

ENVIRONMENTAL CONSEQUENCES

Introduction

This section is organized by impact topic or resource. Each section first describes the affected environment or existing condition of each resource, followed by a discussion of the anticipated effects on that resource resulting from the implementation of the No Action Alternative and the two action alternatives. This discussion is followed by two sections that address the short-term construction-related environmental impacts associated with the Preferred Alternative and the potential cumulative and secondary impacts.

Throughout this Environmental Assessment/Assessment of Effect, impacts are defined as any modification (beneficial or undesirable) to an existing resource condition. Direct impacts that could result from implementation of the Preferred Alternative or selection of the No Action Alternative are addressed in each resource section. The resource impact discussions specify the context of each potential impact, including its duration (short-term versus long-term) and intensity (no impact, negligible, minor, moderate, substantial, major, or impairment), as appropriate. The intensity of a given impact is defined separately for each resource, as appropriate.

Cumulative Effects: The Council on Environmental Quality regulations require the assessment of cumulative impacts in the decision-making process for federal projects. While direct impacts generally occur at the same time and place as a proposed action, cumulative impacts are defined as the incremental impact of that action when added to other past, present, or reasonably foreseeable future actions in the general project area. In addition, indirect or secondary impacts could also occur later in time or farther removed in distance from the proposed action. Cumulative impacts are considered for the No Action and Action Alternatives.

Cumulative impacts were determined by combining the impacts of the Preferred Alternative with the following plans and/or projects that are likely to be implemented in the general Lake Powell area.

- City of Page Water Supply Project
- GCNRA Page One Land Exchange
- GCNRA Wildland Fire Management Plan Implementation
- NPS Development Concept Plan for the Uplake Areas of Lake Powell, including the Bullfrog, Halls Crossing and Hite development areas
- Extension of the Antelope Point Public Launch Ramp

The cumulative impacts associated with the No Action and Action Alternatives are discussed in each impact topic presented in the following sections.

Impairment: The Organic Act of 1916 (16 USC 1-4; 1916) and the General Authorities Act of 1970 (16 USC 1a-1 et seq.) establish direction for the management of lands reserved for national parks. Both acts prohibit any “impairment” of national park resources or values. A resource impairment is defined as “...an impact that, in the professional judgment of the NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values” (NPS 2000; 12). Several factors determine whether an anticipated resource impact would constitute an impairment of the resource:

- The resources and values that would be affected
- The severity, duration, and timing of the impact
- The direct and indirect impacts of the impact
- The contribution of the anticipated impact to the overall cumulative condition of the resource

Neither the implementation of the Preferred Alternative nor the selection of the No Action Alternative would result in any resource impairment or affect GCNRA operations.

Natural Environment

Intensity Level Definitions

The methodology used for assessing impacts to natural environmental resources (i.e., vegetation, terrestrial and aquatic wildlife, threatened and endangered species, and species of concern) is based on a site visit and coordination with the US Fish and Wildlife Service (USFWS), the Navajo Department of Fish and Wildlife, and the Arizona Game and Fish Department (AGFD). The thresholds for this impact assessment are:

- Negligible:** The impact to natural environmental features at the project site would be short-term and at or below the levels of detection.
- Minor:** The impact would be detectable but would not have an appreciable adverse or beneficial effect on the natural environment. If mitigation is needed to offset adverse effects, it would be easily implemented and readily successful.
- Moderate:** The effects would be readily apparent and would result in adverse or beneficial impact to the natural environmental elements in the project area. Mitigation measures would be needed to offset any adverse impacts.
- Major:** The effects would result in substantial adverse or beneficial impacts to the resources in the project area and would require mitigation measures to offset adverse effects. These measures could be expensive and require seasonal restrictions on construction activities.

Existing Conditions

Vegetation: The project area is located on the Colorado Plateau and lies within the Great Basin desertscrub biotic community (Brown 1994). Blackbrush (*Coleogyne ramosissima*) and shadscale (*Atriplex confertifolia*) are the dominant vegetation. Other species include Mormon tea (*Ephedra torreyana*), yucca (*Yucca angustissima*), snakeweed (*Gutierrezia microcephala*), and sand sagebrush (*Artemisia filifolia*). Vegetation is sparsely distributed, with bare ground and sandstone rock common.

Wildlife: Approximately 80 species of mammals, 35 species of reptiles and amphibians, and 200 species of birds are in the Lake Powell area (Malespin 1981). In addition, the lake itself supports up to 20 species of fish, the majority of which are introduced game fish. These include striped bass (*Morone saxatilis*), largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), walleye (*Stizostedion vitreum*), bluegill (*Lepomis macrochirus*), and channel catfish (*Ictalurus punctatus*). Threadfin shad (*Dorosoma petenense*) are very abundant and form the food base for larger predatory fish, especially striped bass. Open water habitats in Lake Powell are dominated by these two species.

The quagga mussel (*Dreissena bugensis*) is a small freshwater mussel that is native to Russia and Ukraine. In the late 1980s, quagga mussels invaded North America, specifically the Great Lakes, and recently (January 2007), they were found in the Colorado River system (i.e., Lake Mead and Lake Havasu). Because they are transported in the ballast water or on the engines and hulls of boats, it is likely only a matter of time before the quagga mussel is found in Lake Powell. In addition to being prolific invaders and upsetting the ecological balance of lakes and other aquatic systems, quagga mussels are notorious for clogging water intake systems, thus creating expensive maintenance issues.

Common small mammals in the project vicinity include jackrabbit (*Lepus californicus*), Ord kangaroo rat (*Dipodomys ordi*), deer mouse (*Peromyscus maniculatus*), pocket mouse (*Chaetodipus* spp. and *Perognathus* spp.), and woodrat (*Neotoma* spp.). Large mammals such as coyote (*Canis latrans*) and mule deer (*Odocoileus hemionus*) are seen occasionally. Plateau striped whiptail lizard (*Cnemidophorus velox*) are abundant and easily observed on warm summer days. Other common reptiles include gopher

snake (*Pituophis catenifer*), Western rattlesnake (*Crotalus viridis*), desert spiny lizard (*Sceloporus magister*), and side-blotched lizard (*Uta stansburiana*).

The common raven (*Corvus corax*) is the most noticeable resident bird; other large birds that are regularly seen include golden eagle (*Aquila chrysaetos*) and red-tailed hawk (*Buteo jamaicensis*). The great-tailed grackle (*Quiscalus mexicanus*) is ubiquitous around the campgrounds and marinas, and the canyon wren (*Catherpes mexicanus*) is frequently seen and heard in the canyon country around the lake. Common waterfowl include mallard (*Anas platyrhynchos*), coot (*Fulica americana*), and Western grebe (*Aechmophorus occidentalis*). Yellow warbler (*Dendroica petechia*), Say's phoebe (*Sayornis saya*), and blue-grey gnatcatcher (*Polioptila caerulea*) are among the various species of migratory birds found in the Lake Powell area.

Threatened and Endangered Species and Species of Concern: The Endangered Species Act of 1973 requires the examination of impacts to all federally listed threatened or endangered species. According to the USFWS, there are 21 species in Coconino County that are listed as endangered, threatened, proposed for listing, or candidate species (Appendix A). Because the project occurs on the Navajo Nation, species of concern of the Navajo Nation were investigated. The Navajo Department of Fish and Wildlife has no records of species of concern occurring at or near the project site, but it provided a list of species from the Navajo Endangered Species List that could potentially occur in the project area (Appendix A). There are no NPS sensitive species in the project area (Spence 2004).

Small numbers of the endangered razorback sucker (*Xyrauchen texanus*) have been found in Lake Powell, but only at the inflow sites of the Colorado River, approximately 100 miles from the project site, and the San Juan River, approximately 70 miles from the project site. Juvenile suckers are probably carried downstream toward the lake, but abundant predators are believed to prevent them from moving farther than the inflow sites (Mueller et al. 2001).

Based on the habitat conditions surrounding the project area, only two species from the Coconino County threatened and endangered species list would be expected to occur in the project vicinity (Spence 2004). Bald eagles (*Haliaeetus leucocephalus*), which are listed as threatened, have been seen at Antelope Island, across the lake and north of the project area, in the winter months. There have not been any nests on Antelope Island or in the project area. California condors (*Gymnogyps californianus*), which are listed as endangered (Experimental Population, Non-Essential), have been observed year-round in Page, Arizona, and at Wahweap Marina, both approximately 5 miles west of the project area. No breeding or nesting was observed. Condors have not been observed in the project area.

Of the species on the Navajo Endangered Species List, only the peregrine falcon has been recorded near the project area. The AGFD Heritage Data Management System has recorded the peregrine falcon within 3 miles of the water intake site. Peregrine falcons may occasionally forage near the project area. Generally, peregrines require very tall cliffs for nesting and wetlands that support their prey, which consists largely of waterfowl. These conditions are present below Glen Canyon Dam, within approximately 10 miles of the project area. Peregrines from this part of the Colorado River may sometimes forage over Lake Powell.

Table 1 in Appendix A evaluates the potential for occurrence of these and other federally listed and Navajo listed species in the project area.

Impacts of Alternative A (No Action Alternative)

Vegetation: The water intake site is a 1-acre plot of land that includes a building that houses the pump station and is enclosed by a chain-link fence. The area inside the fence is heavily disturbed. It has been excavated and entirely cleared of vegetation, and much of the area surrounding the building is paved. Similarly, the access road and the NGS landfill are heavily disturbed sites. There would be no impact under the No Action Alternative because these sites are already disturbed.

Wildlife: The lack of vegetation in the general project area and at the water intake site has probably resulted in reduced densities of terrestrial wildlife in the project area. Because of the disturbed nature of the site, there would be no impact to wildlife under the No Action Alternative.

Impacts to aquatic wildlife under the continued operation of the water intake facilities would be negligible. The possibility of fish being entrained in the water intakes is remote due to the depth of the existing intakes (Mueller and Horn 1999). In addition, fish densities are much higher at the lake inflow sites, and fish are much more common in side canyons and tributary arms than they are in the mainstem channel of Lake Powell, where the intakes are located.

If the lake level continues to decline, the intakes will be closer to the lake surface, where most fish are active, and the possibility that fish will be entrained increases. Because they occur in such high numbers, threadfin shad are probably most vulnerable to entrainment. The occasional loss of introduced game fish or their prey base, threadfin shad, would be a negligible impact to aquatic wildlife.

It is anticipated that quagga mussels will eventually invade Lake Powell. These mussels, which feed on phytoplankton and can upset the balance of the lake ecosystem, are likely to colonize the existing water intake system of NGS, leading to problems with reduced flow and increased maintenance costs.

Threatened and Endangered Species and Species of Concern: Under the No Action Alternative, operation of the current water intake facility would continue. Only three special status species—the bald eagle, the California condor, and the peregrine falcon—have been observed in the project vicinity. Bald eagles sometimes occur on Antelope Island in the winter, and California condors have occasionally been seen at Wahweap Marina; neither has been recorded in the project area. Peregrine falcons may occasionally move upstream from the Colorado River below Glen Canyon Dam to forage over the project area, but they would be unlikely to remain for any length of time. All of these species avoid contact with humans and are unlikely to remain in the project area; when encountered by humans, they fly to another nearby location. There would be no impact to special status species under the No Action Alternative.

Cumulative Effects: Under the No Action Alternative, the current and future use of the existing NGS pump station would not change and would have no cumulative effect on the natural environment. Therefore, this alternative would have no cumulative effect on these resources when considered with other past, present, or reasonably foreseeable future actions that were identified previously.

Conclusion: This alternative would have no effect on the natural environment because no ground-disturbing activities would be conducted.

Impacts of Alternative B (Action Alternative)

Vegetation: Operation of the water intake facilities under Alternative B would continue to provide cooling water for the NGS electrical generating units but by using new pumps at the proposed new intake elevation. There would be no impact to vegetation because the new intake and pumping equipment would be installed on the existing pump station site, which contains no vegetation.

Wildlife: The site of the proposed new water intake shaft has been cleared of vegetation, paved, and fenced. There would be no impacts to terrestrial wildlife under Alternative B because the work would occur on the existing fenced site that is not accessible to wildlife.

The new pumps would be located 120 feet deeper in Lake Powell than the existing pumps, further reducing the possibility of fish entrainment because fish are less likely to be found at these greater depths. Thus, Alternative B may result in a long-term, minor, beneficial impact on aquatic wildlife.

If the drought continues and the lake level continues to decline, possibly even reaching the dead pool elevation of 3,374 feet, the possibility of fish being entrained in the new intakes at 3,339 feet increases. Entrainment losses of introduced game fish would be a negligible impact on aquatic wildlife.

It is anticipated that quagga mussels will eventually invade Lake Powell. These mussels, which feed on phytoplankton and can upset the balance of the lake ecosystem, are likely to colonize the water intake system planned under Alternative B, leading to problems with reduced flow and increased maintenance costs.

Construction of the lateral microtunnels under Alternative B may release very small amounts of drilling fluids and drill cuttings into the lake. Because of the location in the lake, the depth of the intakes, and the small amounts of fluid or cuttings released, impacts to aquatic wildlife would be negligible.

Threatened and Endangered Species and Species of Concern: Under Alternative B, operation of the water intake facility would continue as it does today but with a new pump and well system. Only three special status species—the bald eagle, the California condor, and the peregrine falcon—occur in the project vicinity. None of these species has been observed in the immediate project area. Breeding by these species in the project area or the Lake Powell area has not been observed. These species would avoid human activities in the project area by flying to another nearby location. Implementation of this alternative would not affect the threatened bald eagle or the endangered California condor or their habitat. Alternative B would not impact any special status species.

Cumulative Effects: Alternative B would have negligible cumulative effects on these resources when considered with the other planned activities identified at the beginning of this chapter that could occur concurrent with or subsequent to the implementation of this alternative.

Conclusion: Alternative B would have no effect on vegetation; terrestrial wildlife; or threatened, endangered, or special status species. However, this alternative could have a minor beneficial impact on aquatic wildlife.

Impacts of Alternative C (Preferred Alternative)

Vegetation: Operation of the water intake facilities under Alternative C would continue to provide cooling water for the NGS electrical generating units but would do so by using new pumps at the proposed new intake elevation. There would be no impact to vegetation because the new intake and pumping equipment would be installed on the existing pump station site, which contains no vegetation.

Wildlife: The site of the proposed new water intake shafts has been cleared of vegetation, paved, and fenced. There would be no impacts to terrestrial wildlife under Alternative C because the work would occur on the existing fenced site that is not accessible to wildlife.

The new pumps would be located 120 feet deeper in Lake Powell than the existing pumps, further reducing the possibility of fish entrainment because fish are less likely to be found at these greater depths. Thus, Alternative C may result in a long-term, minor, beneficial impact on aquatic wildlife.

If the drought continues and the lake level continues to decline, possibly even reaching the dead pool elevation of 3,374 feet, the possibility of fish being entrained in the new intakes at 3,339 feet increases. Entrainment losses of introduced game fish would be a negligible impact on aquatic wildlife.

It is anticipated that quagga mussels will eventually invade Lake Powell. These mussels, which feed on phytoplankton and can upset the balance of the lake ecosystem, are likely to colonize the water intake system planned under Alternative C, leading to problems with reduced flow and increased maintenance costs.

- To prevent the potential spread of the quagga mussel, the hulls of any boats that are used during project construction and any other equipment that will be used in Lake Powell must be pressure-washed with hot water before entering the lake.
- Metal screens will be attached to the submersible pumps in each of the five water intake shafts and will be cleaned when these pumps are periodically brought to the surface for routine maintenance.

Construction of the inclined shafts under Alternative C may release very small amounts of drilling fluids and drill cuttings into the lake. Because of the location in the lake, the depth of the intakes, and the small amounts of fluid or cuttings released, impacts to aquatic wildlife would be negligible.

Threatened and Endangered Species and Species of Concern: Under Alternative C, operation of the water intake facility would continue as it does today but with a new pump and well system. Only three special status species—the bald eagle, the California condor, and the peregrine falcon—occur in the project vicinity. None of these species has been observed in the immediate project area. Breeding by these species in the project area or the general Lake Powell area has not been observed. These species would avoid human activities in the project area by flying to another nearby location. Implementation of this alternative would not affect the threatened bald eagle or the endangered California condor or their habitat. Alternative C would not impact any special status species.

To mitigate for the potential presence of California condors in the project area, the following measures would be implemented in accordance with the USFWS November 3, 2004, letter (Appendix A):

- Prior to the start of construction, personnel monitoring California condor locations and movement will be contacted to determine the locations and status of condors in the project vicinity.
- If a condor occurs at the construction site, construction will cease until the condor leaves on its own or until techniques are employed by permitted personnel that result in it leaving the area.
- Construction workers and supervisors will be instructed to avoid interaction with condors and to immediately contact the appropriate GCNRA personnel if or when condors occur at the construction site.
- The construction site will be cleaned up (e.g., trash removed) at the end of each day that work is being conducted to minimize the likelihood of condors visiting the area. Site visits will ensure that adequate cleanup measures are taken.
- To prevent water contamination and potential poisoning of condors, a vehicle fluid leakage and spill plan shall be developed and implemented. The plan should include provisions for immediate cleanup of any hazardous substance and define how each hazardous substance will be treated in case of leakage or spill.

Cumulative Effects: Under the Preferred Alternative, the proposed installation of new NGS water intakes would have a negligible cumulative effect on vegetation; terrestrial wildlife; and threatened, endangered or sensitive species with the concurrent or subsequent implementation of the planned actions in the general project vicinity that were identified above. Installation of the water intakes at a lake elevation 120 feet lower than the existing intakes may have a minor beneficial cumulative effect on fish in the area because the possibility of fish entrainment would be decreased at these greater depths.

Conclusion: The Preferred Alternative would have no effect on vegetation; terrestrial wildlife; or threatened, endangered, or special status species but would have a minor beneficial impact on aquatic wildlife.

Geology

Intensity Level Definitions

The methodology used for assessing impacts to the geological resources in the project area is based on information provided by geotechnical investigations at the existing NGS pump station. The thresholds for this impact assessment are:

Negligible: The impact to geological features at the project site would be short-term and at or below the levels of detection.

- Minor:** The impact would be detectable but would not have an appreciable adverse or beneficial effect on the geological formations beneath the current NGS pump station. If mitigation is needed to offset adverse effects, it would be easily implemented and readily successful.
- Moderate:** The effects would be readily apparent and would result in adverse or beneficial impact to the geological formations beneath the current NGS pump station or the cliff face above Lake Powell. Mitigation measures would be needed to offset any adverse impacts.
- Major:** The effects would result in substantial adverse or beneficial impacts to the resources in the project area and would require mitigation measures to offset adverse effects. These measures could be expensive and require specialized construction methods.

Existing Conditions

At the water intake site, the bedrock and the cliffs overlooking Lake Powell are composed of Navajo sandstone, which is one of the most conspicuous formations of the lower Glen Canyon area and on the Navajo Indian Reservation (Harshbarger et al. 1957). In the Antelope Point area, the Navajo sandstone is up to 1,400 feet thick, with the formation likely extending to the bottom of Lake Powell and beyond, but only the uppermost 100 to 150 feet is visible when the lake level is at full pool. The rock ranges from pale orange to reddish-brown to gray in color, except for where it has been bleached by the lake water and then exposed by declining lake levels. Navajo sandstone consists of hard, resistive rock, exhibits prominent cross-bedding, forms cliffs, and typically weathers into rounded hills and domes. It developed from ancient windblown sand dune deposits during the late Triassic/Jurassic, approximately 200 to 220 million years ago.

The soils in the project area are medium- to fine-grained reddish-brown or buff-colored sands derived from weathering of the loosely cemented Navajo sandstone. They are classified as Torriorthents-Camborthids rock outcrop association, with shallow and moderately deep soils and rock outcrops of canyons, cliffs, and mesas (Hendricks 1985). These soils have very little developed structure. Some of the sands remain close to the parent rock, while others are blown and deposited great distances from their source. In most places, the sand is very shallow and only a few inches deep, but depths of several feet are possible on the windblown dune areas. These shallow sandy soils are highly erodible.

Published geologic descriptions of the area and recent geotechnical investigations at the project site (AMEC 2004a) confirm that the NGS pump station site is located entirely within the Triassic to Jurassic Navajo sandstone. Based on depth soundings and side-scan sonar profiles of the cliff face below the water surface of Lake Powell, the near-vertical cliff transitions to a 25-degree angle below an approximate elevation of 3,365 feet. The lower slope-forming portion of the submerged cliff face probably consists of loose talus deposits formed at the base of the cliff (AMEC 2004b).

Navajo sandstone is subject to extensive stress fractures, cracking, and abrupt releases of large slabs of rock, which is a potential geologic hazard throughout much of Lake Powell. Such rockfalls occur after significant thaw-freeze cycles or when the lake waters are removed, causing the drying rock to separate from the wetter rock. Large slabs of Navajo sandstone may be released and topple suddenly into the water.

The pump station sits atop a large mass of predominantly unfractured Navajo sandstone. There are exposed stress fractures on both the ground surface and in the canyon wall to the west and to the east of the property boundary, but not in the cliffs below the project site (AMEC 2004b). Based on the lack of large-scale discontinuities in the massive sandstone that underlie the pump station, there is no concern regarding the current gross stability of the rock mass in the vicinity of the pump station. In addition, there is no evidence that the existing intake tunnels that penetrate the massive sandstone unit have caused a preferential fault plane that could result in large-scale failures of the cliff face. Overall, the mass of sandstone underneath the pump station is stable.

At the edge of the lake, where the mass of Navajo sandstone has been weakened by the water and exposure to the weather, there are exposed stress fractures. There is a canyon wall relief joint near the eastern property boundary that, in combination with local fractures and a tension crack, defines three potentially unstable surficial blocks that are not integral to the remaining massive canyon wall. Also, underwater investigations associated with this project revealed that a large block previously existed below the pump station, but it had fallen into the lake probably prior to installation of the existing water intakes. As stated earlier, three potentially unstable rock blocks near the water intake site were identified (AMEC 2004b, Figure 8) and removed.

There are no large-scale discontinuities in the cliff face below the pump station. During the geotechnical drilling at the lake pump station, very few discontinuities were observed in four test borings that exceeded 400 feet in depth (AMEC 2004a). A stability analysis showed that construction of the planned new intake tunnels would not result in large canyon wall failures projecting back under the pump station, so there is no concern with respect to the gross stability of the rock mass in the project area (AMEC 2004b).

Impacts of Alternative A (No Action Alternative)

Under the No Action Alternative, the continued operation of the existing water intake facilities would not involve any drilling activities or other ground-disturbing activities at the project site. Blocks A, B, and C on the cliff face would continue to be a low-risk natural hazard until such time as the NPS deemed their removal to be appropriate.

Cumulative Effects: Although other current or reasonably foreseeable future projects will be implemented, the No Action Alternative would not contribute any adverse or beneficial cumulative impacts to the geological features or conditions in the general project area.

Conclusion: The No Action Alternative would have no impact on the geology of the project site.

Impacts of Alternative B (Action Alternative)

Under Alternative B, drilling the new well and microtunnels would have no impact on the geological stability of the project site. Removal of the blocks of Navajo sandstone, which was completed in 2005 under Alternative B, had a substantial beneficial impact on the project area by eliminating the geological hazards that existed with Blocks A, B, and C.

Cumulative Effects: Although other current or reasonably foreseeable future projects will be implemented, Alternative B would not contribute any adverse or beneficial cumulative impacts to the geological stability of the general project area.

Conclusion: Alternative B would not adversely impact the geologic stability of the project site. The removal of the unstable sandstone blocks on the cliff face adjacent to the NGS pump station had a major beneficial impact by eliminating a major hazard to recreational users of Lake Powell.

Impacts of Alternative C (Preferred Alternative)

Under Alternative C, drilling the inclined shafts would have no impact on the geological stability of the project site. Removal of the blocks of Navajo sandstone already occurred under Alternative B.

Cumulative Effects: Although other current or reasonably foreseeable future projects will be implemented, Alternative C would not contribute any adverse or beneficial cumulative impacts to the geological features in, or stability of, the general project area.

Conclusion: Alternative C would not adversely impact the geologic stability of the project site.

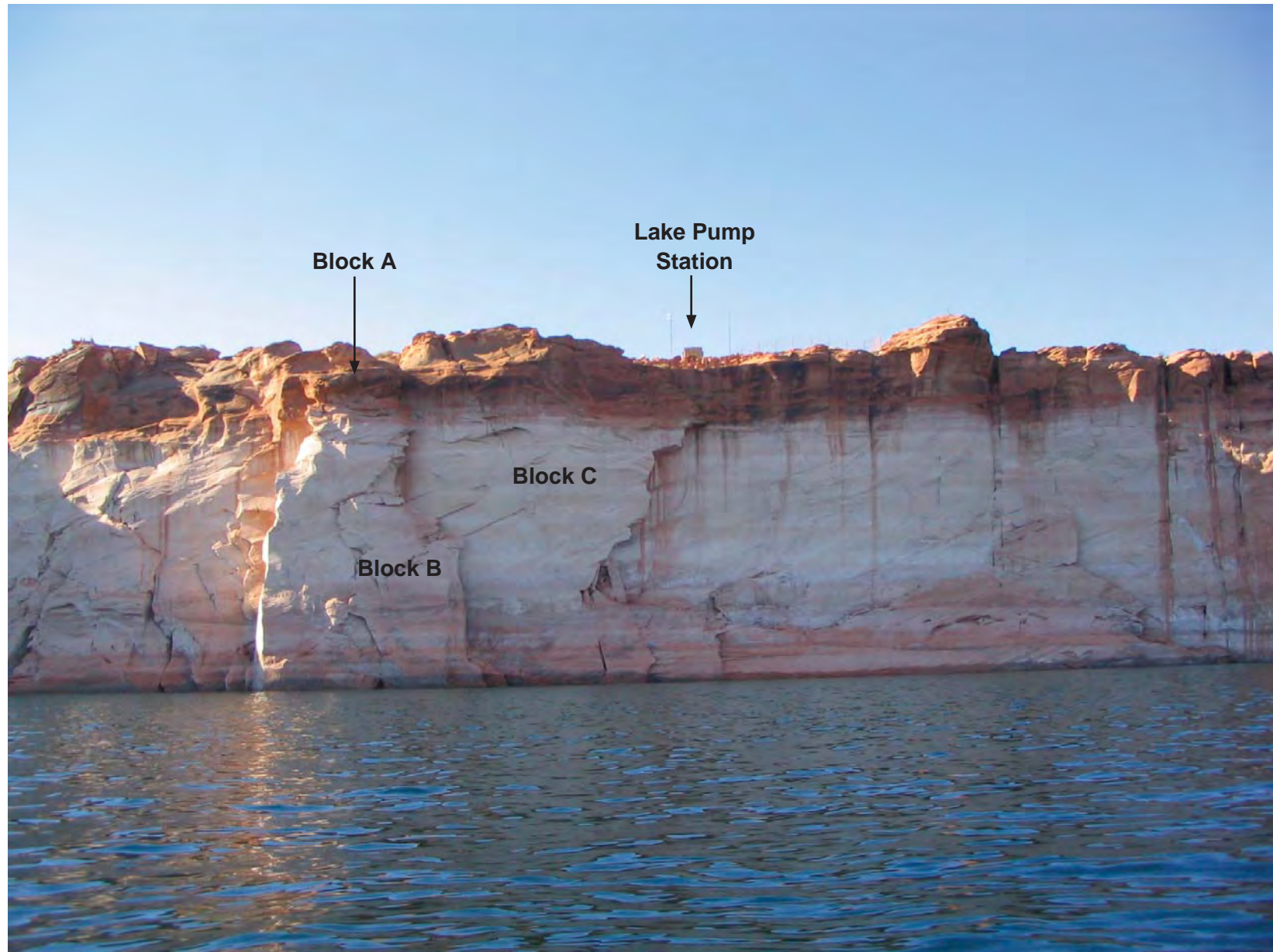


Figure 8. View of the cliff face below NGS lake pump station.

Water Quality

Intensity Level Definitions

The methodology used for assessing impacts to the water quality of Lake Powell is based on information provided by NPS, the Grand Canyon Monitoring and Research Center (GCMRC), and Reclamation. The thresholds for this impact assessment are:

- Negligible:** The impact to the water quality of the lake would be short-term, or the impact would be barely detectable on a long-term basis.
- Minor:** The impact would be detectable but would not have an appreciable adverse or beneficial effect on water quality. If required, mitigation could be accomplished through the implementation of best management practices.
- Moderate:** The effects would result in adverse impacts to the water quality of Lake Powell that would be short-term and limited to the construction period. Mitigation measures would be needed to offset any adverse impacts and would include specific terms and conditions associated with Section 404 permitting requirements.
- Major:** The effects would result in substantial adverse or beneficial impacts to the resources in the project area and would require mitigation measures to offset adverse effects. These measures could be expensive and require specialized construction methods beyond the terms and conditions associated with Section 404 permitting requirements.

Existing Conditions

Lake Powell extends 180 miles up the Colorado River from Glen Canyon Dam and has an estimated 1,900 miles of shoreline. Glen Canyon Dam, constructed and operated by Reclamation, created Lake Powell, which began filling in 1963 and reached full pool elevation in 1980. The pump station/water intake site is located on the south side of a narrow section of a lake channel that was once the main channel of the Colorado River. In the middle of the channel, the lake is approximately 560 feet deep at full pool.

Water quality in Lake Powell has generally been good, with high dissolved oxygen concentrations in surface and subsurface waters and good water transparency (NPS 1979; GCMRC 2004a). Within the last year, dissolved oxygen levels have become relatively low in the subsurface waters (GCMRC 2007). The Natural Resource Division staff of the GCNRA currently monitors the lake for fecal coliform bacteria, which are an indicator of recent fecal contamination because of the enormous number of people using the lake and the lack of sewage facilities in the backcountry areas. Every 2 weeks during the high visitation season (mid-May to mid-October), samples are taken at about 50 beach and marina locations. When fecal coliform counts are high, sampling is repeated, and when counts remain high, the site is usually closed to swimming. Once a site is closed, it is tested daily until the bacterial concentrations return to safe levels and the area can be reopened. Main channel sites, such as the water intake site, usually have water of high clarity and quality; bacterial contamination is more commonly found in shallow side canyon beach sites. The closest area to the project site that has been tested is the Antelope Point Marina, approximately 1 mile downstream, where no high fecal coliform counts have been recorded.

There is enormous sediment input to Lake Powell, but this sedimentation only affects water clarity at the inflow sites and in the deepest portions of the main channel. Transparency is lowest at the inflow sites and highest at Glen Canyon Dam; conversely, turbidity, another measure of water clarity, is highest at the inflow sites and lowest at the dam (GCMRC 2004a).

Salinity is probably the most important water quality issue in the Colorado River, including Lake Powell. Like most southwestern U.S. reservoirs, the waters of Lake Powell are characterized by high concentrations of dissolved salts. There are several reasons for the high salinity of reservoirs in these arid climates. First, the geology of the watershed is a major factor; limestone and sandstone rocks and soils

lead to high salinity because of the dissolution of carbonate minerals into the basin. Second, the size of the watershed is important. A large watershed compared to lake surface area means relatively more water draining into the lake and more contact with the soil before reaching the lake. Lake Powell's watershed is estimated to be 108,000 square miles (GCMRC 2004a). Third, evaporation of water from the surface of a lake concentrates the dissolved solids in the remaining water. Evaporation has a very noticeable effect on the increased salinity in reservoirs of the arid Southwest.

The minimum elevation of Lake Powell is 3,374 feet; below this level is the "dead pool," where the remaining water is below the level of the lowest dam outlets and cannot be removed by gravity flow. The current water intakes for NGS are all above 3,374 feet, within the active pool of the reservoir. The proposed water intakes (Alternative C) would be located at 3,339 feet, within the dead pool. Salinity, as measured by electrical conductivity, is higher in the dead pool than it is in the active pool of Lake Powell (GCMRC 2004a). In addition, dissolved oxygen concentrations have declined to 2–4 parts per million in the dead pool, such that these concentrations are lower than in the active pool of the lake (GCMRC 2007).

Impacts of Alternative A (No Action Alternative)

Power generation at thermal generating stations requires the use of water for power generation (heated by the coal boilers to produce steam and drive the electric turbines) and cooling water. Under its existing allotment of 34,100 acre-feet per year through 2033, NGS uses a maximum of 28,000 acre-feet of cooling water from Lake Powell. The water is cycled through the plant and to large cooling towers adjacent to the plant. The cooling is achieved by evaporating water. However, only pure water is evaporated, leaving behind salts. This increases the saline concentration of the cooling tower water. If the salinity is too high, the salts begin to precipitate on the cooling tower heat exchanger surfaces, reducing their efficiency. To maintain desired efficiencies, salinity levels are limited by bleeding off a portion of the cooling tower basin's water and replacing it with fresh water (make-up water). Water that is removed from the system is first run through a brine concentrator to form a slurry and then run through a crystallizer to further concentrate the salts, leaving only a clay cake for disposal. No waste water is returned to Lake Powell; NGS is a zero discharge plant.

Water diverted from a river or a reservoir can affect downstream salinity. If there are downstream sources of salt, either natural or human-caused, upstream diversion would result in less water available for dilution and could possibly cause higher salinity downstream. The amount of water diverted by NGS is a small fraction of the volume of Lake Powell (28,000 acre-feet versus 27 million acre-feet). While estimates of salinity increase at Glen Canyon Dam due to water use by NGS are not available, it has been estimated that the use of water by the power plant increases the total salinity at Imperial Dam on the Lower Colorado River by less than 1 part per million (Reclamation 1972).

Cumulative Effects: The continued operation NGS pump station and generating station under the No Action Alternative would have no cumulative effect on Lake Powell's water quality because the water volume withdrawn from the lake will remain constant, there is no discharge of water or sediments back into the lake, and the salinity contribution downstream would continue to be negligible. In addition, the No Action Alternative would have no cumulative effect on the dissolved oxygen levels in the dead pool.

Conclusion: The impact to water quality under the No Action Alternative would be long-term and negligible.

Impacts of Alternative B (Action Alternative)

The existing water intakes are located in the active pool of Lake Powell; under Alternative B, the intakes would be located in the dead pool of the reservoir. The water in the dead pool is more saline than the water above, as measured by electrical conductivity. Conductivity ranges from 650–950 microSiemens/cm in the active pool compared with 750–1000 microSiemens/cm in the dead pool (GCMRC 2004a). It is possible that this elevated salinity may decrease the number of times that the water can be cycled through the power plant, resulting in additional water being required to achieve the same level of cooling in the plant.

Two lines of evidence argue that the use of water from the dead pool would not lead to increased water consumption by NGS. First, the plant's water treatment facility uses a water softener to remove most of the calcium, magnesium, and silica from the lake water before it is supplied to the cooling towers as make-up water. These common salts are responsible for the high salinity of Lake Powell's water. Because the other ionic components in the lake water do not have a high potential to precipitate, small increases in salinity would not impact future water use rates. Second, a review of the electrical conductivity data over time shows that salinity varies more from year to year than it does by depth for any given year (GCMRC 2004b). For example, drought years result in elevated salinities throughout the lake. As a result, the power plant has used saline lake water in the past without increasing water consumption. Also, as the lake level recedes, the character of the dead pool water would change and the differences in salinity now evident may diminish.

Under Alternative B, water consumption at NGS would remain at its current level of 28,000 acre-feet per year, which falls within its allotment of 34,100 acre-feet per year. Alternative B would have no impact on local groundwater levels.

Alternative B would require NGS to secure permits based on the requirements of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. These permits would be obtained from the U.S. Army Corps of Engineers prior to project construction. The removal of Blocks A, B, and C discharged approximately 12,963 cubic yards of Navajo sandstone into Lake Powell. During construction of the microtunnels, less than 10 cubic yards of Navajo sandstone would be discharged into the lake.

Cumulative Effects: Alternative B would have no cumulative adverse effect on Lake Powell's water quality because the water volume withdrawn from the lake would remain the same as currently removed, there would be no discharge of water or sediments back into the lake, existing dissolved oxygen levels would not change, and the salinity contribution downstream would continue to be negligible. In addition, the minimal discharge of sandstone drill cuttings into the lake would be miniscule compared with the development plans for the various marinas on Lake Powell and the tons of sediment that annually enter the lake upstream of the NGS pump station.

Conclusion: Alternative B would have a negligible, long-term impact on downstream salinity associated with removing a small amount of water from Lake Powell. There would also be a negligible impact associated with the release of a small amount of drill cuttings (i.e., less than 10 cubic yards) from the microtunnels into the lake.

Impacts of Alternative C (Preferred Alternative)

The existing water intakes are located in the active pool of Lake Powell; under Alternative C, the intakes would be located in the dead pool of the reservoir. The water in the dead pool is more saline than the water above, as measured by electrical conductivity. Conductivity ranges from 650–950 microSiemens/cm in the active pool compared with 750–1000 microSiemens/cm in the dead pool (GCMRC 2004a). It is possible that this elevated salinity may decrease the number of times that the water can be cycled through the power plant, resulting in additional water being required to achieve the same level of cooling in the plant.

Two lines of evidence argue that the use of water from the dead pool would not lead to increased water consumption by NGS. First, the plant's water treatment facility uses a water softener to remove most of the calcium, magnesium, and silica from the lake water before it is supplied to the cooling towers as make-up water. These common salts are responsible for the high salinity of Lake Powell's water. Because the other ionic components in the lake water do not have a high potential to precipitate, small increases in salinity would not impact future water use rates. Second, a review of the electrical conductivity data over time shows that salinity varies more from year to year than it does by depth for any given year (GCMRC 2004b). For example, drought years result in elevated salinities throughout the lake. As a result, the power plant has used saline lake water in the past without increasing water consumption. Also, as the lake level recedes, the character of the dead pool water would change and the differences in salinity now evident may diminish.

Under Alternative C, water consumption at NGS would remain at its current level of 28,000 acre-feet per year, which falls within its allotment of 34,100 acre-feet per year. Groundwater would not be used as a cooling water source.

Alternative C would require NGS to secure permits based on the requirements of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. These permits would be obtained from the U.S. Army Corps of Engineers prior to project construction. During completion of the inclined shafts, less than 5 cubic yards of Navajo sandstone would be discharged into the lake.

Cumulative Effects: Alternative C would have no cumulative adverse effect on Lake Powell's water quality because the water volume withdrawn from the lake would remain the same as currently removed, there would be negligible discharges of water or sediments back into the lake, existing dissolved oxygen levels would not change, and the salinity contribution downstream would continue to be negligible. In addition, the discharge of sandstone drill cuttings into the lake by Alternative C would be even less than anticipated under Alternative B and negligible compared with the development plans for the various marinas on Lake Powell and the tons of sediment that annually enter the lake upstream of the NGS pump station.

Conclusion: As in the No Action Alternative, there would be a negligible, long-term impact on downstream salinity associated with removing a small amount of water from Lake Powell. There would also be a negligible impact associated with a small amount of drill cuttings from the five new inclined shafts into the lake. Alternative C would have no impact on local groundwater levels.

Cultural Resources

Intensity Level Definitions

The methodology used for assessing impacts to cultural resources is based on the criteria of effect found in the regulations of the Advisory Council on Historic Preservation (ACHP) and in accordance with the requirements of Section 106 of the National Historic Preservation Act (36 CFR Part 800). The thresholds for this assessment are:

- Negligible:** Impacts to cultural resources would be at the lowest levels of detection (i.e., barely perceptible and not measurable). For the purposes of Section 106, the determination of effect would be "no adverse effect."
- Minor:** Adverse: Alteration of a feature, site, or structure would not diminish the integrity of the resource. The determination of effect would be "no adverse effect."
- Beneficial: Preservation or stabilization of the cultural resource would occur in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. The determination of effect would be "no adverse effect."
- Moderate:** Adverse: Alteration of a feature, site, or structure would diminish the integrity of the resource. The determination of effect for Section 106 would be "adverse effect." A Memorandum of Agreement (MOA) would need to be executed among the NPS and applicable state or tribal historic preservation officer and, if necessary, the ACHP, in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse effects would reduce the intensity of impact from major to moderate.
- Beneficial: Preservation or rehabilitation of the cultural resource would occur in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. The determination of effect would be "no adverse effect."
- Major:** Adverse: Alteration of a feature, site, or structure would diminish the integrity of the resource. The determination of effect for Section 106 would be "adverse effect." Measures to minimize or mitigate adverse impacts cannot be agreed upon, and the NPS,

state or tribal historic preservation officer and/or ACHP are unable to negotiate and execute a MOA in accordance with 36 CFR 800.6(b).

Beneficial: Restoration of the resource would occur in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. The determination of effect would be "no adverse effect."

Impairment: A major, adverse impact would occur to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the GCNRA general management plan; (2) key to the natural or cultural integrity of the GCNRA; or (3) identified as a goal in the GCNRA general management plan or other relevant NPS planning documents.

Existing Conditions

A Class I cultural resource records review was conducted of the 1-acre pump station site, the access road from Antelope Point Road, and the proposed water intake site, which comprise the Area of Potential Effect (APE). This research was conducted to determine if archeological sites, historic structures, ethnographic resources, cultural landscapes, or museum collections had been identified in the project area. The results indicated that previous surveys identified 13 archeological sites within 1 mile of the project area, none of which are located within the current APE (Jennings 1966, Pilles 1969).

Impacts of Alternative A (No Action Alternative)

Because previous surveys have not identified any cultural resources and because of the extensive ground disturbance already present at the water intake site, the No Action Alternative would have no impact on cultural resources.

Cumulative Effects: The No Action Alternative would not have an adverse or beneficial cumulative impact on cultural resources in the general project area because no construction activities would occur.

Conclusion: For the purposes of Section 106, the determination of effect for the No Action Alternative would be "no effect."

Impacts of Alternative B (Action Alternative)

No cultural resources have been identified at the existing pump station facility; therefore, the additional ground disturbance associated with Alternative B (digging a new water intake well) would have no impact on cultural resources.

Because the site file search indicated that there are no known cultural resources within the current APE, a finding of "no historic properties affected" was recommended by SRP for the NGS water intake maintenance project. NPS submitted a "no effect" determination to the Arizona State Historic Preservation Office (SHPO) (Appendix B) in November 2004 because the project is only located within the Arizona portion of the GCNRA. The SHPO concurred with this determination on December 6, 2004.

If previously unidentified cultural resources are discovered during construction-related activities, construction activities will be halted and NPS will be notified immediately and arrangements will be made for the appropriate assessment and treatment of those resources.

Cumulative Effects: Implementation of Alternative B would not result in either adverse or beneficial cumulative effects upon cultural in the general project area because all construction activities would be confined to the existing disturbed area of the NGS pump station that contains no historic properties. In addition, the APE associated with Alternative B would be at least 1 mile away from the closest, known cultural site, which further reduces the potential impact of the project.

Conclusion: Based on December 6, 2004, SHPO concurrence, Alternative B would have "no effect" on cultural resources.

Impacts of Alternative C (Preferred Alternative)

No cultural resources have been identified at the existing pump station facility; therefore, the additional ground disturbance associated with Alternative C (drilling five new inclined shafts) would have no impact on cultural resources.

Because the site file search indicated that there are no known cultural resources within the current APE, a finding of “no historic properties affected” was recommended by SRP for the NGS water intake maintenance project. NPS submitted a “no effect” determination to the Arizona State Historic Preservation Office (SHPO) (Appendix B) in November 2004 because the project is only located within the Arizona portion of the GCNRA. SHPO concurred with this determination on December 6, 2004.

If previously unidentified cultural resources are discovered during construction-related activities, construction activities will be halted, NPS will be notified immediately, and arrangements will be made for the appropriate assessment and treatment of those resources.

Cumulative Effects: Implementation of Alternative C would not result in either adverse or beneficial cumulative effects on cultural resources in the general project area because all construction activities would be confined to the existing disturbed area of the NGS pump station that contains no historic properties. In addition, the APE associated with Alternative C would be at least 1 mile away from the closest, known cultural site, which further reduces the potential impact of the project.

Conclusion: Similar to Alternative B, construction of the new NGS water intakes, as proposed under Alternative C, would occur within the grounds of the existing pump station that contains no historic properties and at least a mile away from any known cultural resources. Therefore, the “no effect” determination would also apply to Alternative C.

Socioeconomics and Environmental Justice

Intensity Level Definitions

The methodology used for assessing socioeconomic and environmental justice impacts is based on the application of relevant Census data to the proposed action and the requirements of Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” which directs that programs, policies, and activities not have a disproportionately high and adverse human health or environmental effect on minority and low-income populations.” The thresholds for this assessment are:

- Negligible:** Impacts to the local economy, employment, and populations would be at the lowest levels of detection (i.e., barely perceptible and not measurable).
- Minor:** Adverse: Reductions in the local economic base or increases in the unemployment rate would be measurable, although the changes would be slight and likely short-term.
- Beneficial: Increases in the local economy or reductions in the unemployment rate would be measurable, although the changes would be slight and likely short-term.
- Moderate:** Adverse: Reductions in the local economic base or increases in the unemployment rate would be measurable, although the changes would be slight but likely long-term.
- Beneficial: Increases in the local economy or reductions in the unemployment rate would be measurable, although the changes would be slight but likely long-term.
- Major:** Adverse: Reductions in the local economic base or increases in the unemployment rate would be substantive and likely long-term.

Beneficial: Increases in the local economy or reductions in the unemployment rate would be substantive and likely long-term.

Existing Conditions

The water intake site is located on the Navajo Reservation and GCNRA in Coconino County, overlooking Lake Powell in northeastern Arizona. The surrounding area includes the city of Page and the LeChee Chapter of the Navajo Nation. In the 2000 census, the population of Page was 6,809, the population of the LeChee Chapter was 1,890, the population of Coconino County was 116,300, and the population of the Navajo Nation was 180,462 (U.S. Census Bureau 2000).

Page, the gateway community to GCNRA, is located approximately 3 miles southwest of the water intake site. Lake Powell, NGS, the federal government, and tourism are major contributors to the Page economy. NGS is the second-largest employer in Page. Aramark, the company that operates the marinas and concessions on Lake Powell, is the largest employer. According to the Arizona Department of Commerce, in 2000, the Page area had an average labor force of 4,331 and an unemployment rate of 4.5 percent. The estimated unemployment rate on the Navajo Reservation is 44 percent (Choudhary 2000), and the unemployment rate of the LeChee Chapter is 20.6 percent (U.S. Census Bureau 2000).

NGS is part of the Navajo Project, which was constructed in the early 1970s to serve power demands across the southwestern United States and to pump water through the CAP canal system. The Navajo Project also includes the Kayenta Mine, a coal mine operated by Peabody Western Coal Company on the Navajo and Hopi Indian reservations near Black Mesa, Arizona, and the Black Mesa and Lake Powell Railway, a 76-mile electric railway from Black Mesa to NGS. A consideration of the socioeconomic impacts of the NGS water intake project must also consider the socioeconomics of the larger but dependent Navajo Project.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," directs that programs, policies, and activities not have a disproportionately high and adverse human health or environmental effect on minority and low-income populations. Both the Navajo and Hopi reservations are minority communities. Low-income refers to households whose income is at or below the poverty level (\$5,980 for an individual; \$12,100 for a family of four in 1990). Based on the 1990 census, 47.3 percent of Navajo households were below the poverty level (21.4 percent of households in the LeChee Chapter), and 35.5 percent of Hopi households were below the poverty level (U.S. Census Bureau 1990); thus, both the Navajo Nation and the Hopi Reservation are considered low-income communities. In Page, 12.8 percent of households were below the poverty level.

Impacts of Alternative A (No Action Alternative)

If the No Action Alternative is implemented and the current drought continues, the surface level of Lake Powell could decline to a level below the current water intakes by early 2009. If this occurs, NGS would have to be shut down. Without a market for its coal, the Kayenta Mine and the railway would also cease operations. The loss of the Navajo Project would have significant economic impacts to the Navajo and Hopi tribes, and to the city of Page. Electric power customers throughout the Southwest would likely pay increased rates for alternative sources of power and could experience occasional "brown-outs" or blackouts during high use periods. In addition, water users in Arizona would pay increased water rates because alternative sources of electricity would be needed to pump the water in CAP canals.

The Navajo Project employs almost 1,000 people full time, 79 percent of whom are Navajo and Hopi. In addition, 200 to 800 people are employed seasonally, 85 percent of whom are Native American. Given the high unemployment rate on the Navajo Reservation, these jobs are critically important. Royalties and other taxes paid by the owners of the Navajo Project contribute more than \$25 million each year to the Navajo Nation, more than 10 percent of its nonfederal revenue. The Hopi Tribe receives over 40 percent of its nonfederal revenue from Navajo Project coal royalties. The total annual lost revenues associated with closing the Navajo Project are estimated at \$386 million. All of these jobs and revenues would be lost if the No Action Alternative resulted in the shutdown of NGS.

It is estimated that NGS produces enough electricity to supply the homes of 3.1 million people in the southwestern United States (actual power is distributed to a mix of residential and commercial users) as well as distributing CAP water to its users in Arizona. Assuming there is an available site, the cost of replacing NGS with new natural gas plants would be \$1.24 billion, and customers would then pay an estimated \$20 million more per year for power than they do now. Replacing the power produced by NGS with existing sources of electricity would cost customers more than twice that much, assuming that the required electrical service would be available from the power grid. Also, the costs associated with the distribution of CAP water would be passed on as higher water costs for residential and commercial users.

The existing generating capacity of NGS is 2,250 MW of electricity, which in combination with the 1,296 MW maximum generating capacity of Glen Canyon Power Plant, provides a substantial amount of power to the electrical supply grid that serves the Colorado River Basin area, Arizona, and the greater southwestern United States. As such, these two facilities help ensure the reliability of the electrical network of this extensive area. If the No Action Alternative is implemented and lake levels reach the existing water intakes by early 2006, NGS operations will be discontinued due to lack of cooling water, resulting in the loss of 2,250 MW of electrical generation. Furthermore, if drought conditions cause the lake level to reach 3,490 feet in elevation, the total generating capacity of both NGS and Glen Canyon Power Plant (i.e., 3,546 MW) would be lost, resulting in an even greater negative impact to the reliability of the overall electrical distribution system for the region. The socioeconomic impact of increased user costs, lost tribal revenue, and lost jobs associated with the loss of NGS would be magnified by the concurrent loss of the power generating capability of Glen Canyon Dam.

Cumulative Effects: The No Action Alternative, which would not provide new water intakes at a lower lake elevation, could potentially have a major cumulative adverse effect on the socioeconomic character of the project area, northern Arizona, and the Southwest, as well as low-income and minority populations in these areas, if current drought conditions continue or become more severe in the coming years. Without a continuous and reliable supply of cooling water from Lake Powell, NGS would be unable to operate. The net effect would have far-reaching socioeconomic and environmental justice impacts to the area and region.

Conclusion: Implementation of the No Action Alternative, combined with persistent drought conditions that could lead to the closure of the NGS, would have major, long-term negative impacts on socioeconomics at the local and regional levels. These impacts would include lost jobs to Native American tribal members, increased user costs for providing electrical power for CAP water distribution, and a reduction in available electricity in the Colorado River Basin area, Arizona, and the greater southwestern United States.

Impacts of Alternative B (Action Alternative)

Under Alternative B, there would be no negative socioeconomic impacts because NGS operations would continue, and the Navajo Project would be ensured.

Cumulative Effects: By providing a continuous water supply, Alternative B would have a moderate beneficial cumulative effect on the local economic base and employment over the long-term because of the continued operation of NGS, the Kayenta Mine, and businesses and employees that support those operations.

Conclusion: Alternative B would have minor beneficial impacts to the local economy because some construction personnel would be hired, including low-income, minority, and tribal members from the local area.

Impacts of Alternative C (Preferred Alternative)

Under Alternative C, there would be no negative socioeconomic impacts because NGS operations would continue, and the Navajo Project would be ensured.

Cumulative Effects: By providing a continuous water supply, Alternative C would have a moderate beneficial cumulative effect on the local economic base and employment over the long-term because of

the continued operation of NGS, the Kayenta Mine, and the businesses and employees that support those operations.

Conclusion: Alternative C would have minor beneficial impacts to the local economy because some construction personnel would be hired, including low-income, minority, and tribal members from the local area.

Land Use

Intensity Level Definitions

The methodology used for assessing impacts to land use in the project area is based on information provided in the GCNRA General Management Plan. The thresholds for this impact assessment are:

- Negligible:** The impact to land uses in the general project area (i.e., adjacent to the NGS pump station or within the GCNRA) would be short-term and at or below the levels of detection.
- Minor:** The impact would be detectable but would not have an appreciable adverse or beneficial effect on adjacent land uses.
- Moderate:** The effects would be readily apparent and would result in adverse or beneficial impact to adjacent land uses.
- Major:** The effects would result in substantial adverse or beneficial impacts to the resources in the project area and would require mitigation measures to offset adverse effects.

Existing Conditions

The water intake site includes a 1-acre parcel of land leased to SRP by Navajo Nation that includes the land immediately adjacent to the cliffs overlooking Lake Powell and a much smaller (0.2-acre) NPS easement that encompasses the near vertical shoreline and underwater cliff face where the intake openings are situated deep in the lake. The NPS easement for SRP was expanded to a 3.76-acre area in 2006 to accommodate potential build alternatives for the new NGS water intake system. The boundary between GCNRA and the Navajo Nation is at 3,720 feet elevation.

The primary objectives of GCNRA are to maximize recreational opportunities, provide interpretive services, uphold legislative guidelines, and preserve scenic, scientific, and historic features (NPS 1979). The GCNRA is divided into four management zones: natural, recreation and resource, utilization, and cultural and development. The General Management Plan (NPS 1979) designates Antelope Point, including the water intake site, as a Potential Development Area. Utility structures such as the NGS water intakes are an example of a permitted activity in a development zone.

Land use at the project site is industrial. Land use in the surrounding Antelope Point area also includes industry (NGS and the utility lines connecting it to the water intake site), recreation (some dispersed recreation, boating on the lake, but especially the Antelope Point Marina), grazing, and one Navajo home site. None of these uses overlap the project area.

Impacts of Alternative A (No Action Alternative)

Under the No Action Alternative, no changes in land use would occur.

Cumulative Effects: This alternative would have no adverse or beneficial cumulative effects on current or future land uses in the vicinity of the existing NGS pump station. This facility would continue to operate within the 1-acre parcel and have no influence on planned facilities at the Antelope Point marina.

Conclusion: The No Action Alternative would have no impact on land uses within the GCNRA or on land adjacent to the NGS pump station because no construction activities would occur.

Impacts of Alternative B (Action Alternative)

As stated previously, the NPS easement was expanded to include additional area of the underwater cliff face to accommodate the increased boring depth for Alternative B.

Cumulative Effects: Although Alternative B required an expanded easement from GCNRA, this action would have no cumulative effect on recreational opportunities on Lake Powell near the pump station or on the overall management objectives of GCNRA because the intake borings would occur underwater within the expanded easement.

Conclusion: The new easement for Alternative B would represent a negligible impact on land use.

Impacts of Alternative C (Preferred Alternative)

Similar to Alternative B, the NPS easement was expanded to 3.76 acres to include additional area of the underwater cliff face to accommodate the increased boring depth. In addition, the new easement would allow access to the cliff face east of the pump station for drilling the new intake shafts as part of Alternative C. This new easement would represent a negligible impact on land use.

Cumulative Effects: Although Alternative C required an expanded easement from GCNRA, this action would have no cumulative effect on recreational opportunities on Lake Powell near the pump station or on the overall management objectives of GCNRA because the intake borings would occur underwater within the expanded easement.

Conclusion: The new easement for Alternative C would represent a negligible impact on land use.

Visual Resources

Intensity Level Definitions

The methodology used for assessing impacts to visual resources in the project area is based on information provided in the GCNRA General Management Plan. The thresholds for this impact assessment are:

- Negligible:** The impact to visual resources in the general project area would be short-term and at or below the levels of detection.
- Minor:** The impact would be detectable but would not have an appreciable adverse or beneficial effect on adjacent land uses.
- Moderate:** The effects would be readily apparent and would result in adverse or beneficial impact to adjacent land uses.
- Major:** The effects would result in substantial adverse or beneficial impacts to the resources in the project area and would require mitigation measures to offset adverse effects.

Existing Conditions

The midground and background views in all directions from the project area include primarily natural landscapes and little development. Views include rocky cliffs, red rock areas, open water, and rolling hills covered with sparse desert scrub vegetation. The rocky areas contain very little vegetation. The ridgelines appear flat to gently sloped and are slightly more vegetated than the rocky shorelines. NGS is one notable developed use that is visible from the project area; in fact, its three large smokestacks are visible from much of the southern end of Lake Powell.

Foreground views in the project area are dominated by the pump house and its associated development, including a chain-link fence that encircles the site. The building has been set partially into the sandstone

below existing ground level, and the entire site has been cleared of vegetation. From the lake, parts of the chain-link fence, the pump house roof, and a small pump crane on the roof are visible. The project area is on Navajo Nation land, so it has not been classified for scenic resources by NPS. Antelope Island, which is a visually similar area across the lake, is considered a Class IV, unremarkable area (NPS 1979).

Impacts of Alternative A (No Action Alternative)

A negligible visual impact would occur if the existing water intakes became visible due to declining lake levels. In addition, the existing pump house would still be partially visible from Lake Powell.

Cumulative Effects: The No Action Alternative would have a negligible cumulative impact on the foreground and middle-ground views from Lake Powell if the existing water intakes became exposed due to declining lake levels.

Conclusion: This alternative would have a negligible adverse impact on background views from Lake Powell because the pump house roof and fence would still be visible from the lake and Antelope Island.

Impacts of Alternative B (Action Alternative)

Construction under Alternative B would have no long-term impact on visual resources because the majority of new construction would occur underground, and few new installations would occur adjacent to the pump house building that would be visible from Lake Powell. However, a negligible visual impact would occur if the capped existing water intakes became visible due to declining lake levels.

Cumulative Effects: Alternative B would have a negligible cumulative impact on the foreground and middle-ground views from Lake Powell if the existing water intakes became exposed due to declining lake levels.

Conclusion: This alternative would have a negligible adverse impact on background views from Lake Powell because the pump house roof and fence would still be visible from the lake and Antelope Island.

Impacts of Alternative C (Preferred Alternative)

Construction under Alternative C would have no long-term impact on visual resources because the majority of new construction would occur underground, and few new installations would occur adjacent to the pump house building that would be visible from Lake Powell. However, a negligible visual impact would occur if the capped existing water intakes became visible due to declining lake levels.

Cumulative Effects: Alternative C would have a negligible cumulative impact on the foreground and middle-ground views from Lake Powell if the existing water intakes became exposed due to declining lake levels.

Conclusion: This alternative would have a negligible adverse impact on background views from Lake Powell because the pump house roof and fence would still be visible from the lake and Antelope Island.

Hazardous Materials

The methodology used for assessing potential hazardous materials impacts of the project is based on information obtained from SRP regarding hazardous materials uses at the NGS pump station. This assessment was limited to on-site uses because the land adjacent to the existing facility and its access road is undeveloped and did not exhibit any signs of contamination. The thresholds for this impact assessment are:

Intensity Level Definitions

Negligible: The impact of the proposed project would be short-term and at or below the levels of detection.

- Minor:** The impact would be detectable but would not have an appreciable adverse or beneficial effect on adjacent land uses.
- Moderate:** The effects would be readily apparent and would result in adverse or beneficial impact to adjacent land uses.
- Major:** The effects would result in substantial adverse or beneficial impacts to the resources in the project area and would require mitigation measures to offset adverse effects.

Existing Conditions

Hazardous chemicals, including lubricants for the water pumps and oil for the electrical transformers, are stored and used at the project site. These chemicals are transported to the property and stored at the site in sealed containers within the pump house building. Both the pump lubricants and the transformer oils have very low vapor pressures and negligible volatility, so an accidental spill of these chemicals would not result in a toxic vapor cloud. Thus, no off-site consequences would result from an accidental spill at the water pump house. If a spill were to occur during transportation, its effects would be limited to an area very close to the accident site.

Impacts of Alternative A (No Action Alternative)

Hazardous chemicals are stored in sealed containers and used in sealed machinery. No effects from spills during transportation, handling, or storage are expected.

Cumulative Effects: The No Action Alternative would have no cumulative hazardous materials impact on the existing facility or adjacent land because these materials are handled solely within site boundaries in accordance with established handling protocols.

Conclusion: There would be no impacts associated with hazardous materials under the No Action Alternative.

Impacts of Alternative B (Action Alternative)

The use, transportation, handling, and storage of hazardous materials would be the same under Alternative B as with Alternative A. During construction, diesel fuel and hydraulic fluids would be stored in sealed containers within an isolated area on the project site.

Cumulative Effects: Alternative B would have no cumulative hazardous materials impact on the existing facility or adjacent land because these materials are handled solely within site boundaries in accordance with established handling protocols.

Conclusion: No adverse environmental impacts would occur under this alternative because no spills are expected and precautionary measures will be implemented during the handling of hazardous materials.

Impacts of Alternative C (Preferred Alternative)

The use, transportation, handling, and storage of hazardous materials would be the same under Alternative C. During construction, diesel fuel and hydraulic fluids would be stored in sealed containers within an isolated area on the project site. Because no spills are expected and precautionary measures will be implemented, no adverse environmental impacts would occur under this alternative.

Cumulative Effects: Alternative C would have no cumulative hazardous materials impact on the existing facility or adjacent land because these materials are handled solely within site boundaries in accordance with established handling protocols.

Conclusion: No adverse environmental impacts would occur under this alternative because no spills are expected and precautionary measures will be implemented during the handling of hazardous materials.

Recreational Resources

Intensity Level Definitions

The methodology used for assessing impacts to recreational resources in the project area is based on information provided in the GCNRA General Management Plan. The thresholds for this impact assessment are:

- Negligible:** The impact to recreational resources in the general project area (i.e., adjacent to the NGS pump station or within the GCNRA) would be short-term and at or below the levels of detection.
- Minor:** The impact would be detectable but would not have an appreciable adverse or beneficial effect on adjacent land uses.
- Moderate:** The effects would be readily apparent and would result in adverse or beneficial impact to adjacent land uses.
- Major:** The effects would result in substantial adverse or beneficial impacts to the resources in the project area and would require mitigation measures to offset adverse effects.

Existing Conditions

GCNRA was established to provide for the management of public outdoor recreation use and the enjoyment of Lake Powell and adjacent lands in Arizona and Utah. In 2003, there were 1.9 million visitors and more than 1.2 million overnight stays (NPS 2004). Recreation uses range from those activities that require solitude and an undisturbed setting to those that require mechanical means such as power boating and four-wheel driving. The most popular forms of recreation are water-based activities such as boating, fishing, water skiing, and boat camping.

Lake Powell is the major recreational resource of GCNRA and supports four permanent developed marinas. The water-based facilities at the Hite Marina were temporarily closed recently due to the declining lake water levels. The majority of boater use is at the southern end of the lake, at Wahweap Marina and the new Antelope Point Marina (NPS 1987). The project area is on the lake channel approximately 1 mile east of Antelope Point. Because of the declining lake level, all boats, including those from Wahweap, must use the main channel to travel up the lake. At times, there can be considerable boat traffic near the project site.

Impacts of Alternative A (No Action Alternative)

The existing NGS pump station is located on Navajo Nation land that is not used for recreation, and the water intakes are located deep in Lake Powell, where they would not interfere with boating or other water-based activities.

Cumulative Effects: The No Action Alternative would have no adverse or beneficial cumulative effect on recreational uses within the GCNRA because no construction activities would occur at the NGS pump station or from the surface of Lake Powell. As a result, the recreational objectives outlined in the GCNRA General Management Plan would not be affected.

Conclusion: The continued operation of the existing water intakes under the No Action Alternative would have no effect on recreational uses of Lake Powell.

Impacts of Alternative B (Action Alternative)

Under Alternative B, the proposed water intake site would be located in the cliff face adjacent to the existing pump station and over 100 feet lower in Lake Powell than the current intakes. These areas are not used for recreation.

Cumulative Effects: Alternative B would have no adverse or beneficial cumulative effect on recreational uses within the GCNRA because construction activities would be limited to the grounds of the NGS pump station. As a result, the recreational objectives outlined in the GCNRA General Management Plan would not be affected.

Conclusion: There would be no recreational impacts associated with Alternative B because the new water intakes would be installed without interfering with water-based recreation.

Impacts of Alternative C (Preferred Alternative)

Under Alternative C, the new water intake site would be located on Navajo Nation land that is not used for recreation, and the water intakes would be located deeper into Lake Powell, where they would not interfere with boating or other water-based activities.

Cumulative Effects: Alternative C would have no long-term adverse or beneficial cumulative effect on recreational uses within the GCNRA because construction activities would be limited to the grounds of the NGS pump station. As a result, the recreational objectives outlined in the GCNRA General Management Plan would not be affected.

Conclusion: The new intakes proposed under Alternative C would occur within the expanded easement from NPS because they would penetrate the cliff wall at an elevation inside the expanded easement established within the GCNRA management area. However, this activity would occur several hundred feet below the lake surface and would not impact areas used by recreational boaters.

Construction-Related Impacts

Negligible to minor impacts associated with construction of Alternative C, the Preferred Alternative, can be divided into short-term impacts occurring in or on Lake Powell and those occurring at the pump house facility on the cliff overlooking the lake.

Drilling the new water intake shafts would have various negligible impacts on above-ground resources. The drill rig itself and a support crane would be visible for approximately 32 to 34 weeks during construction. Project construction is currently planned for September 2007 to May 2008; however, a lack of available drillers may result in construction being started later in 2007 and extending into the summer of 2008. A houseboat would be visible on the lake for approximately 1 week as each inclined shaft is completed, with those 1-week periods being about 1 month apart as each new shaft is drilled. If construction occurs at night, there would also be short-term visual impacts on the lake due to light intrusion from construction lighting on the cliff. This potential impact would be minimized by directing the lights away from the lake and using temporary shielding. In addition, there would be short-term noise impacts associated with the excavation and construction equipment, such as loaders and large trucks. Dust created by the drilling and by traffic on the unpaved access road would be a negligible, localized short-term impact on air quality. Traffic to and from the water intake site would be increased during project construction, especially from trucks entering, being filled with drill cuttings, then leaving to haul the cuttings to the ash disposal pit at NGS. In addition to the unpaved access road, this truck traffic would use Antelope Point Road and SR 98, both of which are paved and large enough to accommodate these vehicles.

To control the dust associated with increased vehicle traffic on the access road to the pump station, water or an environmentally approved dust palliative will be applied to the road regularly during construction of the vertical shaft.

To lessen noise impacts to recreational users on Lake Powell, sound barricades of sufficient height will be erected to direct noise away from Lake Powell to the south of the pump station site during construction.

Cumulative Effects: Construction of Alternative C would have no long-term adverse cumulative effects on the project area because these activities would be contained within existing NGS properties.

Conclusion: Alternative C, the Preferred Alternative, would have only minor short-term impacts during the construction period that would be mitigated through the use of dust palliatives, temporary sound barriers, and directional lighting.

CONSULTATION AND COORDINATION

External Scoping

This effort was initiated through the distribution of a scoping letter on October 23, 2004, when the following agencies, organizations, and individuals were contacted.

- Arizona Department of Transportation
- Arizona Department of Water Resources
- Arizona Game and Fish Department
- Arizona State Historic Preservation Office
- Bureau of Indian Affairs
- City of Page
- Coconino County
- Colorado River Energy Distributors Association
- Congressman Rick Renzi
- Friends of Lake Powell
- Grand Canyon Monitoring & Research Center
- Grand Canyon National Park
- Grand Canyon Trust
- Hopi Tribe
- Irrigation & Electrical Districts Association
- Lake Powell Resorts and Marinas
- Lake Powell Waterworld
- Lake Powell Yacht Club
- Living Rivers
- National Park Service
- Navajo Nation
- Northern Arizona Audobon Society
- Northern Arizona Council of Governments
- San Juan Southern Piute
- Senator John Kyl
- Senator John McCain
- Sierra Club
- U.S. Army Corps of Engineers
- U.S. Bureau of Reclamation
- U.S. Fish and Wildlife Service
- Upper Colorado River Commission
- Utah Department of Wildlife Resources
- Western Area Power Administration
- Wilderness River Adventures

Copies of all correspondence received during the preparation of the March 2005 Environmental Assessment/Assessment of Effect are presented in Appendix B. Scoping was not reinitiated as a function of this particular document because the proposed action alternative (Alternative C) would occur within the same area as proposed for the 2005 selected alternative.

Scoping Issues

Comments were received from two environmental interest groups and several concerned citizens during the scoping process. These comments included both project-related and non-project-related issues and concerns, as summarized below. The project-related items have been addressed in the development of this Environmental Assessment/Assessment of Effect, and the section in which these topics are addressed is identified after each specific item.

The project-related issues and concerns included:

- The size of the proposed bore holes for the new water intakes (Alternatives B and C under Alternatives Considered)
- Coordination with USFWS regarding threatened and endangered species (Natural Environment under Environmental Consequences)
- Structural integrity of the rock at the existing pump station site (Geology under Environmental Consequences)
- Water rights agreements for NGS (Water Quality under Environmental Consequences)

- Potential effect of upstream sedimentation on NGS water intakes (Water Quality under Environmental Consequences)
- Coordination with the SHPO and Navajo Nation regarding cultural resources (Cultural Resources under Environmental Consequences)
- Construction impacts related to light intrusion, noise, and viewshed impacts (Construction-related Impacts under Environmental Consequences)

The following issues were also raised but are not directly related to the project purpose and need. As a result, they are not addressed in the Environmental Assessment/Assessment of Effect.

- SRP should examine alternative forms of power generation at NGS.
- SRP should install an air-cooled system at NGS to eliminate the need for cooling water and then sell its water rights.

Public Involvement

The NGS water intake maintenance project was discussed at the following public meetings:

July 20, 2004: Representatives of SRP corporate offices and NGS met in Window Rock, Arizona, with members of the Navajo Nation Department of Natural Resources, Department of Water Resources, Department of Water Resources, and Department of Mineral Resources. The discussion topics included the need for relocating the water intakes, the plan for the preliminary work, and the plans for construction.

September 8, 2004: Representatives of SRP corporate offices and NGS attended the public meeting of the LeChee Chapter Planning Committee in LeChee, Arizona. Discussion centered on the project scoping letter, which had previously been sent to the chapter. SRP answered questions from the planning board and the audience.

September 13, 2004: Representatives of NGS attended the LeChee Chapter Meeting in LeChee, Arizona. The scoping letter was read to the audience. A representative from NGS gave a summary of the need for the relocation of the water intakes and an outline of the project. After the meeting, the Navajo Nation Council Representative for the LeChee Chapter and several chapter officers were given an informal presentation on the project.

List of Preparers

The following individuals participated in the development of this document:

- Barbara Wilson, National Park Service
- Chris Kincaid, National Park Service
- John Spence, National Park Service
- Mark Anderson, National Park Service
- Chris Turk, National Park Service
- Nancy Coulam, Bureau of Reclamation
- Ray Hedrick, Salt River Project
- John Keane, Salt River Project
- Peter Prinzse, Salt River Project
- Peter Kandarlis, Salt River Project
- Ed Weeks, Salt River Project
- Guy Leary, Salt River Project
- Don Smith, EcoPlan Associates, Inc.
- Greg Martinsen, EcoPlan Associates, Inc.
- J. Simon Bruder, EcoPlan Associates, Inc.
- Jodi Strohmayr, EcoPlan Associates, Inc.

REFERENCES

- AMEC. 2004a. Geotechnical Investigative Report, Lake Pump Station Project, Navajo Generating Station, Page, Arizona. AMEC Earth and Environmental, Tempe, Arizona.
- _____. 2004b. Cliff Face Stability Assessment Report, Lake Pump Station Project, Navajo Generating Station, Page, Arizona. AMEC Earth and Environmental, Tempe, Arizona.
- Brown, David E. (Ed.). 1994. Biotic Communities: Southwestern United States and Northwestern Mexico. University of Utah Press, Salt Lake City.
- Choudary, Trib. 2000. 2000–2001 Comprehensive Economic Development Strategy. Navajo Nation Division of Economic Development, Window Rock, Arizona.
- GCMRC. 2004a. Water Quality. http://www.gcmrc.gov/what_we_do/score/1999/score_99_water_quality.htm#chloroa (August 17, 2004).
- _____. 2004b. Lake Powell Animation. http://www.gcmrc.gov/what_we_do/products/water_quality/lp_animation/lp_animation.htm (October 6, 2004).
- _____. 2007. Recent Hypoxia in Glen Canyon Dam Releases (April 2, 2007).
- Harshbarger, J.W., C.A. Repenning, and J.H. Irwin. 1957. Stratigraphy of the Uppermost Triassic and the Jurassic Rocks of the Navajo Country. U.S. Geological Survey Professional Paper 291. Washington, D.C.
- Hatch Mott MacDonald 2004. Navajo Generating Station Lake Pump Station Project: Assessment of Tunneling Alternatives, Phoenix, Arizona.
- Hendricks, D.M. 1985. Arizona Soils. The University of Arizona Press, Tucson, Arizona.
- Jennings, Jesse D. 1966. Glen Canyon: A Summary. University of Utah Anthropological Papers No. 81, Glen Canyon Series No. 31. University of Utah, Salt Lake City.
- Malespin, Melanie C. 1981. A baseline Study of the Rodents of Antelope Island. M.S. Thesis, Utah State University, Logan.
- Mueller, Gordon and Michael Horn. 1999. Description of the Pelagic Zooplankton and Fish Communities of Lakes Powell and Mead. USGS Open File Report 99–109.
- Mueller, Gordon, Michael Horn, Quent Bradwisch, and Lewis Boobar. 2001. Examination of Native Fish Recruitment and Description of the Fish Communities Found in the San Juan and Colorado River Interface Zones of Lake Powell, Utah. USGS Open-File Report 01-159.
- NPS. 1979. Glen Canyon NRA Proposed General Management Plan. NPS-D-141. Glen Canyon NRA, Page, Arizona.
- _____. 1987. The Carrying Capacity of Lake Powell: A Management Analysis of the Capacity for Boater Recreation. Glen Canyon NRA, Page, Arizona.
- _____. 2000. *Management Policies 2001*. Department of the Interior, Washington, D.C.
- _____. 2004. Glen Canyon NRA profile. <http://data2.itc.nps.gov/parks/glca/ppdocuments/glcaprofile.pdf> (October 12, 2004).

Pilles, Peter J. Jr. 1969. Navajo Generation Station at Page, Arizona: Preliminary Report. Museum of Northern Arizona, Department of Anthropology, Flagstaff, Arizona.

Reclamation, U.S. Bureau of. 1972. Final Environmental Statement, Navajo Project. Department of the Interior FES 72-1.

_____. 2007. Upper Colorado River Basin Drought. <http://www.usbr.gov/uc/water/crsp/cs/gcd.html>. (March 5, 2007).

Spence, John. 2004. Personal Communication. National Park Service, Glen Canyon National Recreation Area. July 6.

U.S. Census Bureau. 1990. Income and Poverty Status in 1989 of American Indian Tribes. <http://www.census.gov/population/socdemo/race/indian/cp-3-7/tab06.pdf>. (October 29, 2004).

_____. 2000. Census of Population and Housing.

USFWS. 2004. Arizona Ecological Services Field Office. October 25, 2004. <http://arizonaes.fws.gov/>.

Webb, Robert, Gregory McCabe, Richard Hereford, and Christopher Wilkowske. 2004. Climatic Fluctuations, Drought, and Flow in the Colorado River. USGS Fact Sheet 3062-04, U.S. Department of the Interior.

APPENDICES

Appendix A

Special Status Species Consultation



United States Department of the Interior
FISH AND WILDLIFE SERVICE

UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

In Reply Refer To

FWS/R6
ES/UT
04-1359

September 1, 2004

Donald Smith
Senior Environmental Planner
EcoPlan Associates, Inc.
701 West Southern Avenue, Ste. 203
Mesa, Arizona 85210

RE: Navajo Generating Station Water Intake Maintenance Project

Dear Mr. Smith:

This responds to your letter of August 23, 2003 regarding the subject project. We have no comments on the project, as proposed. Should project plans change or if additional information becomes available we may choose to provide comments in the future.

We appreciate the opportunity to review your project. Should you have any questions or need any further information please contact Dr. Lucy Jordan, Federal Projects Supervisor at (801)975-3330 ext. 143.

Sincerely,

Henry R. Maddux
Utah Field Supervisor



United States Department of the Interior

U.S. Fish and Wildlife Service
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 FAX: (602) 242-2513



In Reply Refer to:

AESO/SE
02-21-04-I-0476

November 3, 2004

Mr. Donald C. Smith, Senior Environmental Planner
EcoPlan Associates, Inc.
701 West Southern Avenue, Suite 203
Mesa, Arizona 85210

Subject: Navajo Generating Station Water Intake Maintenance

Dear Mr. Smith:

Thank you for your correspondence of August 23 and September 29, 2004, requesting our comments on the subject action. This action includes installation of new facilities on the grounds of the existing pump house adjacent to Lake Powell and slant drilling five new 54-inch diameter holes through sandstone bedrock. New water intake pipes and submersible pumps will be installed in these holes to withdraw water from the lake at an elevation of about 3,350 feet above sea level. Current water level is at 3,570 feet and the current intake is at 3,470 feet. The purpose of the action is to ensure future access to cooling water in the event the water surface elevation of Lake Powell continues to decrease in association with the ongoing drought. The proposed water intake structure will not change the current annual volume or the seasonal pattern of water withdrawals. The action site is about three miles northeast of Page, in section 15, Township 41 North, Range 9 East, G&SRB&PM, Coconino County, on Navajo Nation land leased to the Salt River Project, and adjacent to the Glen Canyon National Recreation Area (GCNRA). The new intake structures will require a new easement within the boundary of the GCNRA. The National Park Service is the action agency. This letter documents our recommendations regarding threatened and endangered species, critical habitat, species proposed to be listed, or critical habitat proposed to be designated, under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act).

The Arizona Ecological Services Field Office has posted lists of candidate, proposed, threatened and endangered species, and relevant designated or proposed critical habitat, for all of Arizona's counties on the Internet. Please refer to the website <http://arizonaes.fws.gov> for species information for the county where your project occurs. If you have difficulty obtaining a list, please contact our office and we will mail or fax you one. For future projects it is not necessary to contact our office to obtain a species list if you choose to access our website directly.

On the webpage's left side choose "Threatened & Endangered". Scroll down to the state map and click the county of choice. Species information includes status, counties of occurrence, and a summary of the species' physical description, elevation range and habitat, and some general comments including citations for Federal Register (FR) notices. (The FR is available at most public libraries and on the Internet.) At our website, more information for each species can be obtained at the main page by clicking on "Document Library" and "Documents by Species".

Please note that your action area may not include all or any of the species listed on our webpage. The information at our site and in the FR should be useful to you in determining which species may occur within the action area. Site-specific surveys may be needed to verify the presence or absence of a species or its habitat, in order to complete the analysis of project-related effects.

Threatened and endangered species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat *may be affected* by a federally funded, permitted or authorized activity, the agency needs to consult with us. Please note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant or discountable. An effect exists even if only one individual or habitat segment may be affected. The effects analysis needs to include the entire action area, which often extends well outside the "footprint" of the project (e.g., downstream). If the agency determines that the action may jeopardize a proposed species or adversely modify proposed critical habitat, the agency needs to enter into a section 7 conference. Candidate species, which may be listed on our webpage, are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event they become proposed or listed prior to project completion.

Because this action is located adjacent to Lake Powell you should give particular attention to aquatic and riparian species. For example, if stands of riparian vegetation occur in the action area then the southwestern willow flycatcher (*Empidonax traillii extimus*), federally listed endangered, the bald eagle (*Haliaeetus leucocephalus*), threatened, and the yellow-billed cuckoo (*Coccyzus americanus*), candidate, should be considered. Effects to fish should also be given consideration. Although the proposed elevation of the intake means it will be at considerable depth, the possibility for continued drop in lake elevation should be factored into your effects analysis. One potential effect is the entrainment of fish in the pumps. Also, the "Area of Potential Effect" identified on Figure 2 shows a road about 0.75 mile in length. Surface disturbance associated with improvement to this road and/or increased traffic should be evaluated for effects to terrestrial species.

The California condor (*Gymnogyps californianus*) (condor) was reintroduced as a non-essential experimental population to Vermillion Cliffs, less than 40 miles from the project site. The project site is within the nonessential experimental population area. On National Park System lands in this area condors are treated as threatened species for the purposes of section 7 consultation. Condors are capable of traveling long distances in a short period of time (e.g., 200 miles/day) and tend to follow the Colorado River corridor. Therefore, they have the potential to be in the general project area on a daily basis. Like many scavengers, condors are very curious, and some may be drawn to human activity such as construction. We recommend the following measures if condors occur within the action area:

1. Prior to the start of construction, contact personnel monitoring California condor locations and movement to determine the locations and status of condors in the action area.
2. If a condor occurs at the construction site, cease construction until the condor leaves on its own or until techniques are employed by permitted personnel that result in it leaving the area.
3. Instruct construction workers and supervisors to avoid interaction with condors and to immediately contact the appropriate GCNRA or Peregrine Fund personnel if or when condor(s) occur at a construction site.
5. Clean up the construction site at the end of each day work is being conducted (e.g., trash removed, scrap materials picked up) to minimize the likelihood of condors visiting the site. Complete a site visit to the area to ensure adequate clean-up measures are taken.
6. To prevent water contamination and potential poisoning of condors, a vehicle fluid-leakage and spill plan shall be developed and implemented. The plan should include provisions for immediate clean-up of any hazardous substance and define how each hazardous substance will be treated in case of leakage or spill.

In addition to species listed under the Act, we recommend you consider species protected under the Migratory Bird Treaty Act (MBTA). The MBTA prohibits the take of species on the list of migratory birds (see Section 10.13, Title 50 of the Code of Federal Regulations).

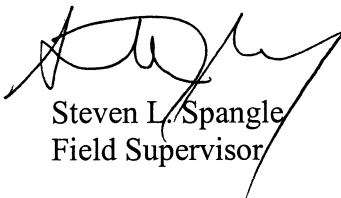
Since the proposed action will occur near Lake Powell, we recommend protecting any riparian vegetation. Riparian areas are essential to biological community diversity and provide linear corridors important to migratory species. In addition, if the project will result in deposition of dredged or fill materials into waters of the United States, we advise contacting the U.S. Army Corps of Engineers, which regulates these activities under Section 404 of the Clean Water Act.

We recommend you contact the Navajo Nation Department of Fish and Wildlife (NNDFWL) for assistance in determining if any Tribally-listed species may occur in your project area. Federal law does not protect some Tribally-listed species. The NNDFWL also houses a natural heritage program (NNHP), which is a database of rare, threatened, and endangered species for the Navajo Nation. The NNHP data provide a more site-specific accounting of species occurrence records that, when used in conjunction with our species by county information, can help identify species occurring in the action area. Because there are areas of the Navajo Nation that have not been inventoried for species of concern and inventory information can become quickly outdated, occurrence records should not be used to rule out the presence of a species, nor should they substitute for on-site surveys. We also recommend that you invite the Navajo Nation to participate in your section 7 consultation.

Thank you for the opportunity to comment on the proposed project. In future communication regarding this project please refer to consultation number 02-21-04-I-0476. If you need more assistance or have any questions, please contact John Nystedt at (928) 226-0614 (x104) or Brenda Smith (x101) of our Flagstaff Suboffice.

Thank you for your continued efforts to conserve endangered species.

Sincerely,



Steven L. Spangle
Field Supervisor

cc: Director, Navajo Nation Department of Fish and Wildlife, Window Rock, AZ
Program Manager, Water Quality, Navajo Environmental Protection Agency, Window Rock, AZ
Superintendent, Glen Canyon National Recreation Area, National Park Service, Page, AZ
NEPA Coordinator, Environmental Services, Bureau of Indian Affairs, Gallup, NM
Tribal Liaison, Fish and Wildlife Service, Albuquerque, NM

THE NAVAJO NATION

P.O. Box 9000 • WINDOW ROCK, ARIZONA • 86515

PRESIDENT
JOE SHIRLEY, JR.
VICE PRESIDENT
FRANK J. DAYISH, JR.

21 October 2004

File#04ECOP02

Greg Martinsen, Ecologist
EcoPlan Associates, Inc.
701 W. Southern Avenue
Suite 203
Mesa, AZ 85210

SUBJECT: NAVAJO GENERATING STATION WATER INTAKE MAINTENANCE PROJECT
PAGE, COCONINO COUNTY, AZ

Mr. Martinsen:

The following information on species of concern¹ is provided in response to your 01 October 2004 request concerning the subject project, which consists of the installation of new water intake facilities on the grounds of the existing pump house. The work will include drilling five new 54-inch diameter hole (for the water intake pipes) to an elevation approximately 100 feet lower than the existing pipes into Lake Powell. Drilling will take place from the cliffs above the lake and occur within the existing water intake site, which houses a facility for pumping water from the lake to the Navajo Generating Station. Borings from the drilling will be transported by truck and disposed of in a large ash pit adjacent to the Navajo Generating Station. The proposed modified water intake structure will not change the annual volume or the seasonal pattern of water withdrawals from those already being made by the Navajo Generating Station.

Although the Navajo Fish and Wildlife Department (NFWD) has no record of species of concern occurring on or near the project site(s) at this time, **the potential for certain species of concern to occur needs to be evaluated.**

Species of concern with **potential** to occur on the 7.5-minute **Page, AZ** quadrangle(s) containing the project boundaries include the following. Potential is based primarily on quadrangle-wide coarse habitat characteristics and species range information. Your project biologist should determine habitat suitability at the project site(s).

1. Aquila chrysaetos (Golden Eagle); NESL group 3; MBTA; EPA.

¹"Species of concern" include protected, candidate, and other rare or otherwise sensitive species, including certain native species and species of economic or cultural significance. For each species, the following tribal and federal statuses are indicated: Navajo Endangered Species List (NESL), federal Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Eagle Protection Act (EPA). No legal protection is afforded species with **only** ESA candidate or NESL group 4 status; please be aware of these species during surveys and inform the NFWD of observations. Documentation that these species are more numerous or widespread than currently known, and addressing these species in project planning and management is important for conservation and may contribute to ensuring they will not be uplisted in the future. Species without ESA or NESL legal protection (e.g., NESL group 4 species) are only included in responses on a regular basis and may not be included in this response. Please refer to the NESL for a list of group 4 species; contact me if you need a copy.

2. Buteo regalis (Ferruginous Hawk); NESL group 3; MBTA.
3. Catostomus discobolus (Bluehead Sucker); NESL group 4.
4. Cinclus mexicanus (American Dipper); NESL group 3; MBTA.
5. Cottus bairdi (Mottled Sculpin); NESL group 4.
6. Empidonax traillii extimus (Southwestern Willow Flycatcher); NESL group 2; ESA endangered; MBTA.
7. Falco peregrinus (Peregrine Falcon); NESL group 4; MBTA.
8. Gila robusta (Roundtail Chub); NESL group 2.
9. Haliaeetus leucocephalus (Bald Eagle); ESA threatened; MBTA; EPA.
10. Mustela nigripes (Black-footed Ferret); NESL group 2; ESA endangered.
11. Ovis canadensis (Bighorn Sheep); NESL group 3.
12. Oxyloma kanabense (Kanab Ambersnail); NESL group 4; ESA endangered.
13. Ptychocheilus lucius (Colorado Pikeminnow); NESL group 2; ESA threatened.
14. Rana pipiens (Northern Leopard Frog); NESL group 2.
15. Waterfowl and shorebirds.
16. Xyrauchen texanus (Razorback Sucker); NESL group 2; ESA endangered.
17. Asclepias welshii (Welsh's Milkweed); NESL group 4; ESA threatened.

Potential for the black-footed ferret should be evaluated if prairie-dog towns of sufficient size (per NFWD guidelines) occur in the project area.

Potential for Puccinellia parishii should be evaluated if wetland conditions exists that contain white alkaline crusts.

Biological surveys need to be conducted during the appropriate season to ensure they are complete and accurate please refer to NN Species Accounts.⁴ Further questions pertaining to surveys should be referred to Species Account. Surveyors on the Navajo Nation must be **permitted** by the Director, NFWD. Contact Jeff Cole at (928) 871-7068 for permitting procedures. Questions pertaining to surveys should be directed to the NFWD Zoologist (David Mikesic) for animals at 871-7070, and Botanist (Daniela Roth) for plants at (928)523-8445. Questions regarding biological evaluation should be directed to Rita Whitehorse-Larsen (Environmental Reviewer) at 871-7060.

On 21 March 1994 (Federal Register, Vol. 59, No. 54), the U.S. Fish and Wildlife Service designated portions of the San Juan River (SJR) as critical habitat for Ptychocheilus lucius (Colorado squawfish) and Xyrauchen texanus (Razorback sucker). Colorado squawfish critical habitat includes the SJR and its 100-year floodplain from the State Route 371 Bridge in T29N, R13W, sec. 17 (New Mexico Meridian) to Neskahai Canyon in the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian) up to the full pool elevation. Razorback sucker critical habitat includes the SJR and its 100-year floodplain from the Hogback Diversion in T29N, R16W, sec. 9 (New Mexico Meridian) to the full pool elevation at the mouth of Neskahai Canyon on the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian). All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of critical habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended. Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

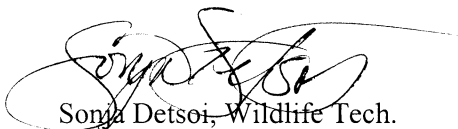
⁴ Available upon request free of charge by contacting Data Manager at 871-6489

Potential impacts to **wetlands** should also be evaluated. The U.S. Fish & Wildlife Service's National Wetlands Inventory (NWI) maps should be examined to determine whether areas classified as wetlands are located close enough to the project site(s) to be impacted. In cases where the maps are inconclusive (e.g., due to their small scale), field surveys must be completed. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. NWI maps are available for examination at the NFWD's Natural Heritage Program (NHP) office, or may be purchased through the U.S. Geological Survey (order forms are available through the NHP). The NHP has complete coverage of the Navajo Nation, excluding Utah, at 1:100,000 scale; and coverage at 1:24,000 scale in the southwestern portion of the Navajo Nation.

The information in this report was identified by the NFWD's biologists and computerized database, and is based on data available at the time of this response. If project planning takes more than two (02) years from the date of this response, verification of the information provided herein is strongly recommended. It should not be regarded as the final statement on the occurrence of any species, nor should it substitute for on-site surveys. Also, because the NFWD's information is continually updated, any given information response is only wholly appropriate for its respective request.

An invoice for this information is attached.

If you have any questions I may be reached at (928) 871-6472.



Sonja Detsoi, Wildlife Tech.
Natural Heritage Program
Department of Fish and Wildlife

xc: file/chrono

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT

2221 WEST GREENWAY ROAD, PHOENIX, AZ 85023-4399
(602) 942-3000 • AZGFD.COM

GOVERNOR
JANET NAPOLITANO
COMMISSIONERS
CHAIRMAN, SUSAN E. CHILTON, ARIVACA
W. HAYS GILSTRAP, PHOENIX
JOE MELTON, YUMA
MICHAEL M. GOLIGHTLY, FLAGSTAFF
WILLIAM H. MCLEAN, GOLD CANYON
DIRECTOR
DUANE L. SHROUFE
DEPUTY DIRECTOR
STEVE K. FERRELL

August 26, 2004

Mr. Donald C. Smith
EcoPlan Associates, Inc.
701 W. Southern Ave.
Suite 203
Mesa, AZ 85210

Re: **Special Status Species Information for Township 41 North, Range 9 East Section 15;
Proposed Navajo Generating Station Water Intake Maintenance Project.**

Dear Mr. Smith:

The Arizona Game and Fish Department (Department) has reviewed your request, dated August 23, 2004, regarding special status species information associated with the above-referenced project area. The Department's Heritage Data Management System (HDMS) has been accessed and current records show that the special status species listed on the attachment have been documented as occurring in the project vicinity (3-mile buffer). In addition this project does not occur in the vicinity of any Designated or Proposed Critical Habitats.

The Department's HDMS data are not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity.

Making available this information does not substitute for the Department's review of project proposals, and should not decrease our opportunities to review and evaluate new project proposals and sites. The Department is also concerned about other resource values, such as other wildlife, including game species, and wildlife-related recreation. The Department would appreciate the opportunity to provide an evaluation of impacts to wildlife or wildlife habitats associated with project activities occurring in the subject area, when specific details become available.

Mr. Donald C. Smith

August 26, 2004

2

If you have any questions regarding this letter, please contact me at (602) 789-3619. General status information, county and watershed distribution lists and abstracts for some special status species are also available on our web site at <http://www.azgfd.com/hdms>.

Sincerely,

A handwritten signature in black ink that reads "Ginger Ritter". The signature is fluid and cursive, with the first name "Ginger" and last name "Ritter" clearly distinguishable.

Ginger L. Ritter

Heritage Data Management System, Data Specialist

SSS:glr

Attachment

cc: Rebecca Davidson, Project Evaluation Program Supervisor
Rick Miller, Habitat Program Manager, Region II

AGFD #08-25-04 (03)

Table 1. Summary of the potential occurrence of USFWS listed species and Navajo Endangered Species within the project area.

Name	Status*	Habitat Requirements	Potential Presence
American dipper <i>Cinclus mexicanus</i>	NESL Group 3	Small, clear streams with a variety of riffles, pools, waterfalls, and instream and streamside boulders.	No suitable habitat. No small streams in the project area.
American peregrine falcon <i>Falco peregrinus</i>	NESL Group 4	Nests on cliffs > 100 feet tall, usually near wetlands or forest habitat.	May forage in the project vicinity. No known eyries in the project vicinity.
Apache trout <i>Oncorhynchus apache</i>	T	Presently restricted to cold mountain streams with many low gradient meadow reaches. Elevation: > 5,000 feet.	No suitable habitat present. No cold mountain streams in the project area. Project area below species' elevational range.
Bald eagle <i>Haliaeetus leucocephalus</i>	T	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey. Elevation: varies.	Wintering individuals may occur in project vicinity.
Bighorn sheep <i>Ovis canadensis</i>	NESL Group 3	Arid, precipitous terrain with rocky slopes and rugged canyons	May occur in project vicinity, but there are no records. Rarely seen in Marble Canyon, approximately 15 miles west of the project area.
Black-footed ferret <i>Mustela nigripes</i>	E, NESL Group 2	Grassland plains, generally found in association with prairie dog colonies. Elevation: < 10,500 feet.	No suitable habitat. No grassland plains or prairie dog colonies in the project area.
Bluehead sucker <i>Catostomus discobolus</i>	NESL Group 4	Rivers and streams, especially swift water areas in mountain streams	No suitable habitat. No swift moving streams in the project area.
Brady pincushion cactus <i>Pediocactus bradyi</i>	E, NESL Group 2	Benches and terraces in Navajo Desert near Marble Gorge. Elevation: 3,850 to 4,500 feet.	No suitable habitat. No Kaibab limestone present in project area. Project below species' elevational range. Nearest known population approximately 15 miles southwest of project area.
California brown pelican <i>Pelecanus occidentalis californicus</i>	E	Coastal land and islands; species found around many Arizona lakes and rivers. Elevation: varies.	May occur in project vicinity as a transient. Very few records for Lake Powell.
California condor <i>Gymnogyps californianus</i>	E	High desert canyonlands and plateaus. Elevation: varies.	May forage in the project vicinity.
Chiricahua Leopard Frog <i>Rana chiricahuensis</i>	T	Streams, rivers, and ponds free from introduced fish, crayfish, and bullfrogs. Elevation: 3,300 to 8,900 feet.	No suitable habitat. Introduced fish, crayfish, and bullfrogs abundant in Lake Powell.
Colorado pikeminnow <i>Ptychocheilus lucius</i>	T NESL Group 2	Backwaters and flooded riparian areas, runs, eddies, and slackwaters of large rivers	Primary occurrence in Lake Powell is at the inflow sites, at least 70 miles northeast of the project area. Very occasionally found in the lake.

Table 1. Summary of the potential occurrence of USFWS listed species and Navajo Endangered Species within the project area.

Name	Status*	Habitat Requirements	Potential Presence
Ferruginous hawk <i>Buteo regalis</i>	NESL Group 3	Badlands, desert grasslands, desertscrub. Elevation: varies.	May forage in the project vicinity. No short cliffs or trees in project area to support nesting.
Fickeisen plains cactus <i>Pediocactus peeblesianus</i> var. <i>fickeiseniae</i>	C, NESL Group 3	Exposed layers of Kaibab limestone on canyon margins or hills of Navajo Desert. Elevation: 4,000 to 5,000 feet.	No suitable habitat. No Kaibab limestone present within the project area. Project below species' elevational range. Nearest known population approximately 25 miles southwest of project area.
Golden eagle <i>Aquila chrysaetos</i>	NESL Group 3	Steep cliffs overlooking desert grasslands or desertscrub Elevation: varies.	May forage in the project vicinity.
Gila chub <i>Gila intermedia</i>	PE	Pools, springs, cienegas, and streams. Elevation: 2,000 to 5,420.	No suitable habitat. No suitable pools, springs, cienegas or streams present in the project area.
Humpback chub <i>Gila cypha</i>	E, NESL Group 2	Large, warm, turbid rivers, especially canyon areas with deep, fast water. Elevation: < 4,000 feet.	No suitable habitat. No large, warm, turbid rivers present in project area; Lake Powell is not considered suitable habitat.
Kanab ambersnail <i>Oxyloma haydeni kanabensis</i>	E, NESL Group 4	Travertine seeps and springs in Grand Canyon National Park. Elevation: 2,900 feet.	No suitable habitat. No travertine seeps or springs within the project area. Project area is above species' elevational range. Nearest known population approximately 55 miles downstream from project area.
Little Colorado spinedace <i>Lepidomeda vittata</i>	T	Moderate to small streams, in pools and riffles with water flowing over gravel and silt. Elevation: 4,000 to 8,000 feet.	No suitable habitat present. No suitable streams in the project area. Project area is below species' elevational range.
Mexican Spotted Owl <i>Strix occidentalis lucida</i>	T, NESL Group 3	Mature montane forest and woodland, shady wooded canyons and steep canyons. Uneven-aged stands with high canopy closure and density. Elevation: 4,100 to 9,000 feet.	No suitable habitat. No forest or woodland habitat in the project area. Project area is below species' elevational range.
Mottled sculpin <i>Cottus bairdi</i>	NESL Group 4	Streams with coarse gravel, usually fast-moving riffle areas.	No suitable habitat. No suitable streams in the project area.
Navajo sedge <i>Carex specuicola</i>	T, NESL Group 3	Silty soils at shady seeps and springs. Elevation: 5,700 to 6,000 feet.	No suitable habitat. No seeps, or springs present within the project area. Project area is below species' elevational range. Nearest known population approximately 20 miles east of project area.
Northern leopard frog <i>Rana pipiens</i>	NESL Group 2	Permanent water including wetlands, streams, ponds, and lakes	No suitable habitat. Introduced predators such as fish, crayfish, and bullfrogs abundant in Lake Powell.
Razorback sucker <i>Xyrauchen texanus</i>	E	Riverine and lacustrine areas; generally not in fast-moving water. May use backwaters. Elevation: < 6,000 feet.	Only occurrence in Lake Powell is at the inflow sites, at least 70 miles northeast of the project area.

Table 1. Summary of the potential occurrence of USFWS listed species and Navajo Endangered Species within the project area.

Name	Status*	Habitat Requirements	Potential Presence
Roundtail chub <i>Gila robusta</i>	NESL Group 2	Pools and eddies in intermediate to large-sized rivers	No suitable riverine habitat. Has been found in the San Juan River, but not in Lake Powell.
San Francisco peaks groundsel <i>Senecio franciscanus</i>	T	Alpine tundra habitat. Elevation: 10,900+ feet.	No suitable habitat. No alpine tundra present within the project area. Project below species' elevational range.
Sentry milk-vetch <i>Astragalus cremnophylax</i> var. <i>cremnophylax</i>	E	Pinyon-juniper-cliffrose on white layer of limestone. Elevation: > 4,000 feet.	No suitable habitat. No white limestone within the project area. Found only on one site in the Grand Canyon. Project area is below species' elevational range
Siler pincushion cactus <i>Pediocactus sileri</i>	T	Desertscrub transitional areas of Navajo, Sagebrush, and Mojave deserts. Elevation: 2,800 to 5,400 feet.	No suitable habitat. No gypsiferous soils of moenkopi formation present in project area. Nearest known population approximately 40 miles west of project area.
Southwestern willow flycatcher <i>Empidonax traillii extimus</i>	E, NESL Group 2	Cottonwood / willow and tamarisk vegetation communities along rivers and streams. Elevation: < 8,500 feet.	No suitable habitat. No dense riparian vegetation in the project area.
Welsh's milkweed <i>Asclepias welshii</i>	T, NESL Group 4	Open, stabilized desertscrub dunes and lee side of active dunes. Elevation: varies.	No suitable habitat. No open desertscrub dunes present within project area. Nearest known population approximately 20 miles west of project area.
Yellow-billed Cuckoo <i>Coccyzus americanus</i>	C, NESL Group 3	Large blocks of riparian woodlands. Cottonwood, willow or tamarisk galleries. Elevation: < 6,500 feet.	No suitable habitat. No dense riparian vegetation within the project area.

*E = Endangered, T = Threatened, PE = Proposed Endangered, C = Candidate. Source: USFWS 2004

NESL = Navajo Endangered Species List

Appendix B

Other Coordination



United States Department of the Interior

BUREAU OF RECLAMATION

Upper Colorado Regional Office
125 South State Street, Room 6107
Salt Lake City, Utah 84138-1102

IN REPLY REFER TO:

UC-720
ENV-1.00

SEP 13 2004

EcoPlan Associates, Inc.
Attn: Mr. Donald C. Smith
701 W. Southern Avenue, Suite 203
Mesa, AZ 85210

Subject: Scoping Concerns Related to Navajo Generating Station Water Intake Maintenance Project (Your Letter Dated August 23, 2004)

Dear Mr. Smith:

Thank you for your letter regarding the proposed environmental assessment for the Salt River Project's proposal to undertake a maintenance project on the water intake system for the Navajo Generating Station near Page, Arizona. Given that Reclamation issued the existing Contract and Grant of Easement No. 14-06-400-5430 for the Navajo Generating Station, the proposed federal action for Reclamation would be a release and extinguishment of the easement. Due to the location of the easement within the state of Arizona, this proposed action falls within the jurisdiction of Reclamation's Western Colorado Area Office in Grand Junction, Colorado. Ms. Kathleen Ozga, Chief, Land and Recreation Group, can be contacted at 970-248-0641 for information or assistance related to the release of the easement. Mr. Terry Stroh, Environmental Protection Specialist, can be contacted at 970-248-0608 for issues regarding environmental compliance. Should you need any assistance with this project, please feel free to contact the Western Colorado Area Office staff.

Sincerely,

Acting
for

Rick L. Gold
Regional Director



SRP- 2004 - 1545 (21617) GC

EcoPlan Associates, Inc.

Environmental Science & Resource Economics

RECEIVED

OCT 05 2004

SEP 29 2004

James Garrison
AZ State Historic Preservation Office
1300 West Washington Street
Phoenix, AZ 85007

Re: Navajo Generating Station Water Intake Maintenance Project

Dear Mr. Garrison:

On August 23, 2004, you were sent a letter inviting you to comment on a Salt River Project (SRP) proposal to undertake a maintenance project on the water intake system for the Navajo Generating Station (NGS) approximately 3 miles northeast of Page, Coconino County Arizona. Eight responses were received by the September 24 due date.

The purpose of this letter is to advise you that the public comment period has been extended to October 29, 2004 per the request of one of the respondents. Please identify any issues or concerns you have regarding this project and mail them to me at EcoPlan Associates, Inc., 701 W. Southern Avenue, Suite 203, Mesa, Arizona 85210; email them to dsmith@ecoplanaz.com; or fax them to 480.733.6661.

As previously stated, the purpose of the project is to ensure the future availability of cooling water for NGS operations due to the continuing decrease of the water surface elevation of Lake Powell associated with the ongoing drought. Current projections indicate the lake surface elevation could fall below the existing NGS water intake elevation of 3,470 feet above sea level by 2009. If severe drought conditions persist, these reduced lake levels could be reached as early as 2006. The proposed project will involve the installation of new water intake facilities on the grounds of the existing pump house facility to withdraw lake water at an approximate elevation of 3,350 feet above sea level. The new intake structures will require SRP to obtain a new easement within the boundary of the Glen Canyon National Recreation Area prior to construction. The proposed modified water intake structure will not change the annual volume or the seasonal pattern of water withdrawals from those already being made by NGS.

In compliance with the requirements of the National Environmental Policy Act (NEPA), an Environmental Assessment (EA) will be prepared to address the potential impacts associated with the construction and operation of the new NGS water intakes. The National Park Service (NPS) will be the lead federal agency responsible for NEPA compliance. The Bureau of Reclamation (USBR) will work cooperatively with the NPS and SRP in developing the EA.

As the project environmental consultant, we will consolidate all comments and forward them to SRP, NPS, and USBR for consideration during project development and completion of the EA. Thank you for your time and assistance.

Sincerely,

Donald C Smith

Donald C. Smith
Senior Environmental Planner

*We look forward to reviewing
the Agency's Section 106 Compliance
Consultation on this undertaking.*

Thank you.

*Ann E. Howard 10/26/04
for J. H. P. O.*



United States Department of the Interior

NATIONAL PARK SERVICE
Glen Canyon National Recreation Area
P.O. Box 1507
Page, Arizona 86040



IN REPLY REFER TO:

NOV 24 2004

H4217 GLCA-1445-C

Mr. James Garrison
State Historic Preservation Office
Arizona State Parks
1300 West Washington Street
Phoenix, Arizona 85007

Subject: Navajo Generating Station Water Intake Maintenance Project located within
Glen Canyon National Recreation Area (NRA)

Dear Mr. Garrison:

The Salt River Project (SRP) proposes to undertake a maintenance project on the water intake system for the Navajo Generating Station (NGS) approximately 3 miles northeast of Page, Coconino County, Arizona. The maintenance activities will require SRP to obtain a new easement within the boundary of Glen Canyon NRA. The issuance of a new easement by the National Park Service (NPS) to SRP constitutes a federal undertaking subject to Section 106 review.

The proposed project involves the installation of new water intake structures on the grounds of the existing pump house facility which is located adjacent to Lake Powell at an elevation of 3,734 feet above sea level. The work includes slant drilling through sandstone bedrock of five new 54-inch-diameter holes in which new water intake pipes and submersible pumps will be installed to withdraw lake water at an approximate elevation of 3,350 feet above sea level. The new intake structures will require SRP to obtain a new easement from NPS prior to construction. Borings from the drilling will be transported by truck to a large ash disposal area on NGS grounds. The proposed modified water intake structure will not change the annual volume or the seasonal pattern of water withdrawals from those already being made by NGS.

The area of potential effect (APE) consists of the existing 1-acre leased parcel and the access road (8.98 acres) which leads to the parcel from Antelope Point Road. In addition, a small water intake facility easement (0.19 acres) will be issued by the NPS for completion of the intake maintenance project. The total APE is 10.17 acres.

The access road, water pipeline, ash disposal area, and the locations of the generating station and pump house facility were previously surveyed intensively by the Museum of Northern Arizona (MNA), the results of which are reported in *"Navajo Generation Station at Page, Arizona:*


Preliminary Report" (Pilles 1969). Four sites were identified within the ash disposal area and later excavated by MNA. The findings were reported in "*Salt River Project Navajo Power Project – Navajo Generation Station Ash Disposal Area, Navajo Indian Reservation, Land District 1, Coconino County, Arizona: Final Report for Archaeological Excavations of Prehistoric Sites NA 10,724; NA 10,725; NA 10,771; and Navajo Site NA 10,774*" (Mueller and Fiero 1971).

The exact width of the access road was not specified by Pilles. No new surface disturbance within the right-of-way will be authorized.

EcoPlan Associates, Inc., completed a Class I records search to identify any additional cultural resources within the APE that could be impacted by the proposed maintenance activities (Strohmayer 2004). The results are reported in "*A Class I Cultural Resource Records Review for the Navajo Generation Station Water Intake Maintenance Project near Page, Coconino County, Arizona,*" and are enclosed for your review and comment. No historic properties were identified within the APE.

Because no historic properties are located within the APE, the NPS recommends that this project can proceed with a finding of "no affect." Please review the enclosed report and the information provided in this letter. If you find the report adequate and agree with the recommendation of the project effect, please sign the concurrence line below and return a signed copy of this letter to us. If you have any questions or concerns, please contact our Cultural Resources Branch Chief Chris Kincaid at 928-608-6277 or by email at chris_kincaid@nps.gov.

Sincerely,


Kitty L. Roberts
Superintendent

Enclosure

cc:
John Keane, SRP
Don Smith, EcoPlan Associates, Inc.

Concurrence

Arizona State Historic Preservation Officer

Date



DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
ARIZONA-NEVADA AREA OFFICE
3636 NORTH CENTRAL AVENUE, SUITE 900
PHOENIX, ARIZONA 85012-1939

September 1, 2004

REPLY TO

Office of the Chief
Regulatory Branch

Donald C. Smith
Senior Environmental Planner
EcoPlan Associates, Inc.
701 West Southern Avenue, Suite 203
Mesa, Arizona 85210

File Number: 2004-01780-DE

Dear Mr. Smith:

It has come to our attention that the Salt River project plans to install new water intake facilities on the grounds of the existing Navajo Generating Station pump house facility. Preliminary information provided by you indicates that project activities will require slant drilling of five, 54-inch diameter holes into which new water intake pipes and pumps will be installed in Lake Powell (Section UNKNOWN, T40N, R9E), Page, Coconino County, Arizona.

This activity may require a Department of the Army permit issued under Section 404 of the Clean Water Act. A Section 404 permit is required for the discharge of dredged or fill material into the "waters of the United States," including adjacent wetlands. Examples of activities requiring a permit are placing bank protection, temporary or permanent stock-piling of excavated material, grading roads, grading (including vegetative clearing operations) that involves the filling of low areas or leveling the land, constructing weirs or diversion dikes, constructing approach fills, and discharging dredged or fill material as part of any other activity.

Enclosed you will find a permit application form and a pamphlet that describes our regulatory program. If you have questions, please contact Daisy Eldridge at (602) 640-5385 x 268. Please refer to file number 2004-01780-DE in your reply.

Sincerely,

A handwritten signature in cursive script that reads "Cindy Lester".

Cindy Lester P.E.
Chief, Arizona Section
Regulatory Branch

Enclosures