SRMA (looking south from Sand Hollow State Park OHV Tunnel)



Red Cliffs Desert Reserve



Source: Red Rock Backcountry Adventures (Undated). "Red Cliffs Desert Reserve, UT." Online: http://southwestbackcountry.wordpress.com/2009/01/16/red-cliffs-desert-reserve-utah/

Frog Hollow OHV Area and Gould's Rim Trail Connector Road (looking southwest from Diamond Ranch Academy Access Road)



Jem Trail (looking northwest from road/LPP ROW leading to Virgin Dam Trailhead)



Sand Hollow State Park (Utah) Day-Use and Boat Ramp Area (looking northeast)



Sand Mountain OHV Tunnel (looking northeast)



RV Campground (looking northwest from Day Use Area)



Sand Hollow Reservoir (looking southeast from Day Use Area to Sand Hollow Hydro)



Quail Creek State Park (Utah)

Day Use Area (looking southeast)



Campground (looking southeast)



Zion National Park (Utah) Kolob Canyons Visitor Center (looking east)



Kolob Canyons Entrance Road; Interstate 15, Exit 40 (looking west)



<u>Private Recreation Areas, Facilities, and Use</u> Amangiri Resort Spa and Villas at Lake Powell (Utah, south of US Highway 89)



Source: Aman Resorts (Undated). "Amangiri." Online: http://www.amanresorts.com/uploadedFiles/Aman/amangiri/Amangiri_E_%2028%20Aug%2009.pdf



Paria Outpost Resort (Utah, US Highway 89 near BLM Paria Contact Station)

Source: Paria Outpost (Undated). "Paria Outpost and Outfitters". Online: http://www.paria.com

Access road to Diamond Ranch Academy (Utah), south of Utah Highway 59



Willowind RV Park (Hurricane, Utah)



Source: Cottam's Willowind RV (Undated). "Willowind RV Park." Online: <u>http://www.willowindrvpark.net/</u>