



— BUREAU OF —
RECLAMATION

Lake Powell Pipeline Project Appendix C-13: Vegetation Communities

**Coconino and Mohave Counties, Arizona
Kane and Washington Counties, Utah**

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1 Introduction/Affected Environment

This appendix details the ecological regions identified during the 2009, 2010, and 2012 field seasons. The area of potential effect was 300 feet on both sides of the centerline of the Lake Powell Pipeline Project (LPP) alignments where no gypsum-influenced soils were present, and 600 feet wide around the Proposed Project alignments where gypsum-influenced soils were present. However, for data analysis purposes, these areas were reduced to better understand potential effects resulting from the current Proposed Project design.

This appendix focuses on general plant, or vegetation, community types that would be affected by the Proposed Project. Systems used to identify vegetation community types are usually hierarchical, tiering from typically larger geographic areas to smaller ones, known as alliances. This study follows this structure using ecological systems, which are organized by ecological region. As shown in Figure 1.4-1, the Colorado Plateau and Mojave Desert are the only two ecological regions affected by the Proposed Project. Each of the alternative alignments, the Southern and Highway Alternatives, would affect both ecological regions. These regions are comprised of numerous vegetation communities, which include 15 vegetation communities within the Colorado Plateau and 10 vegetation communities in the Mojave Desert. Tables 2.2-1, 2.2-2, 2.3-1, and 2.3-2 list these communities and their respective acreage within the LPP alternative alignments. A discussion of cumulative effects is provided in Appendix C-25, Cumulative Effects.

Of special note is the presence of cryptobiotic soil crust in many of the ecological regions described herein. This unusual soil type supports living organisms, such as cyanobacteria, lichens, and bryophytes (e.g., mosses and liverworts) that live on and in the surface soil matrix. They promote water infiltration, provide nutrients for the growth of other plants, and protect the underlying soil against wind erosion. Some vegetation communities rely on soil crust presence to persist. In its absence, those communities would not occur. These biological soil crusts are addressed in detail in the Draft Environmental Impact Statement (DEIS) Section 3.2, Geology and Soils.

1.1 Regulatory Framework

The Bureau of Land Management (BLM) would need to grant multiple rights-of-way (ROWs) allowing the Proposed Project's construction, operation, and maintenance on lands they manage in Utah and Arizona. These ROW permits would require that avoidance, minimization, and restoration activities be applied to affected vegetation communities. The National Park Service (NPS) would also require similar measures where the Proposed Project encroaches onto lands they manage, as would the Kaibab Band of Paiute Indians for the Highway Alternative, where the Bureau of Indian Affairs would grant a ROW.

Sections 201 and 202 of the Federal Land Policy and Management Act direct the BLM to "prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values" and to develop, maintain, and, when appropriate, revise land use plans which provide management direction for the use of the public lands. Land use plans, or resource management

plans, and the planning decisions contained within them are the basis for every on-the-ground action the BLM undertakes. Resource management plans ensure that public lands are managed in accordance with the intent of Congress, as stated in Federal Land Policy and Management Act, under the principles of multiple use and sustained yield.

The LPP would traverse lands within four different management units of the BLM, each with its own resource management plan: Kanab-Escalante Planning Area Resource Management Plan, Kanab Field Office Resource Management Plan, Arizona Strip Field Office Resource Management Plan (RMP), and St. George Field Office Resource Management Plan. Each of these resource management plans includes management direction on vegetation resources, as outlined below.

Kanab-Escalante Planning Area Resource Management Plan (approved February 2020)

The Kanab-Escalante Planning Area Resource Management Plan (BLM 2020) contains the following goals and objectives related to management of vegetation:

- **Goal 1:** Ensure a mosaic of desired vegetation communities is present across the landscape with diversity of species, canopy, density, and age class in accordance with ecological site potential. Protect, enhance, and/or develop ecological processes and functions.
- **Objectives:**
 - Manage sagebrush communities to provide quality habitat necessary to maintain sustainable populations of sagebrush obligate species.
 - Prevent net loss of properly functioning sagebrush-steppe habitat.
 - Create and maintain a mosaic of non-invasive perennial and annual vegetation communities across the landscape with diversity of species, canopy, density, and different stages of growth.

Kanab Field Office Resource Management Plan (approved October 2008)

The Kanab Field Office Resource Management Plan (BLM 2008a) contains the following goals and objectives related to vegetation:

Goals and Objectives:

- A mosaic of non-invasive perennial and annual vegetation communities would be present across the landscape with diversity of species, canopy, density, and age class in accordance with ecological site potential.
- Protect, enhance, and/or restore ecological processes and functions by allowing tools that are necessary and appropriate to mitigate adverse impacts of allowable uses and undesirable disturbances and which contribute to meeting the Utah BLM Standards for Rangeland Health.
- Sustain or reestablish the integrity of the sagebrush communities to provide the quantity, continuity, and quality of habitat necessary to maintain sustainable populations of Greater sage-grouse and other sagebrush obligate species.
- Manage rangelands to prevent net loss of properly functioning sagebrush steppe habitat.

Arizona Strip Field Office Resource Management Plan (approved February 2008)

The following management direction is contained within the RMP (BLM 2008b) regarding vegetation resources.

Decision No. DFC-VM-02: Native vegetative communities will be protected. A mosaic of native perennial and non-invasive annual vegetative communities will be present across the landscape with diversity of species, canopy, density, and age class reflecting its local ecological site potential and naturally occurring habitat conditions.

Decision No. DFC-VM-03: Vegetative communities will provide sufficient plant cover and litter accumulation to protect soils from wind and water erosion and enhance nutrient cycling and productivity, even during drought years.

Decision No. DFC-VM-04: Ecological processes and functions will be protected, enhanced, and/or restored by allowing tools that are necessary and appropriate to mitigate adverse impacts of allowable uses and undesirable disturbances, and contribute to meeting the Standards for Rangeland Health.

Decision No. DFC-VM-06: Each vegetation community is maintained within its natural range of variation in plant composition, structure, and function, and fuel loads are maintained below levels that are considered to be hazardous.

St. George Field Office Resource Management Plan (approved March 1999)

The St. George Field Office Resource Management Plan (BLM 1999) contains the following objective related to vegetation:

BLM's overall objective for vegetation management will be to ensure that the amount, type, and distribution of vegetation on public lands in Washington County reflects desired plant communities. These are defined as plant communities that produce the kind, proportion, and amount of vegetation necessary to meet or exceed management objectives for a given ecological site. Development of such communities will sustain a desired level of productivity for wildlife, livestock, and non-consumptive purposes while maintaining properly functioning ecological conditions.

Although not specifically addressed in this section, federally protected plant species may occur in the ROWs. Since these species are part of the vegetation communities, the U.S. Fish and Wildlife Service (USFWS), under Section 7 of the Endangered Species Act (ESA), would also require avoidance, minimization, and restoration of habitat that supports all potentially occurring federally listed species. Consequently, the Endangered Species Act would indirectly protect some portion of the affected vegetation communities. Although Glen Canyon National Recreation Area (GCNRA) does not have a specific vegetation management plan, general guidelines and practices derived from the Organic Act of 1916 can be found in NPS Management Policies 2006.

1.2 Methodology

1.2.1 Area of Analysis

The affected area is defined as the alternative alignments of the buried pipeline's construction ROWs; other facilities associated with the LPP, such as hydrostations and reservoirs, electrical transmission lines, booster pump stations, and construction staging areas. Vegetation community survey corridors were established based on the pipeline or transmission center line, extending 150

feet on either side for a 300-foot-wide total width; or for areas with greater potential for special plant resources, 300 feet on either side of the center line for a 600-foot-wide total width. Generally, the 300-foot-wide corridors occurred between Lake Powell and the Cockscomb, and west of the Hurricane Cliffs extending northward to the Proposed Project terminus near Sand Hollow Reservoir. All other linear elements had a 600-foot-wide survey corridor. Vegetation community mapping was undertaken concurrently with surveys for noxious weeds and special status plant species. However, since this data was collected, the Utah Board of Water Resources (UBWR) has further refined the proposed construction area; therefore, data analyzed here is based on known construction footprint rather than the initial survey widths. This approach provides a more accurate understanding of LPP effects, whereas basing those effects on a 300- and 600-foot pipeline corridor width would substantially overestimate those effects, producing inaccurate results and analysis.

Vegetation mapping of the LPP survey area was based on detailed, extensive field surveys, which collected data using transects that identified and mapped the plant species and vegetation community type distribution within the survey area to a minimum resolution scale of two acres. This effort was then aided by aerial interpretation using 9-inch resolution, 3-band color digital imagery for Washington County and extrapolated for Project Area lands in Arizona. The remaining area was at 1-meter accuracy, with additional 1-meter, 4-band (includes near infrared) coverage for the entire area. This approach resulted in comprehensive data collection and an analysis effort that can benefit post-construction restoration and restoration efforts.

Vegetation classification is based on a hierarchical nomenclature system, and vegetation communities are classified based on species composition and dominance, plant growth form and stature (height and canopy cover), and plant density. Highest resolution vegetation community mapping of the LPP survey area was that of plant association. Associations are grouped into alliances based on similarities in species composition, and alliances are grouped into ecological regions that reflect major geographic regions (e.g., Colorado Plateau, Great Basin, and Mojave Desert). The completed study area vegetation community mapping uses terminology and classification standards consistent with the U.S. National Vegetation Classification System administered by NatureServe and adopted by many federal land management agencies.

Geographic information system–based vegetation mapping, typically to a minimum mapping unit between 0.2 and 0.3 acres, resulted in the identification of 39 vegetation community types for the Highway Alternative and 38 for the Southern Alternative, and over 340 plant species total. This data has been organized to provide details by ecological region, alliances, associations, and acreage.

By mapping the vegetation communities at this scale, the ecological hierarchy is presented from ecological region to alliance, and association representing species presence, vegetation densities, and plant physiognomy (i.e., the visible structure or outward appearance of a plant community as expressed by the dominant growth forms, such as leaf appearance or deciduousness). The distribution and successional development of vegetation communities can contribute to an accurate land impact assessment and the resulting development of on-site management actions and restoration practices.

All data analysis was then refined to address effects directly associated with construction, operation, and maintenance activities of the Proposed Project. This required reducing the area of analysis to the width and length of construction ROWs, which would also include staging areas, temporary and permanent access roads, and all other infrastructure required to operate the Proposed Project

(temporary construction effects area), as well as the width and length of permanent ROWs, including permanent access roads and all other infrastructure required to operate the Proposed Project (permanent effects area). This was necessary to avoid a substantial overestimation of effects to vegetation community types.

Note: The data set for the vegetation surveys comes from the original study performed by the UBWR, LPP Final Study Report 15 – Vegetation Communities (UBWR 2016). However, the analysis in this appendix and the DEIS Section 3.11, Vegetation Communities, is original to this National Environmental Policy Act effort.

1.3 Environmental Protection Measures

Environmental Protection Measures (EPMs) as outlined in the LPP Plan of Development (POD) are measures or procedures that are part of the Proposed Project and would be implemented as standard practice, including measures or procedures that could reduce or avoid adverse impacts (UDWRe 2020; provided as Appendix E, Plan of Development). EPMs would be applied regardless of landownership, except where the jurisdictional agency or landowner determines changes to the EPM(s) would ensure greater consistency with governing statutes, policies, or plans. Proper communication and coordination would occur with the jurisdictional agency, private landowner, etc., to ensure changes to EPMs are modified and applied appropriately.

In addition to the completed vegetation community study, EPMs would be implemented as avoidance and minimization features of the Proposed Project; therefore, they are considered influential on the affected environment. The following list provides detailed descriptions of proposed EPMs specific to vegetation communities.

B.1.1. The Final POD will incorporate mitigation contained in the BLM Record of Decision and provide detailed project design and construction specifics, including but not limited to construction contract timing, phasing, and any modifications to construction access roads and right-of-way (ROW) entry points, and other details. The BLM will review and approve the updated POD prior to notice to proceed for any surface disturbance activity.

The final project POD shall contain detailed plans, including, but not limited to, those listed below.

- Agency Coordination Plan – primary contacts including the BLM authorized officers, UDWRe, construction management, environmental compliance inspection contractor, and construction contractors; identification of reporting procedures and frequency.
- Bird Conservation Strategy – measures to reduce impacts on migratory birds, bald and golden eagles, and other sensitive birds; the plan will identify measures to be implemented during construction, including but not limited to, the identification of critical nesting periods for bird species anticipated to be within the ROWs, pre-construction surveys to be conducted for nesting raptors and migratory birds (survey to be conducted by qualified biologist <10 days prior to work at site) , and the construction avoidance buffer size and time duration for active raptor and migratory bird nests (ranging from 100-feet to 1-mile, depending on species). The plan will identify design features and measures to be implemented during operation, including description of design standards, any post-construction monitoring, and adaptive measures such as marking of power lines to avoid or

minimize impacts; the bird conservation strategy will be developed in coordination with the BLM for compliance with Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act; for Utah, IM N. UT-2017-007 Guidance for Utah Bureau of Land Management to Meet Responsibilities under MBTA and Executive Order 13186 will be followed, and IM 2006-096 Utah Supplemental Planning Guidance - Raptor Best Management Practices, and applicable BLM RMP prescriptions.

- Construction Plan – construction schedule, access roads, borrow pits, best management practices, vehicle/equipment washing locations, etc.
- Construction Traffic Management Plan – measures to reduce and manage construction traffic.
- Construction Dust Management Plan – air quality standards and permits, dust control measures, general water sources, air quality monitoring, and reporting.
- Emergency Response Plan – emergency contacts, notification procedures, available resources, and emergency procedures.
- Integrated Weed Management Plan – management of areas with noxious/invasive weeds, treatment and control measures, monitoring, and reporting.
- Mitigation Plan – summary of environmental commitments and mitigation measures, responsible parties, timing, and reporting.
- Construction Noise Management Plan – measures to manage construction noise.
- Public Information Plan – public notification measures.
- Recreation Resources Mitigation Plan – measures to protect and restore recreation resources during construction and operation of the LPP.
- Restoration Plan – topsoil (growth medium) and vegetative cover salvage, stockpiling and replacement; plant salvage, maintenance and replacement, seeding, soil stabilization, and post-construction monitoring.
- Spill Prevention, Control, and Countermeasure Plan– procedures for storage and handling of hazardous and toxic materials, necessary permits, spill response and cleanup.
- Storm Water Pollution Prevention Plan (SWPPP) – erosion and sediment control measures, compliance inspections and reporting.

B.1.2. UDWRe will provide a Compliance Inspector (CI). The CI will provide environmental oversight and compliance/regulatory activities for UDWRe during construction activities of the project. The CI will be responsible for ensuring that UDWRe complies with all terms, conditions, stipulations and other metrics and measures required for the project and will have the authority to halt activities that are in non-compliance and assist in BLM coordination, if needed. Metrics and measures will be defined in the various detailed plans described in B.1.1. A pre-construction meeting between applicable permitting agencies, UDWRe, the CI, and the construction contractor will be required prior to any surface disturbing activity occurring. The CI will provide reports to permitting agencies detailing compliance as described in the approved Agency Coordination Plan. If required by BLM, UDWRe will provide a Compliance Inspector Contractor (CIC). The CIC will be a third party compliance construction monitor that will be paid for by the State but will be directed by and will report to the BLM during the construction process. The CIC will have similar duties as the CI and will work in conjunction with the CI but will perform the duties on behalf of BLM.

B.1.17. Where feasible, vegetation within the ROWs will be crushed instead of removed by blading, to minimize impacts to soils.

B.1.20. All available growth medium (topsoil and cleared vegetation) will be salvaged and marked with signage for redistribution during reclamation. Growth medium will be windrowed along the edge of the ROWs or placed in stockpiles and temporarily stabilized (if stockpiled for more than 14 days) with temporary seeding, natural fiber geotextiles, mulch, periodic water applications, or other techniques to reduce or eliminate erosion or dust. Any temporary seeding mixes will be a BLM-approved certified weed-free seed mix. Topsoil and cleared vegetation will not be stockpiled in one location for longer than two years unless approved by land management agency for specific activities. Topsoil and cleared vegetation stockpiles maintained longer than one growing season will be planted with an annual seed mix to help control erosion and keep soil micro-organisms active.

B.1.21. Areas with noxious and invasive weeds will be treated and/or monitored in accordance with the Integrated Weed Management Plan.

B.1.22. A record will be maintained of when construction-related major vegetation and ground-disturbing activities begin and are completed, and when restoration activities are initiated as a function of the SWPPP inspection report.

B.1.31. At the completion of construction, temporary access roads will be restored to pre-construction conditions. Improvements to existing roads made for construction will be left in place in coordination with the BLM.

B.1.45. All concrete washout water will be collected and retained in a leak proof container so caustic material does not reach the soil surface and water does not migrate into the ground and groundwater. Containers will be allowed to dry (evaporate) and then solids will be disposed of or recycled at an approved facility or used as tracking pad material onsite.

B.1.46. A General Permit for Stormwater Discharges Associated with Construction Activity (UTRC00000 & Arizona Department of Environmental Quality [ADEQ] CGP) will be obtained prior to any surface disturbance that includes clearing, grading, excavation, and/or stockpiling.

B.1.47. A site-specific SWPPP will be prepared and implemented for each construction contract. The plan will be submitted to the BLM and other applicable agencies. The SWPPP will identify all potential sources of pollution which could affect the quality of stormwater discharges from the construction site, describe the construction activities that disturb soils at the site, provide an estimate of the total disturbance area, and identify waters of the United States within one mile of the site. The SWPPP will identify erosion and sediment control measures, compliance inspection metrics, maintenance, and reporting. A copy of the SWPPP will be kept on site and updated as needed to manage pollutants or reflect changes in site conditions.

B.1.50. Erosion and sediment control will be implemented using both non-structural and structural best management practices (BMPs). Non-structural BMPs examples include not performing topsoil stripping during wet weather if there is risk of topsoil eroding or washing off the site in violation of National Pollutant Discharge Elimination System permits, and soil stabilization such as mulch, slope tracking, seeding, and erosion matting. Structural examples are silt fence, wattles, and ditch checks.

Any netting for erosion and sediment control BMPs will be of natural-fiber (non-plastic material). BMP specifications will be included in the project specific SWPPP(s).

B.1.51. Temporary perimeter sediment controls will be installed as necessary prior to initial soil disturbance activities and will be maintained throughout construction and reclamation. These controls will be designed to retain sediment on site to the extent practicable. Typical sediment control BMPs include:

- Siltation or filter berms
- Filter or silt fencing
- Sediment barriers, e.g., sand bags, straw bales, straw wattles (straw bound into rolls or bales)
- Temporary erosion controls, e.g. straw & woodchip mulches, Jute netting

Temporary seeding will be installed as soon as practical on all disturbed areas that will remain disturbed and inactive for more than 14 days. Any straw used for erosion or sediment control will be certified weed-free. Temporary erosion and sediment controls will be inspected weekly and after major precipitation events and will be removed after construction and/or when they are no longer needed.

B.1.52. During construction, broken structural erosion controls will be replaced or restored as soon as practicable (typically within a day) but before the next forecasted precipitation event. Sediment will be removed from structures when sediment reaches 50 percent of the barrier capacity and disposed of within disturbed ROWs. Redistribution of sediment will be coordinated with the BLM.

B.1.55. Non-stormwater discharges, including from pipeline and facility hydrostatic testing, will be directed into existing dry washes or other downstream project facilities as feasible. Best management practices such as diffusers or other energy dissipaters, straw bales (certified weed free), or filter sacks will be used to prevent bank instability and erosion. Discharges will be managed and monitored so that they do not exceed the typical 2- to 5-year flood event of the existing washes, and to allow debris accumulations to be removed as needed. Discharges will also be managed to not exceed bank levels and downstream banks and terrestrial vegetation will be monitored and discharges stopped if above bank erosion is detected.

B.1.56. Stormwater compliance inspections will be conducted by UDWR throughout construction at least once every 7 days regardless of rain events, or every 14 days and additionally within 24 hours of a storm event greater than 0.5 inches to ensure compliance with the SWPPP and Utah Department of Environmental Quality (UDEQ) and ADEQ permits. Inspections will include disturbed areas of the project that have not been stabilized, material and equipment storage areas that are exposed to precipitation, all erosion and sediment control measures installed within the ROWs, all structural control measures, and all locations where vehicles enter and/or exit the ROWs. Inspectors will notify the construction manager to where requirements of the SWPPP are not being followed, and implement corrective action as required to achieve compliance. Inspection reports will be maintained on file and submitted to the BLM and UDEQ or ADEQ upon request.

B.1.59. At the completion of construction, all non-natural berms, ditches, temporary erosion and sediment controls, bales, wattles, and other energy dissipating/filtering devices not required for protection of facilities will be removed, and drainage function restored. Soils used for erosion control structures and soils captured by those structures will be distributed across the ROWs prior

to replacing the topsoil and reclamation. Bales, wattles, and other energy dissipating/filtering devices will be disposed of in approved trash receptacles. The ground surface will be graded to blend into the preconstruction topography and/or slopes.

B.1.61. Post-construction stormwater management will consist of permanent erosion control measures installed as necessary to protect areas disturbed by UDWRe activities. These could include but are not limited to vegetation restoration, tracking and matting of steep slopes to maintain stability, berming (contoured to blend with existing landscape), and/or placement of appropriately colored riprap. Final stabilization of soil disturbed areas will be achieved when vegetation restoration and other erosion control measures are completed in accordance with the BLM-approved Restoration Plan and UDEQ or ADEQ stormwater permit requirements.

B.1.62. A detailed Restoration Plan will be submitted to the BLM for approval prior to the start of construction. The portion of the plan pertaining to restoration in listed species habitat will be in accordance with approved study reports and permits and submitted to the USFWS by the BLM for approval. The Restoration Plan will describe reclamation and rehabilitation objectives and methods to be used, species of plants and/or seed mixture to be used, time of planting, blending with existing vegetation at ROW edges, fertilizer mix reviews and approvals, success standards, and follow-up monitoring.

B.1.64. Vegetation conditions of the ROWs and adjacent site locations will be documented in the Restoration Plan prior to construction, to establish baseline conditions for restoration. The Restoration Plan will detail how baseline conditions will be assessed. The Restoration Plan will describe revegetation efforts, success standards, and follow-up monitoring.

B.1.65. All cacti and yucca disturbed within the ROWs located in the Mojave Desert habitat portion of the project will be salvaged, with the following exceptions:

- Cholla, including silver or golden cholla (*Opuntia echinocarpa*) and pencil cholla (*Opuntia ramosissima*), equal to or greater than 3 feet tall or less than 1 foot tall (i.e., only these species of cholla between 1 foot and less than 3 feet tall will be salvaged)
- All cacti and yucca whose vegetative mass is more than 40 percent dead (i.e., apical leaves, brown or significantly chlorotic, stems rotten or significantly desiccated, etc.)
- All cacti and yucca less than 1 foot tall (excluding barrel cactus [*Ferocactus cylindraceus*], cottontop cactus [*Echinocactus polycephalus*], and hedgehog cactus [*Echinocereus sp.*])
- All yucca that are over six feet in height
- Any cacti or yucca that cannot be accessed safely due to steep slopes or very rocky areas
- All cacti and yucca not salvaged will be left on-site to become part of the vegetative mulch

B.1.66 Within disturbed portions of the ROWs located within critical habitat of listed species or areas of critical environmental concern, additional shrub salvage or enhanced seed application may be conducted to enhance restoration efforts in coordination with the BLM. Additional shrub salvage may be accomplished by either 1) salvaging from the BLM-managed lands within the ROWs, 2) salvaging from an approved off-site harvest site, and/or 3) propagation of shrubs from native seed in an approved nursery.

B.1.67. Salvaged cacti and yucca will be transported to designated transplanting or soil windrow sites within the ROWs. Upon approval from the BLM, salvaged or windowed vegetation may be transplanted at designated sites outside the ROWs.

B.1.68. Plant salvage in critical habitat of listed species or areas of critical environmental concern (see B.1.65 and B.1.66) will occur from only within the ROWs or as indicated in the Restoration Plan. Salvaging will not begin until the ROW has been clearly staked and flagged. As feasible, salvage operations will not be performed during periods of high temperatures or other unfavorable environmental conditions. All salvaged plants will be documented and catalogued.

B.1.69. Prior to commencing any plant salvage operations in special designation areas, a free use permit, flora transportation tags, or any other required permits will be obtained to transport salvaged plants as part of restoration activities.

B.1.70. Salvaged plants in special designation areas will be maintained for the duration of construction activities if identified for replanting within the ROWs as part of site restoration, in coordination with the BLM. Maintenance will include necessary watering and other care to ensure reasonable survival of the salvaged plants.

B.1.71. At the completion of construction, coordination with the BLM on road decommissioning will occur. In areas where there are no above-ground facilities, permanent access roads, or facilities no less than 12 inches below the ground surface, the ground surface will be ripped as needed to an appropriate depth based on site characteristics to help relieve compaction, to establish an adequate seed bed to provide good seed-to-soil contact during seeding, and facilitate penetration and plant establishment (see comprehensive seeding program EPMs). Topsoil and mulched vegetation removed from the ROW at the start of construction, if any, and, if necessary, additional stabilization measures such as straw will be re-spread across the ROWs at the completion of construction.

B.1.72. Upon the completion of final grading, salvaged plants identified for replanting will be removed from the nursery sites and transplanted within the ROWs in areas not occupied by above-ground facilities or access roads. Efforts will be taken to restore plants to the same general area from which they were salvaged. Plants will be replanted in a random and non-uniform pattern, in an effort to mimic the adjacent non-disturbed plant communities. Planting holes will be two times the size of the plant material to be transplanted and will be pre-watered. All backfill will be free of debris, foreign objects, rocks large enough to obstruct root growth or watering, and noxious weeds. As feasible, transplanting will not occur during periods of high temperatures or other unfavorable environmental conditions.

B.1.73. A comprehensive seeding program will be applied after final grading and before or after plant replacement. The seed mix, application rate, and application method will be described in the Restoration Plan and reviewed by the BLM. Vegetable-based soil binders and/or hydromulch may be used on steep slopes to reduce seed movement and erosion. Seeds for restoration will be obtained from native local seed and/or a BLM-approved commercial seed vendor, and will be certified free of plant species listed on the Utah and Arizona noxious weed lists or specifically identified by the BLM. Examples of BLM-St. George Field Office (SGFO) approved native plant seed species, include: white bursage (*Ambrosia dumosa*), Four-wing Saltbush (*Atriplex canescens*), Mormon tea (*Ephedra nevadensis*), Sand Sagebrush (*Artemisia filifolia*), Rubber Rabbitbrush (*Chrysothamnus nauseosus*), Saltbush (*Atriplex confertifolia*), Winterfat (*Krascheninnikovia lanata*),

Brittlebrush (*Encelia spp.*), Sideoats Grama (*Bouteloua curtipendula*), Blue Grama (*Bouteloua gracilis*), Galleta (*Pleuraphis jamesii*), Sand Lovegrass (*Eragrostis trichodes*), Indian Ricegrass (*Achnatherum hymenoides*), Sand Dropseed (*Sporobolus cryptandrus*), Bottlebrush Squirreltail (*Elymus elymoides*), Globemallow (*Sphaeralcea ambigua*), Datura (*Datura sp.*), creosote bush (*Larrea tridentate*), and indigo bush (*Psoralea fremontii*). Use of exotic nonnative plant species is not allowed on public land managed by the SGFO, including Forage Kochia (*Kochia prostrata*) and Crested wheatgrass (*Agropyron cristatum*).

B.1.74. Watering may be conducted after completion of seeding, to help remove air pockets and compact soils in and around the roots of transplanted vegetation. Initial and subsequent quantities and timing of watering will be reviewed by the BLM as part of the Restoration Plan.

B.1.75. Signs and/or physical blocking barriers indicating restoration activities are being conducted may be installed where needed to deter off-road vehicular damage to restored areas. Placement and design of signs and barriers will be coordinated with the BLM and identified in the Restoration Plan.

B.1.76. An Integrated Weed Management Plan will be prepared and submitted to the BLM and other applicable agencies for approval prior to the start of construction. The BLM will coordinate with USFWS as needed. Noxious weed control will be implemented to minimize the spread of noxious weeds during construction and restoration/revegetation activities. All weed control efforts on BLM-administered lands will be in compliance with the BLM Handbook H-9011, H-9011-1 Chemical Pest Control, H-9014 Use of Biological Control Agents of Pests on Public Lands, and H-9015 Integrated Pest Management.

B.1.77. Areas within the ROWs that have pre-existing noxious weed infestations as identified in the Special Status Vegetation and Noxious Weed Inventory will be treated by a licensed contractor with a BLM-approved control method (i.e., chemical, mechanical, and/or biological controls) prior to the start of construction activities, as feasible. If noxious weed infestations exist within the ROWs at the start of construction, topsoil and fill will be kept segregated and not transported to other areas within the ROWs.

B.1.79. Any straw or other organic products used during construction, restoration, operations, maintenance, or for stabilization will be certified free of plant species listed on the Utah and Arizona noxious weed list or specifically identified in the BLM-approved Integrated Weed Management Plan for the project.

B.1.78. Prior to the import of borrow or fill from outside the ROWs, the source material location will be inspected by a qualified biologist or weed scientist to ensure it is free of noxious weeds or specifically identified in the BLM-approved Integrated Weed Management Plan for the project.

B.1.80. Construction vehicles and equipment will be cleaned with a high pressure washer or high pressure air and wire brush prior to arrival on the ROWs and prior to departure from areas of known noxious weed infestations to minimize the introduction or spread of noxious weeds. Cleaning efforts will concentrate on tracks, tires, and vehicle undercarriage, with special emphasis on axles, frames, cross members, motor mounts, on and underneath steps, running boards, and front bumper/brush guard assemblies. Vehicle cabs will be swept out and refuse will be disposed of in waste receptacles. Cleaning stations will be designated and will be recorded using global positioning systems or other mutually acceptable equipment and provided to the BLM Weed Coordinator or

designated contact person. All water and material at the vehicle cleaning stations will be contained and collected and hauled off site for disposal at an approved disposal site.

B.1.81. UDWR or its certified licensed contractor will submit a request for a Pesticide Use Proposal to the BLM and other applicable agencies prior to the planned application of any herbicide and a Pesticide Application Record after the planned application of the herbicide. The Pesticide Use Proposal will identify areas of planned herbicide application for BLM use. No herbicide mixing or rinsing of containers or application equipment will occur within 100 feet of natural sources (i.e., lakes, streams, or springs). An annual report on herbicide application on public lands within the ROWs will be provided to the BLM.

B.2.9. Vegetation restoration success will be monitored by UDWR and reported to the BLM, as defined in the approved Restoration Plan. Monitoring will include both qualitative and quantitative data collection and analysis. Vegetation restoration success on non-BLM-managed lands will be coordinated with the respective landowners.

B.2.10. Annual restoration monitoring reports will be submitted to the BLM for five years documenting post-construction monitoring, and will include but not be limited to activities conducted, current status, and recommended future activities. Along with the annual report in the third year, UDWR will include a quantitative analysis, to allow opportunity following the third-year report to correct any issues that may prevent restoration site release within the subsequent two years. If monitoring indicates that restoration is not trending towards meeting or has not met designated interim success criteria, the restoration activities may be revised and remedial measures implemented, subject to BLM approval. Restoration activities and annual reporting shall continue until the restoration fulfills the requirements of the BLM-approved Restoration Plan, and UDWR receives written release from the BLM. Since successful restoration may be achieved in some areas more quickly than other areas, written approval shall identify the area released.

B.1.82. Herbicides may not be sprayed within or around an exclusion area containing sensitive resources (buffers may be applied around areas in coordination with the BLM, depending on resource). These areas will be delineated with stakes and signs during construction or by GPS data. Removal of noxious and invasive weeds in these areas shall be accomplished by method(s) approved by the BLM or that are identified in the biological opinion.

B.2.12. The ROWs and primary unpaved access routes used for facility inspections will be monitored for noxious weeds from the start of construction until termination of the ROWs. Noxious weeds will be treated with a BLM-approved control method (i.e., chemical, mechanical, and/or biological controls) as needed. A request for a Pesticide Use Proposal will be submitted to the BLM prior to any planned noxious weed herbicide application, and a Pesticide Application Record will be submitted after weed herbicide use. All applications of herbicides shall comply with BMPs, standard operating procedures, and Conditions from the Vegetation Treatments Programmatic Environmental Impact Statement Biological Assessment related to Mojave Desert tortoise (DOI-BLM-WO-WO2100-2007-0002-EIS), Vegetation Treatments Using Aminopyralid Fluroxypyr and Rimsulfuron on BLM-managed Lands in 17 Western States PEIS (DOI-BLM-WO-WO2100-2012-0002-EIS), the Arizona Strip Field Office noxious weed EA (DOI-BLM-AZ-A000-2016-0001-EA), and the SGFO specific Environmental Assessment (DOI-BLM-UT-C030-2016-0005-EA). Treatments may be waived in areas where noxious weeds are prevalent in adjacent off ROW areas with the BLM approval.

B.2.13. An annual report on noxious weeds conditions and control activities within the ROWs will be submitted to the BLM.

B.10.1. Dust control permits will be obtained for each construction contract in accordance with local, county and/or state requirements. The permits will contain a Dust Control Plan listing all construction activities that will occur and the BMPs that will be used to mitigate construction dust. The BMPs will include site-specific dust control measures that are based on each project soil type, specific construction activities, phases and stages. They may include:

- Moisture conditioning of construction materials
- Controlling dust on access roads
- Covering or stabilizing soil with vegetation
- Using phased construction
- Limiting size and number of ingress and egress points
- Limiting size of staging areas
- Limiting vehicle speeds on the work site to minimize dust generation
- Proactive measures to prevent unauthorized access to disturbed areas
- Application of track-out controls

B.10.2. UDWR will comply with all requirements of applicable dust control permits.

B.10.6. Active construction sites and unpaved roads used for construction will be watered or a chemical dust suppression approved by the BLM will be applied, as needed, to maintain effective dust control.

1.4 Existing Conditions

The following information provides a summary description for each vegetation community type using ecological region nomenclature following the U.S. National Vegetation Classification System (see Attachment A, Alternative Alignments Ecological System). These vegetation communities are based on two ecological regions: Colorado Plateau and Mojave Desert. A map showing the Proposed Project in relation to these regions is presented in Figure 1.4-1.

1.4.1 Colorado Plateau Active and Stabilized Dune

The Active and Stabilized Dune community is most frequently a shrubland, sparse shrubland, or dwarf shrubland. Occasionally it is a wooded shrubland, sparse woodland, or woodland. A variety of vegetation exists within this community, which may consist of Indian ricegrass, sagebrush, fourwing saltbush, Mormon tea, yellow rabbitbrush, rubber rabbitbrush, blackbrush, muhly grass, lemon scurfpea, antelope bitterbrush, greasewood, and alkali sacaton.

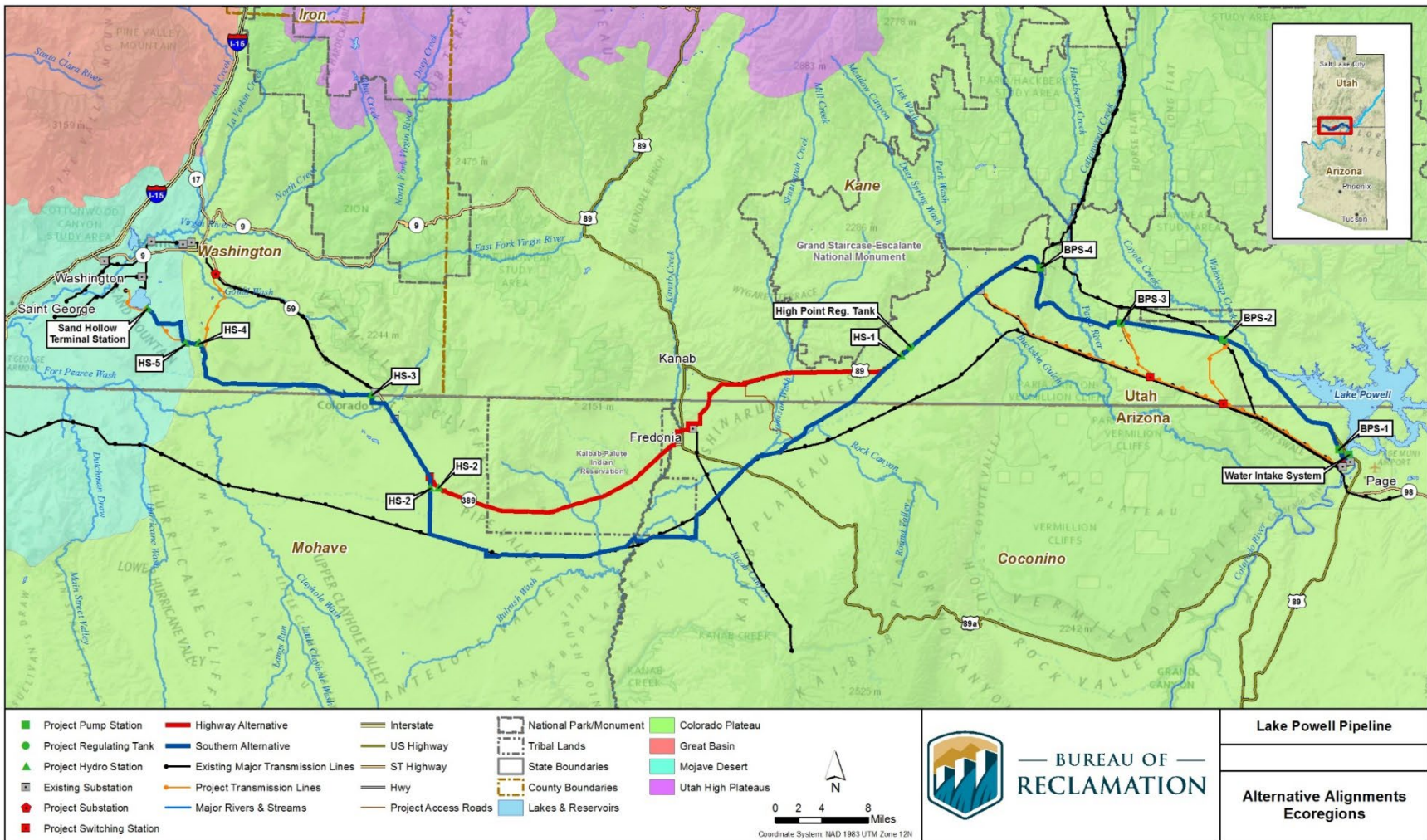


Figure 1.4-1 Ecological Regions Occurring along the Proposed Project Alignment Routes.

This community is predominantly found within the eastern portion of the Colorado Plateau Region. Four exceptions include an occurrence along Highway 389 west of Antelope Valley Road; two areas along Highway 89, with one just west of Fredonia and another just east of Pipe Spring National Monument; and a single occurrence west of Yellowstone Road. Within the pipeline corridor this community occurs scattered along Highway 89 from the Glen Canyon Dam area to west of Big Water, as well as near the Paria Canyon area, the Cockscomb area, Fivemile Valley, and Kimball Valley. Within the transmission line corridor, this community occurs scattered from the Glen Canyon Dam area to the Cockscomb area.

1.4.2 Colorado Plateau Big Sagebrush Shrubland

The Colorado Plateau Big Sagebrush Shrubland is most frequently a shrubland, sparse shrubland, or dwarf shrubland. Occasionally it is a wooded shrubland, sparse woodland, or woodland. A variety of vegetation exists in this community, including sagebrush, juniper, greasewood, saltbush, yellow rabbitbrush, rubber rabbitbrush, antelope bitterbrush, Indian ricegrass, blue grama grass, thickspike wheatgrass, Idaho fescue, needle-and-thread grass, wild rye, and James' galleta.

This community occurs along both alternative alignments of the Proposed Project. UBWR documented occurrences from the Cockscomb geologic formation in the east to the Hurricane Cliffs in the west, though mostly concentrated along Highway 89 from just west of the Cockscomb to Kanab and along much of the Southern Alternative to the southeast corner of the Kaibab Indian Reservation (KIR). Other more minor occurrences are near Colorado City and just east of the Hurricane Cliffs.

1.4.3 Colorado Plateau Blackbrush-Mormon tea Shrubland

The Colorado Plateau Blackbrush-Mormon tea Shrubland community is commonly shrubland, sparse shrubland, or dwarf-shrubland; it occasionally contains sparse dwarf shrubland. It is rarely wooded shrubland, shrub herbaceous vegetation, or a mosaic of shrubland/dwarf-shrubland. Dominant species include blackbrush, Mormon tea, spiny hopsage, and sagebrush. The herbaceous layer may include Indian ricegrass, James' galleta, or sand dropseed.

The Colorado Plateau Blackbrush-Mormon tea Shrubland community occurs in three distinct areas. Within the eastern portion of the Project Area, Blackbrush-Mormon-tea Shrubland occurs along both the pipeline and the electrical transmission line corridors from the Glen Canyon Dam area west to the Cockscomb area. In the central portion of the Project Area, it occurs along Arizona Route 389 near Yellowstone Road, along Yellowstone Road, and along the Navajo-McCullough transmission line corridor. In the western portion of the Project Area, this community occurs along the Honeymoon Trail, Hurricane Cliffs, and north to Hurricane.

1.4.4 Colorado Plateau Grassland

The Colorado Plateau Grassland community is dominated by grasses. Typical plant grass species include Indian ricegrass, James' galleta, sand dropseed, sacaton, muhly grass, three-awn grass, blue grama, and needle-and-thread grass. Although grasses dominate this community, shrub species can also occur. Typical shrubs include sagebrush, saltbush, Mormon tea, broomweed, and winterfat.

The Colorado Plateau Grassland community has a limited distribution. This community predominantly occurs along Cottonwood Canyon Road, just south of Highway 89 and both east and west of Antelope Valley Road along the Navajo-McCullough transmission line corridor south of the KIR. This grassland also occurs along Highway 89 in GCNRA.

1.4.5 Colorado Plateau Greasewood Flat

The Colorado Plateau Greasewood Flat community is characterized by saline soils, low water table, and intermittent flooding. The vegetation is typically an open to moderately dense shrubland with greasewood dominant or codominant. Other shrub species include sagebrush, fourwing saltbush, shadscale saltbush, and winterfat. This wash type is largely dominated by dead and dying tamarisk along Highway 89 in GCNRA.

The Colorado Plateau Greasewood Flat community occurs sporadically throughout the Project Area. It is documented from as far east as East Cove (east of the Cockscomb) to as far west as Short Creek near Canaan Gap (west of Colorado City). The greatest concentration of greasewood flats occurs near Fredonia; here it occurs on both the east and west sides of Highway 89A, where the Proposed Project crosses the highway.

1.4.6 Colorado Plateau Gypsum Badlands

The Colorado Plateau Gypsum Badland community is most commonly composed of sparse vegetation, sparse shrublands, and shrublands; occasionally sparse dwarf-shrublands and dwarf-shrublands; infrequently woodland and wooded shrubland; and rarely sparse understory shrubland and herbaceous vegetation. This community is a complex of landforms, vegetation, and soils. Within any mapped area, inclusions of other physiognomic types may be present. Typical species include sagebrush, Mormon tea, rubber rabbitbrush, buckwheat, Indian ricegrass, James' galleta, and alkali sacaton.

The Colorado Plateau Gypsum Badland community occurs throughout the Project Area, most commonly along the Highway Alternative alignment. Gypsum Badlands occur from just west of Petrified Hollow along Highway 89 to Seaman Wash and sporadically to the Johnson Wash area. It dominates the landscape from the Fredonia area across the KIR to the Pipe Spring National Monument turnoff along Highway 389. Another area of Gypsum Badlands occurs along the Honeymoon Trail north to Highway 59.

1.4.7 Colorado Plateau Juniper Savanna

The Colorado Plateau Juniper Savanna community consists of wooded herbaceous vegetation. Typical species include Utah juniper, sagebrush, and James' galleta.

Within the Project Area, the Colorado Plateau Juniper Savanna community occurs in three distinct areas. From east to west, the first occurrence is located north of Flat Top along the north/south transmission line; the second occurrence is just west of the Cockscomb; and the last occurrence is along the Highway Alternative alignment, about 3 miles west of the Pipe Spring National Monument turnoff along Arizona Route 389.

1.4.8 Colorado Plateau Lower Montane Riparian Woodland and Shrubland

The Colorado Plateau Lower Montane Riparian Woodland and Shrubland community is commonly shrubland; occasionally sparse shrubland; and rarely woodland, shrub herbaceous vegetation, or

sparse vegetation. A mosaic of shrubland and sparse vegetation is also rare. Typical plant species associated with this community include Fremont cottonwood, velvet ash, narrowleaf willow, and seepwillow.

This community occurs intermittently throughout the Project Area. It is most often found adjacent to rivers, creeks, washes, and vegetated stock ponds. Some examples include lower Blue Pool Wash, upper Paria River, Seaman Wash, White Sage Wash, Johnson Wash, Kanab Creek, Cottonwood Wash, Bitter Seeps Wash, Two Mile Wash, Short Creek, and Gould Wash.

1.4.9 Colorado Plateau Mixed Bedrock Canyon and Tableland

The Colorado Plateau Mixed Bedrock Canyon and Tableland community is commonly sparse vegetation and shrublands, infrequently sparse woodland and sparse shrubland, and rarely woodland or wooded shrubland. Slickrock sandstone typically has sparser vegetation cover and fewer plant species than do sandstone bedrock areas. Typical vegetation species include piñon pine, ponderosa pine, juniper, littleleaf mountain mahogany, yellow rabbitbrush, blackbrush, and Mormon tea.

This community is scattered throughout the Project Area. A greater number of occurrences are within the eastern portion, along the southern electrical transmission line corridor. Through this stretch Mixed Bedrock Canyon and Tableland occurs on the west side of the Glen Canyon Dam area, through the south end of Cedar Mountain, east and west of the Paria Canyon, to the Cockscomb. It occurs sporadically along the Proposed Project corridor from Glen Canyon Dam to Kimball Valley along Highway 89. From the Kimball Valley to nearly Kanab Creek only one occurrence was recorded. Occurrences of this community are also concentrated briefly along the Proposed Project corridor from approximately 5 miles east of Kanab Creek to the creek, adjacent to the south boundary of the KIR. Two significantly smaller occurrences are on the far west side, one near Short Creek at Canaan Gap and one north of The Divide.

1.4.10 Colorado Plateau Mixed Desert Scrub

The Colorado Plateau Mixed Desert Scrub community is most commonly a shrubland or dwarf shrubland and less commonly a sparse shrubland. These areas have indistinct boundaries between types. Plant species associated with this community include: shadscale saltbush, fourwing saltbush, spiny hopsage, winterfat, wolfberry, Indian ricegrass, blue grama, and big galleta.

This community occurs throughout the Project Area. Occurrences were documented from as far east as the Glen Canyon Dam area, to as far west as Hurricane Cliffs in the south and Gould Wash in the north.

1.4.11 Colorado Plateau Mixed Low Sagebrush Shrubland

The Colorado Plateau Mixed Low Sagebrush Shrubland community includes associations that are either dwarf shrublands or sparse dwarf shrublands. Typical species are sagebrush, Indian ricegrass, blue grama, needle-and-thread grass, and James' galleta.

This community occurs within the central portion of the Project Area. UBWR documented scattered occurrences on both the east and west side of Buckskin Gulch along Highway 89, across the southwest corner of the KIR, and along Antelope Valley Road.

1.4.12 Colorado Plateau Pinyon-Juniper Woodland

The Colorado Plateau Pinyon-Juniper Woodland is most commonly a woodland; less commonly a sparse woodland or wooded shrubland; occasionally a sparse understory woodland; and rarely a wooded dwarf shrubland, sparse, or dwarf shrubland. Mosaics of sparse woodland/wooded sparse vegetation or wooded shrubland/sparse woodland are also rare. Typical plant species include pinyon pine, Utah juniper, sagebrush, blackbrush, Stansbury's cliffrose, bitterbrush, blue grama, and James' galleta.

This community occurs throughout the Project Area. From east to west, occurrences are concentrated along the southern transmission line corridor from Cedar Mountain west to Highway 89, and along the Highway Alternative following Highway 89 from the Cockscomb west almost to Fredonia, as well as along the north/south electrical transmission line corridor just east of Cedar Mountain, and along the transmission line north to Flat Top. West of Fredonia occurrences are scattered along the Southern Alternative west of Antelope Valley Road and along the Highway Alternative following Highway 389 west of the Pipe Spring National Monument turnoff to Colorado City. Two other groupings were documented, one near Short Creek west of Canaan Gap and one south of Highway 59 along the Honeymoon Trail to The Divide, near the Hurricane Cliffs area.

1.4.13 Colorado Plateau Shrub-Steppe

The Colorado Plateau Shrub-Steppe community is most frequently a shrubland, dwarf shrubland, sparse dwarf shrubland, or shrub herbaceous vegetation. It is infrequently a sparse dwarf shrubland, and rarely a sparse shrubland, or mosaic of shrubland and herbaceous vegetation. Typical vegetation associated with this ecological system includes fourwing saltbush, Greene's rabbitbrush, yellow rabbitbrush, Mormon tea, rubber rabbitbrush, broomweed, winterfat, Indian ricegrass, blue grama, and needle-and-thread grass.

This community occurs intermittently throughout the Project Area. UBWR documented occurrences along both alternative alignments of the Proposed Project from the Glen Canyon Dam area along Highway 89 to the Cockscomb, along the transmission line corridor from the Glen Canyon Dam area to the Cockscomb, from just east of Eight Mile Gap Road (Highway 89) to Cedar Ridge (Highway 389), and from Short Creek at Canaan Gap north to Highway 59.

1.4.14 Colorado Plateau Volcanic Rock and Cinder Land

The Colorado Plateau Volcanic Rock and Cinder Land community is variously shrub herbaceous vegetation, herbaceous vegetation, wooded shrubland, and shrubland. Typical plant species associated with this community include Mormon tea, fourwing saltbush, corymb buckwheat, and Apache plume.

This community occurs within the far western portion of the Project Area. All occurrences in the study area are south of Highway 59 near The Divide and within the northern area of Hurricane Cliffs, just west of the Honeymoon Trail.

1.4.15 Colorado Plateau Wash

The Colorado Plateau Wash community is commonly shrubland; occasionally sparse shrubland or sparse vegetation; and rarely desert wash shrubland, dwarf shrubland, woodland, sparse woodland, wooded sparse vegetation, wooded shrubland, mixed shrubland, shrub herbaceous vegetation, or

herbaceous vegetation. Common plant species include greasewood, rubber rabbitbrush, Apache plume, sagebrush, and spiny hopsage.

This community occurs scattered throughout the Project Area, from just west of Glen Canyon Dam on the east side, to Gould Wash on the west side.

1.4.16 Mojave Desert Active and Stabilized Dune

The Mojave Desert Active and Stabilized Dune community is typically a shrubland, occasionally a dwarf shrubland with blackbrush and Mormon tea or a wooded shrubland where Utah juniper has invaded, and rarely a creosote bush sparse shrubland. Common species include sagebrush, fourwing saltbush, Mormon tea, yellow rabbitbrush, blackbrush, rubber rabbitbrush, needle-and-thread grass, sand wildrye, bitterbrush, blowout grass, alkali sacaton, and greasewood.

This community is found in one distinct area within the Mojave Desert portion of the Project Area. The area extends north from the Hurricane Cliffs and contours the southeast edge of Sand Hollow Reservoir.

1.4.17 Mojave Desert Bedrock Cliff and Outcrop

The Mojave Desert Bedrock Cliff and Outcrop community occurs as shrubland, sparse shrubland, sparse vegetation, and non-vegetated sandstone outcrop. Plant species common in this community include elephant tree, teddy bear cholla, and creosote bush.

This community occurs just east and west of Hurricane Cliffs.

1.4.18 Mojave Desert Blackbrush-Mormon tea Shrubland

The Mojave Desert Blackbrush-Mormon-tea Shrubland community is common and occurs as either shrubland or sparse shrubland; and less frequently as a dwarf-shrubland. This community is dominated by blackbrush often with Mormon tea, or spiny hopsage. Sagebrush is a codominant. The herbaceous layer may include Indian ricegrass, James' galleta, or sand dropseed.

This community is found in one area within the Mojave Desert portion of the Project Area. The area extends north and west of Hurricane Cliffs and toward Sand Mountain.

1.4.19 Mojave Desert Creosote Bush-White Bursage Desert Scrub

The Mojave Desert Creosote bush-White Bursage community is commonly a shrubland, less commonly a sparse shrubland, occasionally sparse vegetation, and rarely dwarf shrubland. Typical plants in this community may include creosote bush, white bursage, fourwing saltbush, Mormon tea, wolfberry, popcorn flower, and scorpionweed.

This community occurs throughout the Mojave Desert portion of the Project Area. It is most commonly associated with relatively flat upland habitats. The greatest concentration of this community is in the surrounding vicinity of the Hurricane Cliffs, extending toward the Hurricane Airport. UBWR also documented these areas east of the Sand Hollow Reservoir, adjacent to the Virgin River (west of Hurricane). It is often interspersed with Mojave Desert Shrub-Steppe and Mojave Desert Mixed Desert Scrub communities.

1.4.20 Mojave Desert Grassland

The Mojave Desert Grassland community occurs in the Project Area exclusively as herbaceous vegetation. Typical plant species include sagebrush, saltbush, blackbrush, Mormon tea, broomweed, winterfat, Indian ricegrass, three-awn grass, blue grama, needle-and-thread grass, muhly grass, James' galleta, and sacaton.

This community occurs northwest of the Hurricane Cliffs and east of Sand Hollow Reservoir within the Mojave Desert portion of the Project Area.

1.4.21 Mojave Desert Mixed Desert Scrub

The Mojave Desert Mixed Desert Scrub community is commonly dwarf shrubland and shrubland and occasionally sparse dwarf shrubland, sparse shrubland, or shrub herbaceous vegetation. Typical species include blackbrush, California buckwheat, Mormon tea, spiny hopsage, wolfberry, spiny menodora, beargrass, buckhorn cholla, bladder sage, and Joshua tree.

This community occurs throughout the Mojave Desert portion of the Project Area. In the north it occurs near the Virgin River, adjacent to the agricultural lands south of Hurricane, portions of Sand Mountain Road, and near the Hurricane Cliffs. It is often interspersed with Mojave Desert Creosote bush-White Bursage Desert Scrub and Mojave Desert Shrub-Steppe communities.

1.4.22 Mojave Desert Lower Montane Riparian Woodland and Shrubland

The Mojave Desert Lower Montane Riparian Woodland and Shrubland community is commonly sparse shrubland and shrubland, occasionally woodland or shrub herbaceous vegetation, and rarely forest or sparse woodland. Dominant trees include box elder, Fremont cottonwood, velvet ash, and wingleaf soapberry. Occasionally, narrowleaf cottonwood may come in from higher elevations. Shrub dominants include willow, buffaloberry, cherry, Arizona alder, and seepwillow.

This community occurs in two distinct areas in the Mojave Desert portion of the Project Area in association with both major and minor drainages within the Project Area, including Sand Hollow Reservoir and in areas associated with agricultural water usage.

1.4.23 Mojave Desert Shrub-Steppe

The Mojave Desert Shrub-Steppe community is commonly dominated by herbaceous vegetation with less than 10% shrub cover. It is also commonly a dwarf shrubland or shrubland and rarely sparse shrubland or herbaceous vegetation without shrubs. Typical species include fourwing saltbush, sagebrush, Fremont's dalea, Greene's rabbitbrush, yellow rabbitbrush, Mormon tea, rubber rabbitbrush, broomweed, and winterfat.

This community occurs from the Virgin River south of Sand Mountain Road in the Mojave Desert portion of the Project Area. It is often interspersed with Mojave Desert Creosote bush-White Bursage Desert Scrub and Mojave Desert Mixed Desert Scrub communities.

1.4.24 Mojave Desert Volcanic Rock and Cinder Land

The Mojave Desert Volcanic Rock and Cinder Land community is either herb or shrub dominated. The latter are typically shrublands and dwarf shrublands, and rarely sparse shrublands. At montane and foothill elevations typical plant species include scattered juniper trees and shrubs such as Mormon tea, fourwing saltbush, corymb buckwheat, and Apache plume.

This community is found in three distinct areas: near the Virgin River, near Sand Hollow Reservoir, and near the Hurricane Cliffs, north to Sand Mountain Road. As the name implies, it is found in association with rock outcrops and rock lands within the Mojave Desert portion of the Project Area. These include the Winkel-Rock outcrop complex and the Bermesa-Rock land association, as well as stony colluvial land.

1.4.25 Mojave Desert Wash

The Mojave Desert Wash community occurs in the Project Area as either a shrubland or a sparse shrubland. Typical plant species include a woody layer dominated by shrubs and small trees such as catclaw acacia, seepwillow, desert willow, Apache plume, burrowbush, smoketree, and desert almond. Common upland shrubs such as creosote bush and white bursage are often present along the edges of these washes.

This community is limited to the Hurricane Cliffs area, extending northward from the cliffs.

1.4.26 Other Vegetation Community Types

A variety of other vegetated and unvegetated land use types were mapped within the Project Area. These are types which are neither natural nor seminatural plant communities. They include agricultural lands, developed lands with various predominant land uses, invasive upland vegetation where the original plant community is no longer extant, ruderal vegetation, and non-vegetated lands.

1.4.26.1 Ruderal Vegetation

Ruderal vegetation occurs throughout the Project Area. It is most often associated with paved roads and areas of recent development activities. This includes U.S. Highway 89 from the Glen Canyon Dam area to the community of Glen Canyon City, U.S. Highway 89 west of the Cockscomb and east of Fredonia, Arizona State Route 389 across the KIR, as well as around Sand Hollow Reservoir, and adjacent to the agricultural lands south of Hurricane. This type is exclusively herbaceous vegetation, often consisting of filaree and cheatgrass.

1.4.26.2 Agricultural Land

For the purposes of the Project Area, the agricultural land designation requires the land to either be in current use/production, or in very recent use/production. Often, older agricultural lands could be identified both on the ground and by historical aerial photograph interpretation. Generally, historic agricultural lands have since been vegetated by invasive plants and are identified as ruderal vegetation, introduced upland vegetation, or invasive upland vegetation. Also included under agricultural lands are stock ponds. Twelve stock ponds were documented within or in the vicinity of the Project Area. Stock ponds may have the invasive tamarisk present.

Agricultural lands are found throughout the LPP area. The greatest concentration occurs within the Mojave Desert Region, just west of the Hurricane Cliffs. Agricultural lands are found sporadically across the Colorado Plateau Region, often associated with nearby drainages. Some examples include Gould Wash, Short Creek at Canaan Gap and Short Creek adjacent to Colorado City, Kanab Creek south of Fredonia, Johnson Wash, and the Paria River where it is crossed by U.S. Highway 89. Since agricultural lands have crops planted on an annual basis, no effort was made to determine what crop was present on any particular tract.

1.4.26.3 Developed Land and Developed Lands–Road

A developed lands designation requires that the land typically be unvegetated and occupied with a structure, or bladed for future use. Three additional categories were included within the Developed Lands grouping: (1) Developed lands–Roads Paved, (2) Developed lands–Roads Graded, and (3) Developed lands–Roads Unimproved.

Developed lands are found throughout the LPP area. Concentrations of such lands are generally found in association with private property and around established towns such as Big Water, Fredonia, Pipe Spring, Colorado City, and Hurricane. They are also in areas with a high percentage of private land, specifically along portions of U.S. Highway 89 between Fredonia and Johnson Wash. “Developed lands–Roads Paved” includes paved roads as found throughout the LPP area. The vast majority of these occur along the existing highway systems, such as U.S. Highway 89 east of Kanab. Other smaller portions of paved roads include areas near Sand Hollow Reservoir and through residential areas south of Hurricane. “Developed lands–Roads Graded” includes graded roads as found throughout the Project Area. The road south from Utah State Route 59 along the Honeymoon Trail is a graded road. The entire length of both Yellowstone Road and Antelope Valley Roads are graded. Another graded road is Eight Mile Gap Road from U.S. Highway 89 to the Utah state border. “Developed lands–Roads Unimproved” includes ungraded two-track roads as found throughout the LPP area. These roads are unmaintained and ungraded and have parallel tracks as created and perpetuated by off-highway vehicles.

1.4.26.4 Invasive Upland Vegetation

Invasive Upland vegetation is found scattered throughout the entire Project Area. This vegetation community type is composed of nearly all herbaceous vegetation, occasionally sparse vegetation, and rarely shrubland. The *Gutierrezia sarothrae* (*Erodium cicutarium*, *Bromus rubens*, *Salsola tragus*) Semi-natural Sparse Vegetation within the *Gutierrezia sarothrae* Sparsely Vegetated Alliance could alternately be classified in the Colorado Plateau Mixed Desert Shrub Community. Invasive vegetation is addressed in detail in the DEIS Section 3.13, Special Status Plants, and Appendix C-15, Special Status Plants.

2 Results/Environmental Consequences

2.1 No Action Alternative

The No Action Alternative would not result in permanent or temporary effects to vegetation communities from the Proposed Project. However, under this alternative, projects already planned by the Proponent would continue to occur. Disturbance due to these projects would vary in space and time. Most impacts would be short term and project-specific, including localized disturbance of vegetation. Most effects to vegetation resources would be minimized through implementation of industry standards or practice by the Project Proponent.

2.2 Southern Alternative

Proposed Project construction would require clearing vegetation from nearly all areas where earthwork occurs, including material and equipment staging areas. More specifically, vegetation clearing and grubbing activities would occur within the pipeline construction corridor and other areas where pump stations, hydrostations, electrical transmission line tower bases, substations, switch stations, and staging areas are proposed. All construction-related activities have potential to permanently change the structure and composition of existing vegetation communities. Construction would have short-term effects on vegetation communities. While complete removal would occur in these areas, there are many acres of comparable vegetation in the area(s) surrounding the pipeline corridor. Once construction activities are completed and the Proposed Project enters the operation and maintenance phase, much of the Project Area would be reclaimed.

Regarding permanent and temporary effects, where physical structures, such as power generating stations, electrical sub-stations, and permanent access roads, would be installed above ground, vegetation would be permanently affected. Conversely, where vegetation is cleared and grubbed for constructability purposes, and no aboveground structures would be installed, effects would be temporary in nature. Most portions of the ROWs would be reclaimed/restored such that the vegetation communities would return to a condition equal to or exceeding that which occurred prior to disturbance. Areas dominated by blackbrush will be permanently altered to alternative vegetation composition due to the lack of blackbrush regeneration. However, for long-term maintenance and safety accessibility, some vegetation (e.g., trees that could affect infrastructure) would be managed in a manner that could be considered permanent effect. More details describing these activities are provided below.

Following construction, operation and maintenance activities would only minimally disturb reestablished vegetation communities in most areas. However, in areas where these activities are more than “routine” (e.g., the pipeline had to be replaced in sections), reestablished vegetation would likely be disturbed again, but those disturbance activities would be at a scale far smaller than the initial Proposed Project construction and would occur infrequently.

Table 2.2-1 (see below) shows temporary and permanent effects on vegetation communities under the LPP Southern Alternative. Table 2.2-2 (see below) shows vegetation community area affected under the LPP Southern Alternative, by landowner/manager.

Table 2.2-1 Vegetation Communities Affected under the LPP Southern Alternative

Vegetation Community Type	Temporary Construction Area	Permanent ROW	Total
Colorado Plateau Ecological Region			
Colorado Plateau Active and Stabilized Dune	56.6	191.9	248.5
Colorado Plateau Agricultural land	5.3	7.8	13.1
Colorado Plateau Big Sagebrush Shrubland	246.0	415.6	661.6
Colorado Plateau Blackbrush-Mormon-tea Shrubland	143.0	385.6	528.6
Colorado Plateau Developed - Road	49.9	41.0	90.9
Colorado Plateau Developed land	14.2	20.5	34.7
Colorado Plateau Grassland	77.8	66.7	144.5
Colorado Plateau Greasewood Flat	4.2	7.1	11.3
Colorado Plateau Gypsum Badlands	3.5	14.2	17.7
Colorado Plateau Invasive Upland Vegetation	38.6	82.7	121.3
Colorado Plateau Juniper Savanna	0.4	5.3	5.6
Colorado Plateau Lower Montane Riparian Woodland and Shrubland	5.5	7.2	12.7
Colorado Plateau Mixed Bedrock Canyon and Tableland	27.7	187.3	215.1
Colorado Plateau Mixed Desert Scrub	278.4	439.1	717.5
Colorado Plateau Mixed Low Sagebrush Shrubland	3.6	6.2	9.7
Colorado Plateau Pinyon-Juniper Woodland	116.6	409.2	525.8
Colorado Plateau Quarry	0.0		0.0
Colorado Plateau Ruderal Vegetation	66.6	107.5	174.0
Colorado Plateau Shrub-Steppe	144.9	260.2	405.2
Colorado Plateau Volcanic Rock and Cinder Land	1.8	1.7	3.5
Colorado Plateau Wash	9.6	27.2	36.8
<i>Subtotal</i>	<i>1,294.1</i>	<i>2,684.0</i>	<i>3,978.1</i>

Table 2.2-1 Vegetation Communities Affected under the LPP Southern Alternative (continued)

Vegetation Community Type	Temporary Construction Area	Permanent ROW	Total
Mojave Desert Ecological Region			
Mojave Desert Active and Stabilized Dune	3.5	110.7	114.2
Mojave Desert Agricultural land	79.3		79.3
Mojave Desert Bedrock Cliff and Outcrop	-	2.8	2.8
Mojave Desert Blackbrush-Mormon-tea Shrubland	-	1.8	1.8
Mojave Desert Creosotebush-White Bursage Desert Scrub	10.8	58.2	69.0
Mojave Desert Developed - Road	0.1	6.9	6.9
Mojave Desert Developed land	0.0	0.6	0.6
Mojave Desert Grassland	-	2.9	2.9
Mojave Desert Invasive Upland Vegetation	6.0	-	6.0
Mojave Desert Mixed Desert Scrub	24.9	11.2	36.1
Mojave Desert Reservoir	-	0.6	0.6
Mojave Desert Ruderal Vegetation	-	0.5	0.5
Mojave Desert Shrub-Steppe	5.5	22.8	28.3
Mojave Desert Volcanic Rock and Cinder Land	0.0	9.4	9.5
Mojave Desert Wash	0.1	0.6	0.6
<i>Subtotal</i>	<i>130.1</i>	<i>228.9</i>	<i>359.1</i>
Other Vegetation Community Types			
Ruderal Vegetation	0.1	0.0	0.1
Developed - Road	0.2	0.3	0.5
Invasive Upland Vegetation	1.9	3.5	5.4
No data	52.8	4.7	57.5
<i>Subtotal</i>	<i>55.1</i>	<i>8.5</i>	<i>63.6</i>
Total	1,479.3	2,921.5	4,400.8

Key:

LPP = Lake Powell Pipeline Project

ROW = Right-of-way

Table 2.2-2 Vegetation Community Area Affected under the LPP Southern Alternative, by Land Owner/Manager

Entity	Colorado Plateau Ecological Region	Mojave Desert Ecological Region	Other	Subtotal
Permanent Disturbance Area (Acres)				
BLM	39.3	26.9	1.9	<i>68.1</i>
NPS	19.9	0.0	0.3	<i>20.2</i>
Reclamation	27.0	0.0	0.0	<i>27.0</i>
State	7.8	3.5	0.0	<i>11.4</i>
Private	33.0	7.1	1.4	<i>41.5</i>
<i>Subtotal</i>	127.0	37.5	3.7	168.3
Temporary Disturbance Area (Acres)				
BLM	1,955.2	94.4	9.3	<i>2,058.8</i>
NPS	259.7	0.0	0.0	<i>259.7</i>
Reclamation	9.1	0.0	0.0	<i>9.1</i>
State	835.8	27.0	0.0	<i>862.9</i>
Private	791.2	200.1	50.6	<i>1,041.9</i>
<i>Subtotal</i>	3,851.1	321.5	59.9	4,232.5
Total	3,978.1	359.1	63.6	4400.8

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Reclamation

2.2.1 Mitigation Measures

Additional substantive measures as mitigation beyond what is proposed in the EPMs in Section 1.3, above, would not be required for this resource, as the EPMs should minimize effects to vegetation communities to the greatest extent practicable.

However, minor changes to the EPMs should be implemented to meet agency-specific goals and objectives for management of vegetation resources. These recommended changes to EPMs (which are underlined) include the following:

- The detailed Restoration Plan to be prepared and submitted to the BLM for approval prior to the start of construction should include details on species of plants and/or seed mixture to be used, time of planting, and also time of seeding (EPM B.1.1).
- Revegetation efforts must establish not only a stable biological ground cover equal to or exceeding that which occurred prior to disturbance, but also must establish the mix (or composition) of native vegetation species identified in the Restoration Plan, as agreed to with the BLM or NPS (EPM B.1.1 and B.1.62).
- Restoration will be considered successful when a stable biological ground cover and mix of native vegetation species (i.e., composition) equal to or exceeding that which occurred prior to disturbance is established (EPM B.1.1 and B.1.62).
- Prior to commencing any plant salvage operations in special designation areas, a collection permit (not a free use permit, as identified in the EPM B.1.69), flora transportation tags, or any other required permits will be obtained to transport salvaged plants as part of restoration activities (EPM B.1.62).

- Transplanting will not occur during periods of high temperature or other unfavorable environmental conditions. EPM B.1.68 and B.1.72 state this would occur “as feasible,” which should not be included because transplanting in these conditions would result in almost certain failure.
- UBWR or its certified licensed contractor will submit a request for a Pesticide Use Proposal to the BLM and other applicable agencies prior to the planned application of any herbicide and a Pesticide Application Record will be submitted to the BLM (EPM B.1.81 and B.2.12).
- No herbicide mixing or rinsing of containers or application equipment will occur within 100 feet of natural water sources (i.e., lakes, streams, livestock reservoirs, or springs) (EPM B.1.81).
- The following should be added to EPM B.1.68: On NPS land, salvage will be preferred and where seeding is needed, seeding must be done in accordance with the 2006 NPS Management Policies and use genetically similar variants of individuals of the immediate area.

Additional mitigation measures for effects to vegetation communities could occur indirectly as part of federal and state regulatory processes that protect other resources associated with some vegetation community types. For example, if the USFWS requires mitigation measures for protecting species listed for protection under the ESA, such measures would likely require additional protection for those species’ habitats. By extension, some vegetation community types that provide habitat for those species would benefit from specific mitigation requirements.

2.3 Highway Alternative

Effects to vegetation for the Highway Alternative would be similar to the Southern Alternative in that vegetation communities would be affected as a consequence of construction, operation, and maintenance activities. The Highway Alternative would produce permanent and temporary effects to vegetation communities because of construction, operation, and maintenance activities. Temporary effects would result from clearing vegetation where work activities would occur but are not needed for long-term operation, such as maintenance of the pipeline and associated infrastructure (e.g., construction-related access roads and staging areas), which are subsequently reclaimed. Permanent effects would result from areas where impervious surfaces (e.g., concrete pads) would be installed. To a degree, permanent effects would result in areas within the pipeline and electrical transmission line corridors where vegetation would be managed through removal or restrictions on height (e.g., under transmission wires or directly over the pipeline and permanent access roads).

Table 2.3-1 (see below) shows temporary and permanent effects on vegetation communities under the LPP Highway Alternative. Table 2.3-2 (see below) shows vegetation community area affected under the LPP Highway Alternative, by landowner/manager.

Table 2.3-1 Vegetation Communities Affected in the LPP Highway Alternative

Vegetation Community Type	Temporary Construction Area	Permanent ROW	Total
Colorado Plateau Ecological Region			
Colorado Plateau Active and Stabilized Dune	58.6	194.6	253.2
Colorado Plateau Agricultural land	6.0	9.7	15.7
Colorado Plateau Big Sagebrush Shrubland	179.1	334.6	513.7
Colorado Plateau Blackbrush-Mormon-tea Shrubland	143.5	390.6	534.1
Colorado Plateau Developed - Road	31.0	52.4	83.4
Colorado Plateau Developed land	18.2	27.1	45.3
Colorado Plateau Grassland	6.3	10.7	17.0
Colorado Plateau Greasewood Flat	16.9	31.7	48.7
Colorado Plateau Gypsum Badlands	47.2	80.7	127.9
Colorado Plateau Invasive Upland Vegetation	39.5	75.0	114.5
Colorado Plateau Juniper Savanna	1.2	6.4	7.6
Colorado Plateau Lower Montane Riparian Woodland and Shrubland	6.6	9.6	16.2
Colorado Plateau Mixed Bedrock Canyon and Tableland	24.5	179.3	203.9
Colorado Plateau Mixed Desert Scrub	208.3	303.5	511.8
Colorado Plateau Mixed Low Sagebrush Shrubland	1.2	2.2	3.3
Colorado Plateau Pinyon-Juniper Woodland	128.0	434.1	562.2
Colorado Plateau Quarry	0.0		0.0
Colorado Plateau Ruderal Vegetation	112.7	162.9	275.6
Colorado Plateau Shrub-Steppe	81.1	186.7	267.8
Colorado Plateau Volcanic Rock and Cinder Land	1.8	1.7	3.5
Colorado Plateau Wash	8.5	25.2	33.7
<i>Subtotal</i>	<i>1,120.1</i>	<i>2,518.8</i>	<i>3,639.0</i>

Table 2.3-1 Vegetation Communities Affected in the LPP Highway Alternative (continued)

Vegetation Community Type	Temporary Construction Area	Permanent ROW	Total
Mojave Desert Ecological Region			
Mojave Desert Active and Stabilized Dune	3.5	110.7	114.2
Mojave Desert Agricultural land	79.3		79.3
Mojave Desert Bedrock Cliff and Outcrop	0.0	2.8	2.8
Mojave Desert Blackbrush-Mormon-tea Shrubland	0.0	1.8	1.8
Mojave Desert Creosotebush-White Bursage Desert Scrub	10.8	58.2	69.0
Mojave Desert Developed - Road	0.1	6.9	6.9
Mojave Desert Developed land	0.0	0.6	0.6
Mojave Desert Grassland	0.0	2.9	2.9
Mojave Desert Invasive Upland Vegetation	6.0	0.0	6.0
Mojave Desert Mixed Desert Scrub	24.9	11.2	36.1
Mojave Desert Reservoir	0.0	0.6	0.6
Mojave Desert Ruderal Vegetation	0.0	0.5	0.5
Mojave Desert Shrub-Steppe	5.5	22.8	28.3
Mojave Desert Volcanic Rock and Cinder Land	0.0	9.4	9.5
Mojave Desert Wash	0.1	0.6	0.6
Subtotal	130.1	220.9	351.0
Other Vegetation Community Types			
Ruderal Vegetation	0.1	0.0	0.1
Developed - Road	0.2	0.3	0.5
Invasive Upland Vegetation	1.9	3.5	5.4
No data	52.8	4.7	57.5
Subtotal	54.8	8.3	63.1
Total	1,255.9	2,668.5	3,924.3

Key:

LPP = Lake Powell Pipeline Project

ROW = Right-of-way

Table 2.3-2 Vegetation Community Area Affected under the Highway Alternative, by Landowner/Manager

Entity	Colorado Plateau Ecological Region	Mojave Desert Ecological Region	Other	Subtotal
Permanent Disturbance Area (Acres)				
BLM	39.3	26.9	1.9	68.1
NPS	19.9	0.0	0.3	20.2
Reclamation	27.0	0.0	0.0	27.0
Tribe	0.0	0.0	0.0	0.0
State	7.6	3.5	0.0	11.1
Private	35.6	7.1	1.4	44.1
<i>Subtotal</i>	129.3	37.5	3.7	170.6
Temporary Disturbance Area (Acres)				
BLM	1,344.0	94.4	9.3	1,447.6
NPS	259.7	0.0	0.0	259.7
Reclamation	9.1	0.0	0.0	9.1
Tribe	239.3	0.0	0.0	239.3
State	751.6	27.0	0.0	778.6
Private	905.9	200.1	50.6	1,156.6
<i>Subtotal</i>	3,509.6	321.5	59.9	3,891.0
Total	3,639.0	359.1	63.6	4,061.6

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Reclamation

Tribe = Kaibab Band of Paiute Indians

2.3.1 Mitigation Measures

Mitigation measures for the Highway Alternative would be the same as those proposed for the Southern Alternative.

2.4 Comparative Analysis of Alternatives

The Proposed Project would have unavoidable adverse effects on vegetation resources.

Construction activities associated with the proposed alternatives would temporarily disturb 4,232.5 acres of vegetation community types from the Southern Alternative and 3,891 acres from the Highway Alternative. The Southern Alternative would permanently affect 168.3 acres of vegetation, while the Highway Alternative would permanently affect 170.6 acres (see Tables 2.2-2 and 2.3-2, above). Construction activities would have short-term effects on vegetation communities; once construction activities are completed and the Proposed Project enters the O&M phase, much of the Project Area would be reclaimed, reducing long-term effects.

UBWR's proposed measure to develop a detailed restoration plan and implement revegetation activities as described Section 1.3, above, would reduce effects on vegetation. Proposed methods for segregation and stockpiling topsoil would ensure existing seed banks. UBWR's proposed salvage of

shrubs and cacti could also enhance restoration success, although transplanting desert vegetation can be difficult and have low rates of success. Salvaged plant use would restore vegetation structure, providing shade and more suitable microhabitats for germination of seeds. Consideration of the spatial relationships between individual plants during salvage and transplant could influence ultimate survivorship. It would be particularly important not to transplant during periods of high temperature or other unfavorable environmental conditions, as clarified above in Section 2.2.3, to ensure the highest chance of success. If UBWR includes measures in the restoration plan to use salvaged trees and shrubs to shade smaller plants (especially those removed from similar shaded habitats), considers these spatial relationships during replanting, and transplants only during favorable environmental conditions, restoration efforts could be more successful and reduce long-term adverse effects on vegetation.

With implementation of revegetation activities, long-term effects of construction on vegetation within disturbed areas would be reduced but would be unavoidable. Due to slow growing rates and disruptions in soil structure, revegetation efforts are likely to require several years or more to be successful, depending on the vegetation community and composition of the seed mixture—grassland areas would recover much more quickly than shrubland/wooded areas.

Restoration of desert vegetation is often a slow process, so extended monitoring efforts, as proposed, are justified and necessary to ensure the restoration is successful. UBWR's proposed methods for collecting baseline data in the ROWs and in adjacent reference areas is also well suited to monitoring revegetation success. Comparing treated sites with reference sites during a specific season ensures that success criteria are not dependent on climatic conditions but compares vegetation in treated areas with non-treated areas under the same weather conditions. Therefore, it is prudent to monitor reference sites and restoration areas at the same time. These methods would provide necessary data to measure restoration success. UBWR's proposed restoration monitoring would occur for a minimum of five years, or until the restoration fulfills the requirements of the approved restoration plan and UBWR receives written release from the BLM/NPS. Since successful restoration may be achieved in some areas more quickly than other areas, written approval would identify the area(s) released (see EPM B.2.10 in the POD, provided as Appendix E, Plan of Development).

Due to slow growth rates of vegetation in the Project Area, particularly in the Mojave Desert ecoregion, construction activities would likely produce long-term effects. The overall effects of the Southern Alternative and the Highway Alternative would be similar, although the Southern Alternative would temporarily affect approximately 159 more acres and permanently affect approximately 184 more acres than the Highway Alternative (see Tables 2.1-1 and 2.2-1, above).

Following construction, project operations and maintenance activities would occasionally produce additional disturbance to vegetation if clearing or digging is needed to repair project facilities. Restoration for these activities would follow the same avoidance and minimization measures to facilitate the achievement of restoration success criteria.

3 References

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Utah Division of Water Resources (UDWRe). 2020. Lake Powell Pipeline Plan of Development. February 2020.

Utah Board of Water Resources (UBWR). 2016. Lake Powell Pipeline, Final Study Report 15 – Vegetation Communities. https://water.utah.gov/wp-content/uploads/LPP-Reports/Vegetation/20160430-15-Part-1-Vegetation-Communities-thru-Appendix-C-Study-Report_FINAL.pdf and https://water.utah.gov/wp-content/uploads/LPP-Reports/Vegetation/20160430-15-Part-2-Vegetation-Communities-Study-Report-Appendix-D_FINAL.pdf

4 Attachments List

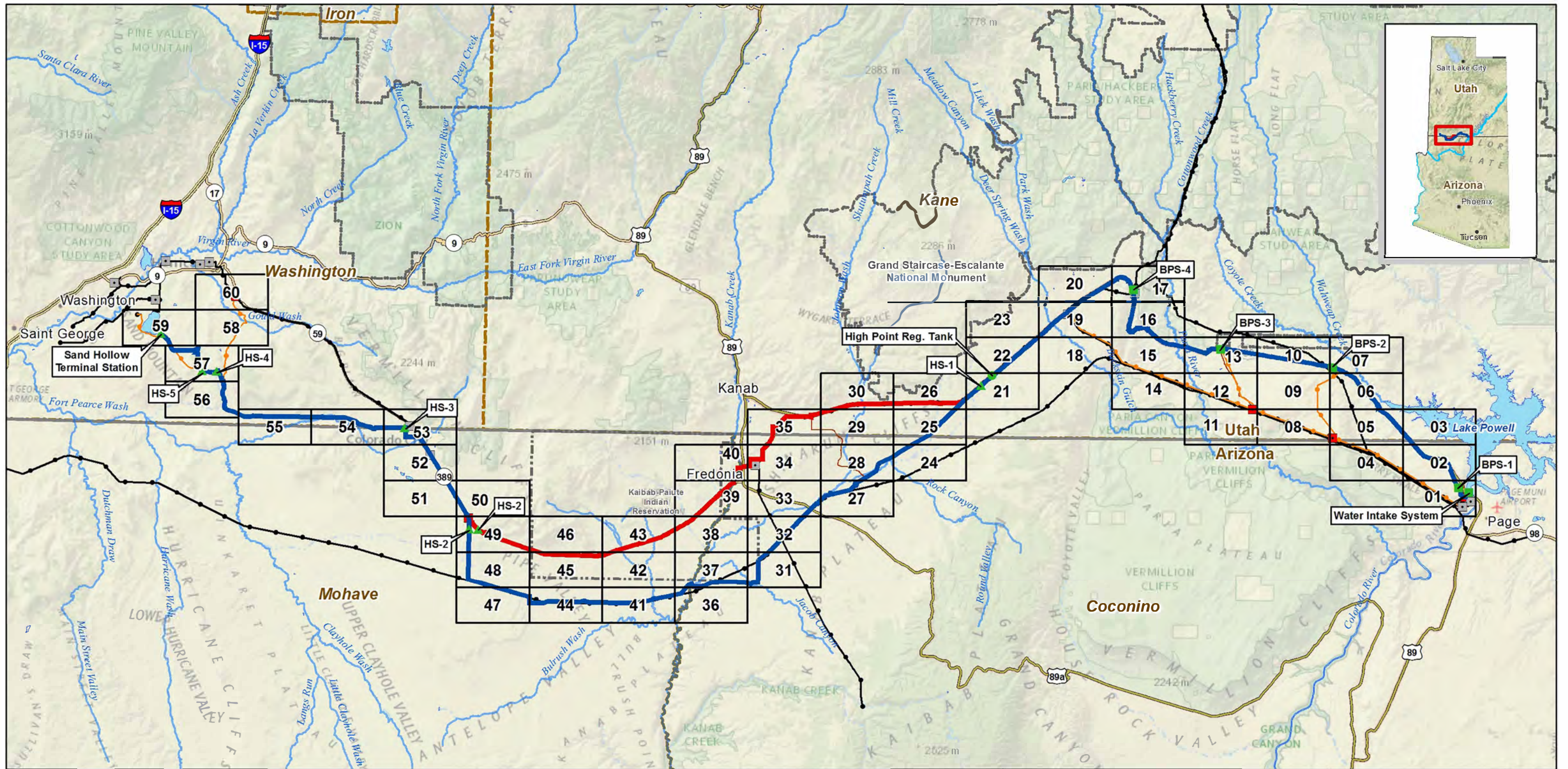
Attachment A: Alternative Alignments Ecological System

5 Acronyms

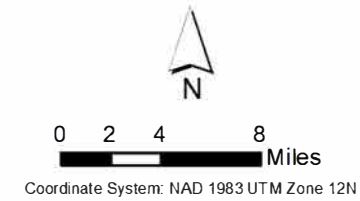
ADEQ	Arizona Department of Environmental Quality
BLM	Bureau of Land Management
BMP	best management practice
CI	Compliance Inspector
CIC	Compliance Inspector Contractor
DEIS	Draft Environmental Impact Statement
EA	Environmental assessment
EPM	Environmental Protection Measure
ESA	Endangered Species Act
GCNRA	Glen Canyon National Recreation Area
KIR	Kaibab Indian Reservation

LPP	Lake Powell Pipeline Project
MBTA	Migratory Bird Treaty Act
NPS	National Park Service
POD	Plan of Development
RMP	Arizona Strip Field Office Resource Management Plan
ROW	right-of-way
SGFO	St. George Field Office
SWPPP	Storm Water Pollution Prevention Plan
UBWR	Utah Board of Water Resources
UDEQ	Utah Department of Environmental Quality
UDWRe	Utah Division of Water Resources
USFWS	U.S. Fish and Wildlife Service

Attachment A
Alternative Alignments Ecological System

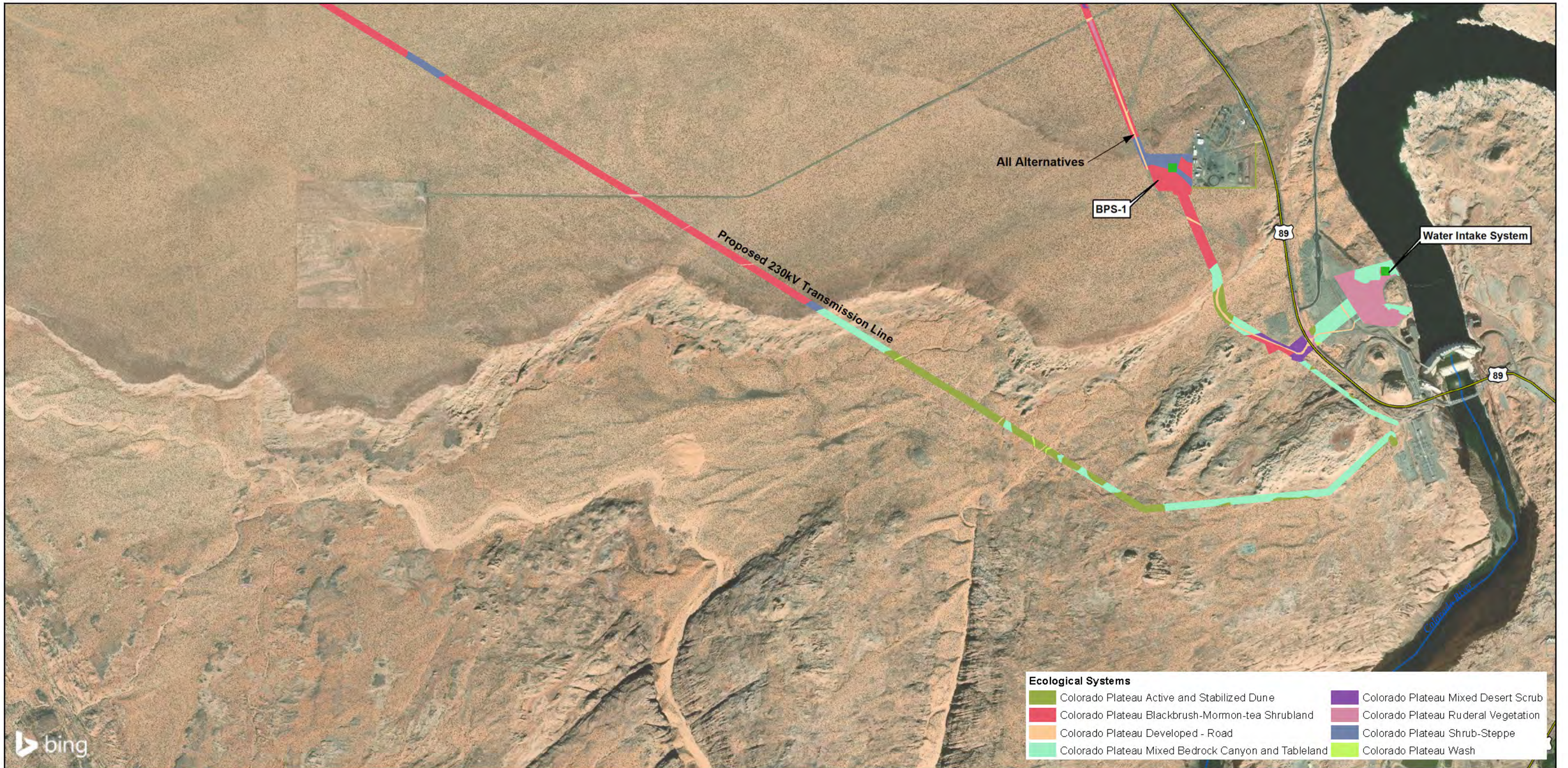


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|---------------------------|-----------------------------------|----------------------|------------------------|
| Project Pump Station | Southern Alternative | Interstate | National Park/Monument |
| Project Regulating Tank | Highway Alternative | US Highway | Tribal Lands |
| Project Hydro Station | Existing Major Transmission Lines | ST Highway | State Boundaries |
| Existing Substation | Project Transmission Lines | Hwy | County Boundaries |
| Project Substation | Major Rivers & Streams | Project Access Roads | Lakes & Reservoirs |
| Project Switching Station | | | |

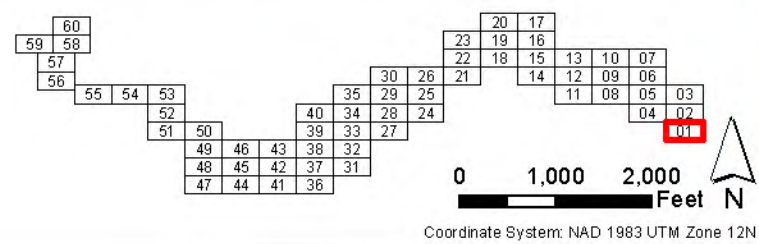


Lake Powell Pipeline

**Alternative Alignments
Ecological Systems
Key Map**



- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy

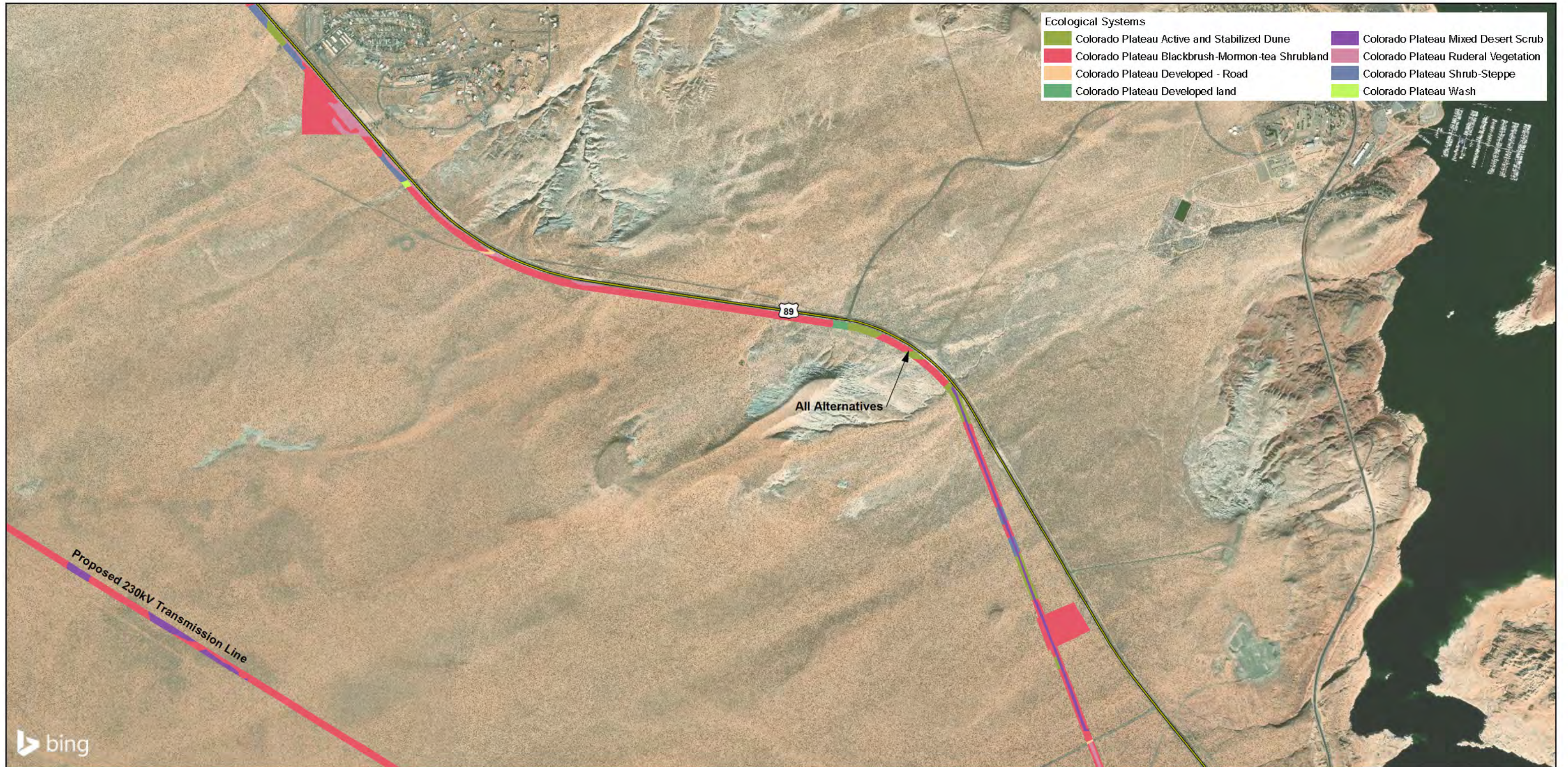


BUREAU OF RECLAMATION

Lake Powell Pipeline

Sheet 01

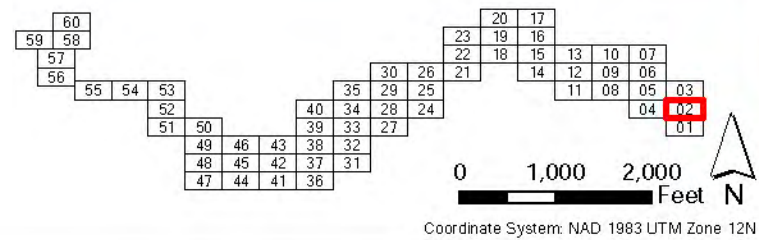
**Alternative Alignments
Ecological Systems**



Ecological Systems	
■ Colorado Plateau Active and Stabilized Dune	■ Colorado Plateau Mixed Desert Scrub
■ Colorado Plateau Blackbrush-Mormon-tea Shrubland	■ Colorado Plateau Ruderal Vegetation
■ Colorado Plateau Developed - Road	■ Colorado Plateau Shrub-Steppe
■ Colorado Plateau Developed land	■ Colorado Plateau Wash

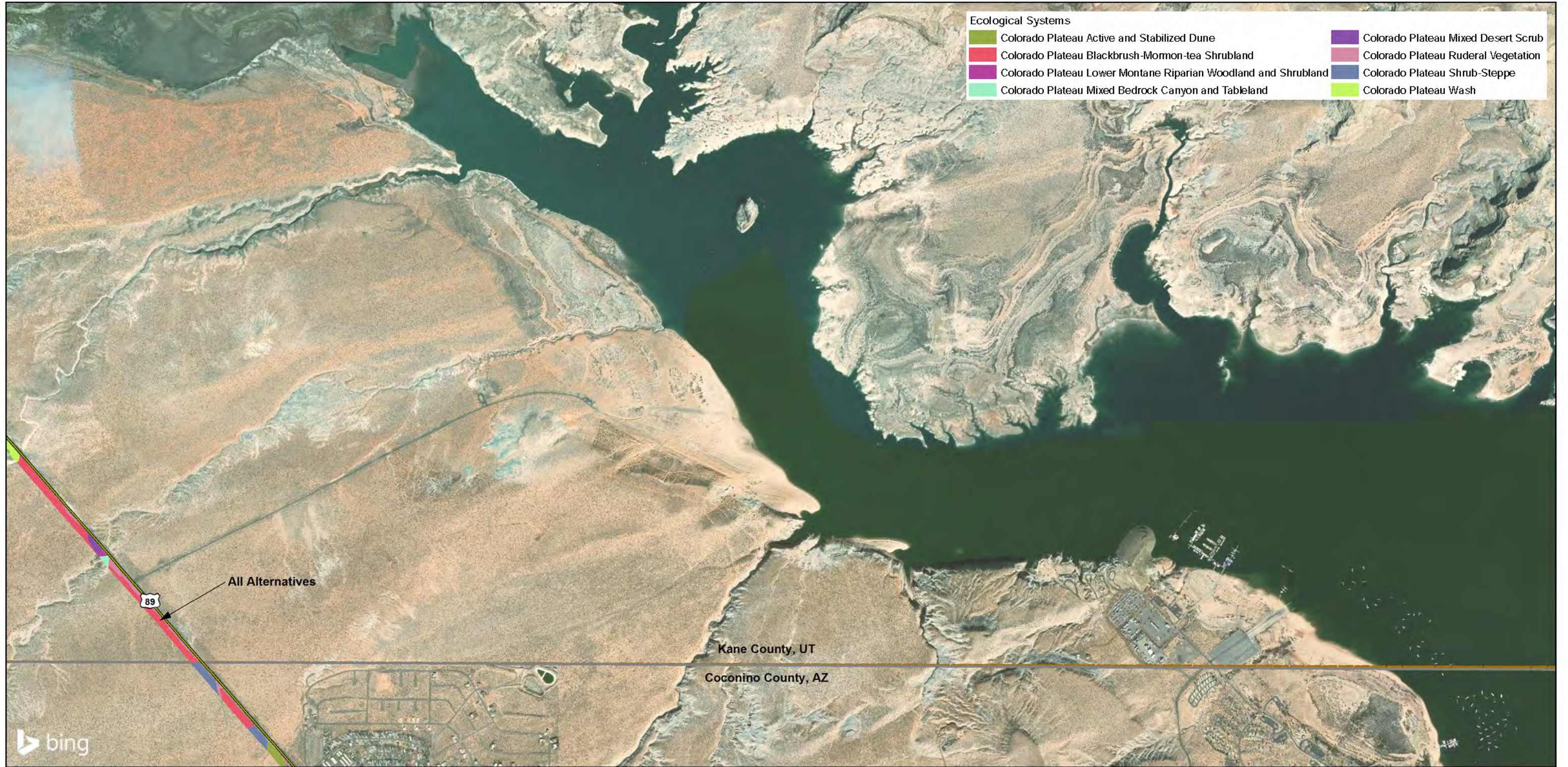
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■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	



BUREAU OF RECLAMATION

Lake Powell Pipeline
Sheet 02
Alternative Alignments Ecological Systems



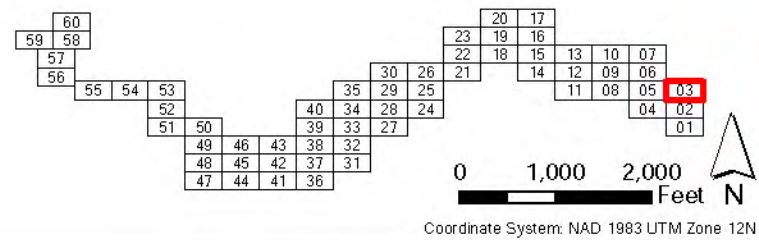
- Ecological Systems**
- Colorado Plateau Active and Stabilized Dune
 - Colorado Plateau Blackbrush-Mormon-tea Shrubland
 - Colorado Plateau Lower Montane Riparian Woodland and Shrubland
 - Colorado Plateau Mixed Bedrock Canyon and Tableland
 - Colorado Plateau Mixed Desert Scrub
 - Colorado Plateau Ruderal Vegetation
 - Colorado Plateau Shrub-Steppe
 - Colorado Plateau Wash

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All Alternatives

Kane County, UT
Coconino County, AZ

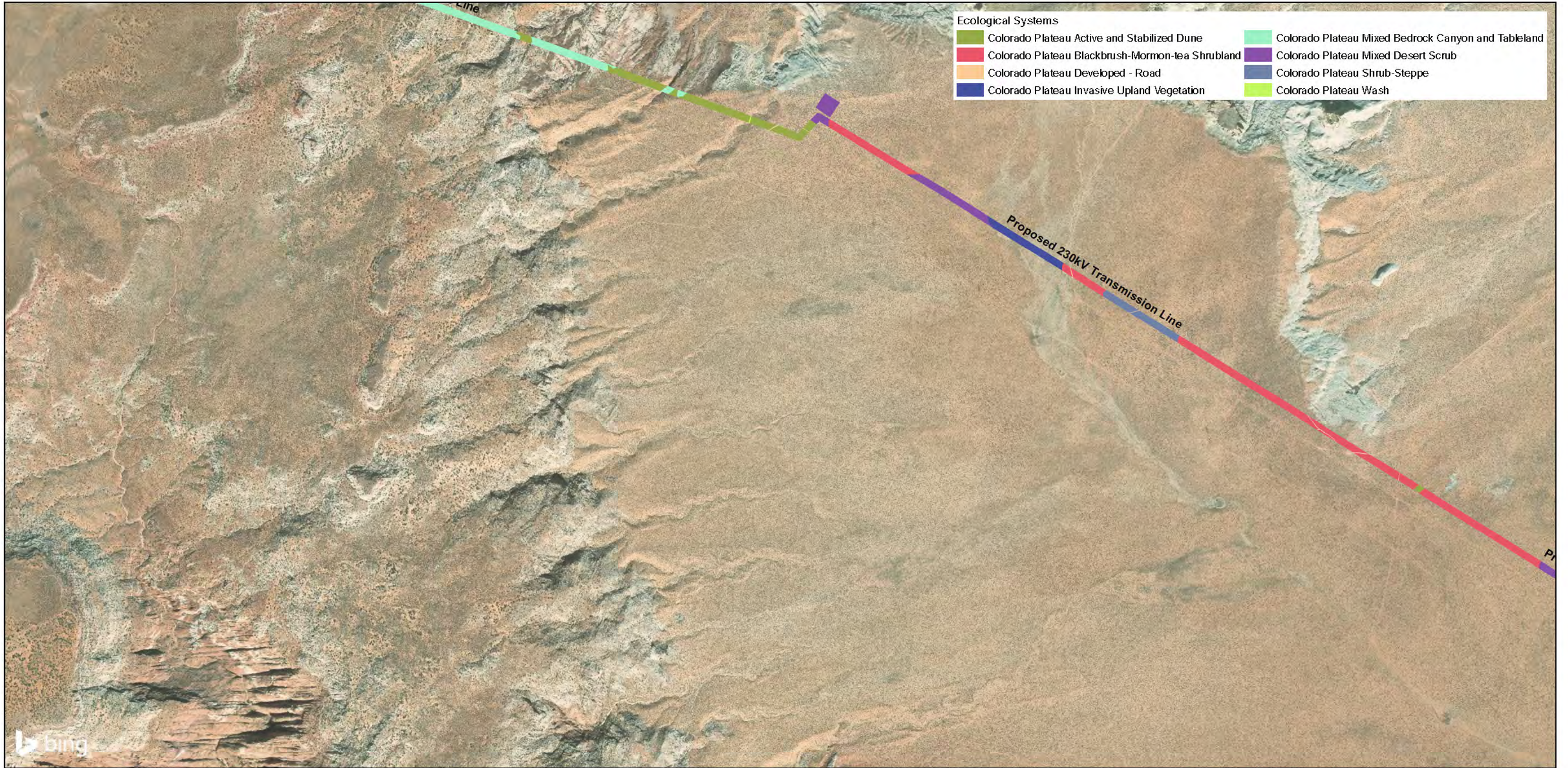


- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- Interstate
- US Highway
- ST Highway
- Hwy
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams



BUREAU OF RECLAMATION

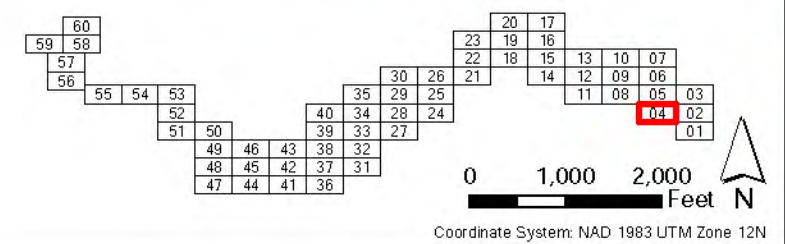
Lake Powell Pipeline
Sheet 03
Alternative Alignments
Ecological Systems



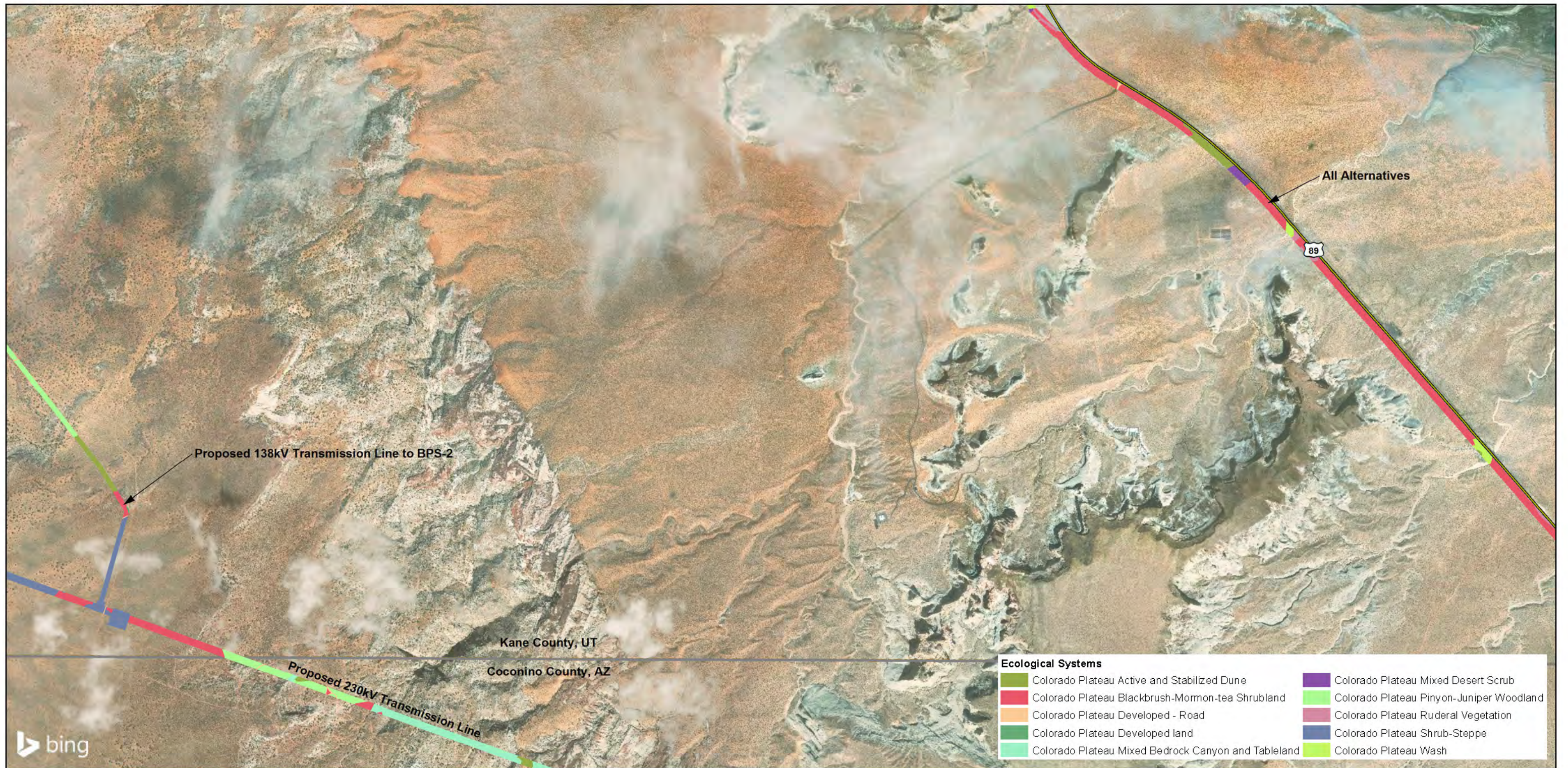
Ecological Systems	
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	Colorado Plateau Blackbrush-Mormon-tea Shrubland
	Colorado Plateau Developed - Road
	Colorado Plateau Invasive Upland Vegetation
	Colorado Plateau Mixed Bedrock Canyon and Tableland
	Colorado Plateau Mixed Desert Scrub
	Colorado Plateau Shrub-Steppe
	Colorado Plateau Wash

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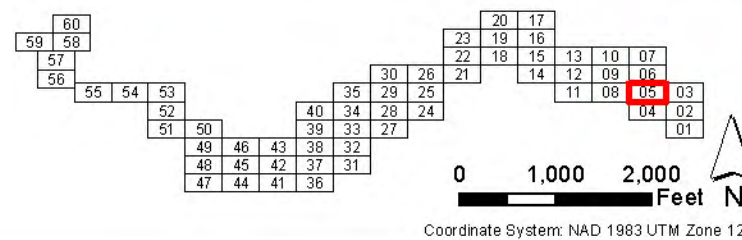
	Project Pump Station		Interstate
	Project Regulating Tank		US Highway
	Project Hydro Station		ST Highway
	National Park/Monument		Hwy
	Tribal Lands		
	Major Rivers & Streams		



Lake Powell Pipeline
Sheet 04
Alternative Alignments Ecological Systems



- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy

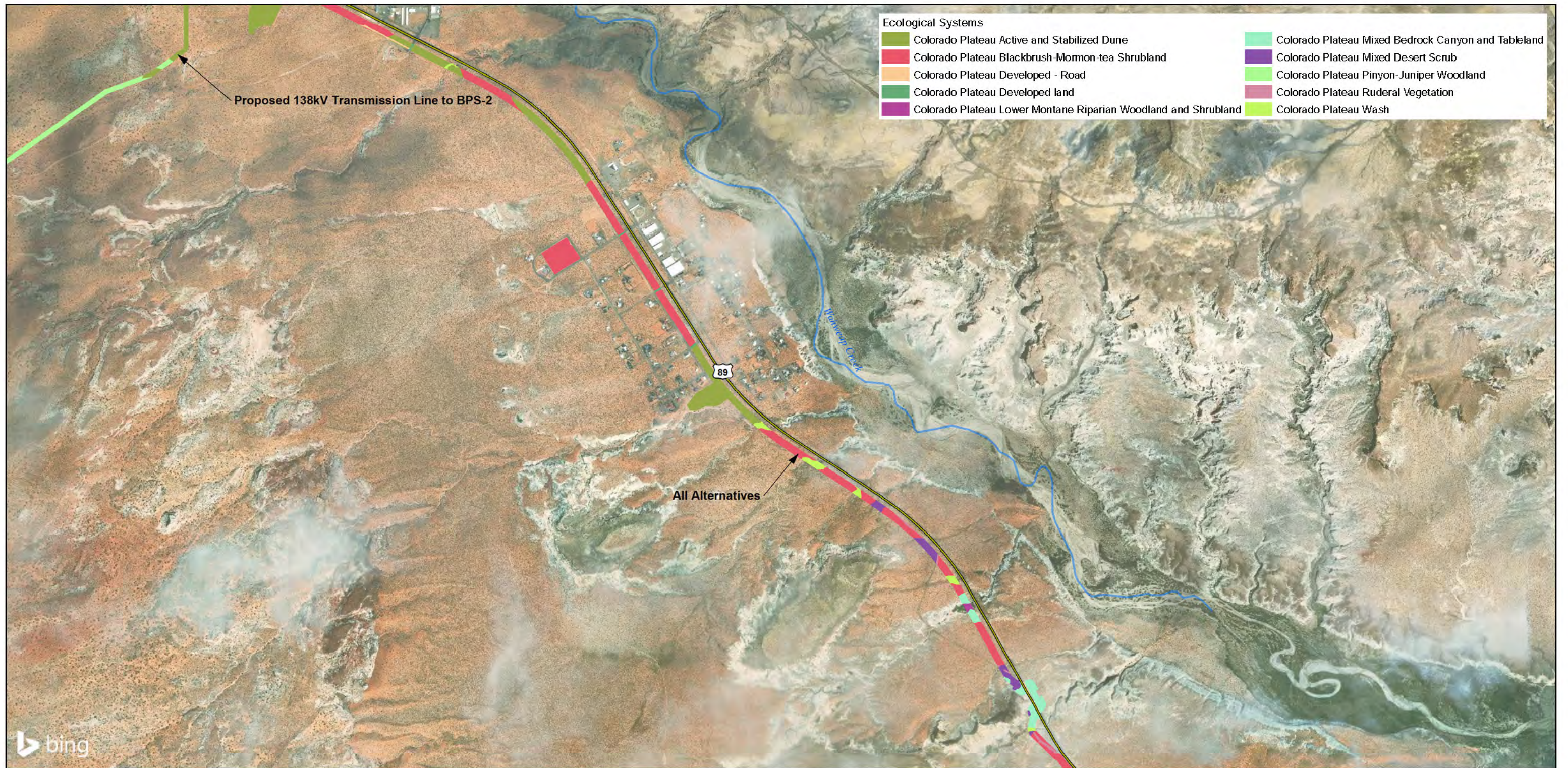


BUREAU OF RECLAMATION

Lake Powell Pipeline

Sheet 05

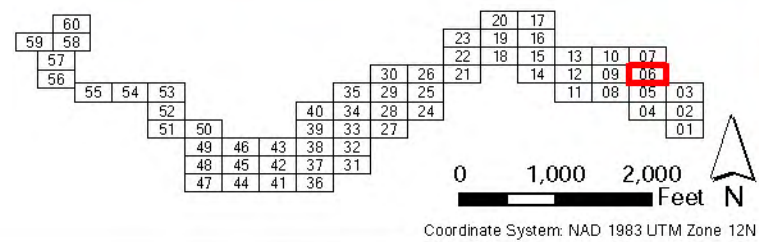
**Alternative Alignments
Ecological Systems**



Ecological Systems	
■ Colorado Plateau Active and Stabilized Dune	■ Colorado Plateau Mixed Bedrock Canyon and Tableland
■ Colorado Plateau Blackbrush-Mormon-tea Shrubland	■ Colorado Plateau Mixed Desert Scrub
■ Colorado Plateau Developed - Road	■ Colorado Plateau Pinyon-Juniper Woodland
■ Colorado Plateau Developed land	■ Colorado Plateau Ruderal Vegetation
■ Colorado Plateau Lower Montane Riparian Woodland and Shrubland	■ Colorado Plateau Wash

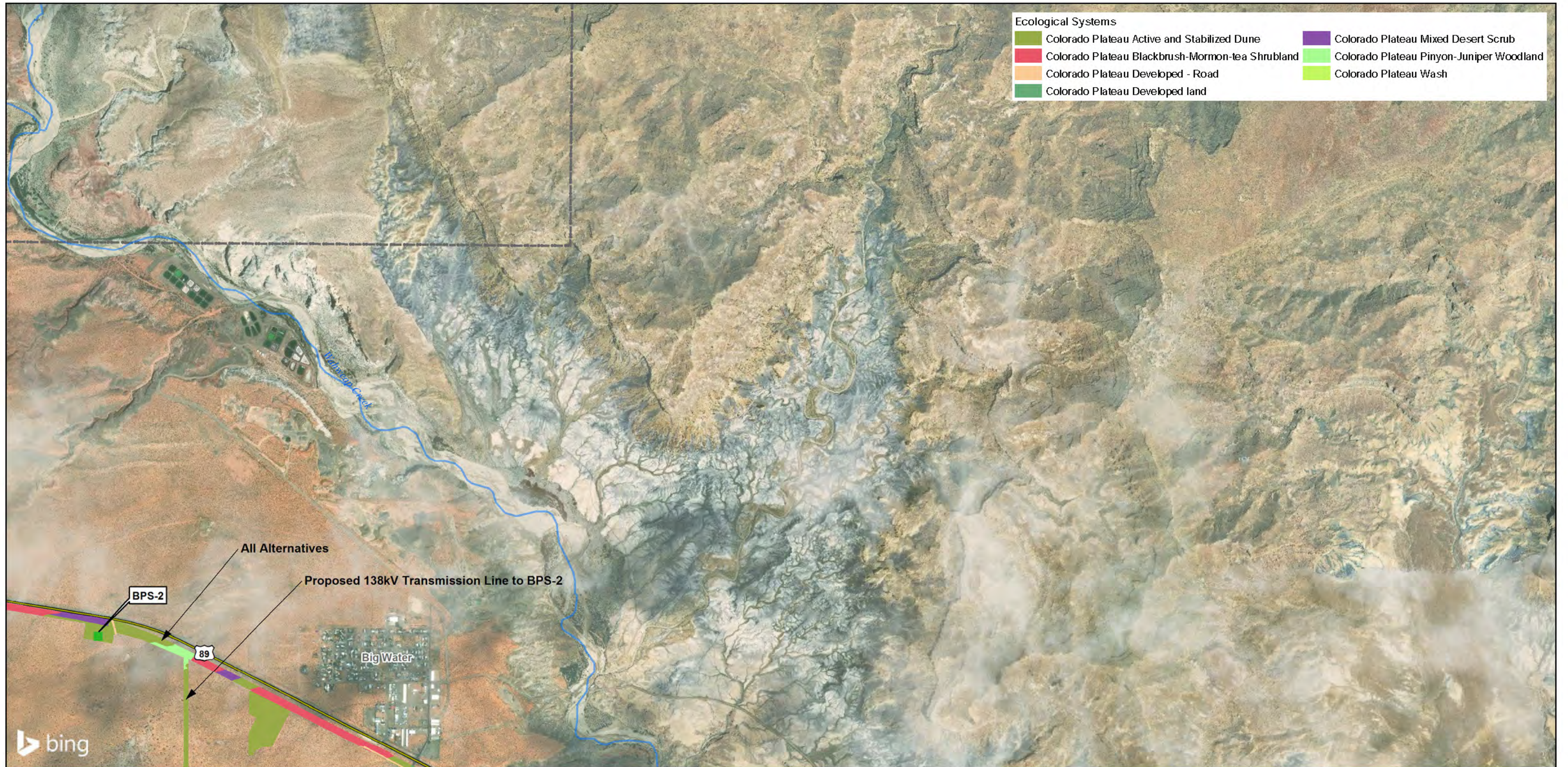
bing

■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	



BUREAU OF RECLAMATION

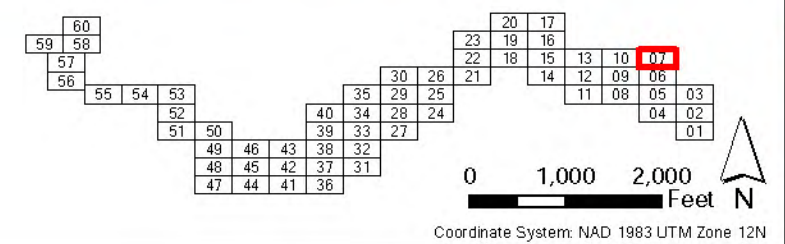
Lake Powell Pipeline
Sheet 06
Alternative Alignments Ecological Systems



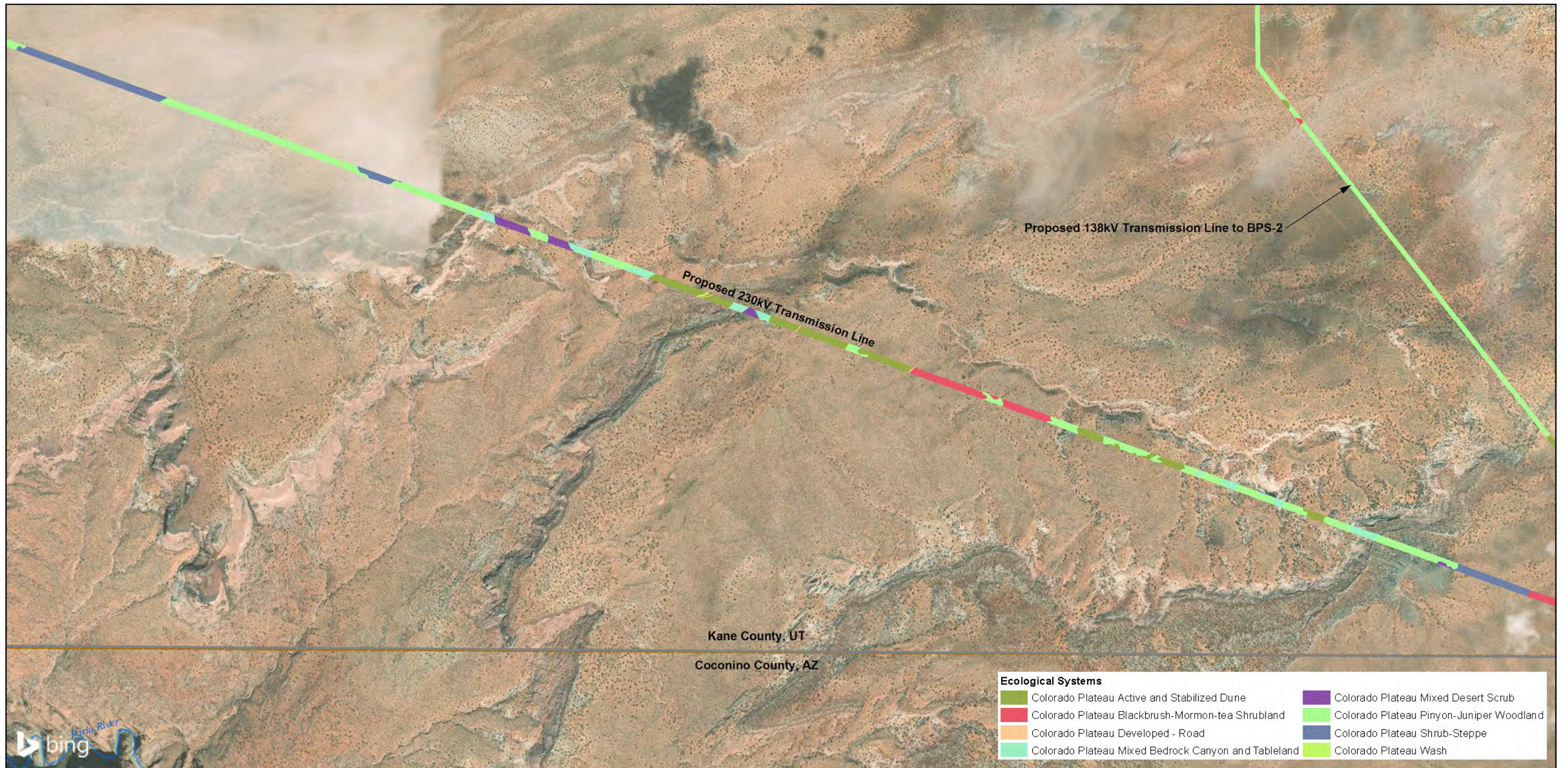
Ecological Systems

■ Colorado Plateau Active and Stabilized Dune	■ Colorado Plateau Mixed Desert Scrub
■ Colorado Plateau Blackbrush-Mormon-tea Shrubland	■ Colorado Plateau Pinyon-Juniper Woodland
■ Colorado Plateau Developed - Road	■ Colorado Plateau Wash
■ Colorado Plateau Developed land	

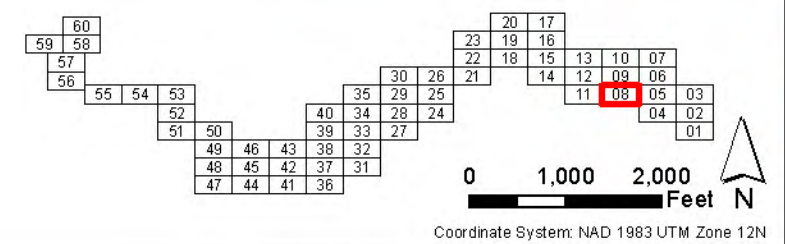
■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	



Lake Powell Pipeline
Sheet 07
Alternative Alignments Ecological Systems



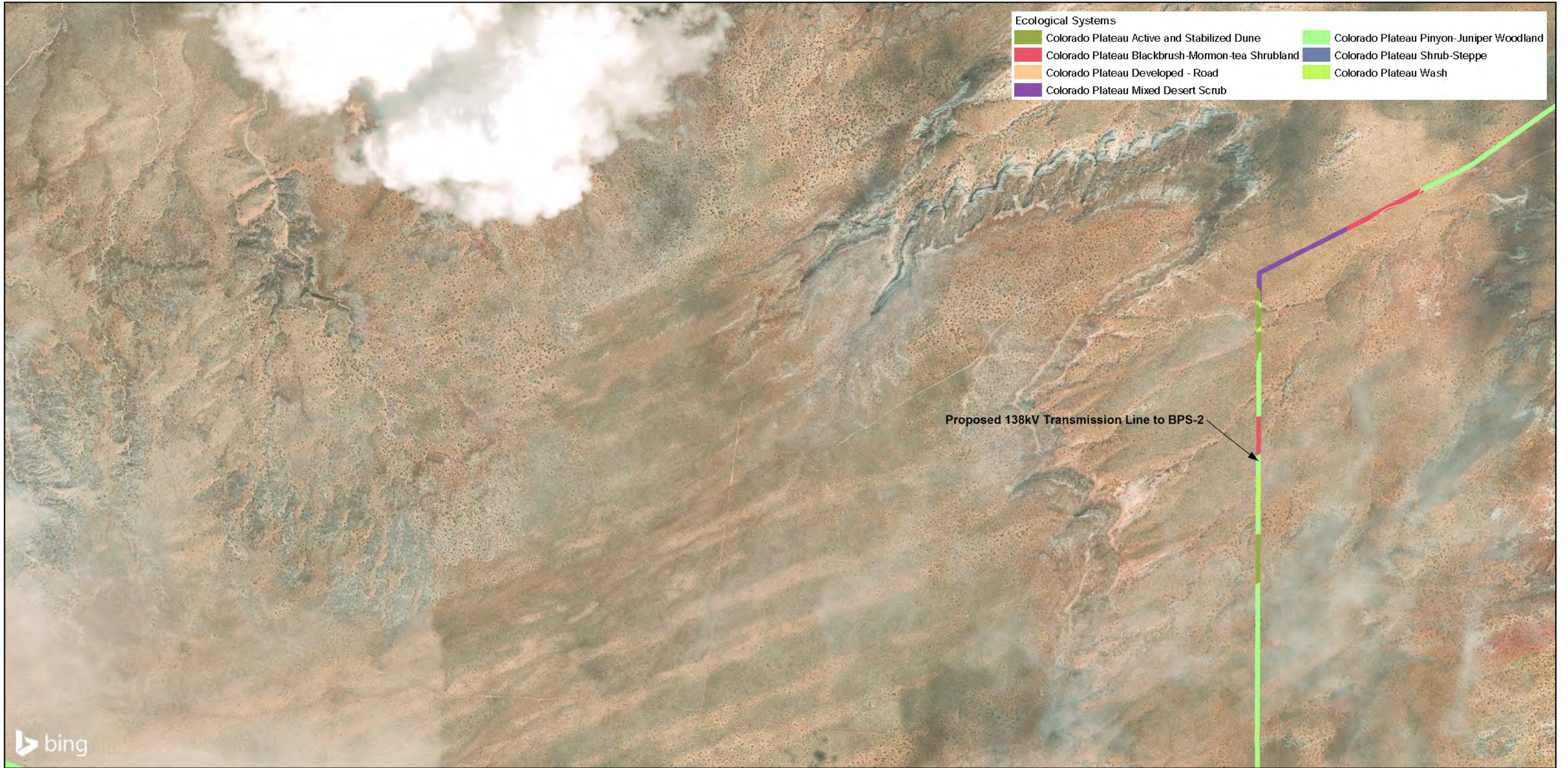
- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- ▭ National Park/Monument
- ▭ Tribal Lands
- Major Rivers & Streams
- ==== Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline

Sheet 08

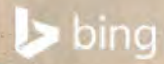
**Alternative Alignments
Ecological Systems**



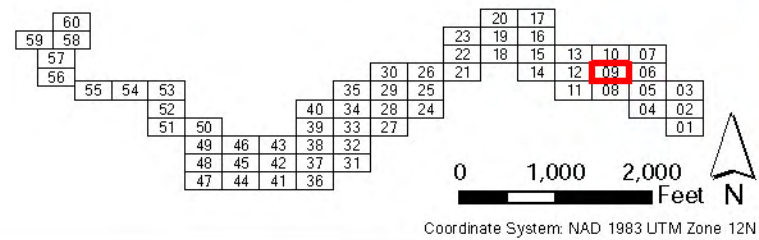
Ecological Systems

■ Colorado Plateau Active and Stabilized Dune	■ Colorado Plateau Pinyon-Juniper Woodland
■ Colorado Plateau Blackbrush-Mormon-tea Shrubland	■ Colorado Plateau Shrub-Steppe
■ Colorado Plateau Developed - Road	■ Colorado Plateau Wash
■ Colorado Plateau Mixed Desert Scrub	

Proposed 138kV Transmission Line to BPS-2

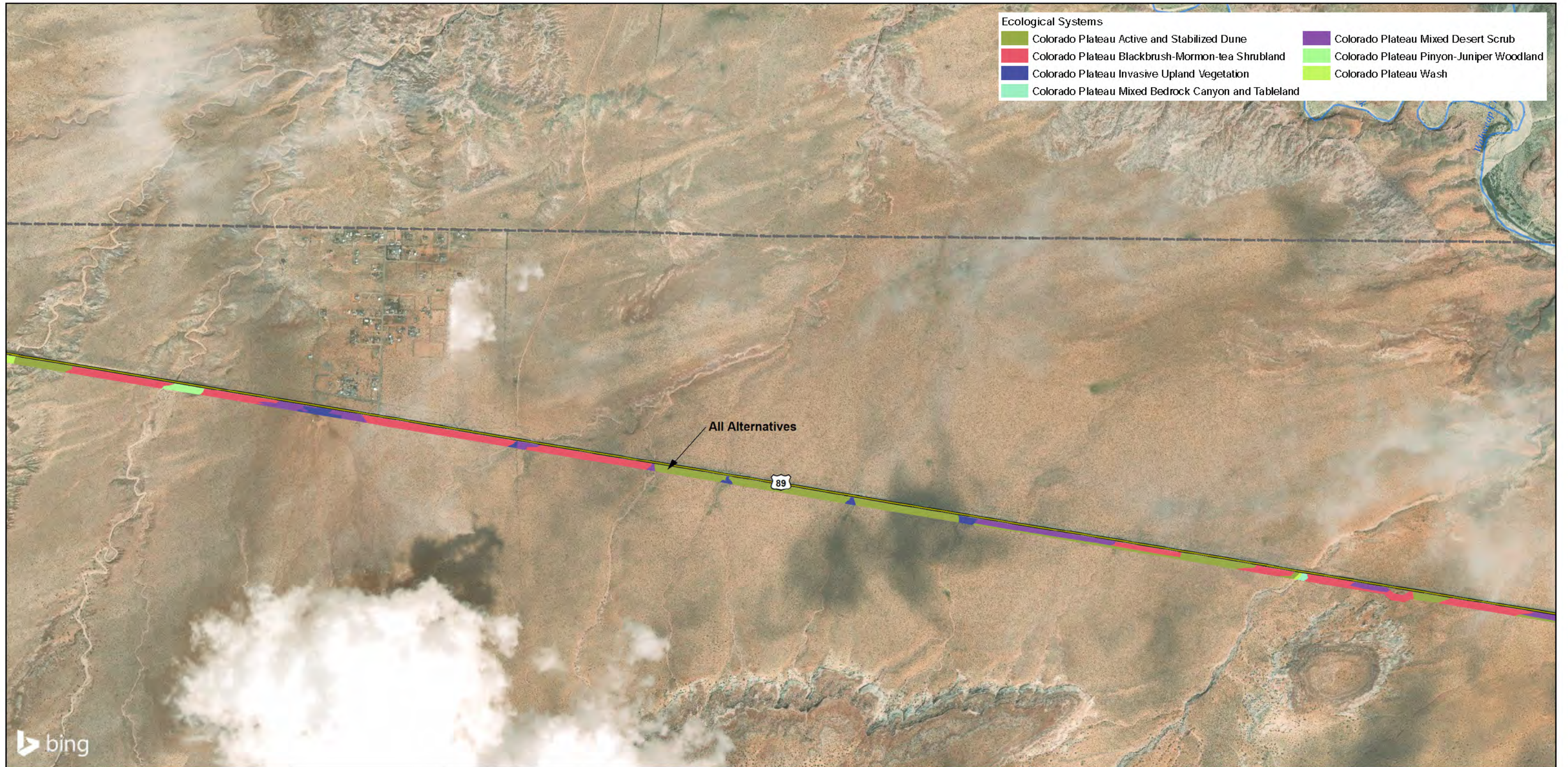


■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	



BUREAU OF RECLAMATION

Lake Powell Pipeline
Sheet 09
Alternative Alignments Ecological Systems



Ecological Systems

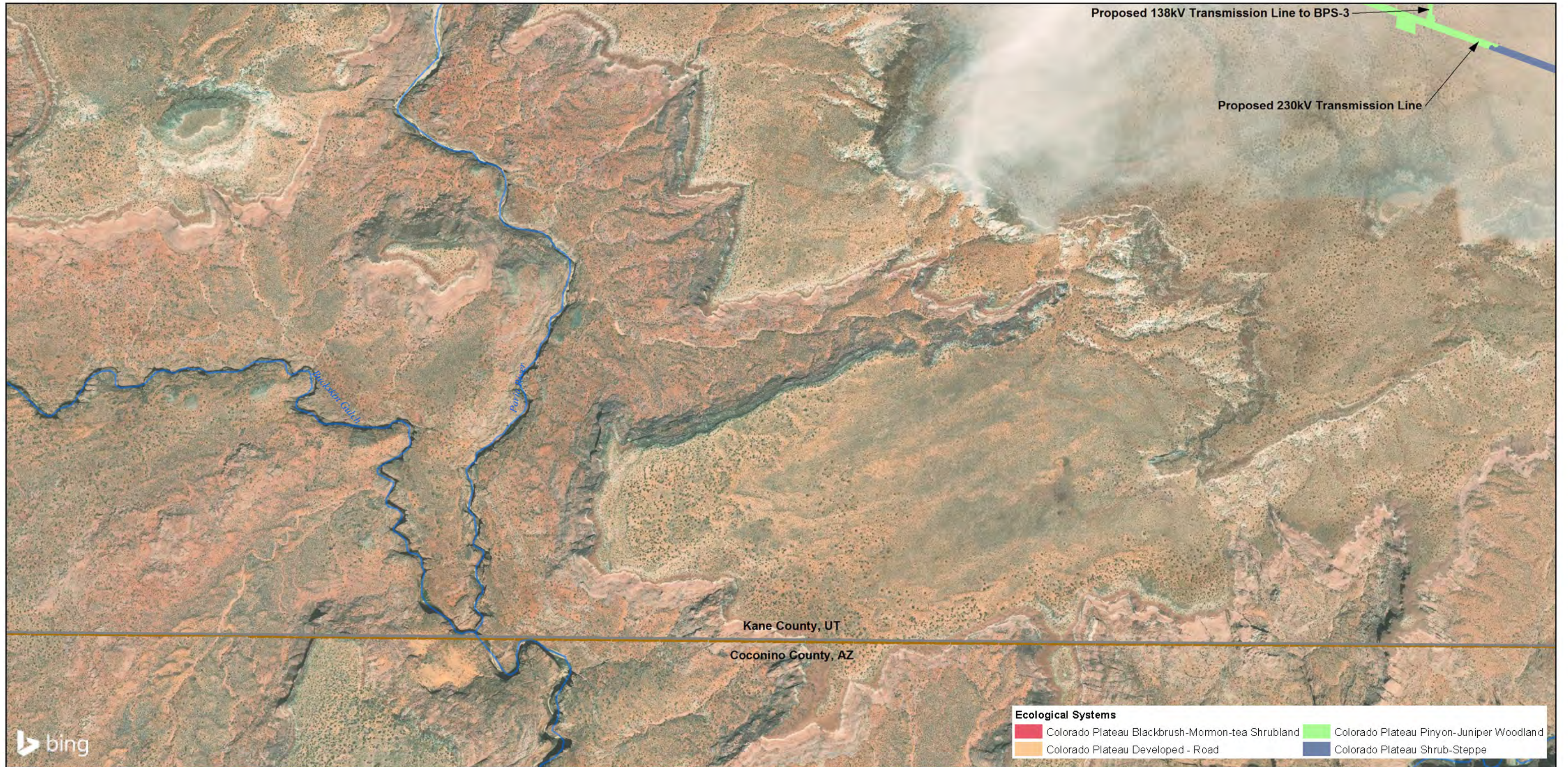
Colorado Plateau Active and Stabilized Dune	Colorado Plateau Mixed Desert Scrub
Colorado Plateau Blackbrush-Mormon-tea Shrubland	Colorado Plateau Pinyon-Juniper Woodland
Colorado Plateau Invasive Upland Vegetation	Colorado Plateau Wash
Colorado Plateau Mixed Bedrock Canyon and Tableland	

Project Pump Station	Interstate
Project Regulating Tank	US Highway
Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	

Coordinate System: NAD 1983 UTM Zone 12N

BUREAU OF RECLAMATION

Lake Powell Pipeline
Sheet 10
Alternative Alignments Ecological Systems



Proposed 138kV Transmission Line to BPS-3

Proposed 230kV Transmission Line

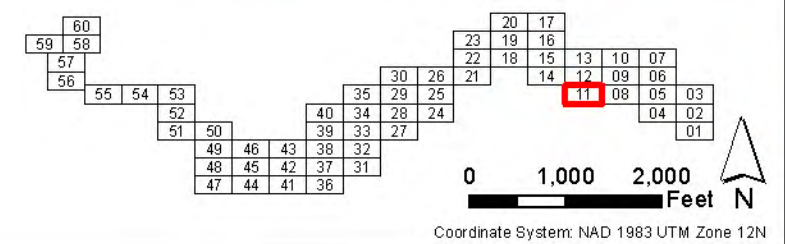
Kane County, UT

Coconino County, AZ



Ecological Systems			
■	Colorado Plateau Blackbrush-Mormon-tea Shrubland	■	Colorado Plateau Pinyon-Juniper Woodland
■	Colorado Plateau Developed - Road	■	Colorado Plateau Shrub-Steppe

- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



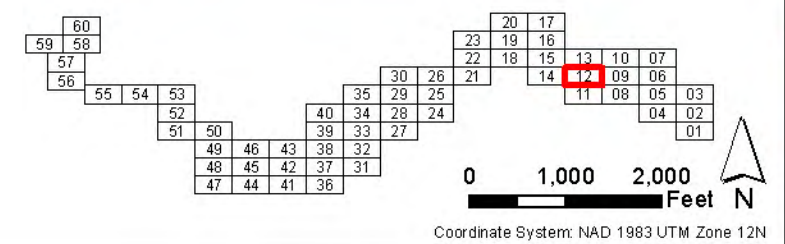
Lake Powell Pipeline

Sheet 11

Alternative Alignments
Ecological Systems



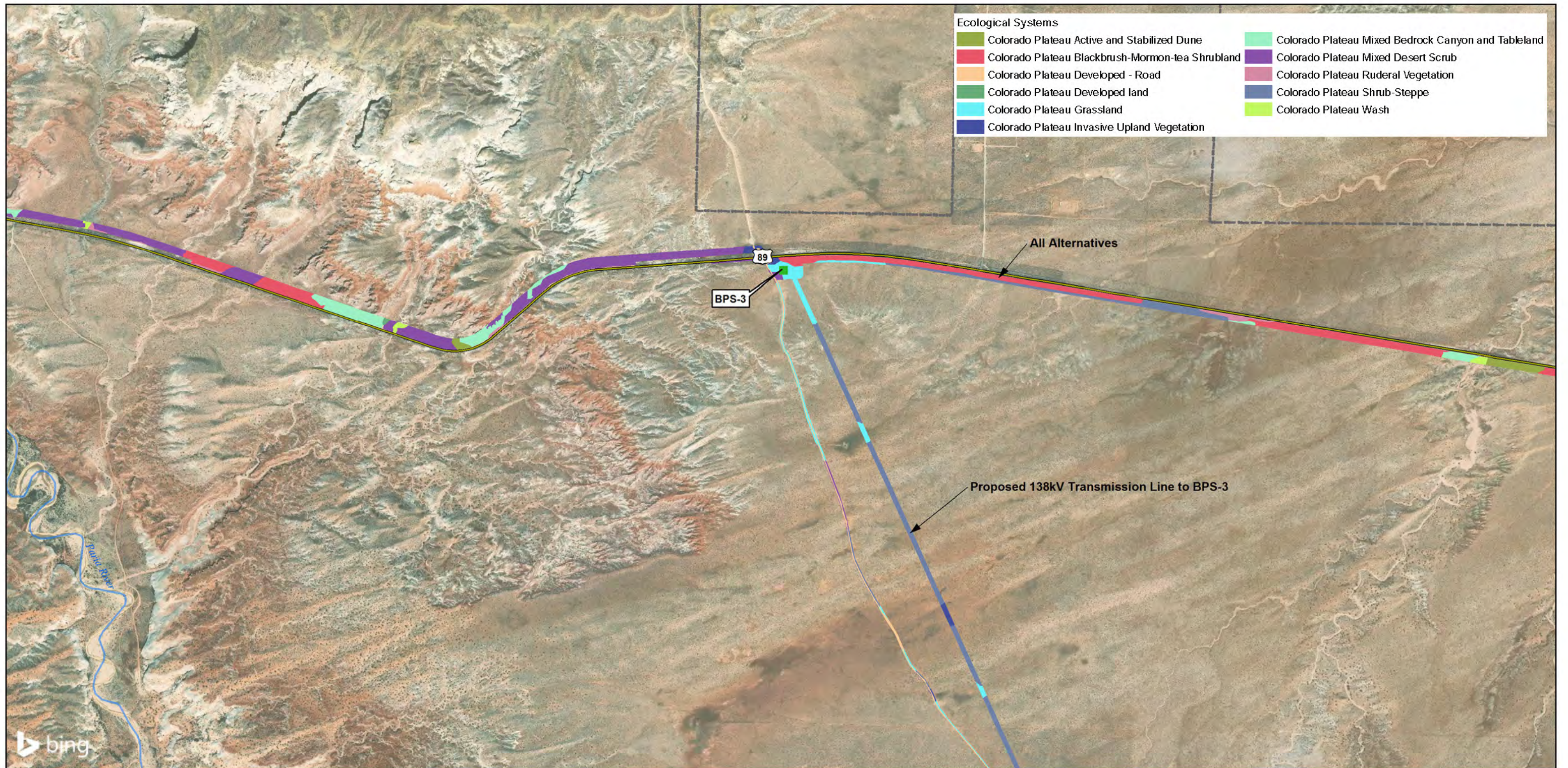
- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline

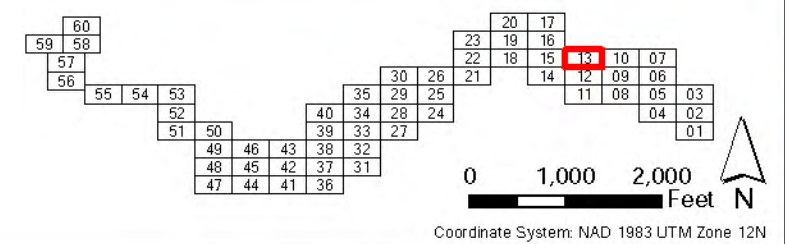
Sheet 12

Alternative Alignments
Ecological Systems



- Ecological Systems**
- Colorado Plateau Active and Stabilized Dune
 - Colorado Plateau Blackbrush-Mormon-tea Shrubland
 - Colorado Plateau Developed - Road
 - Colorado Plateau Developed land
 - Colorado Plateau Grassland
 - Colorado Plateau Invasive Upland Vegetation
 - Colorado Plateau Mixed Bedrock Canyon and Tableland
 - Colorado Plateau Mixed Desert Scrub
 - Colorado Plateau Ruderal Vegetation
 - Colorado Plateau Shrub-Steppe
 - Colorado Plateau Wash

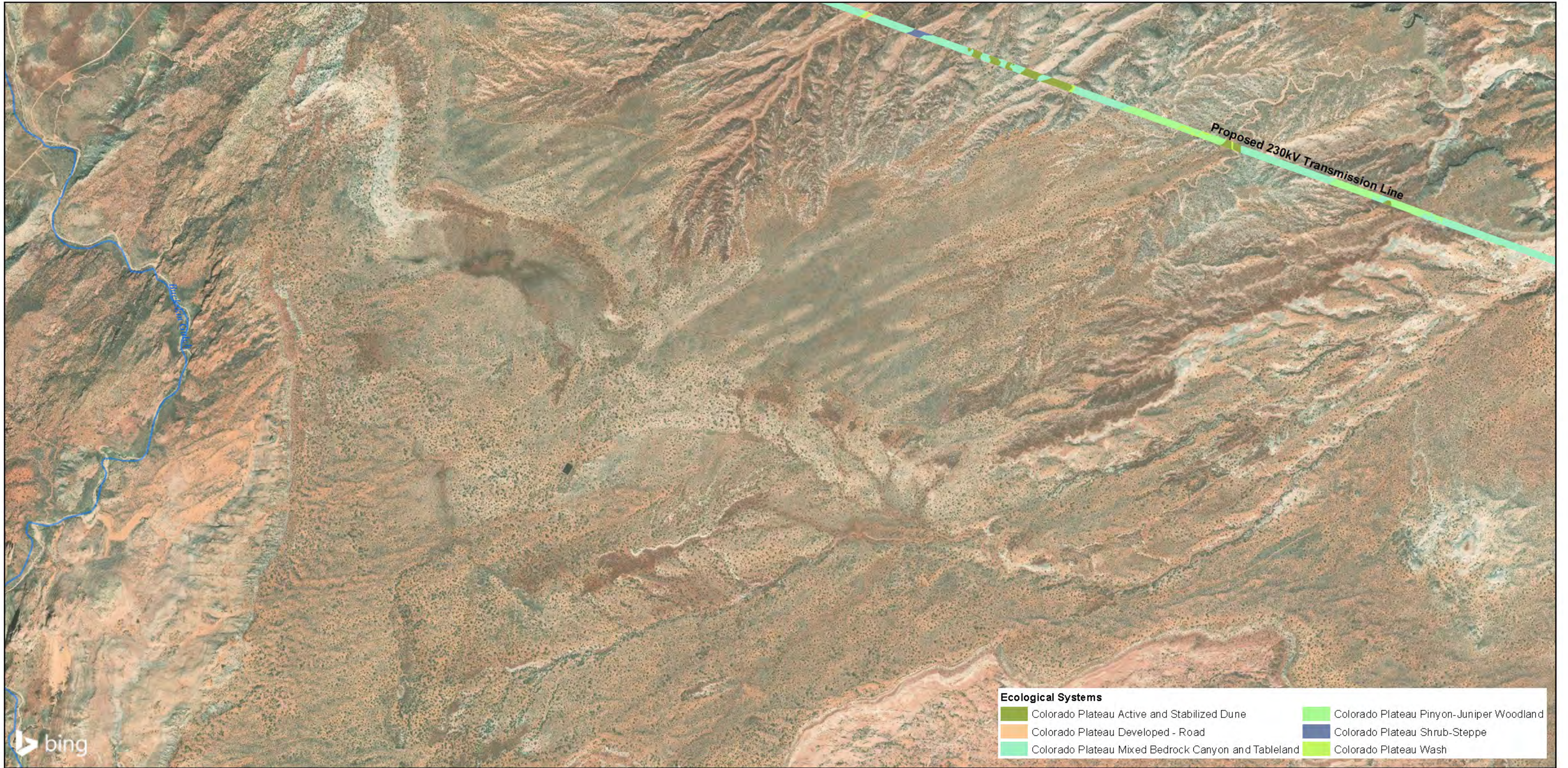
- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline

Sheet 13

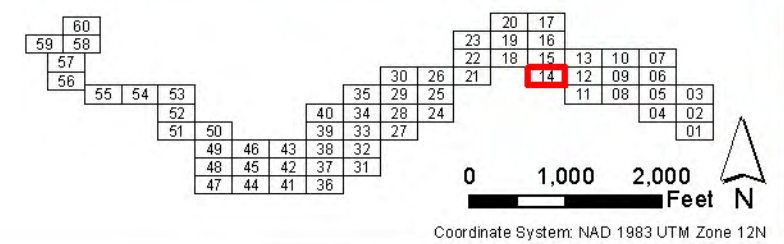
Alternative Alignments
Ecological Systems



Ecological Systems

 Colorado Plateau Active and Stabilized Dune	 Colorado Plateau Pinyon-Juniper Woodland
 Colorado Plateau Developed - Road	 Colorado Plateau Shrub-Steppe
 Colorado Plateau Mixed Bedrock Canyon and Tableland	 Colorado Plateau Wash

 Project Pump Station	 Interstate
 Project Regulating Tank	 US Highway
 Project Hydro Station	 ST Highway
 National Park/Monument	 Hwy
 Tribal Lands	
 Major Rivers & Streams	



0 1,000 2,000 Feet N

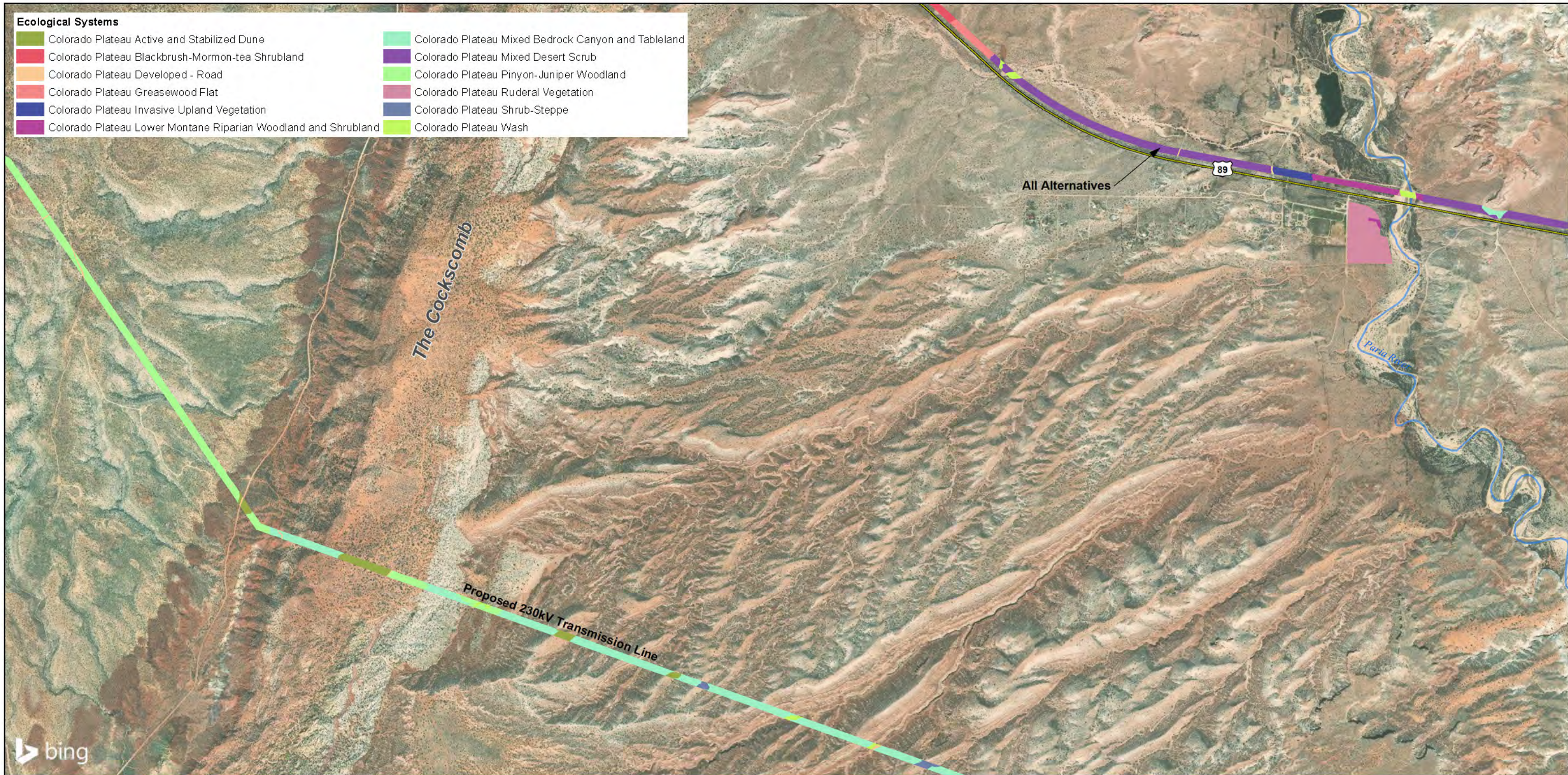
Coordinate System: NAD 1983 UTM Zone 12N



Lake Powell Pipeline
Sheet 14
Alternative Alignments Ecological Systems

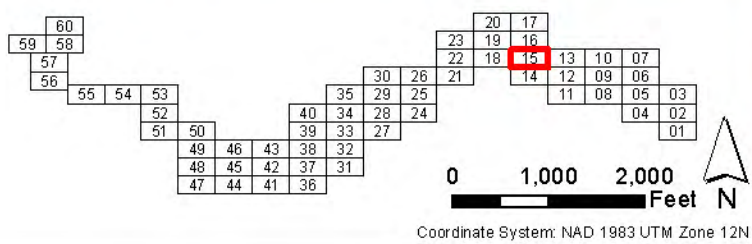
Ecological Systems

 Colorado Plateau Active and Stabilized Dune	 Colorado Plateau Mixed Bedrock Canyon and Tableland
 Colorado Plateau Blackbrush-Mormon-tea Shrubland	 Colorado Plateau Mixed Desert Scrub
 Colorado Plateau Developed - Road	 Colorado Plateau Pinyon-Juniper Woodland
 Colorado Plateau Greasewood Flat	 Colorado Plateau Ruderal Vegetation
 Colorado Plateau Invasive Upland Vegetation	 Colorado Plateau Shrub-Steppe
 Colorado Plateau Lower Montane Riparian Woodland and Shrubland	 Colorado Plateau Wash

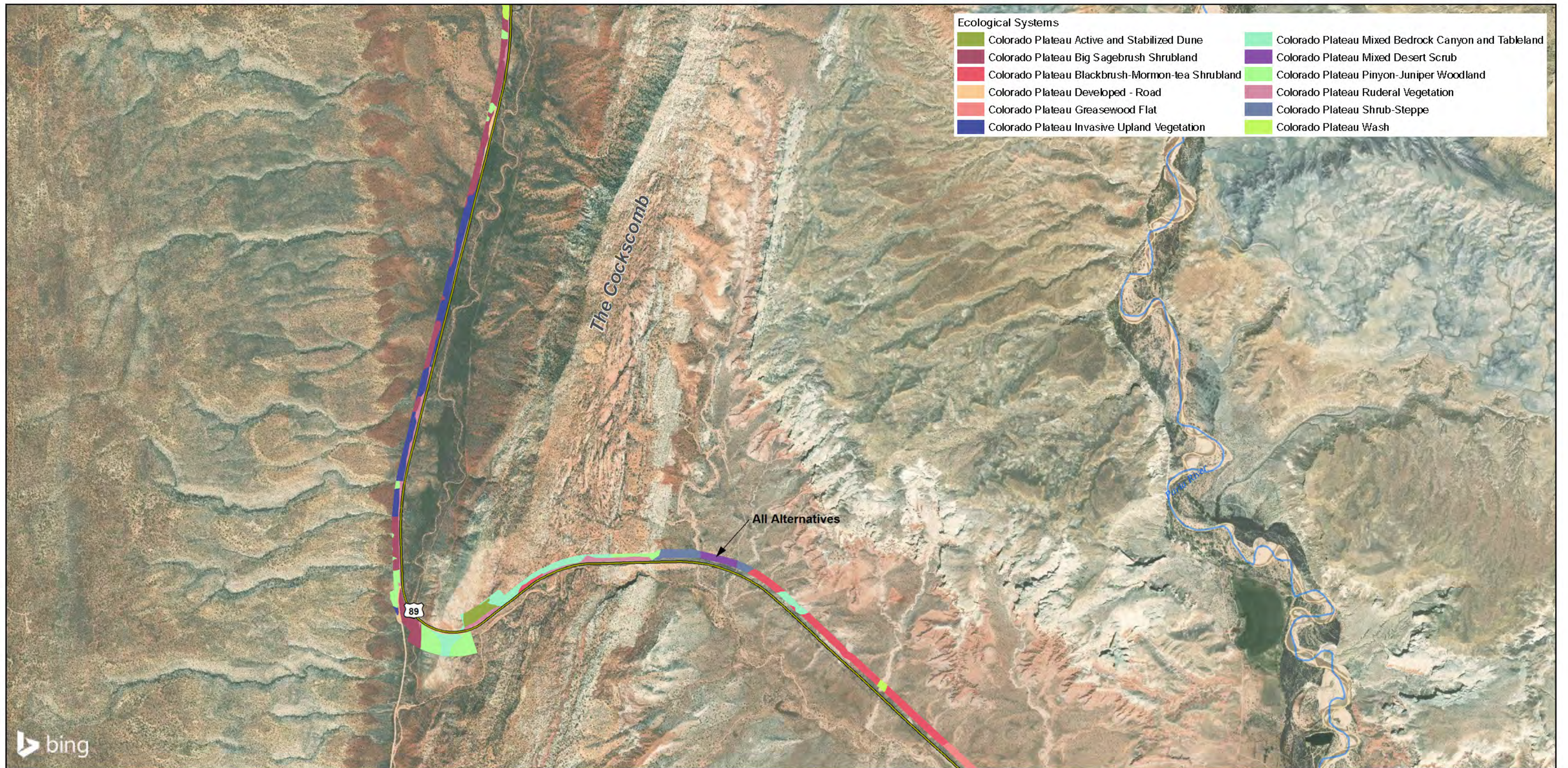


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 Project Pump Station	 Interstate
 Project Regulating Tank	 US Highway
 Project Hydro Station	 ST Highway
 National Park/Monument	 Hwy
 Tribal Lands	
 Major Rivers & Streams	



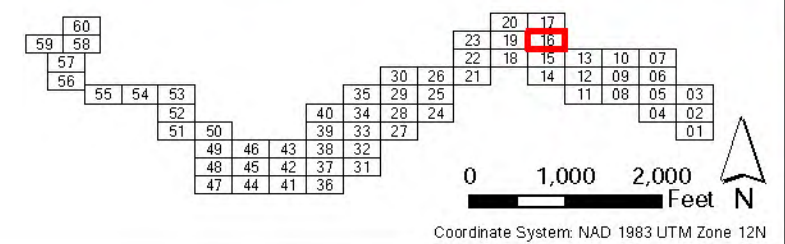
Lake Powell Pipeline
Sheet 15
Alternative Alignments Ecological Systems



- Ecological Systems**
- Colorado Plateau Active and Stabilized Dune
 - Colorado Plateau Mixed Bedrock Canyon and Tableland
 - Colorado Plateau Big Sagebrush Shrubland
 - Colorado Plateau Mixed Desert Scrub
 - Colorado Plateau Blackbrush-Mormon-tea Shrubland
 - Colorado Plateau Pinyon-Juniper Woodland
 - Colorado Plateau Developed - Road
 - Colorado Plateau Ruderal Vegetation
 - Colorado Plateau Greasewood Flat
 - Colorado Plateau Shrub-Steppe
 - Colorado Plateau Invasive Upland Vegetation
 - Colorado Plateau Wash

bing

- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- ▭ National Park/Monument
- ▭ Tribal Lands
- Major Rivers & Streams
- === Interstate
- US Highway
- ST Highway
- Hwy

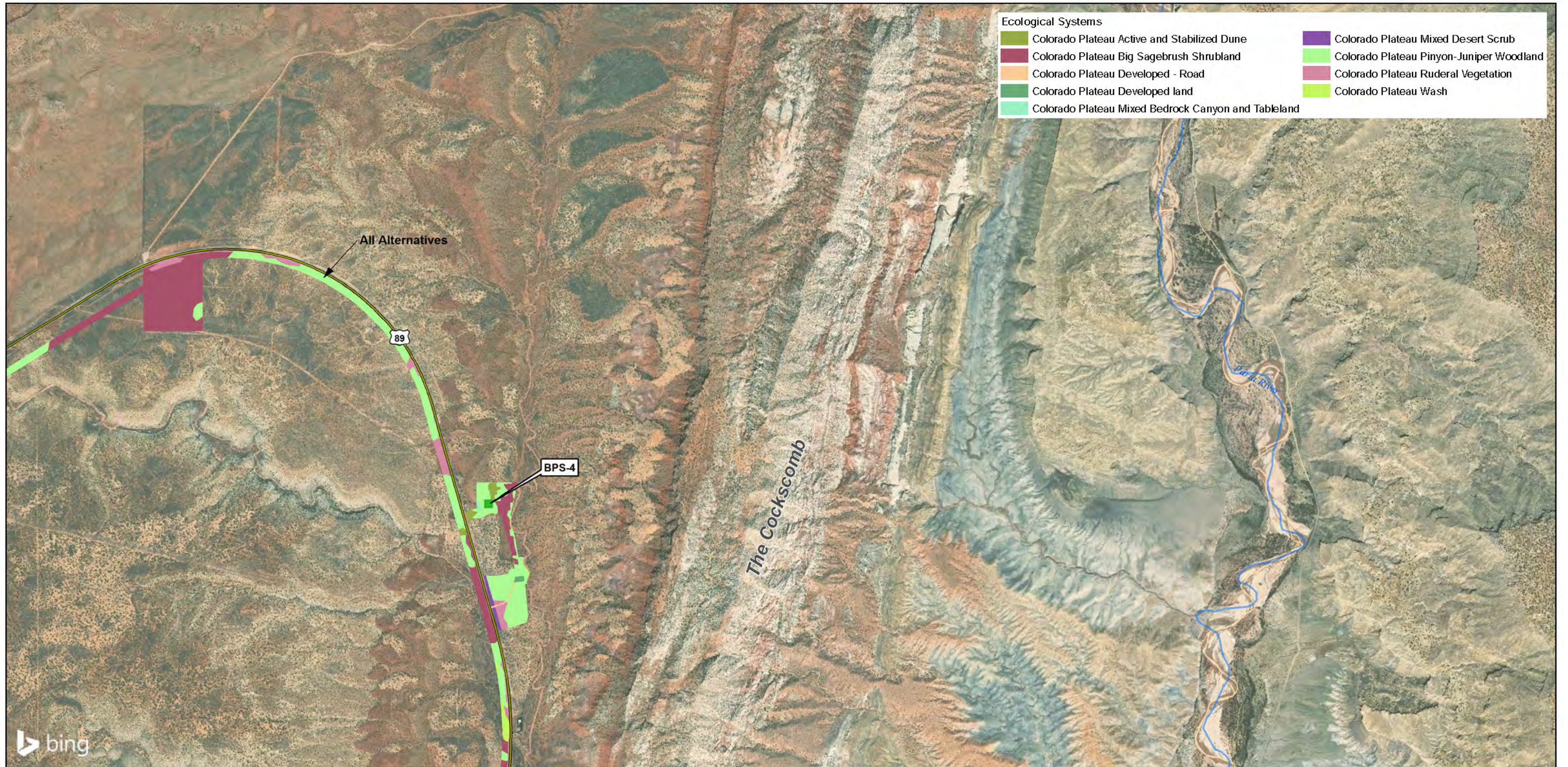


BUREAU OF RECLAMATION

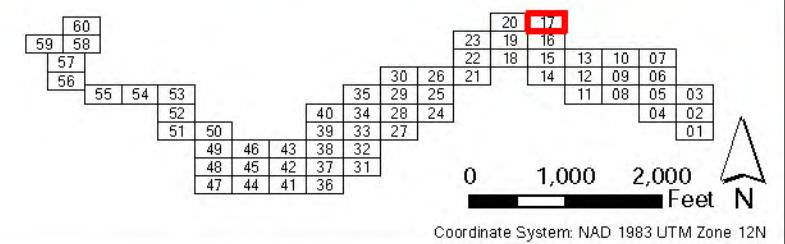
Lake Powell Pipeline

Sheet 16

Alternative Alignments
Ecological Systems



- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline

Sheet 17

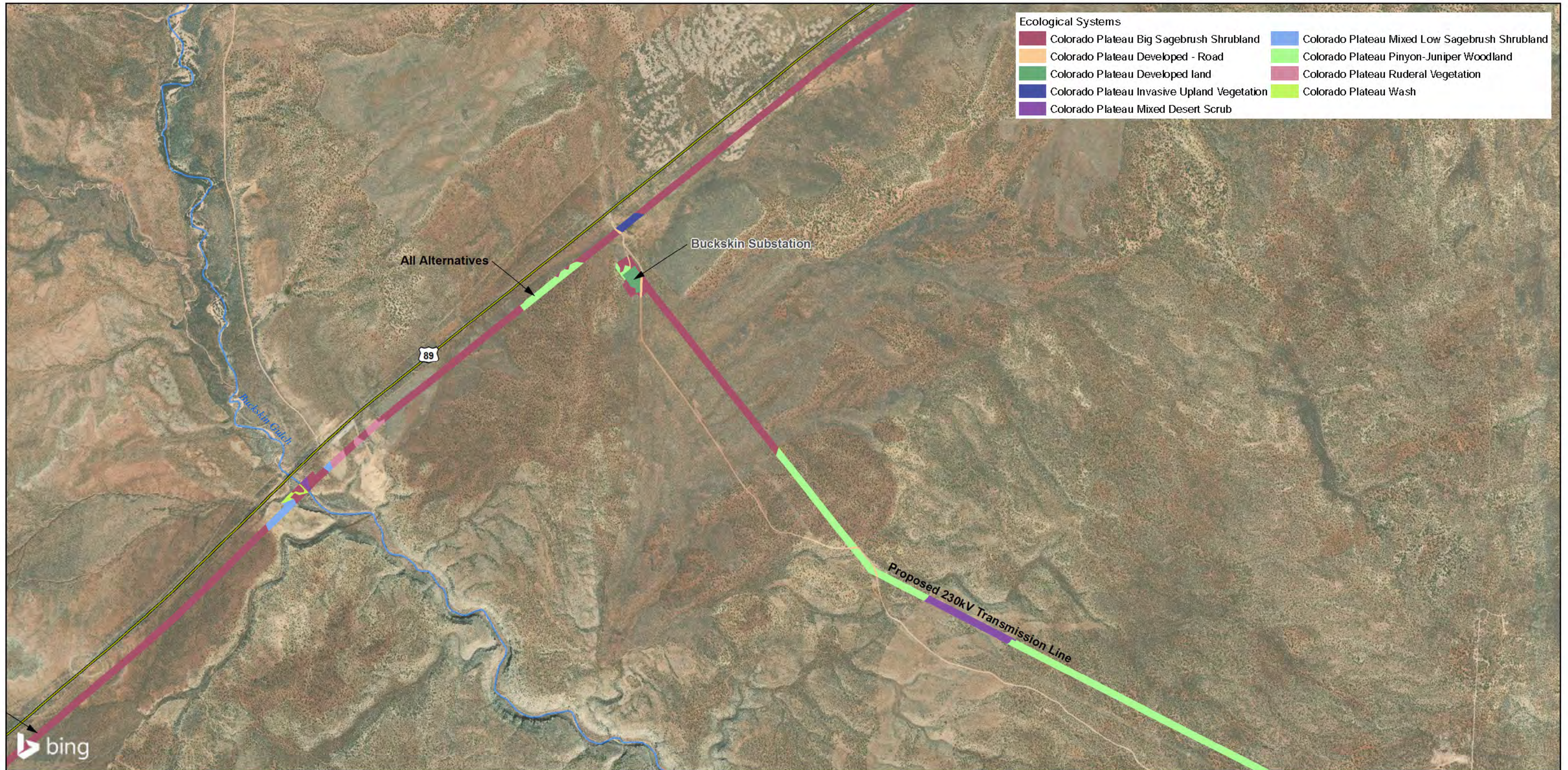
Alternative Alignments
Ecological Systems



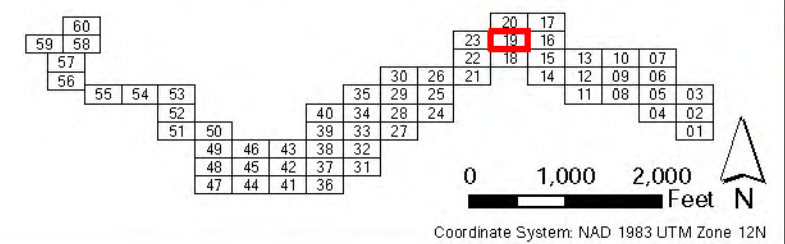
Lake Powell Pipeline

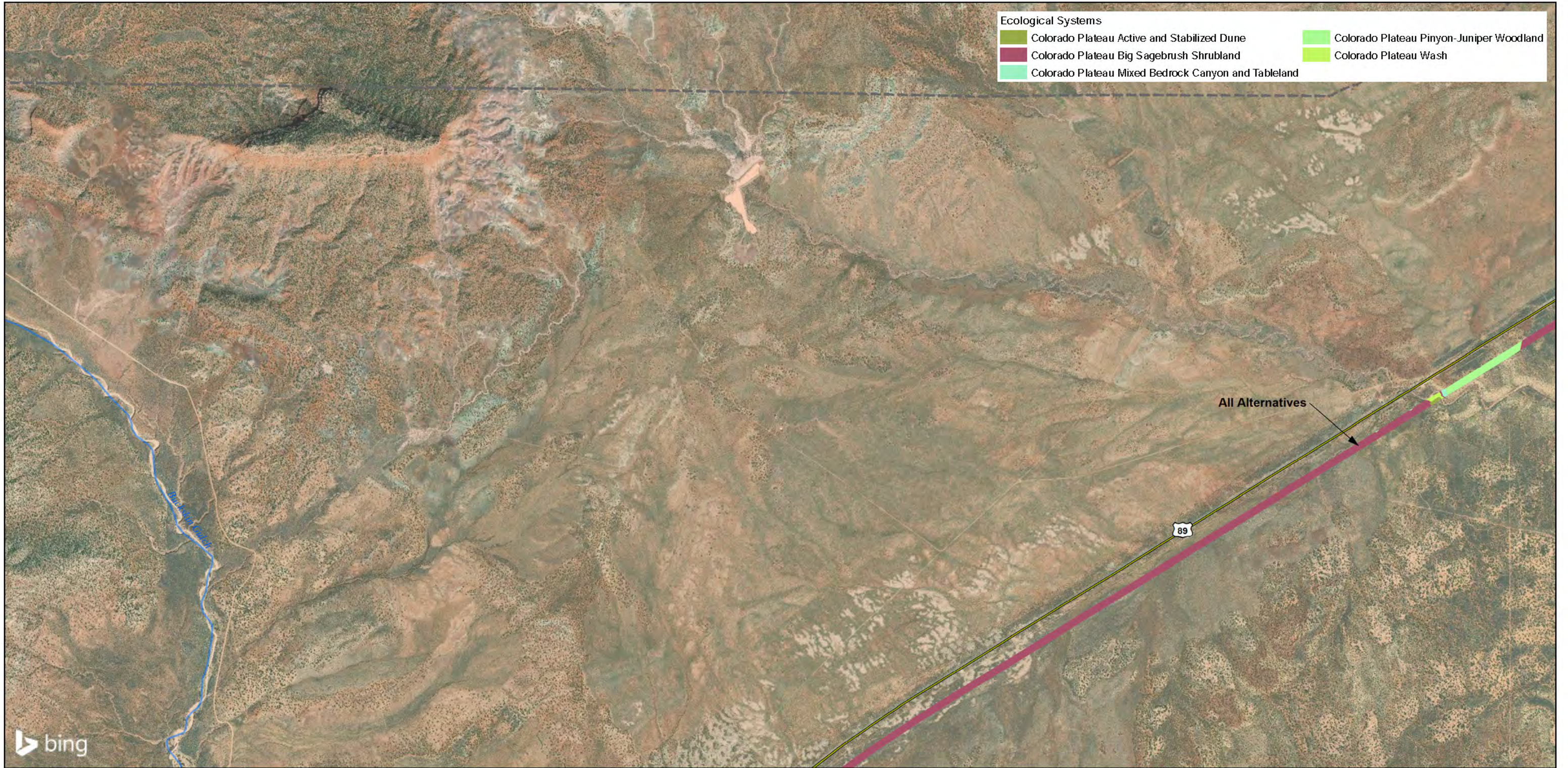
Sheet 18

Alternative Alignments
Ecological Systems



- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



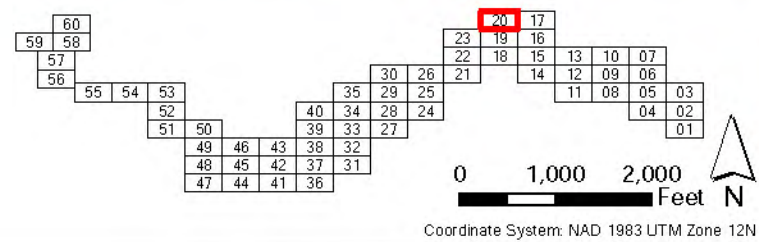


Ecological Systems

- Colorado Plateau Active and Stabilized Dune
- Colorado Plateau Big Sagebrush Shrubland
- Colorado Plateau Mixed Bedrock Canyon and Tableland
- Colorado Plateau Pinyon-Juniper Woodland
- Colorado Plateau Wash

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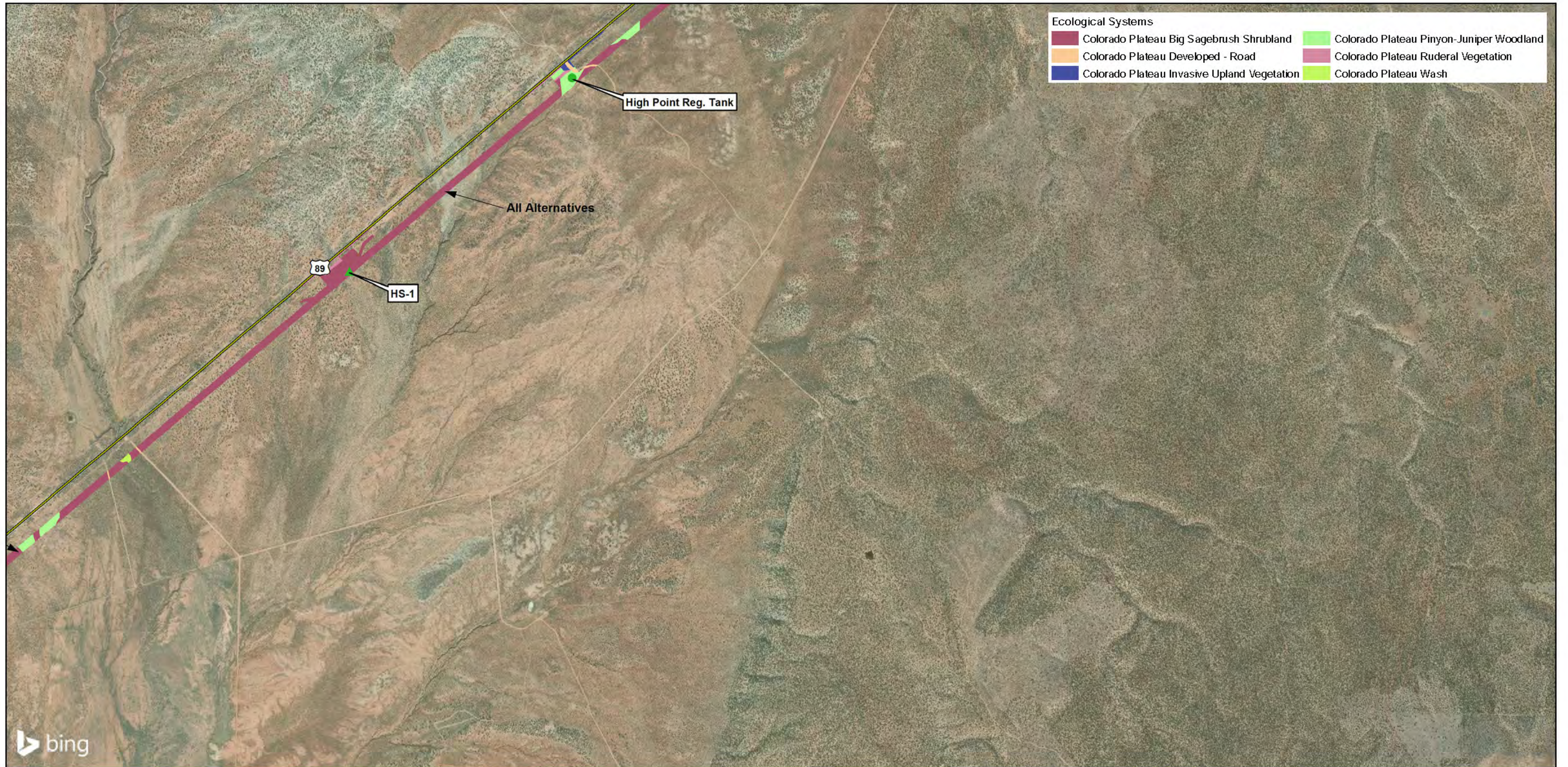
- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline

Sheet 20

Alternative Alignments
Ecological Systems

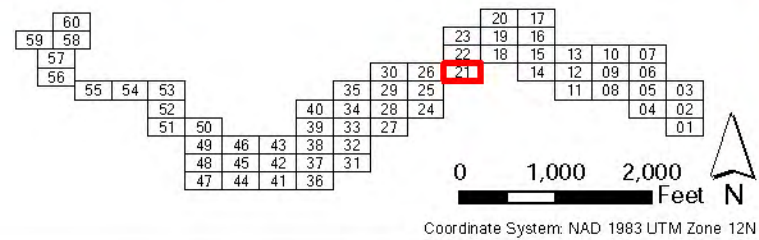


Ecological Systems

Colorado Plateau Big Sagebrush Shrubland	Colorado Plateau Pinyon-Juniper Woodland
Colorado Plateau Developed - Road	Colorado Plateau Ruderal Vegetation
Colorado Plateau Invasive Upland Vegetation	Colorado Plateau Wash





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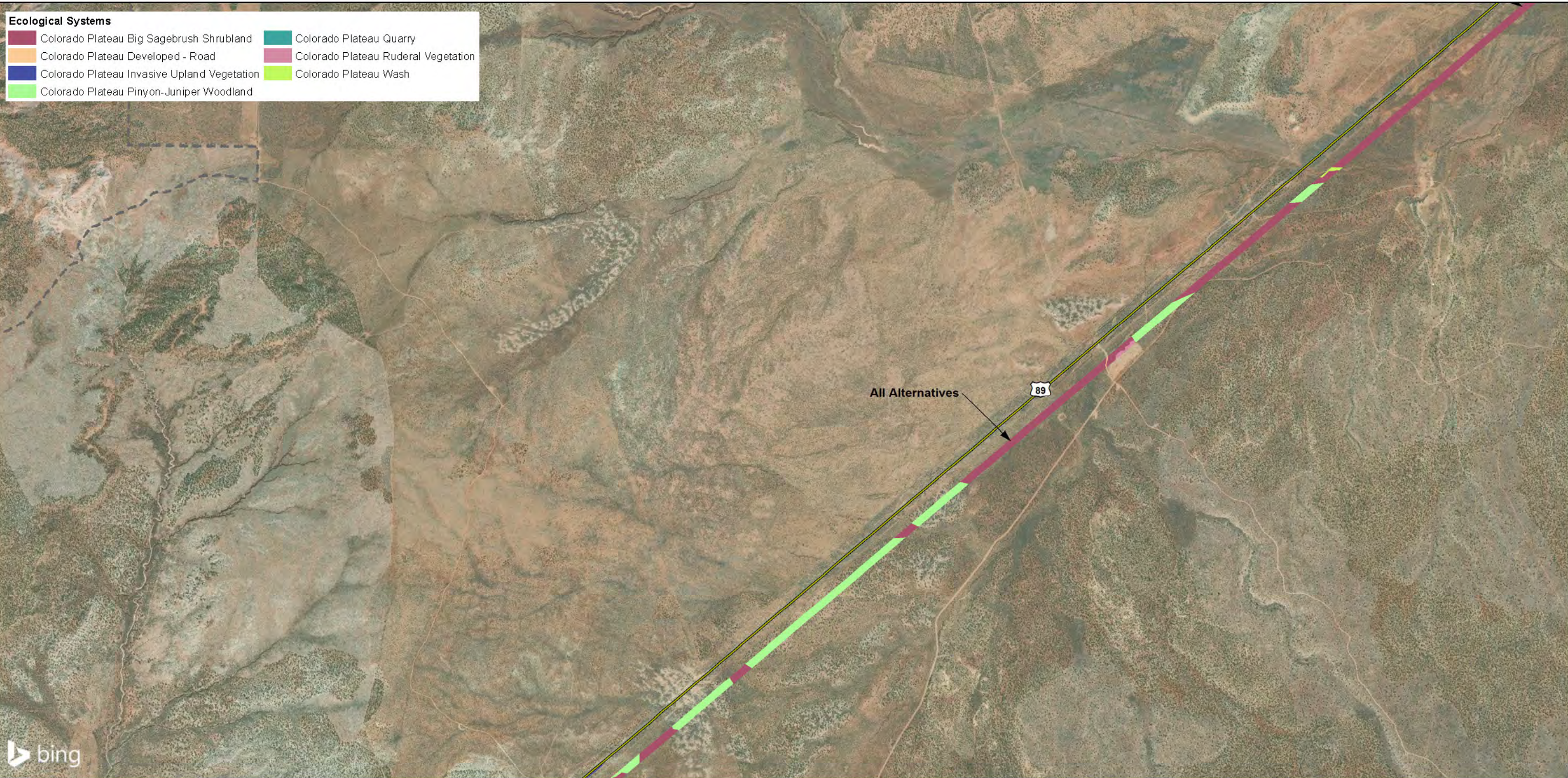
Project Pump Station	Interstate
Project Regulating Tank	US Highway
Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	



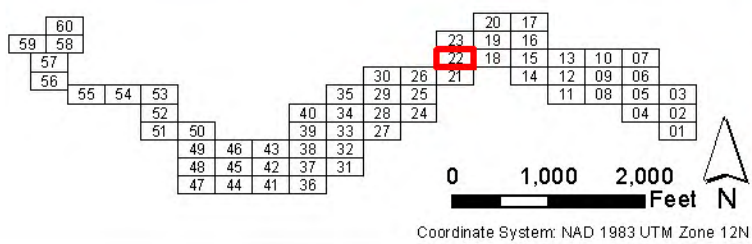
Lake Powell Pipeline
Sheet 21
Alternative Alignments Ecological Systems

Ecological Systems

 Colorado Plateau Big Sagebrush Shrubland	 Colorado Plateau Quarry
 Colorado Plateau Developed - Road	 Colorado Plateau Ruderal Vegetation
 Colorado Plateau Invasive Upland Vegetation	 Colorado Plateau Wash
 Colorado Plateau Pinyon-Juniper Woodland	



 Project Pump Station	 Interstate
 Project Regulating Tank	 US Highway
 Project Hydro Station	 ST Highway
 National Park/Monument	 Hwy
 Tribal Lands	
 Major Rivers & Streams	



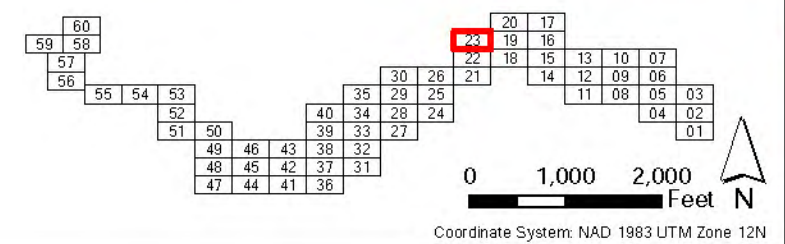
Lake Powell Pipeline
Sheet 22
Alternative Alignments Ecological Systems

Ecological Systems
 Colorado Plateau Big Sagebrush Shrubland

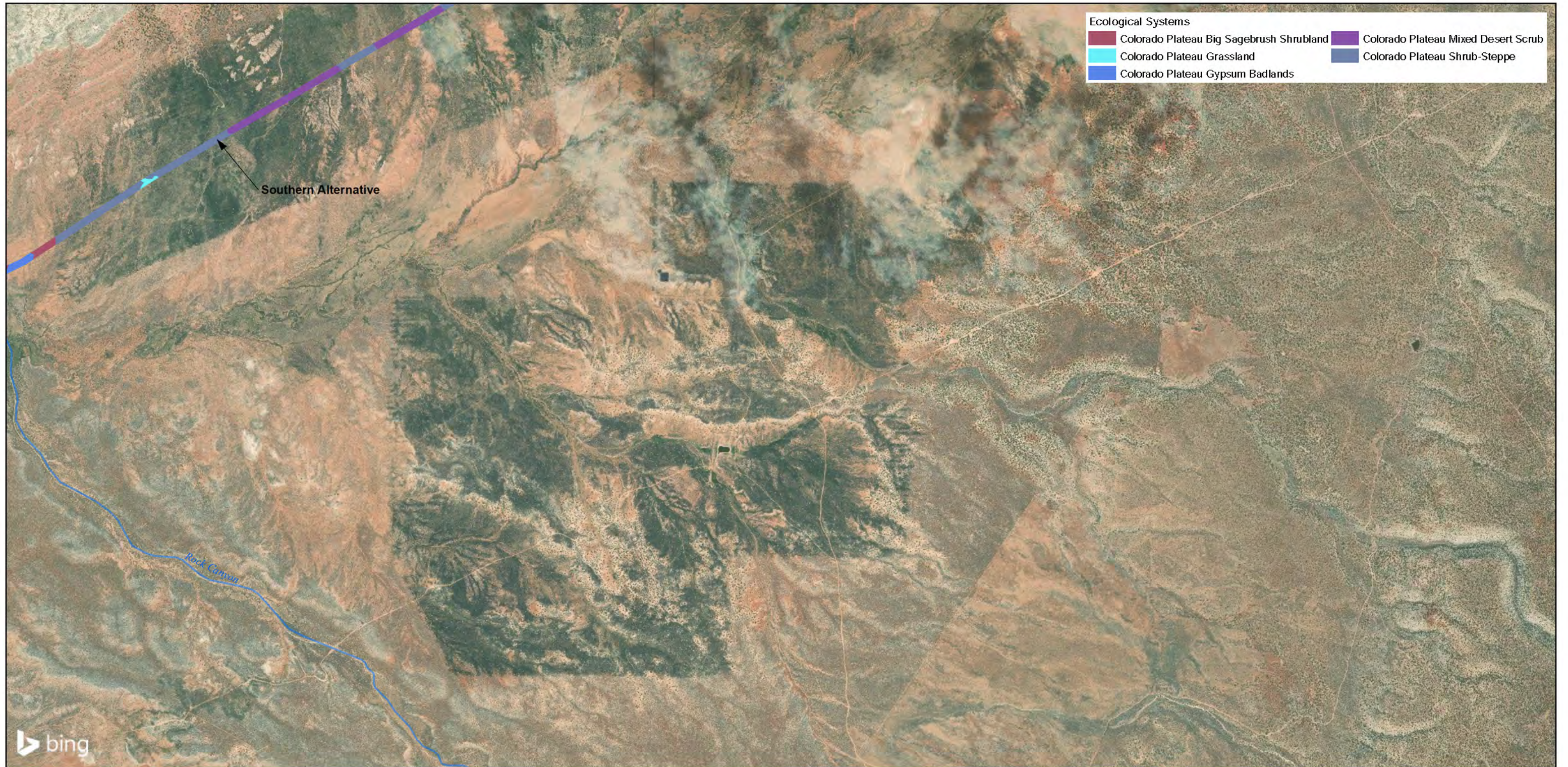


bing

- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- ▭ National Park/Monument
- ▭ Tribal Lands
- Major Rivers & Streams
- ══ Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline
 Sheet 23
 Alternative Alignments
 Ecological Systems



Ecological Systems

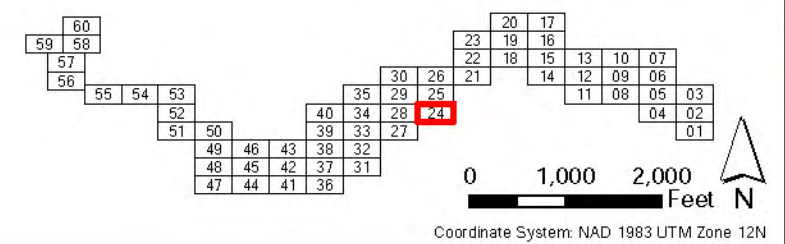
■ Colorado Plateau Big Sagebrush Shrubland	■ Colorado Plateau Mixed Desert Scrub
■ Colorado Plateau Grassland	■ Colorado Plateau Shrub-Steppe
■ Colorado Plateau Gypsum Badlands	

Southern Alternative

Rock Canyon











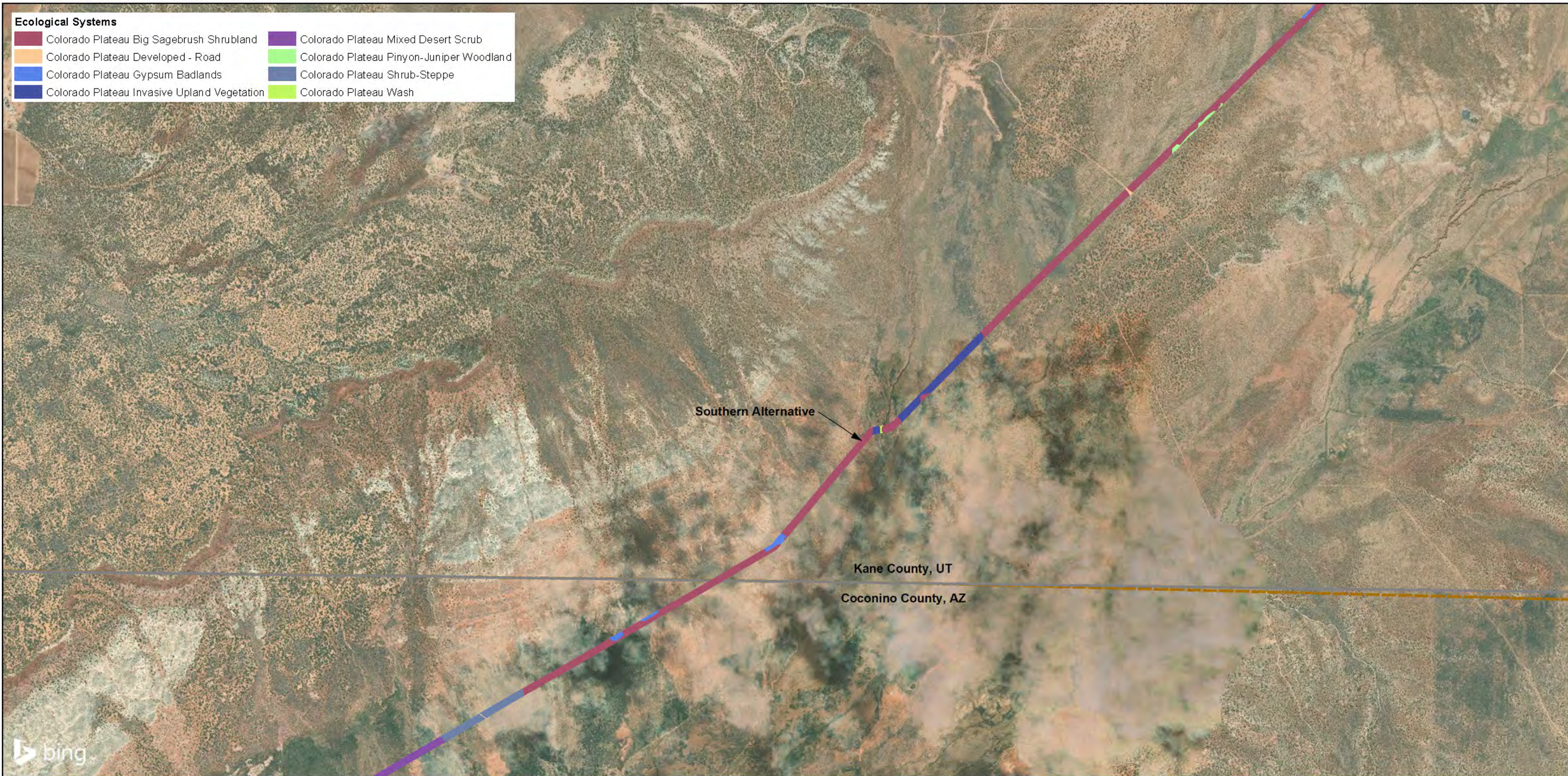
■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	



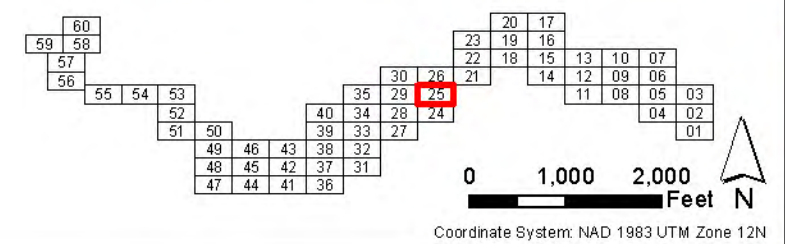
Lake Powell Pipeline
Sheet 24
Alternative Alignments Ecological Systems

Ecological Systems

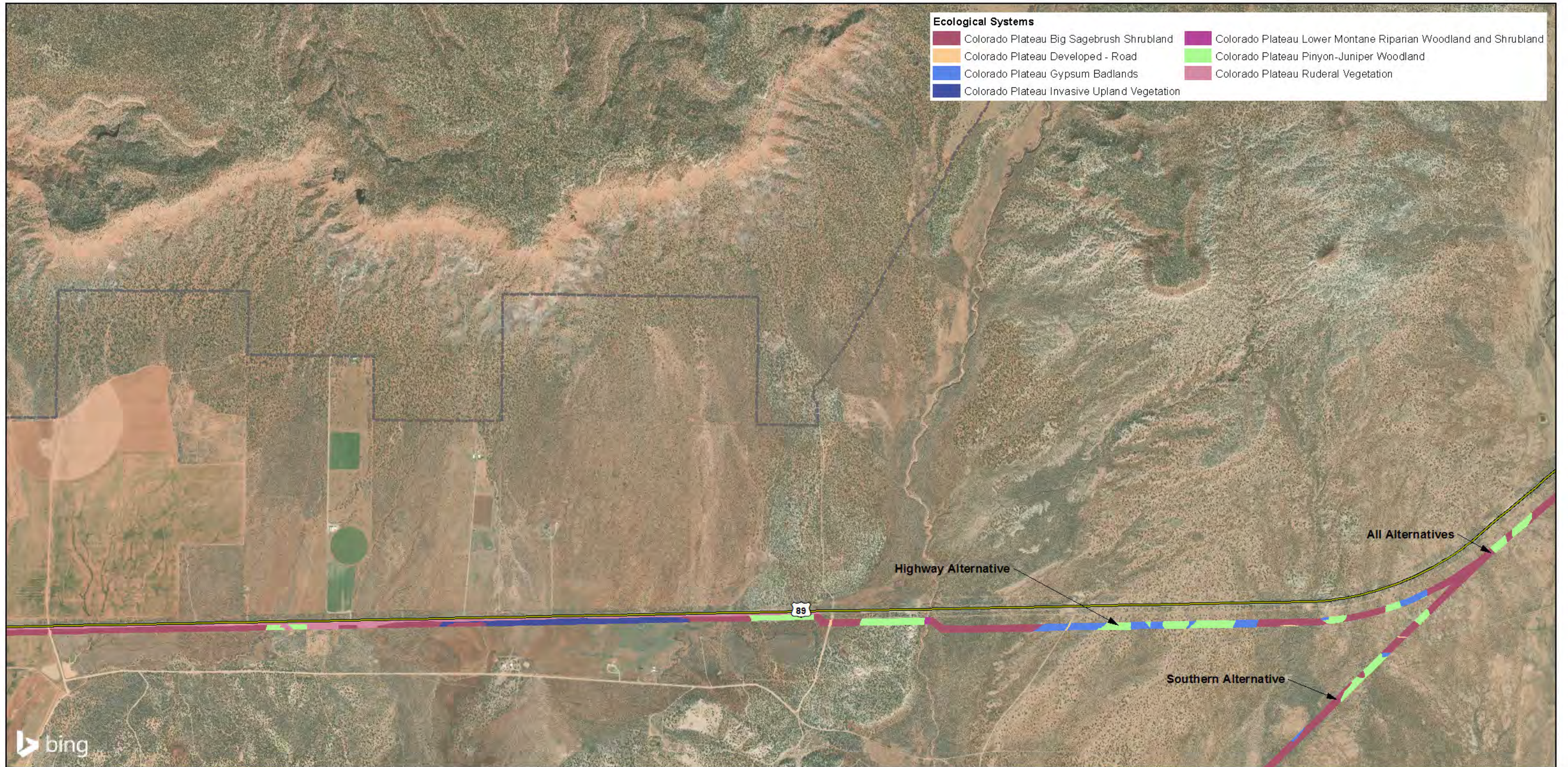
 Colorado Plateau Big Sagebrush Shrubland	 Colorado Plateau Mixed Desert Scrub
 Colorado Plateau Developed - Road	 Colorado Plateau Pinyon-Juniper Woodland
 Colorado Plateau Gypsum Badlands	 Colorado Plateau Shrub-Steppe
 Colorado Plateau Invasive Upland Vegetation	 Colorado Plateau Wash



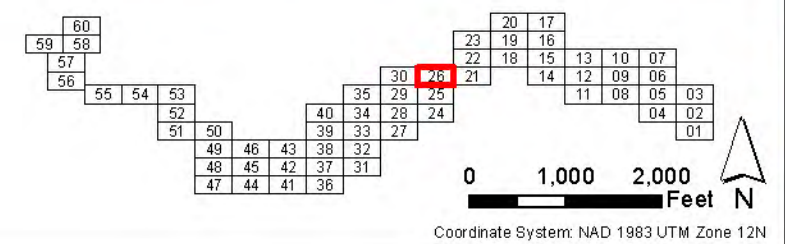
 Project Pump Station	 Interstate
 Project Regulating Tank	 US Highway
 Project Hydro Station	 ST Highway
 National Park/Monument	 Hwy
 Tribal Lands	
 Major Rivers & Streams	



Lake Powell Pipeline
Sheet 25
Alternative Alignments Ecological Systems



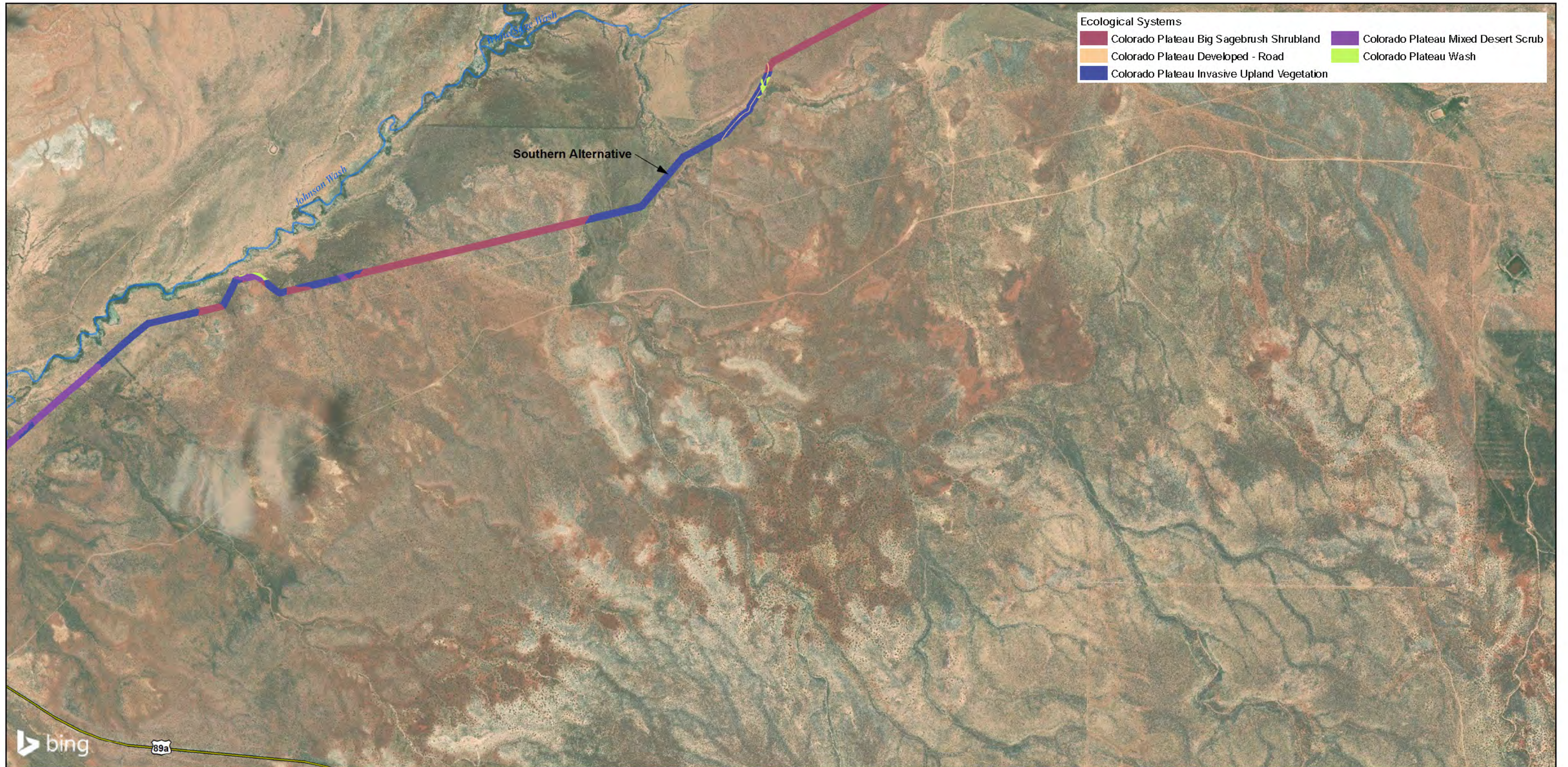
- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline

Sheet 26

Alternative Alignments
Ecological Systems



Ecological Systems

■ Colorado Plateau Big Sagebrush Shrubland	■ Colorado Plateau Mixed Desert Scrub
■ Colorado Plateau Developed - Road	■ Colorado Plateau Wash
■ Colorado Plateau Invasive Upland Vegetation	

Southern Alternative

Johnson Wash

bing 89a

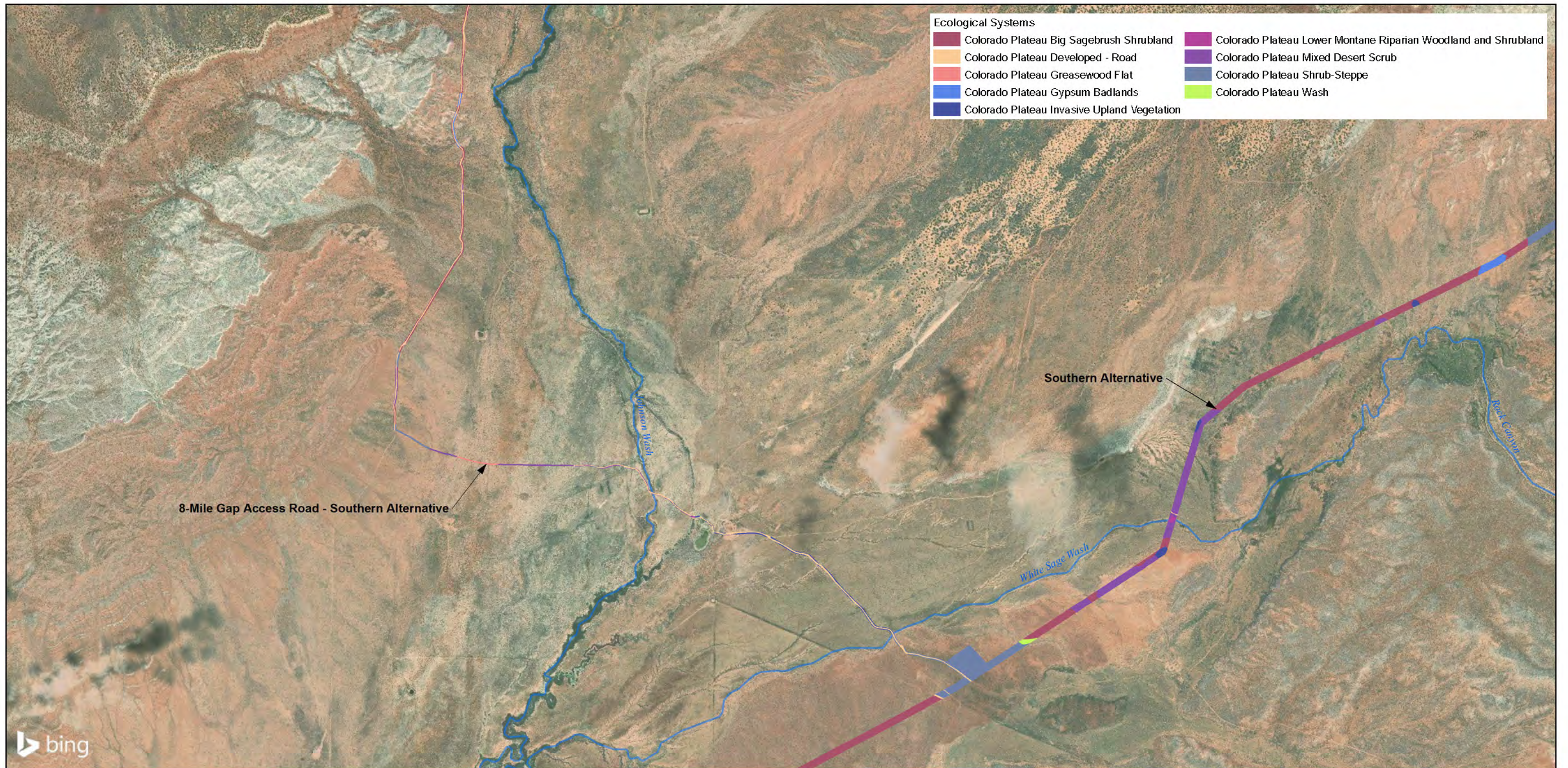
■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	

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Coordinate System: NAD 1983 UTM Zone 12N

BUREAU OF RECLAMATION

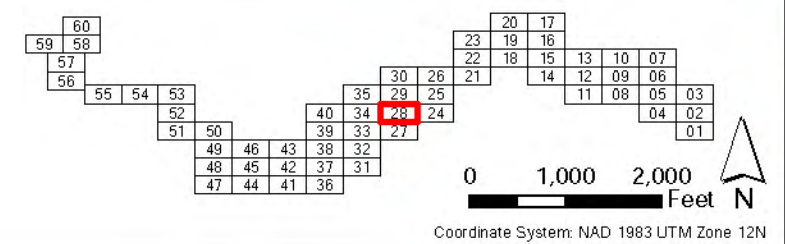
Lake Powell Pipeline
Sheet 27
Alternative Alignments Ecological Systems



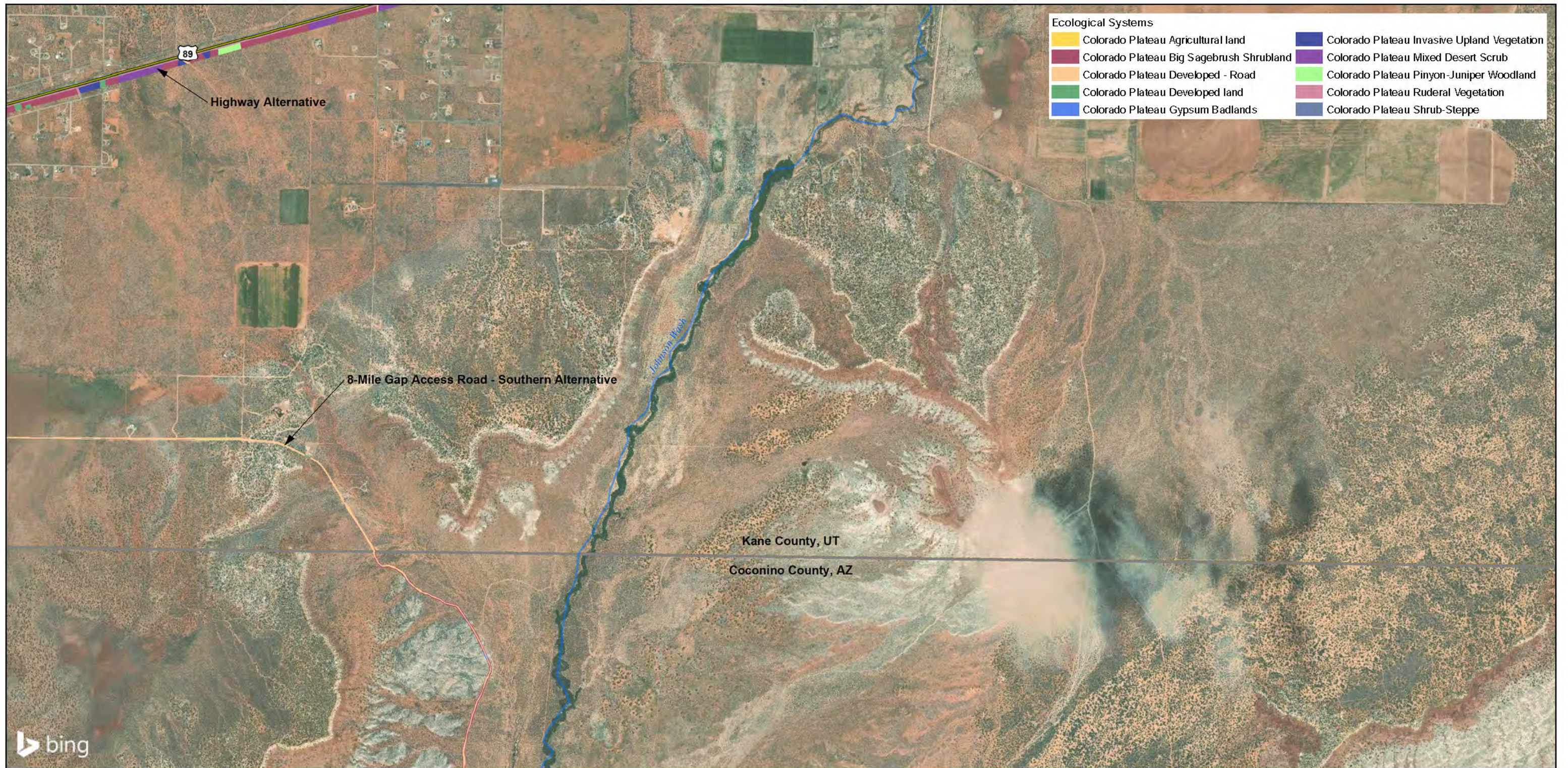
Ecological Systems	
Colorado Plateau Big Sagebrush Shrubland	Colorado Plateau Lower Montane Riparian Woodland and Shrubland
Colorado Plateau Developed - Road	Colorado Plateau Mixed Desert Scrub
Colorado Plateau Greasewood Flat	Colorado Plateau Shrub-Steppe
Colorado Plateau Gypsum Badlands	Colorado Plateau Wash
Colorado Plateau Invasive Upland Vegetation	



Project Pump Station	Interstate
Project Regulating Tank	US Highway
Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	

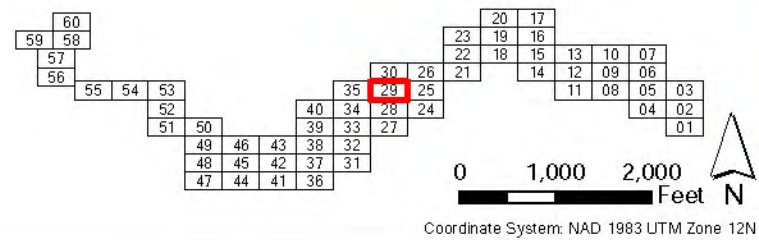


Lake Powell Pipeline
Sheet 28
Alternative Alignments Ecological Systems



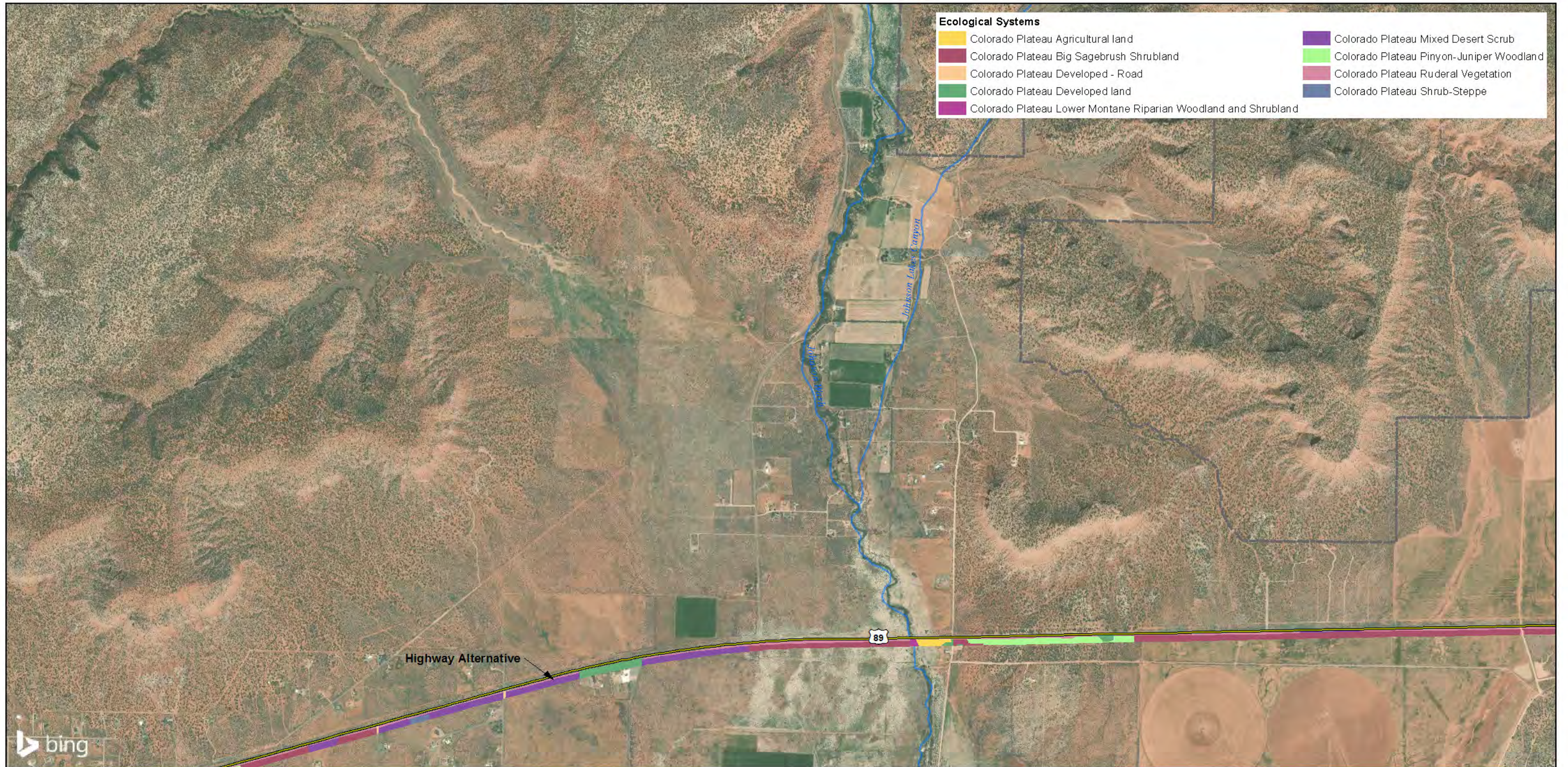
bing

- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



BUREAU OF RECLAMATION

Lake Powell Pipeline
Sheet 29
Alternative Alignments Ecological Systems



Ecological Systems

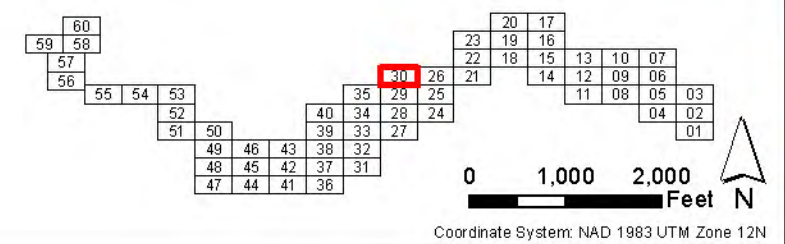
 Colorado Plateau Agricultural land	 Colorado Plateau Mixed Desert Scrub
 Colorado Plateau Big Sagebrush Shrubland	 Colorado Plateau Pinyon-Juniper Woodland
 Colorado Plateau Developed - Road	 Colorado Plateau Ruderal Vegetation
 Colorado Plateau Developed land	 Colorado Plateau Shrub-Steppe
 Colorado Plateau Lower Montane Riparian Woodland and Shrubland	



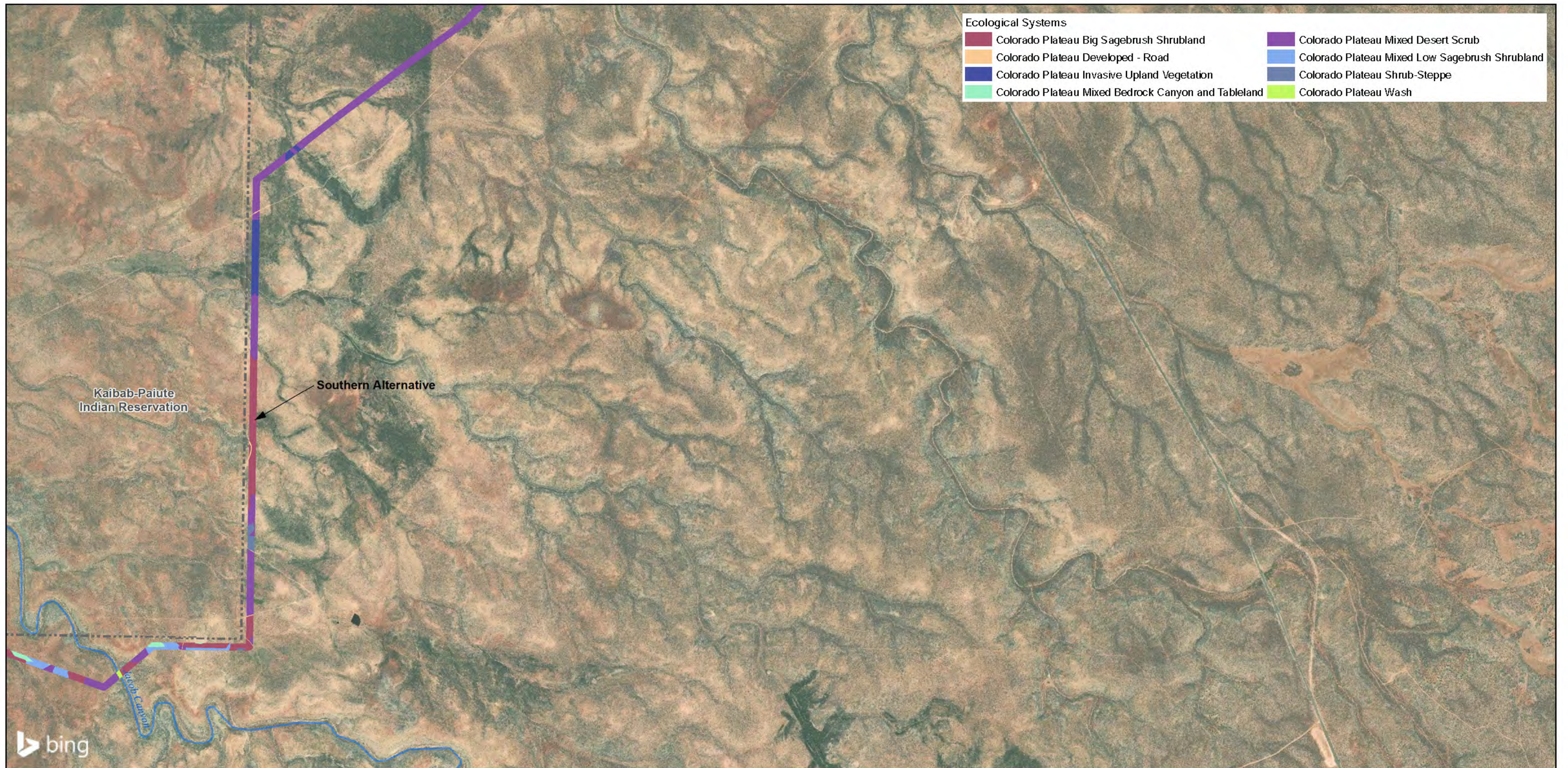
Highway Alternative

89

 Project Pump Station	 Interstate
 Project Regulating Tank	 US Highway
 Project Hydro Station	 ST Highway
 National Park/Monument	 Hwy
 Tribal Lands	
 Major Rivers & Streams	

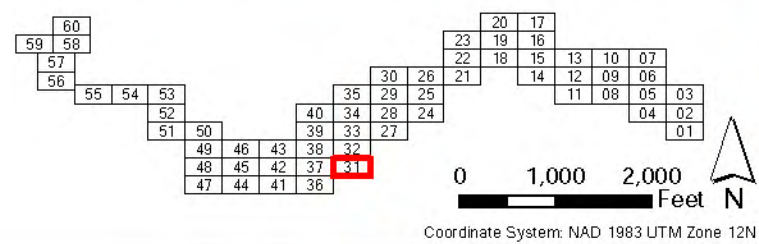


Lake Powell Pipeline
Sheet 30
Alternative Alignments Ecological Systems



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- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- ▭ National Park/Monument
- ▭ Tribal Lands
- Major Rivers & Streams
- ==== Interstate
- US Highway
- ST Highway
- Hwy

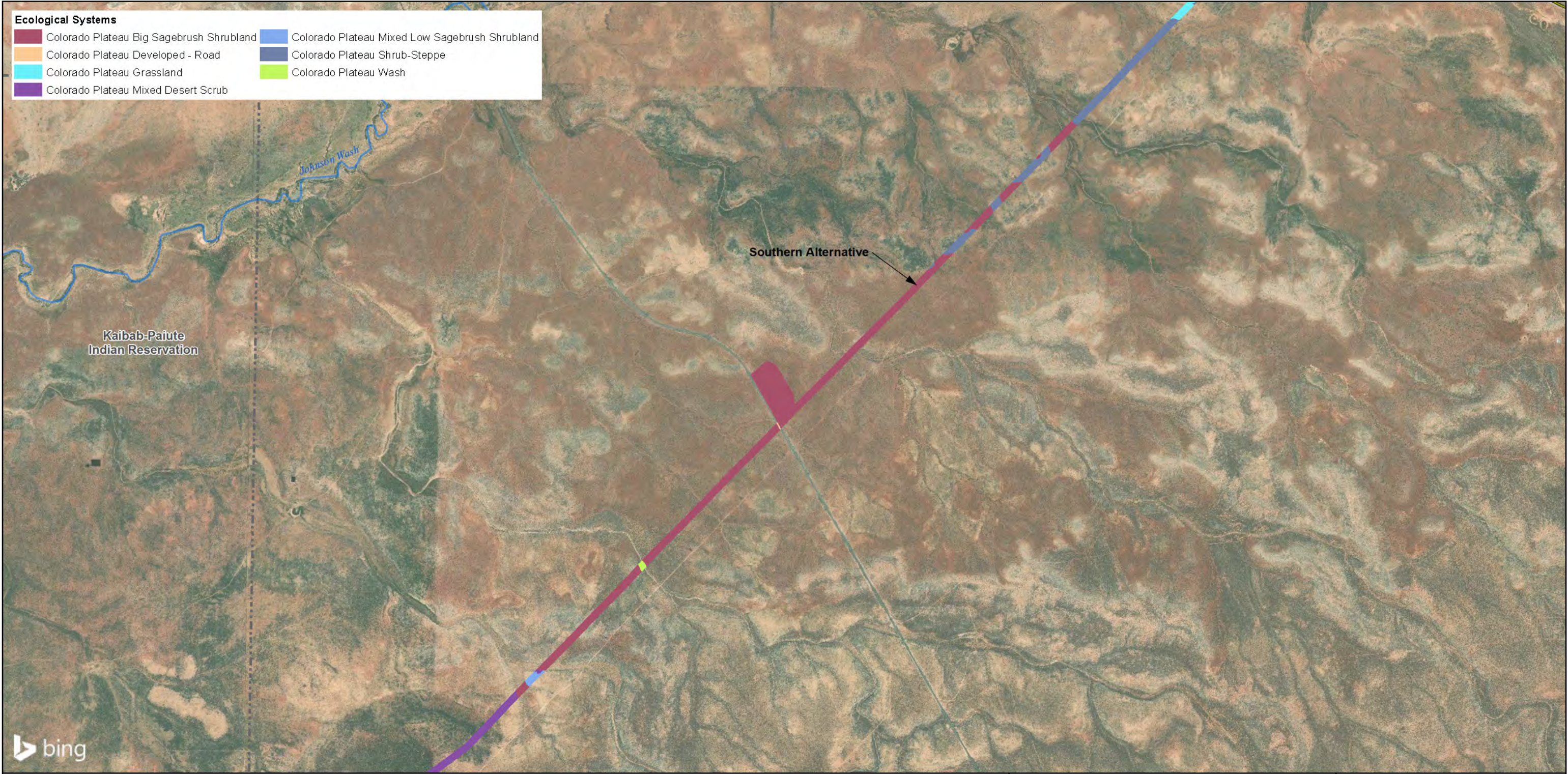


BUREAU OF RECLAMATION

Lake Powell Pipeline
Sheet 31
Alternative Alignments Ecological Systems

Ecological Systems

 Colorado Plateau Big Sagebrush Shrubland	 Colorado Plateau Mixed Low Sagebrush Shrubland
 Colorado Plateau Developed - Road	 Colorado Plateau Shrub-Steppe
 Colorado Plateau Grassland	 Colorado Plateau Wash
 Colorado Plateau Mixed Desert Scrub	




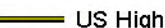

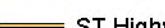






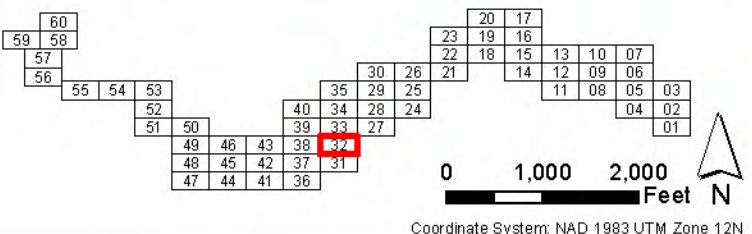
Southern Alternative

Kaibab-Paiute Indian Reservation

Johnson Wash

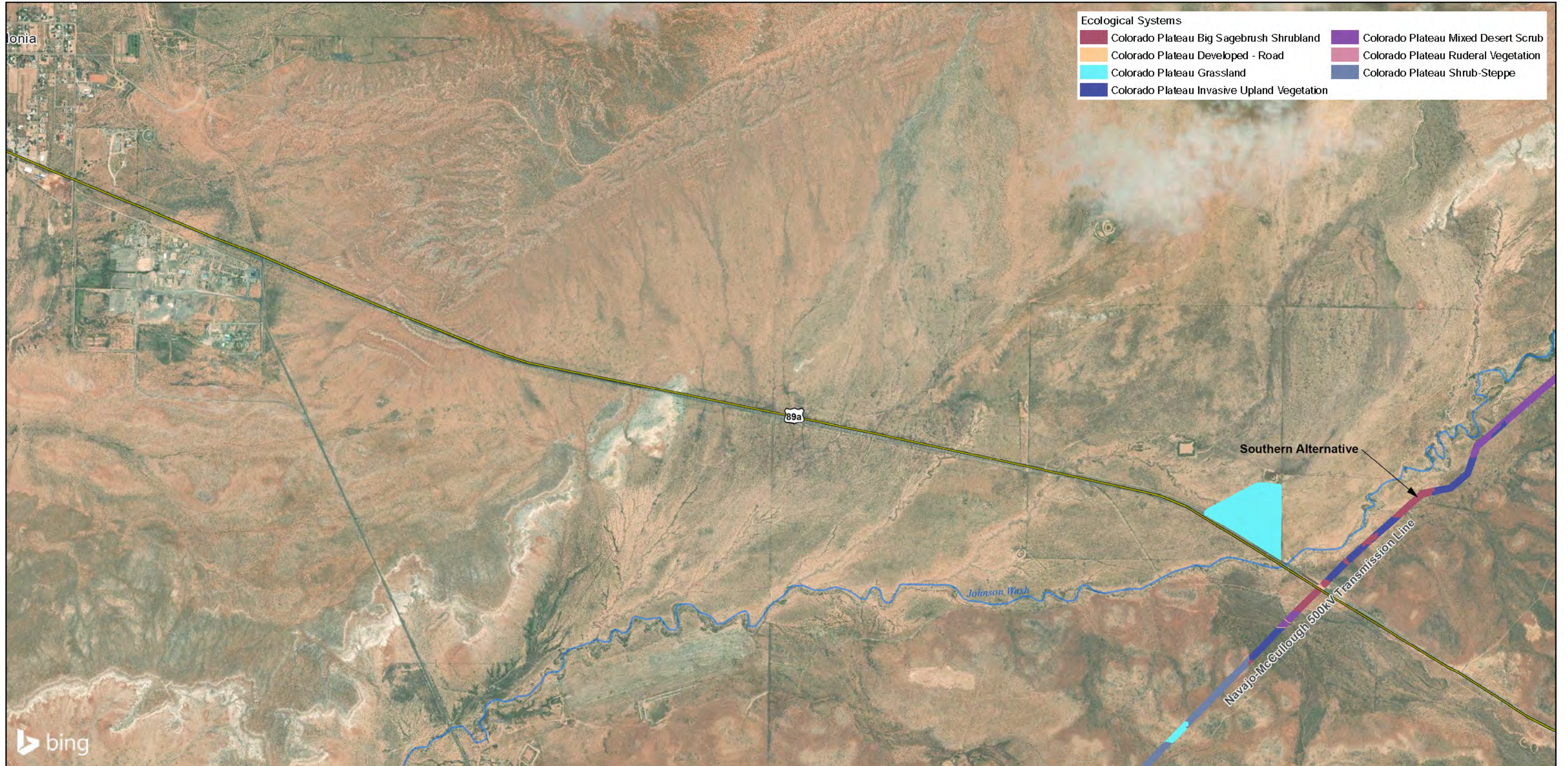


 Project Pump Station	 Interstate
 Project Regulating Tank	 US Highway
 Project Hydro Station	 ST Highway
 National Park/Monument	 Hwy
 Tribal Lands	
 Major Rivers & Streams	



BUREAU OF RECLAMATION

Lake Powell Pipeline
Sheet 32
Alternative Alignments Ecological Systems



Ecological Systems

■ Colorado Plateau Big Sagebrush Shrubland	■ Colorado Plateau Mixed Desert Scrub
■ Colorado Plateau Developed - Road	■ Colorado Plateau Ruderal Vegetation
■ Colorado Plateau Grassland	■ Colorado Plateau Shrub-Steppe
■ Colorado Plateau Invasive Upland Vegetation	

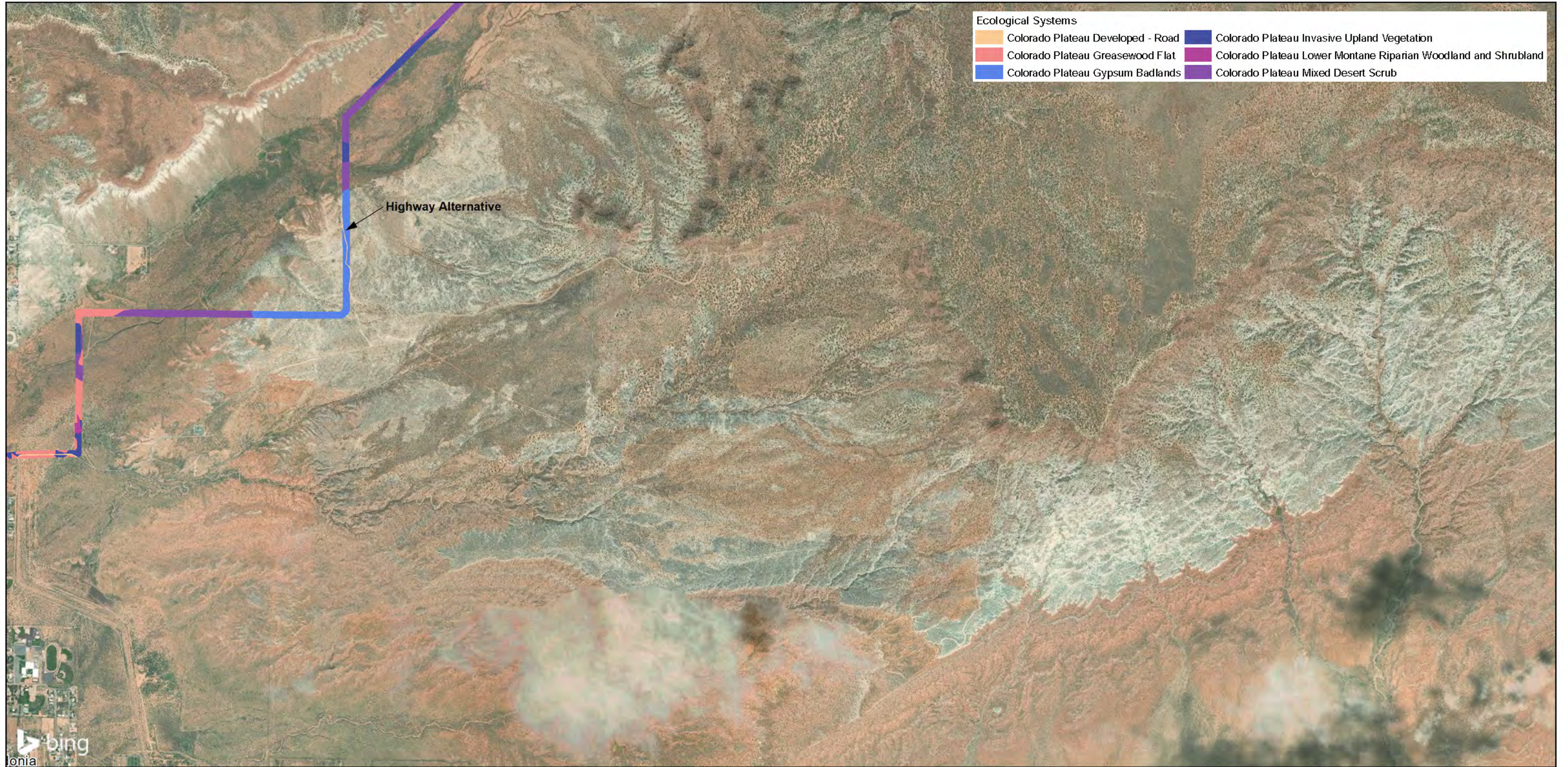
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■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	











Coordinate System: NAD 1983 UTM Zone 12N

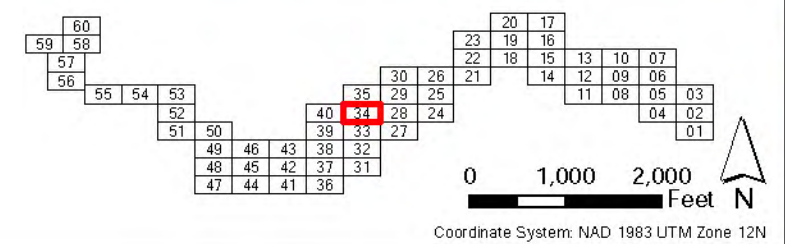
BUREAU OF RECLAMATION

Lake Powell Pipeline
Sheet 33
Alternative Alignments Ecological Systems

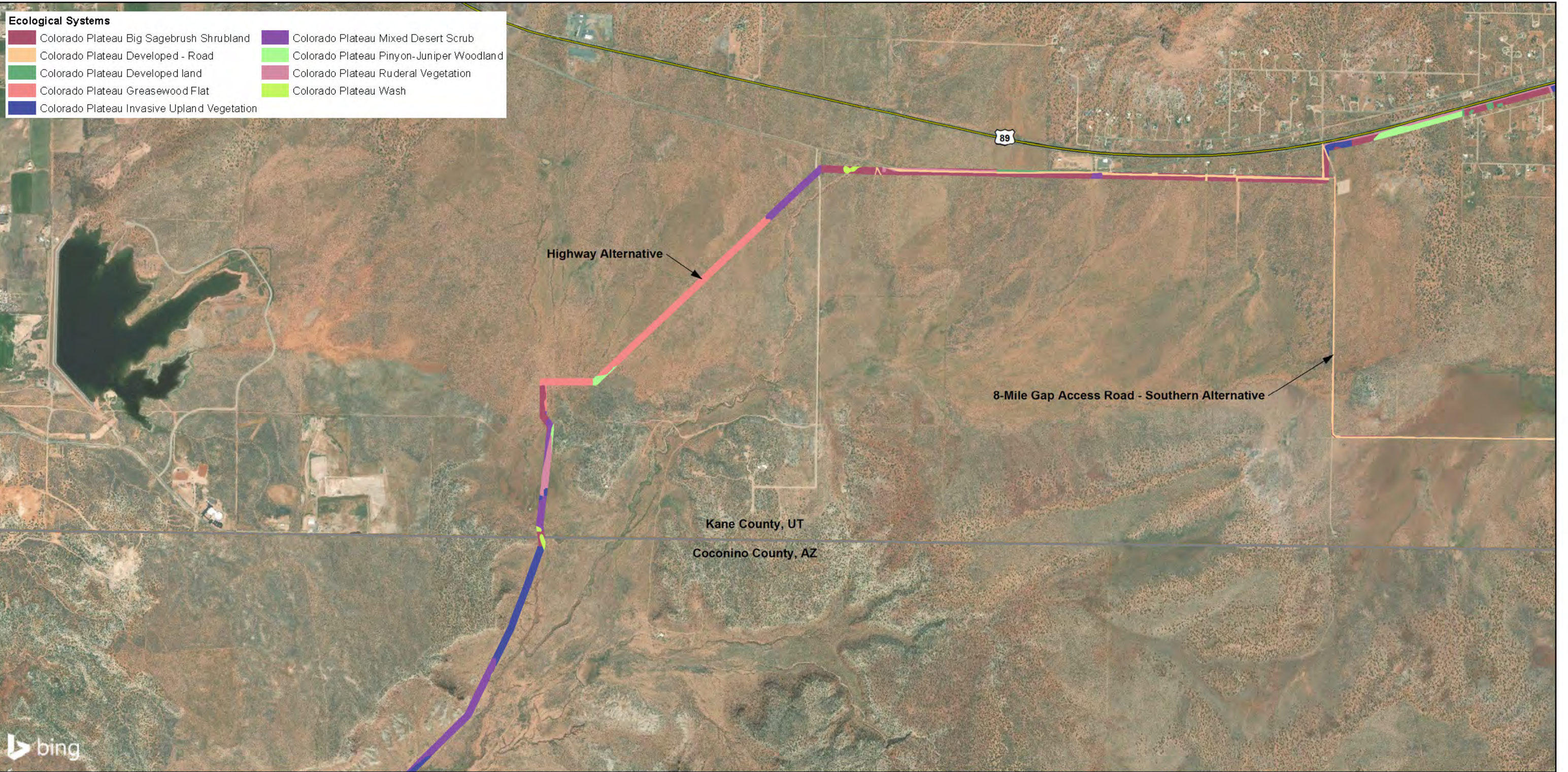


Ecological Systems	
	Colorado Plateau Developed - Road
	Colorado Plateau Greasewood Flat
	Colorado Plateau Gypsum Badlands
	Colorado Plateau Invasive Upland Vegetation
	Colorado Plateau Lower Montane Riparian Woodland and Shrubland
	Colorado Plateau Mixed Desert Scrub

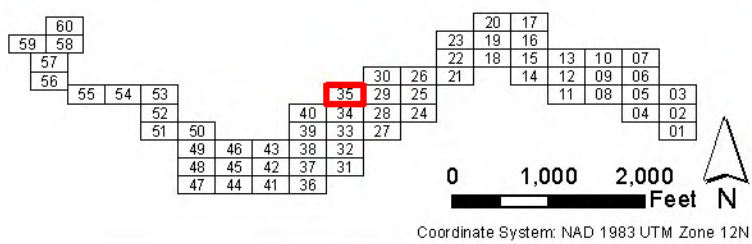
-  Project Pump Station
-  Project Regulating Tank
-  Project Hydro Station
-  National Park/Monument
-  Tribal Lands
-  Major Rivers & Streams
-  Interstate
-  US Highway
-  ST Highway
-  Hwy



Lake Powell Pipeline
Sheet 34
Alternative Alignments Ecological Systems



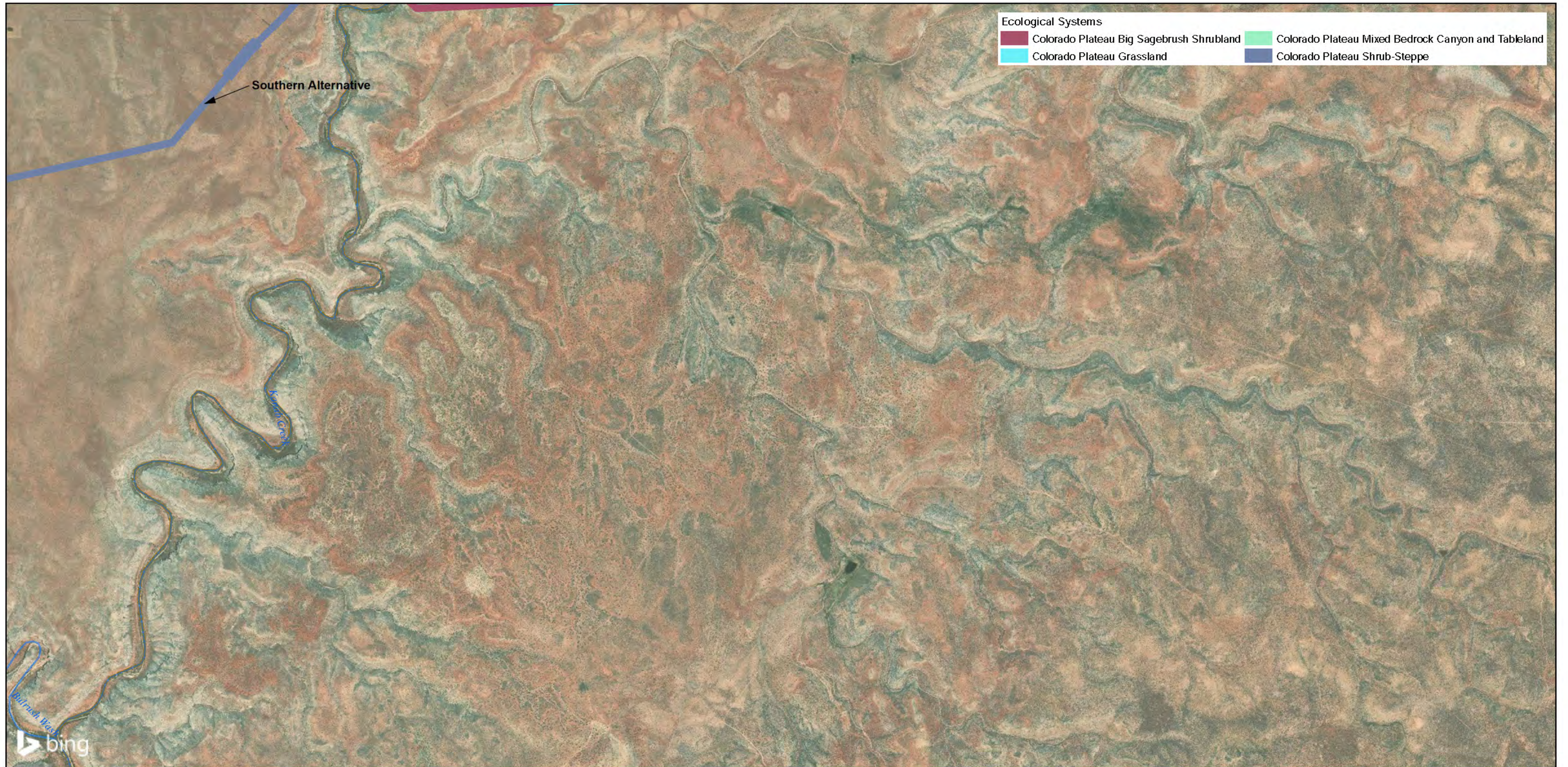
- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline

Sheet 35

Alternative Alignments
Ecological Systems



Ecological Systems

■ Colorado Plateau Big Sagebrush Shrubland	■ Colorado Plateau Mixed Bedrock Canyon and Tableland
■ Colorado Plateau Grassland	■ Colorado Plateau Shrub-Steppe

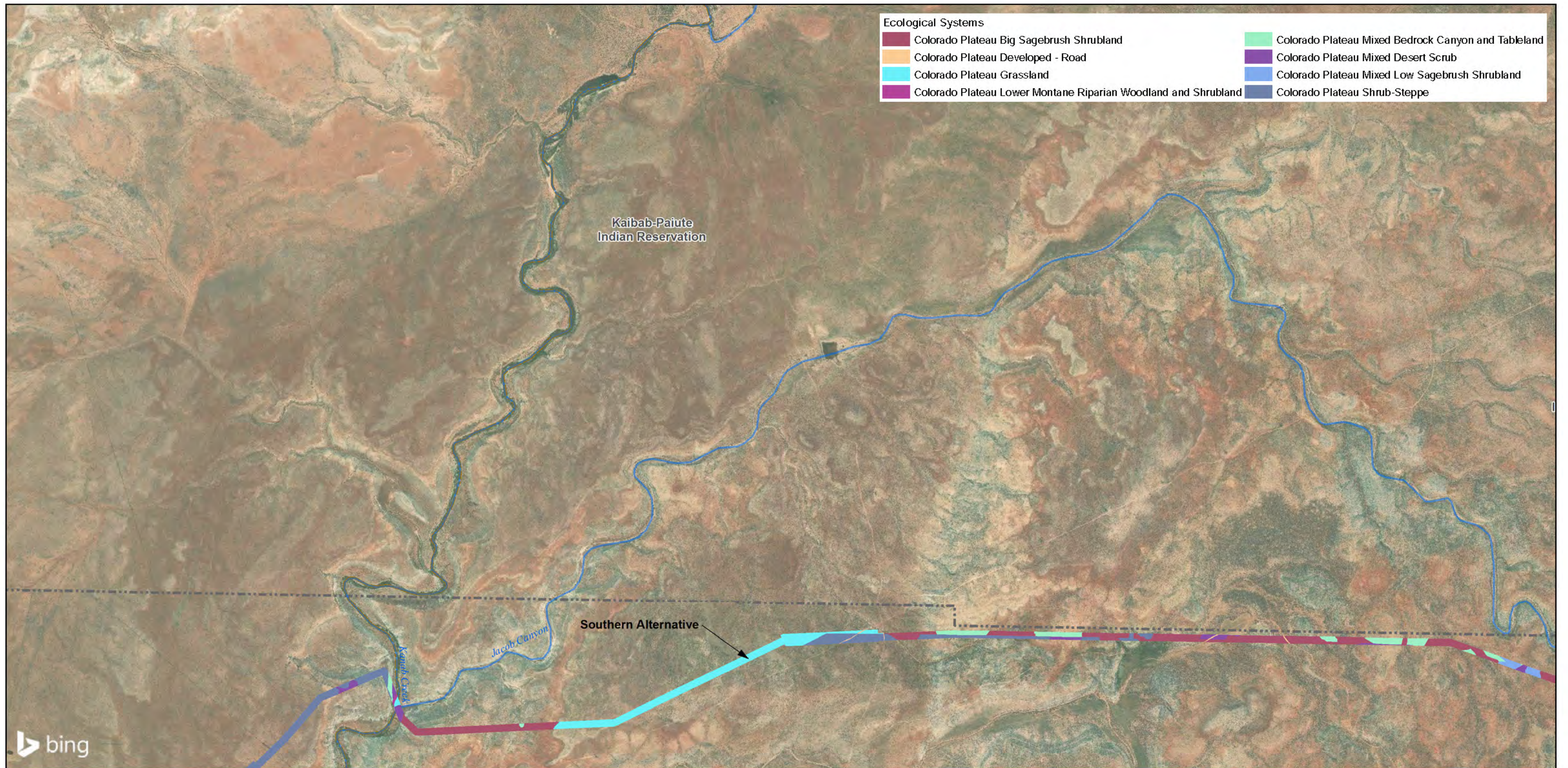
■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	

0 1,000 2,000 Feet N

Coordinate System: NAD 1983 UTM Zone 12N



Lake Powell Pipeline
Sheet 36
Alternative Alignments Ecological Systems



Ecological Systems

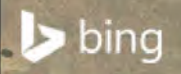
■ Colorado Plateau Big Sagebrush Shrubland	■ Colorado Plateau Mixed Bedrock Canyon and Tableland
■ Colorado Plateau Developed - Road	■ Colorado Plateau Mixed Desert Scrub
■ Colorado Plateau Grassland	■ Colorado Plateau Mixed Low Sagebrush Shrubland
■ Colorado Plateau Lower Montane Riparian Woodland and Shrubland	■ Colorado Plateau Shrub-Steppe

Kaibab-Paiute
Indian Reservation

Southern Alternative

Jacob Canyon

Kanab Canyon

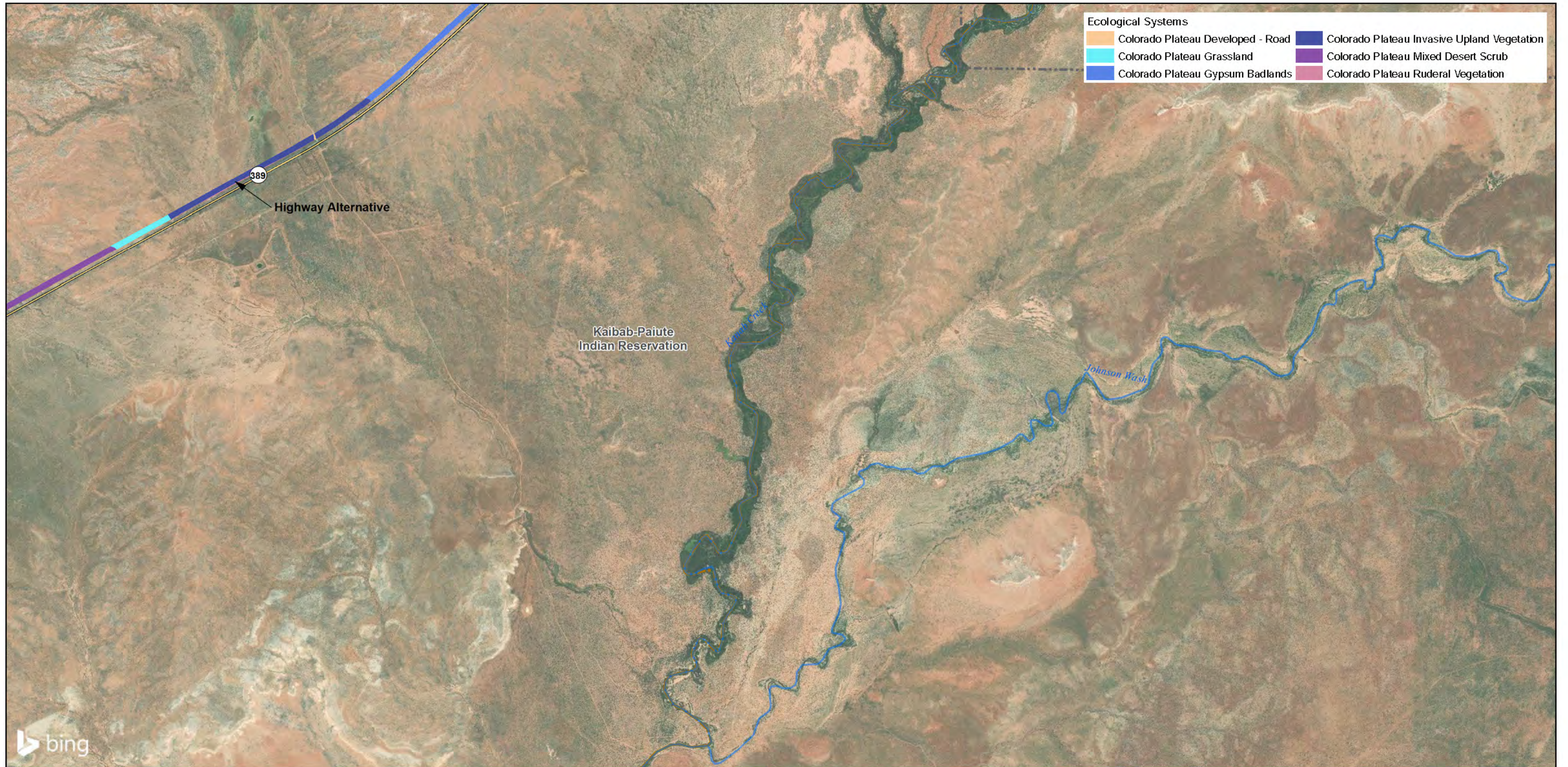


■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	

Coordinate System: NAD 1983 UTM Zone 12N

BUREAU OF RECLAMATION

Lake Powell Pipeline
Sheet 37
Alternative Alignments Ecological Systems



Ecological Systems

 Colorado Plateau Developed - Road	 Colorado Plateau Invasive Upland Vegetation
 Colorado Plateau Grassland	 Colorado Plateau Mixed Desert Scrub
 Colorado Plateau Gypsum Badlands	 Colorado Plateau Ruderal Vegetation

 Project Pump Station	 Interstate
 Project Regulating Tank	 US Highway
 Project Hydro Station	 ST Highway
 National Park/Monument	 Hwy
 Tribal Lands	
 Major Rivers & Streams	

0 1,000 2,000 Feet N

Coordinate System: NAD 1983 UTM Zone 12N



BUREAU OF RECLAMATION

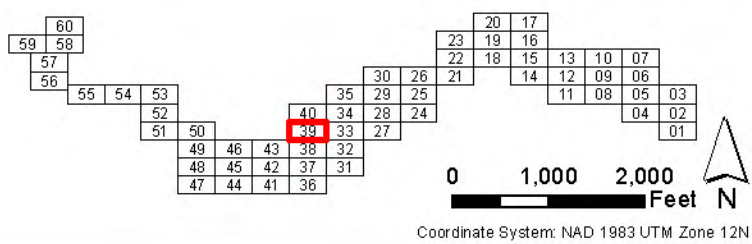
Lake Powell Pipeline
Sheet 38
Alternative Alignments Ecological Systems



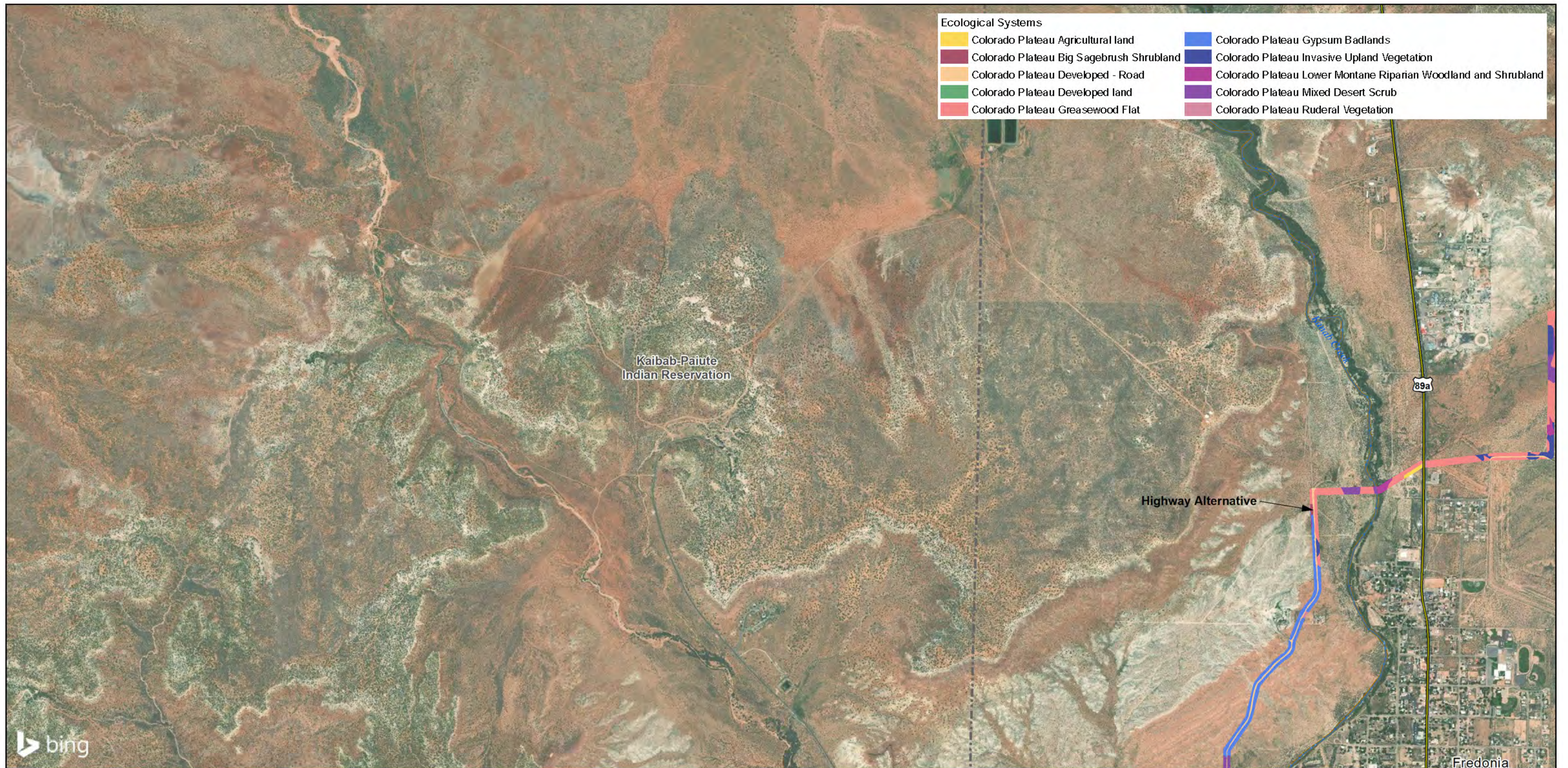
Ecological Systems

Colorado Plateau Active and Stabilized Dune	Colorado Plateau Lower Montane Riparian Woodland and Shrubland
Colorado Plateau Developed - Road	Colorado Plateau Mixed Desert Scrub
Colorado Plateau Developed land	Colorado Plateau Ruderal Vegetation
Colorado Plateau Gypsum Badlands	Colorado Plateau Wash
Colorado Plateau Invasive Upland Vegetation	

Project Pump Station	Interstate
Project Regulating Tank	US Highway
Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	

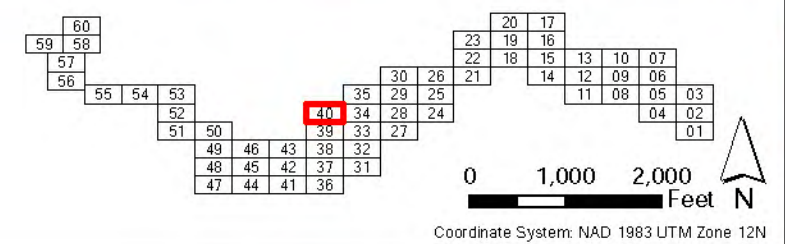


Lake Powell Pipeline
Sheet 39
Alternative Alignments Ecological Systems

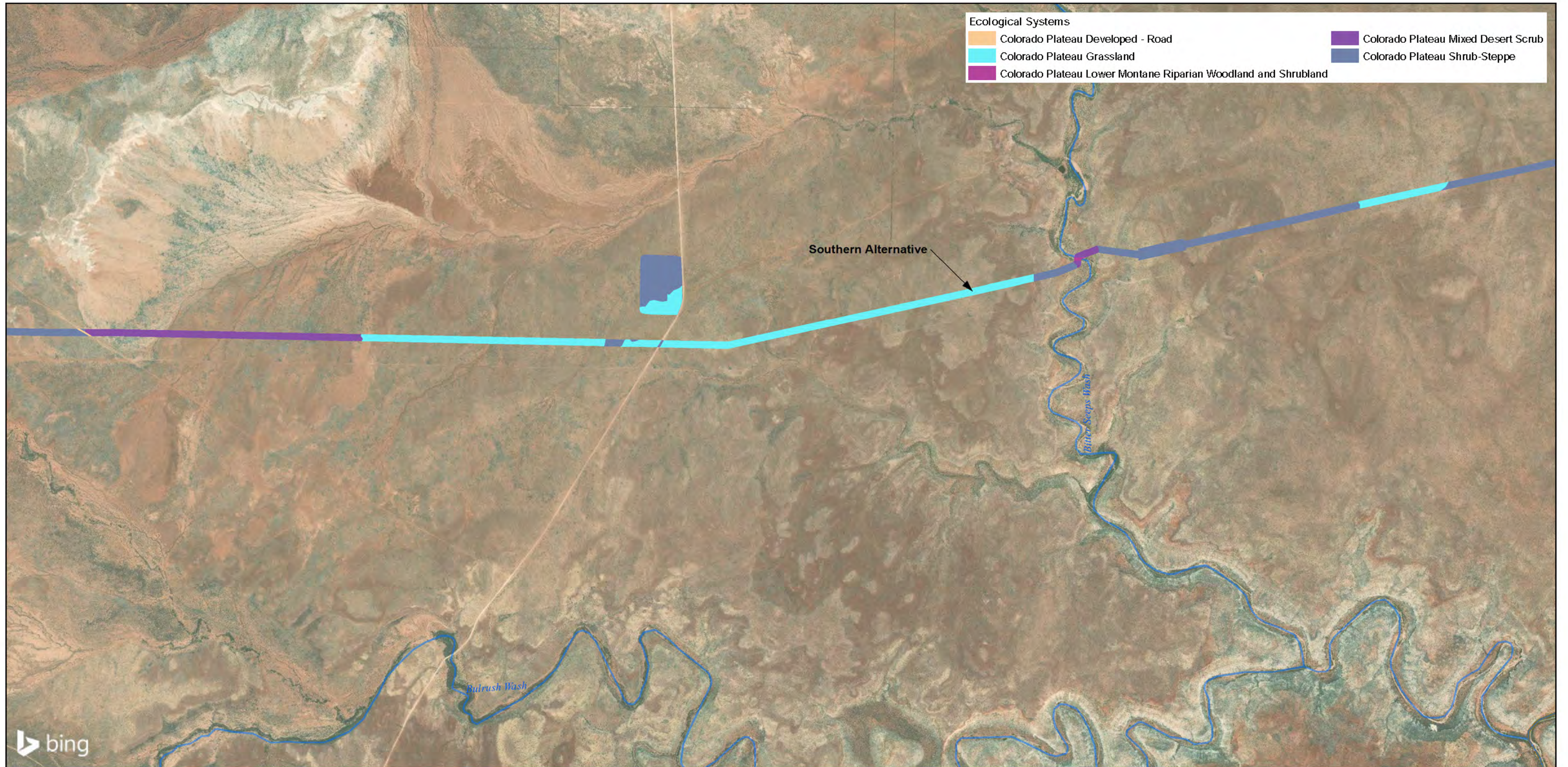


Ecological Systems	
■ Colorado Plateau Agricultural land	■ Colorado Plateau Gypsum Badlands
■ Colorado Plateau Big Sagebrush Shrubland	■ Colorado Plateau Invasive Upland Vegetation
■ Colorado Plateau Developed - Road	■ Colorado Plateau Lower Montane Riparian Woodland and Shrubland
■ Colorado Plateau Developed land	■ Colorado Plateau Mixed Desert Scrub
■ Colorado Plateau Greasewood Flat	■ Colorado Plateau Ruderal Vegetation

■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	



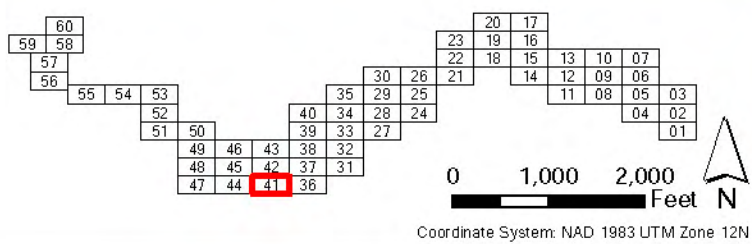
Lake Powell Pipeline
Sheet 40
Alternative Alignments Ecological Systems



Ecological Systems

- Colorado Plateau Developed - Road
- Colorado Plateau Grassland
- Colorado Plateau Lower Montane Riparian Woodland and Shrubland
- Colorado Plateau Mixed Desert Scrub
- Colorado Plateau Shrub-Steppe

- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline

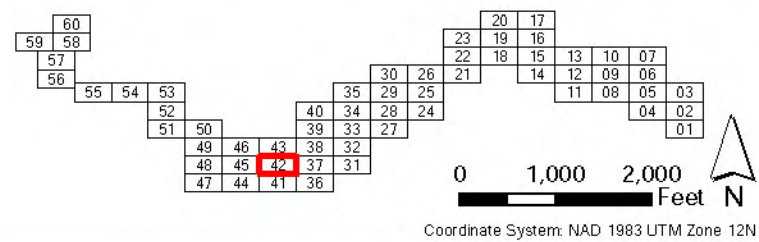
Sheet 41

Alternative Alignments
Ecological Systems



bing

- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy

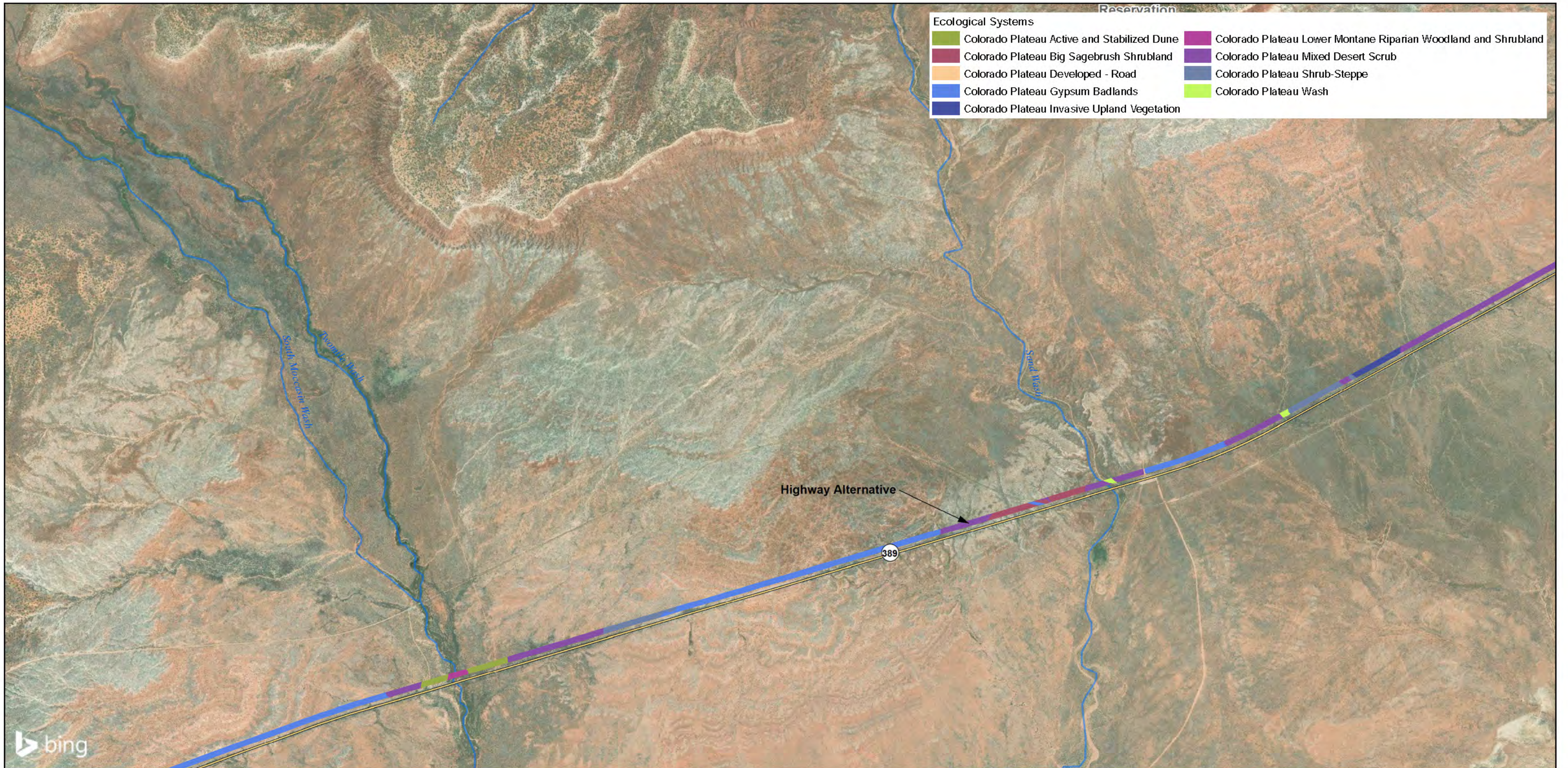


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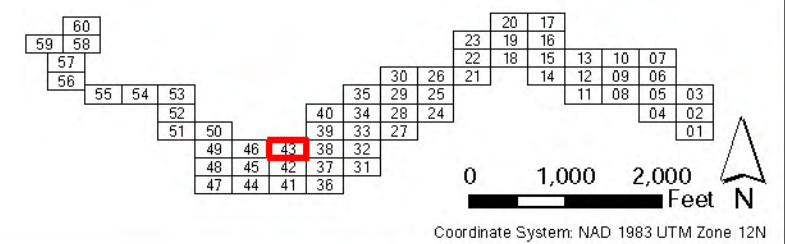
Lake Powell Pipeline

Sheet 42

Alternative Alignments
Ecological Systems



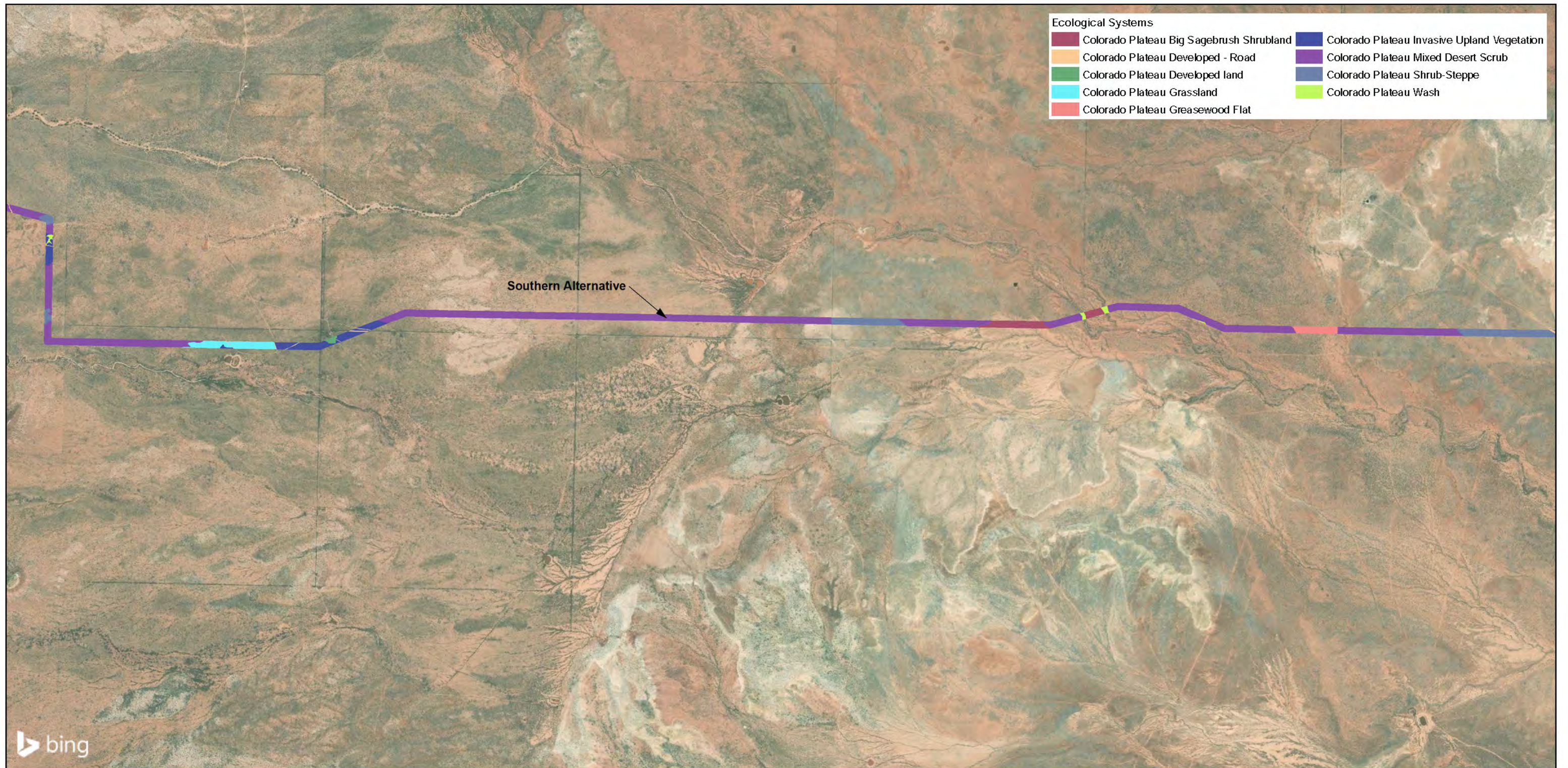
- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline

Sheet 43

Alternative Alignments
Ecological Systems



Ecological Systems

■ Colorado Plateau Big Sagebrush Shrubland	■ Colorado Plateau Invasive Upland Vegetation
■ Colorado Plateau Developed - Road	■ Colorado Plateau Mixed Desert Scrub
■ Colorado Plateau Developed land	■ Colorado Plateau Shrub-Steppe
■ Colorado Plateau Grassland	■ Colorado Plateau Wash
■ Colorado Plateau Greasewood Flat	

bing

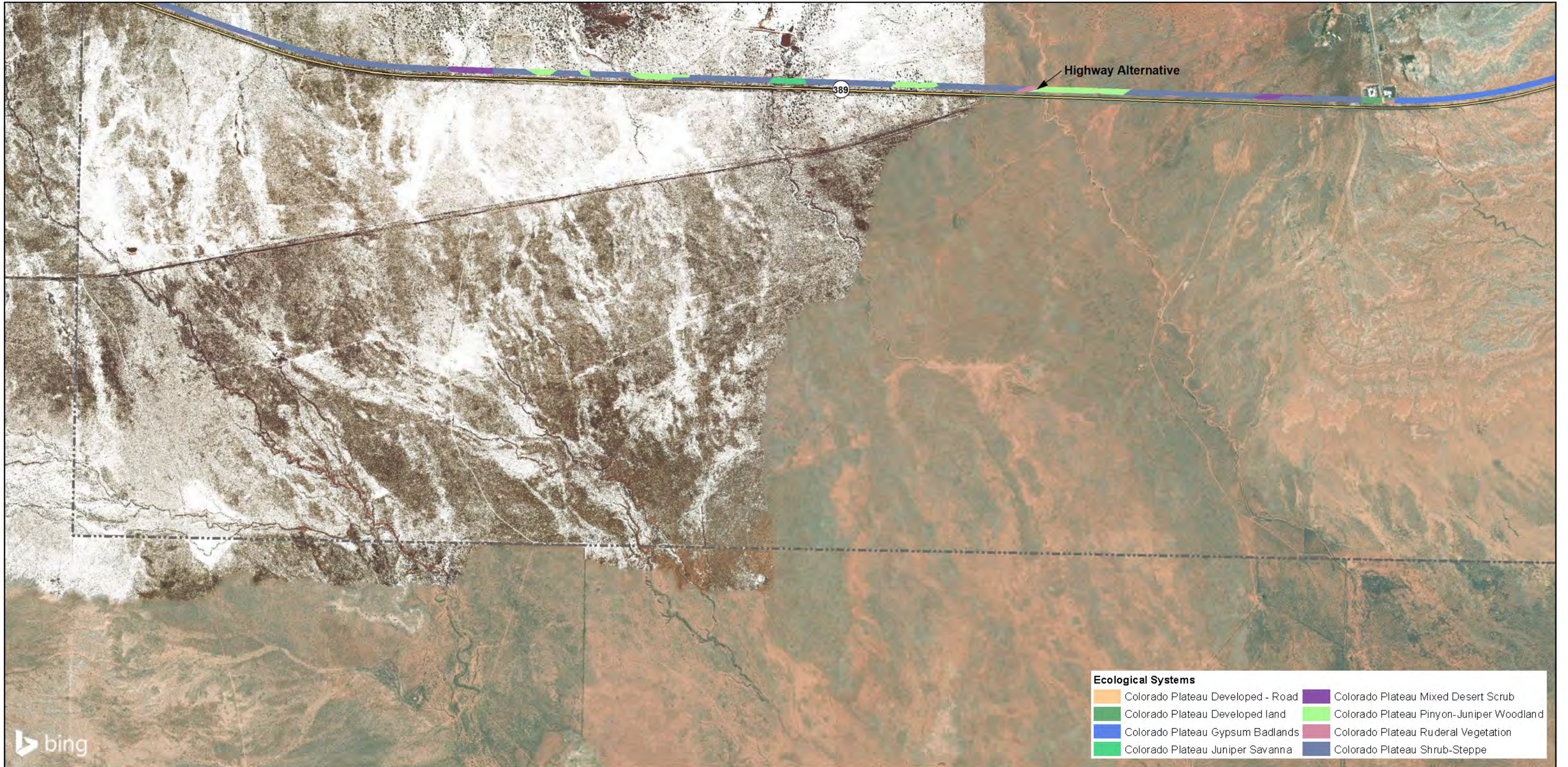
■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	

0 1,000 2,000 Feet N

Coordinate System: NAD 1983 UTM Zone 12N



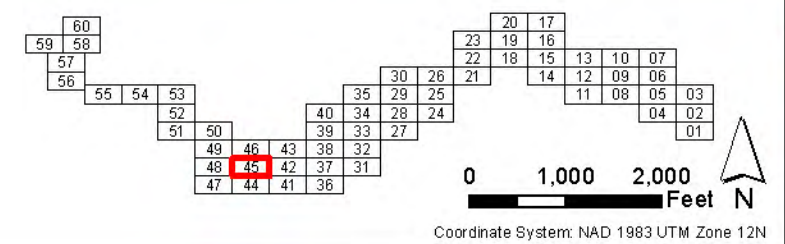
Lake Powell Pipeline
Sheet 44
Alternative Alignments Ecological Systems



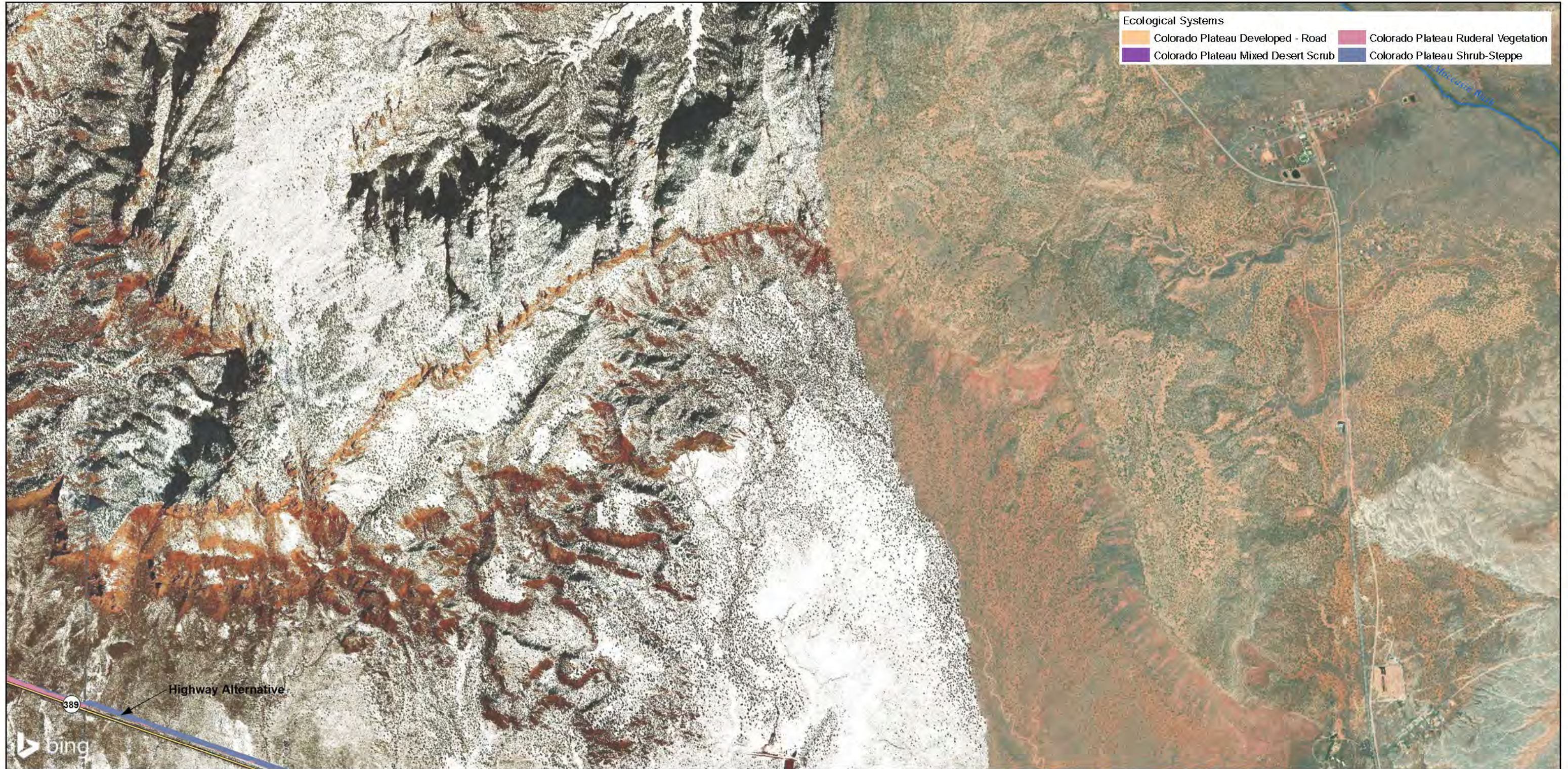
Ecological Systems	
	Colorado Plateau Developed - Road
	Colorado Plateau Developed land
	Colorado Plateau Gypsum Badlands
	Colorado Plateau Juniper Savanna
	Colorado Plateau Mixed Desert Scrub
	Colorado Plateau Pinyon-Juniper Woodland
	Colorado Plateau Ruderal Vegetation
	Colorado Plateau Shrub-Steppe

bing

	Project Pump Station		Interstate
	Project Regulating Tank		US Highway
	Project Hydro Station		ST Highway
	National Park/Monument		Hwy
	Tribal Lands		
	Major Rivers & Streams		



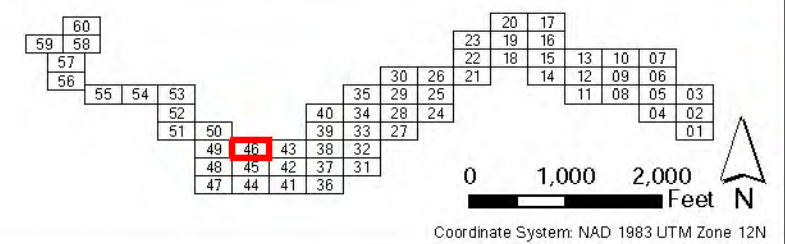
Lake Powell Pipeline
Sheet 45
Alternative Alignments Ecological Systems



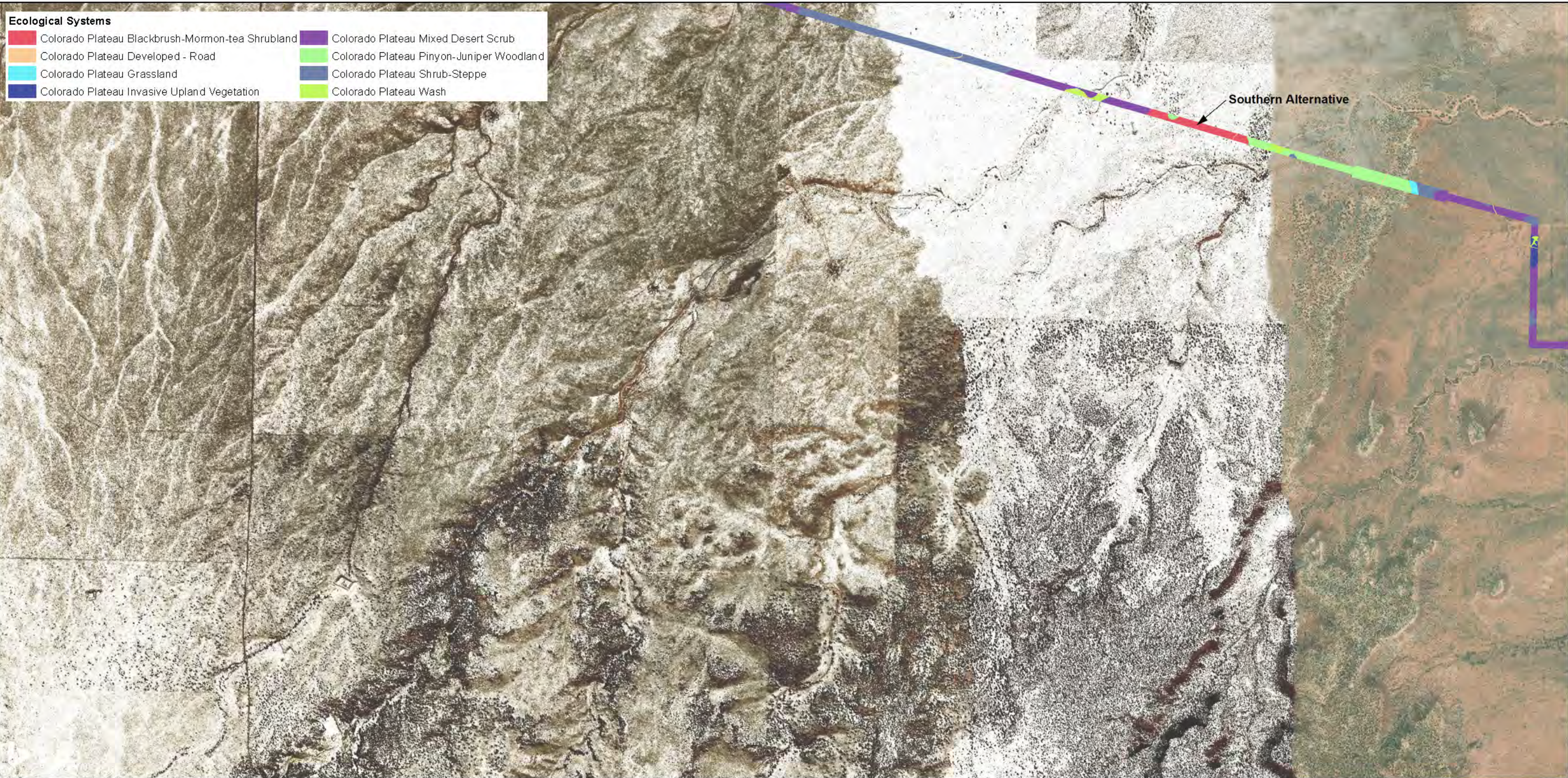
Ecological Systems

 Colorado Plateau Developed - Road	 Colorado Plateau Ruderal Vegetation
 Colorado Plateau Mixed Desert Scrub	 Colorado Plateau Shrub-Steppe

 Project Pump Station	 Interstate
 Project Regulating Tank	 US Highway
 Project Hydro Station	 ST Highway
 National Park/Monument	 Hwy
 Tribal Lands	
 Major Rivers & Streams	



Lake Powell Pipeline
Sheet 46
Alternative Alignments Ecological Systems

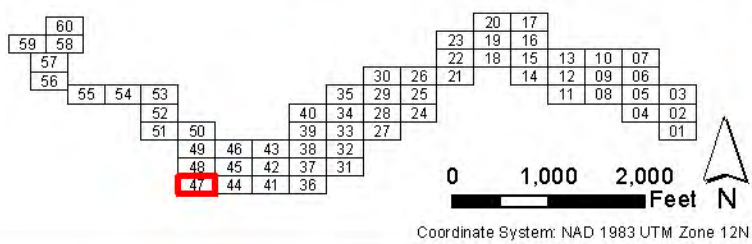


Ecological Systems

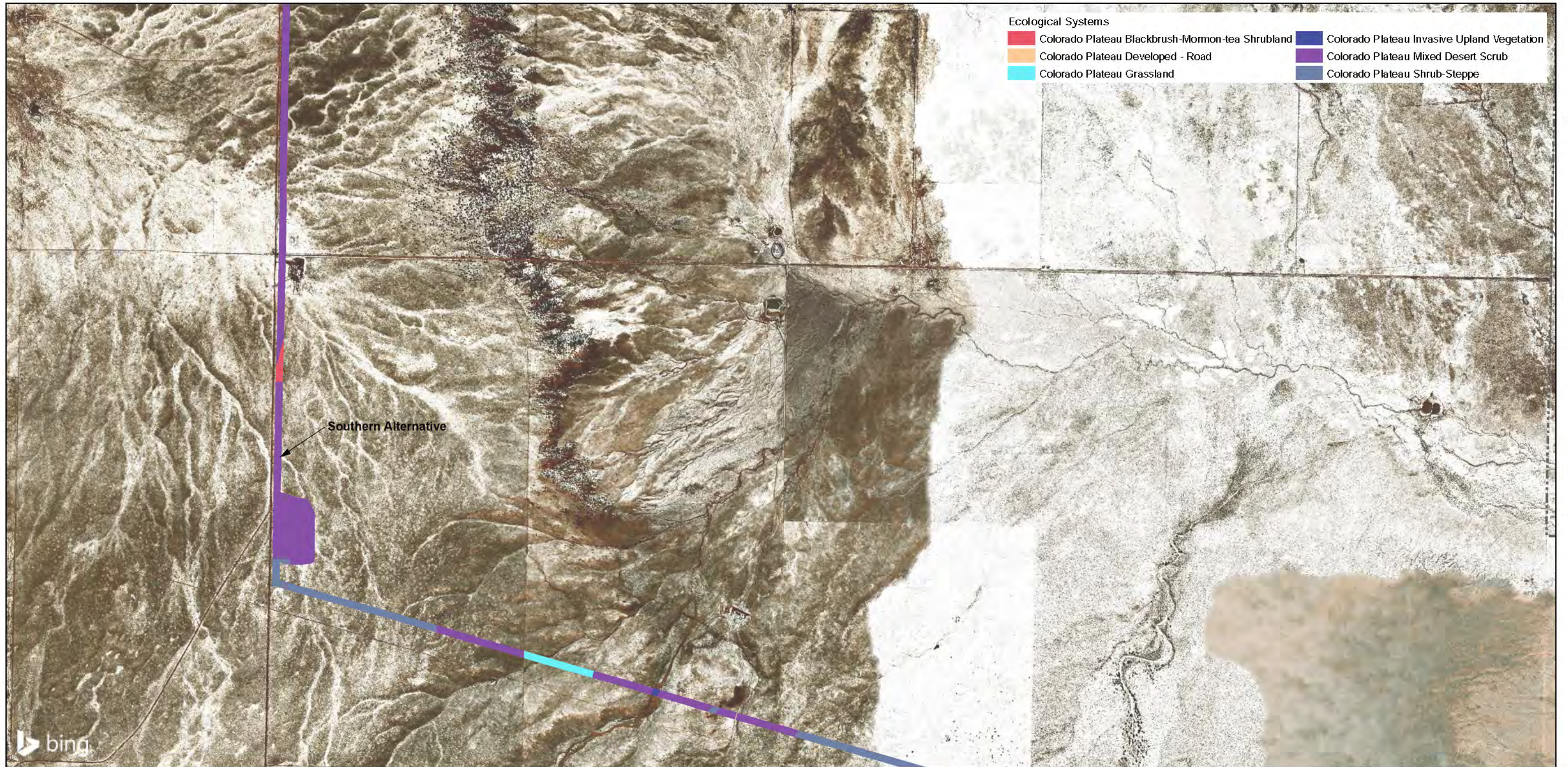
■ Colorado Plateau Blackbrush-Mormon-tea Shrubland	■ Colorado Plateau Mixed Desert Scrub
■ Colorado Plateau Developed - Road	■ Colorado Plateau Pinyon-Juniper Woodland
■ Colorado Plateau Grassland	■ Colorado Plateau Shrub-Steppe
■ Colorado Plateau Invasive Upland Vegetation	■ Colorado Plateau Wash

Southern Alternative

■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	



Lake Powell Pipeline
Sheet 47
Alternative Alignments Ecological Systems

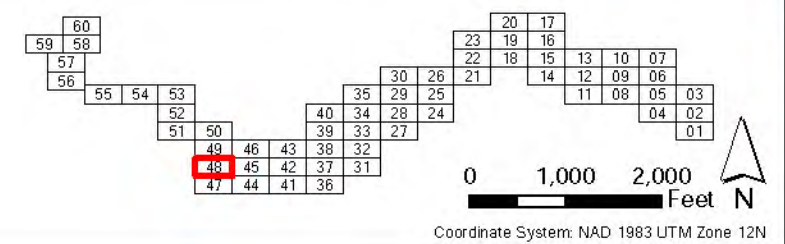


Ecological Systems

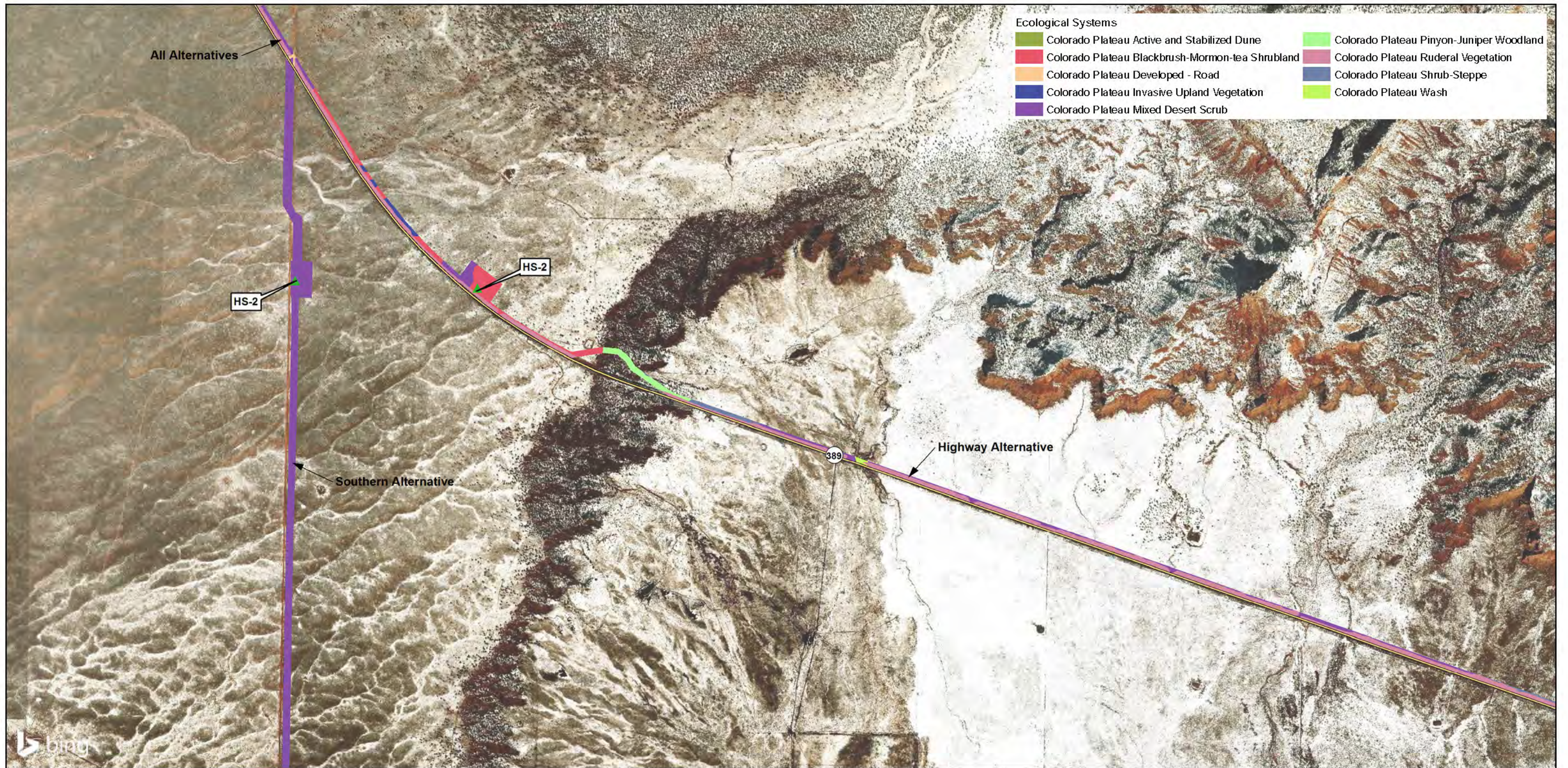
Colorado Plateau Blackbrush-Mormon-tea Shrubland	Colorado Plateau Invasive Upland Vegetation
Colorado Plateau Developed - Road	Colorado Plateau Mixed Desert Scrub
Colorado Plateau Grassland	Colorado Plateau Shrub-Steppe

Southern Alternative

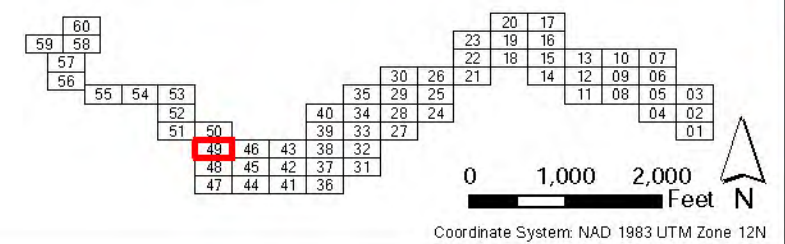
- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- ▭ National Park/Monument
- ▭ Tribal Lands
- Major Rivers & Streams
- === Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline
Sheet 48
Alternative Alignments Ecological Systems



- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline

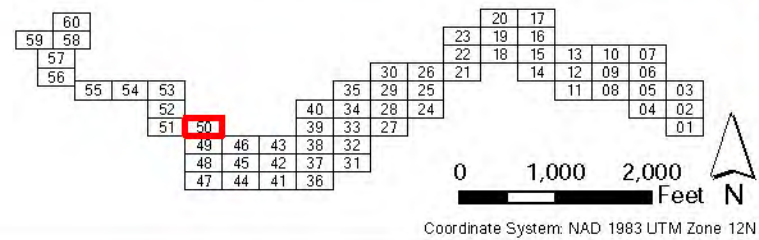
Sheet 49

Alternative Alignments
Ecological Systems



Ecological Systems	
■	Colorado Plateau Active and Stabilized Dune
■	Colorado Plateau Invasive Upland Vegetation
■	Colorado Plateau Mixed Desert Scrub
■	Colorado Plateau Ruderal Vegetation

- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy









BUREAU OF RECLAMATION

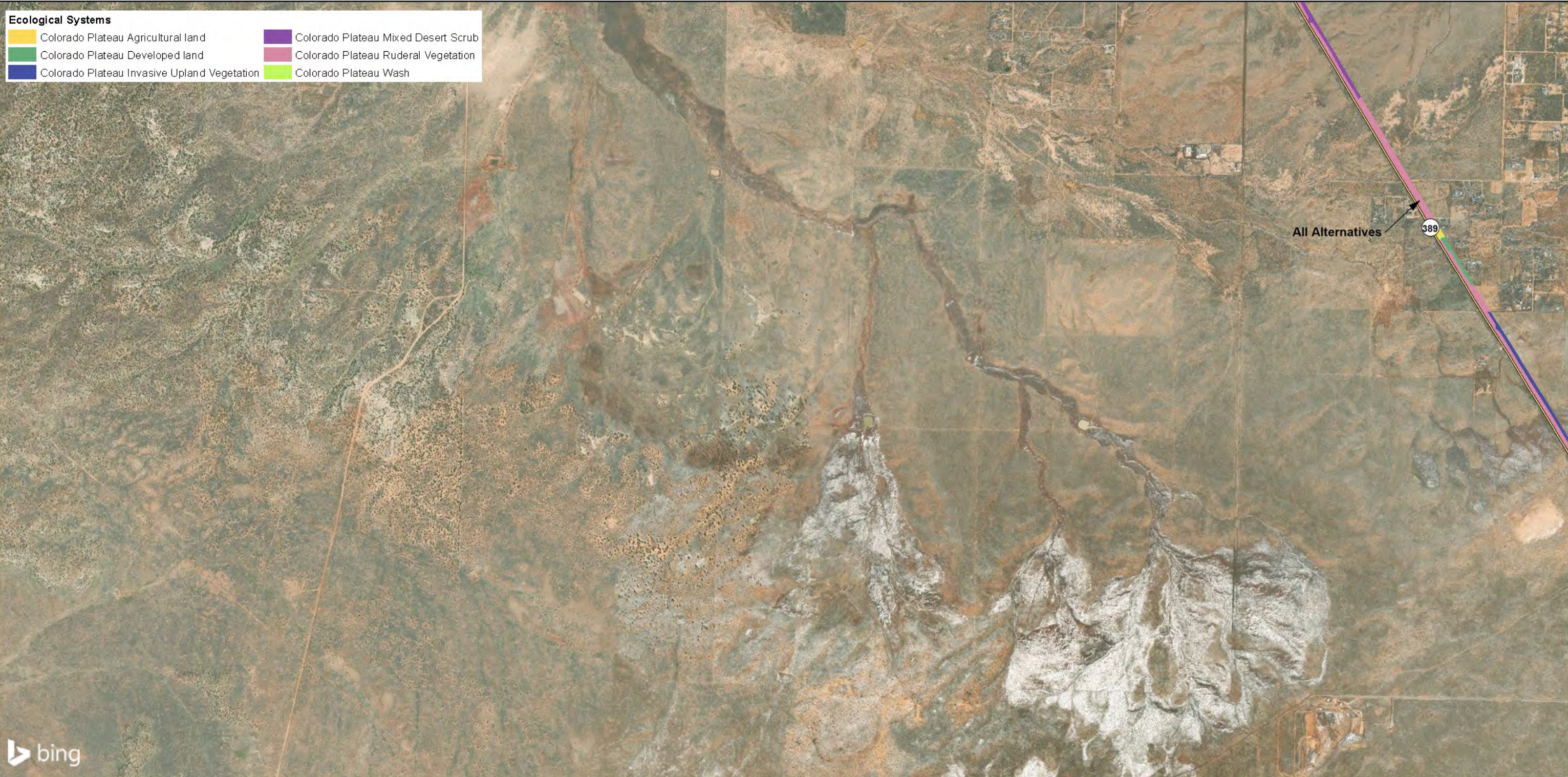
Lake Powell Pipeline

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Alternative Alignments
Ecological Systems

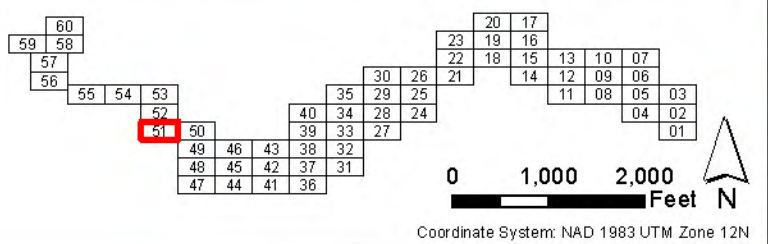
Ecological Systems

 Colorado Plateau Agricultural land	 Colorado Plateau Mixed Desert Scrub
 Colorado Plateau Developed land	 Colorado Plateau Ruderal Vegetation
 Colorado Plateau Invasive Upland Vegetation	 Colorado Plateau Wash



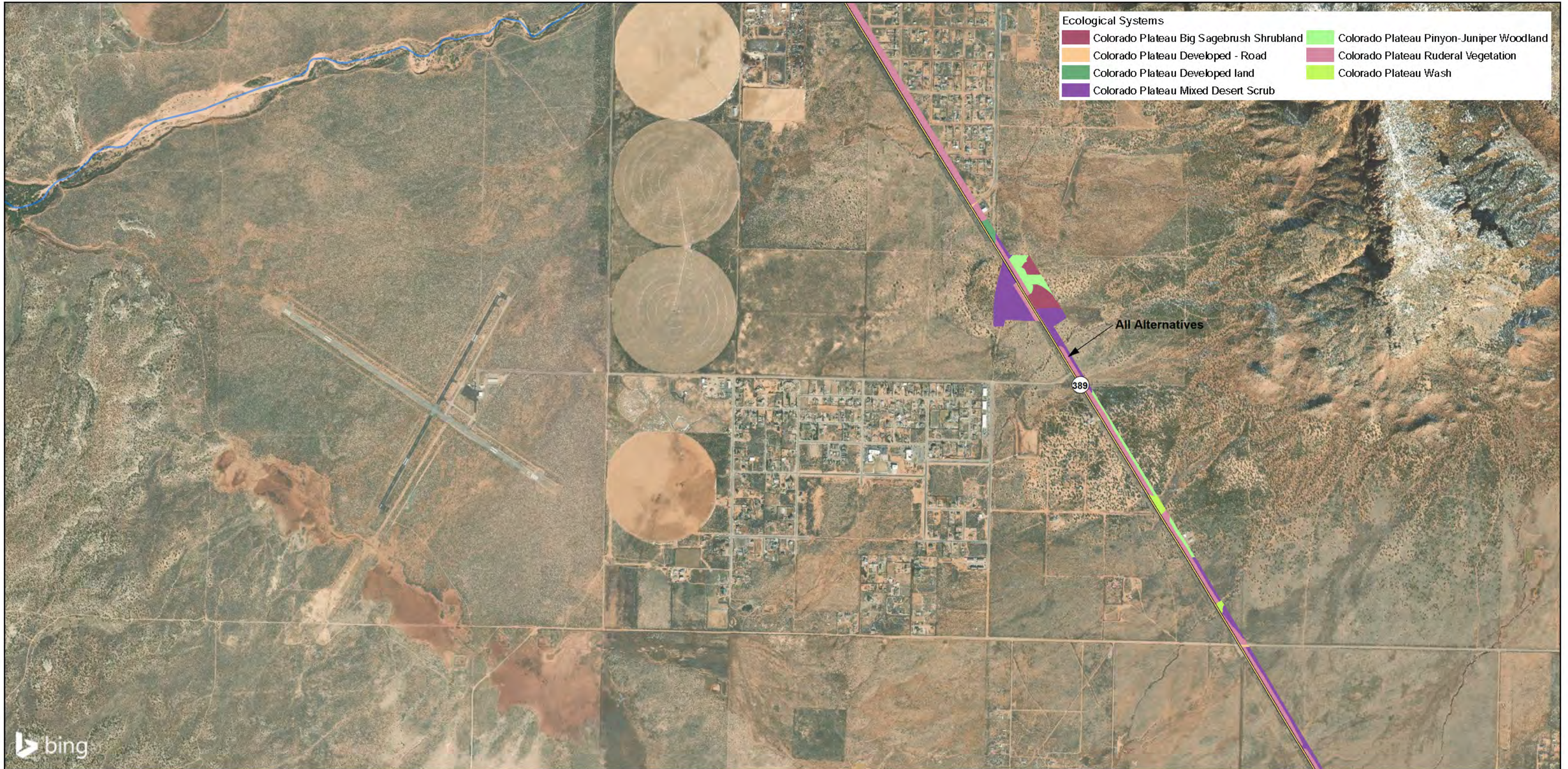
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 Project Pump Station	 Interstate
 Project Regulating Tank	 US Highway
 Project Hydro Station	 ST Highway
 National Park/Monument	 Hwy
 Tribal Lands	
 Major Rivers & Streams	




BUREAU OF RECLAMATION

Lake Powell Pipeline
Sheet 51
Alternative Alignments Ecological Systems



Ecological Systems

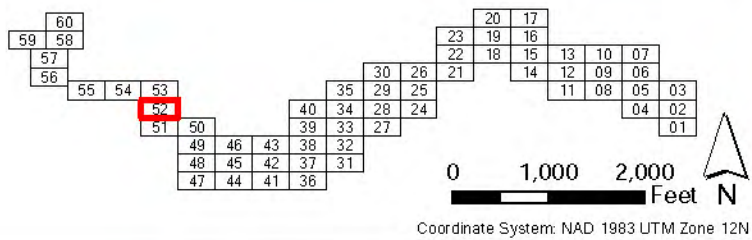
■ Colorado Plateau Big Sagebrush Shrubland	■ Colorado Plateau Pinyon-Juniper Woodland
■ Colorado Plateau Developed - Road	■ Colorado Plateau Ruderal Vegetation
■ Colorado Plateau Developed land	■ Colorado Plateau Wash
■ Colorado Plateau Mixed Desert Scrub	

All Alternatives

389



■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	

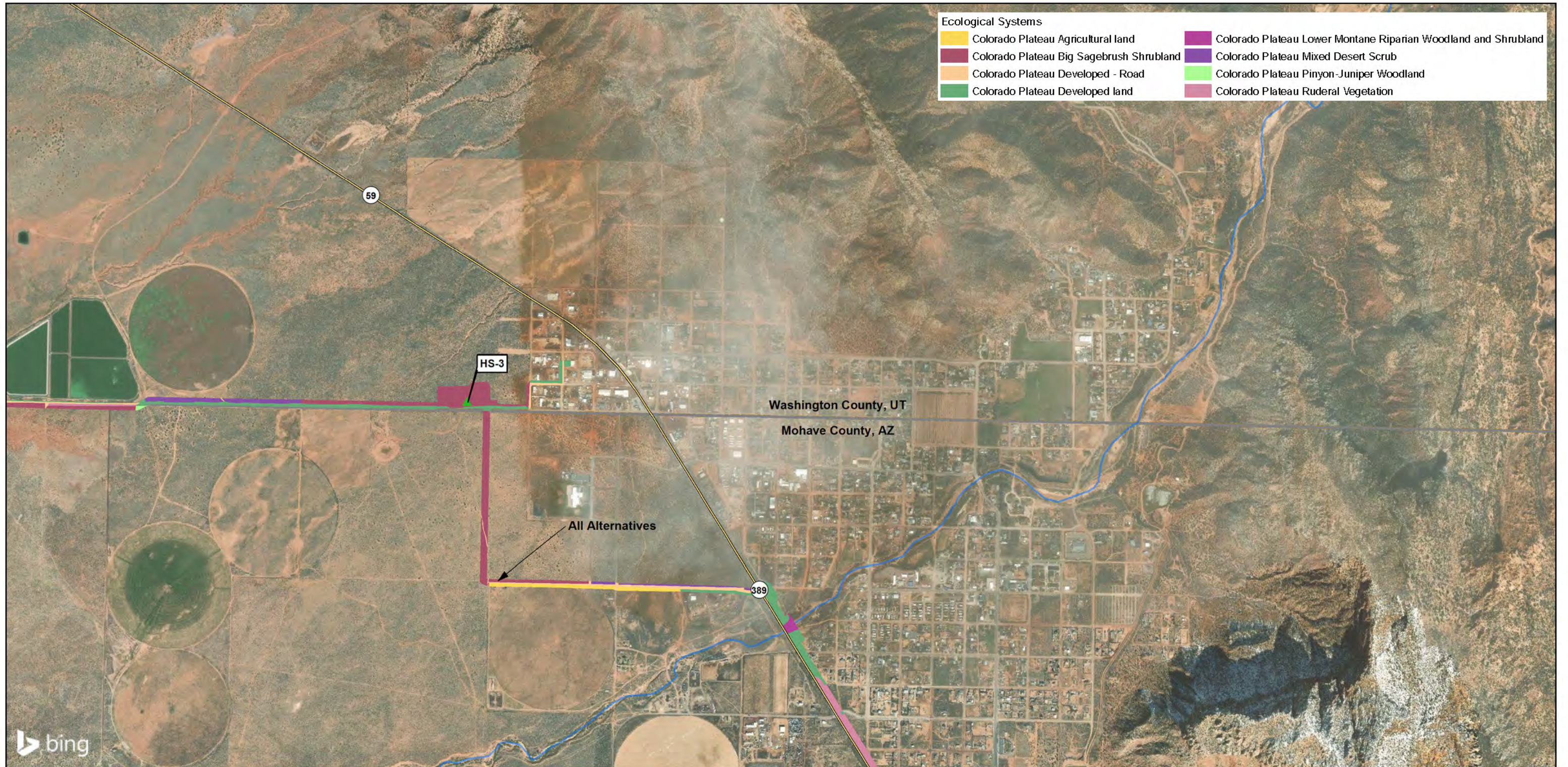


BUREAU OF RECLAMATION

Lake Powell Pipeline

Sheet 52

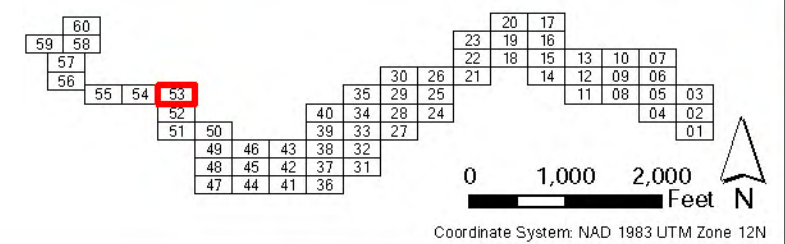
Alternative Alignments
Ecological Systems



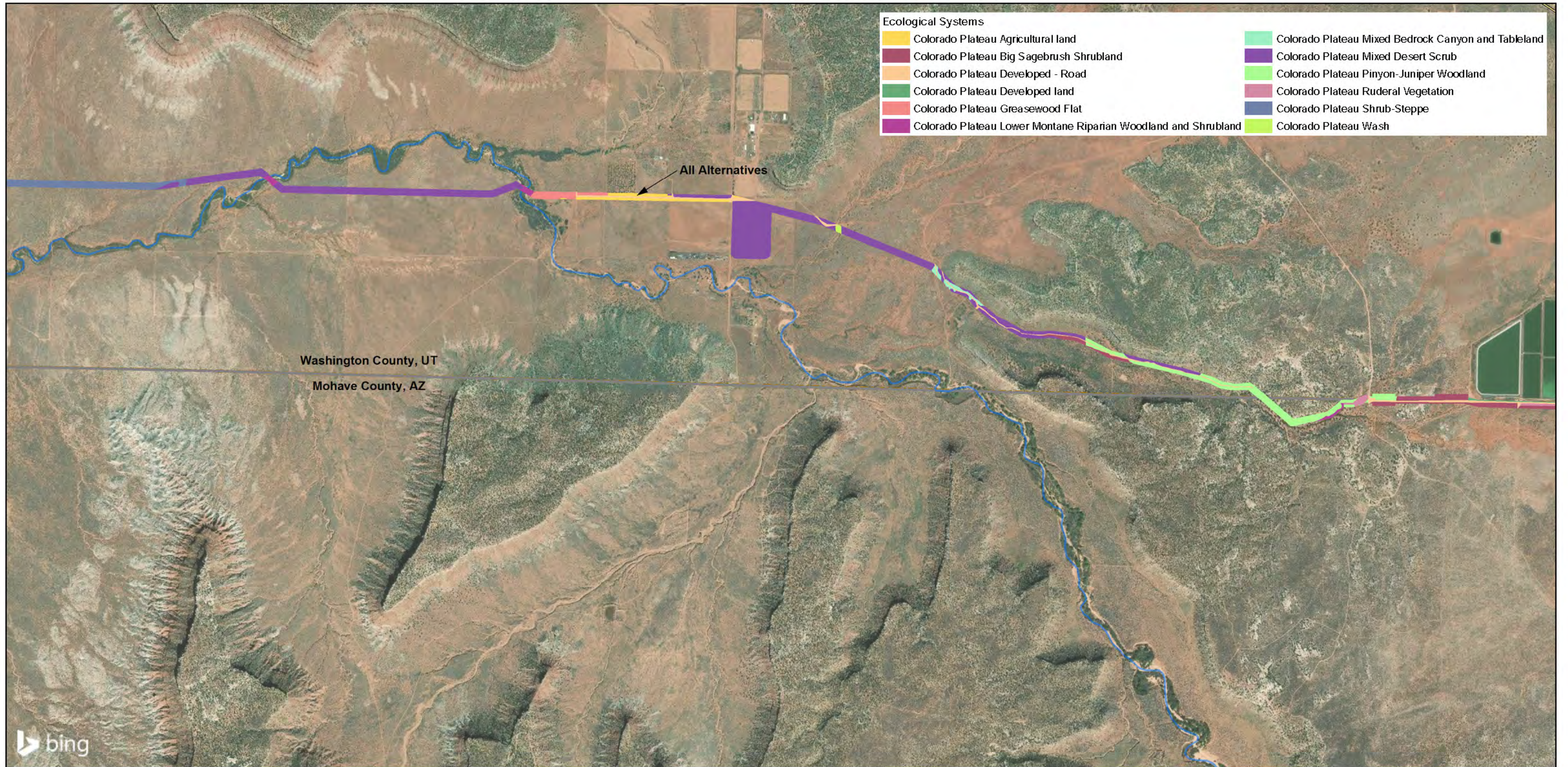
Ecological Systems

■ Colorado Plateau Agricultural land	■ Colorado Plateau Lower Montane Riparian Woodland and Shrubland
■ Colorado Plateau Big Sagebrush Shrubland	■ Colorado Plateau Mixed Desert Scrub
■ Colorado Plateau Developed - Road	■ Colorado Plateau Pinyon-Juniper Woodland
■ Colorado Plateau Developed land	■ Colorado Plateau Ruderal Vegetation

■ Project Pump Station	Interstate
● Project Regulating Tank	US Highway
▲ Project Hydro Station	ST Highway
National Park/Monument	Hwy
Tribal Lands	
Major Rivers & Streams	

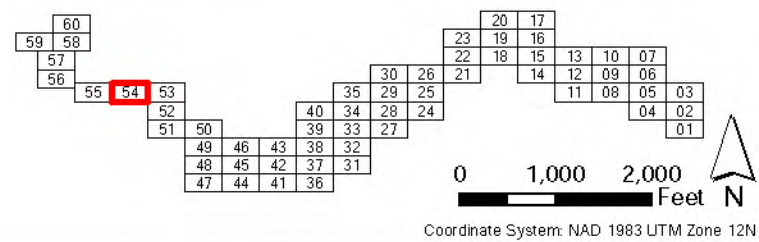


Lake Powell Pipeline
Sheet 53
Alternative Alignments Ecological Systems



bing

- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy

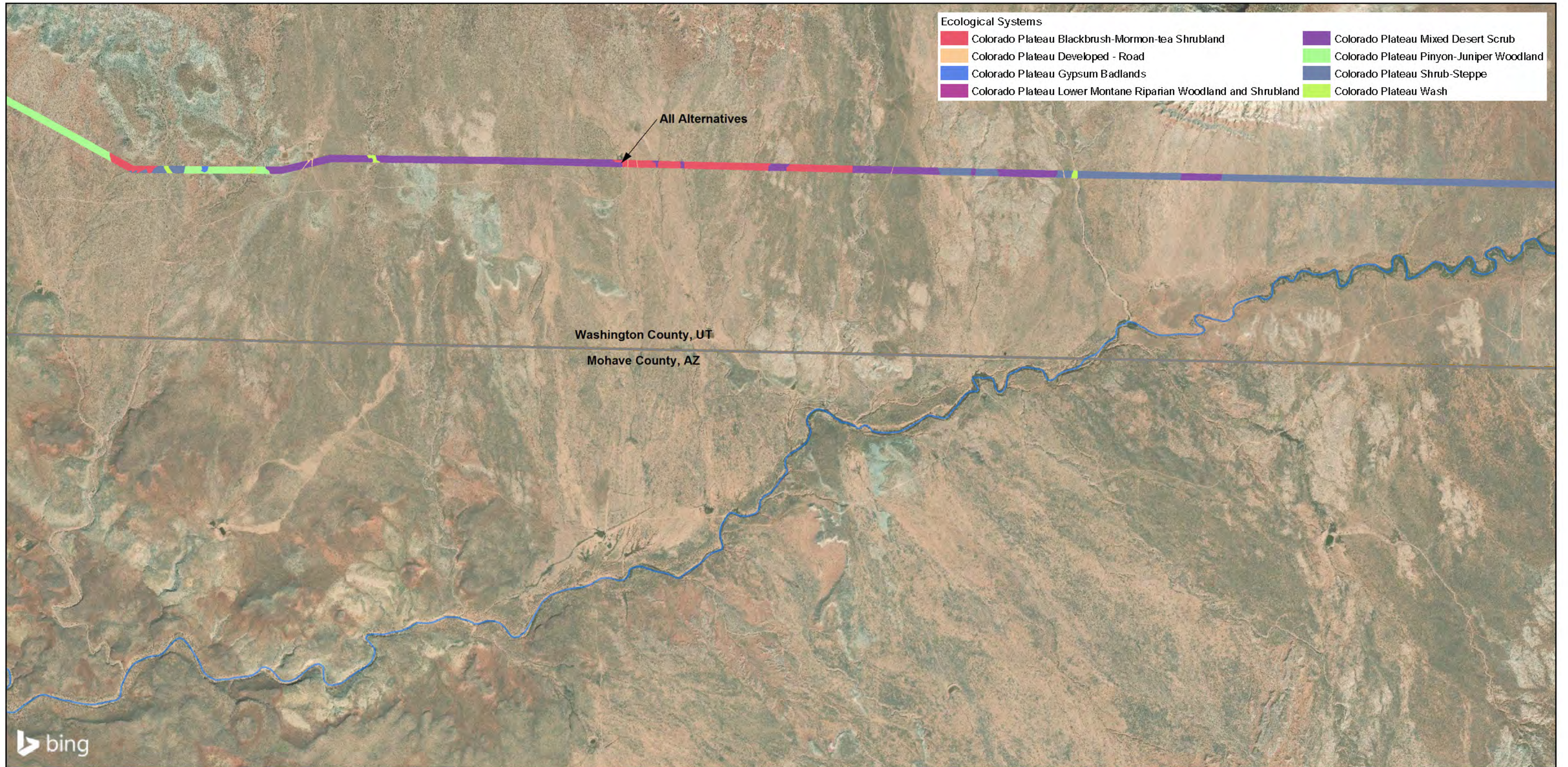


BUREAU OF RECLAMATION

Lake Powell Pipeline

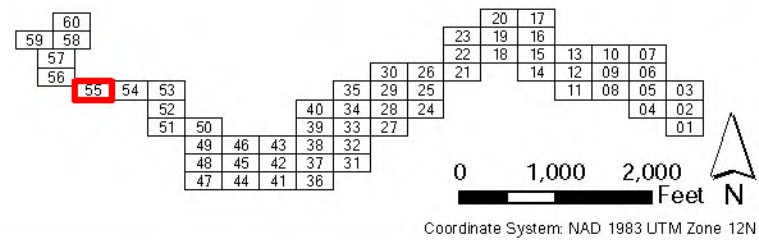
Sheet 54

Alternative Alignments
Ecological Systems



bing

- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy










BUREAU OF RECLAMATION

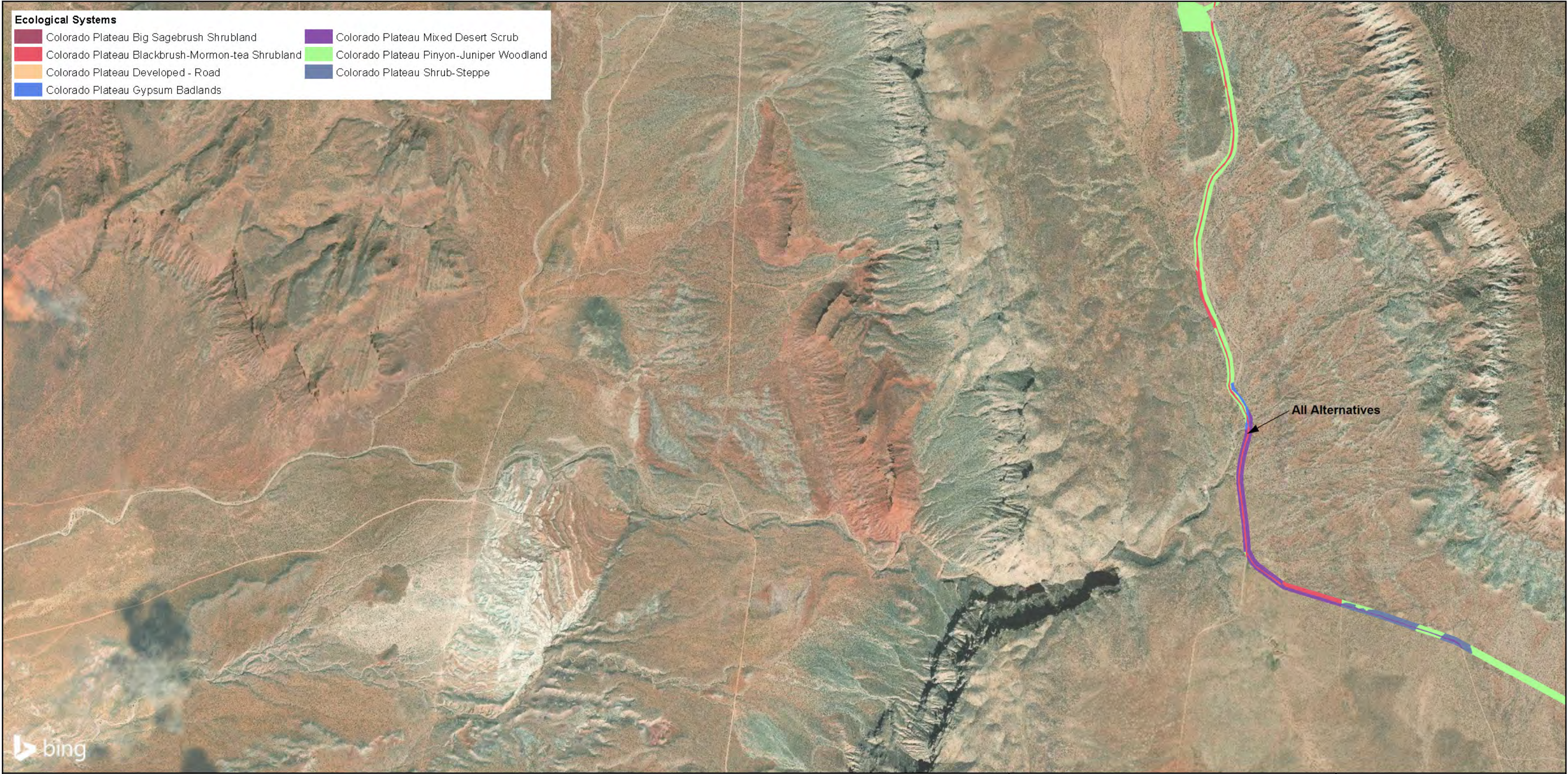
Lake Powell Pipeline

Sheet 55

Alternative Alignments
Ecological Systems

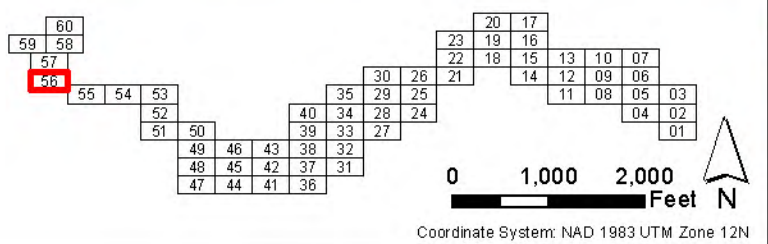
Ecological Systems

 Colorado Plateau Big Sagebrush Shrubland	 Colorado Plateau Mixed Desert Scrub
 Colorado Plateau Blackbrush-Mormon-tea Shrubland	 Colorado Plateau Pinyon-Juniper Woodland
 Colorado Plateau Developed - Road	 Colorado Plateau Shrub-Steppe
 Colorado Plateau Gypsum Badlands	

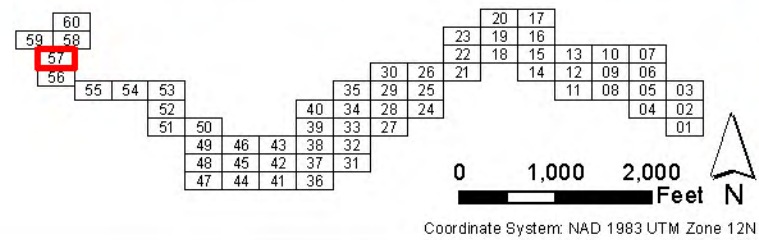
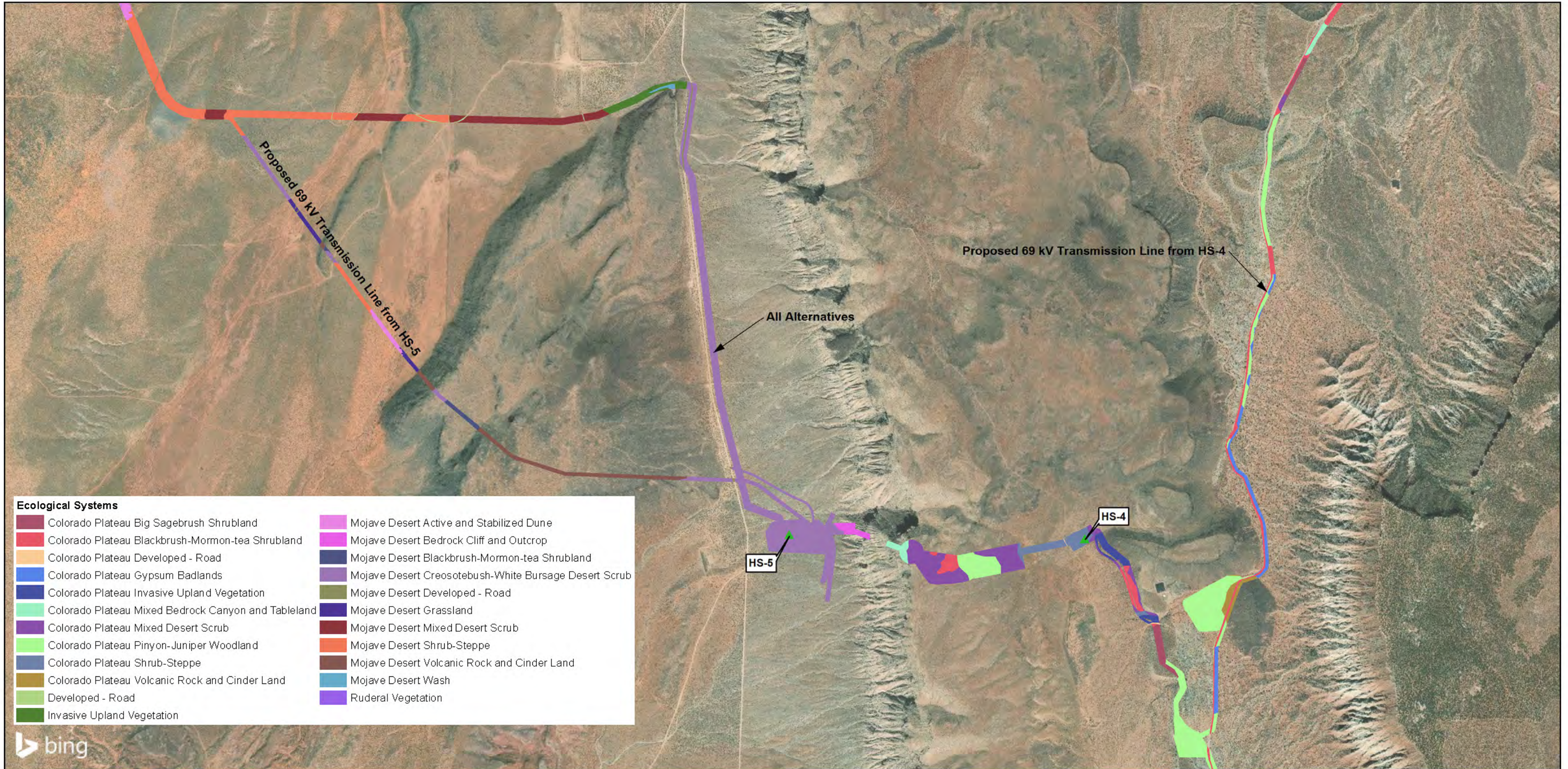


bing

 Project Pump Station	 Interstate
 Project Regulating Tank	 US Highway
 Project Hydro Station	 ST Highway
 National Park/Monument	 Hwy
 Tribal Lands	
 Major Rivers & Streams	



Lake Powell Pipeline
Sheet 56
Alternative Alignments Ecological Systems



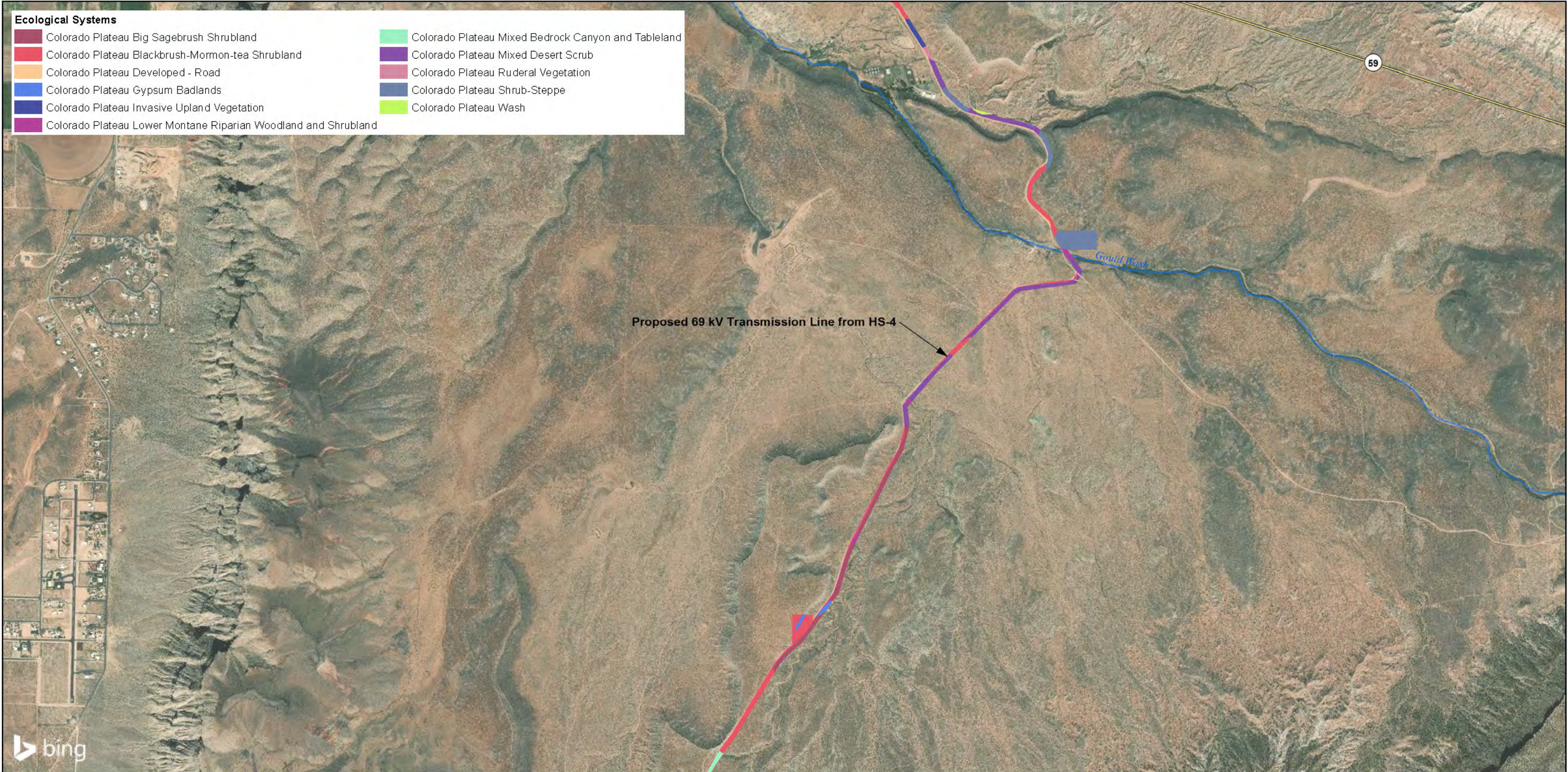
BUREAU OF RECLAMATION

Lake Powell Pipeline

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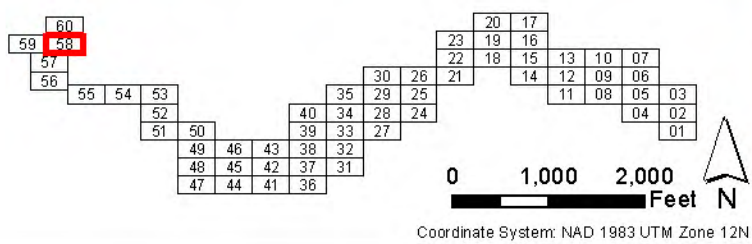
Alternative Alignments
Ecological Systems

- Ecological Systems**
- Colorado Plateau Big Sagebrush Shrubland
 - Colorado Plateau Blackbrush-Mormon-tea Shrubland
 - Colorado Plateau Developed - Road
 - Colorado Plateau Gypsum Badlands
 - Colorado Plateau Invasive Upland Vegetation
 - Colorado Plateau Lower Montane Riparian Woodland and Shrubland
 - Colorado Plateau Mixed Bedrock Canyon and Tableland
 - Colorado Plateau Mixed Desert Scrub
 - Colorado Plateau Ruderal Vegetation
 - Colorado Plateau Shrub-Steppe
 - Colorado Plateau Wash



Proposed 69 kV Transmission Line from HS-4

- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



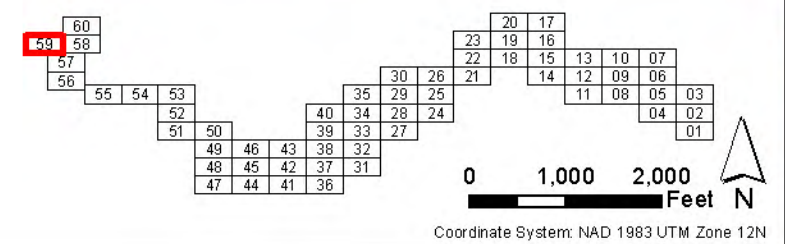
Lake Powell Pipeline

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Alternative Alignments
Ecological Systems



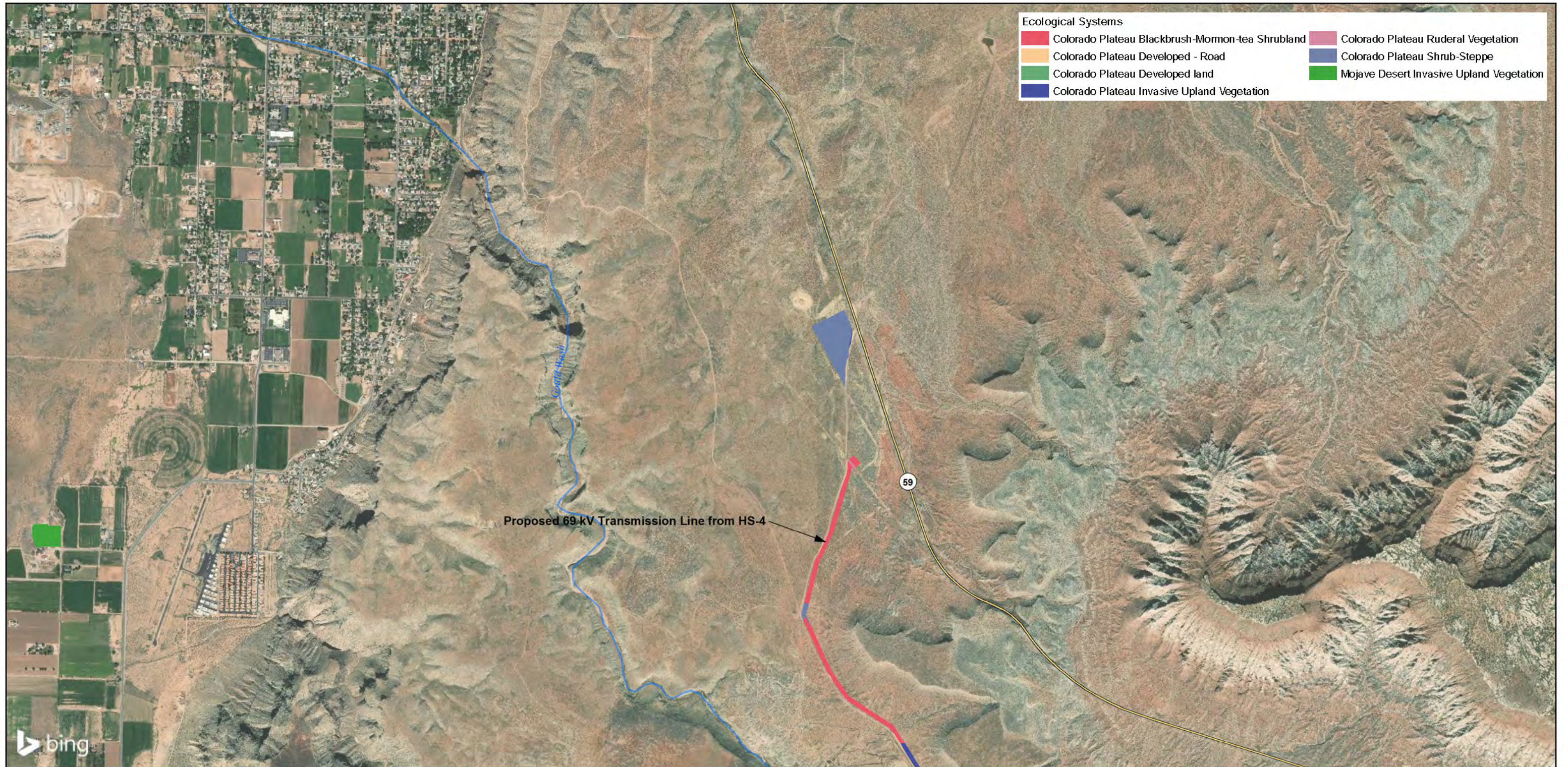
- Project Pump Station
- Project Regulating Tank
- ▲ Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



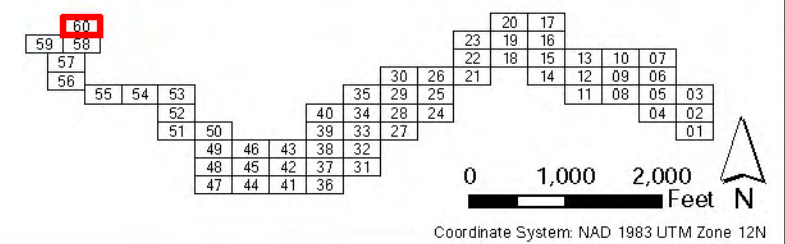
Lake Powell Pipeline

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**Alternative Alignments
Ecological Systems**



- Project Pump Station
- Project Regulating Tank
- Project Hydro Station
- National Park/Monument
- Tribal Lands
- Major Rivers & Streams
- Interstate
- US Highway
- ST Highway
- Hwy



Lake Powell Pipeline

Sheet 60

Alternative Alignments
Ecological Systems



— BUREAU OF —
RECLAMATION

Lake Powell Pipeline Project Appendix C-14: Wetland and Riparian Areas

**Coconino and Mohave Counties, Arizona
Kane and Washington Counties, Utah**

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1 Introduction/Affected Environment

Wetlands are areas that meet the criteria for soils, hydrology, and vegetation as defined in the 1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (USACE 1987). These are areas that are inundated or saturated by surface or groundwater at a duration and frequency sufficient to support vegetation typically adapted for saturated soil conditions. Wetland areas typically comprise marshes, shallow swamps, lakeshores, wet meadows, and riparian areas, and are often along or adjacent to perennial or intermittent water bodies. Water salinity levels can range from no salinity to levels associated with estuaries.

Wetlands that are determined to be hydrologically connected to “waters of the United States” are considered jurisdictional waters and, if affected (i.e., work on, in, or over these areas), permitting is required through the USACE. Ephemeral and intermittent streams or washes, which are common along the Proposed Project alternatives, often do not exhibit the presence of vegetation dependent on saturated soils and are infrequently considered wetlands under the USACE criteria. However, under a Supreme Court ruling in the *Rapanos v. United States* case, these waters may be considered jurisdictional under the Clean Water Act (CWA) (EPA and USACE 2007). In non-vegetated areas (e.g., lakes, ponds, and reservoirs), the jurisdictional boundary is determined by the ordinary high-water mark and confirmed by the USACE.

Riparian areas are vegetated zones that form a transition between permanently saturated and upland areas and typically exhibit vegetation and physical characteristics associated with permanent sources of surface or subsurface water. These areas may or may not meet all three USACE criteria for wetlands, and, within an individual system, may contain jurisdictional and non-jurisdictional areas and still be considered riparian. The Proposed Project alternative alignments would cross numerous riparian areas along, adjacent to, or contiguous with perennial and intermittent rivers or water bodies. Although they make up a small percentage of the overall Project Area, riparian areas are among the most productive and important ecosystems, having a greater diversity of flora and fauna than adjacent uplands. Riparian systems filter and purify water, reduce sediment loads, enhance soil stability, provide microclimatic moderation when contrasted with extremes in adjacent areas, and can contribute to groundwater recharge and stream base flow.

The following section discusses jurisdictional and non-jurisdictional Waters of the United States as well as jurisdictional and non-jurisdictional riparian area observed along the alternative alignments. These categories are not mutually exclusive from each other as a riparian area can also be a jurisdictional Waters of the United States, which also means it can be a wetland area. Conversely, a Waters of the United States may not be a wetland nor a riparian area. Examples include lakes, streams, and other open water systems. Therefore, not all riparian areas addressed in this appendix are identified as jurisdictional waters. However, the Bureau of Land Management (BLM) is directed to manage its riparian-wetland areas for the benefit of the nation and its economy (BLM 1993).

1.1 Regulatory Framework

Waters of the United States are protected by the federal government through Section 404 of the CWA, which is administered by the USACE with oversight by the U.S. Environmental Protection Agency. The CWA applies to dredge or fill material placed in Waters of the United States, which Title 40 Code of Federal Regulations (CFR) 230.3 defines as all waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide, all interstate waters, including interstate wetlands and all other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes or natural ponds. Section 10 of the Rivers and Harbors Act addresses potential effects to interstate commerce, which is directly linked to the CWA as rivers and harbors may also represent Waters of the United States. The USACE also administers that regulatory program.

The BLM has responsibility for the majority of the lands through which the Proposed Project would cross. These lands sustain a variety and abundance of resources that are prized for their recreation, wildlife, cultural, and historic values, as well as their economic values, and for such uses as livestock production and mineral extraction. Riparian-wetland areas, though they comprise only a small amount of the total land base, are the most productive and highly prized resources found on BLM-managed lands. The Federal Land Policy and Management Act (FLPMA) of 1976 directs the BLM to manage public lands in a manner that will provide for multiple use and at the same time protect natural resources for generations to come. In addition to FLPMA, numerous laws, regulations, policies, Executive Orders, and Memorandums of Understanding direct the BLM to manage its riparian-wetland areas for the benefit of the nation and its economy.

Sections 201 and 202 of FLPMA direct the BLM to “prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values” and to develop, maintain, and, when appropriate, revise land use plans which provide management direction for the use of the public lands. Land use plans (or resource management plans and the planning decisions contained within them are the basis for every on-the-ground action the BLM undertakes. resource management plans ensure that the public lands are managed in accordance with the intent of Congress, as stated in FLPMA, under the principles of multiple use and sustained yield.

The Project Area traverses lands within four different management units of the BLM, each with its own resource management plan: Kanab-Escalante Planning Area, Kanab Field Office, St. George Field Office, and the Arizona Strip Field Office. Each of these resource management plans includes management direction on vegetation resources, as outlined below.

Kanab-Escalante Planning Area Resource Management Plan (approved February 2020)

The Kanab-Escalante Planning Area Resource Management Plan (BLM 2020) contains the following goals and objectives related to management of vegetation, including riparian vegetation:

- **Goal 1:** Ensure a mosaic of desired vegetation communities is present across the landscape with diversity of species, canopy, density, and age class in accordance with ecological site potential. Protect, enhance, and/or develop ecological processes and functions.

Objectives:

- Maintain and/or restore riparian areas to proper functioning condition (PFC), or to making significant progress toward PFC, where BLM-managed or BLM-authorized activities have been identified as contributing to riparian impairment.
- Ensure water quantity and quality for multiple-use management and functioning, healthy riparian and upland systems.
- Manage undesirable and desirable vegetation with the goal of improving overall watershed conditions.

Management Actions:

- Avoid new surface-disturbing activities within 300 feet of riparian/wetland riparian areas unless it could be shown that (1) there are no practical alternatives (e.g., a designated utility corridor), (2) all long-term impacts could be fully mitigated, or (3) the activity would benefit and enhance the riparian area.

Kanab Field Office Resource Management Plan (approved October 2008)

The Kanab Field Office Resource Management Plan (BLM 2008a) contains the following goals and objectives related to vegetation, including riparian vegetation:

Goals and Objectives:

- Improve watershed conditions on eroding sites and on other sensitive watershed areas, such as riparian areas.

Arizona Strip Field Office Resource Management Plan (approved February 2008)

The following management direction is contained within the Arizona Strip Field Office Resource Management Plan (RMP) (BLM 2008b) regarding riparian resources.

Decision No. DFC-RP-01: Riparian areas will consist of a diversity of vertical and horizontal structures, vegetative age classes, and endemic species.

Decision No. DFC-RP-02: Riparian areas will be protected, enhanced, and/or restored by allowing tools that are necessary and appropriate to mitigate adverse impacts of allowable uses and undesirable disturbances, and contribute to meeting the Arizona Standards for Rangeland Health.

Decision No. DFC-RP-03: Ecological functions and processes will be intact with vegetative species composition and cover appropriate to the site.

Decision No. DFC-RP-05: All riparian areas will be in, or moving towards, proper functioning condition.

Decision No. DFC-RP-10: Riparian communities will provide habitat for common species such as rush, cottonwood, willow, and yellow-breasted chat, as well as rare species such as southwestern willow flycatcher, common black hawk, Lucy's warbler, and speckled dace where consistent with site potential.

Decision No. MA-RP-01: Habitat conditions at priority riparian areas will be maintained or improved.

St. George Field Office Resource Management Plan (approved March 1999)

The St. George Field Office Resource Management Plan (BLM 1999) contains the following objective related to riparian areas:

BLM's objective, to the extent practical, will be to manage riparian areas so as to maintain or restore them to properly functioning conditions and to ensure that stream channel morphology and functions are appropriate to the local soil type, climate, and landform.

Under the BLM's mandate of multiple-use management, a variety of activities such as livestock grazing, mineral extraction, recreation, and road and transportation corridor construction takes place on public lands. If not managed correctly, these activities can affect the quality of riparian-wetland areas (BLM 1993).

1.2 Methodology

The Project Area includes the entire length of the alternative alignments and transmission corridors, specifically the following features:

- Any wetland, riparian, or other potentially jurisdictional areas (including intermittent and ephemeral drainages) directly affected by the Proposed Project feature construction or operations;
- Any stream or river and associated corridor that would be subject to water discharges or flow alterations; and
- Any wetland, riparian or other potentially jurisdictional area (including intermittent and ephemeral drainages) affected by transmission line construction and maintenance.

1.2.1 Background/Literature Review

The wetland and riparian analyses included the following:

- Geographic information system (GIS) layers with Proposed Project alternatives;
- Wetland mapping (i.e., National Wetland Inventory mapping), where available;
- Soils mapping, including locations of hydric soils, where available;
- Hydrologic maps showing locations of intermittent, ephemeral, and permanent waterways and their receiving bodies, including U.S. Geological Survey (USGS) topographic maps;
- Aerial photography (2007 one-meter National Agricultural Imagery Program [NAIP] imagery in Arizona and 2009 one-meter NAIP imagery in Utah) and video;
- USGS stream gage data, where available;
- BLM data; and
- Vegetation mapping, including identification of riparian areas.

1.2.2 Field Data

Data collected in the field includes evaluation of vegetation, soils, and hydrology at stream crossings and washes. Scour chains and crest gages were installed in washes and streams at selected locations to collect additional hydrological data. The boundaries of wetland and riparian areas and channel

cross-sections were mapped in the field using global positioning system (GPS) instruments with data conversion to GIS.

1.2.3 Wetland Determination and Riparian Area Identification

A wetland determination was performed in all areas containing wetland and/or riparian vegetation following the methodology outlined in the 1987 USACE Wetland Delineation Manual (USACE 1987) and the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual for the Arid West (USACE 2006). This included an evaluation of vegetation, soils, and hydrology. Data were collected at a paired set of points at the wetland or riparian feature, including excavation of soil pits to 18 inches below ground surface, or at refusal, if refusal occurred at less than 18 inches.

The Arizona Strip Field Office compiled a list of riparian areas for the RMP revision Environmental Impact Statement (EIS) in 2007—see Table 3.8 in the Proposed Resource Management Plan/Final EIS for the Arizona Strip Field Office (BLM 2007). This EIS also includes mapped information (Map 3.11) on the location of riparian ecological zone vegetation communities and riparian areas (Map 3.2) across the Arizona Strip.

Also, in 2009, the Utah Board of Water Resources (UBWR) identified and conducted functional analysis of all reservoirs, rivers, streams, and washes crossed by Proposed Project features. Functional analysis followed the PFC method, which considers a riparian area in proper functioning condition when adequate vegetation, landform, or wood debris is present to:

- Dissipate stream energy associated with high waterflow, thereby reducing erosion and improving water quality;
- Filter sediment, capture bedload, and aid floodplain development;
- Improve flood water retention and ground-water recharge;
- Develop root masses that stabilize stream banks against cutting action; and
- Develop diverse ponding and channel characteristics to provide the habitat, and, the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity.

1.2.4 Functional Assessment

Functional assessments were completed for all areas with riparian and/or wetland vegetation. Washes without wetland/riparian vegetation were documented photographically. Functions are the ecological processes performed by wetlands. In contrast to wetland functions, values are subjective descriptions of the worth or quality of a wetland from a societal perspective, including aesthetics and recreational opportunities. There are various methods of evaluating wetland functions and values, including the Utah Department of Transportation (UDOT) Wetland Functional Assessment (Johnson et al. 2006), Wetland Evaluation Technique (Adamus et al. 1987), Oregon Freshwater Wetland Assessment Methodology (Roth et al. 1996), the BLM's process for assessing PFC (BLM 1993, 1998), and professional judgment. The basic approach in these methods is to evaluate a wetland against a checklist of specific functions, attributes, processes, and values based on a visual assessment of its physical, biological, hydrological, and societal characteristics.

The UDOT Wetland Functional Assessment was designed for highway projects but is applicable to linear facility projects like the Lake Powell Pipeline Project (LPP) as well. Therefore, this method was selected as a basis for assessing wetland function. The functional assessment was modified to specifically address the fact that not all riparian areas meet wetland criteria but have the potential to

do so in whole or part (see Section 1.4.2, below). The UDOT Wetland Functional Assessment method assigns a numeric rating to all evaluated wetlands and riparian areas to allow for comparison of the overall biological and hydrological functional level of different features. A values assessment also allows for comparison of the relative importance of visual quality and recreational/educational values between features.

In addition to the UDOT Wetland Functional Assessment, PFC was assessed for all areas with wetland and/or riparian vegetation. The PFC method used in this study was developed by the BLM, the U.S. Fish and Wildlife Service (USFWS), and the Natural Resources Conservation Service (BLM 1998, 2003). This method uses a qualitative checklist to assess the condition of riparian and wetland areas by evaluating hydrology, vegetation, and soils attributes and processes.

1.2.5 Scour Chains and Crest Gages

Scour chains were installed in washes and streams that would be crossed by the Proposed Project (see Table 1.2-1) to measure bed scour depth, sediment deposition, and bed aggradation or degradation following peak runoff events. Each scour chain consisted of a 24-inch-long metal chain with 1.2-inch-long links attached to a duck-bill soil anchor. The soil anchor was driven vertically into the streambed at the proposed pipeline crossing, with the top link of the chain matching the stream bed grade. During precipitation events resulting in flow through the wash or stream, sediments scoured from the channel bed at the scour chain location exposed the chain and deflected it in the flow direction. The length of chain left horizontal in the channel bed following the runoff event indicated the depth of scour. Sediment deposited over the top of the scour chain indicated the amount of sediment fill during and after a flow and scour event. If the sediment fill over the chain was greater than the length of the chain, then this indicated a net increase in the channel bed elevation (i.e., bed aggradation). If the sediment fill over the chain was less than the length of chain, then this indicated a net decrease in the channel bed elevation (i.e., bed degradation). Scour chains were monitored periodically during the field studies and measurements were recorded in field notebooks. The scour chains were reset to vertical positions following each measurement.

Table 1.2-1 Scour Chains Installed and Removed During Field Surveys

Wash or Stream Description ^(a)	Date Installed	Date Removed
Bitter Seeps Wash	7/22/2009	12/14/2011
Two Mile Wash	7/23/2009	12/14/2011
Cottonwood Creek	7/23/2009	12/14/2011
Jacob Canyon at Kanab Creek	7/23/2009	12/14/2011
Kanab Creek at Jacob Canyon	7/23/2009	12/14/2011
Wash west of Blue Pool Wash	7/24/2009	Lost in 2010
Paria River, north side of Bridge	7/24/2009	Lost in 2010
Johnson Wash	7/24/2009	12/13/2011

Note:

(a) The U.S. Environmental Protection Agency and U.S. Army Corps of Engineers, in January 2020, signed an agreement implementing a new definition for Waters of the United States. That definition has not yet been applied to these areas but will be assessed at a later phase of the environmental impact study.

As shown in Table 1.2-2, below, crest gages were installed in washes and streams near scour chains to measure the peak flow stage during the period between monitoring trips. The crest gage site was selected based on a straight channel reach (i.e., monitoring reach) with a straight upstream approach of at least 100 feet, uniform cross-section and channel slope, and consistent channel bed and bank

conditions within the monitoring reach. Each crest gage consisted of a 24-inch long, 1-inch diameter polyvinyl chloride (PVC) pipe with end caps, holes drilled near each end of the pipe to allow water and air to move freely, cork dust placed in the bottom end of the pipe, a four-foot-long steel rebar, and plastic electrical ties to attach the pipe to the rebar. The rebar was driven vertically into the streambed and the PVC pipe was attached vertically to the rebar with the ties, with the bottom end cap matching the streambed grade. During precipitation events resulting in flow through the wash or stream, the water level would fill the pipe and carry the cork dust to the highest flow stage, leaving a residue on the pipe sides. The cork dust ring was measured and recorded from the bottom of the crest gage to indicate the peak flow depth at the representative cross-section since the previous monitoring trip.

Table 1.2-2 Crest Gages Installed and Removed During Field Surveys

Wash or Stream Description ^(a)	Date Installed	Date Removed
Bitter Seeps Wash	7/22/2009	12/14/2011
Kanab Creek at Jacob Canyon	7/23/2009	12/14/2011
Wash west of Blue Pool Wash	7/24/2009	12/13/2011
Paria River, north side of Bridge	7/24/2009	12/13/2011
Johnson Wash	7/24/2009	4/20/2010 ^(a)

Note:

(a) The Environmental Protection Agency and U.S. Army Corps of Engineers, in January 2020, signed an agreement implementing a new definition for Waters of the United States. That definition has not yet been applied to these areas but will be assessed at a later phase of the environmental impact statement study.

Stream channel cross-sections and channel bed profile were mapped in each monitoring reach containing the crest gage and scour chain with a mapping grade GPS instrument. The GPS data were analyzed to develop representative cross-sections and the channel bed slope for use in calculating peak flows using the crest gage data. Scour chains were monitored and then removed.

Initial data collection results, including field data, were used to evaluate criteria in the 2007 Guidance on the Rapanos Decision, which was issued by the U.S. Environmental Protection Agency and USACE. That decision provided guidance on determining Waters of the United States jurisdiction for waterways. The Project Proponent also coordinated with those agencies to confirm which waters may be jurisdictional and those that are likely to not meet criteria for jurisdictional waters.

The description of baseline conditions was determined from an evaluation of existing mapped data and the results of field surveys to identify and delineate existing wetlands, riparian areas, and other jurisdictional waters; characterize wetland hydrology and hydrogeologic settings; and determine wetland and riparian area functions within the Proposed Project's potential area of effect. This information is summarized in Table 1.2-3, below.

Effects on wetlands, riparian areas, and jurisdictional waters were analyzed for both of the Proposed Project's alternative alignments. These effects were measured by calculating the area where construction would affect the resource and estimating potential changes in wetland/riparian area function or value.

Table 1.2-3 Major Stream and Channel Crossings

Major Streams and Washes	Alternative		Stationing Location Along Alignment (+00) ^(a)	Probability of Encountering Groundwater	Hydrologic Characteristic
	Highway	Southern			
Paria River	X	X	1505	High	Perennial flow ^(b)
Johnson Wash	X	-	3260	Low	Typically dry
White Sage Wash	-	X	3430	Low	Typically dry
Jacob Canyon Wash	-	X	4210	Low	Typically dry
Kanab Creek	X	-	4020	High	Perennial flow; high water table in area wells ^(b)
	-	X	4460		
Jacob Canyon Wash		X	4210	Low	Typically dry
Two Mile Wash	X	-	4575	Low/Medium	May flow other than storm events
Bitter Seeps Wash	-	X	4650	Low	Typically dry
Short Creek	X	X	6080, 6535, 6580	High	Seasonal flow; medium to high water table in area wells

Notes:

(a) Indicates station in hundreds of feet beginning at Lake Powell and proceeding west.

(b) Paria River and Kanab Creek may be considered perennial by other sources but are considered seasonally ephemeral at the Proposed Project crossing. The State of Utah would install pipeline through these systems when dry or containing little flow.

Effects to groundwater level changes on wetland hydrologic conditions were estimated qualitatively for wetlands and riparian areas using the results of the groundwater resources analysis. The results of the surface water hydrology analysis, including effects from intermittent blowoff valve releases, were used to qualitatively determine if wetlands, riparian areas, and jurisdictional waters might be reduced or enhanced because of changes in surface water levels in streams and canals. Results from analyses of soils and vegetation along with review of proposed stormwater pollution prevention and other construction industry standards or practices were evaluated to determine potential effects to wetlands, riparian areas, and jurisdictional waters from sedimentation and/or introduction of non-native or invasive plant species.

Baseline wetland function and value assessment information was used to characterize the existing wetland resources in the area of influence and to assess the effects and significance of potential changes from project-related activities. Functional assessment also was used to develop potential Environment Protection Measures (EPMs). A detailed list of these measures, specific to wetlands/riparian resources is presented in Section 1.3, below.

1.3 Environmental Protection Measures

EPMs as outlined in the LPP Plan of Development (POD) are measures or procedures that are part of the Proposed Project and would be implemented as standard practice, including measures or procedures that could reduce or avoid adverse impacts (UDWRe 2020; provided in Appendix E, Plan of Development). EPMs would be applied regardless of landownership, except where the jurisdictional agency or landowner determines changes to the EPM(s) would ensure greater consistency with governing statutes, policies, or plans. Proper communication and coordination would occur with the jurisdictional agency, private landowner, etc., to ensure changes to EPMs are modified and applied appropriately.

Presented below are the EPMs that would be implemented as part of the Proposed Project to minimize effects to wetland/riparian resources. Additional measures identified that would reduce or eliminate effects of the Proposed Project alternatives are considered mitigation measures and are presented below in Sections 2.2.4 and 2.3.5.

B.1.1. The Final POD will incorporate mitigation contained in the BLM Record of Decision and provide detailed project design and construction specifics, including but not limited to construction contract timing, phasing, and any modifications to construction access roads and right-of-way (ROW) entry points, and other details. The BLM will review and approve the updated POD prior to notice to proceed for any surface disturbance activity.

The final project POD shall contain detailed plans, including, but not limited to, those listed below.

- Agency Coordination Plan – primary contacts including the BLM authorized officers, Utah Department of Water Resources (UDWRe), construction management, environmental compliance inspection contractor, and construction contractors; identification of reporting procedures and frequency.
- Bird Conservation Strategy – measures to reduce impacts on migratory birds, bald and golden eagles, and other sensitive birds; the plan will identify measures to be implemented during construction, including but not limited to, the identification of critical nesting periods

for bird species anticipated to be within the ROWs, pre-construction surveys to be conducted for nesting raptors and migratory birds (survey to be conducted by qualified biologist <10 days prior to work at site) , and the construction avoidance buffer size and time duration for active raptor and migratory bird nests (ranging from 100-feet to 1-mile, depending on species). The plan will identify design features and measures to be implemented during operation, including description of design standards, any post-construction monitoring, and adaptive measures such as marking of power lines to avoid or minimize impacts; the bird conservation strategy will be developed in coordination with the BLM for compliance with Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act; for Utah, IM N. UT-2017-007 Guidance for Utah Bureau of Land Management to Meet Responsibilities under MBTA and Executive Order 13186 will be followed, and IM 2006-096 Utah Supplemental Planning Guidance- Raptor Best Management Practices, and applicable BLM Resource Management Plan prescriptions.

- Construction Plan – construction schedule, access roads, borrow pits, best management practices, vehicle/equipment washing locations, etc.
- Construction Traffic Management Plan – measures to reduce and manage construction traffic.
- Construction Dust Management Plan – air quality standards and permits, dust control measures, general water sources, air quality monitoring, and reporting.
- Emergency Response Plan – emergency contacts, notification procedures, available resources, and emergency procedures.
- Integrated Weed Management Plan – management of areas with noxious/invasive weeds, treatment and control measures, monitoring, and reporting.
- Mitigation Plan – summary of environmental commitments and mitigation measures, responsible parties, timing, and reporting.
- Construction Noise Management Plan – measures to manage construction noise.
- Public Information Plan – public notification measures.
- Recreation Resources Mitigation Plan – measures to protect and restore recreation resources during construction and operation of the LPP.
- Restoration Plan – topsoil (growth medium) and vegetative cover salvage, stockpiling and replacement; plant salvage, maintenance and replacement, seeding, soil stabilization, and post-construction monitoring.
- Spill Prevention, Control, and Countermeasure Plan (SPCC) – procedures for storage and handling of hazardous and toxic materials, necessary permits, spill response and cleanup.
- Storm Water Pollution Prevention Plan (SWPPP) – erosion and sediment control measures, compliance inspections and reporting.

B.1.2. UDWRe will provide a Compliance Inspector (CI). The CI will provide environmental oversight and compliance/regulatory activities for UDWRe during construction activities of the project. The CI will be responsible for ensuring that UDWRe complies with all terms, conditions, stipulations and other metrics and measures required for the project and will have the authority to halt activities that are in non-compliance and assist in BLM coordination, if needed. Metrics and measures will be defined in the various detailed plans described in B.1.1. A pre-construction meeting between applicable permitting agencies, UDWRe, the CI, and the construction contractor will be required prior to any surface disturbing activity occurring. The CI will provide reports to permitting agencies detailing compliance as described in the approved Agency Coordination Plan.

If required by BLM, UDWRe will provide a Compliance Inspector Contractor (CIC). The CIC will be a third party compliance construction monitor that will be paid for by the State but will be directed by and will report to the BLM during the construction process. The CIC will have similar duties as the CI and will work in conjunction with the CI but will perform the duties on behalf of BLM.

B.1.17. Where feasible, vegetation within the ROWs will be crushed instead of removed by blading, to minimize impacts to soils.

B.1.20. All available growth medium (topsoil and cleared vegetation) will be salvaged and marked with signage for redistribution during reclamation. Growth medium will be windrowed along the edge of the ROWs or placed in stockpiles and temporarily stabilized (if stockpiled for more than 14 days) with temporary seeding, natural fiber geotextiles, mulch, periodic water applications, or other techniques to reduce or eliminate erosion or dust. Any temporary seeding mixes will be a BLM-approved certified weed-free seed mix. Topsoil and cleared vegetation will not be stockpiled in one location for longer than two years unless approved by land management agency for specific activities. Topsoil and cleared vegetation stockpiles maintained longer than one growing season will be planted with an annual seed mix to help control erosion and keep soil micro-organisms active.

B.1.36. Hazardous and toxic materials such as fuels, solvents, lubricants, and acids used during construction will be controlled to prevent accidental spills. Toxic and hazardous materials will be stored in accordance to the project SPCC plan. Vehicle and equipment refueling and hazardous materials storage will not be allowed within 100 feet of any wash, stream, or spring.

B.1.37. Spill cleanup kits will be available on heavy equipment and maintained so that any spill of fuels, solvents, lubricants, or acids can be quickly cleaned up. Construction and maintenance personnel will be trained in the proper use of the spill kit materials and correct disposal procedures.

B.1.38. Any leak or accidental release of hazardous and toxic materials will be stopped immediately and cleaned up at the time of occurrence. Contaminated soils will be removed and disposed of at a State of Utah or State of Arizona approved landfill site. All spills requiring an emergency response, regardless of the size of the spill, will be reported to UDWRe and BLM and will be tracked.

B.1.39. Any release of hazardous and/or toxic materials in excess of a reportable quantity established by 40 CFR, Part 117 will be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, Section 102b. A copy of any report required or requested by any federal agency or state government as a result of a reportable release or spill of any toxic substances will also be submitted to the BLM and other applicable agencies.

B.1.44. A dewatering plan will be prepared and submitted to the BLM for approval in advance of construction. Should dewatering be necessary, discharge will be filtered to minimize sediment and will be directed to prevent flow from directly entering streams, wetlands, or sensitive environmental areas. Erosion and sediment control will be conducted the same as described for stormwater practices. The CI will coordinate with the BLM on monitoring discharges and will identify site-specific mitigation actions.

B.1.45. All concrete washout water will be collected and retained in a leak proof container so caustic material does not reach the soil surface and water does not migrate into the ground and groundwater. Containers will be allowed to dry (evaporate) and then solids will be disposed of or recycled at an approved facility or used as tracking pad material onsite.

B.1.46. A General Permit for Stormwater Discharges Associated with Construction Activity (UTRC00000 & Arizona Department of Environmental Quality [ADEQ] CGP) will be obtained prior to any surface disturbance that includes clearing, grading, excavation, and/or stockpiling.

B.1.47. A site-specific SWPPP will be prepared and implemented for each construction contract. The plan will be submitted to the BLM and other applicable agencies. The SWPPP will identify all potential sources of pollution which could affect the quality of stormwater discharges from the construction site, describe the construction activities that disturb soils at the site, provide an estimate of the total disturbance area, and identify waters of the United States within one mile of the site. The SWPPP will identify erosion and sediment control measures, compliance inspection metrics, maintenance, and reporting. A copy of the SWPPP will be kept on site and updated as needed to manage pollutants or reflect changes in site conditions.

B.1.48. A SPCC Plan (40 CFR 112) will be prepared and submitted to the BLM and other applicable agencies. The plan will describe measures that will be taken to properly store, handle, and prevent hazardous materials from being picked up in stormwater and transported offsite. It will also contain measures related to clean up procedures and time frames, notification procedures, and restoration efforts for the affected area.

B.1.49. Construction sequencing will be designed and scheduled to create the shortest construction window practicable and the least amount of potential stormwater runoff. Construction, cleanup, and reclamation will be sequenced to reasonably minimize the time between ground disturbance and final restoration.

B.1.50. Erosion and sediment control will be implemented using both non-structural and structural best management practices (BMPs). Non-structural BMPs examples include not performing topsoil stripping during wet weather if there is risk of topsoil eroding or washing off the site in violation of National Pollutant Discharge Elimination System permits, and soil stabilization such as mulch, slope tracking, seeding, and erosion matting. Structural examples are silt fence, wattles, and ditch checks. Any netting for erosion and sediment control BMPs will be of natural-fiber (non-plastic material). BMP specifications will be included in the project specific SWPPP(s).

B.1.51. Temporary perimeter sediment controls will be installed as necessary prior to initial soil disturbance activities and will be maintained throughout construction and reclamation. These controls will be designed to retain sediment on site to the extent practicable. Typical sediment control BMPs include:

- Siltation or filter berms
- Filter or silt fencing
- Sediment barriers, e.g., sand bags, straw bales, straw wattles (straw bound into rolls or bales)
- Temporary erosion controls, e.g. straw & woodchip mulches, Jute netting

Temporary seeding will be installed as soon as practical on all disturbed areas that will remain disturbed and inactive for more than 14 days. Any straw used for erosion or sediment control will be certified weed-free. Temporary erosion and sediment controls will be inspected weekly and after major precipitation events and will be removed after construction and/or when they are no longer needed.

B.1.52. During construction, broken structural erosion controls will be replaced or restored as soon as practicable (typically within a day) but before the next forecasted precipitation event. Sediment will be removed from structures when sediment reaches 50 percent of the barrier capacity and disposed of within disturbed ROWs. Redistribution of sediment will be coordinated with the BLM.

B.1.53. For construction activities crossing a dry wash, spoil stockpiles will be pushed away and stored a minimum of 10 feet away from the ordinary high-mark and silt fencing will be used to limit sediment movement from the stockpile; stockpiles without silt fences will be located a minimum of 100 feet away from dry washes. All stockpiles will be kept within project ROWs.

B.1.54. At a minimum, a 10-foot wide vegetation buffer strip and other erosion control measure such as straw bales or wattles (certified weed free) will be maintained between the cleared ROWs and an adjacent drainage. The timing of clearing, grading, trenching, pipe installation, stabilization and seeding banks during drainage crossings will be minimized to promote expedient efforts towards restoration.

B.1.55. Non-stormwater discharges, including from pipeline and facility hydrostatic testing, will be directed into existing dry washes or other downstream project facilities as feasible. Best management practices such as diffusers or other energy dissipaters, straw bales (certified weed free), or filter sacks will be used to prevent bank instability and erosion. Discharges will be managed and monitored so that they do not exceed the typical 2- to 5-year flood event of the existing washes, and to allow debris accumulations to be removed as needed. Discharges will also be managed to not exceed bank levels and downstream banks and terrestrial vegetation will be monitored and discharges stopped if above bank erosion is detected.

B.1.56. Stormwater compliance inspections will be conducted by UDWR throughout construction at least once every 7 days regardless of rain events, or every 14 days and additionally within 24 hours of a storm event greater than 0.5 inches to ensure compliance with the SWPPP and Utah Department of Environmental Quality (UDEQ) and ADEQ permits. Inspections will include disturbed areas of the project that have not been stabilized, material and equipment storage areas that are exposed to precipitation, all erosion and sediment control measures installed within the ROWs, all structural control measures, and all locations where vehicles enter and/or exit the ROWs. Inspectors will notify the construction manager to where requirements of the SWPPP are not being followed, and implement corrective action as required to achieve compliance. Inspection reports will be maintained on file and submitted to the BLM and UDEQ or ADEQ upon request.

B.1.57. A Hydrostatic Discharge Plan will be submitted to the BLM for approval, prior to the start of any discharges.

B.1.58. Water quality of the hydrostatic testing water will be tested prior to discharge in accordance with UDEQ or ADEQ permit requirements.

B.1.59. At the completion of construction, all non-natural berms, ditches, temporary erosion and sediment controls, bales, wattles, and other energy dissipating/filtering devices not required for protection of facilities will be removed, and drainage function restored. Soils used for erosion control structures and soils captured by those structures will be distributed across the ROWs prior to replacing the topsoil and reclamation. Bales, wattles, and other energy dissipating/filtering devices will be disposed of in approved trash receptacles. The ground surface will be graded to blend into the preconstruction topography and/or slopes.

B.1.60. Washes and ephemeral drainage function will be restored. Soils over the pipeline will be compacted in place for maximum pipeline stability, and additional stabilization measures such as natural fiber erosion matting and seeding will be installed where necessary. Stabilization measures such as rip rap may be required to protect facilities and prevent increased erosion in washes. If armoring of a channel crossing with rip-rap or concrete is necessary due to high erosion potential, those areas and erosion control methods will be identified for BLM, USACE, or other appropriate agency based upon the jurisdictional status of the feature.

B.1.61. Post-construction stormwater management will consist of permanent erosion control measures installed as necessary to protect areas disturbed by UDWRe activities. These could include but are not limited to vegetation restoration, tracking and matting of steep slopes to maintain stability, berming (contoured to blend with existing landscape), and/or placement of appropriately colored riprap. Final stabilization of soil disturbed areas will be achieved when vegetation restoration and other erosion control measures are completed in accordance with the BLM-approved Restoration Plan and UDEQ or ADEQ stormwater permit requirements.

B.1.64. Vegetation conditions of the ROWs and adjacent site locations will be documented in the Restoration Plan prior to construction, to establish baseline conditions for restoration. The Restoration Plan will detail how baseline conditions will be assessed. The Restoration Plan will describe revegetation efforts, success standards, and follow-up monitoring.

B.1.66 Within disturbed portions of the ROWs located within critical habitat of listed species or areas of critical environmental concern, additional shrub salvage or enhanced seed application may be conducted to enhance restoration efforts in coordination with the BLM. Additional shrub salvage may be accomplished by either 1) salvaging from the BLM-managed lands within the ROWs, 2) salvaging from an approved off-site harvest site, and/or 3) propagation of shrubs from native seed in an approved nursery.

B.1.68. Plant salvage in critical habitat of listed species or areas of critical environmental concern (see B.1.65 and B.1.66) will occur from only within the ROWs or as indicated in the Restoration Plan. Salvaging will not begin until the ROW has been clearly staked and flagged. As feasible, salvage operations will not be performed during periods of high temperatures or other unfavorable environmental conditions. All salvaged plants will be documented and catalogued.

B.1.69. Prior to commencing any plant salvage operations in special designation areas, a free use permit, flora transportation tags, or any other required permits will be obtained to transport salvaged plants as part of restoration activities.

B.1.70. Salvaged plants in special designation areas will be maintained for the duration of construction activities if identified for replanting within the ROWs as part of site restoration, in

coordination with the BLM. Maintenance will include necessary watering and other care to ensure reasonable survival of the salvaged plants.

B.1.71. At the completion of construction, coordination with the BLM on road decommissioning will occur. In areas where there are no above-ground facilities, permanent access roads, or facilities no less than 12 inches below the ground surface, the ground surface will be ripped as needed to an appropriate depth based on site characteristics to help relieve compaction, to establish an adequate seed bed to provide good seed-to-soil contact during seeding, and facilitate penetration and plant establishment (see comprehensive seeding program EPMS). Topsoil and mulched vegetation removed from the ROW at the start of construction, if any, and, if necessary, additional stabilization measures such as straw will be re-spread across the ROWs at the completion of construction.

B.1.74. Watering may be conducted after completion of seeding, to help remove air pockets and compact soils in and around the roots of transplanted vegetation. Initial and subsequent quantities and timing of watering will be reviewed by the BLM as part of the Restoration Plan.

B.1.75. Signs and/or physical blocking barriers indicating restoration activities are being conducted may be installed where needed to deter off-road vehicular damage to restored areas. Placement and design of signs and barriers will be coordinated with the BLM and identified in the Restoration Plan.

B.1.76. An Integrated Weed Management Plan will be prepared and submitted to the BLM and other applicable agencies for approval prior to the start of construction. The BLM will coordinate with USFWS as needed. Noxious weed control will be implemented to minimize the spread of noxious weeds during construction and restoration/revegetation activities. All weed control efforts on BLM-administered lands will be in compliance with the BLM Handbook H-9011, H-9011-1 Chemical Pest Control, H-9014 Use of Biological Control Agents of Pests on Public Lands, and H-9015 Integrated Pest Management.

B.1.77. Areas within the ROWs that have pre-existing noxious weed infestations as identified in the Special Status Vegetation and Noxious Weed Inventory will be treated by a licensed contractor with a BLM-approved control method (i.e., chemical, mechanical, and/or biological controls) prior to the start of construction activities, as feasible. If noxious weed infestations exist within the ROWs at the start of construction, topsoil and fill will be kept segregated and not transported to other areas within the ROWs.

B.1.79. Any straw or other organic products used during construction, restoration, operations, maintenance, or for stabilization will be certified free of plant species listed on the Utah and Arizona noxious weed list or specifically identified in the BLM-approved Integrated Weed Management Plan for the project.

B.1.80. Construction vehicles and equipment will be cleaned with a high pressure washer or high pressure air and wire brush prior to arrival on the ROWs and prior to departure from areas of known noxious weed infestations to minimize the introduction or spread of noxious weeds. Cleaning efforts will concentrate on tracks, tires, and vehicle undercarriage, with special emphasis on axles, frames, cross members, motor mounts, on and underneath steps, running boards, and front bumper/brush guard assemblies. Vehicle cabs will be swept out and refuse will be disposed of in waste receptacles. Cleaning stations will be designated and will be recorded using global positioning systems or other mutually acceptable equipment and provided to the BLM Weed Coordinator or

designated contact person. All water and material at the vehicle cleaning stations will be contained and collected and hauled off site for disposal at an approved disposal site.

B.1.81. UDWRe or its certified licensed contractor will submit a request for a Pesticide Use Proposal to the BLM and other applicable agencies prior to the planned application of any herbicide and a Pesticide Application Record after the planned application of the herbicide. The Pesticide Use Proposal will identify areas of planned herbicide application for BLM use. No herbicide mixing or rinsing of containers or application equipment will occur within 100 feet of natural sources (i.e., lakes, streams, or springs). An annual report on herbicide application on public lands within the ROWs will be provided to the BLM.

B.1.82. Herbicides may not be sprayed within or around an exclusion area containing sensitive resources (buffers may be applied around areas in coordination with the BLM, depending on resource). These areas will be delineated with stakes and signs during construction or by GPS data. Removal of noxious and invasive weeds in these areas shall be accomplished by method(s) approved by the BLM or that are identified in the biological opinion.

B.2.9. Vegetation restoration success will be monitored by UDWRe and reported to the BLM, as defined in the approved Restoration Plan. Monitoring will include both qualitative and quantitative data collection and analysis. Vegetation restoration success on non-BLM lands will be coordinated with the respective landowners.

B.2.10. Annual restoration monitoring reports will be submitted to the BLM for five years documenting post-construction monitoring, and will include but not be limited to activities conducted, current status, and recommended future activities. Along with the annual report in the third year, UDWRe will include a quantitative analysis, to allow opportunity following the third-year report to correct any issues that may prevent restoration site release within the subsequent two years. If monitoring indicates that restoration is not trending towards meeting or has not met designated interim success criteria, the restoration activities may be revised and remedial measures implemented, subject to BLM approval. Restoration activities and annual reporting shall continue until the restoration fulfills the requirements of the BLM-approved Restoration Plan, and UDWRe receives written release from the BLM. Since successful restoration may be achieved in some areas more quickly than other areas, written approval shall identify the area released.

B.4.2. The project has been sited to avoid wetlands, and no construction is currently planned to occur in wetlands.

B.5.8. In areas where special status plant species were identified in previous surveys either within or adjacent to the ROWs, pre-construction surveys will be conducted during the blooming or fruiting season as needed to verify plant identification. The USFWS Information for Planning and Consultation website will be reviewed prior to construction to obtain appropriate ESA species list updates for the project. Specific locations of special status plants, including BLM sensitive species, will be recorded for subsequent salvage or seed collection.

B.1.82. Herbicides may not be sprayed within or around an exclusion area containing sensitive resources (buffers may be applied around areas in coordination with the BLM, depending on resource). These areas will be delineated with stakes and signs during construction or by GPS data. Removal of noxious and invasive weeds in these areas shall be accomplished by method(s) approved by the BLM or that are identified in the biological opinion.

B.10.1. Dust control permits will be obtained for each construction contract in accordance with local, county and/or state requirements. The permits will contain a Dust Control Plan listing all construction activities that will occur and the BMPs that will be used to mitigate construction dust. The BMPs will include site-specific dust control measures that are based on each project soil type, specific construction activities, phases and stages. They may include:

- Moisture conditioning of construction materials
- Controlling dust on access roads
- Covering or stabilizing soil with vegetation
- Using phased construction
- Limiting size and number of ingress and egress points
- Limiting size of staging areas
- Limiting vehicle speeds on the work site to minimize dust generation
- Proactive measures to prevent unauthorized access to disturbed areas
- Application of track-out controls

B.10.2. UDWRe will comply with all requirements of applicable dust control permits.

B.10.6. Active construction sites and unpaved roads used for construction will be watered or a chemical dust suppression approved by the BLM will be applied, as needed, to maintain effective dust control.

1.4 Existing Conditions

Table 1.4-1 lists the lakes, streams, and washes evaluated during the 2009 and 2010 LPP field surveys. The affected wetland and riparian resources include any wetland, riparian, or other potentially jurisdictional areas (including intermittent and ephemeral drainages) directly affected by project feature construction or operations, including transmission lines, and any stream or river and associated corridor that would be subject to water discharges or flow alterations.

Table 1.4-1 Summary of Waters of the United States Features

Watershed	Lakes, Rivers, Streams, Washes	Location	USGS Topographic Mapping Designation	Tributary to	Water Observed^(b)
Lower Lake Powell	Lake Powell Intake	Coconino County, Arizona	Reservoir	N/A	Yes
Lower Lake Powell	Wash 1 West of Greenthaven	Kane County, Utah	Intermittent stream	Lake Powell	No
Lower Lake Powell	Wash 2 West of Greenthaven	Kane County, Utah	Intermittent stream	Lake Powell	No
Lower Lake Powell	Blue Pool Wash	Kane County, Utah	Intermittent stream	Wahweap Creek	No
Lower Lake Powell	West of Blue Pool Wash	Kane County, Utah	Perennial pond/wetland fed by intermittent stream	Wahweap Creek	No
Lower Lake Powell	Wash 2 West of Blue Pool Wash (2nd Wash East of Big Water)	Kane County, Utah	Intermittent stream	Wahweap Creek	No
Paria River	Grand Staircase Escalante National Monument trailhead wash	Kane County, Utah	Intermittent stream	Paria River	No
Paria River	Wash west of Grand Staircase Escalante National Monument trailhead ^(a) wash	Kane County, Utah	Intermittent stream	Paria River	No
Paria River	2nd wash west of Grand Staircase Escalante National Monument trailhead ^(a) wash (wash east of Paria River)	Kane County, Utah	Intermittent stream	Paria River	No
Paria River	Paria River	Kane County, Utah	Perennial stream	Colorado River	Yes
Paria River	Sand Gulch Highway Crossing	Kane County, Utah	Intermittent stream	Paria River	No
Paria River	Sand Gulch west of Cockscomb	Kane County, Utah	Intermittent stream	Buckskin Gulch	No
Paria River	Sand Gulch 2 nd crossing west of Cockscomb	Kane County, Utah	Intermittent stream	Buckskin Gulch	No
Paria River	Buckskin Gulch (also known as Kitchen Corral Wash, Kaibab Gulch)	Kane County, Utah	Perennial stream	Paria River	No

Table 1.4-1 Summary of Waters of the United States Features (continued)

Watershed	Lakes, Rivers, Streams, Washes	Location	USGS Topographic Mapping Designation	Tributary to	Water Observed^(b)
Kanab Creek	Petrified Hollow Wash (drainage west of HS1)	Kane County, Utah	Perennial stream	White Sage Wash	No
Kanab Creek	Johnson Wash	Kane County, Utah	Perennial stream	Kanab Creek	No
Kanab Creek	Kanab Creek at Fredonia	Mohave County, Arizona	Perennial stream	Colorado River	No
Kanab Creek	Cottonwood Creek	Mohave County, Arizona	Perennial stream	Kanab Creek	No
Kanab Creek	3 rd Wash east of Two Mile Wash	Mohave County, Arizona	Perennial stream	Sand Wash -> Two Mile Wash	No
Kanab Creek	2 nd Wash east of Two Mile Wash	Mohave County, Arizona	Perennial stream	Sand Wash -> Two Mile Wash	No
Kanab Creek	1 st Wash east of Two Mile Wash	Mohave County, Arizona	Perennial stream	Sand Wash -> Two Mile Wash	No
Kanab Creek	Two Mile Wash	Mohave County, Arizona	Perennial stream	Bitter Seeps Wash	No
Kanab Creek	Drainage West of Pipe Springs National Monument	Mohave County, Arizona	Perennial stream	Bitter Seeps Wash	No
Kanab Creek	1 st drainage west of Kaibab Indian Reservation	Mohave County, Arizona	Perennial stream	Pipe Valley Wash -> Bulrush Wash -> Kanab Creek	No
Kanab Creek	2 nd drainage west of Kaibab Indian Reservation	Mohave County, Arizona	Perennial stream	Pipe Valley Wash -> Bulrush Wash -> Kanab Creek	No

Table 1.4-1 Summary of Waters of the United States Features (continued)

Watershed	Lakes, Rivers, Streams, Washes	Location	USGS Topographic Mapping Designation	Tributary to	Water Observed^(b)
Kanab Creek	White Sage Wash 1 (access road)	Coconino County, Arizona	Perennial stream	Johnson Wash	No
Kanab Creek	White Sage Wash 2 (access road)	Coconino County, Arizona	Perennial stream	Johnson Wash	Ponding from low head dam
Kanab Creek	White Sage Wash	Coconino County, Arizona	Perennial stream	Johnson Wash	No
Kanab Creek	Jacob Canyon on Kaibab Indian Reservation	Coconino County, Arizona	Perennial stream	Kanab Creek	No
Kanab Creek	Jacob Canyon South of Kaibab Indian Reservation	Coconino County, Arizona	Perennial stream	Kanab Creek	No
Kanab Creek	Jacob Canyon at Kanab Creek	Coconino County, Arizona	Perennial stream	Kanab Creek	No
Kanab Creek	Kanab Creek at Jacob Canyon	Mohave County, Arizona	Perennial stream	Colorado River	Ponding, but no flow
Kanab Creek	Bitter Seeps Wash	Mohave County, Arizona	Perennial stream	Bulrush Wash -> Kanab Creek	No
Kanab Creek	Two Mile Wash at Antelope Valley Road	Mohave County, Arizona	Perennial stream	Bitter Seeps Wash	No
Kanab Creek	Moonshine Ridge Wash	Mohave County, Arizona	Intermittent stream	Pipe Valley Wash -> Bulrush Wash -> Kanab Creek	No

Table 1.4-1 Summary of Waters of the United States Features (continued)

Watershed	Lakes, Rivers, Streams, Washes	Location	USGS Topographic Mapping Designation	Tributary to	Water Observed^(b)
Kanab Creek	Wash west of Moonshine Ridge (Big Sand Wash)	Mohave County, Arizona	Perennial stream	Pipe Valley Wash -> Bulrush Wash -> Kanab Creek	No
Fort Pierce Wash	Cane Bed Wash	Mohave County, Arizona	Perennial stream	Cottonwood Wash -> Lakes of Short Creek (dry lakes)	No
Fort Pierce Wash	Short Creek, Colorado City	Mohave County, Arizona	Perennial stream	Fort Pierce Wash -> Virgin River	No
Fort Pierce Wash	Short Creek, East Canaan Gap	Washington County, Utah	Intermittent stream	Fort Pierce Wash -> Virgin River	No
Fort Pierce Wash	Short Creek, West Canaan Gap	Washington County, Utah	Intermittent stream	Fort Pierce Wash -> Virgin River	No
Fort Pierce Wash	Wash South of HS-4 and HS-5	Washington County, Utah	Perennial stream	Fort Pierce Wash -> Virgin River	No

Note:

(a) This trailhead is no longer within the boundary of Grand Staircase Escalante National Monument—the boundary of the monument was adjusted by Presidential Proclamation on December 4, 2017, excluding these lands.

(b) July 2009 Field Surveys

Key:

N/A = not applicable

USGS = U.S. Geological Survey

1.4.1 Wetlands

No features met the three-parameter criteria for wetland determination; therefore, there were no wetlands identified in the Project Area.

1.4.2 Riparian Areas

Riparian areas are vegetated zones that form a transition between permanently saturated and upland areas and typically exhibit vegetation and physical characteristics associated with permanent sources of surface or subsurface water. These areas may or may not meet all three USACE criteria for wetlands, and, within an individual system, may contain jurisdictional and non-jurisdictional areas and still be considered riparian. The Proposed Project alternative alignments would cross numerous riparian areas along, adjacent to, or contiguous with perennial and intermittent rivers or water bodies. Although they comprise a small percentage of the overall Project Area, riparian areas are among the most productive and important ecosystems, having a greater diversity of flora and fauna than adjacent uplands. Riparian systems filter and purify water, reduce sediment loads, enhance soil stability, provide microclimatic moderation when contrasted with extremes in adjacent areas, and can contribute to groundwater recharge and stream base flow.

Riparian areas/zones are those areas supporting riparian vegetation, including hydrophytic vegetation as identified in the National List of Plant Species that Occur in Wetlands (Reed 1988). Riparian areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning condition of riparian-wetland areas is a result of interaction among geology, soil, water, and vegetation (BLM 1998). Plant species observed in riparian areas included saltcedar (*Tamarix ramosissima*), narrowleaf willow (*Salix exigua*), Goodding's willow (*Salix gooddingii*), Russian olive (*Elaeagnus angustifolia*), Fremont cottonwood (*Populus fremontii*), rough cocklebur (*Xanthium strumarium*), and pale spikerush (*Eleocharis macrostachya*). Table 2-1 (below) summarizes the riparian acreage potentially affected by the Proposed Project.

The Kanab Creek Area of Critical Environmental Concern (ACEC) was designated in part to protect riparian areas that occur along, adjacent to, or contiguous with Kanab Creek and its tributaries. The Southern Alternative would directly affect riparian areas within this special designation area. The dominant plant species in the Kanab Creek riparian zone are cottonwood (*Populus* spp.), willow (*Salix* spp.), seep willow (*Baccharis salicifolia*), arrowweed (*Pluchea sericea*), ash (*Fraxinus* spp.), cattail (*Typha* spp.), rush (*Juncus* spp.), and sedge (*Carex* spp.), as well as a variety of grasses and forbs. However, in Kanab Creek and associated side canyons, native vegetation is being displaced by invasive species such as tamarisk (*Tamarix* spp.). Tamarisk is now a dominant riparian shrubby tree in the Colorado River basin below 6,000 feet. Kanab Creek also hosts populations of Russian olive (*Elaeagnus angustifolia*), tree of heaven (*Ailanthus altissima*), and pampus grass (*Cortaderia* spp.) (BLM 2015).

The riparian assessment identified 12 perennial and intermittent streams/washes with potential to support riparian vegetation along the Southern Alternative alignment. Riparian vegetation occurs at nine streams/washes, which included the plant species saltcedar, narrowleaf willow, Goodding’s willow, Russian olive, Fremont cottonwood, rough cocklebur, and pale spikerush. Table 1.4-2 presents results of the functional assessment of these areas.

Table 1.4-2 Summary of Properly Functioning Condition Ratings and Trends for Southern Alternative Riparian Areas

Riparian System Name	Ownership	PFC Functional Rating	Trend
West of Blue Pool Wash	NPS	Nonfunctional	Not Apparent
Paria River	UDOT/Private	Functional–At Risk	Downward
Johnson Wash	UDOT/Private	Nonfunctional	Downward
Kanab Creek at Fredonia	Private	Functional–At Risk	Downward
Cottonwood Creek	ADOT/Tribe	Functional–At Risk	Not Apparent
Two Mile Wash	Tribe	Nonfunctional	Downward
White Sage Wash	BLM	Nonfunctional	Not Apparent
Kanab Creek at Jacob Canyon	BLM	Functional–At Risk	Not Apparent
Bitter Seeps Wash	BLM	Functional–At Risk	Not Apparent
Short Creek, Colorado City	ADOT/Private	Nonfunctional	Downward
Short Creek, East Canaan Gap	BLM/Private	Nonfunctional	Downward
Short Creek, West Canaan Gap	BLM	Nonfunctional	Downward

Key:

ADOT = Arizona Department of Transportation

BLM = Bureau of Land Management

NPS = National Park Service

PFC = proper functioning condition

Tribe = Kaibab Band of Paiute Indians

UDOT = Utah Department of Transportation

1.4.2.1 Stream Scour and Sediment Deposition

Streams and washes monitored for scour and sediment deposition associated with peak runoff events yielded data on the scour and sediment deposition depths following a peak runoff event, and channel bed aggradation and degradation. Scour chains and crest gages were installed in July 2009 and monitored in October 2009, April 2010, and December 2010. The following sections summarize the scour chain and crest gage data obtained from the streams and washes selected for monitoring.

Wash West of Blue Pool Wash

The Wash West of Blue Pool Wash scour chain and crest gage site was selected based on the approximate location of the Proposed Project crossing. No runoff flow was encountered during any of the monitoring trips to this site. A peak flow event occurred prior to the final monitoring site visit, with the highest stage at 22 inches deep recorded in the crest gage, matching debris lines on the banks. The scour chain was lost during the final monitoring period; however, a new 1.5-foot-deep channel was formed west of the monitored channel. This indicated that scour depth was between 1.5 and 2 feet deep because the crest gage remained vertical. The channel bed substrate consisted of mostly fine sand with clay and silt as a minor fraction. The flow velocity is low at this site and it is occasionally inundated because the flow outlet invert elevation through the U.S. Highway 89 embankment is approximately 4.5 feet above the channel invert elevation (i.e., the highway embankment can act as a small dam).

Paria River

The Paria River scour chain and crest gage site was selected based on the approximate location of the LPP crossing. Stream flow was encountered during all four monitoring trips to this site. The peak runoff flow in the Paria River throughout the monitoring period was estimated at greater than 450 cubic feet per second (cfs), based on USGS gage records at the U.S. Highway 89 Bridge. The scour chain indicated scour and/or deposition occurred repeatedly at the crossing site throughout the monitoring period. After the first monitoring period, the scour depth was 2.4 inches and deposition of 1.0 inch of sand (net degradation of 1.4 inches), and the crest gage indicated 5.4 inches of flow depth. After the second monitoring period, the scour depth was 1.2 inches and 1 inch of sand was deposited over the scour chain (net degradation of 0.2 inch), and the crest gage indicated 5.5 inches of flow depth. During the third monitoring period and highest estimated river flow, the scour chain was lost along with the crest gage. The depth of scour was at least 38 inches and estimated to be at least 6 feet deep, based on remnant pools in the east portion of the floodplain. The river channel and floodplain had been scoured to 340 feet wide and the active channel shifted from the east side to the west side. The channel bed substrate consisted of well-graded fine gravel and coarse to fine sand throughout the monitoring period.

Johnson Wash

The Johnson Wash scour chain and crest gage site was selected based on the approximate location of the LPP crossing. Runoff flow was encountered during the last of five monitoring trips to this site. The peak runoff flow in Johnson Wash throughout the monitoring period was estimated at 3 cfs. The crest gage was damaged by livestock during the monitoring period and no flow stages were recorded. The scour chain indicated no scour at the crossing site throughout the monitoring period. The channel bed substrate consisted of clayey soil with high cohesion. There was no indication of either aggradation or degradation of the channel occurred during the monitoring period.

Cottonwood Creek

The Cottonwood Creek scour chain site on the Kaibab Indian Reservation was selected based on the approximate location of the Highway Alternative crossing. No runoff flow was encountered during either of the two monitoring trips to this site. The peak runoff flow in Cottonwood Wash throughout the monitoring period was estimated at 0 cfs, based on lack of debris flow lines along the channel banks. The scour chain indicated no scour at the crossing site throughout the monitoring period. The channel bed substrate consisted of sandy, clayey, and silty soil with moderately high cohesion. There was no indication that either aggradation or degradation of the channel occurred during the monitoring period.

Two Mile Wash

The Two Mile Wash scour chain site on the Kaibab Indian Reservation was selected based on the approximate location of the Highway Alternative crossing. Runoff flow was encountered during the second of two monitoring trips to this site. The peak runoff flow in Two Mile Wash throughout the monitoring period was estimated at 0.2 cfs, based on debris flow lines along the channel banks. The scour chain indicated no scour at the crossing site throughout the monitoring period. The channel bed substrate consisted of sandy, clayey soil with moderately high cohesion. There was no indication that either aggradation or degradation of the channel occurred during the monitoring period.

Jacob Canyon at Kanab Creek

The Jacob Canyon scour chain and crest gage site was selected based on the approximate location of the Southern Alternative crossing. No runoff flow was evident during five monitoring trips to this site. The peak runoff flow at the Jacob Canyon crossing site throughout the monitoring period was estimated at 85 cfs. The crest gage recorded 8.5 inches of water, matching debris lines on the banks. The scour chain indicated no scour at the crossing site. The channel bed substrate consisted of medium cobble, gravel, coarse sand, and fine sand, in a well graded, tight matrix. The scour chain had 0.75 inches of silty clay deposited over the chain, indicating a net aggradation of the channel occurred during the monitoring period.

Bitter Seeps Wash

The Bitter Seeps Wash scour chain and crest gage site was selected based on the approximate location of the Southern Alternative crossing. No runoff flow was evident during five monitoring trips to this site. The peak runoff flow at the Bitter Seeps Wash crossing site throughout the monitoring period was estimated at 145 cfs. The crest gage recorded 19 inches of water, matching debris lines on the banks. The scour chain indicated 9.6 inches of scour at the crossing site. The channel bed substrate consisted of fine sand. The scour chain had 9.6 inches of sand deposited over the chain, indicating no net aggradation or degradation of the channel occurred during the monitoring period.

1.4.3 Jurisdictional Waters

The area of waters indicated to be jurisdictional was estimated from digital photography and field data collected based on the potential location of ordinary high-water mark and is shown in Table 1.4-3.

Table 1.4-3 Summary of Jurisdictional Waters

Name	Location	Jurisdictional Waters Area (acres)	Applicable Jurisdictional Criteria
Lake Powell Intake	Coconino County, Arizona	0.002	Navigable waterway
Wash 1 west of Greenhaven	Kane County, Utah	0.770	Intermittent drainage within several miles of navigable waterway (<2 miles from Lake Powell)
Wash 2 west of Greenhaven	Kane County, Utah	0.560	Intermittent drainage within several miles of navigable waterway (<2 miles from Lake Powell)
Blue Pool Wash	Kane County, Utah	1.040	Intermittent drainage within several miles of navigable waterway (<1 mile from Lake Powell)
West of Blue Pool Wash	Kane County, Utah	1.040	Intermittent drainage within several miles of navigable waterway (<1 mile from Lake Powell)
Wash 2 west of Blue Pool Wash (2 nd Wash east of Big Water)	Kane County, Utah	0.350	Intermittent drainage within several miles of navigable waterway (<2 miles from Lake Powell)
Paria River	Kane County, Utah	3.290	Perennial river
Johnson Wash	Kane County, Utah	0.230	Intermittent stream with continuous seasonal flow
Kanab Creek at Fredonia	Coconino County and Mohave County, Arizona ^(a)	0.160	Intermittent stream with continuous seasonal flow
Cottonwood Creek	Mohave County, Arizona	0.180	Intermittent stream with continuous seasonal flow
Two Mile Wash	Mohave County, Arizona	0.090	Intermittent stream with continuous seasonal flow
White Sage Wash	Coconino County, Arizona	0.240	Intermittent stream with continuous seasonal flow
Kanab Creek at Jacob Canyon	Coconino County and Mohave County, Arizona ^(a)	0.360	Intermittent stream with continuous seasonal flow
Bitter Seeps Wash	Mohave County, Arizona	0.150	Intermittent stream with continuous seasonal flow
Two Mile Wash at Antelope Valley Road	Mohave County, Arizona	0.070	Intermittent stream with continuous seasonal flow
Short Creek, Colorado City	Mohave County, Arizona	0.430	Intermittent stream with continuous seasonal flow
Short Creek, East Canaan Gap	Washington County, Utah	0.380	Intermittent stream with continuous seasonal flow
Short Creek, West Canaan Gap	Washington County, Utah	0.210	Intermittent stream with continuous seasonal flow

Note:

(a) The centerline of Kanab Creek serves as the Coconino County/Mohave County line.

2 Results/Environmental Consequences

This section describes results from the assessment methods used to identify and address potential effects and whether mitigation of the effect is warranted. Effects are determined relative to the No Action Alternative as the No Action Alternative represents the baseline (or existing conditions) against which to compare the environmental effects of the action alternatives. Effects to wetland and riparian areas, and jurisdictional waters, are considered significant if construction, operation or maintenance activities would result in any of the following conditions:

- A net loss of wetland area, riparian areas, or jurisdictional waters resulting from construction or operational activities;
- Changes in the quality or quantity of hydrologic support (either through surface flow or groundwater levels) that would result in an overall loss or gain of in the area of wetlands, riparian areas, or jurisdictional waters;
- Other indirect effects on wetlands, riparian areas, or jurisdictional water resulting from LPP construction or operational activities; or
- Loss of wetland or riparian functions or values from changes in water supply affecting wetland plant communities, wetland soils, or hydrology.

A discussion of cumulative effects is provided in Appendix C-25, Cumulative Effects.

Effects to wetlands, riparian areas, and jurisdictional waters were determined using the data and methods described in Section 1.2, above. Table 2-1 presents riparian area acreage affected by alternative of the Proposed Project.

Table 2-1 Riparian Area Acres Affected by Alternative

Riparian System Name	Riparian Area Acreage	
	Southern Alternative	Highway Alternative
Wash west of Blue Pool Wash	0.63	0.63
Paria River	1.14	1.14
Johnson Wash	0.12	0.12
Kanab Creek at Fredonia	N/A	0.09
Cottonwood Creek	N/A	0.03
Two Mile Wash	N/A	0.06
White Sage Wash	0.27	N/A
Kanab Creek at Jacob Canyon	0.18	N/A
Bitter Seeps Wash	0.03	N/A
Short Creek, Colorado City	0.27	0.27
Short Creek, East Canaan Gap	0.21	0.21
Short Creek, West Canaan Gap	0.12	0.12
Total	2.97	2.67

Key:

N/A = Not applicable as this riparian area is not crossed by this alternative.

2.1 No Action Alternative

Under the No Action Alternative, no construction would occur, and there would be no direct or indirect effects on wetlands, riparian areas, and jurisdictional waters. Under this alternative, no amendment to the RMP would occur, so current management of the resources for which the ACEC was designated (including riparian resources) as prescribed in the RMP would continue. This alternative would therefore not result in effects to riparian resources.

However, under this alternative, projects already planned by the Project Proponent would continue to occur. Disturbance due to these projects, would vary in space and time. Most impacts would be short term and project-specific, including localized impacts to wetlands and riparian areas prior to reestablishment of vegetation. Most effects to wetlands and riparian areas would be minimized through implementation of industry standards or practices by the Project Proponent and through potential mitigation required by a 404 Permit.

2.2 Southern Alternative

The Southern Alternative would produce permanent and temporary unavoidable adverse effects on riparian areas and jurisdictional waters because of construction, and operation and maintenance activities. Unavoidable effects would include short-term loss of riparian vegetation where the pipeline crosses the resource and short-term loss of some system functions as a result of clearing riparian vegetation in areas where work activities would occur but are not needed for long-term operation and maintenance of the pipeline and associated infrastructure and are subsequently reclaimed. To a degree, permanent effects would result from areas within the ROWs where vegetation would be managed through removal or restrictions on height (e.g., under transmission wires and directly over the pipeline). In other words, if trees occur in an electrical transmission line corridor, that area would be managed to prevent trees from reaching a specific height, which might mean removal, but other vegetation strata would persist. Proposed EPMs should be effective in reducing both temporary and permanent effects, and these effects would not be significant. As shown in Table 2-1 above, 2.97 acres of riparian area would be affected from the Southern Alternative; as shown in Table 2.2-1, 9.05 acres of jurisdictional waters would be affected from the Southern Alternative.

2.2.1 Riparian Areas

Table 2-1, above, summarizes the riparian areas affected within the Southern Alternative alignment. A total of 2.97 acres would be affected. The only riparian area that is classified as perennial at the proposed crossing by the Southern Alternative is associated with the Paria River; this area is known to support suitable habitat for federally listed fish species in downstream reaches.

The only riparian area that is classified as perennial at the proposed crossing by the Southern Alternative is associated with the Paria River; this area is known to support suitable habitat for federally listed fish species in downstream reaches. Constructing the pipeline through hydrologic features, such as streams, would typically involve trenching during dry or low water seasons to completely avoid or minimize effects. Vegetation removal would be required and is considered unavoidable for any pipeline crossing. However, implementing the proposed EPMs (see Section 1.3, above) should restore the riparian area and its functional level in the long term, except where

vegetation that could affect infrastructure (such as trees growing into powerlines or deep roots interfering with the buried pipeline) would be managed for long-term project maintenance and safety accessibility vegetation, which would be considered a permanent effect. Such measures make pipeline installation a temporary effect to riparian areas. EPMs identify the requirement to develop a resource specific restoration plan. Such a plan would require implementation of techniques and approaches that have helped successfully restore affected riparian areas for similar pipeline construction projects.

Construction activities associated with the Proposed Project could also pose a hazard to hydrological function at riparian area crossings, in particular the Kanab Creek crossing. Clearing of vegetation along the LPP corridor and grading the soil to prepare for installation of the pipeline would temporarily lead to increased erosion and sedimentation in drainages in the vicinity of the Proposed Project. Improper staging of construction equipment or accumulation of project waste could result in surface runoff of petroleum or other contaminants into nearby waterways or drainages. Construction of open cut crossings disturbs channel banks and the canyon walls in Kanab Creek, which would likely increase sediment loading downstream. Blasting of shallow bedrock could temporarily increase turbidity in groundwater cells, which could then be discharged into nearby drainages. Each of these effects would be mitigated to the extent possible with the proper implementation of EPMs. However, even with the implementation of EPMs, hydrologic function of riparian areas would likely be affected. Effects from constructing the pipeline across the deep canyon at the Kanab Creek crossing for this alternative would likely be difficult to mitigate, and the potential exists for substantial erosion and siltation into the creek during construction. In addition, restoration would be difficult due to the steepness of the canyon, resulting in the potential for long-term erosion and siltation into Kanab Creek which could affect hydrologic function of the riparian area.

Following construction, implementation of the Project Proponent's proposed Riparian Area Restoration Plan would restore vegetation through installing appropriate native plant species, restoring pre-construction grade of the stream bank and bottom. However, as stated above, complete restoration of the Kanab Creek crossing may be difficult due to the steepness of canyon walls at this crossing location. Monitoring revegetation to meet success criteria would be required annually for several years, using such data to make corrections where the restoration may not be trending toward meeting those success criteria. Those criteria would be site-specific, and therefore would be developed closer to construction start as part of the Riparian Area Restoration Plan. Restoration measures would not only address revegetating riparian areas but would also have mandatory supporting techniques implemented such as soil stabilization measures to minimize erosion. Another substantially important supporting technique would be topsoil segregation, which requires before any excavation occurs (e.g., pipeline trenching) that topsoil must first be removed and placed in a separate spoil pile before subsurface soil excavation (i.e., completing the trench) is removed. By doing so, important vegetation nutrients that persist in topsoil would be protected, along with the existing seed bank and root stock. Replacing topsoil after pipeline installation substantially increases the revegetation success because when topsoil receives proper short-term storage, nutrients, seeds, and root stock are still viable, expediting appropriate plant species reestablishment. However, where necessary, some areas would also receive supplemental plantings and seedlings.

2.2.2 Jurisdictional Waters

Table 2.2-1 lists the water bodies expected to be considered jurisdictional under the CWA that occur within the Southern Alternative corridor. It is anticipated that 9.05 acres of jurisdictional waters would be affected by the Proposed Project (Southern Alternative).

Table 2.2-1 Summary of Jurisdictional Waters in the Southern Alternative Corridor

Jurisdictional Water Name	Jurisdictional Waters (acres)
Lake Powell Intake	0.002
Wash 1 west of Grenehaven	0.77
Wash 2 west of Grenehaven	0.56
Blue Pool Wash	1.04
West of Blue Pool Wash	1.04
Wash 2 west of Blue Pool Wash (2nd Wash east of Big Water)	0.35
Paria River	3.29
Johnson Wash	0.23
White Sage Wash	0.24
Kanab Creek at Jacob Canyon	0.36
Bitter Seeps Wash	0.15
Short Creek, Colorado City	0.43
Short Creek, East Canaan Gap	0.38
Short Creek, West Canaan Gap	0.21
Total	9.05

Effects on jurisdictional waters would be temporary, with no permanent loss of function or values occurring. Temporary effects would not affect areas of open water, except where pipeline crossings occur through perennial streams (e.g., the Paria River and La Verkin Creek). Effects may include vegetation loss, soil and hydrologic processes disturbance, sedimentation, and water quality effects. These would be minimized by the implementation of EPMs.

2.2.2.1 Permitting Requirements

Permits would be required for effects on potential jurisdictional waters regulated under Section 404 of the CWA and/or Section 10 of the Rivers and Harbor Act. Pipeline crossings of potential jurisdictional waters are expected to be addressed under Section 404 12, with each crossing being covered under a separate permit. Effects on potential jurisdictional waters at Lake Powell Intake are expected to be addressed under Nationwide Permit (NWP) 18. Table 2.2-2 identifies the expected permitting requirements within the Southern Alternative alignment.

Table 2.2-2 Summary of Expected Permits Required in the Highway Alternative

Name	Location	Permit ^(a)
Lake Powell Intake	Coconino County, Arizona	NWP 18
Wash 1 west of Grenehaven	Kane County, Utah	NWP 12
Wash 2 west of Grenehaven	Kane County, Utah	NWP 12
Blue Pool Wash	Kane County, Utah	NWP 12
West of Blue Pool Wash	Kane County, Utah	NWP 12
Wash 2 West of Blue Pool Wash (2nd Wash east of Big Water)	Kane County, Utah	NWP 12
Paria River	Kane County, Utah	NWP 12
Johnson Wash	Kane County, Utah	NWP 12
White Sage Wash	Coconino County, Arizona	NWP 12
Kanab Creek at Jacob Canyon	Coconino County and Mohave County, Arizona ^(b)	NWP 12
Bitter Seeps Wash	Mohave County, Arizona	NWP 12
Short Creek, Colorado City	Mohave County, Arizona	NWP 12
Short Creek, East Canaan Gap	Washington County, Utah	NWP 12
Short Creek, West Canaan Gap	Washington County, Utah	NWP 12

Notes:

(a) NWP = CWA Section 404 Nationwide Permit anticipated at the date of this report.

(b) The centerline of Kanab Creek serves as the Coconino County/Mohave County line.

Key:

NWP = Nationwide Permit

2.2.3 Resource Management Plan Amendments

Designation of an Area of Critical Environmental Concern highlights areas where special management attention is needed to protect and prevent irreparable damage to important historic, cultural, and scenic values, fish, or wildlife resources, or other natural systems or processes. The Area of Critical Environmental Concern designation indicates to the public that the BLM recognizes that an area has significant values and has established special management measures to protect those values. In addition, designation also serves as a reminder that significant values or resources exist which must be accommodated when future management actions and land use proposals are considered near or within an Area of Critical Environmental Concern. Designation may also support a funding priority. The designation of an Area of Critical Environmental Concern is achieved only through the planning process, either in a resource management plan itself or through a plan amendment.

The ACEC was designated for its cultural, endangered bird species, riparian, and scenic values. The relevance and importance of these values are as follows:

- Cultural – The area contains significant regionally important cultural resources that are vulnerable to vandalism and impacts.
- Endangered bird species and riparian areas – The riparian area is a natural system that includes rare, endemic plant communities and suitable unoccupied habitat for endangered southwestern willow flycatcher. It has regional significance, the riparian area is fragile, irreplaceable, and unique, and is vulnerable to adverse change. Cause for concern is dewatering, loss of habitat due to development, flooding, and alteration of the stream channel.
- Scenery – The canyon depths, intricacies, and colors of Kanab Creek provide high scenic quality.

The RMP includes special management prescriptions that provide additional protection to the values listed above.

2.2.3.1 Utility Corridor and Land Use Authorizations

The RMP designated a 1-mile-wide utility corridor from Glen Canyon Dam to the Arizona/Nevada border. This utility corridor crosses the ACEC, within the Arizona Strip Field Office Resource Management Plan Amendment (RMPA) planning area. The designation of utility corridors is generally achieved only through the planning process, either in a resource management plan itself or through a plan amendment.

The RMP allows for the consideration of a variety of land use authorizations (ROWS, permits, leases, and easements). Requests for land use authorizations will be evaluated on a case-by-case basis in accordance with other RMP provisions and compliance with the National Environmental Policy Act. New land use authorizations are discouraged within avoidance areas (defined as “areas with sensitive resource values” such as critical habitat, lands supporting listed species, riparian areas, national historic trails, areas managed to maintain wilderness characteristics, and Areas of Critical Environmental Concern). Authorizations made in avoidance areas must be compatible with the purpose for which the area was designated/allocated and not otherwise feasible on lands outside the avoidance area (BLM 2007, 2008b). The ACEC was designated to protect cultural resources, endangered bird species (southwestern willow flycatcher), and riparian and scenic values.

While amending the RMP to reduce the size of the ACEC or change the configuration of the utility corridor would not directly involve ground disturbance or development, this action could allow for the construction, operation, and maintenance of the LPP and potentially other utility lines. Future development proposals would be analyzed under project-specific National Environmental Policy Act review and analysis.

The Southern Alternative alignment crosses the ACEC. The Southern Alternative alignment is primarily located within the designated utility corridor. However, constructability concerns were identified at the proposed Kanab Creek crossing within the utility corridor. Steep canyon walls made installing a large pipeline under the creek impractical due to financial cost and anticipated adverse environmental effects. A route modification was identified (and incorporated into the Southern Alternative) in which the Kanab Creek crossing would occur north of the utility corridor, but still within the ACEC; although this crossing would not be as steep as within the utility corridor, the

canyon walls are steep here as well and could still pose challenges to restoration efforts. As a result of this crossing location being outside the utility corridor, the RMP would be amended to address the pipeline being installed within the ACEC as there are conflicts between management of the ACEC and the utility corridor. There are three proposed sub-alternatives for this RMPA. The following three sections address the potential effects to riparian areas for each RMPA sub-alternative.

2.2.3.2 Sub-alternative 1

Under RMPA Sub-alternative 1, no changes to the size of the ACEC are proposed. This sub-alternative proposes an amendment to Decision No. MA-LR-06 so that new land use authorizations could be allowed in the ACEC even when another reasonable alternative exists. Any new land use authorization approved would have the potential for adverse effects to ACEC values but would also include mitigation for any effects to sensitive resources. While the proposed amendment to MA-LR-06 would require mitigation for effects from new land use authorizations such as the Proposed Project, disturbance to the Kanab Creek and Bitter Seeps Wash riparian areas would still occur, and riparian resources would be lost in at least the short term due to pipeline installation until restoration activities described in the EPMS are successful.

2.2.3.3 Sub-alternative 2

Potential effects under this sub-alternative would result in similar effects as RMPA Sub-alternative 1. However, the size of the ACEC would be reduced by 905 acres, with no specific provisions for mitigation from new land use authorizations (including the Proposed Project) in the area excluded from the ACEC. Construction and O&M of the LPP would result in direct effects to riparian vegetation, as well as indirect effects to riparian resources from sedimentation and erosion as vegetation is removed. EPMS would mitigate effects to the extent possible.

2.2.3.4 Sub-alternative 3

Effects to riparian resources under this sub-alternative would be similar to those described for Sub-alternative 1. In addition, the portion of the ACEC overlapped by the utility corridor would no longer be an avoidance area for new land use authorizations, which could increase the likelihood of land use authorizations within the corridor with associated effects to resources. However, this sub-alternative would result in a net decrease of 175.5 acres within the ACEC that is overlapped by the utility corridor (no change in the size of the ACEC would occur). Thus, these lands would no longer be identified as an area where new ROWs are encouraged, potentially decreasing the likelihood of effects to riparian resources from potential new land use authorizations.

2.2.4 Mitigation Measures

Minor changes to the EPMS should be implemented to meet agency-specific goals and objectives for management of wetland and riparian resources.

Mitigation measures should be considered where riparian areas crossed by the pipeline must be maintained free of woody vegetation over the buried pipeline. In those instances, off-site enhancement and/or restoration of riparian areas should occur to improve overall riparian system health in the region. These mitigation measures should occur in the same system at sites that are already protected as special designation lands (e.g., the ACEC).

In addition to the EPMs described in Section 1.3, above, and the Proposed Project POD (provided in Appendix E, Plan of Development), the following mitigation measures should be implemented as part of the Southern Alternative to reduce effects to riparian areas and jurisdictional waters:

- The construction methods for each crossing would ultimately be determined in coordination between the Project Proponent and the applicable jurisdictional agency during final design stages.

Minor changes to the EPMs should also be implemented meet agency-specific goals and objectives for management of riparian resources. These recommended changes to EPMs (which are underlined) include the following:

- Construction vehicles and equipment will be cleaned with a high-pressure washer or high-pressure air and wire brush prior to arrival on the ROWs and prior to departure from areas of known noxious weed infestations to minimize the introduction or spread of noxious weeds. This would include cleaning all equipment before entering the Arizona Strip.
- Vegetation restoration success will be monitored by the Project Proponent and reported to the BLM, as defined in the approved Restoration Plan. Monitoring will include both qualitative and quantitative data collection and analysis. Restoration will be considered successful when a stable biological groundcover and approved mix of native vegetation species (i.e., composition) equal to or exceeding that which occurred prior to disturbance is established. Vegetation restoration success on non-BLM-managed lands will be coordinated with the respective landowners.
- The Proposed Project would not occur in wetlands. However, in accordance with CWA Section 404 NWP requirements, industry standard practices will be implemented for the pipeline crossing of Paria River (intermittent flow) and Sand Wash, Buckskin Gulch (if flowing during a precipitation runoff event), and pipeline crossings of Kanab Creek (intermittent flow), Bitter Seeps Wash (intermittent flow), and Short Creek (if flowing during a precipitation runoff event). The industry standard practices will utilize industry-accepted procedures.
- Vegetation conditions of the ROWs and adjacent reference site locations will be documented in the Restoration Plan prior to construction, to establish baseline conditions for restoration. The Restoration Plan will detail how baseline conditions will be assessed. Revegetation efforts will establish a stable biological groundcover and approved mix of vegetation species (i.e., composition) equal to or exceeding that which occurred prior to disturbance.

2.3 Highway Alternative

The Highway Alternative would produce permanent and temporary unavoidable adverse effects on riparian areas and jurisdictional waters because of construction, and operation and maintenance activities. Unavoidable adverse effects would include short-term loss of riparian vegetation where the pipeline crosses the resource and short-term loss of some system functions as a result of clearing riparian vegetation where work activities would occur but are not needed for long-term operation and maintenance of the pipeline and associated infrastructure, and are subsequently reclaimed. Permanent effects would result from areas where impervious surface (e.g., concrete pads) would be installed. As with the Southern Alternative, permanent effects would result from areas within the ROWs where vegetation would be managed through removal or restrictions on height (e.g., under

transmission wires and directly over the pipeline). Proposed EPMs should be effective in reducing these effects, and none are predicted to be significant. As shown in Table 2-1, 2.67 acres of riparian area would be affected from the Highway Alternative; as shown in Table 2.3-1, 8.73 acres of jurisdictional waters would be affected from the Highway Alternative.

The main difference between the Highway Alternative and the Southern Alternative is the location where the LPP would cross Kanab Creek. Further discussion on this can be found in Section 2.3.1, below.

2.3.1 Riparian Areas

Effects to the Paria River riparian area would be the same as described for the Southern Alternative. However, effects to riparian resources on the Arizona Strip (e.g., Kanab Creek and Bitter Seeps Wash) would be less under the Highway Alternative than under the Southern Alternative. Bitter Seeps Wash, which does contain riparian vegetation (and potential southwestern flycatcher habitat) would not be crossed under this alternative, and therefore not affected. While Kanab Creek would be crossed under both alternatives, the crossing under the Highway Alternative is in an area where the drainage is very shallow, narrow, and contains little riparian vegetation; this is in contrast to the Southern Alternative Kanab Creek crossing, which is much deeper, wider, and contains well-established riparian vegetation. As described in Section 2.2.1, above, the deep canyon at the Kanab Creek crossing for the Southern Alternative would likely be difficult to mitigate, and the potential exists for substantial erosion and siltation into the creek during construction, and restoration would be difficult due to the steepness of the canyon, resulting in the potential for long-term erosion and siltation into Kanab Creek which could affect hydrologic function of the riparian area. The potential for effects (both direct and indirect) is greatly reduced for the Highway Alternative as compared to the Southern Alternative.

While the Highway Alternative would affect 2.67 acres, which is 0.30 acres fewer than the Southern Alternative, the nature of the Kanab Creek drainage at the crossing locations is not comparable, as described above in Section 2.2.1, above.

2.3.2 Jurisdictional Waters

Table 2.3-1 lists the water bodies expected to be considered jurisdictional under the CWA that occur within the Highway Alternative corridor. It is anticipated that 8.73 acres of jurisdictional waters would be affected by construction.

Effects on jurisdictional waters would be temporary, with no permanent loss of function or values occurring. Temporary effects would not affect areas of open water, except where pipeline crossings occur through perennial streams (i.e., the Paria River and La Verkin Creek). Effects may include vegetation loss, soil and hydrologic processes disturbance, sedimentation, and water quality effects. These would be minimized by the implementation of EPMs.

Table 2.3-1 Summary of Jurisdictional Waters in the Highway Alternative

Jurisdictional Water Name	Jurisdictional Waters (acres)
Lake Powell Intake	0.002
Wash 1 west of Greenehaven	0.77
Wash 2 west of Greenehaven	0.56
Blue Pool Wash	1.04
West of Blue Pool Wash	1.04
Wash 2 west of Blue Pool Wash (2nd Wash east of Big Water)	0.35
Paria River	3.29
Johnson Wash	0.23
Kanab Creek at Fredonia	0.16
Cottonwood Creek	0.18
Two Mile Wash	0.09
Short Creek, Colorado City	0.43
Short Creek, East Canaan Gap	0.38
Short Creek, West Canaan Gap	0.21
Total	8.73

Permitting Requirements

Permits would be required for effect to potential jurisdictional waters regulated under Section 404 of the CWA and/or Section 10 of the Rivers and Harbor Act. Pipeline crossings of potential jurisdictional waters are expected to be addressed under Section 404 NWP 12, with each crossing being covered under a separate permit. Effects to potential jurisdictional waters at Lake Powell Intake are expected to be addressed under NWP 18. Table 2.3-2 identifies the expected permitting requirements for riparian areas within the Highway Alternative alignment.

Table 2.3-2 Summary of Expected Permits Required in the Highway Alternative

Name	Location	Permit ^(a)
Lake Powell Intake	Coconino County, Arizona	NWP 18
Wash 1 west of Greenehaven	Kane County, Utah	NWP 12
Wash 2 west of Greenehaven	Kane County, Utah	NWP 12
Blue Pool Wash	Kane County, Utah	NWP 12
West of Blue Pool Wash	Kane County, Utah	NWP 12
Wash 2 West of Blue Pool Wash (2nd Wash east of Big Water)	Kane County, Utah	NWP 12
Paria River	Kane County, Utah	NWP 12
Johnson Wash	Kane County, Utah	NWP 12
Kanab Creek at Fredonia	Coconino County and Mohave County, Arizona ^(b)	NWP 12
Cottonwood Creek	Mohave County, Arizona	NWP 12
Two Mile Wash	Mohave County, Arizona	NWP 12
Short Creek, Colorado City	Mohave County, Arizona	NWP 12
Short Creek, East Canaan Gap	Washington County, Utah	NWP 12
Short Creek, West Canaan Gap	Washington County, Utah	NWP 12

Notes:

(a) NWP = CWA Section 404 Nationwide Permit anticipated at the date of this report.

(b) The centerline of Kanab Creek serves as the Coconino County/Mohave County line.

Key:

CWA = Clean Water Act

NWP = Nationwide Permit

2.3.3 Mitigation Measures

Mitigation measures should be considered where riparian areas that cross the pipeline must be maintained free of woody vegetation over the buried pipeline. In those instances, off-site enhancement and/or restoration of riparian areas should occur to improve overall riparian system health in the region. Preferably, these mitigation measures would occur in the same system at sites that are already protected as special designation lands (e.g., the ACEC).

The same minor changes to the EPMS that are recommended for the Southern Alternative are also recommended for the Highway Alternative.

2.4 Comparative Analysis of Alternatives

Construction activities associated with the Proposed Project could pose a hazard to hydrological function at riparian area crossings, in particular the Kanab Creek crossing. While Kanab Creek would be crossed under both alternatives, the crossing under the Highway Alternative is in an area where the drainage is very shallow, narrow, and contains little riparian vegetation; this is in contrast to the Southern Alternative Kanab Creek crossing, which is much deeper, wider, and contains well established riparian vegetation that also provides habitat for the endangered southwestern willow flycatcher. The potential for effects (both direct and indirect) is reduced for the Highway Alternative as compared to the Southern Alternative.

In terms of effects to jurisdictional waters, there is little difference between the two alternatives. Under the Southern Alternative, 2.97 acres of riparian area and 9.05 acres of jurisdictional waters would be affected. Under the Highway Alternative, 2.67 acres of riparian area and 8.73 acres of jurisdictional waters would be affected.

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4 Acronyms

ACEC	Kanab Creek Area of Critical Environmental Concern
ADEQ	Arizona Department of Environmental Quality
BLM	Bureau of Land Management
BMP	best management practice
CFR	Code of Federal Regulations
cfs	cubic feet per second
CI	Compliance Inspector
CIC	Compliance Inspector Contractor
CWA	Clean Water Act
EIS	Environmental Impact Statement
EPM	Environmental Protection Measure
FLPMA	Federal Land Policy and Management Act
GIS	geographic information system
GPS	global positioning system
LPP	Lake Powell Pipeline Project
MBTA	Migratory Bird Treaty Act
NAIP	National Agricultural Imagery Program
NWP	Nationwide Permit
PFC	proper functioning condition
POD	Plan of Development
PVC	polyvinyl chloride
RMP	Arizona Strip Field Office Resource Management Plan
RMPA	Arizona Strip Field Office Resource Management Plan Amendment
ROW	right-of-way
SPCC	Spill Prevention, Control, and Countermeasure Plan
SWPPP	Storm Water Pollution Prevention Plan
UBWR	Utah Board of Water Resources
UDEQ	Utah Department of Environmental Quality
UDOT	Utah Department of Transportation
UDWR _e	Utah Department of Water Resources
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey



— BUREAU OF —
RECLAMATION

Lake Powell Pipeline Project Appendix C-15: Special Status Plants

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1 Introduction/Affected Environment

Special status plant species are plant species identified by the Bureau of Land Management (BLM) as Sensitive Species and for the National Park Service (NPS) these are as species in need of protection through conservation measures. The Kaibab Band of Paiute Indians (Tribe) provided a list of Plants of Cultural Concern, which have significant importance to the Tribe (Stoffle 2020). That list addresses plant species occurring in the region and not limited to occurrence on the Tribe's reservation. Plant species protected by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act of 1973 (ESA) are analyzed in Appendix H-19, Threatened and Endangered Species.

Vegetation surveys provide baseline information about existing conditions, as well as detailed distribution and abundance information on each special status plant species within the Lake Powell Pipeline Project (LPP or Proposed Project) corridor and are used in the effects analyses and identification of potential protection and conservation measures, and to coordinate management activities with various land and resource management agencies. This report addresses conservation measures and concepts, standard construction procedures, standard operating procedures, and industry standards or practice that would be used during the Proposed Project's construction; and operation and maintenance phases to protect and conserve special status plant species as defined herein. Collectively these are referred to as Environmental Protection Measures (EPMs) and are identified in detail in Section 1.3, below. These measures, concepts, procedures, and practices are considered a part of the Proposed Project and not mitigation measures. Mitigation measures are addressed separately in Sections 2.2.2 and 2.3.1, below, as actions that could reduce or avoid adverse effects and are not incorporated into the Proposed Project.

A noxious weed and invasive plant species are any plant designated by a federal, state, or county government as injurious to public health, agriculture, recreation, wildlife, or property. More specifically, invasive plant species are not native to an area in which they become established, altering a vegetation community. This study collected data about weed type, abundance, and general distribution, as well as evaluating factors that lead to weed invasion, persistence, and spread. Field survey results were used as the basis for developing a weed management plan, which is incorporated in the Proposed Project as presented in Section 1.3, below.

Two main ecological regions, the Colorado Plateau and Mojave Desert, are represented within the Proposed Project rights-of-way (ROWs). Most of the Project Area, from Lake Powell to Hurricane, occurs within the Colorado Plateau Ecological Region, where the Mojave Desert Ecological Region is represented in a small portion of the Proposed Project, southwest of Hurricane. Diverse landforms, geologic exposures, and elevation gradients present across the Project Area contribute to the biodiversity and unique character of the vegetation of the ecological regions as presented in the LPP Final Study Report 15 – Vegetation Communities (UBWR 2016b).

1.1 Regulatory Framework

Special status plant species include the BLM designated sensitive species, NPS species of concern, and Tribal designated species of cultural concern. Plants identified by the Tribe include only those species of importance and interest to their culture, herein known as Ethnographic Plants, so some of those species may be abundant within the Proposed Project ROWs. Each of these entities/agencies has responsibility for management of special status plant species and their habitat on lands that they manage. In particular, actions authorized by the BLM and NPS must not contribute to the listing of these species. Listed below are laws and policies applicable to BLM and NPS management of special status species.

- BLM Special Status Species Management Policy Manual 6840 (BLM 2008a) provides management direction and guidance for the conservation of special status species and their habitats. Under this policy, special status species include animal and plant species listed as threatened or endangered, proposed for listing, or candidates for listing under the provisions of the ESA; those listed as sensitive species by a state; and those listed by a BLM state director as sensitive. However, for the Proposed Project, only state identified and BLM state director identified species are applicable in this appendix. Plant species listed for protection under the ESA are addressed in Appendix C-18, Threatened and Endangered Species.
- BLM resource management plans provide overall direction for management of resources on lands the agency administers, including special status plants. Those resource management plans will be used to manage potential effects to special status plant species as conformance with the resource management plans is required by the BLM. Such management measures would be in addition to measures identified in this appendix as proposed by the Utah Board of Water Resources (UBWR) and any mitigation requirements.
- NPS Organic Act, passed in 1916 (16 United States Code [USC] 1), established the NPS as an agency under the direction of the Secretary of the Interior with the stated purpose of promoting use of national park lands while protecting them from impairment. Specifically, this act declares that the NPS has a dual mission, both to conserve park resources and to provide for their use and enjoyment “in such a manner and by such means as will leave them unimpaired” for future generations (16 USC 1).
- NPS Management Policies 2006 sets the framework and provides direction for all management decisions relating to national park lands. This document states the NPS “will use all available authorities to protect lands and resources within units of the national park system” (NPS 2006) NPS personnel are required to be knowledgeable about and adhere to laws, regulations, and policies pertinent to NPS management included in this document.
- NPS Director’s Order 12 (DO-12 and Handbook; 66 FR 7507) describes the National Environmental Policy Act of 1969 (NEPA) process and describes the responsibility of the NPS regarding participation in or coordination of NEPA procedures for actions occurring on NPS-managed land. This order outlines the NPS’s requirement of affirmatively stating whether impairment (as defined by the Organic Act and the 2006 Management Policies document) to park resources would result from a proposed action and provides guidelines for assessing intensity of effects.

The State of Arizona operates a program regulating activities that could affect native plant species. This program is administered by the State Department of Agriculture, Environmental Services Division (Arizona Administrative Code [AAC] Title 3, Chapter 3, Article 11). Such species are

known as highly safeguarded native plants that are organized into four categories identified as Appendices A through D in the AAC. Activities that remove and/or salvage highly safeguarded native plants may require a permit(s) from the Environmental Services Division. The State of Utah does not regulate native plant species removal or salvage.

Noxious Weeds and Invasive Plant Species

Restoration treatments are an integral part of control and management of future invasions of invasive species, and to prevent further harm to sensitive plants and animals from disrupted local ecosystem function. Executive Order 13112 Section 2(a)2; charges federal agencies to “provide for restoration of native species and habitat conditions in ecosystems that have been invaded.”

Following this requirement, weed species must be managed during pre-construction, construction, and post-construction periods to assure that further invasions are prevented or limited to the greatest extent practicable. In other words, by requiring protection measures for special status plant species, by extension, weed plant species must be controlled simultaneously.

- The Carlson-Foley Act (43 USC 1241) directs federal land-management agencies to destroy noxious weeds growing on land under their jurisdiction and provides a legal framework for reimbursement of expenses to state or local agencies for weed control on federal land.
- Federal Noxious Weed Act of 1974 (Public Law 93-629) (76 USC 2801 et seq.) directs the management of undesirable plants on federal lands, including prohibiting the transport of noxious weeds into the United States and between states. This legislation also outlines how noxious weed infestations are to be quarantined and controlled on federal lands.
- BLM resource management plans provide overall direction for management of resources on lands the agency administers, including noxious weeds and invasive species. The BLM maintains data on the locations, approximate quantities, and management of noxious weed populations. Applicable resource management plan management direction for the Proposed Project where it occurs on BLM-managed lands includes the resource management plan decisions regarding noxious weed/invasive species for the Arizona Strip Field Office, St. George Field Office, Kanab Escalante Planning Area, and Kanab Field Office.
- BLM Manual H1740-2 – Integrated Vegetation Management (BLM 2008b) and BLM Manual 1740-2 – Renewable Resource Improvement and Treatment Guidelines and Procedures (BLM 1987) outline policies, objectives, and standards focused primarily on planning, analyzing, constructing, maintaining, replacing, or modifying renewable resource improvements and treatments such as for forestry, invasive species, and range management.
- NPS Organic Act (described above).
- NPS Management Policies 2006 (described above).
- NPS Director’s Order 12 (described above).

The States of Arizona (AAC Title 3, Chapter 4) and Utah (Utah Noxious Weed Act, Utah Administrative Code R68-9) operate programs to manage and control the spread of noxious and invasive plant species. Arizona regulates through two state agencies, the Department of Agriculture and the Department of Forestry and Fire Management, in cooperation with the U.S. Department of Agriculture (USDA). Utah regulates its program through the State Department of Agriculture and Food. Both states operate their programs in two main ways: (1) providing a list of noxious weeds and invasive plant species that require regulation; and (2) permit individuals and companies that treat such species with herbicides (i.e., applicator license).

1.2 Methodology

Short-term effects are defined as five years or less and long-term effects are greater than five years. Analysis considerations for noxious weeds and invasive species include the extent of land potentially disturbed by the Proposed Project construction, operation, and maintenance activities and the extent of noxious weed-infested land potentially disturbed by the Proposed Project. Invasive species and noxious weeds are a threat to native vegetation communities and wildlife species and their habitats. Such analysis is opposite to the way plants species protected by the State of Arizona, the BLM, the NPS and the Tribe are analyzed for potential effects. In other words, these species' effects considers if the Proposed Project would adversely affect the individual species and/or its habitat.

Much of the data collected and partially analyzed for this resource assessment was provided by the UBWR, which conducted comprehensive surveys and collected other data to produce supporting documents (see LPP Final Study Reports 12 – Special Status Plan Species and Noxious Weeds, and 15 – Vegetation Communities [UBWR 2016b, 2016a]). The area of analysis is defined as the Proposed Project's alternative alignments construction ROW areas, other facilities associated with the pipeline such as hydrostations (i.e., power generating stations), electrical transmission lines, booster pump stations, and construction staging areas. The plant species survey was conducted simultaneously as a comprehensive effort to record vegetation community data as well. Survey corridors were established based on the pipeline or electrical transmission center line, extending 150 feet on either side for a 300-foot total width; or for areas with greater potential for special plant resources, 300 feet on either side of the center line, for a 600-foot total width. Generally, the 300-foot-wide corridors occurred between Lake Powell and the Cockscomb, and west of the Hurricane Cliffs extending northward to the Proposed Project terminus near Sand Hollow Reservoir. All other linear elements had a 600-foot-wide survey corridor.

However, since these data were initially collected, UBWR has further refined the proposed construction area, therefore, data analyzed in this document is based on the known construction footprint rather than the initial survey widths. This approach provides a more accurate understanding of LPP effects, whereas basing those effects on a 300- and 600-foot pipeline corridor width would substantially overestimate those effects, producing inaccurate results and analysis.

A preliminary survey of areas likely to support special status plants was conducted in 2008. In 2009 the survey area represented the entire Proposed Project alternative alignments and surveys were conducted for special status plants, noxious weeds, and vegetation communities. Additionally, surveying was conducted in 2010 to address route refinement (see Final Study Report 12 – Special Status Plan Species [UBWR 2016b]).

Furthermore, the proposed Dixie Springs Electric Transmission line corridor, which occurs at the western terminus of both proposed route alternatives, was rerouted to the west side of Sand Hollow Reservoir in March 2020. Because this is a late reroute, there was no time to perform plant species surveys, and, moreover, winter plant surveys would not produce comprehensive results based on plants being dormant. Plant surveys will be conducted prior to construction (see Section 2.2.2, below).

1.3 Environmental Protection Measures

EPMs as outlined in the LPP Plan of Development are measures or procedures that are part of the Proposed Project and would be implemented as standard practice, including measures or procedures that could reduce or avoid adverse impacts (UDRWe 2020; provided as Appendix E, Plan of Development). EPMs would be applied regardless of landownership, except where the jurisdictional agency or landowner determines changes to the EPM(s) would ensure greater consistency with governing statutes, policies, or plans. Proper communication and coordination would occur with the jurisdictional agency, private landowner, etc., to ensure changes to EPMs are modified and applied appropriately.

In Appendix B of the Plan of Development (POD), the UBWR has identified EPMs that would be implemented as part of the construction, operation, and maintenance of the Proposed Project. EPMs also apply to emergency maintenance activities to the extent they do not interfere with efforts to protect public safety and undue environmental effect during an emergency event. Some efforts may occur after the fact in emergency situations. These UBWR-committed measures include design features, industry standards or practices, monitoring, standard operating procedures, and other practices. They also include measures that the UBWR anticipates would be included in any special use permit(s) and agreements with other federal agencies, state or local agencies and entities, and those anticipated to be required by other permit conditions.

The following EPMs from the POD apply to special status plants:

B.1.1. The Final POD will incorporate mitigation contained in the BLM Record of Decision and provide detailed project design and construction specifics, including but not limited to construction contract timing, phasing, and any modifications to construction access roads and ROW entry points, and other details. The BLM will review and approve the updated POD prior to notice to proceed for any surface disturbance activity.

The final project POD shall contain detailed plans, including, but not limited to, those listed below.

- Agency Coordination Plan – primary contacts including the BLM authorized officers, Utah Division of Water Resources (UDWRe), construction management, environmental compliance inspection contractor, and construction contractors; identification of reporting procedures and frequency.
- Bird Conservation Strategy – measures to reduce impacts on migratory birds, bald and golden eagles, and other sensitive birds; the plan will identify measures to be implemented during construction, including but not limited to, the identification of critical nesting periods for bird species anticipated to be within the ROWs, pre-construction surveys to be conducted for nesting raptors and migratory birds (survey to be conducted by qualified biologist <10 days prior to work at site), and the construction avoidance buffer size and time duration for active raptor and migratory bird nests (ranging from 100-feet to 1-mile, depending on species). The plan will identify design features and measures to be implemented during operation, including description of design standards, any post-construction monitoring, and adaptive measures such as marking of power lines to avoid or minimize impacts; the bird conservation strategy will be developed in coordination with the BLM for compliance with Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act; for Utah, IM N. UT-2017-007 Guidance for Utah Bureau of Land

Management to Meet Responsibilities under MBTA and Executive Order 13186 will be followed, and IM 2006-096 Utah Supplemental Planning Guidance- Raptor Best Management Practices, and applicable BLM Resource Management Plan prescriptions.

- Construction Plan – construction schedule, access roads, borrow pits, best management practices, vehicle/equipment washing locations, etc.
- Construction Traffic Management Plan – measures to reduce and manage construction traffic.
- Construction Dust Management Plan – air quality standards and permits, dust control measures, general water sources, air quality monitoring, and reporting.
- Emergency Response Plan – emergency contacts, notification procedures, available resources, and emergency procedures.
- Integrated Weed Management Plan – management of areas with noxious/invasive weeds, treatment and control measures, monitoring, and reporting.
- Mitigation Plan – summary of environmental commitments and mitigation measures, responsible parties, timing, and reporting.
- Construction Noise Management Plan – measures to manage construction noise.
- Public Information Plan – public notification measures.
- Recreation Resources Mitigation Plan – measures to protect and restore recreation resources during construction and operation of the LPP.
- Restoration Plan – topsoil (growth medium) and vegetative cover salvage, stockpiling and replacement; plant salvage, maintenance and replacement, seeding, soil stabilization, and post-construction monitoring.
- Spill Prevention, Control, and Countermeasure Plan – procedures for storage and handling of hazardous and toxic materials, necessary permits, spill response and cleanup.
- Storm Water Pollution Prevention Plan (SWPPP) – erosion and sediment control measures, compliance inspections and reporting.

B.1.2. UDWRe will provide a Compliance Inspector (CI). The CI will provide environmental oversight and compliance/regulatory activities for UDWRe during construction activities of the project. The CI will be responsible for ensuring that UDWRe complies with all terms, conditions, stipulations and other metrics and measures required for the project and will have the authority to halt activities that are in non-compliance and assist in BLM coordination, if needed. Metrics and measures will be defined in the various detailed plans described in B.1.1. A pre-construction meeting between applicable permitting agencies, UDWRe, the CI, and the construction contractor will be required prior to any surface disturbing activity occurring. The CI will provide reports to permitting agencies detailing compliance as described in the approved Agency Coordination Plan. If required by BLM, UDWRe will provide a Compliance Inspector Contractor (CIC). The CIC will be a third party compliance construction monitor that will be paid for by the State but will be directed by and will report to the BLM during the construction process. The CIC will have similar duties as the CI and will work in conjunction with the CI but will perform the duties on behalf of BLM.

B.1.5. A worker education program will be developed by UDWRe and used during construction and operation. It will be presented to personnel who will be on-site, including but not limited to contractors, contractor's employees, supervisors, inspectors, and subcontractors. A handout will be developed addressing environmental protection measures incorporated into the project and the

responsibility of each worker in environmental protection. Each worker will be briefed on his or her environmental compliance responsibilities, provided a handout, and required to sign a certification that he or she understands and will comply with those environmental protection measures. An individual who fails to comply with the environmental protection measures will be subject to corrective action up to and including dismissal from the project.

Specifics of the program will include, but are not limited to:

- General site maintenance (i.e., trash disposal)
- Stormwater and Erosion Control
- Hazardous material spill protocols
- refueling protocols
- Smoking areas
- Use of sanitary facilities
- California condor conservation measures
- MBTA
- Incident reporting,
- Prohibiting driving off the cleared corridor or existing roads,
- Importance of speed limits and other traffic regulations on access roads
- Prohibiting unrestrained dogs or hunting on the construction and facility sites
- Terms and conditions of the LPP Biological Opinion
- Desert tortoise Habitat Conservation Plan measures
- Identifying and reporting procedures for other sensitive plants and wildlife that occur within the area of potential effect
- Cultural and paleontological resource identification and protection
- Biological, Cultural, and Paleontological monitoring requirements
- Visual resources measures
- Avoidance of undue disturbance of biological soil crusts
- Soil segregation requirements,
- Noxious weed management and identification
- Prohibiting collection of wildlife, plants, or cultural/paleontological resources, unless the collection is part of a mitigation plan and is done by qualified personnel
- Workers will receive a sticker or certificate that they have completed the training; a laminated card that can be used for reference, including applicable contact phone numbers, may also be used
- Training sessions will be held for new contractors and/or contractor personnel throughout the life of the project

B.1.10. If any exclusion zones within the ROWs are required by the BLM, NPS, or identified in the biological opinion for resource protection (i.e., biological or cultural resources, protected plants, nesting birds, etc.), those areas will be staked, flagged or fenced, and signed by UDWR and approved by the BLM and NPS to ensure avoidance during construction, and if necessary during operation and maintenance.

B.1.11. UDWR will develop a geographic information system (GIS) cloud-based Environmental Access Plan (EAP). All contractors will utilize EAP. The EAP will detail access requirements such as required pre-access surveys or monitoring requirements. The EAP will be updated throughout the construction process as needed based on completed surveys, approved access areas, and current conditions and requirements.

B.1.14. Temporary construction fencing may be installed, as necessary, for management of wildlife resources and grazing livestock during both construction and restoration efforts. The type and location of fencing will be coordinated with the BLM, Utah Division of Wildlife Resources, and/or Arizona Game and Fish Department.

B.1.16. All Biological Resource EPMs (B.5 below) will be adhered to prior to and during clearing and grading.

B.1.17. Where feasible, vegetation within the ROWs will be crushed instead of removed by blading, to minimize impacts to soils.

B.1.20. All available growth medium (topsoil and cleared vegetation) will be salvaged and marked with signage for redistribution during reclamation. Growth medium will be windrowed along the edge of the ROWs or placed in stockpiles and temporarily stabilized (if stockpiled for more than 14 days) with temporary seeding, natural fiber geotextiles, mulch, periodic water applications, or other techniques to reduce or eliminate erosion or dust. Any temporary seeding mixes will be a BLM-approved certified weed-free seed mix. Topsoil and cleared vegetation will not be stockpiled in one location for longer than two years unless approved by land management agency for specific activities. Topsoil and cleared vegetation stockpiles maintained longer than one growing season will be planted with an annual seed mix to help control erosion and keep soil micro-organisms active.

B.1.21. Areas with noxious and invasive weeds will be treated and/or monitored in accordance with the Integrated Weed Management Plan.

B.1.22. A record will be maintained of when construction-related major vegetation and ground-disturbing activities begin and are completed, and when restoration activities are initiated as a function of the SWPPP inspection report.

B.1.43. If blasting is determined to be necessary based on project design, a Blasting Plan will be prepared and submitted to the BLM for approval in advance of construction. Any blasting will be conducted conservatively and managed to avoid damage to nearby facilities, properties, or sensitive cultural sites. Blast noise monitoring will be conducted if blasting will be in the vicinity of occupied properties, wildlife areas, or sensitive public uses such as campgrounds or visitor facilities. Blasting will not occur within 100 feet of an occupied Mojave Desert tortoise burrow.

B.1.44. A dewatering plan will be prepared and submitted to the BLM for approval in advance of construction. Should dewatering be necessary, discharge will be filtered to minimize sediment and will be directed to prevent flow from directly entering streams, wetlands, or sensitive environmental areas. Erosion and sediment control will be conducted the same as described for stormwater practices. The CI will coordinate with the BLM on monitoring discharges and will identify site-specific mitigation actions.

B.1.47. A site-specific SWPPP will be prepared and implemented for each construction contract. The plan will be submitted to the BLM and other applicable agencies. The SWPPP will identify all potential sources of pollution which could affect the quality of stormwater discharges from the construction site, describe the construction activities that disturb soils at the site, provide an estimate of the total disturbance area, and identify waters of the United States within one mile of the site. The SWPPP will identify erosion and sediment control measures, compliance inspection metrics, maintenance, and reporting. A copy of the SWPPP will be kept on site and updated as needed to manage pollutants or reflect changes in site conditions.

B.1.49. Construction sequencing will be designed and scheduled to create the shortest construction window practicable and the least amount of potential stormwater runoff. Construction, cleanup, and reclamation will be sequenced to reasonably minimize the time between ground disturbance and final restoration.

B.1.50. Erosion and sediment control will be implemented using both non-structural and structural best management practices (BMPs). Non-structural BMPs examples include not performing topsoil stripping during wet weather if there is risk of topsoil eroding or washing off the site in violation of National Pollutant Discharge Elimination System permits, and soil stabilization such as mulch, slope tracking, seeding, and erosion matting. Structural examples are silt fence, wattles, and ditch checks. Any netting for erosion and sediment control BMPs will be of natural-fiber (non-plastic material). BMP specifications will be included in the project specific SWPPP(s).

B.1.51. Temporary perimeter sediment controls will be installed as necessary prior to initial soil disturbance activities and will be maintained throughout construction and reclamation. These controls will be designed to retain sediment on site to the extent practicable. Typical sediment control BMPs include:

- Siltation or filter berms
- Filter or silt fencing
- Sediment barriers, e.g., sand bags, straw bales, straw wattles (straw bound into rolls or bales)
- Temporary erosion controls, e.g. straw & woodchip mulches, Jute netting

Temporary seeding will be installed as soon as practical on all disturbed areas that will remain disturbed and inactive for more than 14 days. Any straw used for erosion or sediment control will be certified weed-free. Temporary erosion and sediment controls will be inspected weekly and after major precipitation events and will be removed after construction and/or when they are no longer needed.

B.1.52. During construction, broken structural erosion controls will be replaced or restored as soon as practicable (typically within a day) but before the next forecasted precipitation event. Sediment will be removed from structures when sediment reaches 50 percent of the barrier capacity and disposed of within disturbed ROWs. Redistribution of sediment will be coordinated with the BLM.

B.1.54. At a minimum, a 10-foot-wide vegetation buffer strip and other erosion control measure such as straw bales or wattles (certified weed free) will be maintained between the cleared ROWs and an adjacent drainage. The timing of clearing, grading, trenching, pipe installation, stabilization and seeding banks during drainage crossings will be minimized to promote expedient efforts towards restoration.

B.1.55. Non-stormwater discharges, including from pipeline and facility hydrostatic testing, will be directed into existing dry washes or other downstream project facilities as feasible. Best management practices such as diffusers or other energy dissipaters, straw bales (certified weed free), or filter sacks will be used to prevent bank instability and erosion. Discharges will be managed and monitored so that they do not exceed the typical 2- to 5-year flood event of the existing washes, and to allow debris accumulations to be removed as needed. Discharges will also be managed to not exceed bank levels and downstream banks and terrestrial vegetation will be monitored and discharges stopped if above bank erosion is detected.

B.1.56. Stormwater compliance inspections will be conducted by UDWRe throughout construction at least once every 7 days regardless of rain events, or every 14 days and additionally within 24 hours of a storm event greater than 0.5 inches to ensure compliance with the SWPPP and Utah Department of Environmental Quality (UDEQ) and Arizona Department of Environmental Quality (ADEQ) permits. Inspections will include disturbed areas of the project that have not been stabilized, material and equipment storage areas that are exposed to precipitation, all erosion and sediment control measures installed within the ROWs, all structural control measures, and all locations where vehicles enter and/or exit the ROWs. Inspectors will notify the construction manager to where requirements of the SWPPP are not being followed, and implement corrective action as required to achieve compliance. Inspection reports will be maintained on file and submitted to the BLM and UDEQ or ADEQ upon request.

B.1.57. A Hydrostatic Discharge Plan will be submitted to the BLM for approval, prior to the start of any discharges.

B.1.59. At the completion of construction, all non-natural berms, ditches, temporary erosion and sediment controls, bales, wattles, and other energy dissipating/filtering devices not required for protection of facilities will be removed, and drainage function restored. Soils used for erosion control structures and soils captured by those structures will be distributed across the ROWs prior to replacing the topsoil and reclamation. Bales, wattles, and other energy dissipating/filtering devices will be disposed of in approved trash receptacles. The ground surface will be graded to blend into the preconstruction topography and/or slopes.

B.1.60. Washes and ephemeral drainage function will be restored. Soils over the pipeline will be compacted in place for maximum pipeline stability, and additional stabilization measures such as natural fiber erosion matting and seeding will be installed where necessary. Stabilization measures such as rip rap may be required to protect facilities and prevent increased erosion in washes. If armoring of a channel crossing with rip-rap or concrete is necessary due to high erosion potential, those areas and erosion control methods will be identified for BLM, USACE, or other appropriate agency based upon the jurisdictional status of the feature.

B.1.61. Post-construction stormwater management will consist of permanent erosion control measures installed as necessary to protect areas disturbed by UDWRe activities. These could include but are not limited to vegetation restoration, tracking and matting of steep slopes to maintain stability, berming (contoured to blend with existing landscape), and/or placement of appropriately colored riprap. Final stabilization of soil disturbed areas will be achieved when vegetation restoration and other erosion control measures are completed in accordance with the BLM-approved Restoration Plan and UDEQ or ADEQ stormwater permit requirements.

B.1.62. A detailed Restoration Plan will be submitted to the BLM for approval prior to the start of construction. The portion of the plan pertaining to restoration in listed species habitat will be in accordance with approved study reports and permits and submitted to the USFWS by the BLM for approval. The Restoration Plan will describe reclamation and rehabilitation objectives and methods to be used, species of plants and/or seed mixture to be used, time of planting, blending with existing vegetation at ROW edges, fertilizer mix reviews and approvals, success standards, and follow-up monitoring.

B.1.63. Soils and cut/fill areas will be restored to reasonably blend into existing landforms and will be placed in a manner to minimize stark contrast with adjacent undisturbed areas. Topsoil from cut/fill activities will be spread on freshly disturbed areas to reduce color contrast and aid rapid revegetation. Disposal of excess fill material downslope will be completed in such a fashion as to avoid creating stark color contrast with existing vegetation/soils. Cut slopes will be randomly scarified and roughened to reduce texture contrasts with existing landscapes.

B.1.64. Vegetation conditions of the ROWs and adjacent site locations will be documented in the Restoration Plan prior to construction, to establish baseline conditions for restoration. The Restoration Plan will detail how baseline conditions will be assessed. The Restoration Plan will describe revegetation efforts, success standards, and follow-up monitoring.

B.1.65. All cacti and yucca disturbed within the ROWs located in the Mojave Desert habitat portion of the project will be salvaged, with the following exceptions:

- Cholla, including silver or golden cholla (*Opuntia echinocarpa*) and pencil cholla (*Opuntia ramosissima*), equal to or greater than 3 feet tall or less than 1 foot tall (i.e., only these species of cholla between 1 foot and less than 3 feet tall will be salvaged)
- All cacti and yucca whose vegetative mass is more than 40 percent dead (i.e., apical leaves, brown or significantly chlorotic, stems rotten or significantly desiccated, etc.)
- All cacti and yucca less than 1 foot tall (excluding barrel cactus [*Ferocactus cylindraceus*], cottontop cactus [*Echinocactus polycephalus*], and hedgehog cactus [*Echinocereus* sp.])
- All yucca that are over six feet in height
- Any cacti or yucca that cannot be accessed safely due to steep slopes or very rocky areas
- All cacti and yucca not salvaged will be left on-site to become part of the vegetative mulch

B.1.66 Within disturbed portions of the ROWs located within critical habitat of listed species or areas of critical environmental concern, additional shrub salvage or enhanced seed application may be conducted to enhance restoration efforts in coordination with the BLM. Additional shrub salvage may be accomplished by either 1) salvaging from the BLM-managed lands within the ROWs, 2) salvaging from an approved off-site harvest site, and/or 3) propagation of shrubs from native seed in an approved nursery.

B.1.67. Salvaged cacti and yucca will be transported to designated transplanting or soil windrow sites within the ROWs. Upon approval from the BLM, salvaged or windowed vegetation may be transplanted at designated sites outside the ROWs.

B.1.68. Plant salvage in critical habitat of listed species or areas of critical environmental concern (see B.1.65 and B.1.66) will occur from only within the ROWs or as indicated in the Restoration

Plan. Salvaging will not begin until the ROW has been clearly staked and flagged. As feasible, salvage operations will not be performed during periods of high temperatures or other unfavorable environmental conditions. All salvaged plants will be documented and catalogued.

B.1.69. Prior to commencing any plant salvage operations in special designation areas, a free use permit, flora transportation tags, or any other required permits will be obtained to transport salvaged plants as part of restoration activities.

B.1.70. Salvaged plants in special designation areas will be maintained for the duration of construction activities if identified for replanting within the ROWs as part of site restoration, in coordination with the BLM. Maintenance will include necessary watering and other care to ensure reasonable survival of the salvaged plants.

B.1.71. At the completion of construction, coordination with the BLM on road decommissioning will occur. In areas where there are no above-ground facilities, permanent access roads, or facilities no less than 12 inches below the ground surface, the ground surface will be ripped as needed to an appropriate depth based on site characteristics to help relieve compaction, to establish an adequate seed bed to provide good seed-to-soil contact during seeding, and facilitate penetration and plant establishment (see comprehensive seeding program EPMs). Topsoil and mulched vegetation removed from the ROW at the start of construction, if any, and, if necessary, additional stabilization measures such as straw will be re-spread across the ROWs at the completion of construction.

B.1.72. Upon the completion of final grading, salvaged plants identified for replanting will be removed from the nursery sites and transplanted within the ROWs in areas not occupied by above-ground facilities or access roads. Efforts will be taken to restore plants to the same general area from which they were salvaged. Plants will be replanted in a random and non-uniform pattern, in an effort to mimic the adjacent non-disturbed plant communities. Planting holes will be two times the size of the plant material to be transplanted and will be pre-watered. All backfill will be free of debris, foreign objects, rocks large enough to obstruct root growth or watering, and noxious weeds. As feasible, transplanting will not occur during periods of high temperatures or other unfavorable environmental conditions.

B.1.73. A comprehensive seeding program will be applied after final grading and before or after plant replacement. The seed mix, application rate, and application method will be described in the Restoration Plan and reviewed by the BLM. Vegetable-based soil binders and/or hydromulch may be used on steep slopes to reduce seed movement and erosion. Seeds for restoration will be obtained from native local seed and/or a BLM-approved commercial seed vendor, and will be certified free of plant species listed on the Utah and Arizona noxious weed lists or specifically identified by the BLM. Examples of BLM St. George Field Office (SGFO) approved native plant seed species, include: white bursage (*Ambrosia dumosa*), Four-wing Saltbush (*Atriplex canescens*), Mormon tea (*Ephedra nevadensis*), Sand Sagebrush (*Artemisia filifolia*), Rubber Rabbitbrush (*Chrysothamnus nauseosus*), Saltbush (*Atriplex confertifolia*), Winterfat (*Krascheninnikovia lanata*), Brittlebrush (*Encelia spp.*), Sideoats Grama (*Bouteloua curtipendula*), Blue Grama (*Bouteloua gracilis*), Galleta (*Pleuraphis jamesii*), Sand Lovegrass (*Eragrostis trichodes*), Indian Ricegrass (*Achnatherum hymenoides*), Sand Dropseed (*Sporobolus cryptandrus*), Bottlebrush Squirreltail (*Elymus elymoides*), Globemallow (*Sphaeralcea ambigua*), Datura (*Datura sp.*), creosote bush (*Larrea tridentate*), and indigo bush (*Psoralea fremontii*). Use of exotic nonnative plant species is not allowed on public land

managed by the SGFO, including Forage kochia (*Kochia prostrata*) and Crested wheatgrass (*Agropyron cristatum*).

B.1.74. Watering may be conducted after completion of seeding, to help remove air pockets and compact soils in and around the roots of transplanted vegetation. Initial and subsequent quantities and timing of watering will be reviewed by the BLM as part of the Restoration Plan.

B.1.75. Signs and/or physical blocking barriers indicating restoration activities are being conducted may be installed where needed to deter off-road vehicular damage to restored areas. Placement and design of signs and barriers will be coordinated with the BLM and identified in the Restoration Plan.

B.1.76. An Integrated Weed Management Plan will be prepared and submitted to the BLM and other applicable agencies for approval prior to the start of construction. The BLM will coordinate with USFWS as needed. Noxious weed control will be implemented to minimize the spread of noxious weeds during construction and restoration/revegetation activities. All weed control efforts on BLM-administered lands will be in compliance with the BLM Handbook H-9011, H-9011-1 Chemical Pest Control, H-9014 Use of Biological Control Agents of Pests on Public Lands, and H-9015 Integrated Pest Management.

B.1.77. Areas within the ROWs that have pre-existing noxious weed infestations as identified in the Special Status Vegetation and Noxious Weed Inventory will be treated by a licensed contractor with a BLM-approved control method (i.e., chemical, mechanical, and/or biological controls) prior to the start of construction activities, as feasible. If noxious weed infestations exist within the ROWs at the start of construction, topsoil and fill will be kept segregated and not transported to other areas within the ROWs.

B.1.78. Prior to the import of borrow or fill from outside the ROWs, the source material location will be inspected by a qualified biologist or weed scientist to ensure it is free of noxious weeds or specifically identified in the BLM-approved Integrated Weed Management Plan for the project.

B.1.79. Any straw or other organic products used during construction, restoration, operations, maintenance, or for stabilization will be certified free of plant species listed on the Utah and Arizona noxious weed list or specifically identified in the BLM-approved Integrated Weed Management Plan for the project.

B.1.80. Construction vehicles and equipment will be cleaned with a high pressure washer or high pressure air and wire brush prior to arrival on the ROWs and prior to departure from areas of known noxious weed infestations to minimize the introduction or spread of noxious weeds. Cleaning efforts will concentrate on tracks, tires, and vehicle undercarriage, with special emphasis on axles, frames, cross members, motor mounts, on and underneath steps, running boards, and front bumper/brush guard assemblies. Vehicle cabs will be swept out and refuse will be disposed of in waste receptacles. Cleaning stations will be designated and will be recorded using global positioning systems or other mutually acceptable equipment and provided to the BLM Weed Coordinator or designated contact person. All water and material at the vehicle cleaning stations will be contained and collected and hauled off site for disposal at an approved disposal site.

B.1.81. UDWR or its certified licensed contractor will submit a request for a Pesticide Use Proposal to the BLM and other applicable agencies prior to the planned application of any herbicide and a

Pesticide Application Record after the planned application of the herbicide. The Pesticide Use Proposal will identify areas of planned herbicide application for BLM use. No herbicide mixing or rinsing of containers or application equipment will occur within 100 feet of natural sources (i.e., lakes, streams, or springs). An annual report on herbicide application on public lands within the ROWs will be provided to the BLM.

B.1.82. Herbicides may not be sprayed within or around an exclusion area containing sensitive resources (buffers may be applied around areas in coordination with the BLM, depending on resource). These areas will be delineated with stakes and signs during construction or by global positioning system (GPS) data. Removal of noxious and invasive weeds in these areas shall be accomplished by method(s) approved by the BLM or that are identified in the biological opinion.

B.2.5. Stormwater discharges will be managed during facility operation by conducting regular inspection and maintenance of any permanent erosion control structures. Inspections will be conducted prior to and immediately following a rain event. Maintenance will be performed on the permanent structures as needed.

B.2.8. If major infrastructure replacements or improvements are required, additional ROWs or an amendment of the existing ROWs may be required. Additional environmental compliance may also be required. Notification and prior approval for said additional or amended ROWs will be obtained from the BLM as required.

B.2.9. Vegetation restoration success will be monitored by UDWR and reported to the BLM, as defined in the approved Restoration Plan. Monitoring will include both qualitative and quantitative data collection and analysis. Vegetation restoration success on non-BLM-managed lands will be coordinated with the respective landowners.

B.2.10. Annual restoration monitoring reports will be submitted to the BLM for five years documenting post-construction monitoring, and will include but not be limited to activities conducted, current status, and recommended future activities. Along with the annual report in the third year, UDWR will include a quantitative analysis, to allow opportunity following the third-year report to correct any issues that may prevent restoration site release within the subsequent two years. If monitoring indicates that restoration is not trending towards meeting or has not met designated interim success criteria, the restoration activities may be revised and remedial measures implemented, subject to BLM approval. Restoration activities and annual reporting shall continue until the restoration fulfills the requirements of the BLM-approved Restoration Plan, and UDWR receives written release from the BLM. Since successful restoration may be achieved in some areas more quickly than other areas, written approval shall identify the area released.

B.2.11. In the unlikely event of a major system rupture resulting in discharge of greater than 5,000,000 gallons or off-site erosion, UDWR will notify the BLM and other appropriate government entities as identified in the Emergency Response Plan. UDWR will coordinate with the BLM to develop and implement incident-specific restoration measures as directed by the BLM.

B.2.12. The ROWs and primary unpaved access routes used for facility inspections will be monitored for noxious weeds from the start of construction until termination of the ROWs. Noxious weeds will be treated with a BLM-approved control method (i.e., chemical, mechanical, and/or biological controls) as needed. A request for a Pesticide Use Proposal will be submitted to

the BLM prior to any planned noxious weed herbicide application, and a Pesticide Application Record will be submitted after weed herbicide use. All applications of herbicides shall comply with BMPs, SOPs, and Conditions from the Vegetation Treatments Programmatic Environmental Impact Statement Biological Assessment related to Mojave Desert tortoise (DOI-BLM-WO-WO2100-2007-0002-EIS), Vegetation Treatments Using Aminopyralid Fluroxypyr and Rimsulfuron on BLM-managed Lands in 17 Western States Programmatic Environmental Impact Statement (DOI-BLM-WO-WO2100-2012-0002-EIS), the Arizona Strip Field Office noxious weed Environmental Assessment (DOI-BLM-AZ-A000-2016-0001-EA), and the SGFO specific EA (DOI-BLM-UT-C030-2016-0005-EA). Treatments may be waived in areas where noxious weeds are prevalent in adjacent off ROW areas with the BLM approval.

B.2.13. An annual report on noxious weeds conditions and control activities within the ROWs will be submitted to the BLM.

B.4.1. In accordance with Clean Water Act individual permit requirements, BMPs will be implemented for the pipeline crossing of Paria River (intermittent flow) and Sand Wash, Buckskin Gulch (if flowing during a precipitation runoff event), and pipeline crossing of Kanab Creek (intermittent flow) and Short Creek (if flowing during a precipitation runoff event). The BMPs will utilize industry-accepted procedures.

B.4.2. The project has been sited to avoid wetlands, and no construction is currently planned to occur in wetlands.

B.5.2. All necessary federal and state handling permits will be obtained.

B.5.8. In areas where special status plant species were identified in previous surveys either within or adjacent to the ROWs, pre-construction surveys will be conducted during the blooming or fruiting season as needed to verify plant identification. Specific locations of special status plants will be recorded for subsequent salvage or seed collection.

B.5.9. UDWRe will adjust construction activities as feasible to avoid any identified special status plant populations within the ROWs. T-posts strung with rope and signage will be used to mark the avoidance area including a reasonable buffer, alerting construction personnel to avoid the area. The onsite Environmental Compliance Representative will ensure these areas are properly monitored and protected. When individual special status plant locations are known (coordinates have been surveyed with GPS equipment) prior to construction drawings being prepared, the special status plants will be included in the construction drawings.

The only ESA-listed plant species that has been found near the construction area is the Siler pincushion cactus (*Pediocactus sileri*). The known occurrences of Siler pincushion cactus are outside the construction easement along the LPP and would be avoided.

B.5.10. If the special status plant species cannot be avoided, UDWRe will implement plant or seed salvage prior to the start of construction. Seeds will be collected from special status plants that are located within the ROWs. Collection, storage, and handling of seeds will be in accordance with commonly accepted scientific practices. Collected special status plant seed will be applied with the seeding program as part of restoration at the completion of construction, and in the same general area as the seeds were initially collected, as appropriate.

B.5.11. If previously unknown special status plant species are discovered within the ROWs prior to the start of or during construction, UDWR will consult with the BLM, and the BLM will reinitiate consultation with USFWS, if appropriate.

B.5.12. If federal or state protected plant species are discovered in areas cleared during previous surveys within the ROWs during construction, the on-site biological monitor or agency personnel will have the authority to temporarily halt non-emergency construction activities in order to: 1) mark the area with T-posts and rope, including a reasonable buffer, to alert construction personnel to avoid the area, or 2) allow time for UDWR to consult with the BLM, and for the BLM to reinitiate consultation with USFWS, if appropriate.

B.5.13. Herbicides may not be sprayed within or around any special status plant exclusion areas (buffers may be applied around areas in coordination with the BLM, depending on species). These areas will be delineated with stakes and signs during construction or by GPS data. Removal of noxious and invasive weeds in these areas shall be accomplished by method(s) approved by the BLM and that are identified in the biological opinion.

B.11.5. Additional trees in juniper areas will be cleared to create uneven, natural appearing openings in vegetative cover adjacent to the pipeline alignment. Trees and shrubs will be feathered along the edge of the ROW with selective thinning to create variations in density and create uneven edges. Slash piles will not be left in sensitive viewing areas.

B.11.6. Existing vegetation that screens pipeline alignments, flow-control facilities, parking lots and other features from key viewing areas will be retained if it does not impede construction activities.

B.11.7. Pitting and vertical mulching in sensitive locations may be used in coordination with the BLM to reduce contrast and visibility of the pipeline.

1.4 Existing Conditions

Two main ecological regions, the Colorado Plateau and Mojave Desert, are represented within the Project Area (Figure 1.4-1). Most of the Project Area, from Lake Powell to Hurricane, occurs within the Colorado Plateau Ecological Region. The Mojave Desert Ecological Region is represented by the area southwest of Hurricane, Utah. Diverse landforms, geologic exposures, and elevation gradients present across the Project Area contribute to the biodiversity and unique character of the vegetation of the ecological regions (see LPP Final Study Report 15 – Vegetation Communities [UBWR 2016a]).

The Colorado Plateau is an approximately 72,000-square-mile uplifted plateau that is generally centered on the “Four Corners” area of the United States that occurs in the states of Arizona, Utah, Colorado, and New Mexico. Elevations range from 1,200 feet to 12,700 feet, which results in a great diversity of habitats (NRCS 2020a). The more prevalent habitats are pinyon-juniper/juniper savanna, big sagebrush shrublands, steppe, and grasslands. Within the LPP ROWs, the Colorado Plateau region extends from Lake Powell on the eastern end, westward to Hurricane, Utah.

The Mojave Desert is a 43,750-square-mile region that features basin and range topography, with broad valleys separated by rugged mountain ranges containing several large sand dune complexes, and dry lakes are common (NRCS 2020b). Elevations range from 282 feet below sea level in Death Valley to over 5,280 feet in other areas of the region. Within the Proposed Project ROWs, this ecological region is dominated by shrublands but represents a minor fraction of the entire Project Area when compared to the Colorado Plateau.

1.4.1 Special Status Plant Species

Pre-survey activities in preparation for the 2009/2010 surveys included the compilation of lists from appropriate federal and state land and resource management agencies. Sensitive Plant Species Lists were obtained from the BLM for Arizona and Utah, and a list of special status plants was provided for Glen Canyon National Recreation Area by the NPS. The Tribe provided a list of Ethnographic Plants. Plants listed by the State of Arizona as highly safeguarded native plants were provided per AAC Title 3, Chapter 3, Article 11. These lists were used to compile a table containing potentially occurring special status plant species, habitat preferences, and the known and potential distribution of each species were compared to the habitats represented across the Project Area (Table 1.4-1). A couple of species that currently do not have special status designations but were recommended by the USFWS to be of conservation concern were also added to the table. Refer to LPP Final Study Report 12 – Special Status Plant Species and Noxious Weeds (UBWR 2016b) for detailed methods, preparation activities, and data collection as they related to the special status plant surveys.

During the 2009 season, a total of 68 species were determined to have the potential to occur, therefore, surveys focused on these 68 species. After the 2009 survey season was completed, 18 of these species were excluded from further evaluation because no suitable habitat was found. In 2010, with the addition of new pipeline and transmission line alignments, eight new species were added to the exclusion table, for a total of 58 species for which surveys were conducted during the 2010 survey season.

1.4.2 Ethnographic Plants

Special status plant species also include those culturally significant to the Tribe. A report was prepared on behalf of the Tribe and provided for the Proposed Project (Stoffle 2020). This report states there are 391 plants identified in the immediate region of the Proposed Project and that, at least 138 of those plants are within an area of potential effect (see Table 1.4-2) used by the Tribe in their assessment, of which 44 were observed along the Southern Alternative and 61 were observed along the Highway Alternative. The report identifies 27 plants that are common among both action alternatives; the Southern Alternative contains 17 plants not observed in the Highway Alternative, and the Highway Alternative contains 34 plants not observed in the Southern Alternative (see Table 1.4-2; Stoffle 2020).

A summary of special status plant species amounts for the BLM, NPS and the Tribe is presented in Table 1.4-3

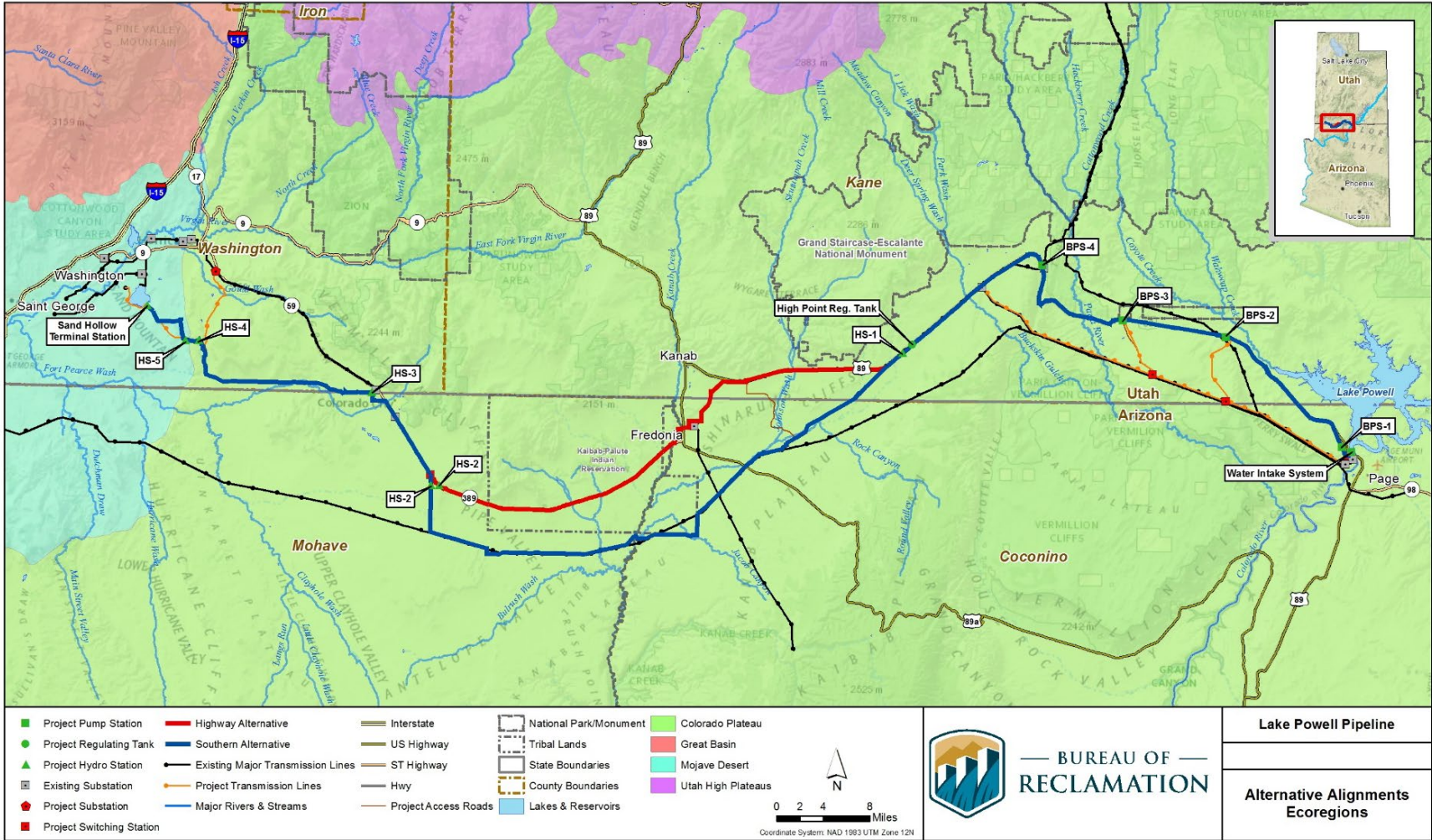


Figure 1.4-1 Alternative Alignments, Ecoregions

Table 1.4-1 Potential Occurrence of Special Status Plant Species for BLM and NPS

Scientific Name	Common Name	Status	Habitat Type
<i>Aliciella latifolia</i> var. <i>imperialis</i>	Cataract gilia	NPS	Found in shadscale and other mixed desert shrub communities, especially in wash bottoms and at the bases of ledges. Occurs in Kane County, UT.
<i>Aralia racemosa</i>	American spikenard	NPS	Found in crevices in sandstone and on sandy detritus. Found in Washington County, UT, and Coconino and Navajo Counties, AZ.
<i>Astragalus ampullarius</i>	Gumbo milkvetch	BLM (UT)	Found in clay soils of the Triassic Chinle and Tropic Shale formations. In Mohave and Coconino Counties, AZ; and in east Washington, and Kane Counties, UT (including the Cockscomb area).
<i>Astragalus striatiflorus</i>	Escarpment milkvetch	BLM (UT)	Found in inter-dune valleys, sandy depressions on ledges, and on bars and terraces in stream channels. In pinyon-juniper, ponderosa pine, and sandy desert shrub communities in eastern Washington and Kane Counties, UT; and Coconino County, AZ.
<i>Camissonia bairdii</i>	Baird's camissonia	BLM (UT)	Found in blackbrush, and pinyon-juniper communities. Found in Washington County, UT.
<i>Camissonia exilis</i>	Slender evening primrose	NPS	Occurs in small pockets of saline soil derived from gypsum outcrops. Also powdered travertine-encrusted flats. Known to occur in Kane County, UT, and Coconino and Mohave Counties, AZ (NatureServe Explorer 2016a).
<i>Camissonia gouldii</i>	Diamond Valley suncup	BLM (UT)	Found in volcanic ash, or sandy pockets in basalt in Washington County. Restricted to volcanic ash deposits Mohave and east-central Coconino Counties, AZ.
<i>Ceanothus greggii</i> var. <i>vestitus</i>	Mohave ceanothus	NPS	Found in mixed desert shrub, pinyon-juniper, and mountain brush communities.
<i>Cladium californicum</i> ^(a)	California sawgrass	NPS	Found in alkaline freshwater marshes, swamps, hanging gardens, and springs; and in hanging gardens above the high-water line at Lake Powell. Known from Mohave County, AZ; Kane County, UT.
<i>Cornus sericea</i> ^(a)	Red-osier dogwood	NPS	Associated with streambanks and other moist sites; found in all Utah counties, and in AZ including Coconino, Navajo, and Apache Counties; widespread in North America.

Table 1.4-1 Potential Occurrence of Special Status Plant Species for BLM and NPS (continued)

Scientific Name	Common Name	Status	Habitat Type
<i>Cryptantha semiglabra</i>	Smooth catseye	BLM (AZ)	Associated with arid red detrital clay soils and gray shales of the Moenkopi Formation. In Great Basin desert scrub, sagebrush, and pinyon-juniper communities.
<i>Cystopteris utabensis</i>	Utah brittle-fern	NPS	Found on the calcareous cliffs of the Weber Formation, particularly on sandy ledges and in crevices in AZ.
<i>Echinocactus polycephalus</i> var. <i>xeranthemoides</i>	Kanab barrel cactus	NPS	Found in Mojave Desert scrub, Great Basin desert scrub and pinyon-juniper communities on rocky hills, slopes, and ledges of canyons, derived from igneous and calcareous substrates. Known from Mohave and Coconino Counties, AZ (including Lee's Ferry in the NPS); and Kane County, UT.
<i>Enceliopsis argophylla</i>	Silverleaf sunray	BLM (AZ)	Found from clay and gypsum cliffs to gravelly slopes and sandy washes. in Washington County.
<i>Epilobium nevadense</i>	Nevada willowherb	BLM (UT)	Found in pinyon-juniper and oak-mountain mahogany communities; on limestone or quartzite. Occurs in Washington County, UT.
<i>Euphorbia nebradenia</i>	Utah spurge	BLM (UT)	Found in mat-saltbush, blackbrush, Mormon tea, and mixed sandy desert shrub communities on Tropic Shale and Entrada formations in Kane County, UT.
<i>Imperata brevifolia</i>	Satintail grass	NPS	Found along stream sides and other moist places. Occurs in Mohave and Coconino Counties.
<i>Iris pariensis</i>	Paria iris	BLM (UT)	Occurs in grassy-shrub community in Kane County, UT (Utah Native Plant Society 2003–2020).
<i>Jamesia americana</i> var. <i>zionis</i>	Zion jamesia	BLM (UT)	Found in hanging gardens, sandstone crevices, and cliff sides and bases in pinyon-juniper, oak, and ponderosa pine communities occurs in Washington and Kane Counties, UT.
<i>Lepidium montanum</i> var. <i>claronense</i>	Claron pepperplant	BLM (UT)	Found in sagebrush, pinyon-juniper, and ponderosa pine/bristlecone pine communities. Occurs in Kane County, UT.

Table 1.4-1 Potential Occurrence of Special Status Plant Species for BLM and NPS (continued)

Scientific Name	Common Name	Status	Habitat Type
<i>Lupinus caudatus</i> var. <i>cutleri</i>	Cutler's spurred lupine	BLM (UT)	Found in pinyon-juniper woodlands along the Cockscomb in Kane County, UT.
<i>Mentzelia memorabilis</i>	stickleaf	BLM (AZ)	Grows on dry, sparsely vegetated, gypsum-clay outcrops. Endemic to northern Mohave County, AZ.
<i>Oenothera murdockii</i>	Murdock's evening primrose	BLM (UT)	Found in pinyon-juniper communities on red-purple or gray clay silty barrens. Occurs in Kane and Washington Counties, UT.
<i>Ostrya knowltonii</i>	Western hophornbeam	NPS	Found at the bases of monoliths, shaded defiles, and hanging gardens in sandstone areas. Found in Kane County, UT, and Mohave and Coconino Counties, AZ.
<i>Pediomelum aromaticum</i> var. <i>barnebyi</i>	Barneby's breadroot	BLM (UT)	Found in pinyon-juniper and silver buffaloberry communities on fine-textured substrates. Found in Kane and Washington County, UT, and Mohave County, AZ.
<i>Pediomelum castoreum</i>	Beaver Dam breadroot	BLM (UT)	Occurs in dry, sandy soils. Known to occur in Mohave County, AZ (NatureServe Explorer 2016b).
<i>Pediomelum epipsilum</i>	Kane breadroot	BLM (UT)	Found in pinyon-juniper woodland communities. Found in Kane County, UT, and Mohave County, AZ.
<i>Penstemon ammophilus</i>	Sandloving penstemon	BLM (UT)	Found in blow sand derived from Navajo Sandstone and in ponderosa pine and mixed shrub communities. Found in Kane and Washington Counties, UT.
<i>Penstemon laevis</i>	Smooth penstemon	BLM (AZ)	Found in sandy places in pinyon-juniper, ponderosa-manzanita, and mountain brush communities. Found in Mohave County, AZ.
<i>Petalonyx parryi</i>	Parry petalonyx	BLM (UT)	Found in shadscale, indigo bush, creosote bush, and bursage communities in Washington County, UT, and Mohave and western Coconino Counties, AZ.
<i>Phacelia mammilariensis</i>	Nipple phacelia	NPS	Found in mixed desert shrub communities. Occurs in Kane County, UT.
<i>Phacelia pulchella</i> var. <i>atwoodii</i>	Atwood's pretty phacelia	BLM (UT)	Occurs in duff under junipers on gypsiferous strata in pinyon-juniper, oak, sagebrush, single-leaf ash, and serviceberry communities. Known from western Kane County, UT.
<i>Platanthera zotbecina</i>	Alcove bog orchid	NPS	Found in seeps and hanging gardens, and on moist stream banks in mixed desert shrub, pinyon-juniper, and oak brush communities. Occurs in Coconino County, AZ.

Table 1.4-1 Potential Occurrence of Special Status Plant Species for BLM and NPS (continued)

Scientific Name	Common Name	Status	Habitat Type
<i>Psoralea thompsoniae</i> var. <i>whittingii</i>	Whitting's indigo-bush	NPS	Associated with sandy-clay banks and talus, and gravelly or sandy washes; in mixed desert shrub communities. Occurs in Coconino and Navajo Counties, AZ.
<i>Ptelea trifoliata</i> ssp. <i>pallida</i>	Hoptree	NPS	Found along canyons in Kane and Washington Counties; possibly near town of Kanab and the shores of Lake Powell in UT. Known in Mohave County, AZ, where locally plentiful on limestone.
<i>Rosa stellata</i> var. <i>abyssa</i>	Grand Canyon rose	BLM (AZ)	Found on or near canyon rims or the tops of cliffs at the edges of mesas or plateaus, along low ledges at depressions caused by breccia pipes in Great Basin conifer woodland or scrub communities. Occurs in; Mohave and Coconino Counties, AZ.
<i>Salvia columbariae</i> var. <i>argillacea</i>	Chinle chia	BLM (UT)	Found on sparsely vegetated pinyon-juniper woodlands on fine textured saline-clay silts and 'gypsum boils.' Occurs in Kane and Washington Counties, UT.
<i>Sclerocactus sileri</i>	Paria Plateau fishhook cactus	BLM (AZ)	In pinyon-juniper communities on mesa tops in sandstone to sandy soils derived from Moenave, Chinle, and Navajo formations. Occurs in Coconino County, AZ; and Washington and Kane Counties, UT.
<i>Sisyrinchium demissum</i>	Blue-eyed grass	NPS	In seeps, springs, wet meadows, and stream banks, often where saline. Found in Kane and Washington Counties, UT, and Mohave and Coconino Counties, AZ.
<i>Thelypodopsis ambigua</i> var. <i>erecta</i>	Kanab thelypod	BLM (UT)	Found in pinyon-juniper woodland and desert shrub communities on clay soils derived from purple Chinle shale. Found in Kane and possibly Washington Counties, UT, and Mohave County, AZ.
<i>Viguiera soliceps</i>	Tropic goldeneye	NPS	Found within the mat-saltbush community on clay knolls and bluffs of the Tropic Shale Formation. Known from Cottonwood Canyon in Kane County, UT.

Key:

AZ = Arizona

BLM = Bureau of Land Management

NPS = National Park Service

UT = Utah

Table 1.4-2 Tribal Plant Species of Cultural Concern with Potential to Occur in the Project Area

Scientific Name	Common Name	Southern Paiute Name	Project Area	Southern Alternative	Highway Alternative
<i>Abies concolor</i>	White fir	ca-ta-vee	X	-	-
<i>Abies lasiocarpa</i>	Balsam fir	NA	X	-	-
<i>Achnatherum hymenoides</i>	Indian ricegrass	wa-i, wa'iv, wa'ir, wa'ai	X	X	X
<i>Aconitum columbianum</i>	Wolfsbane, Columbian monkshood	NA	X	-	-
<i>Agropyron</i> spp.	Wheatgrass	paxankua	X	X	-
<i>Allium nevadense</i>	Nevada onion	kwichasi	X	-	-
<i>Ambrosia dumosa</i>	White bursage, burrobush	kutsiav, tumpisangwav	X	-	-
<i>Amelanchier utabensis</i>	Utah serviceberry	tungwump, tuvwampu, kwiyav, toyaba	X	X	X
<i>Amorpha fruticosa</i>	False indigo bush	NA	X	-	-
<i>Amsinckia tessellata</i>	Bristly fiddleneck, western fiddleneck	NA	X	X	-
<i>Androsace</i> spp.	Jasmine, rock jasmine	NA	X	-	-
<i>Apocynum cannabinum</i>	Dogbane, Indian hemp	NA	X	-	-
<i>Arctostaphylos patula</i>	Greenleaf manzanita	ararmpipi	X	-	-
<i>Artemisia bigelovii</i>	Bigelow sagebrush	sangwav	X	-	X
<i>Artemisia filifolia</i>	Sand sagebrush	NA	X	-	X
<i>Artemisia ludoviciana</i>	White sagebrush	hipata-sangwav	X	-	X
<i>Artemisia nova</i>	Black sagebrush	sangwav, sua'piv	X	-	-
<i>Artemisia tridentata</i>	Big sagebrush	po-ho'-be, sahng-wav', sah-wahb', sangwav, pah-eesh sah-wavvy, pah-hoe-be, sangwavi, sangwa, sanwa'bi, pah-wavvy, sah-wah-be, sah-wavvy	X	X	-
<i>Asclepias</i> spp.	Milkweed	hewovey, wa-na	X	-	-
<i>Astragalus praelongus</i>	Rattleweed locoweed	NA	X	-	X
<i>Astragalus</i> ssp.	Milkvetch, locoweed	NA	X	X	-
<i>Atriplex canescens</i>	Fourwing saltbush	Skump, tono, murunibi	X	X	X
<i>Atriplex hymenelytra</i>	Desert holly	NA	X	X	-
<i>Balsamorhiza sagittata</i>	Arrowleaf balsamroot	NA	X	-	-
<i>Berberis repens</i>	Creeping barberry	cor-ren-nup pah-vee, poo-heg-wee-dah	X	-	-

Table 1.4-2 Tribal Plant Species of Cultural Concern with Potential to Occur (continued)

Scientific Name	Common Name	Southern Paiute Name	Project Area	Southern Alternative	Highway Alternative
<i>Bouteloua gracilis</i>	Blue grama	NA	X	-	-
<i>Bryophytes</i>	Moss	NA	X	-	-
<i>Calliandra eriophylla</i>	Fairy duster	NA	X	-	-
<i>Calochortus nuttallii</i>	Sego lily	sigo'oo	X	X	X
<i>Carduus nutans</i>	Milk thistle	NA	X	-	-
<i>Carex</i> spp.	Sedge	sambiv	X	-	X
<i>Castilleja</i> spp.	Indian paintbrush	NA	X	X	-
<i>Ceanothus</i> ssp.	Buck brush	NA	X	-	X
<i>Cercocarpus montanus</i>	Birch-leaf Mountain Mahogany	NA	X	-	-
<i>Chenopodium</i> spp.	Goosefoot	sax'watikup	X	-	X
<i>Chrysothamnus nauseosus</i>	Rubber rabbitbrush	koo-chum'-ahv, koo-tsam'-mah, hav', sikomp, sikump, s'kump	X	X	X
<i>Chrysothamnus viscidiflorus</i>	Yellow rabbitbrush	koo-chum'-ahv, koo-tsam'-mah, hav', sikomp, sikump, sikump, s'kump	X	-	-
<i>Coleogyne ramosissima</i>	Blackbrush	NA	X	-	-
<i>Cryptantha</i> spp.	Cryptantha	NA	X	-	X
<i>Cucurbita foetidissima</i>	Coyote gourd, Missouri gourd	ankompi, ahn-no-quav, arno-cup, ahn-noquav	X	-	X
<i>Datura</i> spp.	Sacred datura, jimsonweed	mu-maup', moa-nump, momomp, momompu, mimip, main-oph-weep, man-op-weep, mainophweep, manopweep	X	X	X
<i>Descurainia pinnata</i>	Tansy mustard	aku, haheck, ku'u, ak, ok	X	X	X
<i>Descurainia sophia</i>	Herb Sophia	ahk	X	X	X
<i>Echinocereus engelmannii</i>	Strawberry hedgehog cactus	usivwuits, tule, manav	X	-	X
<i>Elymus elymoides</i>	Squirrel tail	saxwanartotsivuaium	X	-	X
<i>Encelia farinosa</i>	White brittlebrush	NA	X	-	-
<i>Enceliopsis nudicaulis</i>	Nakedstem sunray	NA	X	X	-
<i>Ephedra nevadensis</i>	Nevada Indian tea	tup, tup; hutuup; tu'up; tutuupi; tutupi; tu-tupe; tutupe; utuupi; u'tuup; yatup	X	-	X

Table 1.4-2 Tribal Plant Species of Cultural Concern with Potential to Occur (continued)

Scientific Name	Common Name	Southern Paiute Name	Project Area	Southern Alternative	Highway Alternative
<i>Ephedra viridis</i>	Green Indian tea	tup, tutuupi, soo-roop-ee, too-roop-ee, tutu'pi, utuupi, u'tuup, too-toop-ee	X	X	X
<i>Eriodictyon</i> spp.	Yerba Santa	NA	X	-	-
<i>Eriogonum desertorum</i>	Great Basin desert buckwheat	NA	X	-	-
<i>Eriogonum inflatum</i> var. <i>inflatum</i>	Desert trumpet	papakurum, papakurum	X	X	X
<i>Eriogonum microthecum</i>	Slender buckwheat	pee-wee-guy-womb-mutz-zee	X	X	-
<i>Erodium cicutarium</i>	Storksbill, heronbill	wyuvimp	X	-	X
<i>Euphorbia albomarginata</i>	Spurge, rattlesnake weed	tuvika'xaiv, tuvipukaxi, tuvipukaxi tava'namu'obi, tuvipaxghaiv	X	-	-
<i>Fallugia paradoxa</i>	Apache plume (Indian spinach)	muup	X	-	X
<i>Gaura coccinea</i>	Scarlet beeblossom	NA	X	-	X
<i>Grindelia squarrosa</i>	Gumweed	oha tonega, sah-nah tonegan	X	-	-
<i>Gutierrezia microcephala</i>	Threadleaf snakeweed	yainup, waarump	X	X	-
<i>Gutierrezia sarothrae</i>	Broom snakeweed	s'kump	X	-	X
<i>Helianthus annuus</i>	Common sunflower	ah-kump, bah-kuk	X	-	X
<i>Hilaria jamesii</i>	James' galleta grass	NA	X	-	X
<i>Juniperus osteosperma</i>	Utah juniper	wa'ap, wa'apu, wa'apu, wa'apumpi, wa'apumpi, noo-ahntup, noo-ahn-tup	X	X	X
<i>Juniperus scopulorum</i>	Rocky mountain red cedar	bah-sah-mabe, bas-um-ah-be	X	-	-
<i>Krascheninnikovia lanata</i> var. <i>lanata</i>	Winterfat	boo-see-ah-wah-be, she-shu-bah	X	-	-
<i>Larrea tridentata</i>	Creosote bush, greasewood	yatumpi, yatump, yatump, yatamp, ya'tampi, yatumb, yah-temp, yahtemp,	X	-	-
<i>Lepidium montanum</i>	Mountain pepperplant	NA	X	-	X
<i>Lichen</i>	Lichen	timpap suchiku	X	-	-
<i>Lupinus aridus</i>	Desert lupine	quee-duh-kwana	X	X	-

Table 1.4-2 Tribal Plant Species of Cultural Concern with Potential to Occur (continued)

Scientific Name	Common Name	Southern Paiute Name	Project Area	Southern Alternative	Highway Alternative
<i>Lycium andersonii</i>	Anderson's wolfberry	u'upwivi, u'up, pa'up, u'upi, hu'up, u'up	X	X	X
<i>Lycium pallidum</i>	Pale wolfberry	u'upi, pa'up	X	-	Lycium pallidum
<i>Machaeranthera</i> spp.	Aster	NA	X	-	X
<i>Marrubium vulgare</i>	Common horehound	quee-ban-oob	X	-	X
<i>Melilotus indicus</i>	Yellow sweet-clover	NA	X	-	X
<i>Melilotus</i> spp.	Clover	NA	X	-	-
<i>Mentzelia</i> spp.	Blazingstar	ku'u	X	-	X
<i>Mirabilis alipes</i>	Winged four o'clock	he-wov-bee, hewovey	X	X	-
<i>Mirabilis multiflora</i>	Colorado four o'clock	toxowatsiv, tukwivi	X	X	X
<i>Nicotiana attenuata</i>	Coyote tobacco	koapi, koap, koaop, tsaw-wap, koap, bah-moh, poo-ee-bah-hoon, poo-ee-bah-moh, poo-wee-buh-hoon, toh-quoh-quah	X	-	-
<i>Nicotiana trigonophylla</i> var. <i>trigonophylla</i>	Desert tobacco	koapi, nungwukoap, nungwukoap, saxwaxwapi, koap	X	X	X
<i>Oenothera pallida</i>	Pale evening-primrose	Sixo	X	-	X
<i>Opuntia aurea</i>	Golden prickly pear	NA	X	-	-
<i>Opuntia basilaris</i>	Beavertail cactus	manav, yuavi, yuavimp, yuavimpu, yuavimpi, navump	X	X	X
<i>Opuntia echinocarpa</i>	Golden cholla, silver cholla	NA	X	X	X
<i>Opuntia phaeacantha</i>	Tulip prickly pear	manav	X	X	X
<i>Pedicularis</i> sp.	Lousewort, elephant head	NA	X	-	-
<i>Penstemon eatonii</i>	Eaton's penstemon	kwichasi	X	-	-
<i>Penstemon palmeri</i>	Firecracker penstemon	toxowatsip	X	X	X
<i>Penstemon</i> spp.	Penstemon, beardtongue	toxowatsip, too-buzz-sah-wop, toh-quoh-wat-ziv, toxowatsip, toe-buzz-see-bee	X	-	-
<i>Phragmites australis</i>	Common reed	po'-ru, pa-gump, pahgump, hoh-goh-koh, paxamp, hohgohkoh	X	-	-

Table 1.4-2 Tribal Plant Species of Cultural Concern with Potential to Occur (continued)

Scientific Name	Common Name	Southern Paiute Name	Project Area	Southern Alternative	Highway Alternative
<i>Physaria newberryi</i>	Newberry Twinpod	NA	X	-	-
<i>Pinus edulis</i>	Colorado Pinyon	tu-wop', tu-vap', toov', tũ-bah'-kah-bub, yu-vim', õ-gump', yu-wim'p, tuva, tivah, tuva, tuvap, tu'uv, tuvwap	X	X	X
<i>Pinus monophylla</i>	Singleleaf pinyon	tu-wop', tu-vap, toov', tũ-bah'-kah-bub, yu-vim', õ-gump', yu-wim'p, tuva, tivah, tuva, tuvap, tu'uv, tuvwap, tu-bap-ee, wah-pee	X	-	-
<i>Pinus ponderosa</i>	Ponderosa pine	yu-vim, -gump, yu-wim p	X	-	-
<i>Plantago major</i>	Common plantain	NA	X	-	-
<i>Pleiocanthus spinosus</i>	Thorn skeletonweed, Indian gum plant	i-goon-zon-um, pee-ee-ah-gub, see-ko-pe, too-man-abbe, too-wan-oo-pah	X	-	-
<i>Populus</i> spp.	Cottonwood	sho-wĩp', so-vwĩp, sovip, só-vip, sah'-vip, sah'-vip'	X	X	X
<i>Populus tremuloides</i>	Quaking aspen	NA	X	-	-
<i>Prosopis</i> spp.	Mesquite	'op, opimp, 'opimpu, kwiyaru, quee-et-umb, quee-etumb	X	-	-
<i>Prunus</i> spp.	Chokecherry	tonap, tonapi, tonopi	X	-	-
<i>Pseudotsuga menziesii</i> var. <i>glauca</i>	Douglas fir	NA	X	-	-
<i>Psoralea</i> spp.	Indigobush	ma-good-du-hoo, ma-good-tu-hoo, moh-goon-du-hoop, moh-goon-du-hoopie, kaatamonup, i-era-midja, i-eramidja	X	-	-
<i>Purshia glandulosa</i>	Desert bitterbrush	u'nup	X	X	X
<i>Purshia mexicana</i>	Mexican cliffrose	unapu, uh-nop, hunap, uhnop	X	-	-
<i>Purshia stansburiana</i>	Stansbury's cliffrose	unapu, uh-nop, hunap, uhnop	X	X	X
<i>Purshia tridentata</i>	Antelope bitterbrush	unap, huh-na-bee	X	X	-

Table 1.4-2 Tribal Plant Species of Cultural Concern with Potential to Occur (continued)

Scientific Name	Common Name	Southern Paiute Name	Project Area	Southern Alternative	Highway Alternative
<i>Quercus gambelii</i>	Gambel oak	tuav, kwiav	X	X	-
<i>Quercus</i> spp.	Oak	kwi'-uv, to-mum-pīv, hēm'-pah, kwe'-av, we-am'-pe, tomumpi, tuav, kwiav, tomump, tomumpi	X	-	X
<i>Rhus trilobata</i>	Three-leaf sumac, skunkbush	e-is', I'isi, i-siv', shen-pimp', suuv, shuuvi, siuvimpu, huupi, see-a-wimp, huiupi, su'uvimpu, suuvimp, I'is, see-a-wimp, su'uv, su'uv	X	X	X
<i>Ribes cereum</i>	White squaw currant	NA	X	-	-
<i>Rosa 28oodsia</i>	Woods' rose	pikikurump, see-avvie	X	-	X
<i>Rumex</i> spp.	Indian rhubarb	nambitu, tuha-kono-be, ku'u, tuha-kono-gip	X	-	-
<i>Salix exigua</i>	Coyote willow	kanav, kah-nav, coo-see suh-ee-be, soo-vee, suh-ee-be, suh-ee-wee	X	-	X
<i>Salix</i> spp.	Willow	kahn-nahv, sah'b, kah-nahv', sah-kahv', kan-av', ka-nav, kanavi, kah-nav, kahnnav, pakanav, pawaxanav	X	X	-
<i>Salvia</i> spp.	Sage	siguwiiipi, pasiits, sangwav, see-goo-we-up, seegoowe-up, nungwukoap, nungwukoap, kwatamanum, saywav, sigimwiap, kung-nuh sah-wabbe, too-bee she-gin-oop	X	X	-
<i>Sarcobatus vermiculatus</i>	Black greasewood	yah-tahmp', tah-uh-be, toh-no-be, yah-tamp', tone-oh-bee	X	X	-
<i>Sclerocactus whipplei</i>	Whipple fishhook	NA	X	-	X
<i>Senecio multilobatus</i>	Unita groundsel	NA	X	-	-
<i>Shepherdia argentea</i>	Buffaloberry	pa'a-u'op	X	-	-
<i>Shepherdia rotundifolia</i>	Roundleaf buffaloberry	pa'a-u'op	X	X	X
<i>Sisymbrium altissimum</i>	Tumble mustard	wa'ai	X	-	X

Table 1.4-2 Tribal Plant Species of Cultural Concern with Potential to Occur (continued)

Scientific Name	Common Name	Southern Paiute Name	Project Area	Southern Alternative	Highway Alternative
<i>Sphaeralcea ambigua</i>	Desert globemallow	tupwiv	X	X	X
<i>Stanleya pinnata</i>	Prince's plume (Indian spinach)	tumar, namvit, tumar, tumaru, who-goo-buh, nambitu, tumaru, nambitu, tumaru, whoo-goop	X	X	X
<i>Stephanomeria exigua</i>	Small wire lettuce	NA	X	-	X
<i>Stephanomeria tenuifolia</i>	Narrow-leaved wire lettuce	tuwishanakoup	X	-	-
<i>Stipa speciosa</i>	Desert needlegrass	NA	X	-	X
<i>Stipa</i> spp.	Needle-and-thread grass	NA	X	-	-
<i>Swertia albomarginata</i>	White-margined swertia	NA	X	-	X
<i>Symphoricarpos longiflorus</i>	Long-flower snowberry	sahn-ah-vee	X	-	-
<i>Taraxacum</i> spp.	Dandelion	NA	X	-	-
<i>Thelesperma megapotamicum</i>	Great threads, Paiute tea	NA	X	X	-
<i>Typha</i> spp.	Cattail	paxamp, pantu'sahwav, taw-e-vah, to-oiv, ta-oiv, tonovi, tonoz	X	-	-
<i>Verbascum thapsus</i>	Wooly mullen	NA	X	-	-
<i>Xanthium</i> spp.	Cocklebur	NA	X	-	-
<i>Yucca baccata</i>	Banana yucca	cho-ram'-pik, sam-ah'-vip, tsam-a-vip, tcimpi, u'wivi, wiisiv, tachumpi, uusi, o-u-se, uusivi, tachumpi, uusiv, uus	X	X	X
<i>Yucca kanabensis</i>	Kanab yucca	NA	X	-	X
<i>Yucca schidigera</i>	Mojave yucca	tachump, u'vimp, tachumpi, uusivi, uusiv	X	-	-
<i>Zigadenus paniculatus</i>	Foothill death camas	koggie-a-den-up, see-goh-oh, tah-besse-e-goh	X	-	-

Source: Stoffle 2020

Key:

APE = area of potential effect

H Alt = Highway Alternative

NA=Not Applicable

S Alt = Southern Alternative

Table 1.4-3 Total Special Status Plant Species Potentially Occurring in the Area of the Action Alternatives

BLM	NPS	Tribe		
		Southern ^(a)	Highway ^(a)	APE ^(a)
25	16	44	61	138

Note:

(a) This value represents a minimum number of species identified by the Tribe as potentially occurring. The APE represents a geographic area substantially larger than the alternatives project areas combined.

Key:

APE = area of potential effect

AZ = Arizona

BLM = Bureau of Land Management

NPS = National Park Service

Tribe = Kaibab Band of Paiute Indians

UT = Utah

1.4.3 Invasive and Noxious Plant Species

The designation of noxious is given to weed species pursuant to state and federal laws. Plants are generally considered to be noxious if they are non-native and negatively affect agriculture, navigation, fish, wildlife, or public health. Invasive weeds are non-indigenous species that adversely affect the habitats they invade, economically, environmentally, or ecologically.

Noxious weed surveys were completed for the Proposed Project in 2010 and are presented in the LPP Final Study Report 12 – Special Status Plant Species and Noxious Weeds (UBWR 2016b). Preparation for field surveys of noxious weeds included the compilation of noxious and invasive weed lists provided by the federal and state land and resource management agencies having jurisdiction over the Project Area.

The BLM provided lists from their Arizona Strip, St. George, Kanab, and Grand Staircase-Escalante Field Offices. The list of federally designated noxious weeds was obtained from the USDA. The NPS list of invasive weeds was provided by John Spence, ecologist at Glen Canyon National Recreation Area. Noxious weed lists were obtained for Arizona and Utah, as well as for Kane County and Washington County, Utah. Russian thistle (*Salsola tragus*), while not listed as noxious or invasive by any of the federal or state agencies, was included on the list of weeds because it is non-native and of considerable concern to land management agencies. From these lists, all noxious weed species deemed as having the potential to occur within the Project Area were compiled into a table containing 89 species (Table 1.4-4). Refer to the LPP Final Study Report 12 – Special Status Plant Species and Noxious Weeds for detailed methods, preparation activities, and data collection as they related to the noxious weed surveys (UBWR 2016b).

The survey for noxious and invasive weeds confirmed the presence of 16 taxa including red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), red stem fillaree (*Erodium cicutarium*), Russian thistle (*Salsola tragus*), tamarisk (*Tamarix species*), poison milkweed (*Asclepias subverticillata*), field bindweed (*Convolvulus arvensis*), Russian olive (*Elaeagnus angustifolia*), halogeton (*Halogeton glomeratus*), Scotch thistle (*Onopordum acanthium*), common purslane (*Portulaca oleracea*), puncturevine (*Tribulus terrestris*), jointed goatgrass (*Aegilops cylindrica*), African or Saharan mustard (*Brassica tournefortii*), Johnsongrass (*Sorghum halepense*), and Siberian elm (*Ulmus pumila*) as referred to in the LPP Final Study Report 12 – Special Status Plant Species and Noxious Weeds (UBWR 2016b). The occurrence of noxious and invasive weeds varied greatly between ecological systems within the survey area. Refer to Table 5-2 in the LPP Final Study Report 12 – Special Status Plant Species and Noxious Weeds (UBWR 2016b). Within the Colorado Plateau Ecological Region, the Colorado Plateau Big Sagebrush Shrubland, the Colorado Plateau Mixed Desert Scrub, and the Colorado Plateau Wash ecological systems each contained 13 of the 16 weed species observed within the survey area, while the lowest occurrence of weed species was documented for the Colorado Plateau Juniper Savanna Ecological System. Within the Mojave Desert Ecological Region, the Mojave Desert Lower Montane Riparian Woodland and Shrubland and the Mojave Desert Mixed Desert Scrub ecological systems each had seven noxious weed species. No noxious weed species were detected in the Mojave Desert Pinyon-Juniper Woodland ecological system. Refer to the LPP Final Study Report 12 – Special Status Plant Species and Noxious Weeds for detailed locations and maps of invasive species and noxious weeds (UBWR 2016a).

Table 1.4-4 Noxious and Invasive Weed Species with Potential to Occur in Project Area

Species		USDA	USFWS	State of Arizona	State of Utah	Washington County, UT	BLM (Arizona Strip)	BLM (St. George)	BLM (Kanab)	BLM (Grand Staircase-Escalante)	Glen Canyon NRA
Scientific Name	Common Name										
<i>Acroptilon repens</i> (<i>Syn. Centaurea repens</i>)	Russian knapweed	-	-	PNW, RNW	-	-	N	-	-	-	-
<i>Aegilops cylindrica</i>	Jointed goatgrass	-	-	PNW, RNW	-	-	-	-	-	-	-
<i>Agropyron repens</i> (<i>Syn. Elytrigia repens</i>)	Quackgrass	-	-	-	NC	-	-	-	-	-	-
<i>Albagi pseudalbagi</i> (<i>Syn. Albagi maurorum</i>)	Camelthorn	-	-	PNW, RNW	-	-	N	-	-	-	N
<i>Alternanthera philoxeroides</i>	Alligator weed	-	-	PNW	-	-	-	-	-	-	-
<i>Asclepias subverticillata</i>	Poison milkweed	-	-	-	-	-	-	N	-	N	-
<i>Brassica tournefortii</i>	African or Sahara mustard	-	I	-	-	-	-	-	-	-	I
<i>Bromus rubens</i>	Red brome	-	I	-	-	-	I	-	-	-	-
<i>Bromus tectorum</i>	Cheatgrass	-	I	-	-	-	I	-	I	-	-
<i>Cardaria</i> spp.	Hoary cress	-	-	-	NB	-	-	-	-	-	-
<i>Cardaria chalepensis</i>	Lens podded hoary cress	-	-	PNW	-	-	-	-	-	-	-
<i>Cardaria draba</i>	Hoary cress	-	-	PNW, RNW	-	-	N	N	-	-	-
<i>Cardaria pubescens</i>	Hairy whitetop	-	-	PNW	-	-	-	-	-	-	-
<i>Carduus acanthoides</i>	Plumeless thistle	-	-	PNW	-	-	-	-	-	-	-
<i>Carduus nutans</i>	Musk thistle	-	-	-	NB	-	-	-	N	-	-

Table 1.4-4 Noxious and Invasive Weed Species with Potential to Occur in Project Area (continued)

Species		USDA	USFWS	State of Arizona	State of Utah	Washington County, UT	BLM (Arizona Strip)	BLM (St. George)	BLM (Kanab)	BLM (Grand Staircase-Escalante)	Glen Canyon NRA
Scientific Name	Common Name										
<i>Cenchrus echinatus</i>	Southern sandbur	-	-	PNW, RGNW	-	-	-	-	-	-	-
<i>Cenchrus incertus</i> (Syn. <i>C. spinifex</i> , <i>C. pauciflorus</i>)	Field sandbur	-	-	PNW, RGNW	-	-	-	-	-	-	-
<i>Centaurea calcitrapa</i>	Purple starthistle	-	-	PNW	-	-	-	-	-	-	-
<i>Centaurea diffusa</i>	Diffuse knapweed	-	-	PNW, RNW	NA	-	N	-	N	-	-
<i>Centaurea iberica</i>	Iberian starthistle	-	-	PNW	-	-	-	-	-	-	-
<i>Centaurea maculosa</i> (Syn. <i>C. biebersteinii</i>)	Spotted knapweed	-	-	PNW, RNW	NA	-	N	-	N	-	-
<i>Centaurea melitensis</i>	Malta starthistle	-	-	-	-	-	I	-	-	-	-
<i>Centaurea repens</i> (Syn. <i>Acroptilon repens</i>)	Russian knapweed	-	-	-	NB	-	-	N	N	-	-
<i>Centaurea solstitialis</i>	Yellow starthistle	-	-	PNW, RNW	NA	-	-	N	-	-	-
<i>Centaurea squarrosa</i> (Syn. <i>C. virgata</i>)	Squarrose knapweed	-	-	PNW	-	-	-	-	N	-	-
<i>Centaurea sulphurea</i>	Sicilian starthistle	-	-	PNW	-	-	-	-	-	-	-
<i>Centaurea virgata</i> (Syn. <i>C. squarrosa</i>)	Squarrose knapweed	-	-	-	NB	-	-	-	-	-	-
<i>Chondrilla juncea</i>	Rush skeletonweed	-	-	PNW	-	-	-	-	-	-	-

Table 1.4-4 Noxious and Invasive Weed Species with Potential to Occur in Project Area (continued)

Species		USDA	USFWS	State of Arizona	State of Utah	Washington County, UT	BLM (Arizona Strip)	BLM (St. George)	BLM (Kanab)	BLM (Grand Staircase-Escalante)	Glen Canyon NRA
Scientific Name	Common Name										
<i>Chrysanthemum leucanthemum</i>	Oxeye daisy	-	-	-	NA	-	-	-	-	-	-
<i>Cirsium arvense</i>	Canada thistle	-	-	PNW NC	-	-	-	-	N	-	-
<i>Cirsium vulgare</i>	Bull thistle	-	-	-	-	-	-	N	-	-	-
<i>Conium maculatum</i>	Poison hemlock	-	-	-	NB	-	-	-	-	-	-
<i>Convolvulus arvensis</i>	Field bindweed	-	-	PNW, RGNW	NC	-	-	N	-	-	-
<i>Coronopus squamatus</i>	Creeping wartcress	-	-	PNW	-	-	-	-	-	-	-
<i>Cucumis melo</i> var. <i>dudaim</i>	Dudaim melon	-	-	PNW	-	-	-	-	-	-	-
<i>Cuscuta</i> spp.	Dodder	-	-	PNW, RNW	-	-	-	-	-	-	-
<i>Cynodon dactylon</i>	Bermudagrass (Except for Washington County)	-	-	-	NB	-	-	-	N	-	-
<i>Cynoglossum officinale</i>	Houndstounge	-	-	-	NC	-	-	-	-	-	-
<i>Drymaria arenarioides</i>	Alfombrilla, lightning weed	N	-	PNW	-	-	-	-	-	-	-
<i>Eichhornia azurea</i>	Anchored water hyacinth	N	-	PNW	-	-	-	-	-	-	-
<i>Eichhornia crassipes</i>	Floating water hyacinth	-	-	PNW, RGNW, RNW	-	-	-	-	-	-	-
<i>Elaeagnus angustifolia</i>	Russian olive	-	-	-	-	-	I	-	-	-	I
<i>Elytrigia repens</i> (Syn. <i>Agropyron repens</i>)	Quackgrass	-	-	PNW, RNW	-	-	-	-	N	N	-
<i>Erodium cicutarium</i>	Red stem filaree, Stork's bill	-	I	-	-	-	-	-	-	-	-

Table 1.4-4 Noxious and Invasive Weed Species with Potential to Occur in Project Area (continued)

Species		USDA	USFWS	State of Arizona	State of Utah	Washington Co., UT	BLM (Arizona Strip)	BLM (St. George)	BLM (Kanab)	BLM (Grand Staircase-Escalante)	Glen Canyon NRA
Scientific Name	Common Name										
<i>Euphorbia esula</i>	Leafy spurge	-	-	PNW	NA	-	-	-	N	-	-
<i>Euryops subcarnosus</i> ssp. <i>Vulgaris</i>	Sweet resinbush	-	-	RNW	-	-	-	-	-	-	-
<i>Halogeton glomeratus</i>	Halogeton	-	-	PNW, RNW	-	-	N	-	-	-	-
<i>Helianthus ciliaris</i>	Texas blueweed	-	-	PNW, RNW	-	-	-	-	-	-	-
<i>Hydrilla verticillata</i>	Hydrilla	N	-	PNW	-	-	-	-	-	-	-
<i>Hyoscyamus niger</i>	Black henbane	-	-	-	NA	-	-	-	-	-	-
<i>Hypericum perforatum</i>	St. Johnsworts	-	-	-	NA	-	-	-	-	-	-
<i>Ipomoea</i> spp.	Morning glory (Except <i>Ipomoea carnea</i> and <i>Ipomoea arborescens</i>)	-	-	PNW	-	-	-	-	-	-	-
<i>Ipomoea triloba</i>	Three-lobed morning glory	-	-	PNW, RNW	-	-	N	-	-	-	-
<i>Isatis tinctorial</i>	Dyers woad	-	-	PNW	NB	-	-	-	N	-	-
<i>Lepidium latifolium</i>	Broad-leaved peppergrass	-	-	-	NB	-	N	N	N	-	N
<i>Linaria dalmatica</i> (Syn. <i>Linaria genistifolia</i> var. <i>dalmatica</i>)	Dalmation toadflax	-	-	-	NB	-	-	-	-	-	-
<i>Linaria genistifolia</i> var. <i>dalmatica</i> (Syn. <i>Linaria dalmatica</i>)	Dalmation toadflax	-	-	PNW, RNW	-	-	-	-	-	-	-
<i>Linaria vulgaris</i>	Yellow toadflax	-	-	-	NA	-	-	-	-	-	-
<i>Lytbrum salicaria</i>	Purple loosestrife	-	-	PNW	NA	-	-	-	N	-	-
<i>Medicago polymorpha</i>	Burclover	-	-	PNW, RGNW	-	-	-	-	-	-	-

Table 1.4-4 Noxious and Invasive Weed Species with Potential to Occur in Project Area (continued)

Species		USDA	USFWS	State of Arizona	State of Utah	Washington Co., UT	BLM (Arizona Strip)	BLM (St. George)	BLM (Kanab)	BLM (Grand Staircase-Escalante)	Glen Canyon NRA
Scientific Name	Common Name										
<i>Nassella trichotoma</i>	Serrated tussock	N	-	PNW	-	-	-	-	-	-	-
<i>Onopordum acanthium</i>	Scotch thistle	-	-	PNW, RNW	NB	-	N	N	-	-	-
<i>Orobanche ramosa</i>	Branched broomrape	N	-	PNW	-	-	-	-	-	-	-
<i>Panicum repens</i>	Torpedo grass	-	-	PNW	-	-	-	-	-	-	-
<i>Peganum harmala</i>	African rue	-	-	PNW	-	-	-	-	-	-	-
<i>Pennisetum ciliare</i>	Buffelgrass	-	-	PNW, RGNW	-	-	-	-	-	-	-
<i>Portulaca oleracea</i>	Common purslane	-	-	PNW, RGNW	-	-	-	-	-	-	-
<i>Potentilla recta</i>	Sulfur cinquefoil	-	-	-	NA	-	-	-	-	-	-
<i>Rorippa austriaca</i>	Austrian fieldcress	-	-	PNW	-	-	-	-	-	-	-
<i>Saccharum ravennae</i>	Ravennagrass	-	-	-	-	-	-	-	-	-	I
<i>Salsola tragus</i>	Russian thistle	-	-	-	-	-	-	-	-	-	-
<i>Salvinia molesta</i>	Giant salvinia	N	-	PNW, RGNW	-	-	-	-	-	-	-
<i>Senecio jacobaea</i>	Tansy ragwort	-	-	PNW	-	-	-	-	-	-	-
<i>Solanum carolinense</i>	Carolina horsenettle	-	-	PNW	-	-	-	-	-	-	-
<i>Solanum elaeagnifolium</i>	Silverleaf nightshade	-	-	-	-	N	-	N	-	-	-
<i>Solanum viarum</i>	Tropical soda apple	N	-	PNW	-	-	-	-	-	-	-
<i>Sonchus arvensis</i>	Perennial sowthistle	-	-	PNW	-	-	-	-	-	-	-
<i>Sorghum</i> spp.	Perennial sorghum spp. (includes but is not limited to <i>S. almum</i> and <i>S. halepense</i>)	-	-	-	NA	-	-	-	-	-	-

Table 1.4-4 Noxious and Invasive Weed Species with Potential to Occur in Project Area (continued)

Species		USDA	USFWS	State of Arizona	State of Utah	Washington Co., Utah	BLM (Arizona Strip)	BLM (St. George)	BLM (Kanab)	BLM (Grand Staircase-Escalante)	Glen Canyon NRA
Scientific Name	Common Name										
<i>Sorghum almum</i>	Perennial sorghum	-	-	-	NA	-	-	-	-	-	-
<i>Sorghum halepense</i>	Johnsongrass	-	-	-	NA	-	-	-	N	N	-
<i>Stipa brachychaeta</i>	Puna grass	N	-	PNW	-	-	-	-	-	-	-
<i>Striga</i> spp.	Witchweed	N	-	PNW	-	-	-	-	-	-	-
<i>Taeniatherum caput-medusae</i>	Medusahead	-	-	-	NA	-	N	-	N	-	-
<i>Tamarix</i> spp.	Tamarisk	-	-	-	-	-	N	-	-	-	-
<i>Tamarix chinensis</i>	Tamarisk, Saltcedar	-	-	-	-	-	-	-	-	-	N
<i>Tamarix ramosissima</i>	Saltcedar	-	-	-	NC	-	-	N	-	-	-
<i>Trapa natans</i>	Water-chestnut	-	-	PNW	-	-	-	-	-	-	-
<i>Tribulus terrestris</i>	Puncturevine	-	-	PNW, RGNW	-	-	N	-	-	-	-
<i>Ulmus pumila</i>	Siberian elm	-	-	-	-	-	-	-	-	-	I

Key:

BLM = Bureau of Land Management

I = Invasive Species

N = Noxious Weed Designation

NA = Noxious Class A (Early Detection Rapid Response)

NB = Noxious Class B (Control)

NC = Noxious Class C (Containment) (State of Utah Noxious Weed List)

NRA = National Recreation Area

PNW = Prohibited Noxious Weed

RGNW = Regulated Noxious Weed

RNW = Restricted Noxious Weed (State of Arizona Department of Agriculture Noxious Weed List)

USDA = U.S. Department of Agriculture

USFWS = U.S. Fish and Wildlife Service

- Not listed as noxious or invasive by any agencies, but of considerable concern to land managers.

2 Results/Environmental Consequences

2.1 No Action Alternative

Under the No Action Alternative, no construction would occur; therefore, there would be no direct or indirect effects on special status plant species and there would be no additional potential for the spread of noxious weeds and invasive plant species. Current resource conditions would continue under the No Action Alternative; however, unrelated planned projects under current and future authorizations and land uses may affect special status plants and may contribute to presence of noxious weeds and invasive species.

2.2 Southern Alternative

Five special status plants (BLM Sensitive and NPS) were documented during the 2009/2010 survey effort within the proposed Southern Alternative area. These species include Kanab's barrel cactus, Cutler's spurred lupine, Kane breadroot, nipple phacelia, and Atwood's pretty phacelia. The number of individuals observed for each species is presented in Table 2.2-1. Three special status plant species were documented during the same survey period within the proposed Highway Alternative. Those species and the numbers observed are presented in Table 2.2-2.

Proposed Project-related adverse effects to special status species would occur in the short term due to the scale and complexity of the Proposed Project, without measures to avoid and/or minimize potential effects. Even with such measures, short-term adverse effects are unavoidable, but can be minimized by implementing the applicable EPMS. Long-term adverse (i.e., greater than five years) effects are also anticipated due to the potential that some degree of noxious weeds and invasive plant species establishment would occur in addition to already existing cover by such plants. As with the clearing, grading and restoration related EPMS, the noxious weeds and invasive plant species related EPMS would also minimize adverse effects. EPMS that identify specific measures, techniques and approaches that would minimize and/or avoid potential adverse effects during the construction period. Consequently, it is anticipated that overall adverse effects to special status, noxious weeds and invasive plant species would occur in the short and long-term, with restoration efforts based primarily on managing the spread and persistence of noxious and invasive species, while also focusing on avoiding and minimizing adverse effects to special status species in the short-term to minimize the effort required to conserve these species in the long-term.

Table 2.2-1 Special Status Plant Species Observed along Southern Alternative Alignment

Southern Alternative	Number of Special Status Plant Species Found in LPP ROW	
	BLM	NPS
Kanab barrel cactus (<i>Echinocactus polycephalus</i> var. <i>xeranthemoides</i>)	9	-
Cutler’s spurred lupine (<i>Lupinus caudatus</i> var. <i>cutleri</i>)	53	-
Kane breadroot (<i>Pediomelum epipsilum</i>)	5,339	-
Nipple phacelia (<i>Phacelia mammalariensis</i>)	1	1,687
Atwood’s pretty phacelia (<i>Phacelia pulchella</i> var. <i>atwoodii</i>)	1,351	-

Key:

BLM = Bureau of Land Management
 LPP = Lake Powell Pipeline Project
 NPS = National Park Service
 ROW = right-of-way

Table 2.2-2 Special Status Plant Species Observed Along Highway Alternative Alignment

Highway Alternative	Number of Special Status Plant Species Found in LPP ROW		
	BLM	NPS	KIR
Cutler’s spurred lupine (<i>Lupinus caudatus</i> var. <i>cutleri</i>)	53	-	-
Kane breadroot (<i>Pediomelum epipsilum</i>)	5,302	-	30
Nipple phacelia (<i>Phacelia mammalariensis</i>)	1	1,687	-

Key:

BLM = Bureau of Land Management
 LPP = Lake Powell Pipeline Project
 KIR = Kaibab Indian Reservation
 NPS = National Park Service
 ROW = right-of-way

It is anticipated that construction-related activities would affect special status plant species directly. Clearing and grading activities along the Project Area would produce short-term effects to some of the individual plant species. However, implementing EPMs would ensure that most sensitive plant species would be conserved in the long-term by avoiding plant populations and establishing protective buffers. Seed collection and plant salvage by stockpiling them outside the construction area would aid in restoring the ROW areas during the post-construction restoration period. Other EPMs that specifically address minimizing initial effects and that provide general guidelines for reestablishing these plant species as soon as possible are considered standard. Additionally, where construction activities would occur in Arizona, the state would require permit(s) to collect and salvage many species, some of which are those on the BLM and NPS sensitive plant lists. Although UBWR does not present an EPM specific to the need to acquire the State of Arizona permits, there is one that identifies the need to acquire all federal, state and local permits.

Construction of permanent features including access roads are likely to involve actions such as vegetation clearing, soil excavation, piling of soil materials, increased vehicle, equipment, and human traffic, which could result in losses of individual plants and degradation of habitat. Effects may include increased erosion, dust deposition, and spread of invasive species and noxious weeds. UBWR proposes to use agency approved seed mixes on federal managed lands to aid in ROW restoration as seeded species would provide a means for the establishment of groundcover that would stabilize the topsoil, thereby minimizing erosion and potential for invasive species and noxious weeds. In general, this is a good practice for restoring disturbed areas as such mixes are often composed of predominantly native plant seeds; although non-native species may be used depending on site conditions and land management objectives to ensure restoration success standards are achieved. Where special status plant species occur, it would represent a necessary means to successful plant species reestablishment.

Indirect effects as a result of soil disturbance and vegetation removal increases the potential for colonization of invasive species and noxious weeds, which could affect special status plants and their habitats through competition and increased fire regimes (as can be seen with cheatgrass). Drift of herbicides associated with treatment of noxious weeds within the Project Area may inadvertently cause mortality to special status plants. Increased access on new and existing access roads could result in dust deposition, which could inhibit photosynthesis, reproductive ability, and various metabolic processes for individual plants. Increased access in the Project Area could also increase potential for illegal collection of commercially desirable special status plants.

Overall, the proposed EPMs presented in Section 1.3, above, constitute the most effective and practical methods to avoid, minimize or reduce construction effects on naturally occurring plant species of cultural and conservation concern. Further development of these measures during project design, with implementation during construction, would serve to avoid and minimize project-related effects to the extent practicable. An EPM describes the need to develop a ROW restoration plan prior to initiating construction and have the BLM and NPS be involved in its development. Construction, operation, and maintenance associated with the Southern Alternative and application of the EPMs would produce direct and indirect effects on special status plants but could avoid and/or minimize effects to the greatest extent practicable.

Invasive species and noxious weed occurrences and concentrations were similar along both the Southern Alternative and Highway Alternative (see LPP Final Study Report 15 – Vegetation Communities [UBWR 2016a]). Noxious weeds and invasive plant species are treated in a similar manner in the EPMs. In general, concentrated areas of these species would be identified pre-construction so control measures can be specifically targeted. Beyond that, EPMs require that efforts be made to prevent spread and introduction of these species in areas where they are not substantially established. This is an important consideration for a linear project as construction activities can readily spread these species over considerable distances. To address this substantial concern, UBWR is proposing EPMs that include an Integrated Weed Management Plan be prepared and submitted to the state and federal agencies. EPMs would also require heavy equipment (e.g., excavators and side booms) always be inspected prior to entering the construction ROW areas. Additionally, these measures would include frequent off-site equipment cleaning to minimize spreading these species and use of certified weed free materials. Collectively, these measures would represent a practicable way to manage the spread of noxious weeds and invasive plant species.

Although the Southern Alternative would avoid the Kaibab Indian Reservation, effects to these plant species are considered. As with the BLM and NPS special status plant species, the Tribe's species are expected to be affected in the same manner. This includes construction activity effects as well as the proposed EPMS for reestablishing plant species and vegetation communities during the post-construction ROW restoration period. Furthermore, some of these species are expected to receive additional protection measures via the State of Arizona native plant species rules. Therefore, although these species would be affected through construction related activities associated with the Southern Alternative, they would be reestablished to the same extent as other special status plant species. The Southern Alternative may affect 44 plants that are culturally important to the Tribe.

Climate change may affect plant species and communities within the ecological regions associated with the Proposed Project; however, it is difficult to predict how individual plant species would be affected. Since the water would be delivered via a pipeline, with the water being drawn from a single source, Lake Powell, that action is not anticipated to affect natural water sources within the Project Area. Therefore, the Proposed Project as it relates to the effects of climate change would have no direct effect on special status plants, noxious weeds, or invasive plant species.

2.2.1 Mitigation Measures

Minor changes to the EPMS should be implemented to meet agency-specific goals and objectives for management of special status plant resources.

The UBWR has proposed comprehensive EPMS that would address vegetation community restoration and specific measures to address special status plants, noxious weeds and invasive plant species, throughout the Proposed Project, where no impervious surfaces or open water storage would be installed. Although such measures would assist restoration, they may not be enough to achieve success. The Bureau of Reclamation (Reclamation) requires additional mitigation measures to assist with restoration success. These measures are presented below:

- Identify areas where watering may not be practicable to address potential alternative measures.
- Aside from topsoil segregation and replacement, UBWR has indicated that excess soil material will be redistributed across the affected cleared Proposed Project ROW areas post-construction to a depth estimated at increasing the ROW grade by 4.5 inches. UBWR shall assure that excess soil material shall not be placed on the topsoil where redistributed.

In addition, UBWR's EPMS proposed special status plant surveys where these species have been identified during the previous survey effort; however, limiting surveys could result in special status plants outside of those areas going undetected. The following measure is proposed:

- Pre-project habitat assessments will be completed across 100 percent of the Proposed Project disturbance area within potential special status plant habitat prior to any ground-disturbing activities to determine if suitable habitat is present. Special status plant surveys will be conducted within suitable habitat to determine occupancy in accordance with agency approved methods, protocols, and reporting requirements.
- Agency and Tribe plant lists may change over time. The UBWR shall coordinate with BLM, NPS and the Tribe to acquire a current list of these species before initiating surveys described above.

2.3 Highway Alternative

Effects to special status plants, noxious weeds and invasive plant species resulting from the proposed Highway Alternative would be similar to those for the Southern Alternative. Therefore, the analysis in Section 2.2, Southern Alternative, is applicable to the Highway Alternative.

Along the Highway Alternative, the 2009/2010 survey effort documented three special status plants including Cutler's spurred lupine, Kane breadroot, and nipple phacelia. There are 61 plants that are culturally important to the Tribe that have been identified along the Highway Alternative that may be affected by construction, operation, and maintenance (see Supplement #1 in Appendix D, Analysis and Perspective of the Tribes).

2.3.1 Mitigation Measures

All mitigation measures identified in Section 2.2.2, above, are also applicable to the Highway Alternative.

2.4 Comparative Analysis of Alternatives

Due to the scale and complexity of the Proposed Project, differentiating potential effects from the Southern and Highway Alternatives is difficult. However, one exception needs to be considered. The Highway Alternative has the potential to affect more plant species that are of cultural concern to the Tribe than the Southern Alternative. For plant species occurring on the Kaibab Indian Reservation, there may be additional protections requested by the Tribe that would apply to the reservation. Based on surveys for special status plants and invasive species/noxious weeds, and excluding plants of cultural concern, it is anticipated that effects between the two action alternatives would be similar.

3 References

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4 Glossary

Area of analysis. The Proposed Project’s alternative alignments construction ROW areas; other facilities associated with the pipeline such as hydro stations (i.e. power generating stations) and reservoirs; electrical transmission lines; booster pump stations and construction staging areas.

Area of potential effect. An area identified primarily for cultural resource assessment that is typically larger than a proposed project’s disturbance area.

Industry standards or practice. These are actions, methods, techniques and other measures that are implemented as standard procedures during project construction, and, the operation and maintenance phases to manage activities. These practices typically use standard approaches to minimize potential negative issues arising from a project.

Environmental Protection Measures. An action or activity proposed by the State of Utah Board of Water Resources that are part of the project design that would minimize and/or avoid potential adverse effects to resource.

Noxious weed and invasive plant species. Any plant designated by a federal, state, or county government as injurious to public health, agriculture, recreation, wildlife, or property. More specifically, invasive plants are not native to an area in which it become established, altering a vegetation community.

Special status plant species. Plant species identified by the BLM and NPS as species in need of protection through conservation measures. This also includes plant species identified by the Kaibab Band of Paiute Indians as culturally important. Species protected under the Endangered Species Act are not included in this definition.

5 Acronyms and Abbreviations

AAC	Arizona Administrative Code
ADEQ	State of Arizona Department of Environmental Quality
BLM	Bureau of Land Management
BMP	Best Management Practices
CI	Compliance Inspector
CIC	Compliance Inspector Contractor
EAP	Environmental Access Plan
EPM	Environmental Protection Measure
ESA	Endangered Species Act of 1973
GIS	geographic information system
GPS	global positioning system
LPP	Lake Powell Pipeline Project
MBTA	Migratory Bird Treaty Act

NEPA	National Environmental Policy Act of 1969
NPS	National Park Service
POD	Plan of Development
Reclamation	Bureau of Reclamation
ROW	right-of-way
SGFO	St. George Field Office
SWPPP	Storm Water Pollution Prevention Plan
Tribe	Kaibab Band of Paiute Indians
UBWR	Utah Board of Water Resources
UDEQ	Utah Department of Environmental Quality
UDWRe	Utah Division of Water Resources
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service



— BUREAU OF —
RECLAMATION

Lake Powell Pipeline Project Appendix C-16: General Fish and Wildlife

**Coconino and Mohave Counties, Arizona
Kane and Washington Counties, Utah**

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1 Introduction/Affected Environment

The effects of the proposed Lake Powell Pipeline Project (LLP or Proposed Project) to general fish and wildlife resources has been considered but eliminated from further study. The analysis and justification are provided in the following sections of this appendix.

1.1 Regulatory Framework

Tables 1.1-1 through 1.1-3 provide the relevant state and federal statutes, regulations, and policies applicable to general fish and wildlife resources in the Project Area. For more information on Arizona Revised Statutes, please see <https://www.azleg.gov/arsDetail/?title=17>. For more information on Arizona Administrative Code for the Arizona Game and Fish Commission, please see https://apps.azsos.gov/public_services/Title_12/12-04.pdf.

Table 1.1-1 Relevant Regulations – Aquatic Species

Topic	Regulation
Aquatic Species Jurisdiction	<ul style="list-style-type: none"> Utah Code 23-15-2; Arizona Revised Statutes 17-201, 17-231.
Aquatic Species Protection	<ul style="list-style-type: none"> Utah Code 23-14-1, 23-14-18, and 23-14-19 and Rules R657-3, R657-13, and R657-16; Arizona Revised Statutes 17-201, 17-231, and 17-255.01.
Prevent Invasive Species Infestation	<ul style="list-style-type: none"> Utah Code 23-27-301 and 23-27-401 and Rules R657-60; Arizona Revised Statute 17-255.01 and Commission Rules Article 9.

Table 1.1-2 Relevant Statutes, Regulations, and Policies for Wildlife Species

Wildlife Species	Statutes, Regulations, and Policies
Big Game	<ul style="list-style-type: none"> Utah Code 23-14-1, 23-16, and Rules R657-5; Arizona Revised Statutes 17-201, 17-231; National Park Service Law, Policy, and Other Guidance (2006).
Small Game	<ul style="list-style-type: none"> Utah Code 23-14-1, 23-48, and Rules R657-6, R657-9, R657-10, R657-11, R657-33, and R657-54; Arizona Revised Statutes 17-201, 17-231; National Park Service Law, Policy, and Other Guidance (2006).

Table 1.1-2 Relevant Statutes, Regulations, and Policies for Wildlife Species (continued)

Wildlife Species	Statutes, Regulations, and Policies
Nongame	<ul style="list-style-type: none"> • BLM MOU WO-230-2010-04; • BLM IM WY-2013-005; • BLM WO IM-2010-156; • BLM Manual 6500; • Utah Code 23-14-1, and Rules R657-3, R65713, R657-19, and R657-53; • Arizona Revised Statutes 17-201, 17-231; • National Park Service Law, Policy, and Other Guidance (2006); • Migratory Bird Treaty Act (50 CFR 10.13), as amended (Public Law 86-732, 90-578, 91-135, 93-300, 95-616, 99-645, 105-312); • Bald and Golden Eagle Protection Act of 1940, as amended (Public Law 86-70, 87-884, 92-535, and 95-616).

Key:

BLM = Bureau of Land Management

CFR = Code of Federal Regulations

IM = Instruction Memorandum

MOU = Memorandum of Understanding

WO = Washington Office

Table 1.1-3 Relevant Federal Statutes, Regulations, and Policies

General Fish and Wildlife	Statutes, Regulations, and Policies
	<ul style="list-style-type: none"> • Section 7(c) of the Endangered Species Act of 1973 (Public Law 93-205); • Fish and Wildlife Coordination Act; • Clean Water Act of 1977, as amended (Public Law 92-500).

1.2 Methodology

There are no regulatory guidelines for wildlife population or habitat loss or effects. The significance criteria are based on past experience with similar projects and best professional judgment. The following criteria were used to determine effects on general fish and wildlife resources:

- Project activities that would result in disturbance to fish or wildlife habitat or populations. A substantial disturbance could destroy a large area of utilized habitat, disturb, or displace a resident population or subpopulation, or result in losses of a large number of individuals of the species within the area of potential effect. Disturbance may arise from direct construction effects on habitat or indirectly by noise or human activity that would reduce habitat values or disrupt breeding or other critical behaviors. Adverse effects would be based on the status, population dynamics, behavior, habitat availability, and quality for each species group (e.g., game or non-game species) relative to the type, intensity, and duration of a specific effect. Species that are locally common or have a high reproductive potential and ability to rapidly adapt to disturbance would have fewer potential effects than species with small populations, are restricted to limited habitats, have low reproductive potential, or have a limited ability to disperse from disturbed habitats.

- Comments received during scoping highlighted a concern about project activities that would cause a substantial loss (temporary or permanent) or unavailability of crucial seasonal range or migration corridors for big game during critical use periods (as designated by game management agencies). Temporary effects are specified by duration in months or years but are typically related to the duration of direct construction activities.

Environmental consequences are evaluated based on the area of the analysis, duration, season, and intensity of effects in relation to the sensitivity of the resource. The area of analysis extends beyond the designated construction area and can include miles of downstream habitat or even entire watershed effects for aquatic resources. For wildlife resources, crucial seasonal habitat, migratory routes, and home range are considered, depending on potential effects on the species. Individual species requirements inform the effects analysis in addition to state and federal regulations.

The Proposed Project would involve lands and waters in two states (Utah and Arizona) and would cross federal, state, and privately managed lands. The drainage basins involved include Lake Powell and the Colorado River and the Virgin River, a tributary to Lake Mead. The Proposed Project would affect numerous intermittent and ephemeral washes, gulches, and creeks within these drainage basins. (Intermittent washes, gulches, and creeks are those that have surface water flow only during certain times of the year, primarily during the wet-season, but are normally dry during summer months and drought conditions; whereas, ephemeral washes, gulches, and creeks have surface water flows that are short-lived and occur from precipitation, snowmelt, or short-term water releases, but are otherwise dry.) However, only the Paria River, Kanab Creek near Fredonia, and Virgin River have perennial flows within potentially affected areas and can be expected to provide habitat for aquatic resources. (Perennial flows are surface water flows that are continuous year-round.) In addition, the immediate area around the water intake in Lake Powell (also described in Appendix C-12, Aquatic Invasive Species) has the potential to entrain resident fish from Lake Powell or facilitate the transfer of aquatic invasive species to other drainages. The construction disturbance area, surrounding lands, and drainages are included in the analysis of effects for the Proposed Project.

The analysis of wildlife and habitat used data described in Final Study Report 15 - Vegetation Communities (UBWR 2016a) and observations of wildlife made by vegetation surveyors during their field work. Additional wildlife data were used from the Utah Division of Wildlife Resources (UDWR) Conservation Data Center (UDWR 2016), the Utah Geographic Information Systems (GIS) Portal (AGRC 2010; UDWR 2016), the Arizona Game and Fish Department (AZGFD) Natural Heritage Program Data Management System (AZGFD 2010), NatureServe (NatureServe 2010), Kaibab Band of Paiute Indians (Tribe), Wildlife Species of Cultural Concern, and standard field guides for wildlife species. Utah critical winter wildlife habitat mapping data were obtained from the Automated Geographic Reference Center (AGRC 2010); Arizona critical habitats were obtained from the Arizona Bureau of Land Management GIS website (BLM 2010). The AZGFD provided protected data on mule deer movement in the Project Area (AZGFD 2020, protected data). This data, along with Utah's Paunsaugunt mule deer information provided in Cramer and Hamlin (2019), informed the effects analysis and refined the necessary mitigation measures for mule deer. Information provided by the Arizona Strip BLM informed the necessary mitigation measures for desert bighorn sheep.

Analysis of construction and facility operation noise impacts used data from LPP Final Study Report 7 - Noise (UBWR 2016c), and methodology previously described in the Utah Lake Drainage Basin Water Delivery System Wildlife Resources and Habitat Technical Report (CUWCD 2005).

1.3 Environmental Protection Measures

For a full list of environmental protection measures (EPMs) for biological resources, please refer to Appendix B of the LPP Plan of Development (POD) (UDWRe 2020; provided in Appendix E, Plan of Development). The following EPMs have been proposed by the Utah Board of Water Resources (UBWR), and are disclosed in the POD.

1.3.1 General Biological EPMs and Construction Considerations

B.5.1. Qualified biologists will act as biological monitors and be present on-site during project-related actions that may impact special status biological resources. The U.S. Fish and Wildlife Service (USFWS) and authorized BLM officer will approve the selected consulting firm/biologists to be used to implement the terms and conditions of the Biological Opinion or other agreements between Utah Division of Water Resources (UDWRe), BLM, and other federal or state agencies. Any biologist and/or firm not previously approved will submit a curriculum vitae and be approved by the USFWS and BLM authorized officer. Other personnel may assist with implementing terms and conditions that do not involve tortoise handling, monitoring, or surveys, but only under direct field supervision of the USFWS and BLM- approved biologists. Specific biologist requirements for Mojave Desert tortoise are described further in the tortoise measures below.

B.5.2. All necessary federal and state handling permits will be obtained.

B.5.3. The biological monitors will be responsible for determining compliance with measures as defined by the Biological Opinion or other agreements between UDWRe, the BLM, and other federal or state agencies. Biological monitors will have the authority to halt non-emergency construction activities that are not in compliance with these measures. Stop work directives will be effective long enough to remedy the immediate situation and will be limited to the equipment and parties involved in the situation. All action of noncompliance or conditions of threat to special status species will be recorded immediately by the biological monitor and reported to UDWRe. UDWRe will immediately report all such action and conditions to the BLM for reporting to the USFWS and/or Utah Division of Wildlife Resources or Arizona Game and Fish Department (AZGFD). Biological monitors will be qualified biologists and/or botanists, as determined by the BLM.

B.5.4. No harassment or harming of animals will be allowed. Animals found entrapped in open holes, open pipes/culverts, or excavations will be reported to the biological monitor. Before any pipe with a diameter of three inches or greater is buried, capped, or moved it will first be inspected for animals. If the wildlife is unable to escape on its own, it will be moved from the construction area by the biologists, in accordance with applicable federal and state guidelines.

B.5.5. The Environmental Compliance Representative will report to the BLM and other federal or state agencies, in accordance with (right-of-way) ROW requirements, any entrapment, death, or injury to special status species.

B.5.6. Prior to discharge of water used for hydrostatic testing of the pipeline and other facilities, all appropriate discharge and biological permits will be obtained, and the drainage locations will be surveyed for special status species and nesting migratory birds. The BLM will be notified of any special status species or nesting migratory birds found in the drainage area and will determine whether additional measures need to be implemented prior to the discharge, beyond those identified in project permits and any other applicable agreements or requirements between UDWR and the BLM, USFWS, and Utah Division of Wildlife Resources or AZGFD.

B.5.7. Biological resource monitoring and compliance updates will be provided to the BLM throughout the construction period for record keeping and project documentation purposes. These will include information on ongoing construction activities, monitoring, wildlife and special status species observations, species relocations, entrapped special status species, and any other pertinent biological issues. Updates may be written or oral, as agreed upon by the BLM and UDWR or AZGFD contract biologists. An annual written report will be provided to the BLM.

B.1.24. While driving on paved roads or marked dirt roads, posted speed limits will be maintained by construction vehicles and personnel. While driving within the construction area, ROW, or on unposted dirt roads, a maximum speed limit of 25 miles per hour (20 miles per hour in Mojave Desert tortoise habitat) will be required of construction vehicles and personnel to reduce dust and allow for observation and avoidance of wildlife, livestock or visitors in the road.

B.1.35. Escape ramps will be placed at each end and every ¼- mile of any open trench or other excavation deeper than 4 feet to allow escape of wildlife or livestock that may become entrapped. Escape ramps will not be required at the end of a trench where active pipelaying and backfilling is occurring. The spacing of escape ramps may be adjusted upon approval of the BLM to ensure ramps are placed in areas near water sources and visible livestock/wildlife trails. The escape ramps will consist of loose dirt at a 2:1 or shallower slope. Excavation areas that are left open overnight will be checked by construction personnel every morning and evening and directly prior to backfilling.

1.3.2 Big Game

B.5.79. There will be no permanent site fencing along the pipeline alignment away from above-ground facilities in order to avoid restricting seasonal movement patterns of big game. Temporary fencing may be used to protect wildlife during pipeline construction. Temporary fencing may be in place at a given location for an extended period after completing a pipe segment's construction to prevent grazing on the ROW while vegetation is being re-established. Temporary fence specifications will be coordinated with the BLM field offices.

B.5.80. In consultation with the BLM or NPS, and Utah Division of Wildlife Resources or AZGFD, a plan will be developed to either turn existing water sources on or off to aid in animal distribution away from active construction areas. UDWR will coordinate with ranchers and other land permittees within the project hydrographic basins to ensure that existing artificial water sources continue to be available during construction for big game. If construction is within two miles of an existing artificial water source, supplemental temporary stock tanks will be placed in a suitable location away from the construction area. The location of the temporary stock tanks will be selected in consultation with appropriate ranchers and land permittees, the BLM or NPS, and Utah Division

of Wildlife Resources or AZGFD, and after appropriate site-specific environmental review and analysis has occurred. Water tanks will be filled using trucks and maintained for the duration of construction in this area.

B.5.81. Where appropriate, restrict LPP construction activities in big game calving/fawning/kidding/lambing grounds and crucial summer range from April 15 through June 30.

B.5.82. Pipeline and electrical transmission line construction in crucial mule deer winter range will be coordinated with Utah Division of Wildlife Resources and the BLM and scheduled during the period from May 1 through September 30 between Highway 89 milepost 31 and 50 to avoid impacts on crucial mule deer winter habitat. If these dates are determined to be too restrictive to efficiently construct the pipeline, then alternative minimization techniques will be discussed with Utah Division of Wildlife Resources and the BLM.

B.5.83. Unavoidable impacts on Paunsaugunt deer herd crucial winter habitat could be mitigated by compensatory measures, including contributions to ongoing mule deer habitat improvement projects and construction of a new improved crossing structure at Highway 89 milepost 39.5. Compensatory mitigation measures will be coordinated as necessary with Utah Division of Wildlife Resources.

B.5.84. Where appropriate, restrict LPP construction activities within crucial bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.

1.3.3 Aquatic

B.5.85. During pipeline construction, BMPs will be implemented to minimize effects on fish (if present) from the temporary rerouting of intermittent flow in Paria River and in other intermittent washes. Practices will comply with Utah Division of Wildlife Resources, Arizona Game and Fish Department, and Clean Water Act permitting requirements.

For stream crossings which may have flow (e.g., Paria River, Kanab Creek), the construction technique will be open cut with temporary diversion of flow, in accordance with US Army Corps of Engineers and State of Utah or State of Arizona permit requirements, as applicable. A dewatering plan will be prepared and submitted to the BLM for approval in advance of construction (see 1 B.1.44 in Appendix B, POD 2020). There are no wetlands that will be crossed by the requested ROWs.

Crossings of dry or ephemeral washes will be constructed by standard cut and cover, with implementation of erosion control measures in accordance with a project approved Storm Water Pollution Prevention Plan (SWPPP) and as required under the Clean Water Act Section 404 permit (see B.1.46 through B.1.56 in in Appendix 7 B, POD 2020).

Additional EPMs proposed as stormwater and erosion control in the POD 2020 that reduce potential effects to aquatic resources include:

B.1.46. A General Permit for Stormwater Discharges Associated with Construction Activity (UTRC00000 & Arizona Department of Environmental Quality [ADEQ] CGP) will be obtained prior to any surface disturbance that includes clearing, grading, excavation, and/or stockpiling.

B.1.47. A site-specific SWPPP will be prepared and implemented for each construction contract. The plan will be submitted to the BLM and other applicable agencies. The SWPPP will identify all potential sources of pollution which could affect the quality of stormwater discharges from the construction site, describe the construction activities that disturb soils at the site, provide an estimate of the total disturbance area, and identify waters of the United States within one mile of the site. The SWPPP will identify erosion and sediment control measures, compliance inspection metrics, maintenance, and reporting. A copy of the SWPPP will be kept on site and updated as needed to manage pollutants or reflect changes in site conditions.

B.1.48. A SPCC Plan (40 CFR 112) will be prepared and submitted to the BLM and other applicable agencies. The plan will describe measures that will be taken to properly store, handle, and prevent hazardous materials from being picked up in stormwater and transported offsite. It will also contain measures related to clean up procedures and time frames, notification procedures, and restoration efforts for the affected area.

B.1.50. Erosion and sediment control will be implemented using both non-structural and structural best management practices (BMPs). Non-structural BMPs examples include not performing topsoil stripping during wet weather if there is risk of topsoil eroding or washing off the site in violation of NPDES permits, and soil stabilization such as mulch, slope tracking, seeding, and erosion matting. Structural examples are silt fence, wattles, and ditch checks. Any netting for erosion and sediment control will be of natural-fiber (non-plastic material). BMP specifications will be included in the project specific SWPPP(s).

B.1.53. For construction activities crossing a dry wash, spoil stockpiles will be pushed away and stored a minimum of 10 feet away from the ordinary high-mark and silt fencing will be used to limit sediment movement from the stockpile; stockpiles without silt fences will be located a minimum of 100 feet away from dry washes. All stockpiles will be kept within project ROWs.

B.1.54. At a minimum, a 10-foot wide vegetation buffer strip and other erosion control measure such as straw bales or wattles (certified weed free) will be maintained between the cleared ROWs and an adjacent drainage. The timing of clearing, grading, trenching, pipe installation, stabilization and seeding banks during drainage crossings will be minimized to promote expedient efforts towards restoration.

B.1.55. Non-stormwater discharges, including from pipeline and facility hydrostatic testing, will be directed into existing dry washes or other downstream project facilities as feasible. Best management practices such as diffusers or other energy dissipaters, straw bales (certified weed free), or filter sacks will be used to prevent bank instability and erosion. Discharges will be managed and monitored so that they do not exceed the typical 2- to 5-year flood event of the existing washes, and to allow debris accumulations to be removed as needed. Discharges will also be managed to not exceed bank levels and downstream banks and terrestrial vegetation will be monitored and discharges stopped if above bank erosion is detected.

B.1.56. Stormwater compliance inspections will be conducted by UDWRe throughout construction at least once every 7 days regardless of rain events, or every 14 days and additionally within 24 hours of a storm event greater than 0.5 inches to ensure compliance with the SWPPP 1 and Utah Environmental Quality (UDEQ) and ADEQ permits. Inspections will include disturbed areas of the project that have not been stabilized, material and equipment storage areas that are exposed to precipitation, all erosion and sediment control measures installed within the ROWs, all structural control measures, and all locations where vehicles enter and/or exit the ROWs. Inspectors will notify the construction manager to where requirements of the SWPPP are not being followed, and implement corrective action as required to achieve compliance. Inspection reports will be maintained on file and submitted to the BLM and UDEQ or ADEQ upon request.

B.1.57. A Hydrostatic Discharge Plan will be submitted to the BLM for approval, prior to the start of any discharges.

B.1.58. Water quality of the hydrostatic testing water will be tested prior to discharge in accordance with UDEQ or ADEQ permit requirements.

B.1.59. At the completion of construction, all non-natural berms, ditches, temporary erosion and sediment controls, bales, wattles, and other energy dissipating/filtering devices not required for protection of facilities will be removed, and drainage function restored. Soils used for erosion control structures and soils captured by those structures will be distributed across the ROWs prior to replacing the topsoil and reclamation. Bales, wattles, and other energy dissipating/filtering devices will be disposed of in approved trash receptacles. The ground surface will be graded to blend into the preconstruction topography and/or slopes.

B.1.60. Washes and ephemeral drainage function will be restored. Soils over the pipeline will be compacted in place for maximum pipeline stability, and additional stabilization measures such as natural fiber erosion matting and seeding will be installed where necessary. Stabilization measures such as rip rap may be required to protect facilities and prevent increased erosion in washes. If armoring of a channel crossing with rip-rap or concrete is necessary due to high erosion potential, those areas and erosion control methods will be identified for BLM, USACE, or other appropriate agency based upon the jurisdictional status of the feature.

B.1.61. Post-construction stormwater management will consist of permanent erosion control measures installed as necessary to protect areas disturbed by UDWRe activities. These could include but are not limited to vegetation restoration, tracking and matting of steep slopes to maintain stability, berming (contoured to blend with existing landscape), and/or placement of appropriately colored riprap. Final stabilization of soil disturbed areas will be achieved when vegetation restoration and other erosion control measures are completed in accordance with the BLM-approved Restoration Plan and UDEQ or ADEQ stormwater permit requirements.

1.3.4 Migratory Birds (including Raptors)

Bird Conservation Strategy – measures to reduce impacts on migratory birds, bald and golden eagles, and other sensitive birds; the plan will identify measures to be implemented during construction, including but not limited to, the identification of critical nesting periods for bird species anticipated to be within the ROWs, preconstruction surveys to be conducted for nesting

raptors and migratory birds (survey to be conducted by qualified biologist less than 10 days prior to work at site), and the construction avoidance buffer size and time duration for active raptor and migratory bird nests (ranging from 100 feet to 1 mile, depending on species). The plan will identify design features and measures to be implemented during operation, including description of design standards, any post-construction monitoring, and adaptive measures, such as marking of power lines to avoid or minimize impacts; the bird conservation strategy will be developed in coordination with the BLM for compliance with Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA); for Utah, Interim Management N. UT-2017-007 Guidance for Utah Bureau of Land Management to Meet Responsibilities under MBTA and Executive Order 13186 will be followed, and IM 2006-096 Utah Supplemental Planning Guidance–Raptor Best Management Practices, and applicable BLM Resource Management Plan prescriptions.

B.5.64. As feasible, UDWR will conduct initial ground clearing outside of the critical nesting period for migratory birds.

B.5.65. If initial ground clearing will occur during the critical nesting period, pre-construction surveys for nesting migratory birds will be conducted by a qualified biologist (no more than 10 days prior to construction). If an active nest is identified, a no-activity buffer (ranging from 100-feet to 1-mile, depending on species; Romin and Muck 2002, USFWS 2014) is to be established around the nest site and remain in place until the young have fledged and/or the nest becomes non-active.

B.5.66. If nesting migratory birds are found during the pre-construction surveys, UDWR will follow measures identified within the Bird Conservation Strategy (see measure B.1.1). If feasible, the bird nests will be avoided until the birds have fledged. T-posts and rope fencing will be used to mark the avoidance areas, which will also be signed to inform construction personnel to avoid the area. If avoidance is not feasible, UDWR will consult with the BLM.

B.5.67. Power poles, perch discouragers, and line spacing will be designed and constructed in accordance with the recommendations of the Avian Power Line Interaction Committee (APLIC 2006), in order to reduce the potential to electrocute or otherwise harm raptors.

B.5.68. UDWR will continue working with Utah Division of Wildlife Resources or AZGFD through Partners in Flight and other associated monitoring programs to support on-going surveys for eagles, ferruginous hawks, and other raptors within the general project vicinity.

B.5.69. If trees located within the ROWs cannot be avoided and must be removed for construction, the trees will be removed outside of the nesting period for raptors or other migratory birds, as feasible. If removal of a tree during the nesting period is required, the tree will first be surveyed by a qualified biologist to ascertain the presence of any nests. Should active nests of raptors or migratory birds be present, the tree will not be removed until the birds have fledged.

B.5.70. Where appropriate, restrict permitted activities from May 1 through July 15 within 0.5 mile of raptor nest sites unless the nest site has been determined to be inactive for at least the previous five years; the specific avoidance buffer distance and time period for raptor species may be refined in the Bird Conservation Strategy (see measure B.1.1). Construction could occur during restricted periods if sufficient monitoring of the nest is completed during the present active season and the nest is found to be unoccupied for that year (presence/absence surveys according to protocols).

1.4 Existing Conditions

1.4.1 Lake Powell

Lake Powell is the second largest water storage reservoir in the United States (Gustaveson and Blommer 2013). The lake is formed by Glen Canyon Dam and is the impounded waters of the Colorado River. At a full pool elevation of 3,700 feet, Lake Powell has a storage capacity of about 26.2 million acre-feet, a surface area of approximately 160,800 acres, shoreline length of about 1,900 miles, and a total upstream to downstream length of 210 miles (Mueller and Horn 1999).

Lake Powell has both shallow-water and deepwater habitats. Shallow-water habitats compose about 5 percent of the total aquatic habitat and mainly are found in the upper end of the lake and around the rim of the reservoir. The remaining 95 percent of the aquatic habitat is the deepwater pelagic zone of the reservoir. The deepwater pelagic zone consists of most of the aquatic habitat because the steep walls of the flooded canyon that formed Lake Powell limit the extent of shallow water habitat (Mueller and Horn 1999). The lake has an average depth of 167 feet, and maximum depth of 561 feet at Glen Canyon Dam when at full pool (Mueller and Horn 1999).

The lake's existing warmwater and coolwater fish community became established from resource agency stocking efforts, accidental introductions, and recruitment of native Colorado River fish species. Important recreational and ecologically important species present in the lake include striped bass (*Morone saxatilis*), channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), walleye (*Sander vitreus*), bluegill (*Lepomis macrochirus*), black crappie (*Pomoxis nigromaculatus*), gizzard shad (*Dorosoma cepedianum*), and threadfin shad (*Dorosoma petenense*). The lake was also stocked with rainbow trout (*Oncorhynchus mykiss*) and Kokanee salmon (*Oncorhynchus nerka*) starting in the 1960s, but that effort was subsequently discontinued in 1981 because the lake proved to be more suitable for warmwater species (Gustaveson and Blommer 2013).

Striped bass is the most sought-after recreational species in Lake Powell, followed by smallmouth and largemouth bass. Creel surveys performed by Utah Department of Natural Resources (Utah DNR) from May 2010 through April 2013 indicate striped bass accounts for 42 percent of the angler catch, whereas smallmouth and largemouth bass account for 37 and 6 percent of the angler catch, respectively (Gustaveson and Blommer 2013).

Mueller and Horn (1999) performed a hydroacoustic assessment of Lake Powell and mapped fish biomass on a seasonal basis. Results of their survey indicate the distribution of fish throughout the lake is skewed toward tributary inflow locations and nursery habitats during all seasons, except late fall and winter when fish move down-reservoir to overwinter in deepwater habitats. During the summer, fish are typically found near the surface taking advantage of warmer temperatures, higher dissolved oxygen levels, and abundant food. During the spring and early fall, fish move from pelagic habitats to littoral areas to spawn and forage. Larger fish are typically found near or below the thermocline, inhabiting deeper, cooler habitats. Most of the large fish are likely striped bass and common carp and some walleye. In late fall, as reservoir temperatures cool, fish migrate from shallow to deeper habitats, where they concentrate at depths greater than about 120 feet. Fish in Lake Powell typically move to the side canyons during the winter where they are found in narrowly defined depths ranging between about 120 to 240 feet.

The invasive quagga (*Dreissena bugensis*) mussel is found throughout Lake Powell. Spawning primarily occurs in the spring when female mussels release their eggs to be fertilized by male mussels, although spawning is evident throughout the year. Within a few days the drifting fertilized eggs develop into free-swimming larvae called veligers and disperse. After two to three weeks, the mussel veligers settle out of the water column under the weight of their own shell and attach to firm surfaces where they continue to grow and mature. In the Great Lakes these invasive mussels have been documented at depths near 540 feet (Hoddle 2011). For information on quagga mussels and the control plan for the Proposed Project, please see the Draft Environmental Impact Statement (DEIS) Section 3.10, Aquatic Invasive Species, and Appendix C-12, Aquatic Invasive Species.

1.4.2 Colorado River Downstream of Glen Canyon Dam

Construction and operation of Glen Canyon Dam significantly changed the Colorado River from its pre-dam state. Before the dam was constructed, the Colorado River was sediment laden and contained diverse habitats of pools, runs, rapids, gravel, and sandy shoals and bars (Reclamation 2008). Changes to the river downstream since the construction of Glen Canyon Dam include cooler water temperatures, a dynamic flow regime associated with hydropower generation, and reduced sediment transport. Currently, the river downstream of Glen Canyon Dam is a low-gradient reach that has few debris-fan deposits and small riffles and can be generally characterized as a stable gravel and cobble-bedded channel (Reclamation 2016). Collectively, these changes favored the invasion of non-native species at the expense of native Colorado River species.

The existing fish community downstream of Glen Canyon Dam is extensive and consists of 23 non-native, warmwater species, two non-native coldwater species, and five native species. The occurrences of these 32 species are thoroughly discussed in Reclamation (2016). Important fish species include the non-native, but recreationally important, rainbow trout and the native species: humpback chub (*Gila cypha*), razorback sucker (*Xyrauchen texanus*), bluehead sucker (*Catostomus discobolus*), flannelmouth sucker (*Catostomus latipinnis*), and the speckled dace (*Rhinichthys osculus*). The humpback chub and the Colorado pikeminnow (*Ptychocheilus lucius*) are listed as federally endangered, and the bluehead sucker is an Arizona species of greatest conservation need. These special-status species are discussed in Appendix C-18, Threatened and Endangered Species.

The construction and operation of Glen Canyon Dam also affected the food-base and macroinvertebrates downstream of the dam. These changes resulted in a macroinvertebrate assemblage that has low species diversity. The most abundant aquatic macroinvertebrates in the reach include *Gammarus lacustris* (an introduced non-native amphipod), midges (order Diptera, family Chironomidae), snails (*Physella* sp. and *Fossaria obrussa*), and segmented worms (especially Lumbricidae and Tubificidae), which are associated with Cladophora beds, as well as ooze- and gravel-dwelling worms (Naididae and Tubificidae), fingernail clams in the family Sphaeriidae (*Pisidium variable* and *P. walkeri*), and the planarian *Dugesia* spp. (Reclamation 2016). In addition, the reach supports few mayflies, stoneflies, or caddisflies due to cold water releases and the large varial zone along the shoreline from water level fluctuations associated with dam operations (Reclamation 2016). However, recent trends indicate that humpback chub and flannelmouth sucker are increasing in abundance, correlated with increasing distance from Glen Canyon Dam. Some of this success can likely be attributed to changes in dam operations. However, much success is due to the non-native fish management in the Colorado River. Recent monitoring surveys and trends indicate a lower prevalence of non-native fishes with an increasing prevalence of native fishes (Van Haverbeke et al. 2013; Rogowski et al. 2018). The invasive New Zealand mudsnail and quagga mussel are also present

downstream of Glen Canyon Dam (Reclamation 2016). Appendix H-14, Aquatic Invasive Species, contains additional analysis on quagga mussels.

1.4.3 Paria River Drainage

The Paria River Basin is about 1,360 square miles in area and originates near Bryce Canyon National Park, flowing southeast towards its confluence with the Colorado River near Lees Ferry, Arizona, downstream of Glen Canyon Dam. The Paria River itself is generally considered a perennial system and is fed by numerous ephemeral washes and streams. However, the Paria River can have intermittent flows resembling an ephemeral stream near the U.S. Highway 89 crossing downstream to the Utah-Arizona border, where the river becomes perennial.

The ephemeral washes and streams within the Paria River drainage only provide aquatic habitat when they are wet, which typically occurs during spring snowmelt and during flash floods other parts of the year.

In the vicinity of the Proposed Project crossing at U.S. Highway 89, the Paria River provides riverine habitat that is low gradient, consisting mainly of sand and silt intermixed with some gravel and cobble substrate (Figure 1.4-1). Depending on flow, the wetted stream width ranges from 2.4 to 101.0 feet (UBWR 2016b).

Several species of fish are known to occur in the Paria River, including flannelmouth sucker, bluehead sucker, rainbow trout, speckled dace, and redbreast shiner (*Richardsonius balteatus*). Hoffnagle Valdez, and Speas (1999) sampled the lower Paria River in Arizona in 1998 from its confluence with the Colorado River upstream 4.8 river miles, or about 40 river miles downstream from the Proposed Project near the U.S. Highway 89 bridge. Results of the sampling indicate that flannelmouth and speckled dace were the most abundant species collected, with mean catch-per-unit effort that ranged from 0.1 to 3.6 and 0.1 to 3.7, respectively. (Hoffnagle, Valdez, and Speas [1999] reported catch-per-unit effort as number caught per 100 square meters seined.) Bluehead sucker, redbreast shiner, and rainbow trout, however, were in low abundance with mean catch-per-unit effort near 0.1 (Hoffnagle, Valdez, and Speas 1999). In addition to flannelmouth sucker, other special-status species have the potential to occur in the Paria River, including the federally endangered humpback chub and razorback sucker as well as the woundfin (*Plagopterus argentissimus*), which has been introduced to the Paria River by the AZGFD. These species are described in Appendix C-18, Threatened and Endangered Species.

1.4.4 Kanab Creek Drainage

The Kanab Creek basin is about 2,360 square miles in area, and begins near Alton, Utah, and flows south into Arizona and ends at its confluence with the Colorado River within Grand Canyon National Park. From its headwaters to Fredonia, Arizona, Kanab Creek flows are perennial, but downstream of Fredonia and through the Kaibab Indian Reservation (KIR), creek flows are intermittent because of upstream water uses. Kanab Creek again becomes perennial just downstream of the creek's confluence with Bulrush Wash. Similar to the Paria River, flows of Kanab Creek are supported by numerous ephemeral washes and streams and groundwater seeps. The ephemeral washes that the Proposed Project could cross have silt, sand, and gravel substrates with some shoreline vegetation with little other cover. Flows in these ephemeral washes mostly occur during spring runoff and flash-flood events.



Figure 1.4-1. Upstream (A) and downstream (B) views of the Paria River at the Proposed Project U.S. Highway 89 crossing in May 2018 (Source: GoogleEarth 2018, as modified by Commission staff).

The Proposed Project could cross Kanab Creek at two locations: (1) near Fredonia, Arizona (Highway Alternative), and (2) just south of the KIR (Southern Alternative). Figure 1.4-2 shows Kanab Creek near the Highway Alternative. These photographs illustrate that little water is present, but sufficient soil moisture is present to support riparian vegetation.

In perennial areas of the creek upstream of its confluence with the Colorado River, the creek is low-gradient with slow riffles, long runs, and pools with predominantly gravel and sand substrate. The creek supports several species of fish, including flannelmouth sucker, speckled dace, bluehead sucker, and rainbow trout. The special-status flannelmouth sucker and bluehead sucker are discussed in Appendix C-17, Sensitive Species – Fish and Wildlife.



Figure 1.4-2. Kanab Creek at the Highway Alternative crossing (Source: UBWR 2016b).

1.4.5 Sand Hollow Reservoir

Sand Hollow Reservoir is the proposed terminus of the Proposed Project. The reservoir is located near St. George and Hurricane, Utah. Sand Hollow Reservoir has a surface area of about 1,300 acres, an average depth of 45 feet and a maximum depth of about 95 feet (Utah DNR 2015). The fish community is considered a blue-ribbon warmwater fishery by the Utah DNR. Important recreational species present in the reservoir include bluegill, largemouth bass, black bullhead, and black crappie (Utah DNR 2015). The reservoir lacks a vegetated shoreline, but some emergent vegetation is located along the southern and eastern shorelines. A single quagga mussel was discovered attached to a docked boat in the reservoir in 2010, and the reservoir has been managed to prevent the spread of the invasive quagga mussel since then.

1.4.6 Virgin River Drainage

The Virgin River originates from its headwaters in Utah and flows approximately 200 miles to its terminus at Lake Mead, Nevada. In general, the Virgin River is a low-gradient stream with wide channels and predominantly sandy substrate with some gravel, cobble, and boulders. Repeated sampling indicates the stretch of the Virgin River from the Ash Creek confluence to the Santa Clara River confluence is composed of run (81 percent), pool (12 percent), and riffle habitat (7 percent) habitat (UBWR 2016b). Within this same stretch, wetted channel widths vary from approximately 9 feet to over 30 feet.

The Virgin River basin is known to support six native and up to 15 non-native species of fish. Table 1.4-1 contains compiled survey results for the Virgin River between Pah Tempe and the Washington Fields Diversion for spring and fall 2017–2019. Red Shiners, a once common non-native species, have been successfully eradicated from the Virgin River in Utah. In Arizona, red shiners, which migrated upstream from Lake Mead, are numerically dominant and considered to be a major factor limiting juvenile recruitment of woundfin and Virgin River chub (Kegerries et al. 2018; Grover 2019). This stretch of the Virgin River encompasses the portion of the river where sewer and non-sewer return flows from Lake Powell water piped to Sand Hollow Reservoir would enter the river.

Table 1.4-1. All fish captured and catch per effort (CPE; number of fish per 50 m²) by reach during full pass distribution surveys between Pah Tempe and the Washington Fields Diversion, spring and fall 2017-2019.

Species	Total	Fish Density (number of fish per 50 m ²)	Native / Non-native
Woundfin	13,396	0.498	Native
Virgin River chub	25,681	0.955	Native
Virgin spinedace	387	0.014	Native
Speckled dace	11,755	0.437	Native
Desert sucker	8,088	0.301	Native
Flannelmouth sucker	948	0.035	Native
Green sunfish	253	0.009	Non-native
Largemouth bass	155	0.006	Non-native
Black bullhead	239	0.009	Non-native

Source: UDWR data provided by Richard Fridell, Washington County Field Office Manager (Kegerries et al. 2018; Grover 2019).

Of the nine species listed in Table 1.4-1, the virgin spinedace, speckled dace, desert sucker, and flannelmouth sucker are sensitive species, and the Virgin River chub and woundfin are federally listed as endangered. Special-status species are discussed further in Appendix C-17, Sensitive Species – Fish and Wildlife, and the Virgin River chub and woundfin are discussed in the DEIS Section 3.15, Threatened and Endangered Species, and Appendix C-18, Threatened and Endangered Species.

1.4.7 Quail Creek Reservoir

Quail Creek reservoir is north of the Virgin River near Hurricane and St. George, Utah, and can receive Lake Powell water via pipeline from Sand Hollow Reservoir. Quail Creek Reservoir is a large reservoir that has a surface area of 590 acres and average and maximum depth of 68 and 190 feet, respectively (Utah DNR 2015). The fish community is considered a blue-ribbon warmwater fishery by the Utah DNR. Important recreational species include black bullhead, black crappie, bluegill, largemouth bass, and rainbow trout, which are stocked by the Utah DNR (Utah DNR 2015). The reservoir lacks a vegetated shoreline, but some emergent vegetation exists along the western shoreline.

1.4.8 Wildlife

Wildlife occurring in the Project Area include species adapted to the arid climate and limited resources of the Colorado Plateau and Mohave Desert ecosystems. UBWR (2016b) provides complete lists of wildlife species observed during the UBWR's surveys, as well as additional species likely to occur in the area.

1.4.8.1 Big Game Habitat and Migration Routes

The Utah DWR established areas that are crucial seasonal ranges for mule deer, desert bighorn sheep, and pronghorn, species that occur in the Project Area and require large ranges for seasonal migrations. The Utah DWR classified seasonal ranges on the basis of distribution, abundance, forage availability, and animal access. "Crucial habitat" is defined as "sensitive use areas that, because of limited abundance and/or unique qualities, constitute irreplaceable crucial requirements for high interest wildlife." Additional areas are recognized as important seasonal migration routes, especially for mule deer.

The AZGFD has categorized habitat characteristics for mule deer and pronghorn on the Arizona Strip. Mule deer habitat categories are based on several factors, such as topography, forage and cover, availability of water, and limiting factors such as prohibitive fencing. The eastern portion of the Southern Alternative route crosses through habitat categorized as "Winter Crucial," where deer management should focus on increasing or maintaining browse species, such as cliffrose (*Purshia mexicana*), sagebrush (*Artemisia* spp.), oak (*Quercus* spp.), four-wing saltbush (*Atriplex canescens*), winterfat (*Krascheninnikovia lanata*), and bitterbrush (*Purshia* spp.) to provide over-winter forage for the mule deer populations in the area. The AZGFD has also identified desert bighorn sheep habitat in Arizona from habitat analysis that evaluates a combination of slope, topography, aspect, vegetation, proximity to escape cover, and water availability.

Figure 1.4-3 shows the identified habitat categories for these species contained in GIS files in the Utah GIS Portal and in the AZGFD Heritage Data Management System, which contains “crucial” and “high value” seasonal big game ranges in Arizona (these GIS coverages are maintained by the states of Arizona and Utah). Because the Tribe has jurisdiction over wildlife management on Tribal lands, the state GIS classifications do not extend into these areas. However, based on vegetation information in the final license application, we expect similar habitat quality is also present on Tribal lands. Crucial ranges for these three species are discussed in the following sections.

Mule Deer

The Utah mule deer crucial winter range lies west of the Cockscomb and south of U.S. Highway 89 and on Little Creek Mountain. There is a recognized major migration route for the Paunsaugunt mule deer herd that migrates across U.S. Highway 89 between the Cockscomb and Kanab, Utah (U.S. Highway 89 mileposts 37 to 48, Figure 1.4-4). Arizona and Utah characterize this herd as a premium species population and an important sportsman resource. The herd is subject to high traffic-related mortality on U.S. Highway 89, and motorist warning signs exist in high-use, deer-crossing locations. Wildlife fencing and improved wildlife undercrossings of U.S. Highway 89 along migration routes reduce potential for vehicular mortality.

The Arizona mule deer crucial winter range is located just south of the Utah border from Coyote Valley to U.S. Highway 89A, including the Buckskin Mountain area, and south of the KIR on both sides of Kanab Creek Canyon. High-quality, year-round mule deer habitat is located on the Paria Plateau, east of the KIR both north and south of U.S. Highway 89A, and from the Yellowstone Mesa north along the Cedar Ridge to the Cottonwood Point Wilderness, crossing U.S. Highway 389. Mule deer are also a wildlife species of cultural concern to the Tribe within northern Arizona. Mule deer habitat is found within the KIR.

Desert Bighorn Sheep

The Utah desert bighorn sheep crucial winter range occurs north of U.S. Highway 89 in the Glen Canyon highlands and Fourmile and Jack Riggs Benches areas, and crosses the highway at the Cockscomb, extending south through the Paria Canyon–Vermilion Cliffs Wilderness onto the Paria Plateau in Arizona. Another area of year-round crucial range is located on top of the Vermilion Cliffs and Canaan Mountain in Utah.

Desert bighorn sheep habitat in Arizona has been identified from habitat analysis that evaluates a combination of slope, topography, aspect, vegetation, proximity to escape cover, and water availability. To escape predators, bighorn sheep prefer rough, rocky terrain with slopes greater than 20 percent, as is found in Kanab Creek Canyon. Desert bighorn sheep likely obtain some of the moisture they need from succulent vegetation. During the hot summer months, the sheep stay in shaded areas near water as much as possible and are seldom found more than 3 miles from dependable water sources. When rain or snowfall occurs, bighorn sheep expand their use of suitable habitat and range out from permanent waters. They also commonly drink from ephemeral pools of water found in rock pockets. Bighorn sheep prefer rough, rocky terrain with slopes greater than 20 percent to escape predators. The sheep are rarely found far from this escape cover (BLM 2015).

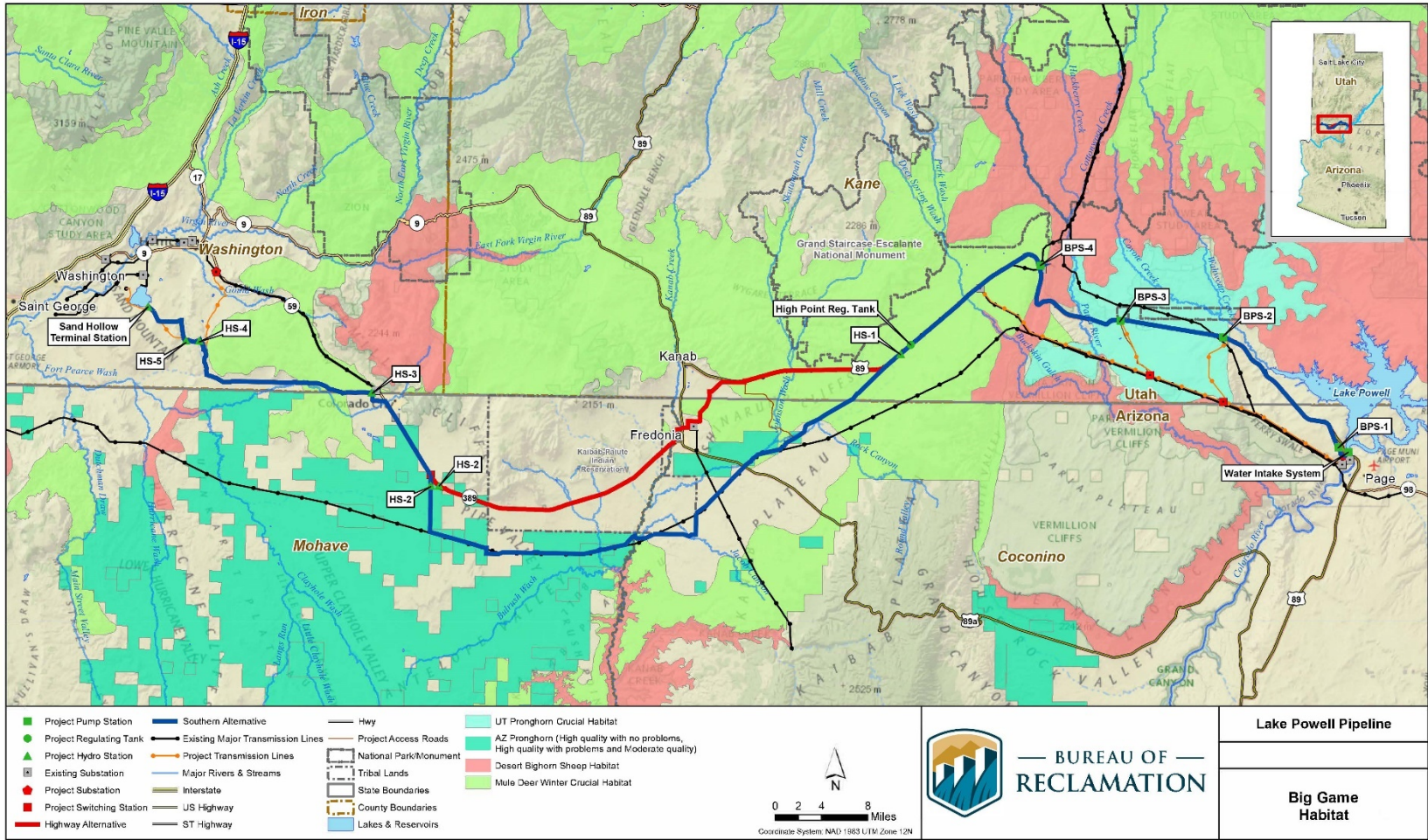
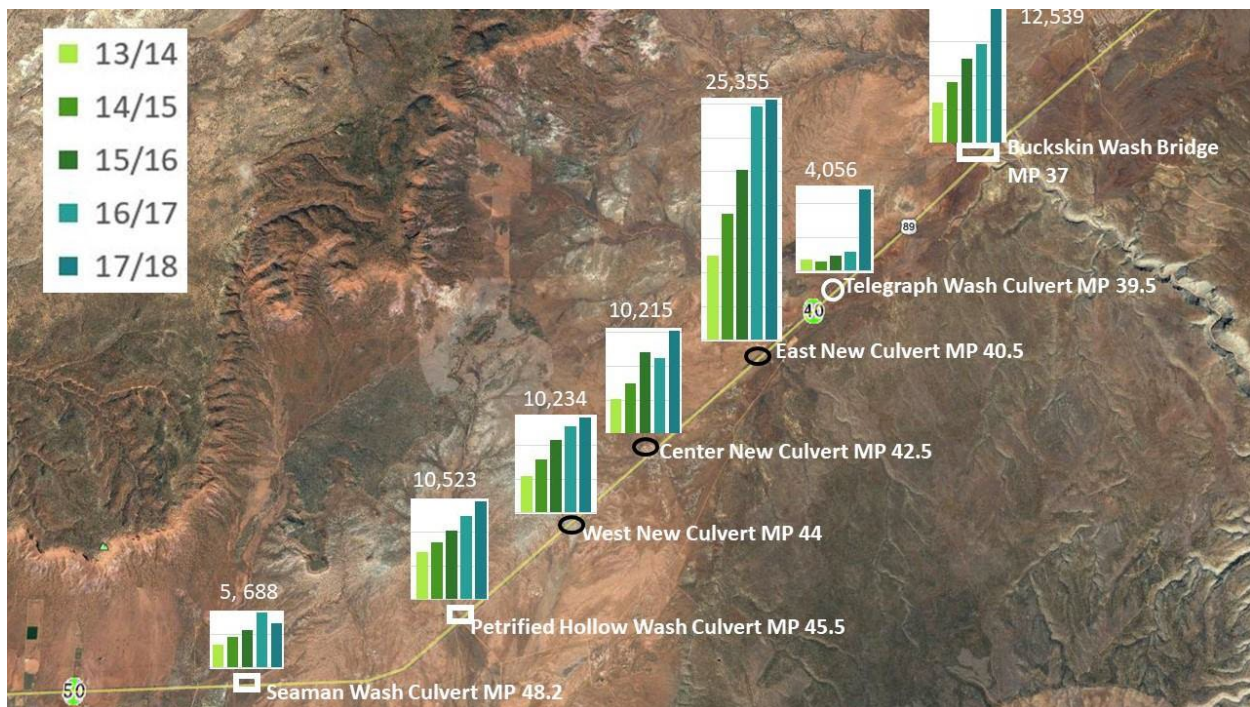


Figure 1.4-3 Big Game Habitat Crossed by the Proposed Project (Source: Stantec 2020).



Source: <https://www.udot.utah.gov/main/uconowner.gf?n=9353379532914605>

Figure 1.4-4 Important big game crossing structures on U.S. Highway 89. The graphs indicate number of movements through the structure during the study period 2013–2018.

Arizona desert bighorn sheep habitat is located on the rim of the Vermilion Cliffs on the Paria Plateau and in Kanab Creek Canyon south of the KIR. Approximately 62,030 acres of suitable habitat occurs along the Vermilion Cliffs, which the AZGFD identifies as the Paria Canyon–Vermilion Cliffs Habitat Area. The Vermilion Cliffs National Monument Resource Management Plan (BLM 2008a) allocated 57,070 acres of this habitat as the Vermilion Cliffs Wildlife Habitat Management Area. Approximately 54,500 acres of suitable habitat occurs within the Kanab Creek drainage, which the AZGFD identifies as the Kanab Creek Habitat Area. The Arizona Strip Field Office Resource Management Plan (RMP) (BLM 2008b) allocated the portion of this habitat on BLM-administered lands as the Kanab Creek Wildlife Habitat Management Area. The BLM established these management areas to manage the habitat for the benefit of desert bighorn sheep. The rough and convoluted terrain in these management areas provide excellent bighorn sheep habitat. Desert bighorn sheep are also a wildlife species of cultural concern to the Tribe within northern Arizona.

Desert bighorn sheep are present in Kanab Creek Canyon, which would be crossed by Southern Alternative route. After Grand Canyon National Park was expanded in 1974, supplemental transplants of desert bighorn sheep were made in lower Hack Canyon to ensure a huntable population was maintained. Several desert bighorn sheep watering facilities were constructed overlooking Kanab Creek Canyon. The Bighorn Sheep Management Plan, as amended in 2014, estimated that the Kanab Creek Habitat Management Area (41 percent of which is on BLM-

administered land, with the other 59 percent on National Forest System lands) can support up to 820 bighorn sheep. In total, 63 have been translocated into this locality between 1985 through 1996.

Pronghorn

High-value year-round pronghorn range occurs on the East Clark Bench on both sides of U.S. Highway 89 between Big Water and the Paria River in Utah. Arizona does not define crucial pronghorn seasonal range; however, high quality pronghorn habitat “with problems” is located south of the KIR and west of Kanab Creek and in the Yellowstone Mesa area near the southwestern corner of the KIR. Pronghorn are also a wildlife species of cultural concern to the Tribe within northern Arizona. Based on similar suitable vegetation communities identified nearby and previous surveys, pronghorn occur within the KIR (Lorraine Christian, personal communication).

1.4.8.2 Migratory Birds

A variety of migratory bird species inhabits the vegetation communities present throughout the analysis area (see LPP Study Report 15 – Vegetation Communities [UBWR 2016a]). Increased species diversity generally occurs in areas exhibiting greater vegetation structure, soil moisture, and available open water, such as wetlands and riparian areas. Species that inhabit wetland and riparian habitats are generally limited to the perennial and intermittent drainages, marshes, and the margins of reservoirs, lakes, and ponds or in the immediate vicinity of these areas. A wide variety of passerine species occurs within the analysis area throughout the year; however, they are most abundant during migration and the breeding season.

Bald and golden eagles are protected under the BGEPA and the MBTA and are considered sensitive species by the BLM in Arizona. Raptor species that could occur as residents or migrants within the analysis area include eagles, hawks, falcons, accipiters, owls, and kites (see LPP Final Study Report 21 – Wildlife Resources [UBWR 2016b]).

Bald Eagle

The bald eagle was removed from the federal list of threatened and endangered species in July 2007 (72 FR 37346, July 7, 2007). Bald eagles remain protected under the BGEPA and the MBTA and remain under post-delisting monitoring. The bald eagle is a Utah species of concern for Kane and Washington counties, an AZGFD species of wildlife concern, and a BLM sensitive species on the Arizona Strip (see Appendix C-17 Sensitive Species – Fish and Wildlife). Bald eagles inhabit coastal areas, estuaries, unfrozen inland waters, and some arid areas of the western interior and southwestern portion of the United States. They prefer areas with high water-to-land edge, and areas with unimpeded views, including both horizontal and vertical aspects. Areas selected for as wintering habitat will have an adequate food supply, and have open water such as river rapids, impoundments, dam spillways, lakes, and estuaries (AZGFD 2010). Bald eagles are rare nesters in Utah, with none recorded in or near the Proposed Project study area (UDWR 2016); Utah Gap Analysis mapping shows potential wintering habitat in Kane and Washington counties. Bald eagle populations use Washington County from November to April. Important bald eagle habitat includes Lake Powell, Leeds Creek, Quail Creek, Quail Creek Reservoir, the Santa Clara and Virgin Rivers, and the Hurricane City sewer lagoons. Occurrences recorded in Arizona are generally in the central region of the state (AZGFD 2010), although some have been observed on the Arizona Strip in winter. The area of potential effect includes suitable waterbodies that could provide foraging habitat

for bald eagles; therefore, transient eagles could roost near the study area (see LPP Final Study Report 13 – Special Status Wildlife Resources [UBWR 2016d]).

Golden Eagle

The golden eagle is a BLM sensitive species in the Arizona Strip. The golden eagle is a USFWS bird of conservation concern and protected under the BGEPA. Golden eagles nest on cliffs near open country (UDWR 2016) and in high desert scrub. High-value habitat is located widely through southern Utah and northern Arizona (UDWR 2016). Nesting, roosting, and foraging by golden eagles occur throughout the Project Area. Aerial and ground-based raptor nest surveys were conducted within suitable raptor nesting habitat to provide information on potential raptor activity and occupancy (with an emphasis on golden eagles) during the three-day period of October 4 through 6, 2011. This survey was conducted in October 2011, and therefore, the species that constructed the nest or last year's occupancy and nesting success could not be determined in most cases. However, nine adult golden eagles were observed, four of which were near recorded nest sites. During the survey, 142 individual raptor nests were documented; 91 nests were located within the 1-mile buffer and 51 nests were found within the 1- to 2- mile buffer. Most nests were located on cliff habitats (129 nests, 91 percent of all nests); of the remaining nests documented, nine were tree nests (6 percent of all nests) and four were transmission-tower nests (3 percent of all nests) (see LPP Final Study Report 21- Wildlife Resources [UBWR 2016b]).

2 Results/Environmental Consequences

2.1 No Action Alternative

Under the No Action Alternative, the Proposed Project would not be built; there would be no request for a water exchange contract, an easement, or ROWs for the Proposed Project, and the BLM would not amend the RMP. Therefore, there would be no effects to general fish and wildlife resources.

2.2 Southern Alternative

Potential effects to mule deer would be reduced as a result of incorporating the EPMs and mitigation measures. The construction closure during October 20 to May 3 would minimize concerns with mule deer migration and wintering. Effects to desert bighorn sheep would occur for two to three years due to construction of the Proposed Project through important habitat in the Kanab Creek Wildlife Habitat Management Area. The construction closure during February 1 to April 30 would minimize construction concerns with disturbing bighorn sheep and their habitat. Disturbance from construction activities would occur for two to three years for the entire Project, but localized effects on fish and wildlife would be expected on a timescale of months. The Proposed Project would have minimized effects on crucial ranges and migration routes for mule deer, desert

bighorn sheep, and pronghorn (Table 2.2-1) as a result of implementing the EPMs and mitigation measures.

Mule Deer

The Proposed Project water conveyance pipeline corridors would cross crucial winter mule deer range and cross a known migration route of the Paunsaugunt mule deer herd along U.S. Highway 89 west of the Cockscomb (Figure 1.4-3). About 42.55 acres of winter range and 16.21 acres of migration habitat (corridors) would be temporarily disturbed (two to three years of construction activity), restored, and revegetated as part of the Proposed Project. EPM B.5.82 states, “Pipeline and electrical transmission line construction in crucial mule deer winter range will be coordinated with Utah Division of Wildlife Resources and the BLM and scheduled during the period from May 1 through September 30 between Highway 89 milepost 31 and 50 to avoid impacts on crucial mule deer winter habitat. If these dates are determined to be too restrictive to efficiently construct the pipeline, then alternative minimization techniques will be discussed with Utah Division of Wildlife Resources and the BLM.” However, after consultation with AZGFD experts, construction would be restricted during October 20 through May 3 in mule deer migration areas between U.S. Highway 89 milepost 40.5 to 45.5 and crucial winter range (about 4.7 miles) near the Kanab Creek Area of Critical Environmental Concern (ACEC) (Cramer and Hamlin 2019; Figure 1.4-4). For clarification, construction would only be allowed in these areas during May 4 to October 19. Disruption of the migration habitat would not exceed the significance criteria due to this mitigation measure.

Johnson Canyon is another important migration area recently discovered (<https://wildlifemigration.utah.gov/>). No crossing structures currently exist there, and it was not included in the recommended areas to restrict construction timing. There would be temporary disturbance of the Paunsaugunt mule deer population if construction occurred near Johnson Canyon during May 4 to October 19. There would be temporary disturbance from construction access roads and staging areas in crucial winter mule deer range. During construction, the area within the noise effect area would have temporary reduced habitat values. However, because construction in these areas would be scheduled outside of the high-use season, effects would not exceed the significance criteria. Table 2.2-1 summarizes the effects to the mule deer habitat as a result of implementing the Southern Alternative.

Desert Bighorn Sheep

Desert bighorn sheep are sensitive to human disturbance. Human encroachment in bighorn sheep habitat affects the species through habitat fragmentation, increased noise, and an increased number of humans. Numerous researchers have documented altered bighorn sheep behavior in response to human-related disturbance, including hiking, camping, and motorized vehicle use. Bighorn sheep may also alter their use of essential resources resulting in physiological effects or abandonment of traditional habitat as a result of human disturbance (Wiedmann and Bleich 2014). Frequent vehicle activity causes sheep to reduce or abandon their use of water sources and surrounding areas. In addition, energy losses due to disturbances (flight, loss of foraging time, and increased stress levels) might result in deleterious effects on physiology, behavior, or fat reserves of sufficient magnitude to reduce survival and reproductive success. Research has shown that particular types of human activity were the most influential variable affecting the behavioral response of bighorn sheep to disturbance. Interactions with hiking parties cause bighorn sheep to flee much more often than interactions with vehicles (Papouchis, Singer, and Sloan 2001). Bighorn sheep would likely avoid the Proposed Project construction area in Kanab Creek and Hurricane Wash and, therefore, be temporarily displaced

during the period of construction occurring outside of the restriction designated by the mitigation measures.

Construction activities and human presence would result in a localized and temporary increase in noise that would likely cause sheep to temporarily avoid the area within ¼ mile of the site. However, the potential for impacts on desert bighorn sheep under this alternative would be reduced by implementing construction restrictions during critical life cycle periods such as during lambing season. EPM B.5.84 states, “Where appropriate, restrict LPP construction activities within crucial bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.” However, after discussion with Arizona BLM experts, they did not feel the late summer restrictions were necessary (Christian 2020). Therefore, the necessary mitigation measure would be, “Where appropriate, restrict project construction activities within bighorn sheep habitat from February 1 through April 30.” For clarification, construction would only be allowed in these areas during May 1 to January 31. Once construction of the Proposed Project is completed, operation and maintenance activities would be minimal. Habitat loss would be reduced due to the vegetation being reclaimed/revegetated (Appendix C-13, Vegetation Communities). Table 2.2-1 summarizes the effects to the desert bighorn sheep habitat as a result of implementing the Southern Alternative

Pronghorn

There is crucial pronghorn winter range on East Clark Bench on both sides of U.S. Highway 89 between Big Water and the Paria River in Utah; approximately 15 miles of the Proposed Project would occur within the U.S. Highway 89 ROW through this area (Figure 1.4-3). High quality pronghorn habitat is located in Arizona south of the KIR west of Kanab Creek and on Yellowstone Mesa (Figure 1.4-3). An existing dirt road would be upgraded by improving the surface and possibly widening the roadway at some locations, extending north from the pipeline corridor across the eastern habitat area for approximately 1 mile.

Permanent habitat disturbance would not be significant because of the extensive area of equivalent habitat adjacent to the Proposed Project ROW. Although there would be temporary human activity and noise disturbance that would reduce habitat values in the described areas during construction, effects would not exceed the significance criteria. Construction staging areas would be restored and revegetated and would regain some of their habitat values within two or three growing seasons. Table 2.2-1 summarizes the effects to the pronghorn habitat as a result of implementing the Southern Alternative.

Table 2.2-1 Big Game Habitat Effects (acres) by Agency – Southern Alternative

Agency	Permanent Disturbance				
	Utah			Arizona	
	Desert Bighorn Sheep	Mule Deer	Pronghorn	Mule Deer	Pronghorn
BLM	0.0	25.5	8.7	0.0	0.0
NPS	0.0	0.0	0.0	0.0	0.0
Reclamation	0.0	0.0	0.0	0.0	0.0
State	0.0	0.0	7.6	0.0	0.3
Private	0.0	13.7	0.0	0.0	7.4
Temporary Disturbance					
BLM	121.4	711.9	180.6	228.4	244.6
NPS	0.0	0.0	0.0	0.0	0.0
Reclamation	0.0	0.0	0.0	0.0	0.0
State	0.0	0.0	490.0	22.5	98.8
Private	18.3	166.5	44.7	39.5	251.3

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Bureau of Reclamation

Migratory Birds and Raptors

This section includes effects to migratory birds and bald and golden eagles. Other bird species considered to be special status species or threatened or endangered are included in the DEIS Sections 3.14, Sensitive Species – Fish and Wildlife, and 3.15, Threatened and Endangered Species, and Appendices C-17, Sensitive Species – Fish and Wildlife, and C-18, Threatened and Endangered Species. The effects of the Proposed Project on migratory birds are also included in those sections, so please refer to them for additional analysis. The EPMs generally follow Utah Raptor Guidelines (Romin and Muck 2002). EPM B.5.65 states, “If initial ground clearing will occur during the critical nesting period, pre-construction surveys for nesting migratory birds will be conducted by a qualified biologist (no more than 10 days prior to construction). If an active nest is identified, a no-activity buffer (ranging from 100-feet to 1-mile, depending on species; Romin and Muck 2002; USFWS 2014) is to be established around the nest site and remain in place until the young have fledged and/or the nest becomes non-active.”

Ground-nesting species, such as burrowing owl, long-billed curlew, western grasshopper sparrow, northern harrier, sagebrush sparrow, and short-eared owl, would be at risk from vehicles and construction equipment. EPM B.5.66 states, “If nesting migratory birds are found during the pre-construction surveys, UDWR will follow measures identified within the Bird Conservation Strategy (see measure B.1.1). If feasible, the bird nests will be avoided until the birds have fledged. T-posts and rope fencing will be used to mark the avoidance areas, which will also be signed to inform construction personnel to avoid the area. If avoidance is not feasible, UDWR will consult with the BLM.” EPM B.5.68 states, “UDWR will continue working with Utah Division of Wildlife Resources or AZGFD through Partners in Flight and other associated monitoring programs to support on-going surveys for eagles, ferruginous hawks, and other raptors within the general project vicinity.” These measures would ensure conformance with the MBTA and the BGEPA and reduce potential effects on bird species.

Aquatic

Potential effects to water quality of Sand Hollow Reservoir receiving Lake Powell water is contained within the DEIS Section 3.9, Water Quality and Appendix C-11, Water Quality. The existing fish community in Sand Hollow Reservoir would not be impacted by the slight change in water quality, assuming the preventive measures for aquatic invasive species are effective. If Sand Hollow Reservoir becomes infested with quagga mussels, a Rapid Response Plan would prescribe treatment of the entire reservoir with potassium chloride. The effects of this chemical on aquatic organisms is discussed in Appendix C-12, Aquatic Invasive Species. There should not be any fish mortality as a result of the prescribed chemicals and dosages used for the Rapid Response Plan treatment. The fish inhabiting Sand Hollow Reservoir are non-native and are primarily a recreational resource. Refer to the DEIS Section 3.7, Recreation, and Appendix C-9, Recreation, for any concerns about recreational opportunities at Sand Hollow Reservoir.

While the Proposed Project does not directly release water into the Virgin River, the river system may benefit from additional flows that help reduce the strain on the Virgin River from water withdrawals. The Virgin River Daily Simulation Model (see the DEIS Section 3.8, Hydrology) predicts a slight decrease in peak flows during spring flooding and a slight flow increase during critical summer months when the water level is low, and fish are susceptible to poor water quality conditions. The slightly decreased peak flows would not be expected to negatively affect habitats in the Virgin River because of intensity in comparison to a desert system with high seasonal flows and large sediment inputs. Reduced spring peak flows would normally be considered a negative effect on many western streams and rivers. However, the primary concern with the Virgin River is due to water quality issues that arise from low summer base flows. The Proposed Project would provide additional water to alleviate some stress on the system and aquatic life during the crucial summer period.

The aquatic community at Lake Powell would not be affected by the Proposed Project. The intake screens would be designed to maintain a low intake velocity (less than 0.4 feet per second) to prevent small fish and other biota (as well as suspended inorganic solids) from being taken into the intake system. The construction work completed while excavating and installing the intake system would be temporary and localized at the intake site.

The primary method (microscreens and hydro-optic disinfection ultraviolet treatment) for preventing quagga mussels from being transported in the pipeline would not cause any environmental impacts. Depending on the season, water releases into Sand Hollow Reservoir may be cooler than resident water. However, the volume of water would not be expected to cause negative effects to the fish community at the Sand Hollow or Quail Creek reservoirs. If chemical treatment is required to treat quagga mussels, the chlorine would be neutralized with sodium bisulfite before being discharged into Sand Hollow Reservoir to alleviate harmful impacts from chlorination levels.

There would be no effects from the proposed microscreen filters and hydro-optic disinfection ultraviolet units. There could be effects from the potential of the chemical and neutralizing chemicals on the fish and aquatic resources (see the DEIS, Section 3.10, Aquatic Invasive Species, and Appendix C-12, Aquatic Invasive Species). Leaks along the pipeline are not expected, and hydrostatic testing would use water not associated with the Proposed Project water. Maintenance may require periodic releases of LPP water into dry washes but would require a permit and approval

from BLM. While quagga mussels can cause substantial adverse effects on the ecosystem in large numbers, those effects would be minimized by a quick response to eradicate them before their population increased to a problematic level. This treatment would primarily include application of potassium chloride to Sand Hollow Reservoir and Quail Creek Reservoir if required. The self-sustaining populations of largemouth bass, bluegill sunfish, black crappie, green sunfish, and black bullhead comprise the blue-ribbon fishery at Sand Hollow Reservoir. These species are especially hardy and can endure low water quality standards. All fish species occurring in Sand Hollow Reservoir are non-native to Utah. The Proposed Project would provide additional water to a stressed Virgin River watershed. The additional Proposed Project water would result in higher base flows in the Virgin River during warmer summer months when the native fish are most susceptible to poor water quality (see The Virgin River Daily Simulation Model in Appendix C-10, Hydrology). The Proposed Project would provide a benefit to native Virgin River fish while having two to three years of negative effects from construction activities (primarily construction involving crossing perennial streams; Table 2.4-2) and possibly negative effects to the non-native fish populations in Sand Hollow Reservoir due to chemical treatment, if required. At the potassium chloride concentrations recommended for the Proposed Project, there would be no risk to human health or non-target species other than unionids (Waller et al. 1993; DFO 2014). At target concentrations of 100 ppm potassium, no non-molluscan aquatic wildlife, vegetation, or terrestrial wildlife were harmed during or after treatment at Millbrook Quarry (Fernald and Watson 2013). Fernald and Watson (2013) found that turtles, fish, aquatic insects, and snails all “continued to thrive” post treatment. The DEIS Section 3.7, Recreation, and Appendix C-9, Recreation, contain additional discussion on potential effects of the Proposed Project on the recreational blue-ribbon fishery.

Typical operation and maintenance (O&M) would require evaluating Proposed Project facilities on a regular time interval. O&M for pumping stations, including the high point regulating tank, would occur weekly. This would result in increased traffic along U.S. Highway 89. Due to the large volume of traffic already on U.S. Highway 89 and the animal designated crossings that exist along U.S. Highway 89, additional traffic due to O&M responsibilities would not be noticeable. Testing of facilities, scheduled discharges, dust, and noise would not contribute a measurable effect to general fish and wildlife resources.

Summary of Effects

Concerns about potential effects to large mammal movements (i.e., mule deer and bighorn sheep migration corridors and seasonal ranges) were raised by BLM, UDWR, and AZGFD during the public scoping process. Because Proposed Project construction would not occur during migration and wintering periods in these crucial areas based on the EPMs and mitigation measures, potential risks to the populations would be greatly reduced. The effects would primarily result from direct construction activities (two to three years) and vegetation disturbance in the ROWs until the vegetation has the time required to reestablish (Appendix C-13, Vegetation Communities). Appropriate protection and mitigation of jurisdictional waters and wetlands and their associated habitats would be required under the applicable permitting procedures. Accounting for all the other EPMs, such as escape ramps built every 1/4 mile in the trenches, alleviate many concerns like entrapment of small mammals, reptiles, and amphibians from implementing the Proposed Project. There are potential effects to fish due to the Proposed Project, but they have been reduced through careful consideration of EPMs for construction and aquatic invasive species treatment. The construction activity would disturb habitat for migratory birds, 2.85 acres of riparian habitat, during the two- to three-year construction duration (Table 2.4-2). Other potential effects to migratory birds are discussed in Appendix C-17, Sensitive Species – Fish and Wildlife.

2.2.1 Mitigation Measures

Aside from corrected construction dates to minimize effects on big game, mitigation measures for general fish and wildlife resources are not necessary. EPMs and mitigation measures required for other resources, such as revegetation and erosion prevention, as outlined in the DEIS Section 3.11, Vegetation Communities, and Appendix C-13, Vegetation Communities, would further minimize potential effects. Effects to general fish and wildlife resources would be minimized as the result of incorporating the measures in Section 1.3, above, and mitigation measures in the DEIS Section 3.14, Sensitive Species – Fish and Wildlife, and DEIS Section 3.15, Threatened and Endangered Species, and Appendices C-17, Sensitive Species – Fish and Wildlife and C-18, Threatened and Endangered Species. The following includes mitigation measures and justification for minimizing effects of the Proposed Project.

2.2.1.1 Aquatic

Aquatic resource EPMs would focus on avoiding construction activities in ephemeral drainages during periods of high runoff and flow and ensuring that all construction areas are suitably reclaimed prior to seasonal runoff periods. This is both a safety issue (flash flooding) and to protect the local and downstream aquatic resources. Construction in and around perennial streams in the area of potential effect would be performed using open-cut trench excavation and fill techniques, with temporary diversions of active flow around the pipeline crossing sites. At perennial streams, EPMs would be implemented to minimize the short-term effects on water quality, aquatic resources, and habitat (see Section 1.3.3, above) and no additional measures would be required as mitigation.

2.2.1.2 Terrestrial

In addition to the EPMs discussed above, the following measures are proposed to minimize effects of Proposed Project construction on large mammals. These are considered mitigation measures because they include adjusted dates from the EPMs in order to minimize the short-term effects to mule deer and bighorn sheep. These dates were provided by BLM, UDWR, and AZGFD, based on movement data from the region (Olson 2020).

EPM B.5.82 states, “Pipeline and electrical transmission line construction in crucial mule deer winter range will be coordinated with Utah Division of Wildlife Resources and the BLM and scheduled during the period from May 1 through September 30 between U.S. Highway 89 milepost 31 and 50 to avoid impacts on crucial mule deer winter habitat. If these dates are determined to be too restrictive to efficiently construct the pipeline, then alternative minimization techniques will be discussed with Utah Division of Wildlife Resources and the BLM.” However, after consultation with AZGFD experts, construction would be restricted during October 20 through May 3 in mule deer migration areas between U.S. Highway 89 milepost 40.5 to 45.5 and crucial winter range (about 4.7 miles) near the ACEC (Cramer and Hamlin 2019; Figure 1.4-4). For clarification, construction would only be allowed in these areas during May 4 to October 19.

EPM B.5.84 states, “Where appropriate, restrict LPP construction activities within crucial bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.” However, after discussion with the Arizona BLM experts, they did not feel the late summer restrictions were necessary (Christian 2020). Therefore, the necessary mitigation measure would be, “Where appropriate, restrict project construction activities within bighorn sheep habitat from February 1 through April 30.” For clarification, construction would only be allowed in these areas during May 1 to January 31.

These construction restrictions would occur in crucial habitat highlighted in Figure 1.4-3 and discussed in Section 2.2, above. Additionally, crucial habitat as identified by AZGFD (2019) data would be protected from construction during the provided closure dates. This includes the stretch of U.S. Highway 89 with crossings structures for migration and mule deer crucial winter range near the ACEC on the southeast corner of the KIR. These refined dates are based on the most recent research on these populations and requests from UDWR and AZGFD.

2.3 Highway Alternative

The Highway Alternative would alleviate concerns with Proposed Project construction occurring farther south into crucial winter ranges of the Kaibab mule deer population. However, effects to mule deer would still be expected along their range in Utah, although greatly reduced as a result of incorporating the EPMS and mitigation measures. The construction closure during October 20 to May 3 would minimize concerns with mule deer migration and wintering. The construction closure during February 1 to April 30 would minimize construction concerns with disturbing bighorn sheep and their habitat. The Highway Alternative would have minimized effects on crucial ranges and migration routes for mule deer, desert bighorn sheep, and pronghorn based on the EPMS and mitigation measures.

The Highway Alternative would have temporary and permanent effects on wildlife habitat, big game crucial ranges and migration routes, and wildlife populations throughout the area of potential effect. Permanent effects on wildlife resources would occur from Highway Alternative features, including the intake pump station, booster pump stations and substations, regulating tank, hydroelectric generating stations, and permanent access roads. Temporary effects on wildlife resources would occur from construction of pipeline, transmission lines, staging areas, and temporary access roads and would only be expected for the two to three years of construction activity. This duration of disturbance would be expected for the entire Proposed Project, but fish and wildlife would experience these effects at localized areas during construction.

The Highway Alternative would have short-term effects on Mojave Desert Region and Colorado Plateau wildlife habitats during construction and revegetation. Wildlife habitat restoration would be implemented immediately following Proposed Project construction by revegetating. The areas of temporary effects would be restored and revegetated and would regain some habitat value within two to three growing seasons. The remaining effects on wildlife habitat would be the same as described for the Proposed Project in Section 2.2, above. Temporary effects on wildlife habitat would not exceed the significance criteria. See the DEIS Section 3.11, Vegetation Communities, and Appendix C-13, Vegetation Communities, for specific effects to habitat that would result from the Highway Alternative.

The Highway Alternative would have negative effects on crucial ranges and migration routes for mule deer, desert bighorn sheep, and pronghorn (Table 2.3-1). Effects on mule deer in Utah would be essentially the same as described in Section 2.2, above. These potential effects should be considered with the extensive adjacent habitat of equivalent value and limited temporal scale of construction while considering the EPMS and mitigation measures. The Highway Alternative would not affect bighorn sheep or their habitat in the Kanab Creek Wildlife Habitat Management Area.

The Highway Alternative effects on all other species discussed in Section 1.4, above, would be the same as those for the Southern Alternative in Section 2.2, above. Many of the same perennial and intermittent streams would be crossed by both alternatives and be affected similarly by both alternatives (Table 2.4-2).

Table 2.3-1 Big Game Habitat Effects (acres) by Agency – Highway Alternative

Agency	Permanent Disturbance				
	Utah			Arizona	
	Desert Bighorn Sheep	Mule Deer	Pronghorn	Mule Deer	Pronghorn
BLM	0.0	25.5	8.7	0.0	0.0
NPS	0.0	0.0	0.0	0.0	0.0
Reclamation	0.0	0.0	0.0	0.0	0.0
Tribe	0.0	0.0	0.0	0.0	0.0
State	0.0	0.0	7.6	0.0	0.0
Private	0.0	13.7	0.0	0.0	9.9
Temporary Disturbance					
BLM	121.4	703.7	180.6	8.0	7.2
NPS	0.0	0.0	0.0	0.0	0.0
Reclamation	0.0	0.0	0.0	0.0	0.0
Tribe	0.0	0.0	0.0	0.0	0.0
State	0.0	0.0	490.0	25.7	30.5
Private	18.3	371.4	44.7	8.0	71.8

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Bureau of Reclamation

Tribe = Kaibab Band of Paiute Indians

2.3.1 Mitigation Measures

Mitigation measures would be similar to the Southern Alternative with the exception of construction restrictions in the ACEC. This mule deer winter range would not be affected for the Highway Alternative. Additional mitigation would not be required in addition to the measures specified for other resources, such as revegetation and erosion prevention, outlined in the DEIS Section 3.11, Vegetation Communities, and Appendix C-13, Vegetation Communities. Effects on general fish and wildlife resources would be minimized as the result of incorporating the EPMS and mitigation measures.

2.4 Comparative Analysis of Alternatives

The Highway Alternative has less potential for impacts than the Southern Alternative due to the alignment following an existing paved highway rather than traversing relatively undisturbed habitat as would occur in the Southern Alternative. The construction closure for mule deer during October 20 to May 3 would not need to occur along the southern border of the KIR for the Highway Alternative. Potential effects to bighorn sheep would be greater under the Southern Alternative due to construction and operation of the Proposed Project through important habitat in the Kanab

Creek Wildlife Habitat Management Area. Differences in effects to big game habitat between alternatives is summarized in Table 2.4-1. Implementing the EPMS and mitigation measures would reduce potential effects to general fish and wildlife. Therefore, neither the Southern Alternative or Highway Alternative would substantially contribute to additional impacts with past, present, or RFFAs projects in or near the area. There would be minimized effects to mule deer, bighorn sheep, and pronghorn during construction from implementing the Proposed Project.

Table 2.4-1 provides a summary of the effects to big game habitat of each alternative by agency. The duration of temporary disturbance is discussed throughout the text in this appendix. Table 2.4-2 provides a comparison of potential aquatic effects. No permanent disturbance would be expected in riparian areas.

Table 2.4-1 Big Game Habitat Effects (acres) by Agency

Agency		Permanent Disturbance				
		Utah			Arizona	
		Desert Bighorn Sheep	Mule Deer	Pronghorn	Mule Deer	Pronghorn
Southern Alternative	BLM	0.0	25.5	8.7	0.0	0.0
	NPS	0.0	0.0	0.0	0.0	0.0
	Reclamation	0.0	0.0	0.0	0.0	0.0
	State	0.0	0.0	7.6	0.0	0.3
	Private	0.0	13.7	0.0	0.0	7.4
		Temporary Disturbance				
	BLM	121.4	711.9	180.6	228.4	244.6
	NPS	0.0	0.0	0.0	0.0	0.0
	Reclamation	0.0	0.0	0.0	0.0	0.0
	State	0.0	0.0	490.0	22.5	98.8
Private	18.3	166.5	44.7	39.5	251.3	
Highway Alternative		Permanent Disturbance				
	BLM	0.0	25.5	8.7	0.0	0.0
	NPS	0.0	0.0	0.0	0.0	0.0
	Reclamation	0.0	0.0	0.0	0.0	0.0
	Tribe	0.0	0.0	0.0	0.0	0.0
	State	0.0	0.0	7.6	0.0	0.0
	Private	0.0	13.7	0.0	0.0	9.9
		Temporary Disturbance				
	BLM	121.4	703.7	180.6	8.0	7.2
	NPS	0.0	0.0	0.0	0.0	0.0
	Reclamation	0.0	0.0	0.0	0.0	0.0
	Tribe	0.0	0.0	0.0	0.0	0.0
	State	0.0	0.0	490.0	25.7	30.5
Private	18.3	371.4	44.7	8.0	71.8	

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Bureau of Reclamation

Tribe = Kaibab Band of Paiute Indians

Table 2.4-2 Potential Riparian Area Effects by Agency and Alternative

Riparian Area Name	Ownership	Potential Riparian Area Temporary Effect (acres)
Southern Alternative		
Wash west of Blue Pool Wash	NPS	0.63
Paria River	UDOT/Private	1.14
White Sage Wash	BLM	0.27
Kanab Creek at Jacob Canyon	BLM	0.18
Bitter Seeps Wash	BLM	0.03
Short Creek, Colorado City	ADOT/Private	0.27
Short Creek, East Canaan Gap	BLM/Private	0.21
Short Creek, West Canaan Gap	BLM	0.12
Total		2.85
Highway Alternative		
Wash west of Blue Pool Wash	NPS	0.63
Paria River	UDOT/Private	1.14
Johnson Wash	UDOT/Private	0.12
Kanab Creek at Fredonia	Private	0.09
Cottonwood Creek	DOT/Tribe	0.03
Two Mile Wash	Kaibab Band of Paiute Indians	0.06
Short Creek, Colorado City	ADOT/Private	0.27
Short Creek, East Canaan Gap	BLM/Private	0.21
Short Creek, West Canaan Gap	BLM	0.12
Total		2.67

Key:

ADOT = Arizona Department of Transportation

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Bureau of Reclamation

Tribe = Kaibab Band of Paiute Indians

UDOT = Utah Department of Transportation

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4 Acronyms

ACEC	Kanab Creek Area of Critical Environmental Concern
AGRC	Automated Geographic Reference Center
AZGFD	Arizona Game and Fish Department
BGEPA	Bald and Golden Eagle Protection Act
DEIS	draft environmental impact statement
DNR	Department of Natural Resources
EPM	environmental protection measures
ESA	Endangered Species Act
GIS	geographic information database
KIR	Kaibab Indian Reservation
LLP	Lake Powell Pipeline Project
MBTA	Migratory Bird Treaty Act
O&M	Operation and Maintenance
RMP	Arizona Strip Field Office Resource Management Plan
SWPPP	Storm Water Pollution Prevention Plan
UBWR	Utah Board of Water Resources
UDWR	Utah Division of Wildlife Resources
UDWRe	Utah Division of Water Resources
Utah DNR	Utah Department of Natural Resources

5 Consultation and Coordination

Federal Agencies	State Agencies and Entities	Private Consultants
BLM	UDWR	Stantec
NPS	AZGFD	Patricia Cramer, Ph.D.
USFWS	UBWR	
Reclamation	WCWCD	



— BUREAU OF —
RECLAMATION

Lake Powell Pipeline Project Appendix C-17: Sensitive Species - Fish and Wildlife

**Coconino and Mohave Counties, Arizona
Kane and Washington Counties, Utah**

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1 Introduction/Affected Environment

This appendix provides a summary of the sensitive wildlife species that may occur or could be affected with implementation of the Highway Alternative, Southern Alternative, and No Action Alternative. Sensitive species in this section include those that are listed as sensitive by the Bureau of Land Management (BLM), species of greatest conservation need identified in Arizona and Utah wildlife action plans, and those identified as rare species in Glen Canyon National Recreation Area. Species listed under Endangered Species Act (ESA) are analyzed in the Draft Environmental Impact Statement (DEIS) Section 3.15, Threatened and Endangered Species, and Appendix C-18, Threatened and Endangered Species, and the effects on general fish and wildlife are analyzed in Appendix C-16, General Fish and Wildlife. A discussion of cumulative effects is provided in Appendix C-25, Cumulative Effects.

1.1 Regulatory Framework

- The BLM establishes goals and objectives for resources and allowable uses on the lands they manage. BLM resource management plans must be prepared in accordance with the Federal Land Policy and Management Act and regulations at 43 Code of Federal Regulations 1600. The Proposed Project includes land administered by the Kanab Field Office, Arizona Strip Field Office, and St. George Field Office (SGFO). The current land-use plans (and plan amendments) are as follows:
 - Kanab Field Office Resource Management Plan (BLM 2008c);
 - Kanab-Escalante Planning Area Resource Management Plan (BLM 2020);
 - Arizona Strip Field Office Resource Management Plan (referred to herein as “the RMP” [BLM 2008a]); and
 - SGFO Resource Management Plan (BLM 1999).
- BLM Special Status Species Management Policy Manual 6840 (BLM 2008b) provides management direction and guidance for the conservation of special status species and their habitats. Under this policy, special status species include animal and plant species listed as threatened or endangered, proposed for listing, or candidates for listing under the provisions of the ESA; those listed a sensitive species by a state; and those listed by a BLM State Director as sensitive. The objective of this policy is to ensure actions requiring authorization or approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species under provisions of the ESA.
- National Park Service (NPS) Organic Act, passed in 1916 (16 United States Code [USC] 1), establishes the NPS as an agency under the direction of the Secretary of the Interior with the stated purpose of promoting use of the national park lands while protecting them from impairment.
- NPS Management Policies 2006 sets the framework and provides direction for all management decisions relating to national park lands.

- NPS Director’s Order 12 (DO-12 and Handbook; 66 Federal Register 7507) describes the National Environmental Policy Act (NEPA) process and describes the responsibility of the NPS regarding participation in or coordination of NEPA procedures for actions occurring on NPS-managed land.
- The Utah State Wildlife Action Plan of 2015 is a comprehensive management plan designed to conserve native species populations and habitats in Utah and prevent the need for additional federal listings (Utah Wildlife Action Plan Joint Team 2015).
- Arizona’s State Wildlife Action Plan of 2012 provides a 10-year vision for achievement, subject to adaptive management and improvement along the way under the watchful eye of the Arizona Game and Fish Commission and its partners for shared success in wildlife conservation and management (AZGFD 2012).
- The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-712) provides that it is unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; or possess any migratory bird, part, nest, egg or product, manufactured or not.
- The Bald and Golden Eagle Protection Act (BGEPA) (16 USC 668-668d) prohibits the taking or possession or any commerce of bald or golden eagles. The definition of take includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.

1.2 Methodology

Sensitive species include invertebrates, fish, amphibians, reptiles, birds, and mammals that are listed as BLM sensitive, species of greatest conservation need by the states of Arizona and Utah, and Glen Canyon National Recreation Area rare species. Specifically, the following lists were considered:

BLM Sensitive Species (denoted in the tables as BLM-AZ or BLM-UT)

- Arizona BLM, Bureau Sensitive Species List, February 2017 (Instruction Memorandum AZ-IM-2017-009).
- Utah BLM, Sensitive Wildlife Species List, December 2018 (Instruction Memorandum IM-2019-005) (BLM 2019).

Glen Canyon National Recreation Area (denoted as NPS in the tables)

- Glen Canyon National Recreation Area, Special Status Species and Communities of Glen Canyon National Recreation Area, December 2014.

State Species of Greatest Conservation Need (denoted in the tables as AZ-SGCN-AZ or UT-SGCN-UT)

- Utah Wildlife Action Plan: A plan for managing native wildlife species and their habitats to help prevent listing under the ESA, 2015-2025 (Utah Wildlife Action Plan Joint Team 2015).
- Arizona’s State Wildlife Action Plan, 2012-2022 (AZGFD 2012).
- Arizona Game and Fish Department (AZGFD), Special Status Species by County, Taxonomic Group, Scientific Name, July 5, 2019.
- State of Utah, Department of Natural Resources, Division of Wildlife Resources, Utah Sensitive Species List, November 1, 2017.

Conservation Agreements (denoted in the tables as CA)

- Conservation agreements provide frameworks for long-term conservation of a species and provides goals, objectives, and conservation actions.

Where available, comparable spatial data sets for sensitive species varied by state and field office. Distribution and occurrence data were reviewed from AZGFD Arizona Environmental Online Review Tool (AZGFD 2020), HabiMap, and the Utah Natural Heritage Program Species of Concern Near the Lake Powell Pipeline (UDWR 2020). The Utah Board of Water Resources completed a variety of study reports for the Proposed Project. In addition to these resources, agency personnel were coordinated with to identify specific species' ranges/occurrences and relevant literature, agency publications, and online databases (e.g., U.S. Fish and Wildlife Services' [USFWS] ECOS Profile, NatureServe, the International Union for Conservation of Nature's Red List of Threatened Species). Sensitive wildlife species known or likely to occur within the Project Area are described in detail in this appendix, based on known occurrences, professional judgment, and knowledge and experience of agency specialists.

The geographic scope of data collected for sensitive species included detailed information within a 6-mile-wide corridor of the Lake Powell Pipeline Project (LPP) (i.e., 3 miles on either side of a reference centerline) and was used to provide consistency in data from both Arizona and Utah. Arizona's Environmental Online Review Tool pulled data within a 3-mile buffer; therefore, similar data sets were compiled for Utah.

The methodology used to assess potential effects to sensitive species was: (1) identifying the types of potential effects on sensitive species that could result from construction, operation, and maintenance of the proposed pipeline and associated facilities, as well as effects associated with a water delivery contract downstream of Flaming Gorge Reservoir downstream in the Green and Colorado Rivers and return flows associated with municipal and agriculture use in the Virgin River; (2) assessing the level and extent of initial effects on sensitive species at the individual or population level; (3) identifying appropriate mitigation measures; and (4) disclosing the level of potential residual effects on sensitive species. Table 1.2-1 lists potential effects identified for analysis on sensitive species during scoping or in coordination with agency personnel.

The analysis area encompasses sensitive species that could be directly affected (e.g., ground disturbance and presence of workers/equipment) by the Proposed Project or that could be indirectly affected by noise. Effects criteria were developed for key sensitive species and habitat issues (Table 1.2-1). These criteria are based on the status (e.g., BLM Sensitive, NPS, and State Rank), regulatory protection, and susceptibility to short- and long-term disturbances. The residual effects assume that all environmental protection measures (EPMs) identified in Appendix B of the LPP Plan of Development (POD) would be fully implemented to avoid, minimize, or mitigate effects and indicates whether effectiveness of the EPMs is low, moderate, or high (see Appendix E, Plan of Development). Short-term effects to species would not extend beyond one full year for any given sensitive species; whereas, long-term effects would extend beyond one full year and may affect more than one reproduction cycle, which could begin to have effects at the population level. For habitat, the same parameters were used as those described for vegetation communities. Short-term effects to habitat are defined as the five-year period for restoration, implying that vegetation community restoration success criteria should be achieved within five years. Long-term effects to habitat would extend beyond a five-year period.

Table 1.2-1 Sensitive Species Effects Identified for Analysis

Type of Effect	Analysis Consideration (Construction, Operation and Maintenance)
<p>Injury and mortality: direct injury or mortality and loss of individuals; indirect mortality as a result of disturbance, contaminants, and increased predation; injury/mortality as a result of electrocutions/collisions, increased predation</p>	<p>Construction activities: destruction of dens or nests and mortality due to vehicles collisions, crushing of individuals, increased stress from presence of construction activities, introduction of contaminants or invasive species, increased predators as a result of construction waste, increased predators as a result of right-of-way (ROW) disturbance</p> <p>Operation and maintenance activities: flight collisions and electrocutions with transmission lines, predators perching on transmission lines, increased pressure on prey populations, noise and human activity</p>
<p>Habitat loss/fragmentation/degradation: extent of habitat potentially affected by the Proposed Project</p>	<p>Construction activities: vegetation removal, dust generation, acres of permanent and temporary disturbance, invasive species/noxious weeds</p> <p>Operation and maintenance activities: ground-disturbing activities</p>
<p>Reproductive effects/function/health/ resilience: displacement of wildlife from noise and human activity during construction, introduction of non-native species and predation, changes to predator populations that may affect prey populations</p>	<p>Construction activities: blasting, vegetation removal and worker activities, disturbance from vehicles and equipment, herbicide use for invasive/noxious species</p> <p>Operation and maintenance activities: noise and human activity, increased predation from predators perching on transmission lines, predators using pipeline ROW as a corridor, herbicide use for invasive/noxious species</p>
<p>Corridors and barriers:</p>	<p>Construction activities: trenches</p> <p>Operation and maintenance activities: facilities/fences that may cause barriers to sensitive species movements</p>
<p>Aquatic invasive species/non-native fish:</p>	<p>Operation and maintenance activities: potential transportation of aquatic invasive species and non-native fishes to the Virgin River system</p>

1.3 Environmental Protection Measures

EPMs as outlined in the LPP POD are measures or procedures that are part of the Proposed Project and would be implemented as standard practice, including measures or procedures that could reduce or avoid adverse impacts (UDWRe 2020; provided as Appendix E, Plan of Development). EPMS would be applied regardless of landownership, except where the jurisdictional agency or landowner determines changes to the EPM(s) would ensure greater consistency with governing statutes, policies, or plans. Proper communication and coordination would occur with the jurisdictional agency, private landowner, etc., to ensure changes to EPMS are modified and applied appropriately.

The EPMs identified in Appendix B of the POD for the Proposed Project were considered when assessing residual effects on sensitive species and associated habitats. Refer to B.5 Biological Resources in Appendix B of the POD for a full list of EPMs. EPMs for other resources may provide additional benefits to sensitive species such as those identified for Stormwater and Erosion Control, Restoration, Noxious Weeds, Water Resources, and Air Quality.

The following EPMs from the POD apply to sensitive species, fish and wildlife:

Biological Resources

General

B.5.1. Qualified biologists or field contact representatives (FCR) will act as biological monitors and be present on-site during project-related actions that may impact special status biological resources. The USFWS and authorized BLM officer will approve the selected consulting firm/biologists/FCRs to be used to implement the terms and conditions of the Biological Opinion or other agreements between Utah Division of Water Resources (UDWRe), BLM, and other federal or state agencies. Any biologist and/or firm not previously approved will submit a curriculum vitae and be approved by the USFWS and BLM authorized officer. Other personnel may assist with implementing terms and conditions that do not involve tortoise handling, monitoring, or surveys, but only under direct field supervision of the USFWS and BLM- approved biologists. Specific biologist requirements for Mojave Desert tortoise are described further in the tortoise measures below.

B.5.2. All necessary federal and state handling permits will be obtained.

B.5.3. The biological monitors will be responsible for determining compliance with measures as defined by the Biological Opinion or other agreements between UDWRe, the BLM, and other federal or state agencies. Biological monitors will have the authority to halt non-emergency construction activities that are not in compliance with these measures. Stop work directives will be effective long enough to remedy the immediate situation, and will be limited to the equipment and parties involved in the situation. All action of noncompliance or conditions of threat to special status species will be recorded immediately by the biological monitor and reported to UDWRe. UDWRe will immediately report all such action and conditions to the BLM for reporting to the USFWS and/or Utah Division of Wildlife Resources or Arizona Game and Fish Department (AZGFD). Biological monitors will be qualified biologists and/or botanists, as determined by the BLM.

B.5.4. No harassment or harming of animals will be allowed. Animals found entrapped in open holes, open pipes/culverts, or excavations will be reported to the biological monitor. Before any pipe with a diameter of three inches or greater is buried, capped, or moved it will first be inspected for animals. If the wildlife is unable to escape on its own, it will be moved from the construction area by the biologists, in accordance with applicable federal and state guidelines.

B.5.5. The Environmental Compliance Representative will report to the BLM and other federal or state agencies, in accordance with right-of-way (ROW) requirements, any entrapment, death, or injury to special status species.

B.5.6. Prior to discharge of water used for hydrostatic testing of the pipeline and other facilities, all appropriate discharge and biological permits will be obtained and the drainage locations will be

surveyed for special status species and nesting migratory birds. The BLM will be notified of any special status species or nesting migratory birds found in the drainage area, and will determine whether additional measures need to be implemented prior to the discharge, beyond those identified in project permits and any other applicable agreements or requirements between UDWR and the BLM, USFWS, and Utah Division of Wildlife Resources or AZGFD.

B.5.7. Biological resource monitoring and compliance updates will be provided to the BLM throughout the construction period for record keeping and project documentation purposes. These will include information on ongoing construction activities, monitoring, wildlife and special status species observations, species relocations, entrapped special status species, and any other pertinent biological issues. Updates may be written or oral, as agreed upon by the BLM and UDWR or AZGFD contract biologists. An annual written report will be provided to the BLM.

Gila Monster and Common Chuckwalla

B.5.57. Within potential habitat and confirmed sightings near the LPP for Gila monster and common chuckwalla, pre-construction surveys of the ROWs will be conducted by qualified biologists to find and move individuals out of harm's way. These surveys may be conducted in accordance with Gila monster protocol. All occupied burrows found in the construction zone will be examined and excavated as described for the desert tortoise. If a Gila monster is found, Utah Division of Wildlife Resources or Arizona Game and Fish Department and BLM will be immediately contacted.

B.5.58. Gila monster and common chuckwalla will be moved only by qualified biologists and solely for the purpose of moving them out of harm's way. The onsite biologists will follow the Utah Division of Wildlife Resources or AZGFD and BLM Gila monster protocol and specifically will know how to: 1) identify Gila monster and be able to distinguish it from other lizards such as chuckwalla and western banded gecko, 2) report any observations of Gila monster to Utah Division of Wildlife Resources or AZGFD and BLM, 3) be alerted to the consequences of a Gila monster bite; and 4) be aware of protective measures provided under state law.

B.5.59. All Gila monster and common chuckwalla observed by project workers will be reported immediately to the biological monitor. A report of the Gila monster sighting will be filed with Utah Division of Wildlife Resources or AZGFD and BLM. The report will include information on the animal's size and condition, location (with global positioning system [GPS] coordinates), date and time, habitat (including plant species present), photo-documentation (if feasible), and circumstances under which it was found.

Burrowing Owl and Kit Fox

B.5.60. Burrowing owl is a migratory bird. As such, the measures presented in the migratory bird section are in addition to the ones listed here.

B.5.61. Surveys of suitable habitat in the ROWs for active burrowing owl will be conducted by qualified biologists during nesting season (March 1 through August 31) and no more than 30 days prior to the start of construction. Surveys for active kit fox burrows can be conducted at the same time. The presence of active burrows or dens will be verified through non-invasive means including motion cameras, fiber-optic scope or miniature closed-circuit video probe; the surveys will consider

that dens can be very diverse with several tunnels and entrance and exit burrows. The locations of active burrows within the ROWs will be determined using a GPS unit to enable accurate relocation during subsequent mitigation actions.

B.5.62. There will be no destruction of occupied, active nesting burrows or natal dens, capture and relocation of live burrowing owls or kit foxes, nor harm in any way to individual animals on public land administered by the BLM. Active nesting burrows or natal dens within the ROWs will be avoided by modifying construction activities in the immediate area. T-posts with rope and signs will be used to mark the avoidance area, which will include a buffer of at least 0.25 miles. The buffer area may be reduced in coordination with the BLM's adaptive management process and will be determined prior to construction. The fencing will be installed in a manner to allow for ingress and egress of the animals. The avoidance area will also be signed to inform construction personnel to avoid the area.

B.5.63. Destruction of unoccupied burrows and dens will occur outside of the active nesting (March 1 to August 31) or natal season (February 15 to May 15) to avoid take. Burrows or dens will be excavated using hand tools and refilled to prevent reoccupation. Clearing and collapsing of burrows or dens within the ROWs will be done by qualified biologists prior to the start of construction. Existing unsuitable burrows or dens on adjacent BLM-managed land outside of the ROWs will be enhanced (enlarged or cleared of debris) or new burrows and dens created (by installing artificial burrows and dens) at a ratio of two enhanced or new burrows to each one burrow that will be destroyed.

Migratory Birds (including Raptors)

B.5.64. As feasible, UDWRe will conduct initial ground clearing outside of the critical nesting period for migratory birds.

B.5.65. If initial ground clearing will occur during the critical nesting period, pre-construction surveys for nesting migratory birds will be conducted by a qualified biologist (no more than 10 days prior to construction). If an active nest is identified, a no-activity buffer (ranging from 100-feet to 1-mile, depending on species; Romin and Muck 2002, USFWS 2014) is to be established around the nest site and remain in place until the young have fledged and/or the nest becomes non-active.

B.5.66 If nesting migratory birds are found during the pre-construction surveys, UDWRe will follow measures identified within the Bird Conservation Strategy (see measure B.1.1). If feasible, the bird nests will be avoided until the birds have fledged. T-posts and rope fencing will be used to mark the avoidance areas, which will also be signed to inform construction personnel to avoid the area. If avoidance is not feasible, UDWRe will consult with the BLM.

B.5.67. Power poles, perch discouragers, and line spacing will be designed and constructed in accordance with the recommendations of the Avian Power Line Interaction Committee (APLIC, 2006), in order to reduce the potential to electrocute or otherwise harm raptors.

B.5.68. UDWRe will continue working with Utah Division of Wildlife Resources or AGFD through Partners in Flight and other associated monitoring programs to support on-going surveys for eagles, ferruginous hawks, and other raptors within the general project vicinity.

B.5.69. If trees located within the ROWs cannot be avoided and must be removed for construction, the trees will be removed outside of the nesting period for raptors or other migratory birds, as feasible. If removal of a tree during the nesting period is required, the tree will first be surveyed by a qualified biologist to ascertain the presence of any nests. Should active nests of raptors or migratory birds be present, the tree will not be removed until the birds have fledged.

B.5.70. Where appropriate, restrict permitted activities from May 1 through July 15 within 0.5 mile of raptor nest sites unless the nest site has been determined to be inactive for at least the previous 5 years; the specific avoidance buffer distance and time period for raptor species may be refined in the Bird Conservation Strategy (see measure B.1.1). Construction could occur during restricted periods if sufficient monitoring of the nest is completed during the present active season and the nest is found to be unoccupied for that year (presence/absence surveys according to protocols).

B.5.77. The project site will be cleaned up at the end of each day the work is being conducted (e.g., trash removed, scrap materials picked up) to minimize the likelihood of condors visiting the site. BLM staff may conduct site visits to the area to ensure adequate clean-up measures are taken.

B.5.78. For projects where potential exists for leakage or spill of hazardous materials, a spill plan will be developed and implemented to prevent water contamination and potential poisoning of condors. The plan will include provisions for immediate cleanup of any hazardous substance, and will define how each hazardous substance will be treated in case of leakage or spill. The plan will be reviewed by the BLM condor lead biologist to ensure condors are adequately addressed.

Fish

B.5.85. During pipeline construction, best management practices (BMPs) will be implemented to minimize effects on fish (if present) from the temporary rerouting of intermittent flow in Paria River and in other intermittent washes. Practices will comply with Utah Division of Wildlife Resources and Clean Water Act permitting requirements. Examples of BMPs could include screens on pump intakes.

Planning and Permitting

B.1.1. The Final POD will incorporate mitigation contained in the BLM Record of Decision and provide detailed project design and construction specifics, including but not limited to construction contract timing, phasing, and any modifications to construction access roads and ROW entry points, and other details. The BLM will review and approve the updated POD prior to notice to proceed for any surface disturbance activity.

The final project POD shall contain detailed plans, including, but not limited to, those listed below.

- Agency Coordination Plan – primary contacts including the BLM authorized officers, UDWR, construction management, environmental compliance inspection contractor, and construction contractors; identification of reporting procedures and frequency.

- Bird Conservation Strategy – measures to reduce impacts on migratory birds, bald and golden eagles, and other sensitive birds; the plan will identify measures to be implemented during construction, including but not limited to, the identification of critical nesting periods for bird species anticipated to be within the ROWs, pre-construction surveys to be conducted for nesting raptors and migratory birds (survey to be conducted by qualified biologist <10 days prior to work at site) , and the construction avoidance buffer size and time duration for active raptor and migratory bird nests (ranging from 100-feet to 1-mile, depending on species). The plan will identify design features and measures to be implemented during operation, including description of design standards, any post-construction monitoring, and adaptive measures such as marking of power lines to avoid or minimize impacts; the bird conservation strategy will be developed in coordination with the BLM for compliance with MBTA and BGEPA; for Utah, IM N. UT-2017-007 Guidance for Utah Bureau of Land Management to Meet Responsibilities under MBTA and Executive Order 13186 will be followed, and IM 2006-096 Utah Supplemental Planning Guidance-Raptor Best Management Practices, and applicable BLM Resource Management Plan prescriptions.
- Construction Plan – construction schedule, access roads, borrow pits, best management practices, vehicle/equipment washing locations, etc.
- Construction Traffic Management Plan – measures to reduce and manage construction traffic.
- Construction Dust Management Plan – air quality standards and permits, dust control measures, general water sources, air quality monitoring, and reporting.
- Emergency Response Plan – emergency contacts, notification procedures, available resources, and emergency procedures.
- Integrated Weed Management Plan – management of areas with noxious/invasive weeds, treatment and control measures, monitoring, and reporting.
- Mitigation Plan – summary of environmental commitments and mitigation measures, responsible parties, timing, and reporting.
- Construction Noise Management Plan – measures to manage construction noise.
- Public Information Plan – public notification measures.
- Recreation Resources Mitigation Plan – measures to protect and restore recreation resources during construction and operation of the LPP.
- Restoration Plan – topsoil (growth medium) and vegetative cover salvage, stockpiling and replacement; plant salvage, maintenance and replacement, seeding, soil stabilization, and post-construction monitoring.
- Spill Prevention, Control, and Countermeasure Plan (SPCC) – procedures for storage and handling of hazardous and toxic materials, necessary permits, spill response and cleanup.
- Storm Water Pollution Prevention Plan (SWPPP) – erosion and sediment control measures, compliance inspections and reporting.

B.1.5. A worker education program will be developed by UDWR and used during construction and operation. It will be presented to personnel who will be on-site, including but not limited to contractors, contractor's employees, supervisors, inspectors, and subcontractors. A handout will be developed addressing environmental protection measures incorporated into the project and the responsibility of each worker in environmental protection. Each worker will be briefed on his or her environmental compliance responsibilities, provided a handout, and required to sign a certification that he or she understands and will comply with those environmental protection measures. An individual who fails to comply with the environmental protection measures will be subject to corrective action up to and including dismissal from the project.

Specifics of the program will include, but are not limited to:

- General site maintenance (i.e., trash disposal)
- Stormwater and Erosion Control
- Hazardous material spill protocols
- refueling protocols
- Smoking areas
- Use of sanitary facilities
- California condor conservation measures
- MBTA
- Incident reporting,
- Prohibiting driving off the cleared corridor or existing roads,
- Importance of speed limits and other traffic regulations on access roads
- Prohibiting unrestrained dogs or hunting on the construction and facility sites
- Terms and conditions of the LPP Biological Opinion
- Desert tortoise Habitat Conservation Plan measures
- Identifying and reporting procedures for other sensitive plants and wildlife that occur within the area of potential effect
- Cultural and paleontological resource identification and protection
- Biological, Cultural, and Paleontological monitoring requirements
- Visual resources measures
- Avoidance of undue disturbance of biological soil crusts
- Soil segregation requirements,
- Noxious weed management and identification
- Prohibiting collection of wildlife, plants, or cultural/paleontological resources, unless the collection is part of a mitigation plan and is done by qualified personnel
- Workers will receive a sticker or certificate that they have completed the training; a laminated card that can be used for reference, including applicable contact phone numbers, may also be used
- Training sessions will be held for new contractors and/or contractor personnel throughout the life of the project

Surveying

B.1.10. If any exclusion zones within the ROWs are required by the BLM, NPS, or identified in the biological opinion for resource protection (i.e., biological or cultural resources, protected plants, nesting birds, etc.), those areas will be staked, flagged or fenced, and signed by UDWR and approved by the BLM and NPS to ensure avoidance during construction, and if necessary during operation and maintenance.

B.1.11. UDWR will develop a geographical information system (GIS) cloud based Environmental Access Plan (EAP). All contractors will utilize EAP. The EAP will detail access requirements such as required pre-access surveys or monitoring requirements. The EAP will be updated throughout the construction process as needed based on completed surveys, approved access areas, and current conditions and requirements.

Fencing

B.1.14. Temporary construction fencing may be installed, as necessary, for management of wildlife resources and grazing livestock during both construction and restoration efforts. The type and location of fencing will be coordinated with the BLM, Utah Division of Wildlife Resources, and/or AZGFD.

Clearing and Grading

B.1.16. All Biological Resource EPMs (B.5 below) will be adhered to prior to and during clearing and grading.

B.1.17. Where feasible, vegetation within the ROWs will be crushed instead of removed by blading, to minimize impacts to soils.

B.1.18. Trash and debris will be removed from the ROWs before clearing and grading activities begin and properly disposed of in a permitted landfill or recycling facility. This is limited to existing surface debris foreign to the natural, native community.

B.1.19. In specific areas, boulders greater than 18 inches in diameter found on the soil surface will be moved to the edge of the ROWs and redistributed randomly across the ROWs during reclamation. Boulders will either be positioned so that the surface previously in contact with the ground will be in generally the same orientation or a desert varnish may be applied to boulders, as needed, to reduce stark visual contrast. UDWR will coordinate with BLM during final design to identify areas for surface boulder replacement.

B.1.20. All available growth medium (topsoil and cleared vegetation) will be salvaged and marked with signage for redistribution during reclamation. Growth medium will be windrowed along the edge of the ROWs or placed in stockpiles and temporarily stabilized (if stockpiled for more than 14 days) with temporary seeding, natural fiber geotextiles, mulch, periodic water applications, or other techniques to reduce or eliminate erosion or dust. Any temporary seeding mixes will be a BLM-approved certified weed-free seed mix. Topsoil and cleared vegetation will not be stockpiled in one location for longer than two years unless approved by land management agency for specific

activities. Topsoil and cleared vegetation stockpiles maintained longer than one growing season will be planted with an annual seed mix to help control erosion and keep soil micro-organisms active.

B.1.21. Areas with noxious and invasive weeds will be treated and/or monitored in accordance with the Integrated Weed Management Plan.

B.1.22. A record will be maintained of when construction-related major vegetation and ground-disturbing activities begin and are completed, and when restoration activities are initiated as a function of the SWPPP inspection report.

Access Roads

B.1.24. While driving on paved roads or marked dirt roads, posted speed limits will be maintained by construction vehicles and personnel. While driving within the construction area, ROW, or on un-posted dirt roads, a maximum speed limit of 25 miles per hour (20 miles per hour in Mojave Desert tortoise habitat) will be required of construction vehicles and personnel to reduce dust and allow for observation and avoidance of wildlife, livestock or visitors in the road.

Construction

B.1.33. The ROWs will be kept free from any accumulation of construction waste, trash, and debris to reduce the attractiveness of the area to opportunistic predators such as desert kit fox, coyotes, and common ravens. Food waste will be disposed of promptly in predator-proof containers with re-sealable lids. Trash, debris, recyclables and/or waste will not be buried or burned. Disposal or recycling of trash and debris will be off-site, at a State of Utah or State of Arizona approved sanitary landfill or recycling site. Construction materials shall be stored in a gathered, piled, or other organized manner that will readily accommodate use and eventual removal and will not create fluid or additional waste problems.

B.1.35. Escape ramps will be placed at each end and every ¼- mile of any open trench or other excavation deeper than 4 feet to allow escape of wildlife or livestock that may become entrapped. Escape ramps will not be required at the end of a trench where active pipelaying and backfilling is occurring. The spacing of escape ramps may be adjusted upon approval of the BLM to ensure ramps are placed in areas near water sources and visible livestock/wildlife trails. The escape ramps will consist of loose dirt at a 2:1 or shallower slope. Excavation areas that are left open overnight will be checked by construction personnel every morning and evening and directly prior to backfilling.

B.1.36. Hazardous and toxic materials such as fuels, solvents, lubricants, and acids used during construction will be controlled to prevent accidental spills. Toxic and hazardous materials will be stored in accordance to the project SPCC plan. Vehicle and equipment refueling and hazardous materials storage will not be allowed within 100 feet of any wash, stream, or spring.

B.1.37. Spill cleanup kits will be available on heavy equipment and maintained so that any spill of fuels, solvents, lubricants, or acids can be quickly cleaned up. Construction and maintenance personnel will be trained in the proper use of the spill kit materials and correct disposal procedures.

B.1.38. Any leak or accidental release of hazardous and toxic materials will be stopped immediately and cleaned up at the time of occurrence. Contaminated soils will be removed and disposed of at a State of Utah or State of Arizona approved landfill site. All spills requiring an emergency response, regardless of the size of the spill, will be reported to UDWR and BLM and will be tracked.

B.1.40. For every active phase of construction, fire suppression equipment such as extinguishers and shovels will be available on-site during construction. Vehicles will not be parked in tall vegetation to prevent fires from exhaust contact. A designated individual on each construction site will be responsible for fire watch and fire suppression. For welding crews, one team member will be responsible for fire watch, in addition to the individual designated for the construction site fire watch and fire suppression. When welding at field locations, all flammable materials (i.e., brush, litter) will be cleaned for a distance of 15 feet around the area. Fire restrictions that may be in effect could restrict welding activities depending on the level of restriction.

B.1.43. If blasting is determined to be necessary based on project design, a Blasting Plan will be prepared and submitted to the BLM for approval in advance of construction. Any blasting will be conducted conservatively and managed to avoid damage to nearby facilities, properties, or sensitive cultural sites. Blast noise monitoring will be conducted if blasting will be in the vicinity of occupied properties, wildlife areas, or sensitive public uses such as campgrounds or visitor facilities. Blasting will not occur within 100 feet of an occupied Mojave Desert tortoise burrow.

B.1.44. A dewatering plan will be prepared and submitted to the BLM for approval in advance of construction. Should dewatering be necessary, discharge will be filtered to minimize sediment and will be directed to prevent flow from directly entering streams, wetlands, or sensitive environmental areas. Erosion and sediment control will be conducted the same as described for stormwater practices. The Compliance Inspector will coordinate with the BLM on monitoring discharges and will identify site-specific mitigation actions.

Restoration

B.1.62. A detailed Restoration Plan will be submitted to the BLM for approval prior to the start of construction. The portion of the plan pertaining to restoration in listed species habitat will be in accordance with approved study reports and permits and submitted to the USFWS by the BLM for approval. The Restoration Plan will describe reclamation and rehabilitation objectives and methods to be used, species of plants and/or seed mixture to be used, time of planting, blending with existing vegetation at ROW edges, fertilizer mix reviews and approvals, success standards, and follow-up monitoring.

B.1.64. Vegetation conditions of the ROWs and adjacent site locations will be documented in the Restoration Plan prior to construction, to establish baseline conditions for restoration. The Restoration Plan will detail how baseline conditions will be assessed. The Restoration Plan will describe revegetation efforts, success standards, and follow-up monitoring.

B.1.65. All cacti and yucca disturbed within the ROWs located in the Mojave Desert habitat portion of the project will be salvaged, with the following exceptions:

- Cholla, including silver or golden cholla (*Opuntia echinocarpa*) and pencil cholla (*Opuntia ramosissima*), equal to or greater than 3 feet tall or less than 1 foot tall (i.e., only these species of cholla between 1 foot and less than 3 feet tall will be salvaged)
- All cacti and yucca whose vegetative mass is more than 40 percent dead (i.e., apical leaves, brown or significantly chlorotic, stems rotten or significantly desiccated, etc.)
- All cacti and yucca less than 1 foot tall (excluding barrel cactus [*Ferocactus cylindraceus*], cottontop cactus [*Echinocactus polycephalus*], and hedgehog cactus [*Echinocereus sp.*])
- All yucca that are over six feet in height
- Any cacti or yucca that cannot be accessed safely due to steep slopes or very rocky areas
- All cacti and yucca not salvaged will be left on-site to become part of the vegetative mulch

B.1.66 Within disturbed portions of the ROWs located within critical habitat of listed species or areas of critical environmental concern, additional shrub salvage or enhanced seed application may be conducted to enhance restoration efforts in coordination with the BLM. Additional shrub salvage may be accomplished by either 1) salvaging from the BLM lands within the ROWs, 2) salvaging from an approved off-site harvest site, and/or 3) propagation of shrubs from native seed in an approved nursery.

B.1.67. Salvaged cacti and yucca will be transported to designated transplanting or soil windrow sites within the ROWs. Upon approval from the BLM, salvaged or windowed vegetation may be transplanted at designated sites outside the ROWs.

B.1.68. Plant salvage in critical habitat of listed species or areas of critical environmental concern (see B.1.65 and B.1.66) will occur from only within the ROWs or as indicated in the Restoration Plan. Salvaging will not begin until the ROW has been clearly staked and flagged. As feasible, salvage operations will not be performed during periods of high temperatures or other unfavorable environmental conditions. All salvaged plants will be documented and catalogued.

B.1.69. Prior to commencing any plant salvage operations in special designation areas, a free use permit, flora transportation tags, or any other required permits will be obtained to transport salvaged plants as part of restoration activities.

B.1.70. Salvaged plants in special designation areas will be maintained for the duration of construction activities if identified for replanting within the ROWs as part of site restoration, in coordination with the BLM. Maintenance will include necessary watering and other care to ensure reasonable survival of the salvaged plants.

B.1.71. At the completion of construction, coordination with the BLM on road decommissioning will occur. In areas where there are no above-ground facilities, permanent access roads, or facilities no less than 12 inches below the ground surface, the ground surface will be ripped as needed to an appropriate depth based on site characteristics to help relieve compaction, to establish an adequate seed bed to provide good seed-to-soil contact during seeding, and facilitate penetration and plant establishment (see comprehensive seeding program EPMS). Topsoil and mulched vegetation removed from the ROW at the start of construction, if any, and, if necessary, additional stabilization measures such as straw will be re-spread across the ROWs at the completion of construction.

B.1.72. Upon the completion of final grading, salvaged plants identified for replanting will be removed from the nursery sites and transplanted within the ROWs in areas not occupied by above-ground facilities or access roads. Efforts will be taken to restore plants to the same general area from which they were salvaged. Plants will be replanted in a random and non-uniform pattern, in an effort to mimic the adjacent non-disturbed plant communities. Planting holes will be two times the size of the plant material to be transplanted and will be pre-watered. All backfill will be free of debris, foreign objects, rocks large enough to obstruct root growth or watering, and noxious weeds. As feasible, transplanting will not occur during periods of high temperatures or other unfavorable environmental conditions.

B.1.73. A comprehensive seeding program will be applied after final grading and before or after plant replacement. The seed mix, application rate, and application method will be described in the Restoration Plan and reviewed by the BLM. Vegetable-based soil binders and/or hydromulch may be used on steep slopes to reduce seed movement and erosion. Seeds for restoration will be obtained from native local seed and/or a BLM-approved commercial seed vendor, and will be certified free of plant species listed on the Utah and Arizona noxious weed lists or specifically identified by the BLM. Examples of BLM- SGFO approved native plant seed species, include: white bursage (*Ambrosia dumosa*), Four-wing Saltbush (*Atriplex canescens*), Mormon tea (*Ephedra nevadensis*), Sand Sagebrush (*Artemisia filifolia*), Rubber Rabbitbrush (*Chrysothamnus nauseosus*), Saltbush (*Atriplex confertifolia*), Winterfat (*Krascheninnikovia lanata*), Brittlebrush (*Encelia spp.*), Sideoats Grama (*Bouteloua curtipendula*), Blue Grama (*Bouteloua gracilis*), Galleta (*Pleuraphis jamesii*), Sand Lovegrass (*Eragrostis trichodes*), Indian Ricegrass (*Achnatherum hymenoides*), Sand Dropseed (*Sporobolus cryptandrus*), Bottlebrush Squirreltail (*Elymus elymoides*), Globemallow (*Sphaeralcea ambigua*), Datura (*Datura sp.*), creosote bush (*Larrea tridentate*), and indigo bush (*Psoralea fremontii*). Use of exotic nonnative plant species is not allowed on public land managed by the SGFO, including Forage kochia (*Kochia prostrata*) and Crested wheatgrass (*Agropyron cristatum*).

B.1.74. Watering may be conducted after completion of seeding, to help remove air pockets and compact soils in and around the roots of transplanted vegetation. Initial and subsequent quantities and timing of watering will be reviewed by the BLM as part of the Restoration Plan

B.1.75. Signs and/or physical blocking barriers indicating restoration activities are being conducted may be installed where needed to deter off-road vehicular damage to restored areas. Placement and design of signs and barriers will be coordinated with the BLM and identified in the Restoration Plan.

Noxious Weeds

B.1.76. An Integrated Weed Management Plan will be prepared and submitted to the BLM and other applicable agencies for approval prior to the start of construction. The BLM will coordinate with USFWS as needed. Noxious weed control will be implemented to minimize the spread of noxious weeds during construction and restoration/revegetation activities. All weed control efforts on BLM-administered lands will be in compliance with the BLM Handbook H-9011, H-9011-1 Chemical Pest Control, H-9014 Use of Biological Control Agents of Pests on Public Lands, and H-9015 Integrated Pest Management.

B.1.77. Areas within the ROWs that have pre-existing noxious weed infestations as identified in the Special Status Vegetation and Noxious Weed Inventory will be treated by a licensed contractor with a BLM-approved control method (i.e., chemical, mechanical, and/or biological controls) prior to the start of construction activities, as feasible. If noxious weed infestations exist within the ROWs at the start of construction, topsoil and fill will be kept segregated and not transported to other areas within the ROWs.

B.1.78. Prior to the import of borrow or fill from outside the ROWs, the source material location will be inspected by a qualified biologist or weed scientist to ensure it is free of noxious weeds or specifically identified in the BLM-approved Integrated Weed Management Plan for the project.

B.1.79. Any straw or other organic products used during construction, restoration, operations, maintenance, or for stabilization will be certified free of plant species listed on the Utah and Arizona noxious weed list or specifically identified in the BLM-approved Integrated Weed Management Plan for the project.

B.1.80. Construction vehicles and equipment will be cleaned with a high pressure washer or high pressure air and wire brush prior to arrival on the ROWs and prior to departure from areas of known noxious weed infestations to minimize the introduction or spread of noxious weeds. Cleaning efforts will concentrate on tracks, tires, and vehicle undercarriage, with special emphasis on axles, frames, cross members, motor mounts, on and underneath steps, running boards, and front bumper/brush guard assemblies. Vehicle cabs will be swept out and refuse will be disposed of in waste receptacles. Cleaning stations will be designated and will be recorded using global positioning systems or other mutually acceptable equipment and provided to the BLM Weed Coordinator or designated contact person. All water and material at the vehicle cleaning stations will be contained and collected and hauled off site for disposal at an approved disposal site.

B.1.81. UDWR or its certified licensed contractor will submit a request for a Pesticide Use Proposal to the BLM and other applicable agencies prior to the planned application of any herbicide and a Pesticide Application Record after the planned application of the herbicide. The Pesticide Use Proposal will identify areas of planned herbicide application for BLM use. No herbicide mixing or rinsing of containers or application equipment will occur within 100 feet of natural sources (i.e., lakes, streams, or springs). An annual report on herbicide application on public lands within the ROWs will be provided to the BLM.

B.1.82. Herbicides may not be sprayed within or around an exclusion area containing sensitive resources (buffers may be applied around areas in coordination with the BLM, depending on resource). These areas will be delineated with stakes and signs during construction or by GPS data. Removal of noxious and invasive weeds in these areas shall be accomplished by method(s) approved by the BLM or that are identified in the biological opinion.

General Operations Practices

B.2.1. Facility inspection and maintenance will only use established access roads, and no off-road travel will be allowed. While driving on paved roads, routes, or marked dirt roads, posted speed limits will be maintained by inspection and maintenance vehicles and personnel. While driving on un-posted dirt roads, a maximum speed limit of 25 miles per hour (20 miles per hour in Mojave

Desert tortoise habitat) will be maintained by inspection and maintenance vehicles and personnel to reduce dust and allow for observation of desert tortoise, other wildlife or livestock in the road.

B.2.2. The ROWs will be maintained in a clean condition, and any waste material, including human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment that may be generated from ROW activities will be disposed of promptly at a State of Utah or State of Arizona approved landfill site.

B.2.6. Pipeline or other facility repairs that may be needed will be accomplished within the ROWs, following all environmental requirements of this plan. If additional ROWs or amendment of the existing ROWs are required for pipeline or facility repair, prior written approval will be obtained from the BLM. If additional area is required for emergency repairs, such as in the case of a major system failure or break, UDWR will obtain BLM verbal or written permission prior to any disturbance outside of the granted ROW area(s).

Restoration Monitoring

B.2.9. Vegetation restoration success will be monitored by UDWR and reported to the BLM, as defined in the approved Restoration Plan. Monitoring will include both qualitative and quantitative data collection and analysis. Vegetation restoration success on non-BLM lands will be coordinated with the respective landowners.

B.2.10. Annual restoration monitoring reports will be submitted to the BLM for five years documenting post-construction monitoring, and will include but not be limited to activities conducted, current status, and recommended future activities. Along with the annual report in the third year, UDWR will include a quantitative analysis, to allow opportunity following the third-year report to correct any issues that may prevent restoration site release within the subsequent two years. If monitoring indicates that restoration is not trending towards meeting or has not met designated interim success criteria, the restoration activities may be revised and remedial measures implemented, subject to BLM approval. Restoration activities and annual reporting shall continue until the restoration fulfills the requirements of the BLM-approved Restoration Plan, and UDWR receives written release from the BLM. Since successful restoration may be achieved in some areas more quickly than other areas, written approval shall identify the area released.

1.4 Existing Conditions

Variations in climate, elevation, landform, vegetation communities, wetland and riparian communities, and soil create many different environments within the Project Area in Arizona and Utah. Riparian and wetland areas are valuable in maintaining a diverse population of wildlife including many birds, bats, and amphibians that are sensitive. Desert ecosystems typically exhibit a lower diversity of wildlife species relative to mountain or forest ecosystems. Limited habitats, such as riparian-wetlands, rock outcrops and cliffs, and woodlands, are likely to provide valuable habitat to a few sensitive species.

Sensitive species are usually rare within at least a portion of their range. There are 42 sensitive species that are known to occur or have the potential to occur within the Project Area. Federally listed species are described in the DEIS Section 3.15, Threatened and Endangered Species, and Appendix C-18. Sensitive species within the Proposed Project's analysis area are typical of what can be expected within the Colorado Plateau and Mojave Desert ecoregions. Refer to Section 3.11, Vegetation Communities, and Section 3.12, Wetlands and Riparian, of the DEIS for detailed information on vegetation communities within the Project Area.

Sensitive Invertebrates

There are two sensitive invertebrates that are known to occur or have the potential to occur within the analysis area. See detail in Table 1.4-1.

Table 1.4-1 Sensitive Invertebrates Known to Occur or Have Potential to Occur within the Analysis Area

Common Name (Scientific Name)	Status	Habitat
Monarch butterfly (<i>Danaus plexippus plexippus</i>)	BLM-AZ BLM-UT	The monarch butterfly is currently under status review by the USFWS. A petition was submitted in 2014 to list the species under ESA. Monarchs are found throughout the United States where milkweeds (<i>Asclepias</i> spp.) occur. Threats identified in the petition to list the species from the Center for Biological Diversity include loss and degradation of habitat and loss of milkweed resulting from herbicide application, conversion of grasslands to cropland, loss to development and aggressive roadside management, loss of winter habitats from logging, forest disease, and climate change (https://ecos.fws.gov/docs/petitions/92210//730.pdf). In the analysis area, monarchs are likely to be found where milkweed species are present including Welsh's milkweed, which is a federally threatened species, and poison milkweed, a noxious weed that may occur near the analysis area.
Western bumblebee (<i>Bombus occidentalis</i>)	BLM-UT	The western bumblebee was common and widespread throughout the western United States; however, it has undergone declines throughout its range. Threats include pests and disease, habitat destruction or alteration, pesticide use, invasive species, and climate change (https://xerces.org/endangered-species/species-profiles/at-risk-bumble-bees/western-bumble-bee). In the analysis area, western bumblebees are likely to be rarely encountered in areas where there are flowering plants and crops.

Key:

BLM-AZ = Arizona BLM Sensitive Species

BLM-UT = Utah BLM Sensitive Wildlife Species

ESA = Endangered Species Act

USFWS = U.S. Fish and Wildlife Service

Sensitive Fish

There are five sensitive fish species that are known to occur or have the potential to occur within the analysis area (Table 1.4-2). Sensitive fishery resources within the analysis area are limited to Lake Powell and the Colorado and Green Rivers from Flaming Gorge, Paria River, Kanab Creek, and Virgin River. For a detailed account of sensitive fish species life history and occurrence in the Project Area refer to LPP Final Study Report 11 – Special Status Aquatic Species (UBWR 2016a); summaries are provided below for each species. Detailed information for bluehead sucker, flannelmouth sucker, and roundtail chub can also be found in the rangewide conservation agreement and strategy (UDWR 2006). Perennial stream habitat is limited within the analysis area. Refer to Appendix C-10, Hydrology; Appendix C-11, Water Quality; Appendix C-14, Wetland and Riparian; and Appendix C-16, General Fish and Wildlife for additional information.

Sensitive fish that are known to occur in Paria River include bluehead sucker, flannelmouth sucker, and speckled dace. The Paria River Basin covers about 1,360 square miles, originating near Bryce Canyon National Park. It is a perennial system fed by numerous ephemeral washes and streams. Near the U.S. Highway 89 crossing, the river is low gradient, consisting of sand and silt mixed with some gravel and cobble substrate, with higher flows in this area occurring in the spring associated with snowmelt and during summer monsoons (see LPP Final Study Report 11 – Special Status Aquatic Species [UBWR 2016a]).

Sensitive fish known to occur in Kanab Creek include bluehead sucker and flannelmouth sucker. The Kanab Creek Basin is about 2,360 square miles, beginning near Alton, Utah, and ending at the confluence of the Colorado River within Grand Canyon National Park. It is perennial from its headwaters to Fredonia, Arizona, in a 2- to 3-mile-long reach associated with Clearwater Spring, and in its lower reach near the Colorado River (BLM 2011). The rest of Kanab Creek below Fredonia is more intermittent due to upstream water uses (see LPP Final Study Report 11 – Special Status Aquatic Species [UBWR 2016a]).

Sensitive fish known to occur in the Virgin River with the potential for effects associated with return-flows include desert sucker, flannelmouth sucker, and speckled dace. Headwaters to the Virgin River are in the high mountains of southern Utah, north and east of Zion National Park and it originates as snowmelt with high flows from March through May (see LPP Final Study Report 11 – Special Status Aquatic Species [UBWR 2016a]). Temperature tolerances may vary by species, depending on localized conditions. Sensitive fish species have similar preferred temperature tolerances ranging from 50 to 84.2 degrees Fahrenheit.

Table 1.4-2 Sensitive Fish Species Known to or Have Potential to Occur within the Analysis Area

Common Name (Scientific Name)	Status	Habitat
Bluehead sucker (<i>Catostomus discobolus</i>)	BLM-AZ BLM-UT AZ-SGCN UT-SGCN CA	The range of the bluehead sucker extends beyond the Colorado River Basin to the Upper Snake (Idaho), Weber (Wyoming), and Bear (Utah) Rivers and is managed under a range-wide conservation agreement (UDWR 2006). The bluehead sucker occurs in small or mid-sized tributaries. It was historically widely distributed in the mainstem of the Colorado River above the mouth of the Grand Canyon in mainstem and tributaries and has declined 45–60% of its historical range (Bezzerrides and Bestengen 2002). Threats include water diversions and barriers to movement, invasion of non-native fish, and concerns with hybridizing. Within the analysis area, it has been found in tributaries to the Lower Colorado River Basin, including Paria River and Kanab Creek, and within the Upper Colorado River Basin in the mainstem and tributaries to Green and Colorado Rivers up from Lake Powell. For detailed information and maps, refer to the 2002 Status Review (Bezzerrides and Bestengen 2002) and conservation agreements (AZGFD 2006; UDWR 2006).
Desert sucker (<i>Catostomus clarkii</i>)	BLM-AZ BLM-UT AZ-SGCN UT-SGCN	The desert sucker is endemic to the Colorado River Basin, preferring riffles, rapids, and flowing streams with gravelly bottoms. The desert sucker occurs in the Lower Colorado River Basin, below the Grand Canyon, particularly in the Bill Williams, Salt, Gila, and San Francisco River drainages and in the Virgin River drainage, which includes the pluvial White River and Meadow Valley Wash (AZGFD 2002a). Threats include water development, dewatering and depletions, and predation by non-native fish (UDWR 2017). Within the analysis area, desert sucker occurs in the Virgin River drainage.
Flannelmouth sucker (<i>Catostomus latipinnis</i>)	BLM-AZ BLM-UT AZ-SGCN UT-SGCN	The flannelmouth sucker is endemic to the Colorado River Basin and is managed under a range-wide conservation agreement (UDWR 2006). It is commonly found in most medium to large, lower elevation rivers of the Upper Colorado River drainage and in lesser numbers in similar habitats in the lower Colorado River drainage. Within the analysis area, flannelmouth sucker occurs in the Colorado River from Lake Powell upstream into Colorado, in the main channel of the Colorado River below Glen Canyon Dam, and in the Virgin River, Paria River, and Kanab Creek (Bezzerrides and Bestengen 2002). The Paria River is an important spawning stream for the flannelmouth sucker (UDWR 2006; AZGFD 2002b) and it uses the river only seasonally for spawning and early rearing. Spawning has been documented in the Paria River upstream of its confluence with the Colorado River in the Grand Canyon National Park (AZGFD 2002b). Juvenile flannelmouth suckers may remain in the Paria River until flooding flushes them into the Colorado River. Detailed information on flannelmouth sucker occurrence in Kanab Creek is not available.

Table 1.4-2 Sensitive Fish Species Known to or Have Potential to Occur within the Analysis Area (continued)

Common Name (Scientific Name)	Status	Habitat
Speckled dace (<i>Rhinichthys osculus</i>)	BLM-AZ AZ-SGCN	Speckled dace are native to all major western drainages from the Columbia and Colorado Rivers south to Sonora, Mexico. In Arizona, speckled dace are found in the Colorado, Bill Williams, and Gila River drainages, preferring rocky riffles, runs and pools at headwaters, creeks and small to medium rivers. Threats are similar to the other species including dewatering and diversion and non-native species. Speckled dace are widely distributed in Arizona and Utah (AZGFD 2002c). In the analysis area, speckled dace has been documented in the lower Paria River, which is an important spawning stream for the species and the Virgin River and its tributaries.
Roundtail chub (<i>Gila robusta</i>)	BLM-AZ BLM-UT AZ-SGCN UT-SGCN CA	In 2003, a DPS of roundtail chub in the Lower Colorado River Basin was petitioned to be listed and in 2015 it was proposed to be listed as threatened (80 FR 60753); however, USFWS reopened the comment period on the proposed rule citing significant new information on the taxonomic status (81 FR 75801). The proposed rule to list the Lower Colorado River Basin roundtail chub as threatened was withdrawn stating the roundtail chub DPS is not a discrete taxonomic entity and does not meet the definition of a species under ESA (82 FR 16981). Roundtail chub is managed under a conservation agreement and strategy (UDWR 2006). Roundtail chub were historically common throughout the Colorado River Basin in mainstem and tributary streams (Bezzlerides and Bestengen 2002). In the Lower Colorado River basin, extant populations exist in the Upper Gila, Bill Williams, Verde, and Little Colorado drainages. In the Upper Colorado River Basin, the species occupies about 45% of their historic range (Bezzlerides and Bestengen 2002) in the Colorado and Green Rivers and major tributaries (UDWR 2006). In the analysis area, roundtail chub is expected in the mainstem of the upper Colorado River and mainstem and larger tributaries.

Key:

AZ-SGCN = Arizona Species of Greatest Conservation Need

BLM-AZ = Arizona BLM Sensitive Species

BLM-UT = Utah BLM Sensitive Wildlife Species

CA = Conservation Agreement

DPS = distinct population segment

FR = Federal Register

UT-SGCN = Utah Species of Greatest Conservation Need

Sensitive Amphibians

There are two sensitive amphibians that have the potential or are known to occur within the analysis area, including the Arizona toad (BLM-AZ, BLM-UT, AZ-SGCN, UT-SGCN) and northern leopard frog (BLM-AZ, AZ-SGCN, UT-SGCN). For a detailed account refer to the LPP Final Study Report 13 – Special Status Wildlife Species (UBWR 2016b). Refer to DEIS Section 3.12, Wetland and Riparian, for additional information on wetland and riparian habitats within the analysis area.

The Arizona toad is currently undergoing a status review by the USFWS. The Arizona toad inhabits streams, washes, irrigated crop lands, reservoirs, and uplands adjacent to water. Habitat includes desert, grassland, and agriculture. It breeds in shallow water after rains during spring and summer months. Suitable habitat for Arizona toad occurs within the analysis area. It has been documented in the Virgin River drainage and near Colorado City within the analysis area in Utah and is likely to occur in similar habitats in Arizona though it has not been documented.

Northern leopard frog breeds in a variety of aquatic habitats that include slow-moving or still water along streams and rivers, wetlands, permanent or temporary pools, beaver ponds, and human-constructed habitats such as earthen stock tanks and borrow pits. Emergent vegetation, such as sedges and rushes, are important features for breeding areas, and tadpoles are most often found in backwaters and still pools. There is suitable habitat for northern leopard frog in the analysis area and the species has been documented within the analysis area in Arizona.

Sensitive Reptiles

There are five sensitive reptiles that have the potential to occur or are known to occur within the analysis area (Table 1.4-3). For a detailed account refer to LPP Final Study Report 13 – Special Status Wildlife Species (UBWR 2016b).

Sensitive Birds

There are 14 sensitive birds (Table 1.4-4) that may occur or are known to occur within the analysis area including seven raptors (American peregrine falcon, bald eagle, burrowing owl, ferruginous hawk, golden eagle, northern goshawk, and short-eared owl). Raptor surveys were completed for the Proposed Project in October 2011 by searching for nests of diurnal raptors (LPP Final Study Report 13 – Special Status Wildlife Species [UBWR 2016b]) A total of 142 individual nests (129 nests on cliff habitats, nine nests in trees, and four nests in transmission towers) were documented. Due to time of year when nest surveys were completed, species could not be determined for the majority of nests.

Table 1.4-3 Sensitive Reptiles that May Occur or Are Known to Occur within the Analysis Area

Common Name (Scientific Name)	Status	Habitat
Common chuckwalla (<i>Sauromalus ater</i>)	BLM-UT NPS	Predominantly found near cliffs, boulders, or rocky slopes where they use rocks as basking sites and rock crevices for shelter. They can be found in rocky desert, lava flows, hillsides, and outcrops. Creosote bush occurs throughout most of its range. The analysis area is within the range for the species and has been documented within the analysis area in Utah.
Desert night lizard (<i>Xantusia vigilis</i>)	BLM-UT UT- SGCN	Found in arid and semiarid rocky terrain. In Utah, there are two subspecies. The common night lizard (<i>Xantusia vigilis vigilis</i>) is found on the Beaver Dam Slope in Washington County, and the Utah night lizard (<i>X.v. utabensis</i>) is found in Garfield and San Juan Counties (UDWR 2017). The analysis area is within the range for the common night lizard; however, there are no known occurrences.
Gila monster (<i>Heloderma suspectum</i>)	BLM-UT AZ- SGCN UT- SGCN	Preferred habitats include large rocky shelves, sandy areas, and creosote bush–sagebrush areas, less frequently found in desert-grassland, and is rare in oak woodland to 5,000 feet elevation. It is most common in undulating rocky foothills, bajadas and canyons. The analysis area is within the range for the species, and they have been documented within the analysis area in Utah near Warner Valley and Kanab.
Glossy snake (<i>Arizona elegans</i>)	NPS	Inhabits barren to sparse desert shrub, sagebrush flats, grasslands, and sandhills in sandy or loam soils with some rocks present. The analysis area is within the northernmost portion of the range for the species. There is one documented occurrence within the analysis area in Ferry Swale Allotment near Page, Arizona.
Zebra-tailed lizard (<i>Callisaurus draconoides</i>)	BLM-UT	Associated with open areas with little vegetation, washes, and desert pavement and hardpan (UDWR 2017). Distribution in Utah is southern and western Washington County, including Beaver Dam Slope, St. George, Warner Valley, Leeds, Hurricane, Virgin, and Springdale (UDWR 2017). The analysis area is within the range for the species and it has been documented within the analysis area in Utah in the Warner Valley, St. George, and Hurricane areas.

Key:

AZ-SGCN = Arizona Species of Greatest Conservation Need

BLM-UT = Utah BLM Sensitive Wildlife Species

NPS =- National Park Service, Special Status Species and Communities of Glen Canyon National Recreation Area

UT-SGCN = Utah Species of Greatest Conservation Need

Table 1.4-4 Sensitive Birds that May Occur or Are Known to Occur within the Analysis Area

Common Name (Scientific Name)	Status	Habitat
American peregrine falcon (<i>Falco peregrinus anatum</i>)	BLM-AZ AZ-SGCN UT-SGCN	Optimum habitat is associated with steep, sheer cliffs overlooking woodlands, riparian areas, agriculture areas, or other habitats that support avian prey populations. Multiple occurrences are recorded for northern Coconino and Mohave Counties. Potential nesting habitat includes cliff habitat near the Colorado River below Glen Canyon Dam at Hurricane Cliffs; however, no recorded sightings of peregrine falcon have been documented in the area of potential effect at the Hurricane Cliffs. An active eyrie has been identified north of the Proposed Project alignment in an area known as Flag Point in Kane County, approximately 15 miles east of Kanab (LPP Final Study Report 13 – Special Status Wildlife Species [UBWR 2016b]).
Bald eagle (<i>Haliaeetus leucocephalus</i>)	BLM-AZ BLM-UT AZ-SGCN UT-SGCN USFWS- BGEPA	Uses areas with high water-to-land edge and areas with unimpeded views, including both horizontal and vertical aspects. Areas selected for use as wintering habitat will have an adequate food supply and have open water, such as river rapids, impoundments, dam spillways, lakes, and estuaries. Analysis area is within the non-breeding range; therefore, occurrence would be associated with winter from November to April. Important bald eagle habitat includes Lake Powell, Leeds Creek, Quail Creek, Quail Creek Reservoir, the Santa Clara and Virgin Rivers, and the Hurricane City sewer lagoons (LPP Final Study Report 13 – Special Status Wildlife Species [UBWR 2016b]). The analysis area includes suitable winter foraging area; however, there are no known winter roosts.
Brewer's sparrow (<i>Spizella breweri</i>)	NPS AZ-SGCN	Nests in shrub-steppe and high desert scrub habitats.
Burrowing owl (<i>Athene cunicularia</i>)	BLM-AZ BLM-UT AZ-SGCN UT-SGCN	Occurs in open grassland and prairies, but it also uses other open situations, such as golf courses, cemeteries, and airports. The nest is in a mammal burrow, usually that of a prairie dog, ground squirrel, or badger; if a mammal burrow is not available, the owls will sometimes excavate their own nest burrow. The analysis area includes suitable habitat and burrowing owls have been documented near East Clark Bench and Pipe Valley.
Ferruginous Hawk (<i>Buteo regalis</i>)	BLM-AZ BLM-UT AZ-SGCN UT-SGCN	Inhabits grasslands, shrub steppes, and semidesert grasslands. Nesting habitat ranges from cliffs, trees, utility structures, and farm buildings to haystacks and relatively level ground. The species has been documented near West Clark Bench.
Golden Eagle (<i>Aquila chrysaetos</i>)	BLM-AZ BLM-UT AZ-SGCN UT-SGCN USFWS- BGEPA	Nests on cliffs near open country and in high desert scrub. Nests also occur in trees and on transmission towers. Golden eagles have been documented near Shinarump Cliffs.
Green-tailed Towhee (<i>Pipilo chlorurus</i>)	NPS	Occurs in dense, shrubby habitat with scattered trees (pinyon pine-juniper) or cactus. Nest in shrubs.

Table 1.4-4 Sensitive Birds that May Occur or Are Known to Occur within the Analysis Area (continued)

Common Name (Scientific Name)	Status	Habitat
Lewis's woodpecker (<i>Melanerpes lewis</i>)	BLM-UT AZ-SGCN UT-SGCN	Major breeding habitat for Lewis's woodpecker consists of open, park-like ponderosa pine forests. Lewis's woodpecker is attracted to burned-over Douglas-fir, mixed conifer, pinyon-juniper, riparian, and oak woodlands, but is also found in the fringes of pine and juniper stands, and deciduous forests, especially riparian cottonwoods.
Long-billed Curlew (<i>Numenius americanus</i>)	BLM-UT	Long-billed curlew nesting habitat includes several elements; short grass, a bare-ground component, shade, and vertebrate prey.
Northern Goshawk (<i>Accipiter gentilis</i>)	BLM-AZ BLM-UT AZ-SGCN	Prefers mature mountain forest and riparian zone habitats. Nests are constructed in trees in mature forests. In Arizona, goshawks nest most commonly in ponderosa pine forests along the Mogollon Rim, on Mt. Trumbull, on the Kaibab Plateau, and in Arizona pine and ponderosa pine forests in the southeastern mountains. They have been documented near Sand Gulch and Telegraph Flat.
Pinyon Jay (<i>Gymnorhinus cyanocephalus</i>)	BLM-AZ AZ-SGCN	Pinyon jay habitat preferences include mosaics of large tracts of pinyon-juniper woodlands especially those areas that contain large, mature, seed-producing pinyon pines, and relatively open structure with mixed shrubs (especially sage-brush) and grasses. Nests in pinyon-juniper and conifer habitats. Colonial nesters, with 25 or more pairs nesting in one woodland stand. Most nests are placed in ponderosa pine, pinyon pine or junipers at heights ranging from 3 to 115 feet. Pinyon-juniper woodlands are extensive in the analysis area. The presence of fledglings in large flocks of up to 40 birds seen in the Project Area indicate that successful breeding occurs.
Sage thrasher (<i>Oreoscoptes montanus</i>)	NPS	Inhabits sagebrush communities in low deserts.
Sagebrush sparrow (<i>Amphispiza belli</i>)	NPS	Nests in shrublands, grasslands, and desert habitats, often on the ground.
Short-eared owl (<i>Asio flammeus</i>)	BLM-UT	Usually found in grasslands, shrublands, and other open habitats; it nests on the ground, usually under a bush or clump of grass. Nesting may occur from March through August, with multiple broods possible.

Key:

AZ-SGCN = Arizona Species of Greatest Conservation Need

BLM-AZ = Arizona BLM Sensitive Species

BLM-UT = Utah BLM Sensitive Wildlife Species

NPS = National Park Service, Special Status Species and Communities of Glen Canyon National Recreation Area

USFWS-BGEPA = U.S. Fish and Wildlife Service, Bald and Golden Eagle Protection Act

UT-SGCN = Utah Species of Greatest Conservation Need

Sensitive Mammals

There are a variety of sensitive mammals that have the potential or are known to occur within the analysis area, including several bat species, Houserock Valley chisel-toothed kangaroo rat (*Dipodomys microps leucotis*), kit fox (*Vulpes macrotis*), and silky pocket mouse (*Perognathus flavus*). For a detailed account of the species refer to LPP Final Study Report 13 – Special Status Wildlife Species (UBWR 2016b).

The analysis area is within the range for the following 11 bat species: Allen's big-eared bat (*Idionycteris phyllotis*), Arizona myotis (*Myotis occultus*), big free-tailed bat (*Nyctinomops macrotis*), fringed myotis (*Myotis thysanodes*), greater western mastiff bat (*Eumops perotis californicus*), spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), western red bat (*Lasiurus blossevilli*), western small-footed myotis (*Myotis ciliolabrum*), Yuma myotis (*Myotis yumanensis*), and long-legged myotis (*Myotis volans*). Sensitive bats are likely to occur in rocky areas, riparian habitats, woodlands, and scrublands. Roost sites for many species include caves, mines, buildings, rock crevices, large snags, and under exfoliating bark. There are known occurrences for several of the bat species within the analysis area, including the Arizona myotis, Allen's big-eared bat, western small-footed myotis, fringed myotis, long-legged myotis, and Yuma myotis. In Utah, Townsend's big-eared bat has been documented in the analysis area along with a historical record of occurrence for Allen's big-eared bat.

Habitat for the Houserock Valley chisel-toothed kangaroo rat consists of scattered juniper in sandy areas and desert shrub habitats with sandy to rocky soils with little vegetation. The analysis area is within the predicted range model for Houserock Valley chisel-toothed kangaroo rat. There are no documented occurrences within the analysis area for this species and primary habitats where the species has been documented are located south of the analysis area in Houserock Valley.

Kit fox habitat is salt desert shrub habitat with sparsely vegetated flat areas. They tend to select den sites in barren areas with silty, clay soil that are higher than the surrounding terrain that allow for digging. Kit fox have preferences for and ties to specific den sites and may use a range of different dens throughout a season. Kit fox have been documented within the analysis area.

Silky pocket mouse (*Perognathus flavus*) is one of the smallest pocket mice endemic to southern North America preferring valley bottoms with often sandy or loamy soils in arid and semiarid grassland, sandy, and rocky habitats. It is known to occur in the Glen Canyon National Recreation Area.

2 Results/Environmental Consequences

2.1 No Action Alternative

Under the No Action Alternative, the LPP would not be built; there would be no grant for the requests for LPP water exchange contract, easement, or ROWs for the Proposed Project, and the BLM would not amend the RMP. The sensitive species analysis area would exist under current and future authorizations and land uses. Therefore, effects to sensitive species and their habitats associated with the construction or operation of the LPP would not occur. Existing conservation programs would not result in disturbance to sensitive species habitat identified within the Proposed Project ROWs; however, conservation programs may affect water within the Virgin River system.

However, under this alternative, projects already planned by the Project Proponent would continue to occur. Disturbance, due to these projects, would vary in space and time. Most impacts would be short-term and project-specific, including localized effects to sensitive species and to their habitat. Most effects to sensitive species would be minimized through implementation of best management practices by the Project Proponent.

2.2 Effects Common to Both the Highway Alternative and the Southern Alternative

The LPP Proposed Project would affect vegetation communities within the Colorado Plateau and Mojave Desert ecoregions that provide suitable habitat for sensitive species under both the Highway Alternative and the Southern Alternative (hereinafter “action alternatives”). Direct and indirect effects related to construction, operation, and maintenance of both action alternatives would be similar to effects on other general fish and wildlife species described in Appendix C-16, General Fish and Wildlife, and DEIS Section 3.15, Threatened and Endangered Species. Proposed Project effects are described in detail for construction, operation, and maintenance activities associated with the proposed pipeline and infrastructure as well as the LPP water exchange contract and potential return flows. Effects to sensitive species habitat correlates to effects on vegetation communities; therefore, refer to additional effects discussed in DEIS Sections 3.11, Vegetation Communities, and 3.12, Wetland and Riparian. The severity of effects depends on a variety of factors including sensitivity of the species impacted, seasonal use patterns, type and timing of activities, and physical conditions such as topography, cover, forage, and climatic conditions. Direct effects of construction, operation, and maintenance of the Proposed Project would be localized to the ROWs. Indirect effects would extend beyond the ROWs and include noise and fragmentation-related effects. Implementation of the EPMS would be highly effective at minimizing effects to sensitive species and habitats.

Effects to terrestrial sensitive species would include displacement and direct mortality of some individuals along the pipeline and transmission line ROWs, tower locations, and access roads. Large or more mobile species such as non-nesting, adult birds (including raptors) and kit fox would leave the immediate vicinity of the ROW during construction activities. Indirect mortality may occur in association with transmission lines and other above ground facilities, which may provide suitable

perching substrates for raptors and ravens to prey on terrestrial sensitive wildlife such as kit fox, small mammals, and reptiles.

Direct effects to sensitive species could occur from habitat disturbance. Cutting, clearing, and removal of vegetation would reduce the amount of cover, nesting, and foraging habitat available to sensitive species directly within the ROWs, and performing these activities outside of sensitive seasons, such as nesting and natal periods, would minimize effects during critical life stages. Recovery times of the vegetation following restoration activities would be dependent on the quality of the habitats impacted, and shrub or woodland habitats may take longer to recover than grassland. Altering habitats may result in an altered wildlife community that is more adapted to fragmentation and edge habitats. Species that are sensitive to such disturbances may experience predation, parasitism, or interspecific competition and reduced reproductive success. Habitats may become unsuitable for some species and more suitable for others. Seeding specifications on federally managed lands would result in revegetation of plant species per federal agency recommendations aiding in the restoration of sensitive species habitats; non-federal lands would be managed in accordance with the respective landowner.

Noxious and invasive species could degrade habitat values and reduce wildlife diversity within the ROWs. The use of herbicides to control noxious and invasive species within the ROWs could affect sensitive species from contact with or ingestion of treated materials. Effects may include death, damage to vital organs, decreased body condition, and effects to young, depending on exposure and amount. Use of herbicides would be in accordance with a BLM-issued pesticide use proposal and would not be sprayed within or around sensitive resources (e.g., EPM B.1.82, B.2.12), which would minimize potential effects to sensitive wildlife.

Pipeline trenching may cause temporary barriers to sensitive species moving through an area that are unable to cross the trench during construction. The pipeline would be completely buried; therefore, upon completion of construction it would not pose an impediment to sensitive species movements across and through the ROWs. Some facilities, such as substations, would have security fencing around the perimeter, which would impede larger terrestrial wildlife. Facilities that are fenced would provide limited value habitat to sensitive species; however, smaller reptiles, mammals, and birds may still access these areas. The Proposed Project would not cause barriers or disrupt migration corridors for sensitive species.

Noise could affect sensitive species during clearing and grading of the ROW, during construction and blasting, clean-up, and restoration activities. Refer to DEIS Section 3.3, Noise and Vibration, for more detailed discussion. Noise-related effects to sensitive species would include generating reaction responses (e.g., alert postures, fleeing, reduced feeding) and effects during breeding and nesting seasons/rearing of young. Effects of noise-related construction activities would be of short duration and localized, dissipating as activities leave an area. Operational noise effects would be longer duration primarily at the pump stations and hydrostations but would be no greater than 60 dBA outside the perimeter of each facility.

Sensitive Invertebrates

Direct effects to monarch butterfly and western bumblebee would include habitat loss resulting from construction of the pipeline and associated infrastructure and would be similar for both action alternatives. Disturbing soils encourages noxious weeds and invasive species such as annual cheatgrass (*Bromus tectorum*). Poison milkweed (*Asclepias subverticillata*), a noxious species in Utah has

been observed within the analysis area and may be used by monarch butterfly and western bumblebee (see LPP Final Study Report 12 - Special Status Plant Species and Noxious Weeds [UBWR 2016c]). Poison milkweed can be considered invasive in disturbed soils where it readily establishes and is poisonous to livestock; therefore, eradication efforts associated with the Proposed Project may affect habitat for monarch butterflies choosing to lay eggs on poison milkweed plants within the ROWs. All milkweed plants also provide valuable nectar resources for a diverse suite of bees and butterflies. Individual mortality is expected along roadsides resulting from collision with vehicles and new roads may fragment and degrade habitat, increase edge effects, and isolate localized populations. Dust generated from construction and use of unpaved access roads may result in deposition on nearby plants, which may result in degradation of plants important for a variety of pollinators, including western bumblebee and monarch butterfly. Dust may affect photosynthesis, respiration, and transpiration in plants, resulting in injury and decreased productivity reducing the value of the plants to pollinators.

Effects to invertebrates would be minimized along both action alternatives through implementation of the EPMS outlined in Appendix B of the LPP POD, provided in Appendix E, Plan of Development—specifically: B.1.1 (detailed plans such as Construction Dust Management Plan, Integrated Weed Management Plan, Restoration Plan), B.1.5 (worker education program), B.1.17 (crushing vegetation instead of blading), B.1.24 (speed limits), B.1.62 (detailed restoration plan), B.1.71 (road decommissioning), B.1.73 (seeding using native species), B.1.76 (noxious weeds), and B.1.82 (herbicides excluded from sensitive resources). Effectiveness of EPMS is expected to be high. Direct effects during construction to individuals within the ROWs would be localized and short-term. Effects to habitat (e.g., loss, fragmentation, and degradation) within the ROWs are expected to be minimized throughout the majority of the ROWs due to application of EPMS that would provide for restoration of disturbed areas, invasive species and noxious weed control, and construction practices that minimize disturbance. Some localized areas within the ROWs may be more difficult to reclaim, may take longer to recover to pre-disturbance conditions and may be more prone to invasive species. Restoration processes would likely extend more than one season to ensure timing of seeding occurs when conditions are optimal for success; therefore, effects associated with restoration and reseeded efforts would be long term. Herbicide application may be expected to eradicate and control noxious weeds, which may affect individuals. Dust generated by construction activities within the proposed ROWs may also degrade habitat; however, it would result in short-term effects associated with construction, operation, and maintenance activities and would be minimized by EPMS that control dust. Diverse seed mixes during the restoration and reseeded efforts that account for sensitive species would be beneficial.

Sensitive Fish

Effects to sensitive fish would be similar to those described in Appendix C-16, General Fish and Wildlife. Direct and indirect effects resulting from construction within sensitive fish habitat is limited within the analysis area to perennial and intermittent stream crossings at the Paria River and Kanab Creek. There would be no construction-related effects to the Virgin River or Upper Colorado and Green Rivers. Construction at pipeline-stream crossings would involve open-cut excavation, and the installation of cofferdams to divert flowing water from the excavation area, which would alter channel hydrology and disturb existing aquatic habitat. The use of heavy equipment to excavate the pipeline trench would disturb streambed substrate, mobilize sediment, increase the potential for erosion and sedimentation, increase turbidity, and increase the potential for hazardous material spills in the waterway.

The Paria River is the only stream known to contain sensitive fish near the proposed pipeline crossings, which would be the same for both action alternative and would result in 1.14 acres of effects. If sufficient water is present at Kanab Creek, there is the potential to effect sensitive fish. The Southern Alternative would disturb 0.18 acres of riparian habitat at Kanab Creek at Jacob Canyon and the Highway Alternative would disturb 0.09 acres of riparian habitat at Kanab Creek at Fredonia. The Paria River and Kanab Creek near the confluence with the Colorado River support sensitive fish such as flannelmouth sucker, bluehead sucker, and speckled dace; however, the confluences of these two streams is 35 to 40 river miles downstream from the proposed pipeline crossings; therefore, it is unlikely that habitat or sensitive species in the lower reaches would be adversely affected by Proposed Project construction.

The LPP water exchange contract between the Utah Bureau of Water Resources and the Bureau of Reclamation would contribute toward meeting the requirements established in the Upper Colorado River Implementation Program within the upper reaches of Green River, which would also maintain appropriate flows for other sensitive fish species within these reaches. Effects of Proposed Project operation associated with water withdrawals from Lake Powell would have negligible effects to sensitive fish in the Colorado River downstream of Glen Canyon Dam due to minimal changes in water temperatures and lower dissolved oxygen and distance of sensitive fish populations downstream of the dam.

Diversion of Lake Powell water could increase return flows to the Virgin River through increased sewer return flows from the St. George Waste-water Treatment Plant or increased surface water runoff from irrigation. These additional discharges could change the amount of aquatic habitat in the Virgin River, which would affect sensitive fish aquatic communities. Regardless of the pipeline alternative routes, Proposed Project operations under both action alternatives would supply the same quantity of raw Lake Powell water to Sand Hollow Reservoir for treatment in the Quail Creek Water Treatment Plant before distribution throughout the Washington County Water Conservation District service area. Following use in homes, businesses, and institutions, the wastewater would be treated in wastewater treatment facilities and would reach the Virgin River through sewer returns. Alternatively, the wastewater could be further treated in the wastewater reclamation facility for reuse as secondary irrigation water. This water would be stored in existing reservoirs in the St. George metropolitan area and used for outdoor watering and would eventually reach the Virgin River through surface runoff, minus any water that infiltrates the ground.

Effects to sensitive fish within the Virgin River reach that could be most affected by Lake Powell return flows would extend approximately 24 river miles from Hurricane, Utah, to downriver of St. George, Utah. Refer to DEIS Section 3.15 and Appendix C-18, Threatened and Endangered Species, for detailed analysis on effects to ESA-listed species within the Virgin River system, which would be similar for sensitive fish. Similar to ESA-listed fish, flows could benefit desert sucker and Virgin River spinedace populations. Increased flows would result in some improvement in aquatic habitat in the Virgin River, which would be consistent with one objective of the Virgin Spinedace Conservation Strategy to “enhance and/or stabilize instream flows in specific reaches of historic Virgin spinedace habitat” (UDWR 2008). This benefit would also act to offset effects of drought and high water uses on Virgin River sensitive fish species.

Refer to DEIS Section 3.10, Aquatic Invasive Species, for detailed analysis of aquatic invasive species and the potential for effects in the Virgin River system. Effects on sensitive fish within the Virgin River system associated with introduction of quagga mussels would be minimized through

EPMs, which reduce the risk of infestation as described in DEIS Section 3.10, Aquatic Invasive Species. If quagga mussels were to get into Sand Hollow, measures would be in place to manage the infestations and control any transfer to the Quail Creek and the Virgin River (refer to DEIS Section 3.10, Aquatic Invasive Species. Chemical treatments may affect non-target species such as sensitive fish. The Proposed Project would terminate at Sand Hollow Reservoir, which does not provide an outlet to the Virgin River system directly; therefore, there is no potential for the Proposed Project to transfer non-native fish to the Virgin River because Sand Hollow Reservoir is managed as a non-native fishery.

Effects to sensitive fish would be minimized along both action alternatives through implementation of the EPMs outlined in the POD Appendix B specifically: B.1.1 (detailed plans such as Storm Water Pollution Prevention Plan, Spill Prevention, Control, and Countermeasure Plan, and Restoration Plan), B.1.5 (worker education program), B.1.62 (detailed restoration plan), B.1.36 (Hazardous and toxic materials not allowed within 100 feet of any wash, stream or spring), B.1.55 (non-stormwater discharges), B.4.1 (BMPs for pipeline crossings in accordance with Clean Water Act permit requirements), and B.5.85 (BMPs to minimize effects on fish from temporary rerouting of intermittent water flow). Construction and maintenance activities at stream crossings where sensitive fish are present would have the greatest potential for effects. Even with application of EPMs, effects to some individuals and habitat would be expected; however, these effects would be short-term and are not expected to have range-wide effects to sensitive fish populations. Riparian habitats are expected to recover more quickly in comparison to upland habitats. Effectiveness of EPMs is expected to be high, minimizing direct effects to sensitive fish at the stream crossings and for restoration of riparian habitats. The LPP water exchange contract for the upper reaches of the Green River and return flows within the Virgin River would result in beneficial effects to sensitive fish that would extend over the life of the Proposed Project. Effects to sensitive fish below Glen Canyon Dam as a result of water withdrawal from Lake Powell would not affect water flows, temperature, substrate, etc., that would lead to altered habitat conditions.

Sensitive Amphibians and Reptiles

Effects to sensitive amphibians and reptiles would be similar to those described for other terrestrial sensitive species. Construction activities could result in removal of shelter and nesting habitat from vegetation removal, direct injury or mortality, increasing exposure to extreme heat, increased energy use and susceptibility to predators. Trench construction has the potential for amphibians and reptiles to fall within open trenches and not be able to escape. Reptiles are at increased risk for vehicular collisions because they may bask on project construction roads or seek shelter under vehicles that have been parked for extended periods of time or overnight.

Effects to sensitive amphibians and reptiles would be minimized by both action alternatives through implementation of the EPMs outlined in the POD Appendix B specifically: B.1.5 (worker education program), B.5.1 (biological monitors), B.5.4 (no harassment or harming of animals), B.5.5 (reporting entrapment, death, injury), and B.5.6 (prior to discharge survey for sensitive species and nesting migratory birds). In addition, EPMs specific to Gila monster and common chuckwalla include B.5.57 (preconstruction surveys to find and move individuals), B.5.58 (moved only by qualified biologists in accordance with agency protocols), and B.5.59 (project workers report Gila monster and common chuckwalla observations immediately to biological monitors). Construction, operation, and maintenance effects of the pipeline, transmission lines, and ancillary facilities would be minimized based on implementation of the EPMs. Riparian habitats where amphibians are more likely would be expected to recover more quickly in comparison to upland habitats; however, would

extend over more than one season for successful restoration to pre-disturbance conditions. Effectiveness of EPMS is expected to be high, minimizing direct effects to individual sensitive amphibians and reptiles and for restoration of riparian and upland habitats.

Sensitive Birds

Direct effects to sensitive birds that may occur as a result of construction, operation, and maintenance of the Proposed Project include the potential for mortality, injury, loss, degradation, and fragmentation of foraging, nesting, dispersing and sheltering habitat and potential disruptions to breeding and foraging activities. Direct effects also include risk of mortality and injury from in-flight collision and electrocution with transmission lines, which could affect migrating birds. Indirect effects would include the potential for alterations to plant communities, fire regimes, and habitat features important for nesting, which could result in reduced breeding success and survival of individuals.

Construction activities would result in vegetation removal that would disturb sheltering, nesting, and foraging habitat for these species. Construction activities would also result in increased noise and human presence that would deter animals from using preferred habitat and expend resources moving to other areas. Construction could also result in direct injury to wildlife through vehicle collisions or other injuries during vegetation removal and excavation activities.

Construction of the Proposed Project would include removal of vegetation that provides roosting and nesting habitat for sensitive birds within the area. Removal of this habitat during the nesting season would likely result in mortality to eggs, nestlings, and juveniles that may have difficulty fleeing from construction machinery; however, seasonal avoidance measures would minimize this risk. Noise associated with construction activities could also indirectly affect nesting birds outside of the immediate area of vegetation removal by interrupting nest construction and mating behavior and driving birds off nests and incubating eggs. These effects could result in reduced reproductive success.

Operation of the Proposed Project would include electric transmission along new 34.5 kilovolts (kV), 69 kV, 138 kV, 230 kV, and 345 kV power lines. The proposed 34.5 kV lines would present the greatest risk of bird electrocutions due to the smaller size of the arms and conductors necessary for these structures and would be a higher risk for larger birds such as raptors and eagles. Designing these towers to meet Avian Power Line Interaction Committee (APLIC) guidelines would ensure conductors are at least 60 inches from other conductors or electrical connections to ground and minimize risks of electrocution. Due to the conductor spacing on the lines over 60 kV, risk of electrocution is generally small (APLIC 2006). However, these lines can still create risks of collision. APLIC guidelines provide specific recommendations for conductor spacing and conductor arrangement to reduce risk of avian electrocutions. The guidelines also include a variety of nest and perch deterrents, perching poles, and nest platforms to further reduce risk of birds spending time near conductors. APLIC guidelines (APLIC 2012) also provide descriptions of devices for marking lines to increase visibility and allow birds to avoid collisions. Line-marking devices are most effective when placed at stream crossings, near wetlands, near ridgelines, or at other locations along the line where avian densities are likely to be high and collision risk is greatest.

Design and construction of the transmission line with the APLIC guidance (APLIC 2006, 2012) would reduce the risk of avian mortality due to electrocution or collision with the line. However, without knowing what specific measures are proposed, including types and locations of marking

devices, or what, if any, measures beyond conductor separation, would be used to reduce electrocution risk, it is difficult to know whether further protection measures are warranted. Preparation of a bird conservation strategy would provide the detail needed to ensure that the risk of effects on birds including bald and golden eagles associated with the transmission line are effectively minimized.

During transmission line construction, travelers are attached to the support structures and are used to hold pulling lines and conductors in place until the full conductor is installed and appropriately tensioned. Once installation is complete, the travelers are removed, and permanent clamps and insulator hardware are installed to fix the conductor to the support structure. If travelers are in place during the start of the nesting season and remain in place for several weeks prior to tensioning and pulling activities, there is potential for small birds to nest in the traveler hardware.

Effects to sensitive birds, including bald and golden eagles, would be minimized along both action alternatives through implementation of the EPMs outlined in the POD Appendix B specifically: B.1.1 (detailed POD plans including a Bird Conservation Strategy), B.1.5 (worker education program), B.5.1 (biological monitors), B.5.4 (no harassment or harming of animals), B.5.5 (reporting entrapment, death, injury), B.5.6 (Prior to discharge survey for sensitive species and nesting migratory birds), B.5.64 (ground clearing outside of critical nesting period), B.5.65 (preconstruction surveys and spatial buffers around nest sites), B.5.66 (Bird Conservation Strategy), B.5.67 (APLIC recommendations), B.5.68 (ongoing surveys for eagles, ferruginous hawks, and other raptors), B.5.69 (removal of trees outside of nesting period), and B.5.70 (restrict activities from May 1 through July 15 within 0.5 miles of raptor nests). In addition, EPMs for burrowing owls would reduce effects to this species including: B.5.61 (surveys of suitable habitat to document active burrows), B.5.62 (no destruction of occupied, active nesting burrows and avoidance during construction, and B.5.63 (destruction of unoccupied burrows would occur outside of the nesting season (March 1 to August 31).

Construction effects to individual birds would be minimized based on implementation of the EPMs that avoid the nesting season and conduct pre-construction surveys. Effects to habitat (e.g., loss, fragmentation, and degradation) within the ROWs are expected to be minimized throughout the majority of the ROWs due to application of EPMs that would provide for restoration of disturbed areas, invasive species and noxious weed control, and construction practices that minimize disturbance. Some localized areas within the ROWs may be more difficult to reclaim and may be more prone to invasive species. Restoration of sensitive bird habitats would be long term and the ROWs may not maintain pre-disturbance vegetation such as large shrubs and trees for several years; therefore, there may be a long-term loss of some structural components of habitat (i.e., pinyon-juniper) in some vegetation communities. Maintenance activities would be similar to those experienced during construction; however, they would be less intense and more localized and EPMs would apply. Effects may be associated with risk of collision and electrocution of sensitive migrating birds associated with the transmission lines, which would exist for the life of the ROWs. Raptors, including eagles, would be vulnerable to electrocution effects, especially on smaller kV lines (e.g., 34.5 kV and 69 kV); however, effects to sensitive birds would be minimized through incorporation of APLIC guidelines. The effectiveness of EPMs is expected to be high and would minimize effects to individuals; therefore, no population-level effects are expected.

Sensitive Mammals

Sensitive mammals within the Project Area include a variety of bat species. Disturbances to habitats used by bats during certain times of the year such as roosting, and hibernacula could result in more pronounced effects to the species depending on their ability to disperse and the timing of construction activities. Clearing of vegetation, particularly in riparian habitats, may reduce the value of the habitat to provide insect populations for foraging. Noise disturbance may force bats to disperse from roosting areas.

Effects to Houserock Valley chisel-toothed kangaroo rat would be similar to those for small, less mobile wildlife. Clearing of the ROWs could result in injury and mortality, entrapment in trenches, loss, degradation, and fragmentation of habitat.

Clearing the ROWs for construction would result in displacement of kit fox using non-natal den sites within the ROWs. Adult and mobile young kit fox would be expected to disperse to adjacent habitats outside of the ROWs. Based on implementation of EPMs there would be no disturbance to active natal dens. Kit fox are primarily nocturnal, hunting at night, and being more mobile during these activities from dusk to dawn, which would make them more susceptible to vehicular collisions if construction workers are travelling during these times. The pipeline ROWs may create a corridor for other predator species such as coyote, which could displace kit fox.

Effects to sensitive mammals would be minimized along both action alternatives through implementation of the EPMs outlined in the POD Appendix B specifically: B.1.5 (worker education program), B.5.1 (biological monitors), B.5.4 (no harassment or harming of animals), B.5.5 (reporting entrapment, death, injury), and B.5.6 (Prior to discharge survey for sensitive species and nesting migratory birds). In addition, EPMs for kit fox would further reduce effects to this species including: B.5.61 (surveys of suitable habitat to document active dens), B.5.62 (no destruction of occupied, active natal dens and avoidance during construction, and B.5.63 (destruction of unoccupied dens would occur outside of the natal season (February 15 to May 15). Construction effects of the pipeline, transmission lines, and ancillary facilities would be minimized based on implementation of the EPMs. Construction effects would result in a short- to long-term loss of habitat. Effects to habitat (e.g., loss, fragmentation, and degradation) within the ROWs are expected to be minimized throughout the majority of the ROWs due to application of EPMs that would provide for restoration of disturbed areas, invasive species and noxious weed control, and construction practices that minimize disturbance. Some localized areas within the ROWs may be more difficult to reclaim and may be more prone to invasive species. Restoration may not maintain pre-disturbance vegetation such as large shrubs and trees for several years; therefore, there may be a long-term loss of some structural components of habitat in some vegetation communities. Avoiding active dens during the natal season for kit fox would limit the potential for injury and mortality of both young and adults, which would minimize effects to the reproducing population.

2.3 Southern Alternative

The Southern Alternative would have similar direct and indirect effects to sensitive species as those described under Effects Common to Both the Highway Alternative and the Southern Alternatives. The exact locations of sensitive species along the Southern Alternative are not commonly known in this area. Potential adverse effects include short-term disturbance to individuals and long-term loss

of habitat. Short-term effects associated with the Southern Alternative is not expected to result in population level changes to sensitive species resulting in a need for federal listing under ESA because direct effects would be localized to the Proposed Project ROWs. Effects to habitat in some areas may be more long term because of restoration rates of some components of habitat (e.g., pinyon pine-juniper and blackbrush) and the potential for invasive, non-native species within the ROWs, which would result in some effects to sensitive species habitat within the ROWs.

General quantifications to habitat can be made using the analysis completed for the DEIS Section 3.11, Vegetation Communities and Section 3.12, Wetlands and Riparian. Habitats would be permanently lost within the direct footprints of facilities (e.g., high point regulating tank, pumping stations, electrical substations, and pole locations associated with transmission lines). The Southern Alternative would result in temporary and permanent disturbances of 3,705 acres within the Colorado Plateau and 265.8 acres within the Mojave Desert ecological regions. The Southern Alternative would disturb an additional 644.2 acres of developed and otherwise disturbed vegetation communities, which are less likely to provide valuable habitat for sensitive species due to their disturbed condition. Temporary and permanent disturbance within riparian habitats include 2.97 acres. Riparian habitats are more likely to provide habitats for a greater number of sensitive species (e.g., sensitive fish, riparian birds, and amphibians) and overall diversity of wildlife than upland habitats.

2.3.1 Mitigation Measures

Minor changes to the EPMS should be implemented to meet agency-specific goals and objectives for management of sensitive fish and wildlife species resources. In addition to EPMS, the following mitigation measures would further reduce effects to sensitive species.

General

- Environmental Protection Measures (EPMS) as outlined in the POD (provided in Appendix E, Plan of Development) are measures or procedures that are part of the Proposed Project and would be implemented as standard practice, including measures or procedures that could reduce or avoid adverse impacts. EPMS would be applied regardless of landownership, except where the jurisdictional agency or landowner determines changes to the EPM(s) would ensure greater consistency with governing statutes, policies, or plans. Proper communication and coordination would occur with the jurisdictional agency, private landowner, etc., to ensure changes to EPMS are modified and applied appropriately.

Residual Effects – Implementing this measure would further reduce the effects of the Proposed Project and would provide applicability of the EPMS to other lands besides just BLM-managed lands, which would provide additional assurances that effects to sensitive species would be avoided and minimized as appropriate or in coordination with jurisdictional agency or landowner.

Sensitive Fish

- The Dewatering Plan at perennial stream crossings would identify timing of construction activities and if appropriate, promote construction at these crossings during the dry season (September through October possibly later depending on conditions) to minimize effects on sensitive aquatic resources. The Dewatering Plan would address the presence of fish at perennial stream crossings and define a protocol for fish removal from stream channels prior to dewatering activities and diverting water into a diversion channel prior to the start of

construction and subsequent restoration of stream flows and replacement of fish to the original stream channel upon completion of construction at the stream crossing.

Residual Effects – Implementing this mitigation measure would further reduce effects associated with construction at perennial stream crossings by timing those activities during construction when crossings are more likely to be dry or have reduced water flows, which would reduce effects to sensitive fish and amphibians.

Sensitive Birds

- The Bird Conservation Strategy would outline application of APLIC guidelines and to reduce avian collision and electrocution associated with the transmission lines.
- Avoid installing travelers during the nesting season prior to conductor pulling activities.
- Contact state and federal agencies to obtain the most current information on nesting raptors within 1 mile of the ROW. Where state and/or federal agencies determine inadequate raptor nesting data exists, preconstruction (the year before construction is to occur) raptor surveys would be completed in accordance with agency protocols (i.e., aerial and pedestrian surveys) within a 1-mile buffer of the ROW during the breeding/nesting season (January 15 to May 1). Nests would be monitored during construction and if nests are determined to be active during construction then appropriate seasonal and spatial buffers would apply in accordance with BLM Resource Management Plans. Details would be lined out in the Bird Conservation Strategy.

Residual Effects – Implementing mitigation measures for sensitive birds would provide additional assurances that effects to these species are further reduced. Identifying in the Bird Conservation Strategy the specifics such as location, type, etc. of measures that would be deployed for the Proposed Project as defined through APLIC guidelines to reduce avian collisions and electrocutions would provide additional assurances that adequate measures are taken in the design of the transmission lines to reduce collision and electrocution risks. Installing travelers outside of the migratory bird nesting season would further reduce effects to sensitive birds which may nest in travelers if set in place during the nesting season as they provide additional substrate for nesting activities and are known to be used by migratory birds during this time. Raptor nest surveys for the Proposed Project are old and were completed outside of the raptor nesting season. Species was not able to be determined in many cases where nests were identified; therefore, additional coordination to ensure use of best available raptor nest information is used and supplemented with additional raptor nest surveys to be completed during the raptor breeding/nesting season would ensure identification of these sensitive areas and application of seasonal and spatial restrictions during construction of the Proposed Project.

General All Sensitive Species

- Monitor the ROWs ahead of trenching equipment and trenches themselves for small or less mobile animals and haze them from the ROW. If hazing is unsuccessful, a qualified wildlife biologist would capture and relocate animals to a safe distance from the construction corridor.
- Cover or backfill trenches or barriers and place approved working lights along open trenches at the completion of each day. Open no more than 1,000 feet of trench at any one location or segment. Construct all open trenches with escape ramps to allow trapped wildlife to exit the trenches.

- Personnel will look for wildlife under vehicles and construction equipment that has been sitting for extended periods of time and/or overnight and contact the biological monitor(s) if an animal needs to be moved.

Residual Effects – Implementing these measures would provide additional protections for sensitive species. Monitoring the ROWs ahead of trenching would allow for identification of individuals that need to be hazed or removed from the area prior to trenching activities. Opening no more than 1,000 feet of trench at any one location or segment would also ensure that open trenches are not causing barriers to wildlife movements within the ROWs and would allow for monitors to effectively monitor the area(s) of open trench to ensure sensitive species that may become entrapped are readily identified, located, and removed in a timely manner. Checking for sensitive species under vehicles and construction equipment that has been sitting for extended periods would allow for the identification of any species that may have sought protection, shelter, or shade to be identified and hazed prior to moving the vehicle/equipment, which would further reduce effects to sensitive species.

2.4 Highway Alternative

The Highway Alternative would have similar direct and indirect effects to sensitive species as those described under Section 2.2, Effects Common to Both the Highway Alternative and the Southern Alternative. Short-term effects associated with the Highway Alternative are not expected to result in population level changes to sensitive species resulting in a need for federal listing under ESA because direct effects would be localized to the ROWs and portions would be co-located with the existing highway; therefore, effects would be minor. Effects to habitat in some areas may be more long-term because of restoration rates of some components of habitat (e.g., pinyon pine-juniper and blackbrush) potential for invasive, non-native species within the ROWs, which would result in some moderate effects to sensitive species habitat within the ROWs.

The Highway Alternative would result in temporary and permanent disturbances of 3,421.3 acres (283.7 acres less than the Southern Alternative) within the Colorado Plateau and 265.8 acres (which is the same as the Southern Alternative) within the Mojave Desert ecological regions. The Highway Alternative would disturb an additional 421 acres of developed and otherwise disturbed vegetation communities, which are less likely to provide valuable habitat for sensitive species due to their disturbed condition. The Highway Alternative would disturb 2.67 acres of riparian habitat. The Highway Alternative would disturb 1.14 acres at the Paria River crossing and 0.09 acres at Kanab Creek at Fredonia.

2.4.1 Mitigation Measures

The mitigation measures proposed for the Highway Alternative are the same as those proposed for the Southern Alternative since resource concerns are the same.

2.5 Comparative Analysis of Alternatives

The Southern Alternative and Highway Alternative may affect individual sensitive species or their habitat but are not likely to cause a trend toward federal listing or to reduce viability for any

population or species. Effects of ground-disturbing actions would be localized and associated with the ROWs. Operation effects of transmission lines would be long term in regard to collision and electrocution risk. Transmission lines would also provide perching substrate to a variety of predatory and opportunistic birds, such as raptors and ravens, which may increase predation on sensitive species. Habitat recovery is expected to meet recovery standards for vegetation; however, some areas may take longer to recover (e.g., pinyon-juniper woodlands and blackbrush). Implementation of EPMS would minimize potential effects to sensitive species and provide opportunity for restoration of habitats. Effects to sensitive species would be similar for both action alternatives.

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4 Glossary

Degradation. The wearing down, or away, and general lowering or reduction of the earth's surface by the processes of weather and erosion.

Habitat. The region where a plant or animal naturally grows or lives. A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and home range.

Habitat fragmentation. A reduction in area of undisturbed, continuous habitat.

Noxious weed. A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or non-native, new or not common to the United States.

Perennial. Lasting or active through the whole year. May refer to rivers, streams, or plants.

Population. A group of organisms, all of the same species, which occupies a particular area. The term is used to refer to the number of individuals of a species within an ecosystem or of any group of like individuals.

Raptor. A bird of prey.

Restoration. Returning disturbed lands to a form and productivity that will be ecologically balanced.

Species. A group of individuals of common ancestry that closely resemble each other structurally and physiologically and in nature interbreed, producing fertile offspring.

5 Acronyms

APLIC	Avian Power Line Interaction Committee
AZGFD	Arizona Game and Fish Department
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practice
DEIS	Draft Environmental Impact Statement
EAP	Environmental Access Plan
EPM	environmental protection measure
ESA	Endangered Species Act
FCR	field contact representative
GPS	global positioning system
kV	kilovolts

LPP	Lake Powell Pipeline Project
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NPS	National Park Service
POD	Plan of Development
RMP	Arizona Strip Resource Management Plan
RMPA	Arizona Strip Resource Management Plan Amendment
ROW	right-of-way
SGFO	St. George Field Office
SPCC	Spill Prevention, Control, and Countermeasures
SWPPP	Stormwater Pollution Prevention Plan
UDWR _e	Utah Division of Water Resources
USC	United States Code
USFWS	U.S. Fish and Wildlife Service

6 Consultation and Coordination

The following agency representatives were consulted during preparation of this appendix.

National Park Service	John Spence
BLM Arizona Strip District Office	Jeffrey Young
BLM Kanab Field Office	Lisa Church
BLM St. George Field Office	Stephanie Root
U.S. Fish and Wildlife Service	George Weekly
Utah Division of Wildlife Resources	Rhett Boswell



— BUREAU OF —
RECLAMATION

Lake Powell Pipeline Project Appendix C-18: Threatened and Endangered Species

**Coconino and Mohave Counties, Arizona
Kane and Washington Counties, Utah**

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1 Introduction/Affected Environment

This section provides a summary of the federally listed species under the Endangered Species Act of 1973 (ESA) that may occur or could be affected with implementation of the Highway and Southern Alternatives (action alternatives) during construction, operation, and maintenance of the Proposed Project. ESA species in this section include those that are federally listed as endangered, threatened, non-essential/experimental populations, candidates for protection, or proposed for protection under the ESA and designated or proposed critical habitat.

1.1 Regulatory Framework

- The Bureau of Land Management (BLM) establishes goals and objectives for resources and allowable uses on the lands they manage. BLM resource management plans must be prepared in accordance with and regulations at 43 Federal Register (FR) 1600. The Proposed Project includes land administered by the Kanab Field Office, the Arizona Strip Field Office, and the St. George Field Office. The current land use plans (and plan amendments) are as follows:
 - Kanab Field Office Resource Management Plan (2008);
 - Kanab-Escalante Planning Area Resource Management Plan (2020);
 - Arizona Strip Field Office Resource Management Plan (RMP) (2002); and
 - St. George Field Resource Management Plan (1999).
- The ESA, as amended (16 United States Code [USC] 1531 et seq.), protects and recovers imperiled species and the ecosystems on which they depend. The ESA requires federal agencies, in consultation with the Fish and Wildlife Service (USFWS), to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The ESA also prohibits the take of any listed species.
- The BLM Special Status Species Management Policy Manual 6840 provides management direction and guidance for the conservation of special status species and their habitats. Under this policy, special status species include animal and plant species listed as threatened or endangered, proposed for listing, or candidates for listing under the provisions of the ESA; those listed as sensitive species by a state; and those listed by a BLM State Director as sensitive. The objective of this policy is to ensure actions requiring authorization or approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species under provisions of the ESA.
- The National Park Service (NPS), Organic Act, passed in 1916 (16 USC 1), establishes the NPS as an agency under the direction of the Secretary of the Interior with the stated purpose of promoting use of the national park lands while protecting them from impairment.
- NPS Management Policies 2006 sets the framework and provides direction for all management decisions relating to national park lands.

- NPS Director’s Order 12 (DO-12 and Handbook; 66 FR [Federal Register] 7507) describes the NEPA process and describes the responsibility of the NPS regarding participation in or coordination of NEPA procedures for actions occurring on NPS land.
- The Utah State Wildlife Action Plan of 2015 (Utah Wildlife Action Plan Joint Team 2015) is a comprehensive management plan designed to conserve native species populations and habitats in Utah and prevent the need for additional federal listings.
- Arizona’s State Wildlife Action Plan of 2012 (AZGF 2012) provides a 10-year vision for achievement, subject to adaptive management and improvement along the way under the watchful eye of the Arizona Game and Fish Commission and its partners for shared success in wildlife conservation and management.

1.2 Methodology

ESA-listed species that may occur in the analysis area were identified and reviewed from the USFWS (Information for Planning and Conservation [IPaC] website and state-level lists), BLM (state level), Utah Division of Wildlife Resources (UDWR), and Arizona Game and Fish. Distribution and occurrence data were reviewed from BLM, USFWS, and Utah and Arizona. In addition to these data, agency personnel and online databases (e.g., USFWS Environmental Conservation Online System, Heritage Data Request Application, Arizona Environmental Online Review Tool, and HabiMap) were consulted to identify specific species’ ranges, suitable habitat, and occurrence in the analysis area. Official species lists were obtained on March 18, 2020.

For the purposes of adequately identifying potential for ESA species and their habitats and to evaluate Project-related effects on ESA-listed species, detailed information was collected within a 6-mile-wide corridor of the Proposed Project and defined as the analysis area (i.e., 3 miles on either side of a reference centerline) for each alternative. Effects to ESA species and designated critical habitat were also assessed based on the Lake Powell Pipeline Project (LPP) water exchange contract from Flaming Gorge Reservoir down the Green and Colorado Rivers to Lake Powell and return flows from municipal and agriculture water use associated with LPP in the Virgin River from the confluence of Ash and La Verkin Creeks downstream to the confluence with Beaver Dam Wash in Arizona. Entering into the LPP water exchange contract would contribute to meeting the ESA Upper Colorado River Recovery Implementation Program requirements in Reaches 1 and 2 of the Green River and assist in the recovery of the four Colorado River endangered fish species.

Where available, comparable spatial data along all alternatives for ESA species identified for analysis were selected for use in the analysis to support a comparison of alternative routes. The methodology used to assess potential effects to ESA species included (1) identifying the types of potential effects on ESA species and critical habitat that could result from construction, operation, and maintenance of the proposed pipeline and associated facilities; as well as effects associated with the LPP water exchange contract downstream of Flaming Gorge Reservoir downstream in the Green and Colorado Rivers and return flows associated with municipal and agriculture use associated with LPP in the Virgin River; (2) assessing level and extent of initial effects to ESA species in the alternatives; (3) identifying appropriate conservation measures for minimizing potential adverse effects and determining specific areas where conservation measures should be applied; and (4) disclosing level and extent of potential residual effects on ESA species and critical habitat anticipated after conservation measures are applied.

Quantitative and qualitative analyses were performed, depending on available information, to evaluate potential effects of the Proposed Project on ESA species and critical habitat (Table 1.2-1). A discussion of cumulative effects is provided in Appendix C-25, Cumulative Effects.

Table 1.2-1 ESA Species Effects Identified for Analysis

Type of Effect	Analysis Considerations (Construction, Operation, and Maintenance)
<ul style="list-style-type: none"> • Direct loss of individuals and/or habitat due to vegetation removal, soil disturbance, stream crossings. • Decreased habitat connectivity resulting in reduced pollinator movement and gene flow between populations. • Increased soil erosion and alteration to runoff patterns in habitat. • Reduced attractiveness of disturbed areas to pollinator species. • Herbicide drift from adjacent treated areas • Increased dust. • Increased invasive species and noxious weeds. • Increased access potentially resulting in illegal collection of individuals, habitat degradation, and disturbance. • Increased predation pressure by raptors or corvids. • Modification/loss of habitat. • Disruption of breeding and nesting activities or other important seasonal activities. • Potential changes to hydrology and aquatic habitat at perennial, intermittent, and ephemeral stream crossings. • Potential effects of water withdrawal from Lake Powell (entrainment and impingement). • Introduction and dispersal of invasive aquatic species. • Potential effects on Green River and Colorado River and their 100-year floodplain. • Potential effects on the Virgin River and its 100-year floodplain. 	<ul style="list-style-type: none"> • Determining the number of known element occurrences and occupied habitat areas within the action area for each alternative route. • Qualitative analysis of direct threats to individuals due to Proposed Project activities and potential increased collection pressure due to increased public access to habitat. • Extent of ESA species habitat and designated critical habitat potentially disturbed by the Proposed Project. • Proximity of the Proposed Project to known breeding/nesting habitat/other important seasonal habitat.

The analysis area encompasses ESA species that could be directly affected (e.g., from ground disturbance and presence of workers/equipment) by the Proposed Project or that could be indirectly affected by noise or dust. The analysis assumes that all environmental protection measures (EPMs) identified in Appendix B of the LPP Plan of Development (POD) would be fully implemented to avoid, minimize, or mitigate effects (UDWRe 2020; provided in Appendix E, Plan of Development). In addition to EPMs, the Section 7 consultation would provide additional conservation measures that would minimize effects to ESA-listed species. Short-term effects would not extend beyond one

full year for any give ESA species; long-term effects would extend beyond one full year and may affect more than one reproduction cycle, which could begin to have effects at the population level.

1.3 Environmental Protection and Section 7 Consultation Measures

1.3.1 Environmental Protection Measures

Environmental Protection Measures (EPMs) as outlined in the Plan of Development are measures or procedures that are part of the Proposed Project and would be implemented as standard practice, including measures or procedures that could reduce or avoid adverse impacts. EPMs would be applied regardless of landownership, except where the jurisdictional agency or landowner determines changes to the EPM(s) would ensure greater consistency with governing statutes, policies, or plans. Proper communication and coordination would occur with the jurisdictional agency, private landowner, etc., to ensure changes to EPMs are modified and applied appropriately.

The EPMs identified in Appendix B of the POD (UDWRe 2020) were considered when assessing initial and residual effects on ESA species and associated habitats. Refer to B.5 Biological Resources in Appendix B of the POD for a full list of EPMs. EPMs for other resources may provide additional benefits to ESA-listed species such as those identified for stormwater and erosion control, restoration, noxious weeds, water resources, and air quality. EPMs that may effectively reduce potential for adverse effects on ESA species include:

General

B.5.1. Qualified biologists or field contact representatives (FCR) will act as biological monitors and be present on-site during project-related actions that may impact special status biological resources. The USFWS and authorized BLM officer will approve the selected consulting firm/biologists/FCRs to be used to implement the terms and conditions of the Biological Opinion or other agreements between UDWRe (Utah Division of Water Resources), BLM, and other federal or state agencies. Any biologist and/or firm not previously approved will submit a curriculum vitae and be approved by the USFWS and BLM authorized officer. Other personnel may assist with implementing terms and conditions that do not involve tortoise handling, monitoring, or surveys, but only under direct field supervision of the USFWS and BLM-approved biologists. Specific biologist requirements for Mojave Desert tortoise are described further in the tortoise measures below.

B.5.2. All necessary federal and state handling permits will be obtained.

B.5.7. Biological resource monitoring and compliance updates will be provided to the BLM throughout the construction period for record keeping and project documentation purposes. These will include information on ongoing construction activities, monitoring, wildlife and special status species observations, species relocations, entrapped special status species, and any other pertinent biological issues. Updates may be written or oral, as agreed upon by the BLM and UDWRe or AGFD contract biologists. An annual written report will be provided to the BLM.

Special Status Plants

B.5.8. In areas where special status plant species were identified in previous surveys either within or adjacent to the ROWs, pre-construction surveys will be conducted during the blooming or fruiting season as needed to verify plant identification. The USFWS Information for Planning and Consultation website will be reviewed prior to construction to obtain appropriate ESA species list updates for the project. Specific locations of special status plants, including BLM sensitive species, will be recorded for subsequent salvage or seed collection.

B.5.9. UDWRe will adjust construction activities as feasible to avoid any identified special status plant populations within the ROWs. T-posts strung with rope and signage will be used to mark the avoidance area including a reasonable buffer, alerting construction personnel to avoid the area. The onsite Environmental Compliance Representative will ensure these areas are properly monitored and protected. When individual special status plant locations are known (coordinates have been surveyed with GPS equipment) prior to construction drawings being prepared, the special status plants will be included in the construction drawings.

The only ESA-listed plant species that has been found near the construction area is the Siler pincushion cactus (*Pediocactus sileri*). The known occurrences of Siler pincushion cactus are outside the construction easement along the LPP and would be avoided.

B.5.10. If the special status plant species cannot be avoided, UDWRe will implement plant or seed salvage prior to the start of construction. Seeds will be collected from special status plants that are located within the ROWs. Collection, storage, and handling of seeds will be in accordance with commonly accepted scientific practices. Collected special status plant seed will be applied with the seeding program as part of restoration at the completion of construction, and in the same general area as the seeds were initially collected, as appropriate.

B.5.11. If previously unknown special status plant species are discovered within the ROWs prior to start of or during construction, UDWRe will consult with the BLM, and the BLM will reinitiate consultation with USFWS, if appropriate.

B.5.12. If federal or state protected plant species are discovered in areas cleared during previous surveys within the ROWs during construction, the on-site biological monitor or agency personnel will have the authority to temporarily halt non-emergency construction activities in order to: 1) mark the area with T-posts and rope, including a reasonable buffer, to alert construction personnel to avoid the area, or 2) allow time for UDWRe to consult with the BLM, and for the BLM to reinitiate consultation with USFWS, if appropriate.

B.5.13. Herbicides may not be sprayed within or around any special status plant exclusion areas (buffers may be applied around areas in coordination with the BLM, depending on species). These areas will be delineated with stakes and signs during construction or by GPS data. Removal of noxious and invasive weeds in these areas shall be accomplished by method(s) approved by the BLM and that are identified in the biological opinion.

Mojave Desert Tortoise (refer to EPMs B.5.14- B.5.56, below, for a complete list)

B.5.14. Desert tortoise surveys and monitoring in tortoise habitat in Utah will be completed prior to and during construction, respectively. UDWR will submit to U.S. Fish and Wildlife Service (USFWS), Utah Ecological Services Field Office, the qualifications and references for individuals conducting surveys and monitoring at least 30 days prior to initiation of construction activities.

B.5.15. Desert tortoise monitors are individuals who are approved by the USFWS to:

- assess habitat suitability;
- conduct presence/absence and abundance surveys for desert tortoises;
- monitor LPP activities within desert tortoise habitat;
- ensure proper implementation of conservation measures; and
- report incidents of non-compliance in accordance with biological opinions and permits.

Desert tortoise monitors should have sufficient desert tortoise field experience (a minimum of 480 hours searching for tortoises and tortoise sign) to detect the presence of desert tortoises through observations of animals and signs including scat and burrows. A desert tortoise monitor is not authorized to handle desert tortoises. The monitor will keep detailed field notes that will be turned into the USFWS office every three months.

B.5.18. Anytime a vehicle or construction equipment is parked in desert tortoise habitat, the area around and directly under the vehicle must be inspected for tortoises before the vehicle or equipment is moved. The inspection does not need to be performed by a tortoise monitor or FCR. If there is a desert tortoise observed, it will be left to move on its own – the tortoise will not be approached or handled. If this does not occur within 15 minutes, an approved desert tortoise biologist will be contacted to remove and relocate the tortoise. Inspection for wildlife around vehicles and equipment prior to operation will be applied to all LPP activities and the entire LPP ROW.

B.5.19. If a desert tortoise is found in the project area during LPP activities, the tortoise will not be approached or handled and all LPP activities within 300 feet of the tortoise will be halted immediately, until such time as the tortoise leaves the area or is moved from the site. This distance can be adjusted down depending on specific circumstances as coordinated with the Utah Division of Wildlife Resources (UDWR). The UDWR will be contacted to approach and handle the tortoise. The USFWS (and the Washington County HCP administrator, if so directed by UDWR or USFWS) will be notified within 24 hours if a tortoise is found in the project area.

B.5.30. Project and personnel vehicle speeds in the project area within occupied desert tortoise habitat will be limited to 20 mph. Speed limit signs can be posted when entering and exiting occupied habitat.

B.5.36. For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – If LPP activities occur within occupied habitat during the most active seasons (March 15 – May 15 and August 20 – October 20), UDWR will hold a short refresher meeting with all LPP personnel that will be led by the desert tortoise monitor or FCR (whichever is on-site when the meeting is conducted) on March 15 and August 20 (or the first working day just prior to those dates). This meeting will include instruction and handouts to remind workers of the LPP's

conservation measures. A refresher meeting may need to be given on both dates for the LPP. Refresher meetings will be held in addition to the pre-construction meeting described in General Measures. However, if the initial pre-construction meeting occurred recently (within one month prior to the most active season start date, March 15 or October 20), the refresher meeting that will have normally been held on that date is not required.

B.5.14. Desert tortoise surveys and monitoring in tortoise habitat in Utah will be completed prior to and during construction, respectively. UDWR will submit to U.S. Fish and Wildlife Service (USFWS), Utah Ecological Services Field Office, the qualifications and references for individuals conducting surveys and monitoring at least 30 days prior to initiation of construction activities.

B.5.15. Desert tortoise monitors are individuals who are approved by the USFWS to:

- assess habitat suitability;
- conduct presence/absence and abundance surveys for desert tortoises;
- monitor LPP activities within desert tortoise habitat;
- ensure proper implementation of conservation measures; and
- report incidents of non-compliance in accordance with biological opinions and permits.

Desert tortoise monitors should have sufficient desert tortoise field experience (a minimum of 480 hours searching for tortoises and tortoise sign) to detect the presence of desert tortoises through observations of animals and signs including scat and burrows. A desert tortoise monitor is not authorized to handle desert tortoises. The monitor will keep detailed field notes that will be turned into the USFWS office every three months.

B.5.16. Field contact representatives (FCR) are individuals who are approved by the USFWS to:

- monitor LPP activities within desert tortoise habitat;
- conduct daily clearance sweeps as detailed in the text below;
- ensure proper implementation of protective measures; and
- call the desert tortoise monitor or USFWS with any questions or concerns.

The FCRs are not permitted to assess habitat suitability or conduct USFWS protocol level surveys (USFWS 2017) for desert tortoises because they do not have sufficient training or field experience.

- Desert tortoise monitors will ensure the FCRs meet the following qualifications:
- can recognize signs of desert tortoises;
- understand monitoring protocols; and
- have a minimum of one field day under the supervision of a desert tortoise monitor in each activity season and habitat type.

While FCRs are not authorized to handle desert tortoise or conduct USFWS protocol level surveys (USFWS 2017), FCRs may be approved, depending on activity season and habitat quality, to conduct daily clearance sweeps for desert tortoises immediately prior to or during LPP activities. The FCR will keep detailed field notes of tortoise related activity performed that will be turned into the USFWS Utah Ecological Services Field Office every three months.

B.5.17. Before construction activities begin, a pre-construction meeting will be held between the applicant, all onsite workers, Washington County Water Conservancy District, and the desert tortoise monitor to review all conservation measures. A handout of the conservation measures will be provided to all onsite workers.

B.5.18. Anytime a vehicle or construction equipment is parked in desert tortoise habitat, the area around and directly under the vehicle must be inspected for tortoises before the vehicle or equipment is moved. The inspection does not need to be performed by a tortoise monitor or FCR. If there is a desert tortoise observed, it will be left to move on its own – the tortoise will not be approached or handled. If this does not occur within 15 minutes, an approved desert tortoise biologist will be contacted to remove and relocate the tortoise. Inspection for wildlife around vehicles and equipment prior to operation will be applied to all LPP activities and the entire LPP ROW.

B.5.19. If a desert tortoise is found in the project area during LPP activities, the tortoise will not be approached or handled and all LPP activities within 300 feet of the tortoise will be halted immediately, until such time as the tortoise leaves the area or is moved from the site. This distance can be adjusted down depending on specific circumstances as coordinated with the Utah Division of Wildlife Resources (UDWR). The UDWR will be contacted to approach and handle the tortoise. The USFWS (and the Washington County HCP administrator, if so directed by UDWR or USFWS) will be notified within 24 hours if a tortoise is found in the project area.

B.5.20. All equipment taken into desert tortoise suitable habitat will be power-washed to remove noxious weeds and seeds and petroleum products prior to entering or re-entering the site. Fueling machinery will occur on already disturbed areas within ROWs. Laws and regulations pertaining to fueling of vehicles and equipment will be observed.

B.5.21. LPP activities and equipment in desert tortoise suitable habitat will be confined to the designated ROWs which will be identified by stakes, lathes, and flagging. To the extent feasible, previously disturbed areas within the ROWs will be used for temporary storage areas.

B.5.22. Designated routes of travel will be used whenever feasible in desert tortoise suitable habitat. Additional access routes outside designated routes of travel or the temporary ROWs will be limited to areas pre-cleared by the desert tortoise monitor that do not contain sign of desert tortoise within 100 meters (328 feet). Use of access routes will be kept to a minimum. If construction or modification of access routes is needed, desert tortoise monitor(s) approved to conduct protocol level surveys (USFWS 2010) will survey these routes plus a 100-meter (328 feet) zone of influence. If a desert tortoise or fresh tortoise sign is found within the 100 meter (328 feet) zone of influence of the LPP (regardless of habitat quality), the monitor will contact UDWR and USFWS to discuss appropriate translocation, avoidance, and minimization measures based on the case-specific circumstances."

B.5.23. Cross-country vehicular travel by contractor personnel outside of the ROWs or identified access routes will be prohibited. This measure will be applied to all LPP activities and the entire LPP ROW.

B.5.24. Surface occupancy or other surface disturbing activities will be avoided as feasible within 600 meters (1,969 feet) of occupied desert tortoise habitat.

B.5.25. Trash and food items will be contained in closed (predator-proof) containers and removed regularly as needed to reduce attractiveness to opportunistic predators such as ravens, coyotes, and feral dogs. This measure will be applied to all LPP activities and the entire LPP ROW.

B.5.26. Use of firearms by contractor personnel for target practice will be prohibited from the construction site and access routes. This measure will be applied to all LPP activities and the entire LPP ROW.

B.5.27. Contractor personnel will be prohibited from bringing unrestrained domestic dogs to the construction site.

B.5.28. A hazardous materials spill kit will be kept on site during construction that is appropriate for the solvents involved in operation and maintenance of vehicles and machinery used during the construction. Laws and regulations pertaining to hazardous materials will be observed. This measure will be applied to all LPP activities and the entire LPP ROW.

B.5.29. Bulk concrete, grout, cement mortar, and solid and source site materials will be stored at a staging area. This measure will be applied to all LPP activities and the entire LPP ROW.

B.5.30. Project and personnel vehicle speeds in the project area within occupied desert tortoise habitat will be limited to 20 mph. Speed limit signs can be posted when entering and exiting occupied habitat.

B.5.31. For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – Unless UDWR elects fencing in lieu of desert tortoise monitors, desert tortoise monitors will be on site during all LPP activities for the protection of desert tortoises. These monitors will be responsible for determining compliance with measures as defined in the biological opinion.

B.5.32. For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – No more than one hour prior to daily construction activities commencing or by 7 am each work day (whichever is later), a desert tortoise monitor will conduct a clearance sweep of that day's Project activity area (including a 100-meter [328 feet] zone of influence on all sides) and carefully inspect any hazards (e.g. trenches, open pipes). If temperatures are cold enough that tortoise activity is not expected, UDWR may coordinate with USFWS to reduce the monitoring requirements.

B.5.33. For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – A desert tortoise monitor will be assigned to each grouping of equipment (heavy machines which use power to perform a construction function specific to the machine) operating in spatially disjunct areas within the project site. A grouping of equipment is defined as all construction equipment working within a 1,000-foot linear distance from the first piece of equipment to the last piece of equipment. Equipment performing backfilling, re-contouring, and reclamation activities are included in this measure.

B.5.34. For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – If UDWR chooses not to have a desert tortoise monitor on every grouping of equipment, it can use temporary fencing.

B.5.35. For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – Blasting is not permissible within 100 meters (328 feet) of an occupied tortoise burrow, due to potential direct effects of this action on burrow stability.

B.5.36. For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – If LPP activities occur within occupied habitat during the most active seasons (March 15 – May 15 and August 20 – October 20), UDWR will hold a short refresher meeting with all LPP personnel that will be led by the desert tortoise monitor or FCR (whichever is on-site when the meeting is conducted) on March 15 and August 20 (or the first working day just prior to those dates). This meeting will include instruction and handouts to remind workers of the LPP's conservation measures. A refresher meeting may need to be given on both dates for the LPP. Refresher meetings will be held in addition to the pre-construction meeting described in General Measures. However, if the initial pre-construction meeting occurred recently (within one month prior to the most active season start date, March 15 or October 20), the refresher meeting that will have normally been held on that date is not required.

B.5.37. For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – UDWR may choose to use temporary tortoise-proof fencing infrastructure in lieu of full-time monitoring to keep desert tortoises out of LPP activities. When temporary fencing is used and if the temperature is 95 degrees F or higher, the entire fence line will be checked at least three times a day—once by a tortoise monitor no more than one hour prior to each day's construction activities beginning or by 7 am (whichever is later), and twice more by the FCR throughout the day. Longer term Projects can consider installing tortoise shade structures (see b, below) to lessen the need for three daily checks of the fence to one daily check. In the event shade structures are installed, daily fence line checks must continue no more than one hour prior to each day's activities beginning or 7 am (whichever is later). If temperatures do not reach 95 degrees F, the fence line can be checked once a day. Any fencing plans must be approved by USFWS.

Temporary tortoise-proof fencing consists of barrier fence buried at least 15 centimeters or 6 inches (leaving 1 meter or 3.3 feet aboveground) and supported by stakes.

Shade structures will be constructed on a flattened mound of dirt 20 cm high (to protect the shelter from runoff). Shelter material will be arranged in a half moon shape, and must be a minimum of 20 cm tall, 40 cm long, and 40 cm wide. Shelters must be covered with 20 cm of soil on the top and sides to stabilize and insulate the structure.

B.5.38. For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – If the proponent does not install temporary fencing, then by the close of each work day, open trenches and other open excavations will be covered or provided with tortoise escape ramps. Excavations left open will be checked each morning for presence of tortoise prior to commencement of daily work and at the end of the work day.

Escape ramps will have a slope no steeper than 3:1 and be a minimum of 91.5 cm (3 feet) in length. Escape ramps will be placed at 100-meter (328 feet) intervals. These distances will be reduced if the

FCR, desert tortoise monitor, and approved desert tortoise biologist determine that the plug/escape ramp spacing is insufficient to facilitate animal escape from the trench.

B.5.39. For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – No standing water as a result of LPP operations will be permitted in desert tortoise habitat because this can attract desert tortoises and predators. Similarly, leaks on water trucks and water tanks will be repaired to prevent pooling water. If watering conditions could temporarily attract tortoises, the FCR or a desert tortoise monitor assigned to a group of equipment constructing the pipeline may periodically leave the group of equipment to patrol each area being watered.

B.5.40. For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – The storing and handling of bulk hazardous waste materials will be excluded from the LPP areas within 600 meters (1,969 feet) of active tortoise burrows.

B.5.41. For occupied or high quality desert tortoise habitat in the less active season (December 1 – February 14) – A desert tortoise monitor is not required for measures identified for the active season. An FCR will complete similar activities and remain on-site during all LPP activities, conduct daily clearance sweeps out to 100 meters (328 feet), check any hazards, and check all backfilling, re-contouring, and reclamation activities prior to initiation. A desert tortoise monitor will come out to the site weekly to check in with the FCR, review and collect field notes, and check any hazards.

B.5.42. For occupied or high quality desert tortoise habitat in the less active season (December 1 – February 14) – In lieu of an FCR that remains on site throughout the day, UDWR may use temporary fencing infrastructure. An FCR will come out to the site daily to check the fence line and any hazards. A desert tortoise monitor will come out to the site bi-weekly to check in with the FCR, review and collect field notes, and check the fence line and any hazards (regardless of temperatures).

B.5.43. For unoccupied, medium desert tortoise habitat in the active season (February 15 – November 30) – Desert tortoise monitors are not required to be on site during all LPP activities and temporary fencing is not required.

B.5.44. For unoccupied, medium desert tortoise habitat in the active season (February 15 – November 30) – A desert tortoise monitor will come out to the site weekly to check in with the FCR, review and collect field notes, and check any hazards.

B.5.45. For unoccupied, medium desert tortoise habitat in the active season (February 15 – November 30) – A FCR will perform a sweep of any open trench and any other open excavations at least three times daily. If a desert tortoise or fresh tortoise sign is found within the 100 meter (328 feet) zone of influence of the LPP, the monitor will contact UDWR and USFWS to discuss appropriate translocation, avoidance, and minimization measures based on the case-specific circumstances.

B.5.46. For unoccupied, medium desert tortoise habitat in the active season (February 15 – November 30) – No standing water as a result of LPP operations will be permitted in desert tortoise habitat as this can attract desert tortoises and predators. Similarly, leaks on water trucks and water tanks will be repaired to prevent pooling water. If conditions favor tortoise activity, the FCR or a desert tortoise monitor assigned to a group of equipment constructing the pipeline may periodically leave the group of equipment to patrol each area being watered.

B.5.47. For unoccupied, medium desert tortoise habitat in the less active season (December 1 – February 14) – Desert tortoise monitors or an FCR are not required to remain on-site during all LPP activities and temporary fencing is not required.

B.5.48. For unoccupied, medium desert tortoise habitat in the less active season (December 1 – February 14) – A FCR will perform a sweep of any open trench and any other open excavations once daily.

B.5.49. For unoccupied, medium desert tortoise habitat in the less active season (December 1 – February 14) – A FCR will contact a desert tortoise monitor bi-weekly to review and submit field notes (electronic submission is permissible), and report any hazards. If a desert tortoise or fresh tortoise sign is found within the 100 meter (328 feet) zone of influence of the LPP (regardless of habitat quality), the monitor will contact UDWR and USFWS to discuss appropriate translocation, avoidance, and minimization measures based on the case-specific circumstances.

B.5.50. For unoccupied, medium desert tortoise habitat in the less active season (December 1 – February 14) – A desert tortoise monitor will come out to the site every four weeks to check with the FCR and check any hazards.

B.5.51. A formal Bureau of Reclamation (Reclamation) Plan for all desert tortoise habitat will be developed and submitted to the BLM per BLM requirements.

B.5.52. Desert tortoise monitor(s) will prepare all survey reports and field notes and submit them to USFWS quarterly and at project completion. The reports will identify the extent of impacts to desert tortoises. They will include:

- Desert tortoise survey and monitoring reports.
- Desert tortoise encounters within project boundaries and how they were reported and addressed.

B.5.53. During routine inspections, scheduled maintenance, emergency maintenance, or any other maintenance, if desert tortoises are encountered, they will be avoided and the BLM Biologist will be contacted if there appear to be hazards to the tortoise. The BLM will coordinate with the USFWS as appropriate.

B.5.54. Scheduled maintenance in suitable habitat will be performed during the less active season (December 1 – February 14). It will be overseen by an individual who has received the desert tortoise education training provided by the Washington County HCP. Scheduled maintenance activities will not create new disturbance beyond the already-disturbed access road and pipeline features.

B.5.55. Maintenance activities that are performed during the less-active season, or that create new surface disturbance in suitable habitat will be coordinated with the BLM. The BLM will coordinate with the USFWS as appropriate.

B.5.56. If emergency maintenance activities create new surface disturbance in suitable habitat or is required during the active season in suitable habitat, the BLM will be contacted within 24 hours to

minimize any impacts and coordinate post-emergency response. The BLM will coordinate with the USFWS as appropriate.

Migratory Birds (including Raptors and Condors)

B.5.65. If initial ground clearing will occur during the critical nesting period, pre-construction surveys for nesting migratory birds will be conducted by a qualified biologist (no more than 10 days prior to construction). If an active nest is identified, a no-activity buffer (ranging from 100-feet to 1-mile, depending on species; Romin and Muck 2002, USFWS 2014) is to be established around the nest site and remain in place until the young have fledged and/or the nest becomes non-active.

B.5.66 If nesting migratory birds are found during the pre-construction surveys, UDWRe will follow measures identified within the Bird Conservation Strategy (see measure B.1.1). If feasible, the bird nests will be avoided until the birds have fledged. T-posts and rope fencing will be used to mark the avoidance areas, which will also be signed to inform construction personnel to avoid the area. If avoidance is not feasible, UDWRe will consult with the BLM.

B.5.69. If trees located within the ROWs cannot be avoided and must be removed for construction, the trees will be removed outside of the nesting period for raptors or other migratory birds, as feasible. If removal of a tree during the nesting period is required, the tree will first be surveyed by a qualified biologist to ascertain the presence of any nests. Should active nests of raptors or migratory birds be present, the tree will not be removed until the birds have fledged.

B.5.71. Immediately prior to the start of an authorized or permitted project, BLM will contact personnel monitoring California Condor locations and movements to determine the locations and status of condors in or near the project area. A condor deterrent device may need to be installed if a new structure is built in known condor areas. The need for this will be evaluated on a case-by-case basis by the appropriate agency wildlife biologist.

B.5.72. UDWRe will notify the BLM wildlife team lead or condor biologist if California Condors visit the worksite while permitted activities are underway.

B.5.73. Where condor nesting activity is known within 0.5 miles of permitted or authorized activities that include operation of heavy machinery, BLM may encourage the operator to avoid use of the equipment during the active nesting season (February 1- November 30), or as long as the nest is viable to the extent consistent with the Agreement between the U.S. Fish and Wildlife Service and the Coalition of County and Local Governments for the California Condor Experimental Population, Northern Arizona and Southern Utah (Condor Agreement).

B.5.74. Where condors occur within 1.0 mile of permitted or authorized activities that include blasting, BLM will encourage that blasting be postponed until the condors leave the area or are hazed away by personnel permitted to haze condors to the extent consistent with the Condor Agreement.

B.5.75. Where condor nesting activity is known within 1.0 mile of the project area, BLM encourages that blasting activity be delayed until after the active nesting season (February 1- November 30), or as long as the nest is viable to the extent consistent with the Condor Agreement. These dates may be modified based on the most current information regarding condor nesting.

B.5.76. Where California Condors visit a worksite while activities are underway, the onsite supervisor will notify the BLM wildlife team lead or condor biologist. Project workers and supervisors will be instructed to avoid interaction with condors. Operations will cease until the bird leaves on its own or until techniques are employed by permitted personnel that results in the individual condor leaving the area to the extent consistent with the Condor Agreement.

Fish

B.5.85. During pipeline construction, BMPs will be implemented to minimize effects on fish (if present) from the temporary rerouting of intermittent flow in Paria River and in other intermittent washes. Practices will comply with Utah Division of Wildlife Resources and Clean Water Act permitting requirements. Examples of BMPs could include screens on pump intakes.

Planning and Permitting

B.1.1. The Final POD will incorporate mitigation contained in the BLM Record of Decision and provide detailed project design and construction specifics, including but not limited to construction contract timing, phasing, and any modifications to construction access roads and right-of-way (ROW) entry points, and other details. The BLM will review and approve the updated POD prior to notice to proceed for any surface disturbance activity.

The final project POD shall contain detailed plans, including, but not limited to, those listed below.

- Agency Coordination Plan – primary contacts including the BLM authorized officers, UDWR, construction management, environmental compliance inspection contractor, and construction contractors; identification of reporting procedures and frequency.
- Bird Conservation Strategy – measures to reduce impacts on migratory birds, bald and golden eagles, and other sensitive birds; the plan will identify measures to be implemented during construction, including but not limited to, the identification of critical nesting periods for bird species anticipated to be within the ROWs, pre-construction surveys to be conducted for nesting raptors and migratory birds (survey to be conducted by qualified biologist <10 days prior to work at site) , and the construction avoidance buffer size and time duration for active raptor and migratory bird nests (ranging from 100-feet to 1-mile, depending on species). The plan will identify design features and measures to be implemented during operation, including description of design standards, any post-construction monitoring, and adaptive measures such as marking of power lines to avoid or minimize impacts; the bird conservation strategy will be developed in coordination with the BLM for compliance with Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA); for Utah, IM N. UT-2017-007 Guidance for Utah Bureau of Land Management to Meet Responsibilities under MBTA and E.O 13186 will be followed, and IM 2006-096 Utah Supplemental Planning Guidance- Raptor Best Management Practices, and applicable BLM Resource Management Plan prescriptions.
- Construction Plan – construction schedule, access roads, borrow pits, best management practices, vehicle/equipment washing locations, etc.
- Construction Traffic Management Plan – measures to reduce and manage construction traffic.

- Construction Dust Management Plan – air quality standards and permits, dust control measures, general water sources, air quality monitoring, and reporting.
- Emergency Response Plan – emergency contacts, notification procedures, available resources, and emergency procedures.
- Integrated Weed Management Plan – management of areas with noxious/invasive weeds, treatment and control measures, monitoring, and reporting.
- Mitigation Plan – summary of environmental commitments and conservation measures, responsible parties, timing, and reporting.
- Construction Noise Management Plan – measures to manage construction noise.
- Public Information Plan – public notification measures.
- Recreation Resources Mitigation Plan – measures to protect and restore recreation resources during construction and operation of the LPP.
- Restoration Plan – topsoil (growth medium) and vegetative cover salvage, stockpiling and replacement; plant salvage, maintenance and replacement, seeding, soil stabilization, and post-construction monitoring.
- Spill Prevention, Control, and Countermeasure Plan (SPCC) – procedures for storage and handling of hazardous and toxic materials, necessary permits, spill response and cleanup.
- Storm Water Pollution Prevention Plan (SWPPP) – erosion and sediment control measures, compliance inspections and reporting.

B.1.5. A worker education program will be developed by UDWR and used during construction and operation. It will be presented to personnel who will be on-site, including but not limited to contractors, contractor’s employees, supervisors, inspectors, and subcontractors. A handout will be developed addressing environmental protection measures incorporated into the project and the responsibility of each worker in environmental protection. Each worker will be briefed on his or her environmental compliance responsibilities, provided a handout, and required to sign a certification that he or she understands and will comply with those environmental protection measures. An individual who fails to comply with the environmental protection measures will be subject to corrective action up to and including dismissal from the project.

Specifics of the program will include, but are not limited to:

- General site maintenance (i.e., trash disposal)
- Stormwater and Erosion Control
- Hazardous material spill protocols
- refueling protocols
- Smoking areas
- Use of sanitary facilities
- California condor conservation measures
- MBTA
- Incident reporting,
- Prohibiting driving off the cleared corridor or existing roads,
- Importance of speed limits and other traffic regulations on access roads
- Prohibiting unrestrained dogs or hunting on the construction and facility sites
- Terms and conditions of the LPP Biological Opinion

- Desert tortoise Habitat Conservation Plan (HCP) measures
- Identifying and reporting procedures for other sensitive plants and wildlife that occur within the area of potential effect
- Cultural and paleontological resource identification and protection
- Biological, Cultural, and Paleontological monitoring requirements
- Visual resources measures
- Avoidance of undue disturbance of biological soil crusts
- Soil segregation requirements,
- Noxious weed management and identification
- Prohibiting collection of wildlife, plants, or cultural/paleontological resources, unless the collection is part of a mitigation plan and is done by qualified personnel
- Workers will receive a sticker or certificate that they have completed the training; a laminated card that can be used for reference, including applicable contact phone numbers, may also be used
- Training sessions will be held for new contractors and/or contractor personnel throughout the life of the project

Surveying

B.1.10. If any exclusion zones within the ROWs are required by the BLM, NPS, or identified in the biological opinion for resource protection (i.e., biological or cultural resources, protected plants, nesting birds, etc.), those areas will be staked, flagged or fenced, and signed by UDWRe and approved by the BLM and NPS to ensure avoidance during construction, and if necessary during operation and maintenance.

B.1.11. UDWRe will develop a GIS cloud based Environmental Access Plan (EAP). All contractors will utilize EAP. The EAP will detail access requirements such as required pre-access surveys or monitoring requirements. The EAP will be updated throughout the construction process as needed based on completed surveys, approved access areas, and current conditions and requirements.

Fencing

B.1.14. Temporary construction fencing may be installed, as necessary, for management of wildlife resources and grazing livestock during both construction and restoration efforts. The type and location of fencing will be coordinated with the BLM, Utah Division of Wildlife Resources, and/or Arizona Game and Fish Department.

Clearing and Grading

B.1.16. All Biological Resource EPMs (B.5 below) will be adhered to prior to and during clearing and grading.

B.1.17. Where feasible, vegetation within the ROWs will be crushed instead of removed by blading, to minimize impacts to soils.

B.1.18. Trash and debris will be removed from the ROWs before clearing and grading activities begin and properly disposed of in a permitted landfill or recycling facility. This is limited to existing surface debris foreign to the natural, native community.

B.1.19. In specific areas, boulders greater than 18 inches in diameter found on the soil surface will be moved to the edge of the ROWs and redistributed randomly across the ROWs during reclamation. Boulders will either be positioned so that the surface previously in contact with the ground will be in generally the same orientation or a desert varnish may be applied to boulders, as needed, to reduce stark visual contrast. UDWR will coordinate with BLM during final design to identify areas for surface boulder replacement.

B.1.20. All available growth medium (topsoil and cleared vegetation) will be salvaged and marked with signage for redistribution during reclamation. Growth medium will be windrowed along the edge of the ROWs or placed in stockpiles and temporarily stabilized (if stockpiled for more than 14 days) with temporary seeding, natural fiber geotextiles, mulch, periodic water applications, or other techniques to reduce or eliminate erosion or dust. Any temporary seeding mixes will be a BLM-approved certified weed-free seed mix. Topsoil and cleared vegetation will not be stockpiled in one location for longer than two years unless approved by land management agency for specific activities. Topsoil and cleared vegetation stockpiles maintained longer than one growing season will be planted with an annual seed mix to help control erosion and keep soil micro-organisms active.

B.1.21. Areas with noxious and invasive weeds will be treated and/or monitored in accordance with the Integrated Weed Management Plan.

B.1.22. A record will be maintained of when construction-related major vegetation and ground-disturbing activities begin and are completed, and when restoration activities are initiated as a function of the SWPPP inspection report.

Access Roads

B.1.24. While driving on paved roads or marked dirt roads, posted speed limits will be maintained by construction vehicles and personnel. While driving within the construction area, ROW, or on un-posted dirt roads, a maximum speed limit of 25 miles per hour (20 miles per hour in Mojave Desert tortoise habitat) will be required of construction vehicles and personnel to reduce dust and allow for observation and avoidance of wildlife, livestock or visitors in the road.

Construction

B.1.33. The ROWs will be kept free from any accumulation of construction waste, trash, and debris to reduce the attractiveness of the area to opportunistic predators such as desert kit fox, coyotes, and common ravens. Food waste will be disposed of promptly in predator-proof containers with re-sealable lids. Trash, debris, recyclables and/or waste will not be buried or burned. Disposal or recycling of trash and debris will be off-site, at a State of Utah or State of Arizona approved sanitary landfill or recycling site. Construction materials shall be stored in a gathered, piled, or other organized manner that will readily accommodate use and eventual removal and will not create fluid or additional waste problems.

B.1.35. Escape ramps will be placed at each end and every ¼- mile of any open trench or other excavation deeper than 4 feet to allow escape of wildlife or livestock that may become entrapped. Escape ramps will not be required at the end of a trench where active pipelaying and backfilling is occurring. The spacing of escape ramps may be adjusted upon approval of the BLM to ensure ramps are placed in areas near water sources and visible livestock/wildlife trails. The escape ramps will consist of loose dirt at a 2:1 or shallower slope. Excavation areas that are left open overnight will be checked by construction personnel every morning and evening and directly prior to backfilling.

B.1.36. Hazardous and toxic materials such as fuels, solvents, lubricants, and acids used during construction will be controlled to prevent accidental spills. Toxic and hazardous materials will be stored in accordance to the project SPCC plan. Vehicle and equipment refueling and hazardous materials storage will not be allowed within 100 feet of any wash, stream, or spring.

B.1.37. Spill cleanup kits will be available on heavy equipment and maintained so that any spill of fuels, solvents, lubricants, or acids can be quickly cleaned up. Construction and maintenance personnel will be trained in the proper use of the spill kit materials and correct disposal procedures.

B.1.38. Any leak or accidental release of hazardous and toxic materials will be stopped immediately and cleaned up at the time of occurrence. Contaminated soils will be removed and disposed of at a State of Utah or State of Arizona approved landfill site. All spills requiring an emergency response, regardless of the size of the spill, will be reported to UDWR and BLM and will be tracked.

B.1.40. For every active phase of construction, fire suppression equipment such as extinguishers and shovels will be available on-site during construction. Vehicles will not be parked in tall vegetation to prevent fires from exhaust contact. A designated individual on each construction site will be responsible for fire watch and fire suppression. For welding crews, one team member will be responsible for fire watch, in addition to the individual designated for the construction site fire watch and fire suppression. When welding at field locations, all flammable materials (i.e., brush, litter) will be cleaned for a distance of 15 feet around the area. Fire restrictions that may be in effect could restrict welding activities depending on the level of restriction.

B.1.43. If blasting is determined to be necessary based on project design, a Blasting Plan will be prepared and submitted to the BLM for approval in advance of construction. Any blasting will be conducted conservatively and managed to avoid damage to nearby facilities, properties, or sensitive cultural sites. Blast noise monitoring will be conducted if blasting will be in the vicinity of occupied properties, wildlife areas, or sensitive public uses such as campgrounds or visitor facilities. Blasting will not occur within 100 feet of an occupied Mojave Desert tortoise burrow.

B.1.44. A dewatering plan will be prepared and submitted to the BLM for approval in advance of construction. Should dewatering be necessary, discharge will be filtered to minimize sediment and will be directed to prevent flow from directly entering streams, wetlands, or sensitive environmental areas. Erosion and sediment control will be conducted the same as described for stormwater practices. The CI will coordinate with the BLM on monitoring discharges and will identify site-specific mitigation actions.

Restoration

B.1.62. A detailed Restoration Plan will be submitted to the BLM for approval prior to the start of construction. The portion of the plan pertaining to restoration in listed species habitat will be in accordance with approved study reports and permits and submitted to the USFWS by the BLM for approval. The Restoration Plan will describe reclamation and rehabilitation objectives and methods to be used, species of plants and/or seed mixture to be used, time of planting, blending with existing vegetation at ROW (right-of-way) edges, fertilizer mix reviews and approvals, success standards, and follow-up monitoring.

B.1.64. Vegetation conditions of the ROWs and adjacent site locations will be documented in the Restoration Plan prior to construction, to establish baseline conditions for restoration. The Restoration Plan will detail how baseline conditions will be assessed. The Restoration Plan will describe revegetation efforts, success standards, and follow-up monitoring.

B.1.65. All cacti and yucca disturbed within the ROWs located in the Mojave Desert habitat portion of the project will be salvaged, with the following exceptions:

- Cholla, including silver or golden cholla (*Opuntia echinocarpa*) and pencil cholla (*Opuntia ramosissima*), equal to or greater than 3 feet tall or less than 1 foot tall (i.e., only these species of cholla between 1 foot and less than 3 feet tall will be salvaged)
- All cacti and yucca whose vegetative mass is more than 40 percent dead (i.e., apical leaves, brown or significantly chlorotic, stems rotten or significantly desiccated, etc.)
- All cacti and yucca less than 1 foot tall (excluding barrel cactus [*Ferocactus cylindraceus*], cottontop cactus [*Echinocactus polycephalus*], and hedgehog cactus [*Echinocereus* sp.])
- All yucca that are over six feet in height
- Any cacti or yucca that cannot be accessed safely due to steep slopes or very rocky areas
- All cacti and yucca not salvaged will be left on-site to become part of the vegetative mulch

B.1.66 Within disturbed portions of the ROWs located within critical habitat of listed species or areas of critical environmental concern, additional shrub salvage or enhanced seed application may be conducted to enhance restoration efforts in coordination with the BLM. Additional shrub salvage may be accomplished by either 1) salvaging from the BLM-managed lands within the ROWs, 2) salvaging from an approved off-site harvest site, and/or 3) propagation of shrubs from native seed in an approved nursery.

B.1.67. Salvaged cacti and yucca will be transported to designated transplanting or soil windrow sites within the ROWs. Upon approval from the BLM, salvaged or windowed vegetation may be transplanted at designated sites outside the ROWs.

B.1.68. Plant salvage in critical habitat of listed species or areas of critical environmental concern (see B.1.65 and B.1.66) will occur from only within the ROWs or as indicated in the Restoration Plan. Salvaging will not begin until the ROW has been clearly staked and flagged. As feasible, salvage operations will not be performed during periods of high temperatures or other unfavorable environmental conditions. All salvaged plants will be documented and catalogued.

B.1.69. Prior to commencing any plant salvage operations in special designation areas, a free use permit, flora transportation tags, or any other required permits will be obtained to transport salvaged plants as part of restoration activities.

B.1.70. Salvaged plants in special designation areas will be maintained for the duration of construction activities if identified for replanting within the ROWs as part of site restoration, in coordination with the BLM. Maintenance will include necessary watering and other care to ensure reasonable survival of the salvaged plants.

B.1.71. At the completion of construction, coordination with the BLM on road decommissioning will occur. In areas where there are no above-ground facilities, permanent access roads, or facilities no less than 12 inches below the ground surface, the ground surface will be ripped as needed to an appropriate depth based on site characteristics to help relieve compaction, to establish an adequate seed bed to provide good seed-to-soil contact during seeding, and facilitate penetration and plant establishment (see comprehensive seeding program EPMs). Topsoil and mulched vegetation removed from the ROW at the start of construction, if any, and, if necessary, additional stabilization measures such as straw will be re-spread across the ROWs at the completion of construction.

B.1.72. Upon the completion of final grading, salvaged plants identified for replanting will be removed from the nursery sites and transplanted within the ROWs in areas not occupied by above-ground facilities or access roads. Efforts will be taken to restore plants to the same general area from which they were salvaged. Plants will be replanted in a random and non-uniform pattern, in an effort to mimic the adjacent non-disturbed plant communities. Planting holes will be two times the size of the plant material to be transplanted and will be pre-watered. All backfill will be free of debris, foreign objects, rocks large enough to obstruct root growth or watering, and noxious weeds. As feasible, transplanting will not occur during periods of high temperatures or other unfavorable environmental conditions.

B.1.73. A comprehensive seeding program will be applied after final grading and before or after plant replacement. The seed mix, application rate, and application method will be described in the Restoration Plan and reviewed by the BLM. Vegetable-based soil binders and/or hydromulch may be used on steep slopes to reduce seed movement and erosion. Seeds for restoration will be obtained from native local seed and/or a BLM-approved commercial seed vendor, and will be certified free of plant species listed on the Utah and Arizona noxious weed lists or specifically identified by the BLM. Examples of BLM-St. George Field Office (SGFO) approved native plant seed species, include: white bursage (*Ambrosia dumosa*), Four-wing Saltbush (*Atriplex canescens*), Mormon tea (*Ephedra nevadensis*), Sand Sagebrush (*Artemisia filifolia*), Rubber Rabbitbrush (*Chrysothamnus nauseosus*), Saltbush (*Atriplex confertifolia*), Winterfat (*Krascheninnikovia lanata*), Brittlebrush (*Encelia spp.*), Sideoats Grama (*Bouteloua curtipendula*), Blue Grama (*Bouteloua gracilis*), Galleta (*Pleuraphis jamesii*), Sand Lovegrass (*Eragrostis trichodes*), Indian Ricegrass (*Achnatherum hymenoides*), Sand Dropseed (*Sporobolus cryptandrus*), Bottlebrush Squirreltail (*Elymus elymoides*), Globemallow (*Sphaeralcea ambigua*), Datura (*Datura sp.*), creosote bush (*Larrea tridentate*), and indigo bush (*Psoralea fremontii*). Use of exotic nonnative plant species is not allowed on public land managed by the SGFO, including Forage kochia (*Kochia prostrata*) and Crested wheatgrass (*Agropyron cristatum*).

B.1.74. Watering may be conducted after completion of seeding, to help remove air pockets and compact soils in and around the roots of transplanted vegetation. Initial and subsequent quantities and timing of watering will be reviewed by the BLM as part of the Restoration Plan

B.1.75. Signs and/or physical blocking barriers indicating restoration activities are being conducted may be installed where needed to deter off-road vehicular damage to restored areas. Placement and design of signs and barriers will be coordinated with the BLM and identified in the Restoration Plan.

Noxious Weeds

B.1.76. An Integrated Weed Management Plan will be prepared and submitted to the BLM and other applicable agencies for approval prior to the start of construction. The BLM will coordinate with USFWS as needed. Noxious weed control will be implemented to minimize the spread of noxious weeds during construction and restoration/revegetation activities. All weed control efforts on BLM-administered lands will be in compliance with the BLM Handbook H-9011, H-9011-1 Chemical Pest Control, H-9014 Use of Biological Control Agents of Pests on Public Lands, and H-9015 Integrated Pest Management.

B.1.77. Areas within the ROWs that have pre-existing noxious weed infestations as identified in the Special Status Vegetation and Noxious Weed Inventory will be treated by a licensed contractor with a BLM-approved control method (i.e., chemical, mechanical, and/or biological controls) prior to the start of construction activities, as feasible. If noxious weed infestations exist within the ROWs at the start of construction, topsoil and fill will be kept segregated and not transported to other areas within the ROWs.

B.1.78. Prior to the import of borrow or fill from outside the ROWs, the source material location will be inspected by a qualified biologist or weed scientist to ensure it is free of noxious weeds or specifically identified in the BLM-approved Integrated Weed Management Plan for the project.

B.1.79. Any straw or other organic products used during construction, restoration, operations, maintenance, or for stabilization will be certified free of plant species listed on the Utah and Arizona noxious weed list or specifically identified in the BLM-approved Integrated Weed Management Plan for the project.

B.1.80. Construction vehicles and equipment will be cleaned with a high pressure washer or high pressure air and wire brush prior to arrival on the ROWs and prior to departure from areas of known noxious weed infestations to minimize the introduction or spread of noxious weeds. Cleaning efforts will concentrate on tracks, tires, and vehicle undercarriage, with special emphasis on axles, frames, cross members, motor mounts, on and underneath steps, running boards, and front bumper/brush guard assemblies. Vehicle cabs will be swept out and refuse will be disposed of in waste receptacles. Cleaning stations will be designated and will be recorded using global positioning systems or other mutually acceptable equipment and provided to the BLM Weed Coordinator or designated contact person. All water and material at the vehicle cleaning stations will be contained and collected and hauled off site for disposal at an approved disposal site.

B.1.81. UDWRe or its certified licensed contractor will submit a request for a Pesticide Use Proposal to the BLM and other applicable agencies prior to the planned application of any herbicide and a Pesticide Application Record after the planned application of the herbicide. The Pesticide Use Proposal will identify areas of planned herbicide application for BLM use. No herbicide mixing or rinsing of containers or application equipment will occur within 100 feet of natural sources (i.e., lakes, streams, or springs). An annual report on herbicide application on public lands within the ROWs will be provided to the BLM.

B.1.82. Herbicides may not be sprayed within or around an exclusion area containing sensitive resources (buffers may be applied around areas in coordination with the BLM, depending on resource). These areas will be delineated with stakes and signs during construction or by GPS data. Removal of noxious and invasive weeds in these areas shall be accomplished by method(s) approved by the BLM or that are identified in the biological opinion.

General Operations Practices

B.2.1. Facility inspection and maintenance will only use established access roads, and no off-road travel will be allowed. While driving on paved roads, routes, or marked dirt roads, posted speed limits will be maintained by inspection and maintenance vehicles and personnel. While driving on un-posted dirt roads, a maximum speed limit of 25 miles per hour (20 miles per hour in Mojave Desert tortoise habitat) will be maintained by inspection and maintenance vehicles and personnel to reduce dust and allow for observation of desert tortoise, other wildlife or livestock in the road.

B.2.2. The ROWs will be maintained in a clean condition, and any waste material, including human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment that may be generated from ROW activities will be disposed of promptly at a State of Utah or State of Arizona approved landfill site.

B.2.6. Pipeline or other facility repairs that may be needed will be accomplished within the ROWs, following all environmental requirements of this plan. If additional ROWs or amendment of the existing ROWs are required for pipeline or facility repair, prior written approval will be obtained from the BLM. If additional area is required for emergency repairs, such as in the case of a major system failure or break, UDWRe will obtain BLM verbal or written permission prior to any disturbance outside of the granted ROW area(s).

Restoration Monitoring

B.2.9. Vegetation restoration success will be monitored by UDWRe and reported to the BLM, as defined in the approved Restoration Plan. Monitoring will include both qualitative and quantitative data collection and analysis. Vegetation restoration success on non-BLM lands will be coordinated with the respective landowners.

B.2.10. Annual restoration monitoring reports will be submitted to the BLM for five years documenting post-construction monitoring, and will include but not be limited to activities conducted, current status, and recommended future activities. Along with the annual report in the third year, UDWRe will include a quantitative analysis, to allow opportunity following the third-year report to correct any issues that may prevent restoration site release within the subsequent two years. If monitoring indicates that restoration is not trending towards meeting or has not met designated

interim success criteria, the restoration activities may be revised and remedial measures implemented, subject to BLM approval. Restoration activities and annual reporting shall continue until the restoration fulfills the requirements of the BLM-approved Restoration Plan, and UDWR receives written release from the BLM. Since successful restoration may be achieved in some areas more quickly than other areas, written approval shall identify the area released.

1.3.2 Section 7 Consultation Measures

In addition to EPMs, the Section 7 consultation resulted in additional conservation measures as follows:

1.3.2.1 Measures for Listed Plants

The following measures would be applicable to all LPP features and facilities during construction, operation and maintenance and are specific to listed plants. Species-specific measures in this chapter are in addition to or may supersede general conservation measures if more restrictive, as applicable.

For the purposes of these recommendations, the following terms are so defined. Potential, suitable, and occupied habitat are defined as follows. Potential habitat is defined as areas which satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment. Suitable habitat is defined as areas which contain or exhibit the specific components or constituents necessary for plant persistence; it is determined by field inspection and/or surveys; it may or may not contain federally listed plant species; and habitat descriptions can be found in Federal Register Notice and species recovery plan links at <https://ecos.fws.gov/ecp/>. Occupied habitat is defined as areas currently or historically known to support the species; synonymous with “known habitat.”

- Pre-project habitat assessments will be completed across 100 percent of the project disturbance area within potential habitat prior to any ground disturbing activities to determine if suitable habitat is present.
- Surveys will be conducted within suitable habitat to determine occupancy. Surveys:
 - Must be conducted by qualified individual(s) and according to BLM and USFWS accepted survey protocols.
 - Will be conducted in suitable and occupied habitat for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected (usually the flowering period). However, surveyors should verify that the plant is flowering by contacting a BLM or USFWS botanist or demonstrating that the nearest known population is in flower.
 - Will occur within 300 feet from the edge of the proposed right-of-way (ROW) and/or project disturbance for surface pipeline, roads, well pads, and other facilities requiring removal of vegetation.
 - Will include, but not be limited to, plant species lists and habitat characteristics.
 - Will be valid until the beginning of the flowering period the following year.
 - Will be combined with historic plant location data for that particular site to delineate the outer boundary of occupied habitat. The avoidance buffer will then be applied to the outer boundary of occupied habitat for that site. This evaluation will occur in coordination with the BLM and USFWS to ensure that the appropriate buffer is applied to protect active and dormant plants and dormant seed banks in occupied habitat.
 - Reports (electronically submitted) and GIS shape files will be sent no later than December 31 to each of the following:

- Utah or Arizona Natural Heritage Program (with copies of NHP field survey forms)
 - Applicable/affected land owners and/or management agencies, and
 - Appropriate BLM and USFWS field offices.
- Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc., suitable habitat will be assessed and mapped for avoidance (hereafter, “avoidance areas”) and incorporate 300 ft buffers, as feasible. However, site-specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat.
- Design project infrastructure to minimize impacts within suitable habitat:
 - Limit new access routes created by the project.
 - Roads and utilities should share common ROWs where possible.
 - Reduce the width of ROWs and minimize the depth of excavation needed for the roadbed; where feasible, use the natural ground surface for the road within habitat.
 - Place signing to limit off-road travel in sensitive areas.
 - Stay on designated routes and other cleared/approved areas.
 - Noxious weeds within occupied habitat on all federal lands may be controlled with herbicides, in accordance with the 2007 BLM Herbicide PEIS Guidelines (http://www.blm.gov/wo/st/en/prog/more/veg_eis.html) and 2016 BLM Invasive Weed Management Plan Environmental Assessment, or most recent Field Office guidance.
 - A Pesticide Use Permit (PUP) will be approved through the action agency prior to weed control activities in occupied habitat. An approved PUP will include the most recent BLM guidelines for herbicide use near sensitive plant species.
 - Pesticide application would be accomplished using backpack sprayers, hand pumps, or ATV-mounted herbicide applicators using low-drift herbicides to minimize the potential for drift and to ensure treatments are accurately placed on the desired target.
 - A buffer of at least 25 meters around listed plant individuals will be maintained during pesticide application.
 - Erosion control measures (e.g., silt fencing) will be implemented to minimize sedimentation or concentrating water flow toward federally listed plants and populations located down slope of proposed surface disturbance activities. Such measures should only be installed within the area proposed for disturbance.
 - Only water (no chemicals, brine, or produced water) will be used for dust abatement measures.
 - All disturbed areas will be revegetated with native species comprised of species indigenous to the area. Non-native species may be included in a seed mix provided that the selected species are sterile, non-rhizomatous, and unlikely to invade other areas. Seed mix should be approved by BLM botanists and USFWS.
- Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants:
 - Follow the above recommendations for project design within suitable habitats.
 - Buffers of 300 feet, as feasible, will be maintained between the edge of disturbance and plants, populations, occupied habitat, and avoidance areas. If a 300 feet buffer cannot be maintained, then aggressive dust abatement (i.e., more frequent watering) would be implemented, in coordination with the USFWS.

- To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices will be incorporated into the project design; appropriate placement of fill is encouraged.
- Construction activities will not occur during the flowering period within occupied habitat.
- Roads will be graveled within 300 feet of occupied habitat or aggressive dust abatement (i.e., more frequent watering) would be implemented, in coordination with the USFWS.
- Dust abatement measures will be applied to disturbed areas during the active growing period (typically April 1 through July 31) and throughout the lifetime of the project (initial construction through reclamation).
- Before and during construction, areas for avoidance should be visually identifiable in the field (e.g., flagging, temporary fencing, rebar, etc.).
- Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat.
- Project related vehicle travel on dirt roads in occupied habitat will obey a 15-mile-per-hour speed limit in order to reduce dust during the time of the year when the species, pollinators, and associated habitat are most vulnerable to dust related impacts, during the flowering period.
 - Speed limit signs will be posted for project personnel.
- A qualified botanist will be on site during any ground disturbing activity in occupied habitat to monitor surface disturbance activities and assist with implementation of applicable conservation measures.
- Occupied habitat within 300 feet of the edge of the pipeline ROWs, roads ROWs, and associated facilities shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the USFWS. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the USFWS.
- Re-initiation of Section 7 consultation with the USFWS will be sought immediately if any loss of plants or occupied habitat is anticipated as a result of project activities.

Siler Pincushion Cactus

- In areas near identified occupied habitat, aggressive dust abatement (i.e., more frequent watering) would be implemented to minimize impacts to this species to the point of being insignificant to the species.

1.3.2.2 Measures for Listed Birds

Mexican Spotted Owl

Construction

- Coordination with wildlife agencies prior to construction would determine if recent occurrences of Mexican spotted owl have been reported within or near the LPP Action Area. If new information shows that Mexican spotted owls are occurring in or adjacent to the Action Area, then USFWS protocol levels surveys would be conducted 2 years prior to construction activities within 0.5 mile of construction activities. All identified Mexican

spotted owl nests will be avoided by construction activities by at least 0.5 miles March 1 to August 31.

Operation and Maintenance

- The joint Edison Electric Institute (EEI) and USFWS *Avian Protection Plan Guidelines* (2005), *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006), and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012) guidelines would be employed on all LPP transmission lines in coordination with federal agencies. “Perch discouragers” and flight diverters would be incorporated into new electrical transmission lines, where needed, in Mexican spotted owl habitat to restrict perching or nesting by competitive or predator raptors species, such as great horned owls.

Southwestern Willow Flycatcher

Construction

- Clearing of the pipeline construction corridor and construction activities would be avoided within 0.25 miles of riparian areas near the Paria River (designated critical habitat), Kanab Creek, Bitter Seeps Wash, Short Creek at Colorado City, and Short Creek at Canaan Gap and would be scheduled outside of the willow flycatcher breeding and nesting season, which is April 1 through August 15.
- Habitat suitability assessments and protocol surveys would be conducted within potential habitat prior to construction to document suitable habitat and presence/absence of southwestern willow flycatcher.

Operation and Maintenance

- Routine maintenance of the pipeline within 0.25 miles of suitable and potential habitat would be scheduled outside of the southwestern willow flycatcher breeding and nesting season, which is April 1 through August 15.
- The joint EEI and USFWS *Avian Protection Plan Guidelines* (2005), *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006), and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012) guidelines would be employed on all LPP transmission lines in accordance with federal agencies.
- Flight diverters will be installed on the transmission line where it crosses the Paria River. Diverters used will be based on the latest research to address visibility and effectiveness.
- Perch discouragers will be installed on transmission poles.

Western Yellow-billed Cuckoo

Construction

- Project activities (e.g., pipeline, transmission line, access road construction, vegetation management, and maintenance activities) will not be conducted within 0.25-miles of potential habitat, to be coordinated with the BLM Field Offices and USFWS, between June 1 and August 31 unless habitat assessments, including field verification, are completed within 0.5 mile of construction activities prior to construction and habitats are determined to be unsuitable.

Operation and Maintenance

- Protocol surveys for the yellow-billed cuckoos would be completed at the Paria River crossing and other potential riparian habitats prior to any maintenance activities that may affect suitable or potential habitat.
- The joint EEI and USFWS *Avian Protection Plan Guidelines* (2005), *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006), and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012) guidelines would be employed on all LPP transmission lines in accordance with federal agencies.
- Flight diverters will be installed on the transmission line where it crosses the Paria River. Diverters used will be based on the latest research to address visibility and effectiveness.
- Perch discouragers will be installed on transmission poles.

California Condor

Construction

- Immediately prior to the start of an authorized or permitted project, applicable Federal and state agencies would contact personnel monitoring California condor locations and movements to determine the locations and status of condors in or near the Project Area.
- The Project Proponent would notify the applicable federal and state agencies if California condors visit the worksite while permitted activities are underway.
- Where condor nesting activity is known within 0.5 miles of permitted or authorized activities that include operation of heavy machinery and/or drones, the operator would avoid use of the equipment during the active nesting season (February 1 through November 30), or as long as the nest is viable, to the extent consistent with the Condor Agreement.
- Where condors occur within 1.0 mile of permitted or authorized activities that include blasting, the blasting would be postponed until the condors leave the area or are hazed away by personnel permitted to haze condors to the extent consistent with the Condor Agreement (Appendix E).
- Where condor nesting activity is known within 1.0 mile of the Project Area, blasting activity would be delayed until after the active nesting season (February 1 through November 30), or as long as the nest is viable to the extent consistent with the Condor Agreement. These dates may be modified based on the most current information regarding condor nesting and in coordination with applicable federal and state agencies.
- When California condors visit a worksite while activities are underway, the onsite supervisor would notify the biological monitor. Project workers and supervisors would be instructed to avoid interaction with condors. Operations would cease until the bird leaves on its own or until techniques are employed by permitted personnel that result in the individual condor leaving the area to the extent consistent with the Condor Agreement.
- The project site would be cleaned up at the end of each day the work is being conducted (e.g., trash removed, scrap materials picked up) to minimize the likelihood of condors visiting the site. Applicable federal and state agency staff may conduct site visits to the area to ensure adequate clean-up measures are taken.

- For projects where potential exists for leakage or spill of hazardous materials, a spill plan would be developed and implemented to prevent water contamination and potential poisoning of condors. The plan would include provisions for immediate cleanup of any hazardous substance and would define how each hazardous substance would be treated in case of leakage or spill. The plan would be reviewed by applicable federal and state agencies to ensure condors are adequately addressed.
- Carrion encountered on construction sites would be removed to avoid attracting condors to the Project Area.

Operation and Maintenance

- The joint EEI and USFWS *Avian Protection Plan Guidelines* (2005), *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006), and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012) guidelines would be employed on all LPP transmission lines in accordance with federal agencies.

1.3.2.3 Measures for Mojave Desert Tortoise

Mojave Desert Tortoise

The following conservation measures based on the USFWS 2018 Desert Tortoise Section 7 Conservation Guidelines (USFWS 2018a) would be used to avoid and minimize impacts, including mortality, stress, and disturbances, to desert tortoise and their habitat. The selection of appropriate conservation measures would depend on whether the disturbance is temporary or permanent:

- Temporary action—leaves no permanent structures and results in no permanent habitat loss.
- Permanent action—continues for more than one breeding season and causes a loss of tortoise habitat or permanently displaces tortoise through the creation of permanent structures.

Desert tortoise can be active in every month of the year. The selection of specific conservation measures would also be determined by the seasonal timing of construction activities:

- More active season: February 15 through November 30;
- Most active season: March 15 through May 15 and August 20 through October 20;
- Less active season: December 1 through February 14.

The following measures would be applied to desert tortoise and associated habitat on federal lands affected by the LPP. For the purposes of this analysis, all tortoises encountered will be treated as if they occur on federal land.

Construction

Surveyor and Monitor Requirements

Desert tortoise surveys and monitoring per current USFWS protocols would be completed prior to any project activities and desert tortoise monitors or field contact representatives would be used on any project activities occurring in suitable desert tortoise habitat. The Project Proponent would submit to USFWS, Utah Ecological Services Field Office (UESO) in West Valley City, Utah and Arizona Ecological Services Field Office (AESO) in Flagstaff, Arizona, the qualifications and references for individuals conducting surveys and monitoring at least 30 days prior to initiation of

LPP activities. The following definitions describe the individual qualifications for survey and monitoring personnel and typical actions they would typically be approved to conduct.

AUTHORIZED DESERT TORTOISE BIOLOGISTS – Authorized desert tortoise biologists are approved to conduct and oversee presence/absence and clearance surveys, handle desert tortoise, translocate tortoise, construct burrows, excavate burrows, conduct health assessments (including any necessary bloodwork), and oversee project monitoring and compliance. Authorized biologists should have sufficient desert tortoise field experience in each category (a minimum of 480 hours searching for tortoise and tortoise sign) to detect the presence of desert tortoise through observations of animals and sign including scat and burrows. Authorized biologists must maintain up-to-date federal and state tortoise handling permits when they are conducting any handling activities. In some circumstances, Washington County Habitat Conservation Plan (WCHCP) Administration staff or local state or federal biologists may be available to serve this function. Contract desert tortoise biologists must report to and coordinate with the WCHCP Biologist.

DESERT TORTOISE MONITOR – Desert tortoise monitors are individuals who are approved by the USFWS to:

- assess habitat suitability;
- independently conduct presence/absence and abundance surveys for desert tortoise;
- monitor project activities within desert tortoise habitat;
- ensure proper implementation of conservation measures; and
- report incidents of non-compliance in accordance with biological opinions and permits.

Desert tortoise monitors should have sufficient desert tortoise field experience (a minimum of 480 hours searching for tortoise and tortoise sign) to detect the presence of desert tortoise through observations of animals and sign including scat and burrows. A desert tortoise monitor is not authorized to handle desert tortoise. The monitor would keep detailed field notes that would be turned into the UESO and AESO every three months.

FIELD CONTACT REPRESENTATIVE – Field contact representatives (FCRs) are individuals who are approved by the USFWS to:

- monitor project activities within desert tortoise habitat;
- conduct daily clearance sweeps as detailed in the Construction Measures section below;
- ensure proper implementation of protective measures; and
- call the desert tortoise monitor or USFWS with any questions or concerns.

The FCRs are not permitted to assess habitat suitability or conduct USFWS protocol level surveys for desert tortoise because they do not have sufficient training or field experience.

Desert tortoise monitors or authorized desert tortoise biologists would ensure the FCRs meet the following qualifications:

- can recognize signs of desert tortoise;
- understand current monitoring protocols; and
- have a minimum of one field day under the supervision of a desert tortoise monitor in each activity season and habitat type.

While FCRs are not authorized to handle desert tortoise or conduct USFWS protocol level surveys, FCRs may be approved, depending on activity season and habitat quality, to conduct daily clearance sweeps for desert tortoise immediately prior to or during project activities. The FCR would keep detailed field notes that would be turned into the UESO and AESO every three months.

Construction Measures

General Measures

- 1) All individuals working on the project in desert tortoise habitat would be required to take a worker education training class, conducted by Washington County (see Development Protocols-Red Cliffs Desert Reserve 2006). The class would describe the appropriate measures to take upon discovery of a desert tortoise. The class would also include a discussion of construction techniques and conservation measures to minimize potential adverse impacts. All project personnel shall sign an affidavit certifying that they have read and understand the material presented in the brochure and class. Washington County would maintain all records of affidavits.
- 2) Before project activities begin, a pre-project meeting would be held between the applicant, all onsite workers, Washington County Water Conservancy District, and the desert tortoise monitor to review all conservation measures. A handout of the conservation measures would be provided to all onsite workers.
- 3) Any time a vehicle or construction equipment is parked for more than 30 minutes in desert tortoise habitat, the area around and directly under the vehicle must be inspected for tortoise before the vehicle or equipment is moved. The inspection does not need to be performed by a tortoise monitor or FCR. If there is a desert tortoise observed, it would be left to move on its own—the tortoise would not be approached or handled. If this does not occur within 15 minutes, an approved desert tortoise biologist may be contacted to remove and relocate the tortoise, or the equipment may be left in place until the tortoise moves on its own.
- 4) If a desert tortoise is found in the Project Area during project activities, the tortoise would not be approached or handled and all project activities within 300 feet of the tortoise would be halted immediately, until such time as the tortoise leaves the area, or is moved from the site. This distance can be adjusted depending on specific circumstances as coordinated with UDWR. UDWR would be contacted to approach and handle the tortoise. The USFWS (and the Washington County HCP administrator, if so directed by UDWR or USFWS) would be notified within 24 hours if a tortoise is found in the Project Area.
- 5) Placement of transmission lines would be sited to avoid active desert tortoise burrows, where feasible.
- 6) All carrion encountered in construction areas would be removed to prevent attraction of ravens or other tortoise predators.

Site Access

- 1) All equipment taken into desert tortoise suitable habitat would be power washed to remove noxious weeds and seeds and petroleum products prior to entering or re-entering the site. Fueling machinery would occur on already disturbed areas within the ROWs. Laws and regulations pertaining to fueling of vehicles and equipment would be observed.

- 2) Project activities and equipment would be confined to the designated ROWs which would be identified by stakes, lathes, flagging and/or fencing. To the extent feasible, previously disturbed areas within the ROWs would be used for temporary storage areas.
- 3) Already designated routes of travel would be used whenever possible. Additional access routes outside designated routes of travel or the ROWs would be limited to areas pre-cleared by the desert tortoise monitor that do not contain sign of desert tortoise within 100 meters. Use of access routes would be kept to a minimum.
- 4) If construction or modification of access routes is needed, desert tortoise monitor(s) approved to conduct protocol level surveys would survey the new Action Area. If a desert tortoise or fresh tortoise sign is found, the monitor would contact Utah Division of Wildlife Resource and USFWS to discuss appropriate avoidance and minimization measures based on the case-specific circumstances.
- 5) Cross-country vehicular travel outside of the ROW by contractor personnel would be prohibited.
- 6) Unforeseen surface occupancy or other surface disturbing activities would be avoided as much as feasible within 0.5 mile of known occupied desert tortoise habitat to protect the possible home range of the individual.

Site By-products

- 1) Trash and food items would be contained in closed (predator-proof) containers and removed regularly as needed to reduce attractiveness to opportunistic predators such as ravens, coyotes, and feral dogs.
- 2) Use of firearms by contractor personnel would be prohibited from the site and access routes. Contractor personnel would be prohibited from bringing domestic dogs to the project site.
- 3) A hazardous materials spill kit would be kept on site during construction that is appropriate for the materials involved in operation and maintenance of vehicles and machinery used during the project. Laws and regulations pertaining to hazardous materials would be observed.
- 4) Bulk concrete, grout, cement mortar, and solid and source site materials would be stored at a staging area.

Occupied or High Quality (including Critical Habitat) Desert Tortoise Habitat

Habitat quality is based on the physical and biological features necessary for the species (USFWS 2018a). High Quality Habitat areas may or may not include the presence of live tortoise and/or active burrows. The presence of live tortoise is assumed to also be High Quality Habitat (Occupied/High Quality). Where no tortoises are found in presence/absence survey, high quality habitat would include:

- at least 35 acres of continuous habitat (may include patchy habitats connected by artificial or natural corridors);
- sufficient quality and quantity of forage;
- suitable substrates for burrowing, nesting, and overwintering;
- slopes and topography hospitable to desert tortoise;
- suitable shelter vegetation; and
- habitat protected or removed from human disturbance.

Active Season Conservation Measures (February 15 to November 30)

In addition to the general conservation measures described above, the Project Proponent would include the following protocols for any project activities that occur within occupied or high quality desert tortoise habitat during the active season.

- 1) Desert tortoise monitors:
 - a. Desert tortoise monitors would be on site during all project activities within occupied or high quality desert tortoise habitat for the protection of desert tortoise. These monitors would be responsible for determining compliance with measures as defined in the biological opinion.
 - b. No more than one hour prior to daily construction activities commencing or by 7 am each work day (whichever is later), a desert tortoise monitor would conduct a clearance sweep of that day's project activity area (including a 200-foot buffer beyond the footprint on all sides, which may be expanded as appropriate depending on the anticipated action, i.e., blasting, geologic constraints, potential for boulder movement beyond 200 feet) and carefully inspect any hazards (e.g., trenches, open pipes).
 - c. A desert tortoise monitor would be assigned to each grouping of equipment operating in spatially disjunct areas within the project site. A grouping of equipment is defined as all construction equipment working within a 1,000-foot linear distance from the first piece of equipment to the last piece of equipment. Equipment performing backfilling, re-contouring, and reclamation activities are included in this measure.
 - d. If the Project Proponent chooses not to have a desert tortoise monitor on every grouping of equipment, it can use temporary fencing, as detailed below.
 - e. Project vehicle speeds in the Project Area would be limited to 15 miles per hour (mph).
 - f. Speed limit signs can be posted when entering and exiting occupied habitat.
- 2) Blasting is not permissible within 300 feet of an occupied tortoise burrow without notification to USFWS, due to possible direct effects of this action on burrow stability. Areas within 300 feet of proposed blasting would be surveyed for potential burrows and potential burrows would be checked for occupancy directly prior to blasting.
- 3) If project activities occur within occupied habitat during the most active seasons (March 15 through May 15 and August 20 through October 20), the Project Proponent would hold a short refresher meeting with all personnel working within potential desert tortoise habitat that would be led by the desert tortoise monitor or FCR (whichever is on-site when the meeting is conducted) on March 15 and August 20 (or the first working day just prior to those dates). This meeting would include instruction and handouts to remind workers of the conservation measures. A refresher meeting may need to be given on both dates for this project. Refresher meetings would be held in addition to the pre-project meeting described in *General Measures*. However, if the initial pre-project meeting occurred recently (within one month prior to the most active season start date, March 15 or October 20), the refresher meeting that would have normally been held on that date is not required.
- 4) The Project Proponent may choose to use temporary tortoise-proof fencing infrastructure in lieu of full-time monitoring to keep desert tortoise out of project activities. When temporary fencing is used and if the temperature is 95 degrees Fahrenheit or higher, the entire fence line would be checked at least three times a day—once by a tortoise monitor no more than one hour prior to each day's construction activities beginning or by 7:00 a.m. (whichever is later), and twice more by the FCR throughout the day. Tortoise shade structures (see item b, below) can be installed to lessen the need for three daily checks of the fence to one daily check. In the event shade structures are installed, daily fence line checks must continue no more than one hour prior to each day's project activities beginning or 7:00 a.m. (whichever is

later). If temperatures do not reach 95 degrees Fahrenheit, the fence line can be checked once a day. Any fencing plans must be approved by USFWS.

- a) Temporary tortoise-proof fencing often consists of barrier fence buried at least 15 centimeters (leaving 1 meter aboveground) and supported by stakes. For activities lasting for one day or less, a solid barrier fencing installed above grade without trenching could be used along with continuous fence line checks.
 - b) Shade structures would be constructed on a flattened mound of dirt 20 centimeters high (to protect the shelter from runoff) and set at a maximum distance of 300 meters. Shelter material would be arranged in a half moon shape, and must be a minimum of 20 centimeters tall, 40 centimeters long, and 40 centimeters wide. Shelters must be covered with 20 centimeters of soil on the top and sides to stabilize and insulate the structure.
- 5) If the Project Proponent does not install temporary fencing (described above), then each day open trenches and other open excavations would be covered at the end of work activities or provided with tortoise escape ramps. Covered excavations or tortoise escape ramps would at a minimum be checked no later than 7:00 a.m. and prior to commencement of daily work each morning for presence of tortoise.
- a) Escape ramps would have a slope no steeper than 3:1 and be a minimum of 91.5 centimeters (3 feet) in length. Escape ramps would be placed at 100-meter intervals. These distances would be reduced if the FCR, desert tortoise monitor, and approved desert tortoise biologist determine that the plug/escape ramp spacing is insufficient to facilitate animal escape from the trench.
- 6) Standing water as a result of project operations would be avoided as feasible in desert tortoise habitat because this can attract desert tortoise and predators. Similarly, leaks on water trucks and water tanks would be repaired to prevent pooling water. If watering conditions could temporarily attract tortoise, the FCR or a desert tortoise monitor assigned to a group of equipment constructing the pipeline may periodically leave the group of equipment to patrol each area being watered.
- 7) The storing and handling of bulk hazardous materials would be excluded from the Project Areas within 0.5 miles of active tortoise burrows.

Less Active Season Conservation Measures (December 1 to February 14)

The same measures as above (active season) would apply with the following exceptions:

- 1) A desert tortoise monitor is not required. An FCR would remain on-site during all project activities, conduct daily clearance sweeps out to 200–300 feet, check any hazards, and check all backfilling, re-contouring, and reclamation activities prior to initiation. A desert tortoise monitor would visit the site twice a week to check in with the FCR, review and collect field notes, and check any hazards.
- 2) In lieu of an FCR that remains on site throughout the day, the Project Proponent may use temporary fencing infrastructure in combination with the following to keep desert tortoise out of project activity sites.
 - a) An FCR would visit the site daily to check the fence line and any hazards. A desert tortoise monitor would visit the site twice a week to check in with the FCR, review and collect field notes, and check the fence line and any hazards (regardless of temperatures).
- 3) Project vehicle speeds in the Project Area would be limited to 20 mph. Speed limit signs can be posted when entering and exiting occupied habitat (e.g., long linear projects).

Unoccupied Desert Tortoise Habitat in Low or Medium Quality Habitat

Habitat quality is based on the physical and biological features necessary for the species (USFWS 2018a). Medium Quality Habitat is defined as:

- at least 35 acres of continuous habitat (may include patchy habitats connected by artificial or natural corridors);
- suitable substrates for burrowing, nesting, and overwintering;
- decreasing quantity of high-quality forage, increasing presence of cool-season annual grasses;
- may include some steeper slopes less hospitable to tortoise;
- more blackbrush and less creosote than high quality habitat. Creosote, when found, is located in more isolated pockets;
- increased disturbance and probability of human-caused mortalities.

Low Quality Habitat is defined as:

- less than 35 acres of continuous habitat (may include patchy habitats connected by artificial or natural corridors);
- suitable substrates for burrowing, nesting, and overwintering;
- forage is predominantly cool-season annual grasses with very low presence of suitable forage;
- more blackbrush and less creosote than high quality habitat. Creosote, when found, is located in more isolated pockets;
- may include some steeper slopes less hospitable to tortoise;
- highly developed, cultivated, or otherwise disturbed areas.

Active Season Conservation Measures (February 15 to November 30)

Conservation measures applied in unoccupied desert tortoise habitat during the active season would vary depending on the quality of the habitat. The following measures apply to low or medium quality unoccupied habitat.

- 1) Desert tortoise monitors are not required to be on site during all project activities and temporary fencing is not required.
- 2) A desert tortoise monitor would come out to the site twice a week to check in with the FCR, review and collect field notes, and check any hazards.
- 3) An FCR would remain on-site during all project activities, conduct one daily clearance sweep of that day's project activity area (including a 200-foot buffer beyond the footprint on all sides, which may be expanded as appropriate depending on the anticipated action, i.e., blasting, geologic constraints, potential for boulder movement beyond 200 feet) and carefully inspect any hazards (e.g., trenches, open pipes). If a desert tortoise or fresh tortoise sign is found the FCR would contact the monitor, UDWR, and the USFWS to discuss appropriate avoidance and minimization measures based on the case-specific circumstances. Measures could include translocation, site-specific fencing, or additional clearance sweeps and monitoring.
- 4) Standing water as a result of project operations would be avoided as feasible in desert tortoise habitat as this can attract desert tortoise and predators. Similarly, leaks on water trucks and water tanks would be repaired to prevent pooling water. If conditions favor tortoise activity, the FCR or a desert tortoise monitor assigned to a group of equipment constructing the pipeline may periodically leave the group of equipment to patrol each area being watered.

- 5) If project activities occur within unoccupied habitat during the most active seasons (March 15 through May 15 and August 20 through October 20), the Project Proponent would hold a short refresher meeting with all personnel that would be led by the desert tortoise monitor or FCR (whichever is on-site when the meeting is conducted) on March 15 and August 20 (or the first working day just prior to those dates). This meeting would include handouts to remind workers of the conservation measures. A refresher meeting may need to be given on both dates. However, if the initial pre-project meeting occurred recently (within one month prior to March 15 or August 20), the refresher meeting that would have normally been held on that date is not required.
- 6) Project vehicle speeds in the Project Area would be limited to 25 mph.

Less Active Season Conservation Measures (December 1 to February 14)

The following measures apply:

- 1) Desert tortoise monitors or an FCR are not required to remain on-site during all project activities and temporary fencing is not required.
- 2) An FCR would perform a sweep of any open trench and any other open excavations once daily.
- 3) An FCR would contact a desert tortoise monitor twice a week to review and submit field notes (electronic submission is permissible) and report any hazards. A desert tortoise monitor would visit the site every two weeks to check with the FCR and check any hazards.
- 4) If a desert tortoise or fresh tortoise sign is found the FCR would contact the monitor, UDWR, and USFWS to discuss appropriate avoidance and minimization measures based on the case-specific circumstances. Measures could include translocation, site-specific fencing or additional clearance sweeps and monitoring.
- 5) Project vehicle speeds in the Project Area would be limited to 25 mph.

Post-Project Conservation Measures:

- 1) A formal Reclamation Plan for all occupied or high quality desert tortoise habitat would be developed and submitted to USFWS and action agency. Formal reclamation plans are typically needed on projects with permanent or new surface disturbance in occupied or high quality desert tortoise habitat. Only native plant species would be used in reclamation activities. Locally derived seed is preferred. Restoration of biocrusts and associated mycorrhizal fungi should be considered in the Reclamation Plan. Fill materials would be free of fines, waste, pollutants, and must be certified weed-free. The approved survey biologist would inspect reclamation activities at the end of construction to ensure disturbed areas are revegetated/restored according to reclamation criteria approved by the action agency and USFWS. Where revegetation occurs on private land, and if landowners are amenable, the reclamation would follow the desert tortoise guidelines.
- 2) Broadcast applications of herbicides would be prohibited in desert tortoise habitat within the Project Area; if necessary, spot treatments would be applied by hand using herbicides approved by the U.S. Environmental Protection Agency in order to treat noxious weeds. The project's permanent ROW on BLM-administered lands affecting desert tortoise would be monitored and controlled, as necessary, for weeds in coordination with BLM per the Plan of Development and the Integrated Weed Management Plan.

- 3) Desert tortoise monitor(s) would prepare all survey reports and field notes and submit them to USFWS every 3 months and at project completion. The reports would identify the extent of impacts to desert tortoise. They would include:
 - a) Desert tortoise survey and monitoring reports.
 - b) Desert tortoise encounters within Project Area boundaries and how they were reported and addressed.
- 4) Restoration of unoccupied low or medium quality habitat areas would be governed by the Restoration Plan, as outlined in the BLM Plan of Development

Operation and Maintenance

- 1) During routine inspections and condition assessments, annual exercising of appurtenance valves, emergency maintenance, or any other infrequent maintenance, if desert tortoise are encountered, they would be avoided, and the applicable federal and state agencies would be contacted if there appear to be hazards to the tortoise. The agencies would coordinate with the USFWS as appropriate.
- 2) Maintenance activities in high quality habitat that are not performed during the less-active season, or that create new surface disturbance in suitable habitat would be coordinated with the USFWS and the action agency.
- 3) If emergency maintenance activities create new surface disturbance in high-quality habitat or is required during the active season in high-quality habitat, the action agency would be contacted within 24 hours to minimize any impacts and coordinate post-emergency response. The action agency would coordinate with the USFWS as appropriate.
- 4) Project vehicle speeds associated with operation and maintenance activities in the Project Area would be limited to the same speeds imposed during construction (i.e., 15 mph during the more active season and 20 mph during the less active season).
- 5) Carrion encountered on access roads during operation and maintenance activities would be removed to prevent the attraction of raven or other desert tortoise predators to the Project Area.

Offsetting Project Impacts

The conservation measures above serve to avoid and minimize effects to desert tortoise and desert tortoise habitat. Full reclamation of all temporary actions pursuant to the above conservation measures is anticipated to fully offset the temporary impacts of this Proposed Project. Remaining permanent impacts to desert tortoise habitat will be compensated via renumeration fees, which would be at a compensation ratio of 1:1 for Category III habitat. The renumeration fee would be applied to the approximately 25 acres of permanent ROW associated with the HS-5 hydrostation. Final acreage will be determined after final design

1.4 Existing Conditions

Based on the USFWS IPaC online system and coordination with the USFWS, there are 23 ESA-listed species that were identified on the IPaC system with potential to occur within the LPP. Following coordination with the USFWS, it was determined that California condor, southwestern willow flycatcher, western yellow-billed cuckoo, Mojave Desert tortoise, Colorado pikeminnow, razorback sucker, bonytail, humpback chub, Virgin River chub, woundfin, dwarf bear-poppy, Jones cycladenia, Shivwits milk-vetch, Siler pincushion cactus, Ute ladies'-tresses orchid, and Welsh's milkweed have potential to occur within the analysis area and/or in proximity to the Proposed

Project. Table 1.4-1 provides a description of the ESA-listed species and the critical habitat considered for the analysis.

ESA-Listed Birds

California Condor (*Gymnogyps californianus*) – Federally Endangered, Experimental Nonessential
The California condor was listed as endangered on March 11, 1967 (32 FR 4001). Critical habitat was established on September 24, 1976 (41 FR 187). There is no designated critical habitat outside of California.

The population of California condor in northern Arizona and southern Utah that could be affected by the Proposed Project is designated as a nonessential experimental population pursuant to Section 10(j) of the ESA (61 FR 54044, October 16, 1996). Nonessential experimental populations located outside National Wildlife Refuge System or NPS-managed lands are treated, for the purposes of Section 7 of the ESA, as if they are proposed for listing. Thus, for nonessential experimental populations, only two provisions of Section 7 would apply outside National Wildlife Refuge System and NPS-managed lands: Section 7(a)(1), which requires all federal agencies to use their authorities to conserve listed species, and Section 7(a)(4), which requires federal agencies to informally confer with the USFWS on actions that are likely to jeopardize the continued existence of a proposed species. Section 7(a)(2) of the ESA, which requires federal agencies to ensure that their activities are not likely to jeopardize the continued existence of a listed species, would not apply except on National Wildlife Refuge System and NPS-managed lands. Before an experimental population can be released, Section 10(j) requires that a determination be made by the USFWS whether the population is either “essential” or “nonessential” to the continued existence of the species. An experimental population determined to be essential is treated as a threatened species. An experimental population determined to be nonessential is treated as a species proposed for listing as threatened. The exception is that a nonessential population located within the NPS or National Wildlife Refuge System lands will be treated as a threatened species for purposes of Section 7(a)(2) of the ESA. NPS-managed lands occur within the analysis area at Glen Canyon National Recreation Area and Pipe Springs National Monument; therefore, California condors within these areas would be considered threatened under the ESA. Condors that leave the 10(j) area are fully protected. There are parts of the Virgin River that are outside of the 10(j) area; however, condor use in those areas is rare.

California condor is a member of the family Cathartidae, which is the New World vultures and are among the largest flying birds in the world. California condors regularly forage, roost, and nest in northern Arizona and southern Utah. Based on their ability to travel up to 200 miles per day, condors may be found within the Proposed Project. Condors are cavity-nesting birds, and most nest sites within the region are found in caves and on rock ledges. Courtship and nest site selection occur in December and continue through spring when they lay a single egg between late January and early April. Both parents participate in incubation and nestling feeding. Chicks leave the nest cavity at about three months of age but remain in the vicinity where they are cared for by their parents and may not be independent of their parents until the following year.

Table 1.4-1 ESA Species and Critical Habitat Considered for Analysis

Common Name	Scientific Name	Listing Status	State	County	Potential to Occur ^(a)	Critical Habitat
Mammals						
Black-footed ferret ^(b)	<i>Mustela nigripes</i>	EXP-Non-Essential	Utah	Uintah	No, no suitable habitat present	None Designated
Canada lynx ^(b)	<i>Lynx canadensis</i>	T	Utah	Uintah, Daggett	No, no suitable habitat present	Designated; not in Analysis Area
Birds						
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T	Utah Arizona Colorado	Kane, Washington, Emery, Garfield, Grand, San Juan, Uintah, Wayne, Coconino, Mohave Moffat	Yes	Designated; not in Analysis Area
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E	Utah Arizona	Kane, Washington, Emery, Garfield, Grand, San Juan, Uintah, Wayne Coconino, Mohave	Yes	Designated; in Analysis Area
Distinct Population Segment (DPS) of Western yellow-billed cuckoo	<i>Coccyzus americanus</i>	T	Utah Arizona Colorado	Kane, Washington, Daggett, Emery, Garfield, Grand, San Juan, Uintah, Wayne Coconino, Mohave Moffat	Yes	Proposed; in Analysis Area
California condor	<i>Gymnogyps californianus</i>	EXPN T – NPS lands	Utah Arizona	Kane, Washington, Emery, Garfield, Grand, San Juan, Wayne Coconino, Mohave	Yes	Designated and Proposed; not in Analysis Area
California least tern ^(b)	<i>Sterna antillarum brownii</i>	E	Arizona	Mohave	No, no suitable habitat present	None designated
Yuma clapper rail ^(b)	<i>Rallus longirostris yumanensis</i>	E	Arizona	Mohave	No, no suitable habitat present	None designated

Table 1.4-1 ESA Species and Critical Habitat Considered for Analysis (continued)

Common Name	Scientific Name	Listing Status	State	County	Potential to Occur ^(a)	Critical Habitat
Reptiles						
Mojave Desert tortoise	<i>Gopherus agassizii</i>	T	Utah Arizona	Washington Mohave	Yes	Designated; in Analysis Area
Northern Mexican gartersnake ^(b)	<i>Thamnophis eques megalops</i>	T	Arizona	Mohave	No, no suitable habitat present; species does not occur north of the Grand Canyon	Proposed; not in Analysis Area
Fish						
Humpback chub	<i>Gila cypha</i>	E	Utah Arizona Colorado	Kane, Emery, Garfield, Grand, San Juan, Uintah, Wayne Coconino, Mohave Moffat	Yes	Designated; in Analysis Area tied to Bureau of Reclamation Water Exchange Contract
Bonytail	<i>Gila elegans</i>	E	Utah Arizona Colorado	Kane, Emery, Garfield, Grand, San Juan, Uintah, Wayne Mohave Moffat2	Yes	Designated; in Analysis Area tied to Bureau of Reclamation Water Exchange Contract
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	E	Utah Arizona Colorado	Emery, Garfield, Grand, San Juan, Uintah, Wayne Coconino Moffat	Yes	Designated; in in Analysis Area tied to Bureau of Reclamation Water Exchange Contract
Razorback sucker	<i>Xyrauchen texanus</i>	E	Utah Arizona Colorado	Kane, Emery, Garfield, Grand, San Juan, Uintah, Wayne Coconino, Mohave Moffat	Yes	Designated; in Analysis Area tied to Bureau of Reclamation Water Exchange Contract

Table 1.4-1 ESA Species and Critical Habitat Considered for Analysis (continued)

Common Name	Scientific Name	Listing Status	State	County	Potential to Occur ^(a)	Critical Habitat
Virgin River Chub	<i>Gila seminude</i>	E	Utah Arizona	Washington Coconino, Mohave	Yes	Designated; in Analysis Area tied to potential return flows
Woundfin	<i>Plagopterus argentissimus</i>	E	Utah Arizona	Washington Coconino, Mohave	Yes	Designated; in Analysis Area tied to potential return flows
Plants						
Dwarf bear-poppy	<i>Arctomecon humilis</i>	E	Utah	Washington	Yes	None designated
Fickeisen plains cactus ^(b)	<i>Pediocactus peeblesianus</i> var. <i>fickeiseniae</i>	E	Arizona	Coconino, Mohave	No, no suitable habitat is present	Designated; not in Analysis Area
Gierisch mallow ^(b)	<i>Sphaeralcea gierischii</i>	E	Utah Arizona	Washington Mohave	No, no suitable habitat is present	Designated; not in Analysis Area
Jones cycladenia	<i>Cycladenia humilis</i> var. <i>jonesii</i>	T	Utah Arizona	Kane, Emery, Garfield, Grand, San Juan Coconino, Mohave	Yes	None designated
Holmgren milk-vetch ^(b)	<i>Astragalus holmgreniorum</i>	E	Utah Arizona	Washington Mohave	No, no suitable habitat is present	Designated; not in Analysis Area
Shivwits milk-vetch	<i>Astragalus ampullarioides</i>	E	Utah	Washington	Yes	Designated; not in Analysis Area
Siler pincushion cactus	<i>Pediocactus sileri</i>	T	Utah Arizona	Kane, Washington Coconino, Mohave	Yes	None designated
Ute ladies'- tresses orchid	<i>Spiranthes diluvialis</i>	T	Utah Colorado	Daggett, Garfield, Uintah, Wayne Moffat	Yes	None designated
Welsh's milkweed	<i>Asclepias welshii</i>	T	Utah Arizona	Kane Coconino	Yes	Designated; not in Analysis Area
Navajo sedge ^(b)	<i>Carex specuicola</i>	T	Utah Arizona	San Juan	No, no suitable habitat is present	Designated; not in Analysis Area
Clay reed-mustard ^(b)	<i>Schoenocrambe argillacea</i>	T	Utah	Uintah	No, no suitable habitat is present	None designated

Table 1.4-1 ESA Species and Critical Habitat Considered for Analysis (continued)

Common Name	Scientific Name	Listing Status	State	County	Potential to Occur ^(a)	Critical Habitat
Pariette cactus ^(b)	<i>Sclerocactus brevispinus</i>	T	Utah	Uintah	No, no suitable habitat is present	None designated
San Rafael cactus ^(b)	<i>Pediocactus despanii</i>	E	Utah	Emery, Garfield, Grand, Wayne	No, no suitable habitat is present	None designated
Shrubby reed-mustard ^(b)	<i>Schoenocrambe suffrutescens</i>	E	Utah	Uintah	No, no suitable habitat is present	Proposed; not in Analysis Area
Uinta Basin hookless cactus ^(b)	<i>Sclerocactus wetlandicus</i>	T	Utah	Uintah	No, no suitable habitat is present	None designated

Sources:

USFWS IPaC 03/18/2020

USFWS ECOS: <https://ecos.fws.gov>

Utah Natural Heritage Program

Arizona Environmental Online Review Tool

Notes:

(a)Species that are not present or not at risk of impact are not analyzed below.

Key:

C = Candidate

E = Endangered

EXPN = Experimental, Non-Essential

T = Threatened

Refer to the USFWS Environmental Conservation Online System for detailed life history, listing information, recovery plans, and five-year reviews (<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B002>) as well as the LPP Final Study Report 13 - Special Status Wildlife Species (UBWR 2016a).

Exposure to lead continues to be a primary threat to condors. The supplemental finding for the recovery plan for the California condor states that lead toxicosis was the primary cause of approximately 50 percent of condor deaths between 1992 and 2017 (USFWS 1996, 2019).

As captive breeding programs developed adequate numbers of young condors, reintroduction programs were initiated with one site located on the Vermilion Cliffs in northern Arizona approximately 20 miles southeast of the Proposed Project. Early in the reintroduction program, young condors were released on the Hurricane Cliffs, but that site was terminated (USFWS 2007). About 463 condors now exist in the world, with half of them flying free. Condors released in Arizona are radio and Global Positioning System (GPS) monitored. In the past several years, condors have regularly traveled to the Kolob Plateau region of Utah in Zion National Park, crossing the Proposed Project. The current population estimate for condors in Arizona and Utah is 82 individuals (USFWS 2017).

There is no known roosting or nesting habitat within the analysis area. Condors forage long distances in grasslands, oak savannas, mountain plateaus, ridges, and canyons and are expected to forage and fly over the Proposed Project. California condor presence would be similar along both action alternatives. The potential for condor presence is high due to proximity of the alternatives to the release location on the Vermillion Cliffs, condor use of the area, and long foraging distances, which increase likelihood that condors could be encountered across all land jurisdictions.

Mexican Spotted Owl (*Strix occidentalis lucida*) – Federally Threatened

The Mexican spotted owl was federally listed as a threatened species on March 16, 1993 (58 FR 14248). Critical habitat was established on August 31, 2004 (69 FR 53181).

The Mexican spotted owl is one of three recognized subspecies of the spotted owl in North America. Mexican spotted owls range widely across Utah, Colorado, New Mexico, and Arizona and in extreme western Texas in disjunct populations (USFWS 2012).

The analysis area is within the Colorado Plateau Ecological Management Unit. In Utah, steep-walled, narrow, canyons are used as primary breeding habitat. In northern Arizona owls use both canyon and montane forests. Within the analysis area, Mexican spotted owls would be expected to nest in steep-walled canyon habitats and forage in pinyon pine-juniper woodlands. Pair formation begins in February and March, with nesting and egg laying beginning in late March through April (USFWS 2012).

Refer to the USFWS Environmental Conservation Online System for detailed life history, listing information, recovery plan, and status reviews (<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B074&lifeHistory>) as well as the LPP Final Study Report 13 - Special Status Wildlife Species (UBWR 2016a).

In Utah, two designated critical habitat polygons occur near the analysis area: CP-11 and CP-12; both are over 2.5 miles north of the proposed infrastructure that would be associated with constructing the Proposed Project. Critical Habitat Unit CP-11 includes Zion National Park east of Interstate 15 and north of Utah State Routes 9 and 17. CP-12 is designated in Utah in Grand Staircase-Escalante National Monument north of the Cockscomb. In Arizona, the nearest designated critical habitat polygon is CP-10. CP-10 is designated in northern Arizona in the Kaibab National Forest, Grand Canyon National Park, and Marble Canyon National Monument. All of CP-10 is more than 15 miles south of the Proposed Project. Due to the distances of designated critical habitat for Mexican spotted owl, there would be no effect to designated critical habitat from either of the action alternatives. See Figure 1.4-1 for Mexican Spotted Owl Designated Critical Habitat.

There are no documented occurrences of Mexican spotted owl breeding or nesting within the analysis area. Modeled suitable habitat occurs within the analysis area in Utah (Willey and Spotskey 2000); however, knowledge of areas along the U.S. Highway 89 (U.S. 89) corridor indicate there is low potential for breeding/nesting in the area and any occurrence would be incidental. The analysis area does not cross high value Mexican spotted owl habitat within Utah (Lewis 2014). Suitable modeled habitats in Arizona occur outside of the analysis area; however, Kanab Creek (BLM-managed lands) is a potential dispersal corridor.

Recovery habitat is defined as ponderosa pine-Gambel oak, mixed-conifer, and riparian forest that either is or has the potential to become nesting/roosting habitat or does or could provide foraging, dispersal, or winter habitats (USFWS 2012). Areas near designated critical habitat could include components of recovery habitat (USFWS 2012), particularly riparian forest. Potential recovery habitat within the analysis area may include riparian habitats such as Paria River and Kanab Creek which may be used for foraging and dispersal. The value of these riparian habitats is low and would not likely provide suitable recovery habitat for nesting owls, however, lacking elements of recovery habitat such as steep-walled canyons and rock ledges, ponderosa pine, and mixed conifer. Mexican spotted owls would potentially use riparian habitats such as the Paria River and Kanab Creek for limited foraging or dispersal and would primarily be moving through to other more suitable habitats. Dispersing juveniles can travel up to approximately 57 miles from nest sites, although most remain near natal sites (Willey and van Riper 2000). Many areas nearest to designated critical habitat comprise pinyon-juniper woodlands. Potential for Mexican spotted owl would be similar along both the action alternatives and may occur across all land jurisdictions.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*) – Federally Endangered

The southwestern willow flycatcher (flycatcher) was listed as endangered in 1995 (60 FR 10694). On July 22, 1997, a final critical habitat designation for the flycatcher along 599 river miles in Arizona, California, and New Mexico (62 FR 39129) was published with a correction notice on August 20, 1997, on the lateral extent of critical habitat (62 FR 44228). Following a 1998 lawsuit from the New Mexico Cattle Growers' Association, critical habitat was vacated. On October 19, 2005 (70 FR 60886), USFWS designated flycatcher critical habitat along river segments in Arizona, California, New Mexico, Nevada, and Utah. On July 13, 2010, as a result of litigation by the Center for Biological Diversity over USFWS's 2005 critical habitat rule, USFWS agreed to re-designate critical habitat. On January 3, 2013 (78 FR 344), USFWS finalized a revised flycatcher critical habitat designation in Arizona, California, New Mexico, Nevada, Utah, and Colorado (USFWS 2002a).

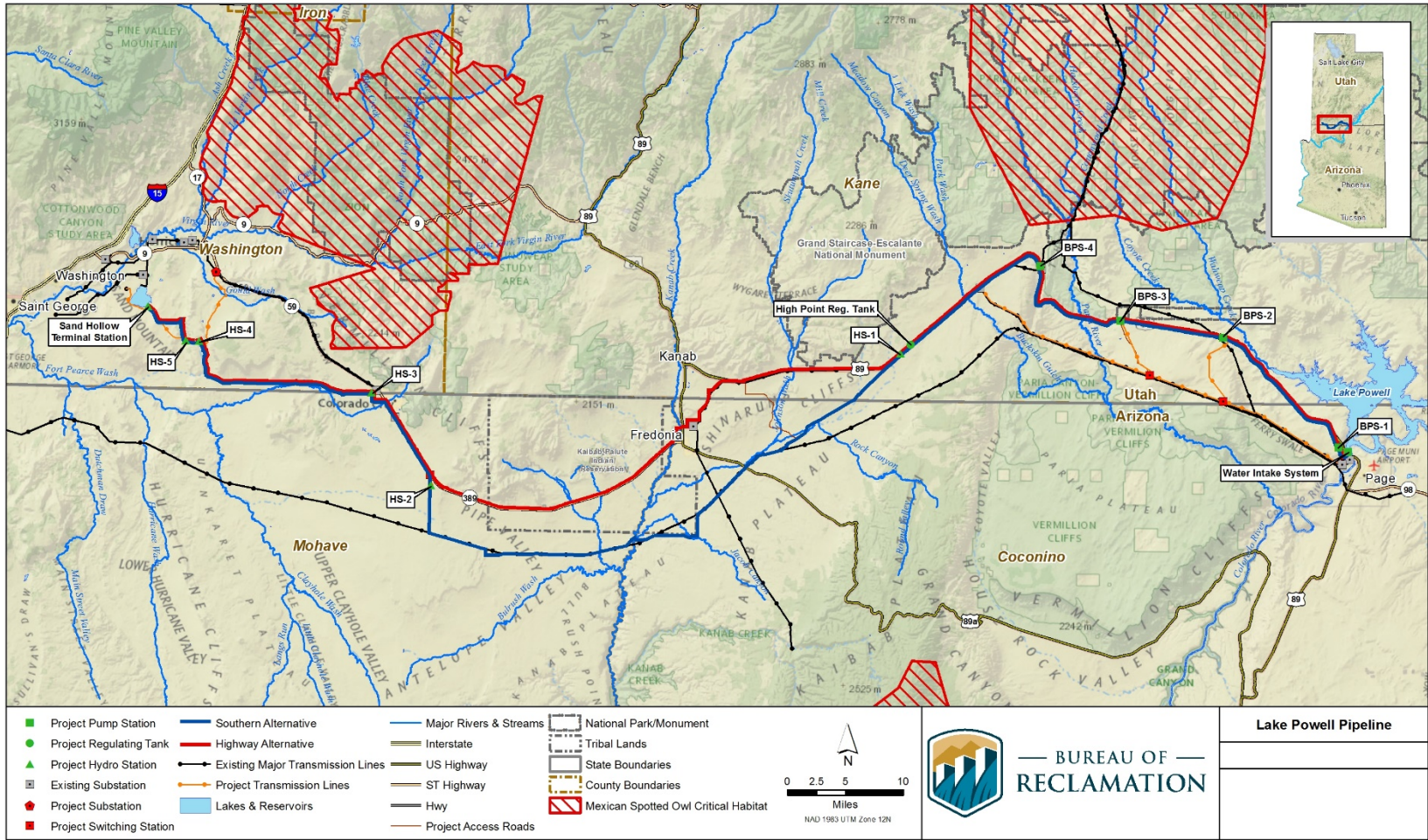


Figure 1.4-1 Mexican Spotted Owl Designated Critical Habitat

The range of the southwestern willow flycatcher is primarily in Arizona, New Mexico, Nevada, and southern California. The analysis area is within the Upper and Lower Colorado Recovery Units (USFWS 2002a). In these recovery units, southwestern willow flycatchers have been documented using native, mixed native/exotic, mixed exotic/native, and exotic vegetation types. Migration routes are not well documented but may include non-riparian habitats and riparian areas that are unsuitable for breeding. Per the *Southwest Willow Flycatcher Recovery Plan* (Recovery Plan) (USFWS 2002a) habitat loss and modification is a primary cause of southwestern willow flycatcher's decline.

The southwestern willow flycatcher nests and forages in dense riparian habitats along streams, rivers, lakesides, and other wetlands. Some of the more common plant species used for nesting are willow, box elder, tamarisk, Russian olive, buttonbush, cottonwood, and mesquite. Nests are found in dense thickets of these and other plants species that are about 13 to 23 feet in height. According to the Recovery Plan (USFWS 2002a), "suitable habitat conditions are generally dense, mesic riparian shrub and tree communities 0.1 hectare (10,764 square feet) or greater in size within floodplains large enough to accommodate riparian patches at least 10 m wide (measured perpendicular to the channel)." Migration habitat is believed to primarily occur along riparian corridors. Utilized habitat occurs at elevations below 8,500 feet above mean sea level. The southwestern willow flycatcher arrives on breeding grounds in late April to early May. Nesting begins in late May and early June, with fledging from late June to mid-August.

Refer to the USFWS Environmental Conservation Online System for detailed life history, listing information, recovery plan, and status reviews (<https://ecos.fws.gov/ecp0/profile/speciesProfile?sPCODE=B094>) as well as the LPP Final Study Report 13 – Special Status Wildlife Species (UBWR 2016a).

Southwestern willow flycatcher critical habitat has been designated along the Virgin River in northwestern Arizona and southwestern Utah (Virgin Management Unit) (USFWS 2002a) and occurs within the analysis area. This habitat extends from approximately 6.9 miles north of the headwaters of Lake Mead in Nevada to a point approximately 1.4 miles north of the Washington Fields Diversion in Utah. The Proposed Project is approximately 1.7 miles from the stream segments designated as critical habitat within the Virgin Management Unit of the Lower Colorado Recovery Unit. Designated critical habitat also exists at the Paria River crossing on private land and includes 4.9 acres of critical habitat, north of U.S. 89, within the Powell Management Unit, which crosses both action alternatives. See Figures 1.4-2 and 1.4-3 for Southwestern Willow Flycatcher Designated Critical Habitat.

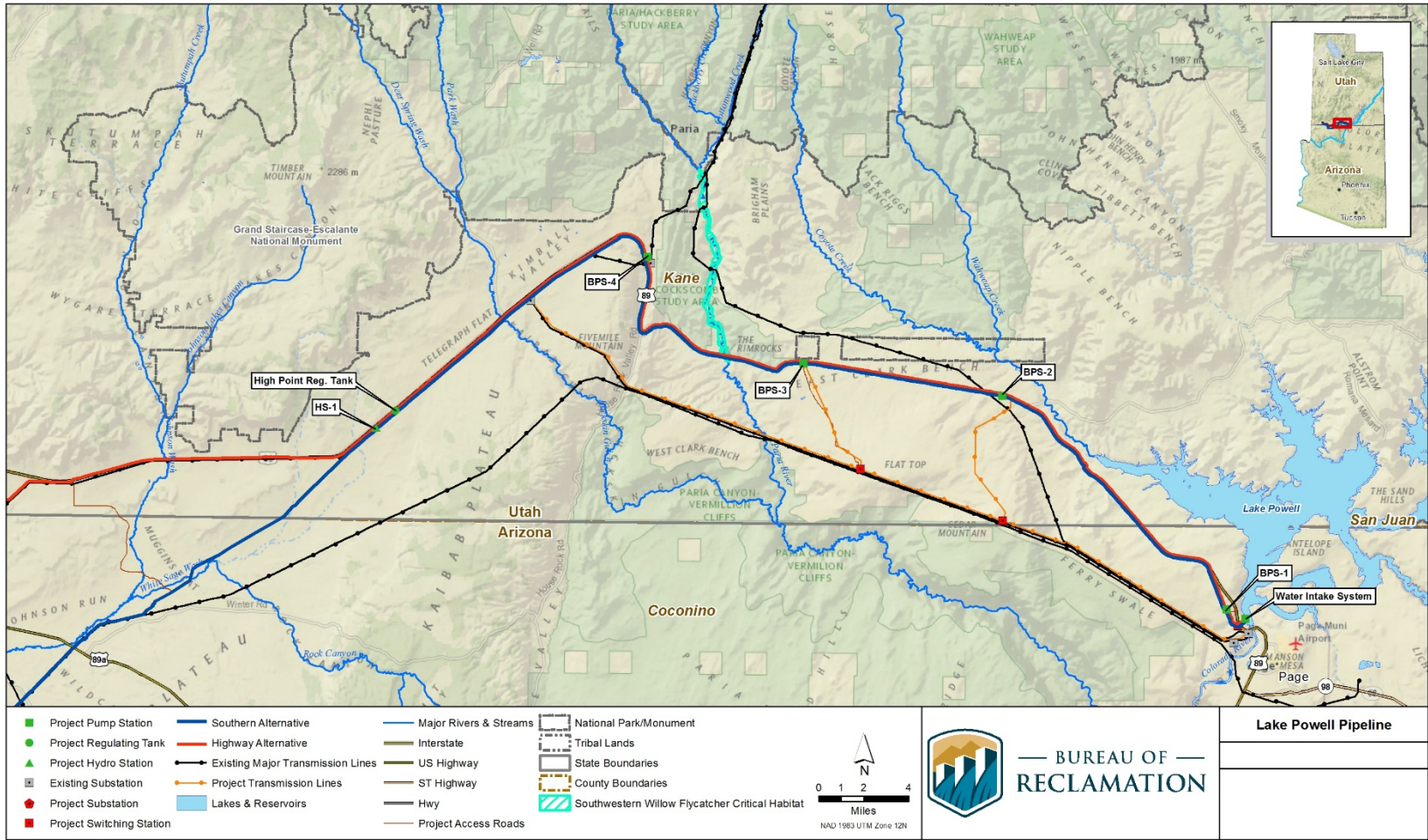


Figure 1.4-2 Southwestern Willow Flycatcher Designated Critical Habitat

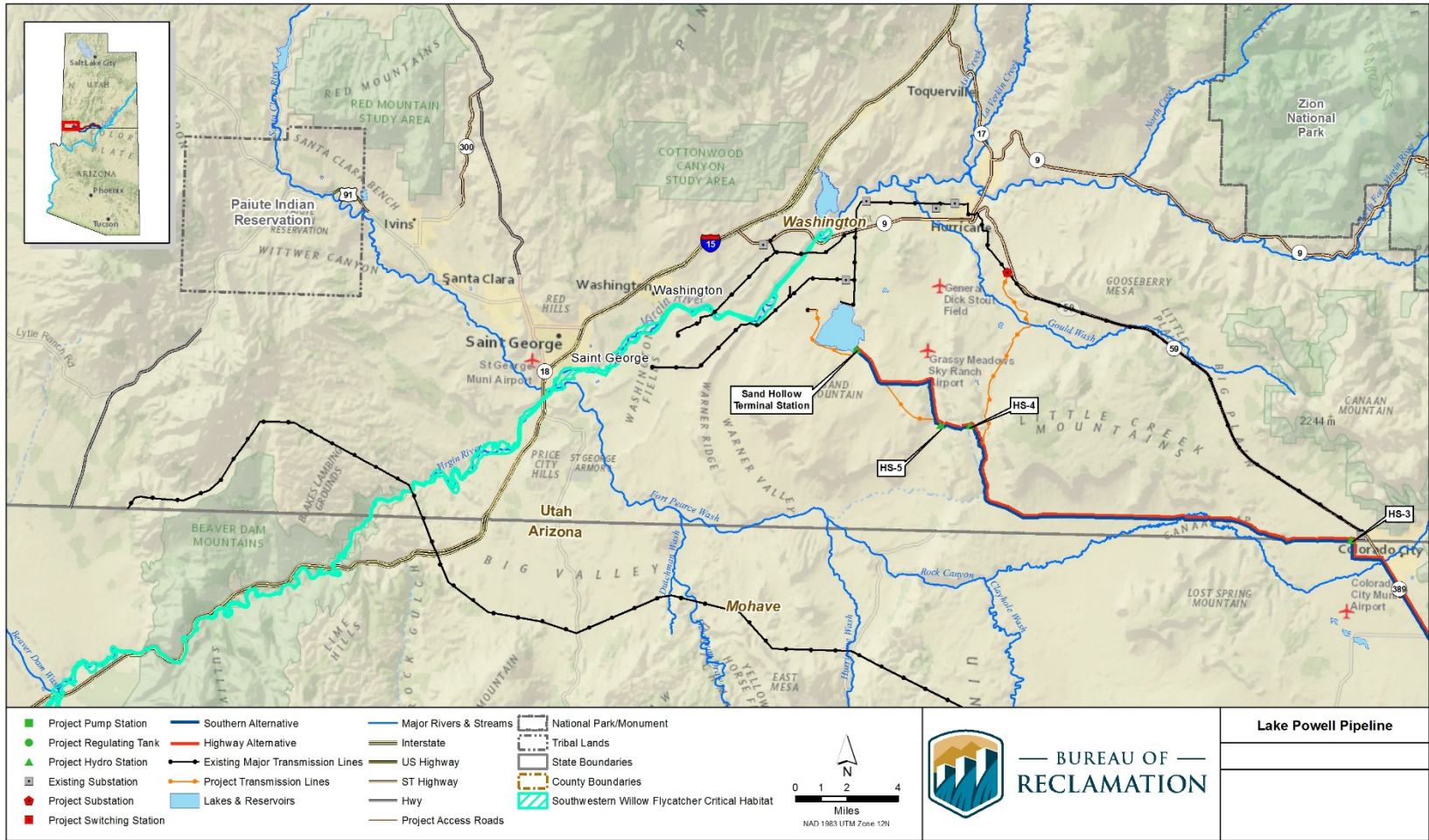


Figure 1.4-3 Southwestern Willow Flycatcher Designated Critical Habitat

In 2009, riparian areas were evaluated for the presence of potentially suitable habitat (UBWR 2016a). Southwestern willow flycatcher suitable habitat exists at Short Creek at Canaan Gap (BLM-managed land and private), Short Creek at Colorado City (private), Two-mile Wash (Kaibab Indian Reservation [KIR]), Kanab Creek (BLM), Cottonwood Wash (KIR), Kanab Creek at Fredonia (private), and Paria River (private). In 2009, field surveys were completed at all the sites except for Paria River, which was not surveyed due to private land access issues. No southwestern willow flycatchers were detected during protocol surveys completed in 2009. Paria River was surveyed in 2010. A migrant willow flycatcher was detected on May 18, 2010, but there were no further detections on subsequent visits. In addition to information provided by Proposed Project-specific study reports; there are documented occurrences of southwestern willow flycatcher within the analysis area (UDWR 2020) primarily associated with designated critical habitat at Paria River within the Powell Management Unit. The crossing of designated critical habitat at the Paria River would be the same for both action alternatives. In addition to designated critical habitat, the Highway Alternative would cross five riparian areas (Kanab Creek at Fredonia, Cottonwood Wash, Two-mile Wash, Short Creek at Colorado City, and Short Creek at Canaan Gap) that may be suitable habitat, and the Southern Alternative would cross three riparian areas that may be suitable (Kanab Creek, Short Creek at Colorado City, and Short Creek at Canaan Gap). In coordination with agency personnel, Bitterseeps Wash (BLM-managed land) along the Southern Alternative was identified as suitable habitat because the Proposed Project-specific surveys were completed 10 years ago, and habitats have since improved.

Western Yellow-billed Cuckoo (*Coccyzus americanus*) – Federally Threatened

The western yellow-billed cuckoo was petitioned for ESA listing as a subspecies in 1998. In 2001, the USFWS determined that listing the yellow-billed cuckoo in the western United States as a Distinct Population Segment (DPS) was warranted but was precluded by higher listing priorities (66 FR 38611-38626). The USFWS proposed listing the western U.S. DPS of the yellow-billed cuckoo as threatened under the ESA in 2013 (78 FR 61621-61666), and published a final rule listing the DPS in 2014 (79 FR 59992-60038). Following the proposed listing of the DPS, the USFWS proposed critical habitat for the yellow-billed cuckoo in 2014 (79 FR 48547-48652). Critical habitat was proposed in nine states, including Utah and Arizona.

The western yellow-billed cuckoo was formerly widespread and locally common in California and Arizona; locally common in New Mexico, Oregon, and Washington; and local and uncommon along drainages in western Colorado, western Wyoming, Idaho, Nevada, and Utah (66 FR 38611-38626). Western populations of yellow-billed cuckoos breed in dense riparian woodlands, primarily of cottonwood (*Populus fremontii*), willow (*Salix* spp.), and mesquite (*Prosopis* spp.), along riparian corridors in otherwise arid areas. Dense undergrowth may be an important factor in selection of nest sites. Western yellow-billed cuckoos appear to require relatively large tracts of riparian woodland. Most western yellow-billed cuckoos arrive on breeding grounds in June. Physical and biological features (primary constituent elements) were defined in the proposed critical habitat rule (79 FR 48547-48652).

Refer to the USFWS Environmental Conservation Online System for detailed life history, listing information, and status reviews (<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B06R>) as well as the LPP Final Study Report 13 – Special Status Wildlife Species (UBWR 2016a).

In February 2020, USFWS published a proposed rule to revise proposed critical habitat to include 493,665 acres (72 units) in Arizona, California, Colorado, Idaho, New Mexico, Texas, and Utah (85 FR 11458). Proposed critical habitat under the 2020 proposed rule within the action area is tied to the LPP water exchange contract with Reclamation and includes UT-1 (Green River 1) and UT-2 (Green River 2). UT-1 is 28,381 acres and totals 52 miles of the Green and Duchesne Rivers in the vicinity of Ouray, Utah. The unit has consistently been occupied by western yellow-billed cuckoos during the breeding season and provides a movement corridor for cuckoos moving farther north (85 FR 11458). UT-2 is 1,135 acres and totals 8 miles along the Green River north of Green River, Utah, and has been occupied during the breeding season. UT-2 also provides migratory stopover habitat for cuckoos. Under the proposed revisions to proposed critical habitat, UT-8 was eliminated. UT-8 is composed of a portion of the Virgin River in the vicinity of St. George in Washington County. Critical Habitat Unit UT-8, which is 1,390 acres in extent and a 13-mile-long continuous segment, occurs within the Virgin River corridor from the Atkinville Wash confluence, extending north along the river corridor to the confluence with Mill Creek. Approximately 1,352 acres, or 97 percent, of Critical Habitat Unit UT-8 are privately owned; 6 acres, or less than 1 percent, are on state-owned land managed by the Utah Division of Forestry, Fire, and State Lands; and 32 acres, or 2 percent, are on federally owned land managed by the BLM. Unit UT-8 has been consistently occupied by western yellow-billed cuckoos during the breeding season and provides migratory stopover habitat for cuckoos travelling farther north (79 FR 48547).

Field surveys evaluated potential nesting habitat within the Proposed Project as documented in survey reports (UBWR 2016a). Potentially suitable habitat was identified at two sites; however, it was determined that the Paria River crossing (private) was the only location that met criteria for potential nesting (UBWR 2016a). In 2009, surveys for western yellow-billed cuckoo were completed concurrently with southwestern willow flycatchers at Short Creek at Canaan Gap (BLM-managed land and private) and Short Creek in Colorado City (private) using draft protocol surveys approved at that time and concurrently in 2010 at Paria River (private). No western yellow-billed cuckoos were detected during the 2010 surveys. Habitat as it relates to the density and stature of cottonwoods and willows at the Paria River was said to not be sufficient to support a population of breeding cuckoos (UBWR 2016a). In addition to project-specific study reports, western yellow-billed cuckoo has been documented within the analysis area (UDWR 2020).

The potential for encountering western yellow-billed cuckoo is similar for both action alternatives. Both alternatives cross suitable habitat at Paria River on private land.

ESA-Listed Reptiles

Mojave Desert Tortoise (*Gopherus agassizii*) – Federally Threatened

The Mojave population of the desert tortoise (*Gopherus agassizii*) was listed as threatened on April 2, 1990 (USFWS 2011a). Critical habitat designated in 1994 (59 FR 5820). A recovery plan was adopted in June 1994, and a revised recovery plan was approved in 2011 (USFWS 2011a).

The desert tortoise genus is considered as two separate populations: the Mojave Desert population (*Gopherus agassizii*) and the Sonoran Desert population (*Gopherus morafkai*). The Mojave population is defined as those tortoises north and west of the Colorado River and west of Beaver Dam Slope, Utah, and is distributed throughout southern Nevada, southeastern California, the Beaver Dam Mountains and Virgin River area of southwestern Utah, and northwestern Arizona (USFWS 2011a).

The Mojave Desert tortoise occupies a variety of habitats from flats and slopes dominated by creosote bush scrub at lower elevations to rocky slopes in blackbrush and juniper woodland ecotones at higher elevations. USFWS characterizes typical tortoise habitat in the Mojave Desert as creosote bush scrub where precipitation ranges from 2 to 8 inches annually, the diversity of perennial plants is relatively high, and production of ephemerals is high. Tortoises depend on bushes for shade and protection from predators such as ravens and coyotes. Many tortoises live in burrows to escape the temperatures of cold winters and very hot summers. They often share burrows and may use multiple burrows scattered across the landscape. Tortoises hibernate for up to nine months each year, becoming most active from March to June and September to October.

Refer to the USFWS Environmental Conservation Online System for detailed life history, listing information, recovery plan, and status reviews (<https://ecos.fws.gov/ecp0/profile/speciesProfile?sPCODE=C04L>) as well as the LPP Final Study Report 13 – Special Status Wildlife Species (UBWR 2016a).

The Mojave Desert tortoise Upper Virgin River Recovery Unit Critical Habitat Unit includes approximately 54,600 acres of the 62,000-acre Red Cliffs Desert Reserve that was established in 1996 by Washington County, Utah. The nearest designated critical habitat is 0.4 mile north of the LPP; therefore, there is no effect to designated critical habitat. Washington County, Utah, contains the Upper Virgin River Mojave Desert Tortoise Recovery Unit. A Washington County Habitat Conservation Plan was approved by the USFWS in 1996 (USFWS 2011a). The Red Cliffs Desert Reserve is within the analysis area; however, the nearest infrastructure associated with the Proposed Project is a proposed 138-kilovolt (kV) transmission line, which would be more than 3 miles from the reserve boundary; therefore, there is no direct effect to the Red Cliffs Desert Reserve. See Figure 1.4-4 for Mojave Desert Tortoise Designated Critical Habitat.

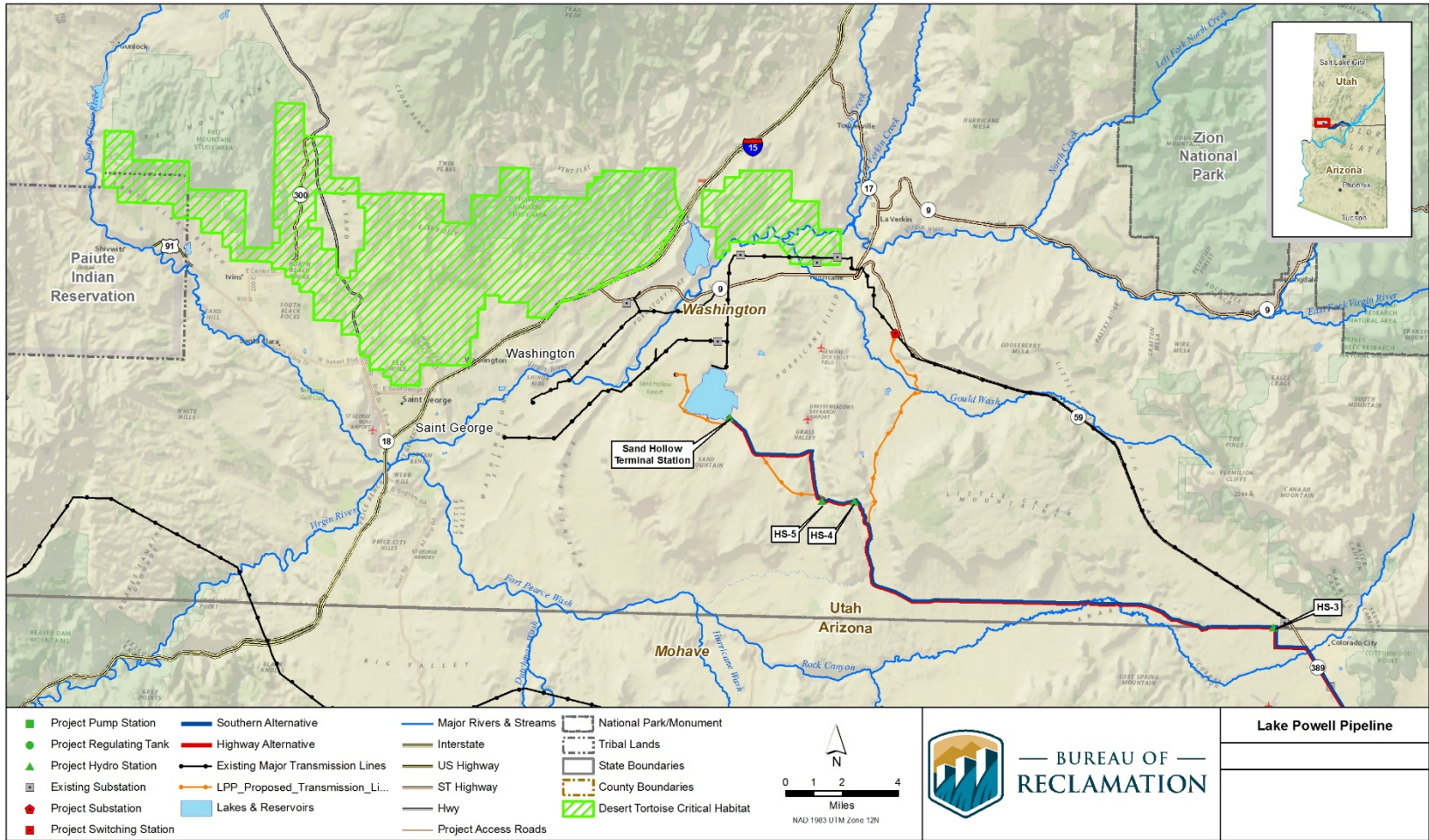


Figure 1.4-4 Mojave Desert Tortoise Designated Critical Habitat

Potential for effects to Mojave Desert tortoise and habitat occur on the westernmost portion of the Project Area in Washington County, Utah on BLM-managed land, School and Institutional Trust Lands Administration (SITLA), and private lands. Approximately 1,694 acres in Washington County were surveyed between December 3, 2019, and March 2, 2020, for Mojave Desert tortoise in accordance with USFWS protocols (Stantec 2020). Habitat was split into three habitat quality classes (Table 1.4-2). All burrows documented during the 2019/2020 surveys were within high quality habitat near the Hurricane Cliffs. No Mojave Desert tortoise were observed during the surveys; however, burrows and scat were documented in high quality habitat. Fourteen burrows (known or possible tortoise burrows) were documented during the surveys.

Table 1.4-2 Habitat Quality Assessment

Habitat Assessment	Acres Surveyed	Percent of Total
Low	1,012	59.7%
High	517	30.6%
Unsuitable	165	9.7%
Total	1,694	100%

ESA-listed Fish

Colorado Pikeminnow (*Ptychocheilus lucius*) – Federally Endangered

The Colorado pikeminnow was listed as endangered on March 11, 1967 (32 FR 4001). Critical habitat was designated on March 21, 1994 (59 FR 133714). Recovery goals have been established in Colorado pikeminnow (*Ptychocheilus lucius*) Recovery Goals Amendment and Supplement to the Colorado Squawfish Recovery Plan (USFWS 2002b).

The Colorado pikeminnow is endemic to the Colorado River Basin. Wild populations are currently found only in the upper basin of the Colorado River above Lake Powell within more than 1,000 miles of riverine habitat in the Green River, upper Colorado River, and San Juan River sub-basins. Populations in the lower basin of the Colorado River were extirpated in the 1970s; however, Colorado pikeminnow have been reintroduced and stocked in the Salt and Verde Rivers as a nonessential, experimental population (USFWS 2011b).

USFWS designated six reaches of the Colorado River System as critical habitat, including portions of the Colorado, Green, Yampa, White, and San Juan Rivers, totaling 1,148 miles of critical habitat for the species (59 FR 133714).

The Colorado pikeminnow migrates long distances to and from spawning area. Adults require pools, deep runs, and eddy habitat maintained by high spring flows for maintenance of channel and habitat diversity, spawning areas, and food production. Spawning occurs in waters that are 18 to 23 degrees Celsius, and larvae drift downstream to nursery backwaters that are restructured during high spring flows and maintained by stable base flows. Threats include streamflow regulation, habitat modification, competition with and predation by nonnative fish species, and pesticides and pollutants (USFWS 2002b).

Refer to the USFWS Environmental Conservation Online System for detailed life history, listing information, recovery plan, and status reviews

(<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E006>) as well as the LPP Final Study Report 11 – Special Status Aquatic Species and Habitats (UBWR 2016b).

Recovery efforts include a variety of actions including managing water to provide adequate instream flows, fish passages and screens at major diversion dams to provide access to hundreds of miles of critical habitat, developing backwaters for early life stages, monitoring population numbers, and managing non-native fishes (<https://coloradoriverrecovery.org/general-information/the-fish/colorado-pikeminnow.html>).

The infrastructure associated with the LPP is located outside of the range for this species; however, because a component of the Proposed Project includes an LPP water exchange contract with Reclamation from Flaming Gorge Reservoir downstream to Lake Powell, effects to the species are considered. The LPP water exchange contract would contribute to meeting the ESA Upper Colorado River Recovery Implementation Programs requirements in the Green River (<https://coloradoriverrecovery.org/general-information.html>). Designated critical habitat is in the Green and Colorado Rivers above Lake Powell.

Razorback Sucker (*Xyrauchen texanus*) – Federally Endangered

The razorback sucker was first proposed for listing under the ESA on April 24, 1978, as a threatened species, but was later withdrawn for technical reasons. In March 1989, the USFWS was petitioned by a consortium of environmental groups to list the razorback sucker as an endangered species. The USFWS made a positive finding on the petition in June 1989, which was published in the Federal Register on August 15, 1989. A final rule was published on October 23, 1991 (56 FR 54957). Critical habitat was designated on March 21, 1994 (59 FR 13374). The Razorback Sucker Recovery Plan was released in 1998 and amended in 2002 (USFWS 2002c).

Historically, razorback sucker was widely distributed in warm water reaches of larger rivers of the Colorado River Basin from Mexico to Wyoming (USFWS 2002c, 2018b) and occupied both lotic and lentic habitats. They are most common in low-velocity habitats such as backwater, floodplains, flatwater river reaches, and reservoirs. Recent documentation shows that habitat selection by adults changes seasonally. Razorback sucker are currently found in small numbers in the Green River, upper Colorado River, and San Juan River sub-basins, including Lake Powell; lower Colorado River between Lake Havasu and Davis Dam; reservoirs of Lakes Mead and Mohave; and in small tributaries of the Gila River sub-basin (Verde River, Salt River, and Fossil Creek).

Dam construction in the Colorado River Basin resulted in reduced flows, disconnected floodplains, vegetation encroachment, and altered flow regimes. These factors allowed non-native species to flourish while recruitment of wild razorback sucker ceased. Stocking programs initiated in the 1990s have allowed the species to persist, and stocked razorback suckers have successfully reproduced in the Colorado River Basin (USFWS 2018a).

Refer to the USFWS Environmental Conservation Online System for detailed life history, listing information, recovery plan, and status reviews (<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E054>) as well as the LPP Final Study Report 11 – Special Status Aquatic Species and Habitats (UBWR 2016b).

Recovery efforts for the razorback sucker include: managing water to provide adequate instream flows, fish passages and screens at major diversion dams to provide access to hundreds of miles of critical habitat, restoring floodplain habitat, monitoring, and managing nonnative fishes (<https://coloradoriverrecovery.org/general-information/the-fish/razorback-sucker.html>).

The infrastructure associated with the LPP is located outside of the range for this species; however, because a component of the Project includes the LPP water exchange contract with Reclamation from Flaming Gorge Reservoir downstream to Lake Powell, effects to the species are considered. The LPP water exchange contract would contribute to meeting the ESA Upper Colorado River Recovery Implementation Programs requirements in the Green River (<https://coloradoriverrecovery.org/general-information/.html>). Designated critical habitat is below Lake Powell in the Colorado River and above Lake Powell in the Green and Colorado Rivers.

Bonytail (*Gila elegans*) – Federally Endangered

Bonytail was listed under the ESA in 1980 (45 FR 27713), with a final determination of critical habitat on March 21, 1994 (59 FR 13374). The bonytail chub is listed as endangered under the ESA and by Utah. Its Natural Heritage Status in Utah is S1 (critically imperiled). The Bonytail Chub Recovery Plan was approved on May 16, 1984, with a revised plan approved September 4, 1990 (USFWS 1990a) and an amendment to the recovery goals approved in 2002 (USFWS 2002d).

The bonytail was historically common in warm water reaches of large rivers ranging from Wyoming to Mexico. Having been extirpated from most of its range prior to extensive fish surveys, little information is known about habitat use and requirements. Currently no self-sustaining populations of bonytail chub exist in the wild, and very few individuals have been caught throughout its range (USFWS 2002d). The bonytail is considered adapted to mainstem rivers where it has been observed in pools and eddies. Like other closely related *Gila* sub-species, bonytail in rivers probably spawn in spring over rocky substrates, while spawning in reservoirs has been observed over rocky shoals and shorelines.

A small number of wild adult bonytail exist in Lake Mohave on the mainstem Colorado River of the Lower Colorado River Basin (i.e., downstream of Glen Canyon Dam), and there are small numbers of wild individuals in the Green River and upper Colorado River sub-basins of the Upper Colorado River Basin (USFWS 2002d).

Refer to the USFWS Environmental Conservation Online System for detailed life history and listing information (<https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=1377>) as well as the LPP Final Study Report 11 – Special Status Aquatic Species and Habitats (UBWR 2016b).

Recovery efforts for the bonytail include: managing water to provide adequate instream flows, fish passages, and screens at major diversion dams to provide access to hundreds of miles of critical habitat; restoring floodplain habitat; and monitoring and managing nonnative fishes (<https://coloradoriverrecovery.org/general-information/the-fish/bonytail.html>).

The infrastructure associated with the LPP is located outside of the range for this species; however, because a component of the Proposed Project includes the LPP water exchange contract with Reclamation from Flaming Gorge Reservoir downstream to Lake, effects to the species are considered. The LPP water exchange contract would contribute to meeting the ESA Upper Colorado River Recovery Implementation Programs requirements in the Green River (<https://coloradoriverrecovery.org/general-information/the-fish/bonytail.html>). Designated critical habitat is below Lake Powell in the Colorado River and above Lake Powell in the Green and Colorado Rivers.

Humpback Chub (*Gila cypha*) – Federally Endangered

The humpback chub is listed as endangered under the ESA and by Utah. This species was first included in the List of Endangered Species issued by the Office of Endangered Species on March 11, 1967 (32 FR 4001) and was considered endangered under provisions of the Endangered Species Conservation Act of 1969 (16 USC 668aa). The humpback chub was included in the United States List of Endangered Native Fish and Wildlife issued on June 4, 1973 (38 FR No. 106), and it received protection as endangered under Section 4(c)(3) of the original ESA of 1973. The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374). The Humpback Chub Revised Recovery Plan was approved on September 4, 1990 (USFWS 1990b) with revisions to recovery goals approved but withdrawn in 2002 (USFWS 2002e). The 2018 five-year status review recommends development of a revised recovery plan.

Populations of humpback chub are restricted to deep, swift, canyon-bound regions of the mainstem and large tributaries of the Colorado River Basin (USFWS 2002e). Adults require eddies and sheltered shoreline habitats maintained by high spring flows (USFWS 2002e). Young fish require low-velocity shoreline habitats, including eddies and backwaters, that are more prevalent under base-flow conditions (USFWS 2002e).

Five extant populations of humpback chub are known. Five populations are in the upper Colorado River Basin (upstream of Glen Canyon Dam): Black Rocks area of the Colorado River, Westwater Canyon, Cataract Canyon, Desolation/Grey Canyon, and one downstream of Lake Powell (Grand Canyon). A sixth population in Dinosaur National Monument is considered extirpated since no individuals have been collected since 2004 (USFWS 2018c). Refer to the Humpback Chub Species Status Assessment for a complete description and status (USFWS 2018c).

Refer to the USFWS Environmental Conservation Online System for detailed life history, listing information, recovery plan, and status reviews (<https://ecos.fws.gov/ecp0/profile/speciesProfile?sPCODE=E000>) as well as the LPP Final Study Report 11 – Special Status Aquatic Species and Habitats (UBWR 2016b).

Recovery efforts for the humpback chub include: managing water to provide adequate instream flows, fish passages, and screens at major diversion dams to provide access to hundreds of miles of critical habitat; and monitoring and managing nonnative fishes (<https://coloradoriverrecovery.org/general-information/the-fish/humpback-chub.html>).

The infrastructure associated with the LPP is located outside of the range for this species; however, because a component of the Project includes the LPP water exchange contract with Reclamation from Flaming Gorge Reservoir downstream to Lake Powell, effects to the species are considered. The LPP water exchange contract would contribute to meeting the ESA Upper Colorado River Recovery Implementation Programs requirements in the Green River (<https://coloradoriverrecovery.org/general-information/the-fish/humpback-chub.html>). Designated critical habitat is below Lake Powell in the Colorado River and above Lake Powell in the Green and Colorado Rivers.

Virgin River Chub (*Gila seminude robusta*) – Federally Endangered

On August 23, 1978, the USFWS proposed listing the Virgin River chub as endangered and designating critical habitat (43 FR 37668). The USFWS withdrew this proposal (45 FR 64853; September 30, 1980) due to the 1978 amendments to the Act. On June 24, 1986, the USFWS again

proposed the listing as endangered and the designation of critical habitat for the Virgin River chub (51 FR 22949). The final rule to list the Virgin River chub as endangered was published on August 24, 1989 (54 FR 35305). The Recovery Plan for Virgin River Fishes was approved on April 19, 1995 (USFWS 1994).

There is little information on the life history and ecology of this species. Adult and juvenile Virgin River chub select deep runs or pools with slow to moderate velocities containing boulders or other instream cover over a sand substrate. Generally, larger fish occupy deeper habitats; however, there is no apparent correlation with velocity. Chub are generally found in velocities ranging up to 2.5 feet/second (USFWS 1994).

The Virgin River chub is considered imperiled in the Virgin River. Populations occur in two core areas of the Virgin River above Washington Fields Diversion in Utah and near the confluence with Beaver Dam Wash in Arizona. Low in-stream flows have been identified as a cause of population decline resulting from water development and drought. Low in-stream flows increase summer water temperatures in the Virgin River, which can lead to changes in feeding, breeding, and sheltering behaviors or to the point of loss of equilibrium and death (USFWS 1994).

Refer to the USFWS Environmental Conservation Online System for detailed life history, listing information, recovery plan and goals, and status reviews (<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E02A>) as well as the LPP Final Study Report 11 – Special Status Aquatic Species and Habitats (UBWR 2016b).

Critical habitat for Virgin River chub was designated as the mainstem Virgin River and its 100-year floodplain extending from the confluence of LaVerkin Creek to Halfway Wash, Nevada. Although the Proposed Project is not located in the Virgin River, this critical habitat reach could be affected by return flows from Project water delivery to the St. George area.

Woundfin (*Plagopterus argentissimus*) – Federally Endangered

Woundfin were listed as endangered on October 13, 1970 (35 FR 16047). Critical habitat was designated on January 26, 2000 (65 FR 4140). The Recovery Plan for Virgin River Fishes was approved on April 19, 1995 (USFWS 1994).

Historically, woundfin extended from near the junction of the Salt and Verde Rivers at Tempe, Arizona, to the mouth of the Gila River at Yuma, Arizona. Woundfin was also likely found in the mainstream Colorado River from Yuma upstream to the Virgin River in Nevada, Arizona, and Utah, and into LaVerkin Creek, a tributary to the Virgin River. Woundfin has been extirpated from almost all its historical range except the mainstem Virgin River. Woundfin presently ranges from LaVerkin Springs, Utah, on the mainstem of the Virgin River and the lower portion of LaVerkin Creek downstream to Lake Mead. The Arizona Game and Fish Department stocked woundfin in the Paria River several times between 1969 and 1972 (650 fish total), but no woundfin were found during Paria River surveys conducted in 1974 and 1975. Historical habitat has been lost due to human effects including habitat fragmentation; introduction of nonnative species; and dewatering due to agriculture, mining, and urbanization (USFWS 1994).

Woundfin live in swift parts of silty streams, seemingly avoiding clear waters, and very seldom found in quieter pools. It occupies the main channel of seasonally swift, highly turbid, and extremely warm streams, with constantly shifting sandy bottoms. Juveniles select areas with slower and deeper water

while larvae are found in backwaters and stream margins that often support filamentous algae growth. Spawning takes place during declining spring flows, and woundfin appears to make relatively long downstream migrations within present habitat (USFWS 1994). Most recent information shows that the woundfin behavioral thermal maximum is 28 degrees Celsius, and 30 degrees is the critical thermal maximum where woundfin organ function starts to be affected (USFWS 2008).

Refer to the USFWS Environmental Conservation Online System for detailed life history, listing information, recovery plans and goals, and status reviews (<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E00Z>) as well as the LPP Final Study Report 11 – Special Status Aquatic Species and Habitats (UBWR 2016b).

Critical habitat for woundfin was designated as the mainstem Virgin River and its 100-year floodplain extending from the confluence of LaVerkin Creek to Halfway Wash, Nevada. Although the Proposed Project is not located in the Virgin River, this critical habitat reach could be affected by return flows from Proposed Project water delivery to the St. George area.

ESA-listed Plants

There is potential for six ESA-listed plants to occur within the analysis area. Based on best available information and records, two species, Shivwits milk-vetch and Siler pincushion cactus, are known to occur within the analysis area. Siler pincushion cactus is the only ESA-listed plant that was documented during field surveys for the Proposed Project and is known to occur on both the Highway Alternative and the Southern Alternative. Suitable habitat has been documented and provided by the USFWS for dwarf-bear poppy, siler pincushion cactus, and Welsh's milkweed. Suitable habitat was also identified during project-specific field surveys (UBWR 2016c) for dwarf bear-poppy, Fickeisen cactus, and Jones cycladenia; however, no populations were encountered.

Dwarf Bear-Poppy (*Arctomecon humilis*) – Federally Endangered

Dwarf bear-poppy was listed as endangered on November 6, 1979 (44 FR 64250). There is no designated critical habitat for this species.

Dwarf bear-poppy is an herbaceous perennial herb of the poppy family. The stems have one or two ivory-white flowers that have orange-yellow stamens that bloom from mid-April through May. The flowers are showy by being next to the red soils in which the plant grows. Its flowers are pollinated by a rare solitary bee species.

Dwarf bear-poppy is a gypsum loving herb, only found growing on barren, clay soils composed predominately of gypsum, in southern Utah. These specific soils include the Moenkopi Formation, specifically the upper three members: Shnabkaib (the white gypsiferous member), Middle Red and Upper Red, where it occurs at elevations from 2,590 to 3,000 feet. The species is found on rolling hills and bluffs in mixed warm desert shrub communities whose dominant plant species include Fremont indigo bush (*Psoralea fremontii*), cheesebush (*Hymenoclea salsola*), Nevada Mormon tea (*Ephedra nevadensis*), saltbush (*Atriplex* sp.), shrubby buckwheat (*Eriogonum corymbosum*), and Fremont pepperweed (*Lepidium fremontii*) (USFWS 1985). It occurs along the eastern edge of the Mojave Desert in Washington County, Utah, in a 7-mile radius to the east, south, and west of St. George, except for Beehive Dome, which is 9 miles southeast of St. George (USFWS 1985).

Refer to the USFWS Environmental Conservation Online System for detailed life history and listing information (<https://ecos.fws.gov/ecp0/profile/speciesProfile?scode=Q1SZ>) as well as the LPP Final Study Report 12 – Special Status Plant Species and Noxious Weeds (UBWR 2016c).

Suitable habitat, as provided by the USFWS, exists within the analysis area near Short Creek at Canaan Gap along the proposed pipeline route and near The Divide along the proposed 138-kV transmission line route in Washington County and occurs on BLM-managed land, SITLA, and private land. Project-specific surveys were completed in 2009/2010. The species was not encountered during the surveys, and the survey report identified that geologically suitable habitat was also found below the southern dike of Quail Creek Reservoir where Shnabkaib and Upper Red Members of the Moenkopi Formation occurs and in the Nephi Twist where the Middle Red Member of the Moenkopi Formation occurs. In addition to Project-specific surveys completed by UBWR, there are no documented occurrences of dwarf bear-poppy within the analysis area. The nearest documented occurrences are more than 1.5 miles from the analysis area and more than 4.5 miles from the nearest infrastructure component of the LPP. See Figure 1.4-5 for Dwarf Bear-poppy Suitable Habitat.

Jones Cycladenia (*Cycladenia humilis* var. *jonesii*) – Federally Threatened

Jones cycladenia was listed as threatened in 1986 (51 FR 16526). There is no critical habitat designated for this species.

Jones cycladenia is a long-lived perennial herb in the Dogbane Family. Funnel-shaped flowers have two forms differing slightly in length and width and are clustered on smooth leafless stalks, each with five pink to rose-purple petals. Flowers appear in May and June.

Jones cycladenia is found in and around the Canyonlands region of southeastern Utah in Kane, Emery, Garfield, and Grand Counties and in Arizona from the Vermilion Cliffs, Moccasin Mountains, and east of Colorado City in Mohave County. In Utah, this species inhabits barren soils of the Wasatch, Cutler, Summerville, and Chinle formations on semi-barren lands of Eriogonum-Ephedra, mixed desert shrub, and juniper communities at 4,390 feet to 6,000 feet. In Arizona, this plant inhabits gypsiferous, sandy, silty, saline clay soils of the Chinle Formation steep sides and lower slopes of mesas in Great Basin desert scrub (UBWR 2016c).

Refer to the USFWS Environmental Conservation Online System for detailed life history and listing information (<https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=3336>) as well as the LPP Final Study Report 12 – Special Status Plant Species and Noxious Weeds (UBWR 2016c).

The species was not encountered during the 2009/2010 surveys; however, the report acknowledged that private lands near Cedar Ridge meet the geologic, vegetative, and elevation requirements and there is high potential for Jones cycladenia to occur. It was suggested that surveys be conducted in May or June in the vicinity of Cedar Ridge if there is access (UBWR 2016c). In addition to Project-specific surveys, known occurrences for Jones cycladenia are more than 40 miles from the analysis area. The USFWS did not provide suitable habitat for this species and stated that the habitat assessments associated with the project-specific surveys were adequate. The potential for occurrence of Jones cycladenia is highest on the Southern Alternative where suitable habitat was documented near Cedar Ridge on private lands. No suitable habitat was identified along the Highway Alternative.

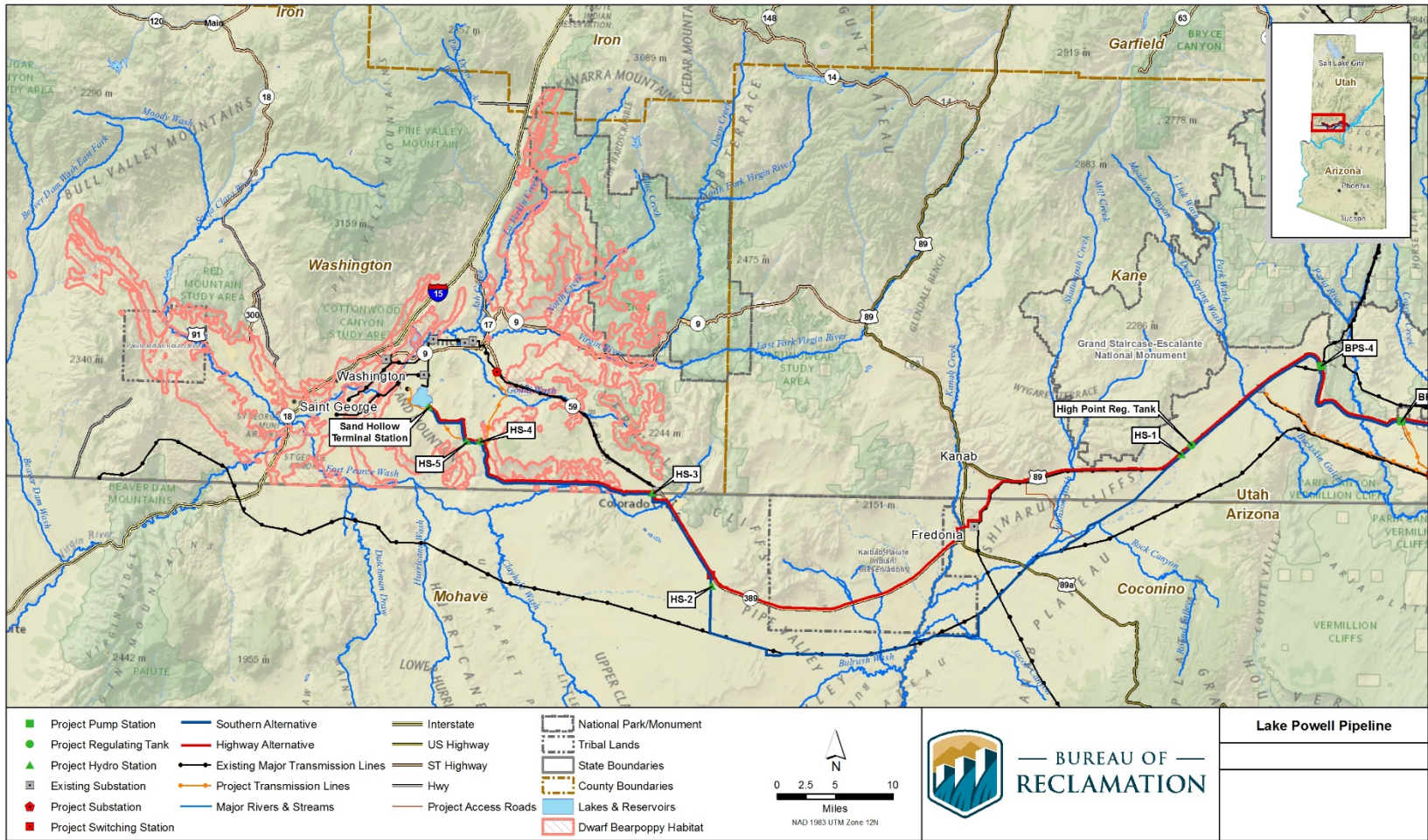


Figure 1.4-5 Dwarf Bearpoppy Suitable Habitat

Shivwits Milk-Vetch (*Astragalus ampullarioides*) – Federally Endangered

Shivwits milk-vetch was listed as endangered in 2001 (66 FR 49560). Critical habitat was designated in 2006 (71 FR 77972). Designated critical habitat occurs within the analysis area; however, is approximately 1.3 miles from the nearest Proposed Project feature.

Shivwits milk-vetch is a perennial herbaceous plant of the Legume Family. Each plant produces approximately 45 small cream-colored flowers on a single stalk and flowering occurs between March and April (USFWS 2006).

Shivwits milk-vetch is found on soils with a high content of gypsum primarily associated with the Triassic Chinle Formation, and occasionally the Dinosaur Canyon Member of the of the Moenave Formation, between 3,400 feet and 3,800 feet in elevation. The fine-grained textured soils of the Upper Red Member of the Moenkopi Formation may provide potentially suitable habitat. Shivwits milk-vetch is found in warm desert shrub, creosote bush and juniper communities, with dense patches of individual plants in an otherwise sparsely vegetated area (USFWS 2006).

Refer to the USFWS Environmental Conservation Online System for detailed life history and listing information (<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=Q2ZA>) as well as the LPP Final Study Report 12 – Special Status Plant Species and Noxious Weeds (UBWR 2016c).

The USFWS provided suitable habitat for this species, which occurs near Canaan Gap in Washington County, Utah on BLM-managed lands and private lands. The species was not encountered during the 2009/2010 surveys (UBWR 2016c). In addition to Project-specific surveys, there are documented occurrences of Shivwits milk-vetch in the analysis area. The nearest documented occurrences are within 2 miles of the infrastructure associated with the LPP (UDWR 2020) in Washington County, Utah. The potential for occurrence is highest in the westernmost portion of the analysis area in Washington County, Utah; therefore, effects would be the same for both alternatives. See Figure 1.4-6 for Shivwits Milk-vetch Suitable Habitat.

Siler Pincushion Cactus (*Pediocactus siler*) – Federally Threatened

Siler pincushion cactus was listed as threatened in 1979 (44 FR 61786) and down-listed to threatened in 1993 (58 FR 68476). There is no designated critical habitat for this species. A Recovery Plan was approved in 1986 (USFWS 1986) and amended in 2019 (https://ecos.fws.gov/docs/recovery_plan/Final%20RP%20Amendment_Siler.pdf).

Siler pincushion cactus is a perennial succulent in the Cactus Family. The flowers are yellowish in color with purple/maroon veins and open from April to mid-May in Arizona and from March through April in Utah (UBWR 2016c).

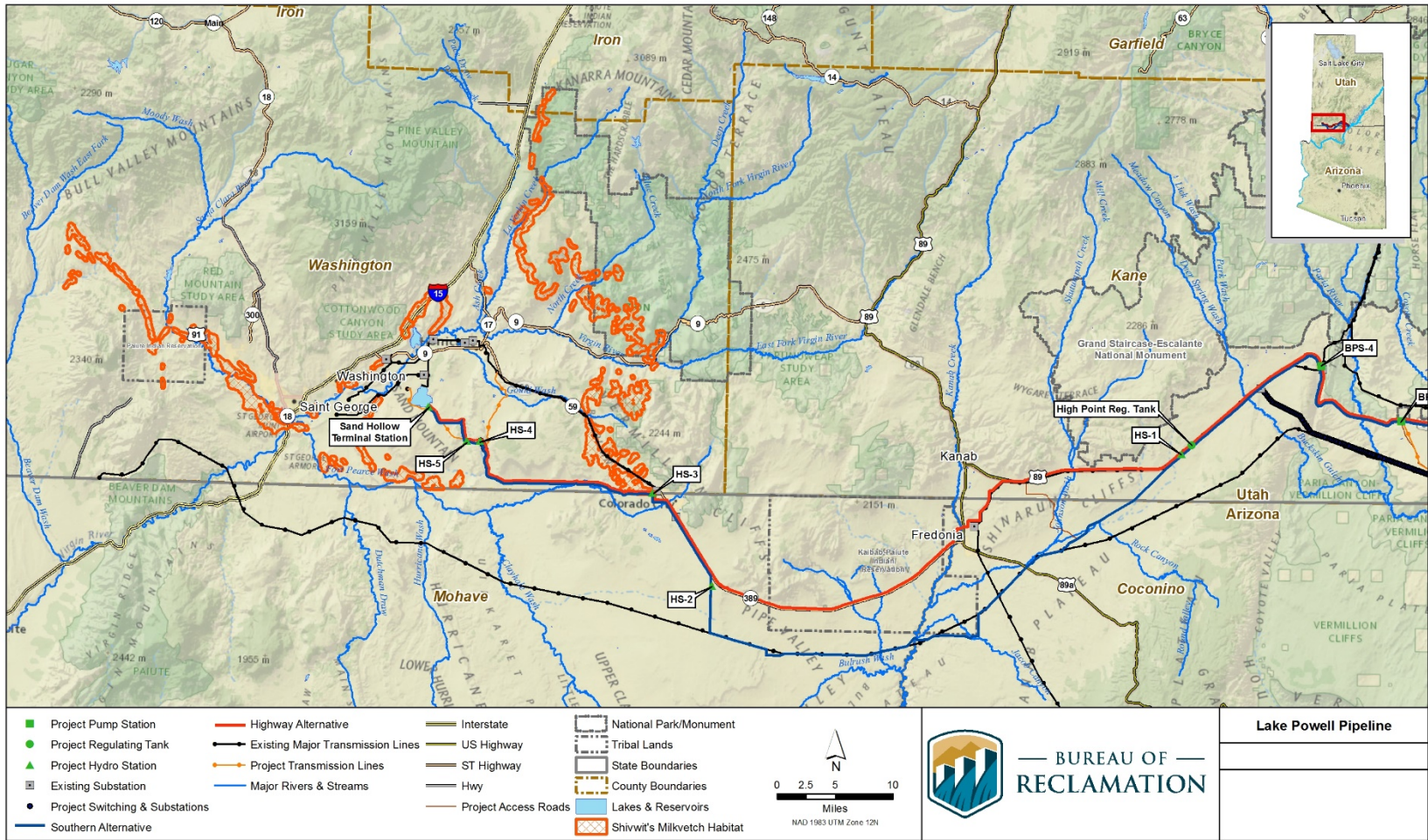


Figure 1.4-6 Shivwits Milk-vetch Suitable Habitat

Siler pincushion cactus is restricted to gypsum and salt-rich soils found in southwestern Utah and northwestern Arizona. It is known from the Fredonia area in northwestern Coconino County, Arizona, west into north-central Mohave County, Arizona. The range extends into Washington and Kane Counties in Utah. Habitat for this species is found only on low red or gray gypsiferous soils derived from the Moenkopi Formation, and sometimes similar Chinle and Kaibab Formations. It is known mostly from the Great Basin Desert scrub biotic community, but also from the Great Basin Conifer Woodland and Plains, Great Basin Grassland, and Mohave Desert scrub biotic communities. Suitable elevations range from 2,800 feet to 5,400 feet in Arizona. In Utah, the range is reported from 2,950 feet to 5,220 feet. The cactus is often found in rolling hills that have a “badlands” appearance with sparse vegetation (UBWR 2016c).

Refer to the USFWS Environmental Conservation Online System for detailed life history and listing information (<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=Q200>) as well as the LPP Final Study Report 12 – Special Status Plant Species and Noxious Weeds (UBWR 2016c).

The USFWS provided suitable habitat for this species, which is located throughout the analysis area on BLM-managed land, KIR, SITLA, and private lands. Siler pincushion cactus was recorded during Project-specific 2009/2010 plant surveys. The species was encountered predominantly southwest of Fredonia (13 individuals on SITLA and private lands) and within the KIR (2,925 individuals); with two additional sites from White Sage Wash to Seaman Wash (one individual on BLM-managed lands) and from west of Short Creek at Canaan Gap (seven individuals on BLM-managed lands and private lands). Surveys located a total of 952 live and 2,000 dead cacti. Most individuals were found on the KIR, scattered along Arizona State Route 389 from west of Fredonia to the intersection of State Route 389 and the road to Pipe Springs National Monument. A total of eight individuals were observed within the proposed ROW for the Southern Alternative, and 2,945 individuals were observed within the ROW for the Highway Alternative, although about two thirds of the encountered individuals were reported dead (UBWR 2016c). In addition to Project-specific surveys, there are documented historical occurrences of Siler pincushion cactus within the analysis area (UDWR 2020). See Figure 1.4-7 for Siler Pincushion Cactus Suitable Habitat

Ute Ladies'-Tresses Orchid (*Spiranthes diluvialis*) – Federally Threatened

Ute ladies'-tresses orchid was listed in 1992 (57 FR 2048). On May 10, 1996, the USFWS received a petition from the Central Utah Water Conservancy District to delist Ute ladies'-tresses. Due to the low priority assigned to delisting petitions, the USFWS postponed immediate action. On October 12, 2004, the USFWS initiated a five-year review that would be used to determine the outcome of the petition to delist (69 FR 60605). There is no designated critical habitat for this species.

Ute ladies'-tresses orchid is a member of the orchid family. It reproduces only by seeds and can produce as many as 7,300 seeds fruit that can persist for up to 8 years as subterranean saprophytes dependent on mycorrhizal fungi. Leaf rosettes may emerge at the end of the growing season and overwinter. In any given year, mature plants can be found in stages—flowering, nonflowering (vegetative), and seasonally dormant stages. Under adverse conditions, individual plants may not flower and can persist underground for an unknown period until conditions are amenable to survival above ground. This can make locating the plant difficult, and the species can only reliably be identified when flowering (USFWS 1995).

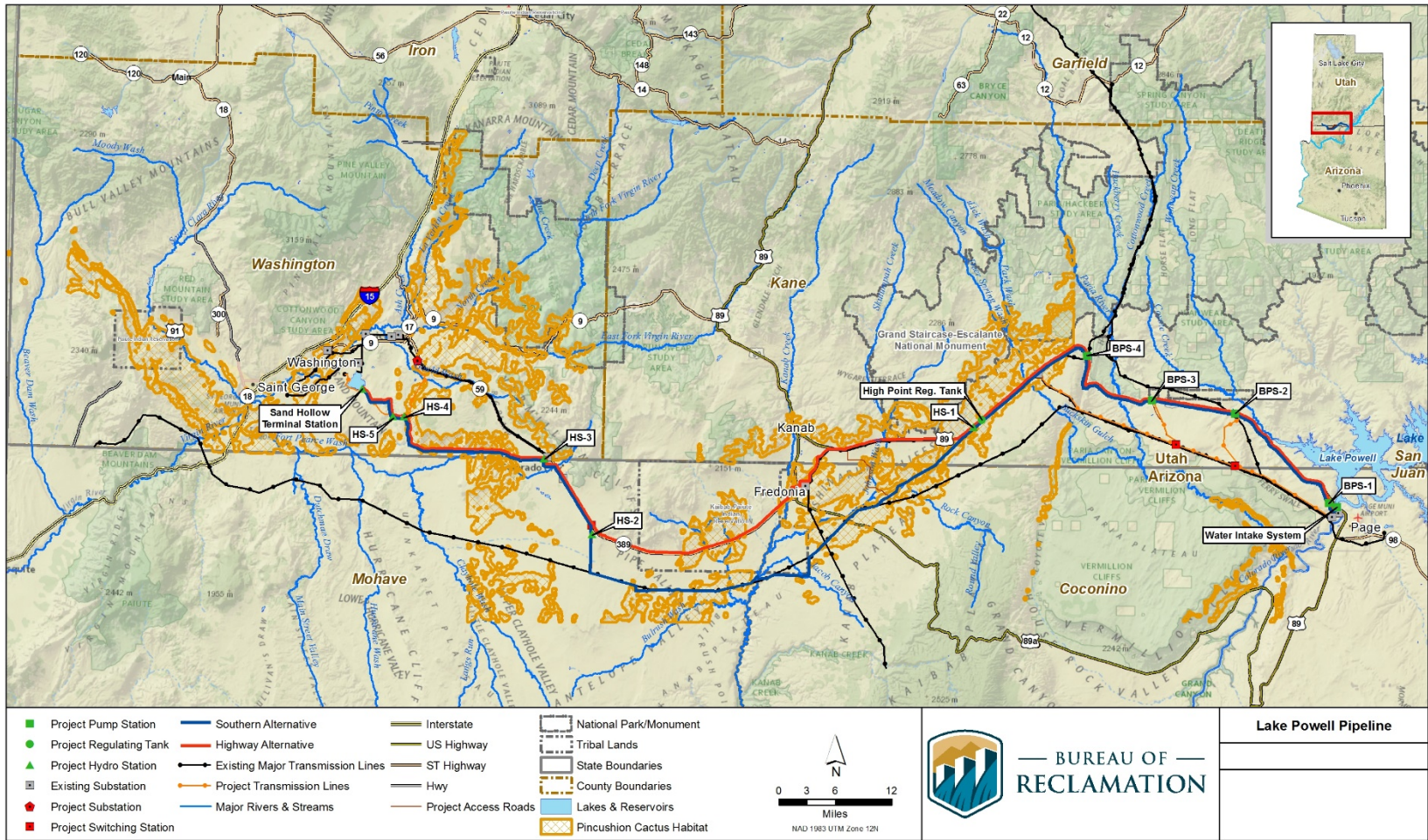


Figure 1.4-7 Siler Pincushion Cactus Suitable Habitat

Ute ladies'-tresses orchid is endemic to moist or very wet meadows near springs, lakes, or perennial streams at elevations ranging from 4,300 to 7,000 feet. It is generally found in areas with relatively open vegetation (USFWS 1995). Threats include season-long grazing, water developments, urbanization, and dams that interrupt flooding cycles (57 FR 2048).

Refer to the USFWS Environmental Conservation Online System for detailed life history and listing information (<https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=2159>).

The infrastructure associated with the LPP is located outside of the range for this species; however, because a component of the Proposed Project includes the LPP Water Exchange Contract with Reclamation from Flaming Gorge Reservoir downstream to Lake Powell, effects to the species are considered.

Welsh's Milkweed (*Asclepias welsbii*) – Federally Threatened

Welsh's milkweed was listed as threatened on October 28, 1987, with designated critical habitat (52 FR 41435). Designated critical habitat is located outside of the analysis area (more than 7 miles); therefore, there would be no effect from the Proposed Project.

Welsh's milkweed is an herbaceous perennial in the Milkweed Family. It produces a globular cluster of flowers that are cream-colored with pink-tinged centers, and it blooms from May to June.

Welsh's milkweed is known from three groups on the Coral Pink Sand Dunes, Sand Hills north of Kanab, Utah, and Sand Cove (on the Arizona-Utah border east of Kanab, Utah). In Arizona its range includes from the Paria Plateau and U.S. Highway 160 north of Wildrose Spring in Coconino County, Arizona, to most recently, the Little Capitan Valley in Navajo County, Arizona, and east into Apache County, Arizona. There are reported locations in Kane County, Utah, and Apache and Coconino Counties, Arizona. It is found on open, sparsely vegetated semi-stabilized coral pink colored sand dunes, in sagebrush, juniper, pine, and oak communities of the Great Basin desert scrub at elevations from 5,500 feet to 6,300 feet in Utah and on active dunes in Great Basin desert scrub from 4,700 to 6,250 feet in Arizona. It occupies both the crest and the down-wind slopes of dunes, adjusting readily to changes in sand depth (USFWS 1992).

Refer to the USFWS Environmental Conservation Online System for detailed life history and listing information (<https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=8400>) as well as the LPP Final Study Report 12 – Special Status Plant Species and Noxious Weeds (UBWR 2016c).

USFWS provided suitable habitat for Welsh's milkweed, which is predominantly near Flat Top west of Page, Arizona, on state lands and some on BLM-managed land in proximity to the proposed transmission lines. Welsh's milkweed was not encountered during 2009/2010 surveys (UBWR 2016c). In addition to Project-specific surveys, the nearest record of occurrence is more than 3 miles from the analysis area. See Figure 1.4-8 for Welsh's Milkweed Suitable Habitat.

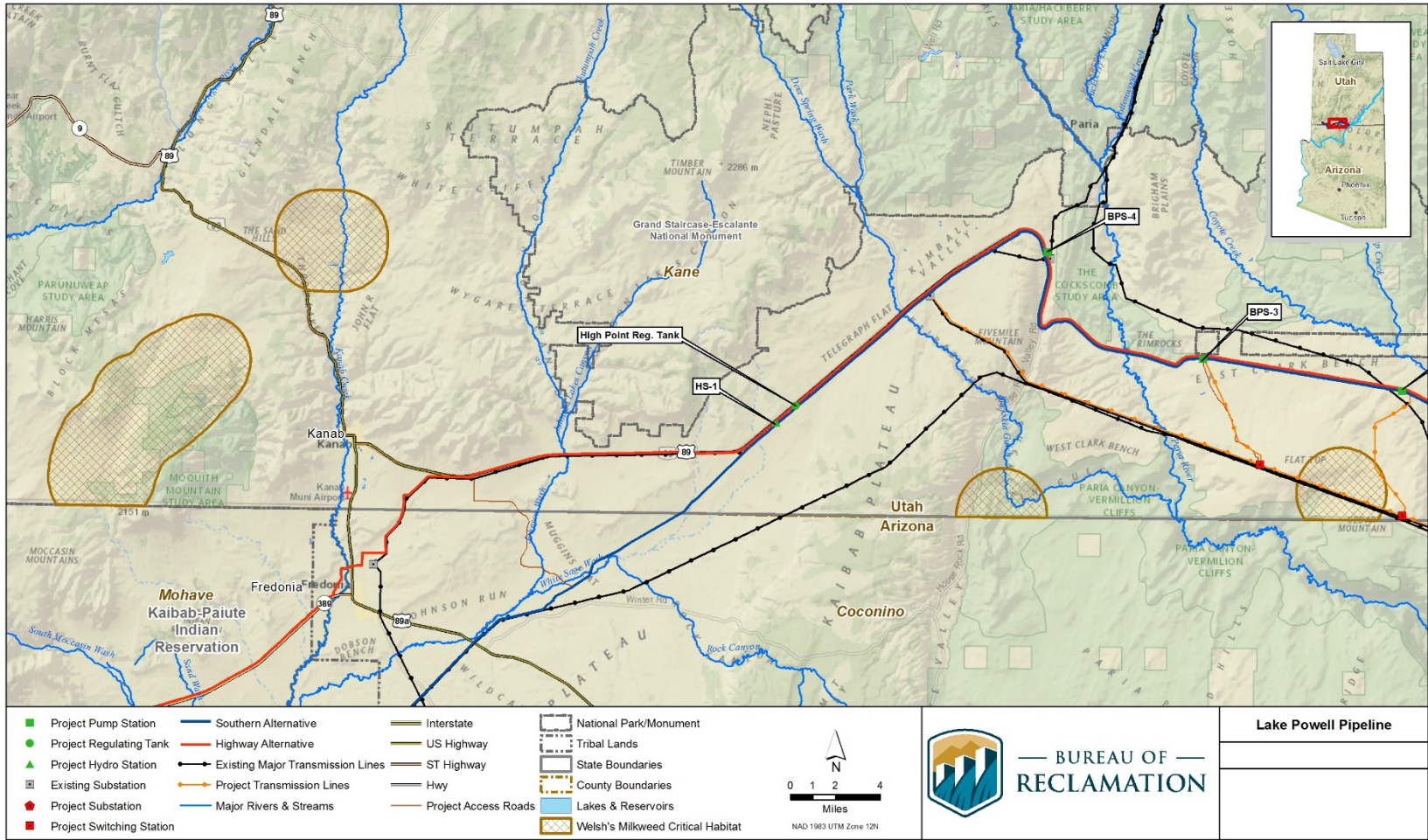


Figure 1.4-8 Welsh's Milkweed Suitable Habitat

2 Results/Environmental Consequences

2.1 No Action Alternative

Under the No Action Alternative, the LPP would not be built; there would be no grant for the requests for LPP water exchange contract, an easement, or ROWs for the Proposed Project; and the BLM would not amend the RMP. The ESA-listed species analysis area would exist under current and future authorizations and land uses. Existing conservation programs would not result in disturbance to ESA-listed species' habitat identified within the Proposed Project ROWs; however, conservation programs may affect water within the Virgin River system.

However, under this alternative, projects already planned by the Project Proponent would continue to occur. Disturbance, due to these projects, would vary in space and time. Most impacts would be short-term and project-specific, including direct effects to ESA-listed species and their habitat. Most effects to ESA-listed species would be minimized through implementation of industry standard practices by the Project Proponent.

Under this alternative, no amendment to the RMP would occur, so current management of the resources for which the Kanab Creek Area of Critical Environmental Concern (ACEC) was designated (including habitat for the endangered southwestern willow flycatcher) as prescribed in the RMP would continue. This alternative would therefore not result in effects to threatened and endangered species, including southwestern willow flycatchers.

2.2 Effects Common to Both Action Alternatives

The action alternatives would affect vegetation communities within the Colorado Plateau and Mojave Desert ecoregions that provide suitable habitat for ESA species. Direct and indirect effects are described in detail for construction, operation, and maintenance activities associated with the proposed pipeline and infrastructure as well as the LPP water exchange contract and potential return flows. Direct effects of construction, operation, and maintenance of the Proposed Project would be localized to the ROWs. Indirect effects would extend beyond the ROWs and include noise, fugitive dust, and fragmentation-related effects. Implementation of the EPMs would be highly effective at minimizing effects to ESA species and habitats. In addition to EPMs, the Section 7 consultation would include additional conservation measures that would apply to ESA species as identified in Section 1.4, which would further minimize effects to ESA-listed species.

Indirect and Direct Species-Specific Effects: California condor, Mexican spotted owl, southwestern willow flycatcher, and western yellow-billed cuckoo

Direct effects on ESA-listed birds that may occur as a result of construction, operation, and maintenance of the Proposed Project include potential for bird mortality and injury; loss, degradation, and fragmentation of foraging, nesting, and sheltering habitat; and potential disruptions

of nesting and breeding activities associated with increased vehicle, human presence, and noise. The types of direct effects may vary. Risk of mortality or injury to ESA-listed birds from in-flight collision or electrocution with transmission lines may be greater in some locations based on habitat values and species use. Noise has the potential to temporarily disrupt ESA-listed species in the vicinity by masking calls or interfering with behavior.

Indirect effects on ESA-listed birds that may occur as a result of construction, operation, and maintenance of the Proposed Project include potential for alterations to plant communities, changes in fire regimes, expansions of invasive plant species, and habitat microclimate quantities and quality. Indirect effects could result in a reduction in breeding success and survival of individuals, and potential for reducing population size of a species.

California Condor

There would be no effect to designated critical habitat for California condor because it does not occur within the analysis area. There would be no effect to condor nesting habitat because known nesting sites are located on NPS-managed lands and Vermillion Cliffs National Monument well outside of the analysis area; however, UBWR would consult with state and federal agencies prior to construction-related activities to ensure no California condors are known to nest in proximity to the Proposed Project.

The primary issue associated with Proposed Project construction is the potential to draw condors into the construction area because they forage great distances. Condors foraging near the LPP ROW drawn to a construction site could be affected by Proposed Project activities, disturbance associated with noise and construction personnel and equipment, and increased potential for vehicular collisions with foraging birds landing within the construction areas or on access roads. Condors that are attracted to construction sites could become habituated to human garbage. Maintaining a clean worksite free of trash and debris would reduce the potential for condors to be attracted to work areas.

Direct effects from operation of the Proposed Project would be limited to the transmission component, which includes potential for electrocution and collision resulting in injury or death if condors were to encounter a transmission line. Due to their size and soaring habitats, condors have low maneuverability, which contributes to the risk of collision and electrocution. The wingspan of a condor could exceed typical separation distances of electrical conductors and other energized equipment especially on smaller voltage transmission lines. The potential for electrocutions and collisions warrants consideration of adequate spacing of transmission equipment to improve line visibility and space conductors to minimize the risk (APLIC 2006, 2012).

Effects to California condor along all alternatives would be minimized through implementation of the following EPMs outlined in the POD, Appendix B: B.1.5 (worker education program), B.5.1 (biological monitors), B.5.2 (compliance with the Biological Opinion/others, stop work, etc.), B.5.4 (no harassment or harming of animals), B.5.5 (reporting entrapment, death, injury), B.5.6 (design power poles to be compliant with APLIC recommendations), B.5.71 (coordination on California condor locations and movements), B.5.72 (notification if California condors visit worksites), B.5.73 (protective buffers for condor nesting activities within 0.5 mile), B.5.74 (condors in the vicinity of blasting), B.5.75 (protective buffers around condor nesting within 1.0 mile), B.5.76 (notification should condors visit worksites), and B.5.77 (site clean-up to minimize attracting condors). In addition to the EPMs, the POD would include a detailed Bird Conservation Strategy. The Section 7

consultation under the ESA would provide additional conservation measures, which would further minimize effects.

California condors have a low reproductive rate, which makes populations vulnerable to the slightest losses. Construction and operation effects of the pipeline and ancillary facilities would be minimized based on implementation of the EPMs and Section 7 consultation conservation measures. Effects to habitat would be associated with foraging activities; there would be no effect to nesting or roosting habitats, and effects to foraging habitats would occur. There would be 2,965 acres of permanent ROW and 1,429 acres of additional temporary construction area that would be affected by the Southern Alternative and 2,768 acres of permanent ROW and 1,339 acres of additional temporary construction area that would be affected by the Highway Alternative, which may affect foraging habitat for California condors. Construction-related effects would be short-term and would dissipate immediately following completion of the Proposed Project. There are operational uncertainties associated with the potential for a condor to collide with a transmission line, tower, conductor, or guard wire. Collisions and electrocutions would be expected to be rare because captive-released condors go through power pole aversion training; however, the potential is still recognized as a threat. Evaluating the possibility of collisions and electrocutions is speculative and it is not possible to fully determine if these effects would occur where the transmission lines would be constructed. The potential threat of collision and electrocution would be long-term for the life of the ROW for the transmission lines; however, implementation of the APLIC guidelines (APLIC 2006, 2012) would reduce the threat. Effects associated with maintenance activities would be similar to those expected during construction; however, they would be less intense and more focused.

Mexican Spotted Owl

There would be no effect to designated critical habitat. Suitable nesting and roosting habitat are located outside of the analysis area; however, foraging and dispersal habitat may occur. Based on distance to nearest known nesting areas, Mexican spotted owls are not expected to nest within the analysis area; therefore, there would be no effect to nesting habitat. The habitat values most likely to be affected by the Proposed Project are foraging and dispersal habitat. The Paria River and Kanab Creek may be used as dispersal corridors for transient Mexican spotted owls travelling and dispersing to suitable habitats on NPS-managed lands at Zion National Park and Grand Canyon National Park. The number of owls using riparian corridors and dispersing is likely to be low since most juveniles remain close to natal sites. The duration of the construction in the corridors would be brief and due to overlap with suitable and potential southwestern willow flycatcher habitat, construction would not occur April 1 through August 15. Some overlap may occur with construction activities and juvenile dispersal since juveniles disperse in September and October (USFWS 2012). It is believed that most juvenile northern spotted owls occupy territories near their natal territories. The Recovery Plan (USFWS 2012) acknowledged that juvenile Mexican spotted owls use a wide variety of habitats during dispersal, which vary greatly from typical breeding habitat. These factors combined make it highly unlikely that an owl would be using the riparian corridors at the time of construction minimizing the potential for effects to foraging or dispersing owls.

Recovery habitat is defined as primarily ponderosa pine-Gambel oak, mixed-conifer, and riparian forest that either is, or has the potential for becoming, nest/roost habitat or does or could provide foraging, dispersal, or wintering habitats (USFWS 2012). Based on vegetation mapping, there is low potential for recovery habitats to occur within the analysis area. Owl foraging habitat includes a wide variety of forest conditions, canyon bottoms, cliff faces, tops of canyon rims, and riparian areas and may occur within the analysis area. In Utah, habitat models indicate that the majority of potential

habitat within the analysis area is low value (Lewis 2014). Pinyon-juniper woodland is the dominant woodland vegetation community type within the analysis area, and there are no specific management suggestions for pinyon-juniper woodland within the Recovery Plan (USFWS 2012). Some effects to foraging habitats associated with pinyon-juniper woodlands would be expected on both the Southern Alternative and Highway Alternative. There would be 124.4 acres (temporary) and 429.3 acres (permanent) disturbance within pinyon-juniper woodlands on the Southern Alternative and 128 acres (temporary) and 434.1 acres (permanent) disturbance on the Highway Alternative.

It is not known to what extent collisions and/or electrocutions affect Mexican spotted owl populations, but fatalities from these causes are not likely a substantial influence on owl persistence (USFWS 2012). The transmission lines are in low value habitat and more than 10 miles from the nearest known nesting habitat. Foraging habitats in proximity to the transmission lines are open desert shrub habitats with some pinyon-juniper woodland but for the most part are relatively open canopy habitats. It is highly unlikely that foraging owls would collide with transmission lines because they are expected to fly well below tree canopy when hunting, putting them well below the risk of collision with a transmission line.

Effects to Mexican spotted owl along all alternatives would be minimized through implementation of the following EPMs outlined in the POD, Appendix B: B.1.5 (worker education program), B.5.1 (biological monitors), B.5.3 (compliance with the Biological Opinion/others, stop work, etc.), B.5.4 (no harassment or harming of animals), B.5.5 (reporting entrapment, death, injury), and B.5.6 (design power poles to be compliant with APLIC recommendations). The Section 7 consultation under the ESA would provide additional conservation measures, which would further minimize effects. Overall, effects of the Proposed Project would result in short-term direct and indirect effects to Mexican spotted owls and associated foraging and dispersing habitats. Noise and disturbance related effects would be short-term, dissipating immediately following completion of the Proposed Project. Operational effects would be minimal, and noise-generating infrastructure does not occur within nesting or roosting habitats.

Southwestern Willow Flycatcher and Western Yellow-billed Cuckoo

The Proposed Project alternatives and associated infrastructure would have no effect on proposed critical habitat for western yellow-billed cuckoo. The Proposed Project would disturb 1.14 acres of designated critical habitat for southwestern willow flycatcher, which is expected to affect biological and physical attributes of designated critical habitat such as food, cover or shelter, and riparian habitat characteristics that support breeding populations (e.g., vegetation height, size and shape of habitat patches, tree canopy structure, and vegetation density). The Paria River was also identified as suitable habitat for western yellow-billed cuckoo. Refer to Table 2.2-1 for acres of disturbance within designated critical habitat and suitable habitat for southwestern willow flycatcher and western yellow-billed cuckoo along the Southern and Highway Alternatives.

Table 2.2-1 Disturbance to Riparian Habitat

Riparian Area	Southern Alternative	Highway Alternative
Paria River ^(a)	1.14 acres	1.14 acres
Kanab Creek	0.18 acres	NA
Kanab Creek at Fredonia	NA	0.09 acres
Short Creek at Colorado City	0.27 acres	0.27 acres
Short Creek at Canaan Gap	0.21 acres	0.21 acres
Two Mile Wash	NA	0.06 acres
Cottonwood Creek	NA	0.03
Total	1.8	1.8

Note:

(a) The Paria River is designated critical habitat for southwestern willow flycatcher and suitable habitat for western yellow-billed cuckoo.

Direct effects to southwestern willow flycatcher and western yellow-billed cuckoo would include disturbance and disruption of breeding, nesting, and brood-rearing and the direct loss, degradation, and fragmentation of limited riparian habitat suitable for the species. Disturbance and disruption during breeding, nesting, and brood-rearing resulting from increased human presence, construction equipment, and noise could result in reduced fitness, survival, nest abandonment, increased predation, and decreased nestling and egg survival. Alteration of riparian habitat including clearing of vegetation over 5 feet in height could result in fragmentation of designated critical habitat and suitable habitat. Direct effects to the species would be limited if construction activities avoid the primary breeding and nesting season. Any activities or clearing of vegetation during this season could result in direct disturbance to nesting birds, nest abandonment, and injury or mortality to eggs and young birds leading to reduced reproductive success; however, EPMs and Section 7 consultation conservation measures would minimize this threat. Direct effects to designated critical habitat for flycatcher and suitable habitat for both flycatchers and cuckoos associated with the Proposed Project would occur and restoration of the habitat components for these species would be long-term.

One proposed transmission line is approximately 3.6 miles south of the southernmost portion of designated critical habitat for flycatchers on the Paria River. Habitat where the transmission line crosses the Paria River is unsuitable for flycatchers and cuckoos; however, riparian corridors that do not meet the requirements for breeding or nesting habitat may still be used as migration and movement routes; therefore, there is risk of collision with transmission lines that bisect migration and movement corridors. The risk of mortality and injury to southwestern willow flycatcher and western yellow-billed cuckoo from in-flight collision with transmission lines may occur; however, due to availability of higher quality nesting habitats outside of the Project Area, low numbers of these species that may be using this corridor, and rarity of such occurrences. There would be no effect based on electrocution risk associated with flycatcher and cuckoo because of the clearance and spacing between conductors.

Indirect effects could include invasive plant introduction which could reduce the quality of these habitats for nesting and brood-rearing habitat. Invasive riparian vegetation such as tamarisk is prevalent throughout riparian habitats within the Project Area; therefore, removal of native riparian vegetation presents an opportunity for tamarisk to establish or replace native vegetation such as willow and potential for modification of designated critical habitat for flycatchers in the Paria River and for both species within other suitable riparian habitats. It is anticipated that the Proposed

Project would result in effects to the riparian communities, and habitats would be expected to improve following restoration efforts.

Effects to flycatcher and cuckoo along all alternatives would be minimized through implementation of the following EPMs outlined in the POD, Appendix B: B.1.5 (worker education program), B.5.1 (biological monitors), B.5.3 (compliance with the Biological Opinion/others, stop work, etc.), B.5.4 (no harassment or harming of animals), B.5.5 (reporting entrapment, death, injury), B.5.6 (design power poles to be compliant with APLIC recommendations), B.5.64 (ground clearing outside nesting period), B.5.65 (preconstruction surveys), B.5.66 (Bird Conservation Strategy), B.5.67 (APLIC), B.5.69 (removal of trees outside of nesting season), and B.5.70 (restrict activities May 1 through July 15). The Section 7 consultation under the ESA would provide additional conservation measures, which would minimize effects.

Riparian habitats within the analysis area are dynamic; therefore, suitable habitat documented 10 years ago may have changed; pre-construction surveys would provide more up-to-date information on habitat suitability and species presence. Construction effects of the pipeline and ancillary facilities would occur within designated critical habitat for southwestern willow flycatcher at the Paria River crossing and additional riparian habitats identified as suitable or potential for both species during the field surveys (UBWR 2016a). Construction-related effects would be short-term and would dissipate immediately following completion of the Proposed Project. Construction activities would alter designated critical habitat for flycatcher and suitable habitat at the other riparian crossings. Restoration at riparian crossings would minimize long-term effects of construction activities allowing for biological and physical features of the habitat to be restored; however, this may take more than one full year to achieve restoration objectives. Operational effects would be primarily associated with the potential for collisions with transmission lines, these effects would occur over the life of the ROW but would be minimized by following the EPMs including APLIC guidelines (APLIC 2006, 2012) and Section 7 consultation conservation measures. Effects associated with maintenance activities would be similar to those expected during construction; however, such effects would be less intense and more focused in areas where maintenance actions are needed.

The LPP water exchange contract would have beneficial effects to proposed critical habitat for western yellow-billed cuckoo in the Upper Colorado and Green Rivers, particularly at Canyonlands National Park at the confluence of the Green and Colorado Rivers (Unit-5, Green River 2) and the Ouray National Wildlife Refuge (Unit 1- Green River 1) (79 FR 48547). The intent of the LPP water exchange contract is to allow flows from Flaming Gorge Dam to meet the ESA Upper Colorado River Recovery Implementation Program, which would also be expected to maintain the physical and biological features of proposed critical habitat for cuckoos; therefore, it is expected the LPP water exchange contract would maintain dynamic riverine processes for meeting biological and physical features. Return flows associated with water delivery of Lake Powell water associated with the Proposed Project may result in increased flows into the Virgin River system contributing to maintenance of or a potential increase in water flows, which would be beneficial to maintaining habitat for these species.

Indirect and Direct Species-Specific Effects: Mojave Desert Tortoise

There would be no effects to designated critical habitat or lands managed under the Red Cliffs Desert Reserve. The Proposed Project would cross occupied Mojave Desert tortoise habitat, which would include vegetation removal, excavation, and vehicle use. Direct effects to tortoise may be expected because Project-related vegetation removal, excavation, and vehicle use have the potential

to disturb or destroy desert tortoise and their burrows. Direct effects may include loss, fragmentation, and degradation of habitat; fatality as a result of crushing or burying; and mishandling of tortoises, which could lead to water expulsion and death if they are not able to access water and rehydrate quickly. The pipeline and access roads are not expected to create barriers to tortoise movement; however, these Proposed Project structures could contribute to fatality, habitat fragmentation, and degradation.

Approximately 1,694 acres were surveyed for tortoises. Within the survey area, 1,012 acres were determined to be low quality habitat, 517 acres were high quality habitat, and 165 acres were unsuitable. There are 346.9 acres of high quality habitat and 567.4 acres of low quality habitat that may be disturbed on BLM-managed lands. On state lands, approximately 40 acres of low quality habitat may be disturbed. On private lands, 58 acres of high-quality habitat, 117 acres of low quality, and 85 acres of unsuitable habitat may be disturbed. Tortoise burrows were documented on BLM-managed lands within high quality habitat. Overall, there would be a total of 578 acres of temporary and permanent disturbance associated with the pipeline and transmission lines within desert tortoise habitat. Most disturbance would be temporary. Permanent disturbance associated with transmission lines would be less than 1 acre, and approximately 25 acres of permanent disturbance would occur at Hydrostation-5. Refer to Table 2.2-2 for acres of disturbance by jurisdiction.

Table 2.2-2 Disturbance to Mojave Desert Tortoise Habitat

Agency	Permanent Effects (acres)			Temporary Effects (Acres)				
	High Quality Habitat	Low Quality Habitat	Not Suitable Habitat	Total	High Quality Habitat	Low Quality Habitat	Not Suitable Habitat	Total
BLM	27	7		34	77	167		244
NPS	0	0	0	0	0	0	0	0
Reclamation	0	0	0	0	0	0	0	0
Tribe	0	0	0	0	0	0	0	0
State	0	4	0	4	0	36	0	36
Private	0	7	0	7	58	110	85	253
Total	27	18	0	45	135	313	85	533

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Bureau of Reclamation

Tribe = Kaibab Band of Paiute Indians

Effects to Mojave Desert tortoise along all alternatives would be minimized through implementation of the EPMs developed specifically for Mojave Desert tortoise outlined in the POD, Appendix B, B.5.14 through B.5.56. The Section 7 consultation under the ESA would provide additional conservation measures, which would minimize effects.

Construction effects to Mojave Desert tortoise would occur for the duration of construction activities and could have result in fatalities of individual tortoise; however, implementation of EPMs and Section 7 consultation conservation measures would minimize potential for fatality. Construction-related effects would be short-term and would dissipate immediately following completion of the Proposed Project. Revegetation would minimize long-term effects of construction on Mojave Desert tortoise habitat; however, restoration in these habitats is difficult often resulting

in low success, and the potential for invasive species such as cheatgrass is high. Operational effects would be primarily associated with the potential for recurring effects from vehicle use for operation activities. Operational effects may include potential for predation by common ravens and other predators, which would occur long term. Although effects associated with maintenance activities would be similar to those expected during construction, they would be less intense and more focused.

Indirect and Direct Species-Specific Effects: Colorado River Fish (Colorado Pikeminnow, Razorback Sucker, Bonytail Chub, and Humpback Chub)

Hydrologic models (refer to Appendix C-10, Hydrology) indicate that the Proposed Project would not change river flows in the Green and Colorado Rivers downstream from Flaming Gorge Dam. The LPP water exchange contract would have beneficial effects to Colorado River fish and designated critical habitat within the Upper Colorado River and Green River and would continue to allow flows from Flaming Gorge Dam to meet the ESA Upper Colorado River Recovery Implementation Program, which would maintain the physical and biological features of designated critical habitat for these species including flow and temperature recommendations. The quantity and quality of water would not be affected as a result of the Proposed Project. Physical habitat within the Green and Colorado River 100-year floodplains would not be modified. The biological environment including food supply, predation, and competition for important elements would not be affected. Water quality modeling (refer to Appendix C-11, Water Quality) results indicate that the Proposed Project would not substantially affect water temperatures in Glen Canyon Dam releases. Effects of water withdrawal from Lake Powell would have minimal effects on ESA-listed fish and designated critical habitat below Glen Canyon Dam. These species inhabit warmer waters well below Glen Canyon Dam and changes to temperature, total dissolved oxygen, etc. would not be detectable since these species are found over 15 river miles below Glen Canyon Dam.

Indirect and Direct Species-Specific Effects: Virgin River Fish (Virgin River Chub and Woundfin)

Impacts to the Virgin River from the operation of the Proposed Project were modeled (refer to Appendix C-10, Hydrology). Differences in simulated streamflow along the Virgin River in the upper portions of the Washington County system near Quail Creek Reservoir were typically small, and within the degree of accuracy of the U.S. Geological Survey stream gages. Releases from Quail Creek Reservoir are often used to supplement instream flows in the Virgin River down to the Washington Fields Diversion. Quail Creek Reservoir would typically maintain a higher storage volume because some LPP water would be stored in the reservoir. Therefore, measurable flow increases would be expected in drier months and years from the Proposed Project due to maintained Quail Creek Reservoir releases into the Virgin River and would have similar flows to compared to current releases into the Virgin River from Quail Creek Reservoir.

Modeled streamflows also increased in the lower portions of the Virgin River near the state line because secondary demands in 2060 were not at a level to fully reuse all Virgin River and LPP return flows from the St. George Municipal and Industry demand center. These increases in streamflows occurred in the drier summer and fall months when municipal demand is highest, and more return flows enter the river. Peak winter and spring runoff flows would not be measurably affected by the Proposed Project.

Virgin River modeling evaluated changes in streamflow through 2060, but there are no data beyond 2060 for changes to Virgin River flows from the Southern Alternative. However, increases in

instream flows from return flows could decrease beyond 2060 as secondary demands would continue to increase and LPP return flows would be reused to meet secondary demands. Effects could also be less under drier, hotter climate change projections because there would be less reuse of water available from Virgin River supplies and more of the LPP return flows would be reused to meet secondary demands.

Generally, the modeling shows increases to Virgin River summer and fall streamflows, which would provide a beneficial effect to flow stability, temperatures, and turbidity for the species (USFWS 2008). As more reuse occurs over time, the magnitude of the beneficial effect would decrease, but the streamflows would not decrease below levels under the No Action Alternative.

The USFWS designated critical habitat for Virgin River chub and roundtail dace as the mainstem Virgin River and its 100-year floodplain extending from the confluence of LaVerkin Creek to Halfway Wash, Nevada. Thus, critical habitat begins upstream of the modeled reach and extends beyond it into Nevada. Other than increased flows into the Virgin River system, the Proposed Project would not affect water quality or change the magnitude, duration, and frequency of flow events. The Proposed Project would not modify the physical habitat within the Virgin River 100-year floodplain and would not alter biological productivity of the river system. This would benefit Virgin River chub and roundtail dace populations in different ways, depending on the species and life stage. This benefit would also act to offset effects of drought and high water uses on Virgin River fish species. Return flows may increase to the Virgin River, which may offset effects of drought and high water uses on Virgin River aquatic resources.

Effects to Colorado River and Virgin River ESA-listed fish along all alternatives would be minimized through implementation of the EPMs outlined in the POD, Appendix B, specifically B.5.85 (BMPs for re-routing intermittent flow). In addition, to the EPMs, the POD would include detailed plans for construction dust management, restoration, spill prevention, and stormwater pollution.

Indirect and Direct Species-Specific Effects: ESA-Listed Plants (Dwarf bear-poppy, Jones cycladenia, Shivwits milk-vetch, Siler pincushion cactus, Ute ladies'-tresses orchid, and Welsh's milkweed)

Direct effects of construction-related activities could result in losses of individual plants and permanent loss and degradation of habitat (i.e., soils and vegetation) as a result of vegetation clearing; soil excavation; piling of soil material; vehicle and construction equipment driving, crushing, and compaction, and human foot traffic in sensitive, erosive soils.

Indirect effects may include the spread of invasive and noxious species, increased habitat fragmentation and reduced gene flow between plant populations, increased soil erosion and dust deposition, changes to water flow and drainage patterns, reduced photosynthesis and reproductive output, increased fire frequencies due to invasive species proliferation such as cheatgrass, potential for herbicide drift from treating noxious weeds, and increased use of access roads by construction vehicles as well as the public leading to dust deposition. Maintenance and access roads could be accessed by the public for recreational purposes, which could increase trampling, illegal collection, and increased off-highway vehicle use, which could lead to a loss and degradation of plants and habitat.

There would be no effect to designated critical habitat for ESA-listed plants. Suitable habitats for dwarf-bear poppy, Jones cycladenia, Shivwits milk-vetch, and Welsh's milkweed would be affected by the Proposed Project; however, based on distance to nearest known occurrences for these species in relation to the Proposed Project and associated infrastructure, limited suitable habitat, and the species not being encountered during the field surveys, effects to occupied habitat for these species are expected to be minimal.

The only ESA-listed plant species encountered during the field surveys is Siler pincushion cactus. Based on results of the 2010 surveys (UBWR 2016c), the Proposed Project may result in disturbance to suitable and occupied habitat, including changes in runoff patterns that could alter water availability or erosion patterns, increase the presence or dominance of noxious weeds or invasive species, or creation of large volumes of dust that could settle on plants or flowers and reduce photosynthesis and reproductive output. Dust production along access roads is likely to vary spatially with soil conditions and temporally with wind conditions.

Effects to Ute ladies'-tresses orchid are tied to the LPP water exchange contract, which would mitigate the potential for water depletions within the upper reaches of the Colorado and Green Rivers. There would be no direct effects of the Proposed Project on Ute ladies'-tresses orchid. The LPP water exchange contract would ensure that water flows would be maintained within the Green and Colorado Rivers downstream of Flaming Gorge Reservoir, which would be beneficial to the species.

Effects to ESA-listed plants along all alternatives would be minimized through implementation of the following EPMs outlined in the POD, Appendix B: B.1.5 (worker education program), B.5.1 (biological monitors), B.5.3 (compliance with the Biological Opinion/others, stop work, etc.), B.5.8 (pre-construction surveys), B.5.9 (adjust ROW to avoid populations), B.5.10 (seed or salvage collection), B.5.11 (consultation on if previously unknown species are discovered), B.5.12 (halt construction if species are discovered in areas cleared during previous surveys), and B.5.13 (no herbicides within or around special status plant exclusion areas). Additional EPMs for general construction practices, stormwater and erosion control, restoration, and noxious weeds would also minimize effects to ESA-listed plants. The Section 7 consultation under the ESA would provide additional conservation measures, which would minimize effects.

Construction- and operation-related effects to most ESA-listed plant species (dwarf bear-poppy, Jones cycladenia, Shivwits milk-vetch, and Welsh's milkweed) associated with the Southern Alternative and Highway Alternative are expected to be minimal. Effects to Siler pincushion cactus would vary by alternative; therefore, additional effects are discussed below for each alternative. The Section 7 consultation under ESA would provide additional conservation measures for Siler pincushion cactus, which would reduce effects of dust.

2.3 Southern Alternative

The Southern Alternative would have similar direct and indirect effects to ESA-listed species and critical habitat as those described under Section 2.2, above.

Suitable habitat disturbance for dwarf bear-poppy, Shivwits milk-vetch, and Siler pincushion cactus is identified in Tables 2.3-1, 2.3-2, and 2.3-3.

Table 2.3-1 Dwarf Bear-poppy Suitable Habitat Affected

Agency	Permanent Effects (acres)	Temporary Effects (acres)	Total
BLM	0	47	47
NPS	0	0	0
Reclamation	0	0	0
Tribe	0	0	0
State	0	0	0
Private	0	34	34
Total	0	81	81

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Bureau of Reclamation

Tribe = Kaibab Band of Paiute Indians

Table 2.3-2 Shivwits Milk-vetch Suitable Habitat Affected

Agency	Permanent Effects (acres)	Temporary Effects (acres)	Total
BLM	0	0	0
NPS	0	0	0
Reclamation	0	0	0
Tribe	0	0	0
State	0	0	0
Private	4	32	36
Total	4	32	36

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Bureau of Reclamation

Tribe = Kaibab Band of Paiute Indians

Table 2.3-3 Siler Pincushion Cactus Suitable Habitat Affected

Agency	Permanent Effects (acres)	Temporary Effects (acres)	Total
BLM	28	787	815
NPS	0	0	0
Reclamation	0	0	0
Tribe	0	0	0
State	0	68	68
Private	0	92	92
Total	28	947	975

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Bureau of Reclamation

Tribe = Kaibab Band of Paiute Indians

The Southern Alternative would affect suitable (refer to Table 2.3-3) and occupied habitat for Siler pincushion cactus. Occupied habitat along the Southern Alternative occurs near White Sage-Seaman Wash. Based on USFWS suitable habitat, the proposed pipeline for the Southern Alternative would intersect approximately 41 miles of suitable habitat for Siler pincushion cactus. There would be approximately seven miles of suitable habitat intersected by the transmission lines which would be the same for both alternatives. A total of eight cacti were detected within the survey corridor along the Southern Alternative with some of these individuals occurring within 25 feet of the construction footprint outside of the proposed ROWs. No documented Siler pincushion cactus were found within the proposed ROWs but due to proximity of cacti to the ROWs, effects to individuals could occur and construction would result in habitat loss, degradation, and fragmentation, as well, as possible effects associated with fugitive dust. EPMs and Section 7 consultation conservation measures including surveys, flagging sensitive areas and dust abatement during construction would minimize on Siler pincushion cactus.

2.3.1 Resource Management Plan Amendment

Southwestern Willow Flycatcher

There is no critical habitat for the southwestern willow flycatcher in the ACEC. This species has declined in population due to riparian habitat loss and fragmentation resulting from the draining of wetlands; channeling and levying of streambeds; construction of canals, drains, and impoundments; livestock grazing and off-road vehicle use in riparian areas and wetlands; and the invasion of riparian habitat by invasive species. Other probable factors contributing to population decline include predators and brood-parasitism by brown-headed cowbirds.

Two patches of suitable habitat are located along Kanab Creek, one patch at Clearwater Spring and the other a half-mile downstream from the spring. Both sites are dominated by dense stands of tamarisk. Although these sites are considered suitable habitat, no willow flycatchers have been documented there.

2.3.1.1 Sub-alternative 1

Under the Arizona Strip Field Office Resource Management Plan Amendment (RMPA) Sub-alternative 1, new land use authorizations could be allowed in the ACEC even when another

reasonable alternative exists. While the proposed amendment to Decision No. MA-LR-06 would still require routing new utilities away from sensitive species populations and mitigation for effects from new land use authorizations (determined during site-specific project planning), disturbance to willow flycatcher habitat from project construction could still occur, and potential habitat (“suitable” habitat is more than a mile away) could be lost in the short term. The proposed amendment to Decision No. LA-VR-01 would not change any visual resource management class designation – the revised language would simply provide clarification to that RMP decision concerning visual resource management designations where a designated utility corridor overlaps an area of critical environmental concern. Thus, the proposed amendment to LA-VR-01 would not result in effects to southwestern willow flycatcher habitat.

2.3.1.2 Sub-alternative 2

Under RMPA Sub-alternative 2, potential effects to southwestern willow flycatcher habitat could occur because the size of the ACEC would be reduced by 905 acres with no specific provision for mitigation from new land use authorizations in the area that has been excluded from the ACEC. Construction, operation, and maintenance of new ROWs (and other land use authorizations) could result in direct effects to southwestern willow flycatcher habitat, as well as indirect effects to riparian resources from sedimentation and erosion as vegetation is removed. However, existing federal laws (including the ESA) would still apply so potential effects to southwestern willow flycatcher habitat would be evaluated during the Proposed Project-specific environmental review and analysis and mitigated to the extent possible.

2.3.1.3 Sub-alternative 3

Under RMPA Sub-alternative 3, effects to southwestern willow flycatcher habitat would be similar to those described under RMPA Sub-alternative 1. In addition, in Sub-alternative 3, the utility corridor would no longer be an avoidance area for new land use authorizations, increasing the likelihood for adverse effects, however, mitigation would be required to address any effects identified in site specific analysis. RMPA Sub-alternative 3 would result in a decrease of 175.5 acres in the overlap area of the utility corridor and the ACEC as compared to RMPA Sub-alternative 1 – the potential for new ROWs may therefore be reduced since utility corridors are areas where new utilities are encouraged. However, RMPA Sub-alternative 3 would also include the amendment of Decision No. MA-LR-06 as outlined in RMPA Sub-alternative 1. While the portion of the ACEC overlapped by the utility corridor would no longer be an avoidance area for new land use authorizations, the proposed amendment would still require mitigation for effects from new land use authorizations that would be determined during site-specific project planning, although disturbance to flycatcher habitat (from project construction) could still occur, and potential habitat could be lost in the short term.

2.3.2 Conservation Measures

Minor changes to the EPMs should be implemented to meet agency-specific goals and objectives for management of threatened and endangered species resources. In addition to EPMs, the following conservation measures should further reduce effects to ESA-listed species.

ESA-listed Plants

- Within sensitive areas (i.e., habitat for Siler pincushion cactus), close or gate access roads to prevent public access to the ROW.

- Within occupied habitat for ESA-listed plants, coordinate with federal agencies to develop seed mixes for restoration and rehabilitation activities.

Residual Effects

Residual effects associated with public access to the ROWs include illegal collection, dust, and off-road vehicle access which could lead to long-term effects to Siler pincushion cactus. Implementation of the conservation measures would minimize these effects. Coordination of a seed mix within occupied habitat for ESA-listed plants would ensure that seed mixes are developed suitable for the habitats and would minimize the potential for aggressive seed mixes to be identified that may compete with ESA-listed plants possibly making habitats unsuitable for some species.

2.4 Highway Alternative

The Highway Alternative would have similar direct and indirect effects to ESA-listed species and critical habitat as those described under Effects Common to both action alternatives.

Suitable habitat disturbance for dwarf bear-poppy, Shivwits milk-vetch, and Siler pincushion cactus is identified in Tables 2.4-1, 2.4-2, and 2.4-3.

Table 2.4-1 Dwarf Bear-poppy Suitable Habitat Affected

Agency	Permanent Effects (acres)	Temporary Effects (acres)	Total
BLM	0	47	47
NPS	0	0	0
Reclamation	0	0	0
Tribe	0	0	0
State	0	0	0
Private	0	34	34
Total	0	81	81

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Bureau of Reclamation

Tribe = Kaibab Band of Paiute Indians

Table 2.4-2 Shivwits Milk-vetch Suitable Habitat Affected

Agency	Permanent Effects (acres)	Temporary Effects (acres)	Total
BLM	0	0	0
NPS	0	0	0
Reclamation	0	0	0
Tribe	0	0	0
State	0	0	0
Private	4	32	36
Total	4	32	36

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Bureau of Reclamation

Tribe = Kaibab Band of Paiute Indians

Table 2.4-3 Siler Pincushion Cactus Suitable Habitat Affected

Agency	Permanent Effects (acres)	Temporary Effects (acres)	Total
BLM	28	434	462
NPS	0	0	0
Reclamation	0	0	0
Tribe	0	92	92
State	0	60	60
Private	0	124	124
Total	28	710	738

Key:

BLM = Bureau of Land Management

NPS = National Park Service

Reclamation = Bureau of Reclamation

Tribe = Kaibab Band of Paiute Indians

The Highway Alternative would affect suitable and occupied habitat for Siler pincushion cactus on the KIR. Based on USFWS suitable habitat, the proposed pipeline for the Highway Alternative would intersect approximately 23 miles of suitable habitat for Siler pincushion cactus. There would be approximately 7 miles of suitable habitat intersected by the transmission lines, which would be the same for both alternatives. Approximately 2,945 individuals were observed within the ROW for the Highway Alternative, although about two thirds of the encountered individuals were reported dead (UBWR 2016c). Most individuals were found on the KIR, scattered along Arizona State Route 389 from west of Fredonia to the intersection of State Route 389 and the road to Pipe Springs National Monument. Siler pincushion cactus were found within the proposed ROWs. Effects to individuals could occur, and construction would result in habitat loss, degradation, and fragmentation, as well as possible effects associated with fugitive dust. EPMS including dust abatement during construction would minimize effects; however, the inability to avoid individual cacti within the proposed ROWs could lead to injury and mortality of individuals resulting in potential for effects to a fairly large area of known occupied habitat.

2.4.1 Conservation Measures

The conservation measures proposed for the Highway Alternative are the same as those proposed for the Southern Alternative because resource concerns are the same.

Residual Effects

Residual effects for the Highway Alternative are the same as those for the Southern Alternative.

2.5 Comparative Analysis of Alternatives

The Southern Alternative and Highway Alternative may affect ESA-listed species, designated critical habitat, or suitable habitat. Implementation of EPMS and Section 7 consultation conservation measures would minimize potential effects to ESA-listed species and provide opportunity for restoration of habitats affected. Effects to ESA-listed species and habitats would be similar for all alternatives due to similarity in vegetation communities that are affected. Effects to California condor, Mexican spotted owl, southwestern willow flycatcher (suitable and designated critical habitat), western yellow-billed cuckoo, and Mojave Desert tortoise would be the same or similar

across the action alternatives. Effects to dwarf bear-poppy and Shivwits milk-vetch suitable habitat would be the same across the action alternatives and effects to suitable habitat would occur on private lands. There are no effects to known individuals for dwarf bear-poppy and Shivwits milk-vetch. Effects to Siler pincushion cactus suitable habitat is greater for the Southern Alternative affecting 975 acres of suitable habitat on BLM-managed lands (815 acres), state (68 acres), and private (92 acres); however, the Southern Alternative would affect fewer plants (8 individuals) that were identified during surveys. The Highway Alternative would affect 738 acres of suitable habitat on BLM-managed lands (462 acres), state (60 acres), private (124 acres), and KIR (92 acres); however, the Highway Alternative would affect more plants (2,945 individuals).

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4 Glossary

Take. To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such activity (16 USC 1532(18)).

5 Acronyms

AESO	Arizona Ecological Services Field Office
BLM	Bureau of Land Management
DPS	Distinct Population Segment
EPM	Environmental Protection Measures
ESA	Endangered Species Act of 1973
FCR	field contact representatives
FR	Federal Register
IPaC	Information for Planning and Consultation
KIR	Kaibab Indian Reservation
kV	Kilovolts
mph	miles per hour
NPS	National Park Service
POD	Plan of Development
PUP	Pesticide Use Permit
ROW	right-of-way
SITLA	School and Institutional Trust Lands Administration
Tribe	Kaibab Band of Paiute Indians
UBWR	Utah Board of Water Resources
UESO	Utah Ecological Services Field Office
USC	United States Code
UDWR	Utah Division of Wildlife Resources
UDWR _e	Utah Division of Water Resources
USFWS	Fish and Wildlife Service
WCHCP	Washington County Habitat Conservation Plan

6 Consultation and Coordination

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