

SECTION III

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment, or existing environment that could be affected by the alternatives considered, if they were implemented, for each impact topic retained for further analysis (see Table 1 of the Purpose and Need chapter of this document). Following this description is an analysis of the environmental consequences, or potential impacts, on the natural, cultural, and human environment at Glen Canyon NRA, from the implementation of the two alternatives considered in this EA.

The description of the Affected Environment, along with the description of Alternative A, the No Action Alternative, and the environmental consequences of the No Action Alternative combine to establish the baseline conditions against which the NPS and the public can compare the potential effects of Alternative B, the Agency Preferred Alternative.

METHODOLOGY

For each impact topic, the analysis includes a brief description of the affected environment and an evaluation of effects. The impact analysis involved the following steps:

- Identify the area that would be impacted.
- Develop impact thresholds for intensity, context (local or regional), duration (short or long-term), and type (direct or indirect) of effects. The criteria used to define the intensity and duration of impacts associated with the analyses is presented in Table 2. Direct impacts are caused by an action and occur at the same time and place as the action. Indirect impacts are caused by an action and occur later in time or farther removed from the area, but are reasonably foreseeable.
- Identify and assess potential impacts using designated criteria, a review of relevant scientific literature, previously prepared environmental documents, and the best professional judgment of EA team resource specialists.
- Identify mitigation measures that may be employed to offset potential adverse impacts.

Table 2: Impact Threshold Definitions

Impact Topic	Negligible	Minor	Moderate	Major	Duration
Public Health and Safety	Public health and safety would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on the public health or safety.	The effect would be detectable and would likely be short- term, but would not have an appreciable effect on public health and safety. If mitigation were needed, it would be relatively simple and would likely be successful.	The effects would be readily apparent and long- term, and would result in substantial, noticeable effects to public health and safety on a local scale. Mitigation measures would probably be necessary and would likely be successful.	The effects would be readily apparent and long- term, and would result in substantial, noticeable effects to public health and safety on a regional scale. Extensive mitigation measures would be needed, and their success would not be guaranteed.	Short- term – Effects last one year or less Long- term – Effects last more than one year
Natural Water	Changes to water quality would be either non- detectable or, if detected, would have effects that would be considered slight, local, and short- term.	Changes in water quality would be measurable, although the changes would be small and the effects would be localized. No mitigation measure would be necessary.	Changes in water quality would be measurable and apparent, but would be relatively local. Mitigation measures would be necessary and the measures would likely be successful.	Changes in water quality would be readily measurable, would have substantial and possibly permanent consequences, and would be noticed on a regional scale. Mitigation measures would be necessary and their success would not be guaranteed.	Short- term – Recovers in less than one year Long- term – Takes more than one year to recover
Drinking Water	Changes to water quality would be either non- detectable or, if detected, would have effects that would be considered slight, local, and short- term.	Changes in water quality would be measurable, although the changes would be small and the effects would be localized. No mitigation measure would be necessary.	Changes in water quality would be measurable and apparent, but would be relatively local. Mitigation measures would be necessary and the measures would likely be successful.	Changes in water quality would be readily measurable, would have substantial and possibly permanent consequences, and would be noticed on a regional scale. Mitigation measures would be necessary and their success would not be guaranteed.	Short- term – Recovers in less than one year Long- term – Takes more than one year to recover
Wetlands and Waters of the U.S.	Effects to Waters of the US and/or wetlands would be below or at the lower levels of detection, (less than 1/10 of 1 acres), with no long- term consequences. Falls under the ACOE Nationwide Permit Program. Notification to the ACOE district Engineer is not required.	Effects to Waters of the US and/or wetlands would be detectable and relatively small in terms of area (less than 1 acre) and the nature of the change. Minor mitigation in the form of re- vegetation with native seeds and/or plants may be required. Falls under the ACOE Nationwide Permit Program with notification to the ACOE district	Effects to Waters of the US and/or wetlands would be readily apparent, 1- 5 acres in size, with possible long- term effects on the function and value that would be affected and may possibly be difficult to mitigate. Falls under ACE Individual Permit Program and ACOE district Engineer would be involved in process. Mitigation could	Effects to Waters of the U.S. and/or wetlands would be observable over a relatively large area and would change the character of the wetland or floodplain substantially (greater than 5 acres in size). Function and value could be permanently damaged, and mitigation would likely be unsuccessful. Falls under ACE	Short- term – Recovers in less than 3 years Long- term – Takes more than 3 years to recover * Assumes introduction of invasive weeds is controlled

Table 2: Impact Threshold Definitions

Impact Topic	Negligible	Minor	Moderate	Major	Duration
		Engineer required.	include re-vegetation or replacement in kind of affected resource.	Individual Permit Program and ACOE district Engineer would be involved in process. Mitigation would be limited to replacement in kind of affected resource	
Floodplains	Effects to Floodplains would be below or at the lower levels of detection, with no long- term consequences.	Effects to Floodplains would be detectable and relatively small in terms of area and the nature of the change. Long- term consequences are unlikely.	Effects to Floodplains would be would be readily apparent with possible long- term effects to function and value. Successful mitigation may prove difficult.	Effects Floodplains would be observable over a relatively large area and would change the character of the floodplain substantially. Function and value could be permanently damaged, and mitigation would likely be unsuccessful.	Short- term – Recovers in less than 3 years Long- term – Takes more than 3 years to recover
Vegetation	No vegetation would be affected or some individual plants could be affected as a result of the alternative, but there would be no effect on native species populations and no spread of noxious weeds or exotics. Any effect would be small scale, and no species of special concern would be affected.	Changes in vegetative communities or species populations would be measurable, with small and localized effects to a relatively minor portion of any species population. The alternative would have some spread of noxious weeds and exotics. Mitigation to offset adverse effects, including special measures to avoid spread of noxious weeds and exotics, could be required and would be effective.	Changes in vegetative communities or species populations would be readily apparent, with effects to a sizeable segment of the species' population over a relatively large area. The alternative would have some spread of noxious weeds and exotics. Mitigation to offset adverse effects could be extensive, but would likely be successful.	Changes to vegetative communities or species populations would have a considerable long- term effect and affect a relatively large area in and out of the park. The alternative would have a considerable long- term effect on the spread of noxious weeds and exotics. Mitigation to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.	Short- term – Recovers in less than 5 years Long- term – Takes more than 5 years to recover Recovery is typically very slow in desert vegetation
Wildlife	Wildlife would not be affected or the effects would be at or below the level of detection, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population. Impacts would be well within the	Effects to wildlife would be detectable, although the effects would be short- term localized, and would be small and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.	Effects to wildlife would be readily detectable, long- term and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.	Effects to wildlife would be obvious, long- term, and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.	Short- term – Recovers in less than one year Long- term – Takes more than one year to recover

Table 2: Impact Threshold Definitions

Impact Topic	Negligible	Minor	Moderate	Major	Duration
	range of natural fluctuations.				
Threatened and Endangered Species	No federally listed species would be affected or the alternative would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence to the protected individual or its population. Negligible effect would equate with a "no effect" determination in USFWS terms.	The alternative would affect an individual(s) of a listed species or its critical habitat, but the change would be small. Minor effect would equate with a "may effect" determination in USFWS terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species.	An individual or population of a listed species, or its critical habitat would be noticeably affected. The effect could have some long- term consequence to the individual, population, or habitat. Moderate effect would equate with a "may effect" determination in USFWS terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species.	An individual or population of a listed species, or its critical habitat, would be noticeably affected with a long- term, vital consequence to the individual, population, or habitat. Major effect would equate with a "may effect" determination in USFWS terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species or critical habitat.	Short- term – Recovers in less than one year Long- term – Takes more than one year to recover
Cultural Resources	The impact to archeological resources, National Register Historic Places, and cultural landscapes is at the lowest levels of detection—barely perceptible and not measurable. Impacts would neither alter ethnographic resource conditions, nor alter the relationship between the resource and the affiliated group's body of practices and beliefs.	For archeological resources, the impact affects an archeological site(s) with modest data potential and no significant ties to a living community's cultural identity. The impact does not affect the character defining features of a National Register of Historic Places eligible or listed structure, district, or cultural landscape. Impacts to ethnographic resources would be slight and noticeable, but would neither appreciably alter resource conditions, such as traditional access or site preservation, nor alter the relationship between the resource and the affiliated group's body of practices and beliefs	For archeological resources, the impact affects an archeological site(s) with high data potential and no significant ties to a living community's cultural identity. For a National Register eligible or listed structure, district, or cultural landscape, the impact changes a character defining feature(s) of the resource but does not diminish the integrity of the resource to the extent that its National Register eligibility is jeopardized. Impacts to ethnographic resources would be apparent and would alter resource conditions. Something would interfere with traditional access, site preservation, or the relationship between the resource and the	For archeological resources, the impact affects an archeological site(s) with exceptional data potential or that has significant ties to a living community's cultural identity. For a National Register eligible or listed structure, district, or cultural landscape, the impact changes a character defining feature(s) of the resource, diminishing the integrity of the resource to the extent that it is no longer eligible to be listed in the National Register. Impact to ethnographic resources would alter resource conditions. Something would block or greatly affect traditional access, site preservation, or the relationship between the	Short term – Effects on the natural elements of a cultural landscape may be short- term (e.g., three to five years until new vegetation grows or historic plantings are restored, etc.) Long term – Most cultural resources are non-renewable, so effects would be long term.

Table 2: Impact Threshold Definitions					
Impact Topic	Negligible	Minor	Moderate	Major	Duration
			affiliated group's practices and beliefs.	resource and the affiliated group's body of practices and beliefs would be jeopardized.	
Visitor Use and Experience	Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short- term. The visitor would not likely be aware of the effects associated with the alternative.	Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short- term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.	Changes in visitor use and/or experience would be readily apparent and likely long- term. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.	Changes in visitor use and/or experience would be readily apparent and have important long- term consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.	Short- term – Occurs only during incident response or during the treatment action Long- term – Occurs after the incident or after the treatment action

Cumulative Impacts

The CEQ regulations for implementing the National Environmental Policy Act of 1969 (42 USC 4321 *et seq.*) require assessment of cumulative impacts in the decision making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non- federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects are considered for both the no- action and proposed action alternatives. Other ongoing actions that may result in a cumulative impact are identified in the Purpose and Need Section of this EA.

Impairment Analysis

NPS *Management Policies* (NPS 2001b) requires analysis of potential effects to determine whether or not actions would impair park resources or values.

The fundamental purpose of the NPS, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, actions that would adversely affect park resources and values.

These laws give the NPS the management discretion to allow impact to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the NPS personnel, 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. An impact to any park resource or value may constitute an impairment. Impairment may result from NPS activities in managing the park, from visitor activities, or from activities undertaken by concessioners, contractors, and others operating in the park. An impact would be more likely to constitute an impairment if it has a major or severe adverse effect upon a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park
- identified as a goal in the park's general management plan or other relevant NPS planning documents

A determination on impairment is included in the impact analysis section for all impact topics relating to park resources and values.

Impact Topics

Public Health and Safety

Existing Condition: The health and safety of recreation area visitors and staff is of the utmost importance to the NPS. The NPS is always striving to upgrade facilities to ensure they are as safe as possible for visitors and staff alike. Currently provides potable drinking water at the ramp, campgrounds, Lees Ferry Compound, Glen Canyon Ranger Station, and staff housing that meets or exceeds Safe Drinking Water Act standards. They also provide flush toilets at the ramps, a courtesy dock to assist in the safe transition of people and equipment on and off of all kinds of boats, a contact station for visitors going down river, a bridge to safely cross the Paria River, an access road to Lonely Dell Road and maintained boat launching ramps that increases the safe launching of boats. Without replacement, many of these facilities will likely deteriorate to the point of being unsafe. Additionally, radio communications in the Lees Ferry area is unreliable and requires multiple bouncing of signals.

Impacts of Alternative A

Analysis: Under Alternative A, none of the proposed projects would occur and the health and safety of visitors and staff are likely to be jeopardized as these utilities and facilities would continue to deteriorate and the use of these utilities and facilities would need to be curtailed or abandoned. Additionally, if the water treatment plant is not upgraded and the water intake structure replaced Glen Canyon NRA would not be able to provide potable water to the visiting public or to the campground, potable water taps, staff housing, and work buildings. A lack of raw water due to a non- functioning water intake would also negatively affect the use of the flush toilets, fish cleaning station, fire response, and irrigation water for the Lonely Dell Orchard. If Alternative A were chosen the impact to visitor and staff health and safety would be adverse and long- term and the Lees Ferry area would likely revert to a “use at your own risk

area.” Emergency radio communications would still continue to operate in a patchy and ineffective mode, putting the health and welfare of visitors and staff at risk.

Conclusion: Implementation of Alternative A would result in moderate short- term and long-term adverse impacts on public health and safety depending on the intensity of use at Lees Ferry. There would be no impairment of park values or resources.

Mitigation Measures: None

Impacts of Alternative B

Analysis: Meeting the health and safety needs of the public and staff is the primary reason these projects are being proposed. Under Alternative B, public health and safety would be improved due to stabilization and/or replacement of visitor facilities will ensure visitors are able to view and receive interpretation and use recreation based facilities without fear of harm from failing utility systems and/or deteriorated buildings. Replacing the water intake and treatment facility will ensure staff and visitors alike have an abundant amount of clean fresh water that would meet all federal and state regulatory parameters. Stabilizing the Paria River around the bridge and Lonely Dell access road and installing new USGS gauging station equipment will help to protect these facilities and the visitors using them from storm water damage. Installation of the Grand Canyon NP Repeater facility will help ensure visitors receive timely help when needed. Removing the obstructing curb at the rafting ramp will help ensure the safety of pedestrians and their equipment. Replacing the courtesy dock will help ensure the safe transfer of people and equipment to and from boats.

Construction of these facilities could effect public health and safety by creating fugitive dust emissions, and create walkway and traffic obstructions. Additionally, these facilities would not be available while they are being replaced; causing a temporary nuisance to visitors and staff alike.

Flooding of the Paria River bank behind the Lees Ferry Compound could cause the release of hazardous materials into the environment.

Conclusion: Implementation of Alternative B may cause short- term minor detrimental impacts to health and safety during construction periods associated with the completion of these projects. Additionally, release of hazardous materials could cause long- term minor impacts to visitors to Lees Ferry and users of the Colorado River (assuming flood waters wash over into the Colorado from the Paria River). The Improvements to facilities and utilities at Lees Ferry would have beneficial, minor to moderate, long- term effects to the health and safety of visitors and staff. There would be no impairment of park values or resources.

Mitigation Measures: The Hazardous Material storage areas proposed for the Lees Ferry Compound will be designed to withstand most flooding events. If time permits, all hazardous materials will be moved to high ground prior to storm events likely to breach the river bank behind the compound. Additionally, the maintenance personnel at Lees Ferry will endeavor to use environmentally friendly products and limit the amount of hazardous materials purchased. Glen Canyon NRA dispatch monitors the National Weather Service flashflood warnings and

would initiate evacuation of facilities and surrounding area of visitors and NPS personnel as the likelihood of a flood event greater than the 100- year level occurs. Once evacuation measures are initiated, visitors and staff alike would be urged to seek higher ground, which is only a very short distance and only a very few minutes from this location, thus allowing quick evacuation. NPS staff would assist in evacuations of visitors and complete area checks to determine all visitors are safe.

Appropriate traffic and pedestrian barriers will be placed to protect visitors and staff from construction related injuries.

Best management practices, including control of dust emissions and a traffic and pedestrian management plan will be instituted to ensure that the visitors, staff, and the natural and cultural resources of Lees Ferry are protected to the maximum extent possible.

Water Resources

Natural Waters

Existing Condition: The Lees Ferry area has a number of important water resources including the Colorado River, downstream from the Glen Canyon Dam, the Paria River, several intermittent washes, and groundwater. Each of these water resources could potentially be affected by the proposed alternatives. Other water resources that are common in the region such as seeps and springs do not exist in areas potentially affected by the proposed alternatives.

Colorado River Tailwater: The nature of the Colorado River at Lees Ferry is dominated by the Glen Canyon Dam. Originally a large sediment- laden desert river, the dam has altered the river's temperature, sediment load, and hydrograph. The temperature is relatively constant year- round, averaging 46°F (8°C). The sediment load for which the Colorado River was named now drops out of suspension in the upper reaches of Lake Powell; at Lee's Ferry the river water is clear and nutrient levels are low. The hydrograph, which varied greatly through the year before the dam, is now fairly constant with the greatest variation occurring on a daily cycle and ranging from 5,000 cubic feet per second (cfs) to about 20,000 cfs. Occasional floods, limited by dam capability, are carried out for natural resource related values. Details of the hydrograph are determined by the Secretary of the Interior through the Bureau of Reclamation based on recommendation of the Glen Canyon Dam Adaptive Management Program.

The Colorado River, below Glen Canyon Dam to Lees Ferry supports a self- sustaining rainbow trout population. Changes caused by the Glen Canyon Dam have created an environment that supports trout well, but is not suited for native Colorado River fish. Some native fishes use the river, such as the spackled dace and flannel mouth sucker, but the cold water suppresses spawning.

Paria River: The Paria River is the only major tributary to the Colorado River below Glen Canyon Dam and within. The Paria is one of very few sediment sources for the Colorado River through Grand Canyon. The Paria River enters the Colorado at Lees Ferry after flowing through the historic district and near several of the proposed project areas. The Paria River is particularly important for many additional reasons including spawning habitat for native fish.

Intermittent Washes: Several intermittent washes trace through the Lees Ferry area. These washes are normally dry, during rain events with high run- off the washes flow. These washes typically include numerous pools and other catchments that can hold water after flow has ceased. These temporary pools support unique forms of life specifically adapted to temporary systems. Intermittent streams and their temporary pools are important water resources in desert environments.

Groundwater: Groundwater near the surface at Lees Ferry is intimately linked with the Colorado and Paria Rivers. Other potential water- bearing strata are poorly known and not potentially affected by the proposed alternatives.

Impacts of Alternative A

Analysis: If the intake pipeline or the pipeline leading to the water treatment plan were to fail, river water would most likely flow back downhill and enter the Colorado River, bringing with it sediments from the bank area. Additionally, fresh water would not be available for drinking, washing hands or flushing the toilets, which could lead to human wastes entering the waterway. If this scenario happened, Glen Canyon NRA maintenance staff would place micro- flush portable comfort stations (with toilets) in the ramp area and endeavor to repair the water line as soon as possible.

Conclusion: Alternative A would result in short- term, negligible to minor adverse impacts to the quality of natural water available at Lees Ferry. There would be no long- term impacts to the quality of natural waters. There would be no impairment of park values or resources.

Impacts of Alternative B

Analysis: The following projects could contribute construction related pollutants and sediments, which could temporarily degrade water quality (ie, during the construction period);

- USGS Gauging Station – on the Paria River
- Courtesy Dock Replacement – on the Colorado River
- Replace water intake facility – on the Colorado River
- Stabilize the bridge over the Paria River and Lonely Dell Access Road – on the Paria and Colorado Rivers
- Rehabilitate Drainage Structures located along Lees Ferry Access Road – on intermittent washes and the Colorado River.
- Lees Ferry Compound – on the Colorado River
- Remove Curb at Rafting Ramp – on the Colorado River

The Paria River contributes the majority of sediments to this portion of the Colorado River and this sediment is an important component to the natural water of the river, helping to support a wide array of native wildlife. Construction of the stabilization of the Paria riverbank could require the grading and re- contouring of up to 10 acres of riverbed and bank. During construction, any water present will have to be either impounded or re- routed, which could decrease or increase the amount of sediment that reached the Colorado River. Additionally, stabilizing the river bank will of itself limit the amount of erosion based sediment that is available for movement downstream.

Conclusion: Construction of the proposed projects would result in short- term, moderately adverse impacts on water resources. There would be no long- term impacts to the quality of natural waters. There would be no impairment of park values or resources.

Mitigation Measures: As required by the Clean Water Act, prior to the start of each project staff or their paid contractors will obtain an Arizona Pollutant Discharge Elimination Permit from the State of Arizona. This permit requires the completion of a storm water management plan and erosion control plan. Using the best management practices available, these plans include instructions on the placement of barriers to insure construction related pollutants and sediments do not enter surface waters in the Lees Ferry Area. Additionally, during the design of the stabilization of the Paria riverbank, special care will be given to ensure that only minimal amounts of sedimentation are captured and that the majority of sediments reach the Colorado River.

Drinking Water

Existing Conditions: The Lees Ferry Water System is classified as a Transient Non-Community Public Water System which serves a population of approximately 480 through 12 connections. This small water system consists of an intake pump capable of providing 110 gallons per minute of raw surface water, a “Conventional” filtration water treatment plant (WTP) with a maximum production capacity of seventy (70) gallons per minute, a 175,000 gallon elevated water tank, and a three- legged distribution system. The three legs include the Campground Main, the Housing Main, and the Main Ramp/Lonely Dell Ranch Main.

The Lees Ferry raw water intake is located on the Colorado River below the Glen Canyon Dam. The intake structure consists of a gravel packed infiltration zone raw water intake/infiltration gallery and a fenced raw water intake locked pumping vault/wet well. The pump delivers water to the water treatment plant through underground piping.

The Lees Ferry Surface Water Treatment Plant (WTP) is a full treatment, standard (“Conventional”) filtration plant that is rated at a maximum production capacity of 70 gallon per day (GPM) but operates most efficiently at fifty 50 GPM or less. 50 GPM meets or exceeds peak summer demand of 25,000 GPD without difficulty. This “Conventional” filtration WTP consists of automated Programmable Logic Controller (PLC) controls, a 2,000 gallon fiberglass clear well/surge tank (contact tank), a 6,500 gallon backwash retention tank, and a hypo- chlorinator, all located within the Water Treatment Facility in the Lees Ferry Compound.

The WTP also controls, through the PLC and automated valves, raw water that is distributed to the Lonely Dell Ranch Orchard. The WTP calls for the intake pumps to provide raw water to the plant but the automated valves divert the water to the Lonely Dell Ranch Orchard just prior to entering the plant’s water treatment process.

Impacts of Alternative A

Analysis: If the raw water intake system and the water treatment plant are not replaced, the NPS will lose the ability to produce potable water at Lees Ferry. Drinking water will then need to be

brought in by truck and stored prior to dispensing. Drinking water quality impacts tend to increase as more intermediary steps are included.

Conclusion: Alternative A would result in negligible to minor, long- term adverse impacts to the quality of drinking water available at Lees Ferry. There would be no impairment of park values or resources.

Mitigation Measures: None

Impacts of Alternative B

Analysis: Replacing the raw water intake system and water treatment facility will help ensure safe drinking water is available for all visitors and staff using the Lees Ferry area. As currently configured, the current treatment plant cannot meet the soon to be invoked changes to Arizona State drinking water standards. Additionally, the buried pipeline associated with the raw water intake system is badly degraded and collapse could occur at any time.

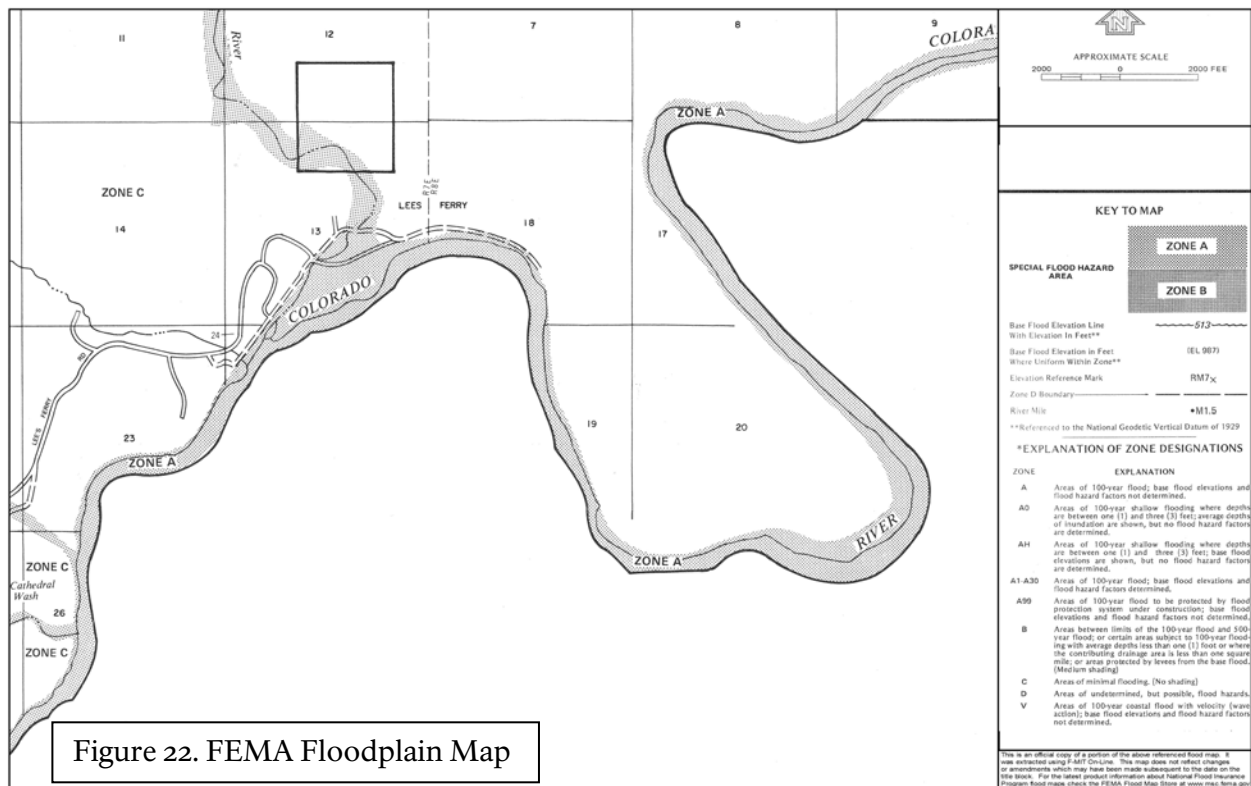
Conclusion: Alternative B would result in a minor, long- term beneficial impact to the quality of drinking water available at Lees Ferry. There would be no short- term impacts to the quality of drinking waters. There would be no impairment of park values or resources.

Mitigation Measures: None

Floodplains

Existing Condition: The Lees Ferry Compound is situated on the combined alluvial fan of the Paria River and gravel bar deposited by the Colorado River. The Federal Emergency Management Administration (FEMA) has identified this geologic formation as a flood plain as illustrated by FEMA Flood Map 0400190375B, subject to varying degrees of flooding by a 100-year precipitation event on the Paria River. Due to many variables including a local bridge over the Paria River, remnants of old channels left during the meandering period of the Paria River, varying river cross- sections, and constructed earthen features, the flood depths range from zero to approximately 14 feet. The area in which the existing compound is located has been in continuous use at least since the early 1970's when the water treatment plant was constructed. The compound is currently comprised of the water treatment plant, the Grand Canyon NP Ranger Contact Station and storage buildings, and the Glen Canyon NRA maintenance and storage buildings.

Other agencies, including the USGS and AZ Game and Fish Department, park boats and store scientific equipment within the compound. This is the most visited area at Lees Ferry and these are the most heavily used public facilities.



Sited adjacent to the 14 day parking lot where boaters park their vehicles and boat trailers, the taking river trips down the Grand Canyon. Grand Canyon NP rangers working out of the existing contact station provide visitors with information on various recreational activities, and maintain an NPS presence for the public. The Grand Canyon NP contact station is within easy walking distance to the boaters' input ramp and the comfort station. The compound and contact station are located in an appropriate location to initiate Search and Research (SAR) operations on the Colorado River or in the backcountry.

Impacts of Alternative A & B

Analysis: On March 24, 2006, a survey was undertaken to determine what effect a 100- year flood event of the Paria River would have on the structures and occupants of the compound. Based on this site visit and hydrologic analysis, it was determined by NPS hydrologists that the area within the compound would not be subject to flooding due to the 100- year event. The analysis shows that the river is approximately 14 feet deep and contained within the river banks, with approximately 12 to 18 inches of riverbank remaining above the flood level. However, downstream, the river may top the bank and follow remnants of old channels. These channels appear to act as a safety valve by lowering the river's surface gradient and providing the freeboard. The point at which the trajectory of the river aligns with the compound, the compound is approximately 350 feet from the river bank and is therefore unlikely to be affected. However, the area may be vulnerable in a rare 500 year event, which could top the riverbank. Additionally, demolition of the existing facilities and construction of new facilities within the

compound would not change current flood flow patterns. Therefore, the adverse impacts to the floodplain from the proposed alternative would be direct, negligible to minor and short to long-term depending on level of flooding event. NPS policies require parks to complete a Statement of Findings (SOF) if a project is going to adversely impact a floodplain. The SOF, which is located in Appendix B, summarizes the investigation and identifies any mitigation measures.

Conclusion: The Lees Ferry Compound and has been in its current location at least since the early 1970's, initially as the site for the water treatment plant. Facility management and maintenance activities are anchored to the water treatment plant, and resource and visitor protection activities to the Colorado River access and adjacent historic district, and close to the compound. This locale is optimal for staging NPS operations and providing direct services for the parks' visitors. It provides sufficient space for upgrading existing facilities to current standards and adding needed structures for the protection of equipment and materials. Relocating these facilities out of the floodplain would be exorbitant in cost, reduce essential services to visitors, and reduce operational efficiencies. There would be short-term impacts to the floodplain due to construction activities. There would be moderate, long-term, adverse impacts to the floodplain due to the continued placement of the existing and/or new facilities associated with the Lees Ferry Compound. There would be no impairment of park values or resources.

Mitigation Measures: To mitigate impact on the floodplain, all new construction would be confined to the previously disturbed area, and as a consequence, above the 100-year flood stage. The current communication and warning system will be maintained in order to evacuate visitors and their personal property in the event of a severe storm over the Paria River drainage.

Glen Canyon NRA dispatch monitors the National Weather Service flashflood warnings and would initiate evacuation of facilities and the surrounding area of visitors and NPS personnel as the likelihood of a flood event greater than the 100-year level occurs. They will be provided with a figure that shows the amount of water in cubic feet per second needed to reach a level above the 100-year flood stage. Once evacuation measures are initiated, visitors and staff alike would be directed to seek higher ground, which is only a very short distance and only a very few minutes from this location, thus allowing quick evacuation. NPS staff would assist in evacuations of visitors and complete area checks to determine all visitors are safe.

Wetlands and Waters of the United States

Existing Conditions: The U.S. Army Corps of Engineers (USACE) has jurisdiction over protecting Waters of the U.S., including wetlands under section 404 of the Clean Water Act. Waters of the U.S. are defined as waters that are navigable for interstate commerce and their tributaries. The Colorado River has been identified as a navigable waterway. The Paria River and several large washes are contributing tributaries within the Lees Ferry area and would also be considered the jurisdiction of the USACE. The USACE has developed an extensive permitting process to ensure projects affecting jurisdictional waters [(Water of the U.S. found below the regulatory defined "ordinary high water mark") OHWM] do not compromise water quality. Typically these permits come with a variety of mitigation measures to which the applicant must adhere. The NPS regularly applies for USACE permits as part of their

construction planning and incorporates any mitigation measures into their construction specifications and design plans.

Wetlands are a type of “Waters of the U.S.” and also generally fall under the jurisdiction of the USACE. Wetlands are defined as “areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3[b]). Wetlands have three diagnostic characteristics that include (1) over 50% of the dominant species present must be classified as obligate, facultative wetland, or facultative, (2) the soils must be classified as hydric, and (3) the area is either permanently or seasonally inundated (US ACOE 1987). There are small patches of wetland vegetation along the bottom and sides of the Paria River, along the bank of the Colorado River between the supports for the courtesy dock and on either side of the water intake structure.

Impacts of Alternative A – There would be no impacts and no impairment of park values or resources.

Impacts of Alternative B

Analysis:

Water Intake Replacement

The intake structure consists of a gravel packed infiltration zone for raw water intake and a fenced- in raw water intake pumping vault. While a variety of wetland species occurs on either side of the fenced vault site, the area within the fence is regularly maintained, including mowing of vegetation, which mainly consists of non- native, non-wetland grasses. Construction of the project would require the removal of all vegetation growing on the graveled infiltration zone and the rock containment wall located between the two.

Courtesy Dock Replacement

While the majority of the dock floats on the Colorado River, the walkway to the dock is suspended on support structures that are fixed to the banks. A small amount of the wetland species that occurs all along the bank would be permanently displaced due to the installation of the support structures. There may also be some short- term trampling of vegetation while installation is completed.

Stabilization of Erosion of the Paria River Banks

The Paria River, which is classified by the U.S. Geological Survey as a perennial stream, is a major tributary to the Colorado River and as such falls under the jurisdiction of the USACE. Stands of wetland species can be found on sand bars and on either bank throughout the length of the Paria within. This project may require the placement of stabilization devices that would require the removal of all the vegetation growing along terraces and on the river bottom. Currently the maximum extent of the study area is 2500’ x 175’ “or about 10 acres in size.

Rehabilitate Drainage Structures Located along Lees Ferry Access Road, including Cathedral Wash and No Name Wash

Because of the intermittent nature of the washes located along Lees Ferry access road, true wetland species are not present, but rather more ephemeral riparian species persist.

Conclusion: The previously listed projects could have direct short and long- term negligible to moderate impacts on wetlands and waters of the U.S. There would be no impairment of park values or resources.

Mitigation Measure: Because a portion of each of the proposed projects would occur in jurisdictional waters, the NPS would need to obtain the appropriate level of permit from the USACE. This permit would require the development of best management practices to ensure pollution does not reach waters of the U.S. and minimizes the loss of wetlands. It also requires replacement of any wetlands lost during construction. As is typical in these types of projects, if impacts are small and there is a surrounding seed bank, restoration generally consists of natural re- growth over the construction site. For a project the potential size and scope of the stabilization of the Paria riverbanks would require the development of a specific mitigation plan for wetlands. The most likely scenario would include use of erosion control structures that are able to support plant growth along with use of seeds and possibly live plants. Level of restoration is dependent on life cycle needs of plants targeted for replacement.

Wildlife, Vegetation and Endangered Species

Existing Condition:

Vegetation: There are generally two Desert shrubland shadscale (*Atriplex confertifolia*) communities found at Lees Ferry. One of these is found on the Moenkopi formation, while the second occurs on Kaibab limestone. Although both are dominated by shadscale, the herbaceous species are different. The Kaibab limestone community supports the listed endangered Brady's pincushion cactus (*Pediocactus bradyi*.) Floristically the shadscale shrublands that occur on limestone is more diverse than on the Moenkopi soils, with numerous forbs and annuals. The exotic grass species, *Schismus arabicus* has invaded this limestone community, and may pose a threat to the *Pediocactus* since it is fire adapted and creates a fire cycle.

The dry wash community (i.e. Cathedral Wash) includes mixed shrubs, forbs and annual species with no clear dominants. Arizona State Species of Concern, the Marble Canyon spurge (*Euphorbia aaron- rossii*) occurs where these small dry washes reach the cliffs along the Colorado River.

Wildlife: Lees Ferry is situated on a major bird migration route up that follows the Colorado River. Almost 200 species have been documented from the area. Bi- weekly surveys between 1994 and 1998 documented 114 songbirds using the Lonely Dell Ranch area and the riparian vegetation near the launch ramp. Large numbers of waterfowl seek refuge at Lees Ferry between October- January during the hunting season, with concentrations of more than 2000 birds of 20 or more species some years. A Peregrine falcon (*Falco peregrinus*) eyrie occurs across the Colorado River in the vicinity of Paria Riffle Beach, and golden eagles (*Aquila chrysaetos*) and red- tailed hawks (*Buteo jamaicensis*) frequently use the area for foraging. Great Blue herons

(*Ardea herodias*) have been nesting across the river from the launch ramp since 1998. Cooper's hawks (*Accipiter cooperii*) are known to nest in the Chinese Elm trees at Lonely Dell Ranch.

A variety of mammals are found at Lees Ferry including coyotes (*Canis latrans*), bobcats (*Felis rufus*), black tailed jackrabbit (*Lepus californicus*), beaver (*Castor canadensis*), ground squirrels, bats and variety of mice, and rats. Reptiles include a variety of snakes and lizards. Amphibians also inhabit the area. Arizona State Listed Species of Concern, the Grand Canyon Pink Rattlesnake has been seen in the Lees Ferry Area.

The Colorado and Paria Rivers are home to a variety of native and non- native game fish. Rainbow trout (*Oncorhynchus mykiss*) a non- native game fish species dominates the Colorado River from the dam down to the insertion point of the Paria near the Paria riffle fishing beach. In the main body of the Paria River and below the insertion point, where the water from the incoming Paria warms and adds silt to the Colorado, Red shiner (*Cyprinella lutrensis*), Flannel mouth sucker (*Catostomus latipinnis*), Bluehead suckers (*Catostomus discobolus*), Roundtail chub (*Gila robusta*), Fathead minnows (*Pimephales promelas*), Mosquito fish (*Gambusia affinis*) and Speckled dace (*Rhinichthys osculus*) are more likely to occur. Carp (*Cyprinus carpio*) and Flannel mouth suckers (*Catostomus insignis*) an Arizona state listed species of concern, can be found in the Paria during the spring when water levels are high.

Impacts of Alternative A

Analysis: Under this alternative there would be no impacts to vegetation or wildlife species and there would be no impairment of park values or resources.

Mitigation Measures: None

Impacts of Alternative B

Analysis: With the exception of the stabilization of erosion of the Paria River bank project, the impacts to vegetation and wildlife from all the remaining proposed projects would be negligible to minor, short- term, indirect, and highly localized.

Lees Ferry Compound – The majority of the compound within the existing fence line is already denuded of vegetation. Wildlife found within the fence line consists mainly of mice and ground squirrels. The existing compound is surrounded by large tamarisk trees, which are considered an invasive species in Coconino County. Some of these trees will need to be removed in order to accommodate the construction within the compound as well as the pull through drive. Most birds using these trees for foraging and roosting are year around residents that includes owls and ravens.

Paria Repeater Site – Some vegetation may be removed as the access road is completed. Due to the very sparse nature of the vegetation in the area, which is mostly comprised of slick rock, the amount to be removed is very minor and will recover on its own. There may also be some small amount of inadvertent death of small burrowing rodents, reptiles and insects within the road corridor. Wildlife and vegetation species found in the project area are ones commonly found

throughout this part of Arizona. They also tend to reproduce at prodigious speed to fill territory openings. The repeater site is entirely sited on slick rock and will not affect vegetation.

Replace Water Intake - There is some minor amount of riparian vegetation that will need to be removed along the intake and transfer pipelines. Removing the stones covering the intake pipeline in the river as well as removing and replacing the pipeline itself may cause a minor amount of short- term sediment disturbance, which depending on the time of year could affect hatching trout. During the water- fowl migratory season, the area around the water intake provides cover for roosting and foraging.

Replace USGS Monitoring Station - Project may require the removal of one or more cottonwood tree seedlings.

Improve Arizona Hiking Trail - Use of the trail portion that follows the Lees Ferry access road, may impact some vegetation species through trampling from foot traffic. Construction of the portion of the trail by the Lees Ferry Compound would require specific trail contouring that may remove native and non- native plants along the path as well as fill small animal holes in the path.

Lees Ferry Access Road Drainage Repair Projects - Repair and/or replacement of metal and concrete box culverts and other drainage structures will likely require the removal of a minimum of native and non- native vegetation species.

Ramp Area Curb Removal - Removal of the curb and placement of a graded and graveled drive would require the removal of the local plant cover, including several large tamarisk trees. Construction so near the river could also allow construction- based pollution to enter the river.

Stabilization of Erosion of the Paria River bank - Impacts to vegetation and wildlife would be minor to major, short- term, direct and indirect, and highly localized.

This project may require the placement of stabilization devices that would require the removal of all the vegetation growing along the riverbottom on terraces. Currently the maximum extent of the study area is 2500" x 175 "or about 10 acres in size. Construction activities could contribute construction- based pollution to the river, which in turn could affect those fish species using the Paria for breeding. Additionally, diverting or impounding the stormwater flow could also affect the ability of fish species to breed in the river.

Conclusion: Alternative B would generally result in minor to major, short- term, highly localized adverse impacts to vegetation and wildlife due to construction activities.

Alternative B would not produce major adverse impacts or impairment of wildlife resources or values whose conservation is necessary to the purpose of the establishing legislation of the recreation area, key to the natural or cultural integrity of the recreation area or opportunities for enjoyment of the recreation area, or identified as a goal in the recreation area's general management plan or other NPS planning documents.

Mitigation Measures: Projects along the banks of the Colorado River will be accomplished during the low- water season and appropriate water retention systems will be installed if

necessary, to protect water quality. Best Management Practices would be instituted to control the movement of storm- water runoff from construction projects into the Paria and Colorado Rivers in order to protect fish species from construction impacts.

All construction plans would include protective measures to ensure there are no introductions of weeds.

Most vegetation removed during construction projects will be replaced within a growing season through natural processes if weeds are controlled. Gabion structures and finger dikes can be constructed to encourage the growth of native species on the top and sides of these structures.

All of the vegetation or wildlife species being removed by the construction of the proposed projects are common throughout the northern portion of Arizona and their individual removal will not impact the overall numbers or health of the remaining members.

Threatened and Endangered Species

Existing Conditions: Species listed as endangered, threatened and candidates for listing are included on Table 3. Species or potentially suitable habitat for listed species likely to be present within this analysis area is discussed in sections following Table 3. Species listed by the USFWS for which suitable habitat is not present within the analysis area are eliminated from further discussion.

Table 3			
Species Listed in Coconino County, Arizona			
<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>	Habitat available for species within the analysis area in
Apache Trout	<i>Oncorhynchus apache</i>	T	No, Habitat Not Present
Bald Eagle	<i>Haliaeetus leucocephalus</i>	AD, T	Yes
Black- Footed Ferret	<i>Mustela nigripes</i>	E, EXPN	No, Habitat Not Present
Brady Pincushion Cactus	<i>Pediocactus bradyi</i>	E	Yes
California Brown Pelican	<i>Pelecanus occidentalis</i>	DM, E	No, Coastal Vagrant
California Condor	<i>Gymnogyps californianus</i>	E, EXPN	Yes
Chiricahua Leopard Frog	<i>Rana chiricahuensis</i>	T	No, Habitat Not Present
Fickeisen Plains Cactus	<i>Pediocactus peeblesianus fickeiseniae</i>	C	No, Outside Known Range of Species
Humpback Chub	<i>Gila cypha</i>	E	Yes
Kanab Ambersnail	<i>Oxyloma kanabense</i>	E	No, Outside Known Range of Species

Table 3			
Species Listed in Coconino County, Arizona			
<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>	Habitat available for species within the analysis area in
Little Colorado Spinedace	<i>Lepidomeda vittata</i>	T	No, Outside Known Range of Species
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	T	No, Habitat Not Present
Navajo Sedge	<i>Carex specuicola</i>	T	No, outside of known range of species
Razorback Sucker	<i>Xyrauchen texanus</i>	E	No, Outside of Known Range of Species
San Francisco Peaks Groundsel	<i>Senecio franciscanus</i>	T	No, Outside Known Range of Species
Sentry Milk- Vetch	<i>Astragalus cremnophylax</i> <i>var. cremnophylax</i>	E	No, Outside Known Range of Species
Siler Pincushion Cactus	<i>Pediocactus</i> (= <i>Echinocactus</i> ,= <i>Utahia</i>) <i>sileri</i>	T	No, Outside Known Range of Species
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	E	No, Habitat Requirements Not All Present – Surveys Were Conducted For Past 10 Years – All Negative
Welsh's Milkweed	<i>Asclepias welshii</i>	T	No, Habitat Not Present In GCNRA
Yellow- Billed Cuckoo	<i>Coccyzus americanus</i>	C	Yes, This species identified on the Colorado River upstream from the Lees Ferry Area during migration surveys.

Coconino County list of endangered species was obtained from:

<http://ifwzes.fws.gov/EndangeredSpecies/lists/ListSpecies.cfm>

Flora species distribution information was obtained from Arizona Rare Plant Field Guide, fauna species distribution was obtained from: <http://www.gf.state.az.us>.

Information on Species That Occur In the Lees Ferry Analysis Area

Brady pincushion cactus (*Pediocactus bradyi*) grows between 3400 and 4600 feet elevation in open, exposed, sunny locations on the Kaibab Limestone. This cactus occurs among sparse

vegetation characterized by scattered shrubs like shadscale and torrey jointfir, a variety of grasses, and annuals. Glen Canyon NRA currently monitors this plant species on a bi- yearly basis.

The humpbacked chub (*Gila cypha*) is an endangered fish of the Colorado River system. Designated critical habitat for this species occurs from the inflow of the Paria River down the Colorado River.

Bald eagles (*Haliaeetus leucocephalus*) can be found in Glen Canyon NRA, primarily on slick rock around the Lake Powell shoreline during the wintertime. They may be occasionally seen along the Colorado River below the Glen Canyon Dam.

Yellow- Billed Cuckoo (*Coccyzus americanus*) has been seen very occasionally during annual migratory bird surveys on the Colorado River below Glen Canyon Dam. There is no record of this species nesting in Glen Canyon NRA. This species, which is declining in numbers, nest in thick stands of riparian vegetation that is dominated by mature willow and cottonwood trees. It is likely that the sightings were migratory birds that were seen roosting or foraging.

The Lees Ferry area is included in the Northern Arizona California Condor Nonessential Experimental Population Area where **California condors** (*Gymnogyps californianus*) have been reintroduced. California condors generally roost in rocky cliffs or in trees in the mountains and foothills of this arid region. Condors are common below Glen Canyon Dam along the Colorado River, particularly in the area of Marble Canyon and Navajo Bridge.

Impacts of Alternative A

Analysis: There would be no impacts and no impairment of park values or resources.

Impacts of Alternative B

Analysis:

Brady's Pincushion Cactus: The proposed Arizona Road trail will be located about ½ mile from several populations of Brady's pincushion cactus. Due to the extreme summer heat, use of this trail is likely to be highest during the late fall, winter and early spring. This species lays dormant and retracts into the soil much of the year and is only above ground during the late spring growing season if sufficient liquid (rain or snow) has fallen. It is expected that the numbers of people actually hiking this portion of the Arizona Trail will be quite small and there is little chance that users would stray off trail and accidentally trample individuals of this species. In order to prevent illegal removal or poaching of this species, the exact locations of this species will not be included in this document. In accordance with Section 7 of the ESA, Glen Canyon NRA biologists have determined that the proposed project would have a "may affect, not likely to adversely effect" on this species.

California condor: Condors can regularly be seen soaring in the Lees Ferry Area, are attracted to human activities, especially construction projects, where they can be physically injured or accidentally poisoned. In accordance with Section 7 of the ESA, Glen Canyon NRA biologists

have determined that the proposed project would have a “may affect, not likely to adversely effect” on this species.

Bald Eagles: Bald eagles are only rarely seen below Glen Canyon Dam, usually right at Lees Ferry where foraging is easier due to the lack of high vertical cliffs as well as width of the Colorado River at this point. They are only seen foraging in the winter and have not been seen in the Lees Ferry area any other time of the year. It is theorized that the birds seen at Glen Canyon NRA in the winter are members of the Arizona Population that nests in the southern part of the state. Additionally, the bald eagles in the NRA are able to move freely from one roost site to another and always vacate an area being occupied (even temporarily) by humans. In accordance with Section 7 of the ESA, Glen Canyon NRA biologists have determined that the proposed project would have a “may affect, not likely to adversely effect” on this species.

Humpbacked chub: Critical habitat for this species has been created within along a stretch of the Colorado River, from the mouth of the inflowing Paria River to boundary with Grand Canyon NP. This species requires the presence of warm silt laden waters, which the Paria provides. Due to the presence of Glen Canyon Dam, the Paria River is the 1st major point where large amounts of silt enter the Colorado River. Completion of the stabilization of the Paria River banks has the possibility to have an minor, long- term indirect impact to this species and its critical habitat by lessening the amount of silt running into the Colorado River by trapping or impeding the movement of silt. There could also be a minor, short- term increase in movement of silt during the construction phase. In accordance with Section 7 of the ESA, Glen Canyon NRA biologists have determined that the proposed project would have a “may affect, not likely to adversely effect” on this species.

Yellow billed cuckoo: Suitable migratory roosting and foraging habitat for this species only occurs upriver and around several bends of the Colorado River. None of the projects proposed in this EA would affect this species during its migration. In accordance with Section 7 of the ESA, Glen Canyon NRA biologists have determined that the proposed project would have a “no affect” on this species.

Conclusion: The proposed projects would have short- term negligible adverse impacts the above identified threatened and/or endangered species. There would be no impairment of park values or resources.

Mitigation Measures:

Brady’s pincushion cactus: The trail guide will remind hikers to stay on the trail. Additionally, natural resource staff will continue to monitor this species to determine if hiking is having detrimental impacts on this species. If there are detrimental impacts, use of this trail may be curtailed or suspended.

California condor: In cooperation with the Arizona Game and Fish Department and the U.S. Fish and Wildlife Service, has established as set of mitigation measures to protect this species from construction projects impacts. These mitigation measures would be incorporated into all construction documents:

- If a condor is spotted directly on or over the construction site, activities will cease until

the bird leaves or is driven off by a biologist.

- Construction workers and supervisors are instructed to avoid interaction with condors and to immediately contact the appropriate Park personnel if and when the condor(s) settle at the construction site.
- The construction site will be cleaned up at the end of each day (e.g., trash removed, scrap materials picked up) to minimize the likelihood of condors visiting the site.
- All dead animals found within 500- feet of the construction zone will be immediately disposed of by placing the carcass the nearest available dumpsters.
- To prevent water contamination and potential poisoning of condors, a Spill Prevention and Cleanup Plan (SPCP) will be developed and implemented for this project. It will include provisions for immediate clean- up of any hazardous substance, and will define how each hazardous substance will be treated in case of leakage or spill. This plan needs to consider possible leakage from support vehicles as well as the drill rig(s). Please forward a digital copy on CD of the plan to the Environmental Specialist at Glen Canyon National Recreation Area, P.O. Box 1507, Page, AZ 86040.
- All drilling personnel will be given a copy of the enclosed literature regarding condor concerns.
- Project personnel are strictly prohibited from hazing condors (chasing, flapping arms, throwing objects, honking horn, etc.)

Humpbacked Chub: A Glen Canyon NRA approved storm water pollution prevention plan that includes erosion control will be required for each project, which will greatly reduce the possibility of construction related pollution affecting this species.

Yellow- billed Cuckoo: None

Bald Eagles: None

Cultural Resources

Existing Conditions: A majority of the projects lie within the boundaries of the Lees Ferry/Lonely Dell Ranch Historic District (LFLD Historic District). The most recent form nominating this property to the National Register of Historic Places was completed in July, 1997, and the property was accepted for listing on the National Register in November of the same year. The District contains a total of 26 contributing elements, including numerous historic structures, a cemetery, irrigation ditch, and the remains of an historic steamboat. Also contained within the district are numerous modern non- contributing structures including maintenance buildings, launch ramp and comfort station. Additionally, Lonely Dell Ranch has been identified by the Secretary of the Interior as a Historic Landscape.

The significance of the District is based on its association with early Mormon settlement, early ranching and agriculture, early mining, early U.S. Geological Survey exploration, the exploration and development of the Colorado Plateau, and transportation across the Colorado River.

In 2000 the NPS completed an Historic Structures Report for the District which summarizes its history in 5 separate phases: The **Introductory Era** (including Native American occupation and early European exploration), the **Mormon Crossing Era** (including early operation of the ferry by Jacob Hamblin, John D. Lee, the Johnson family, and James Emmet), the **Final Ferry Era** (including Charlie Spencer's mining operations, the operation of the Grand Canyon Cattle Company, the beginning of USGS operations, and the creation of a polygamist retreat by the Johnson family), the **Recent Era** (including the construction of the "Paradise Canyon" dude ranch by Leo Weaver, its subsequent ownership and occupation first by Essy Bowers and subsequently by Gus Griffin, and ongoing USGS operations), and the **Modern Era** (including the purchase of Lonely Dell by the Consortium, and the acquisition and management of both properties by the NPS).

Structures included within the District are made of stone and log, with the exception of the Weaver Ranch House which is partly wooden frame construction. The NPS actively stabilizes and monitors 12 historic structures and 5 associated features, although some are in a ruined condition. Recently new roofs were installed in the USGS residence, Spencer Bunkhouse, Placer Corporation Office, Lee's Fort, Samantha Johnson Cabin, polygamist cabin, and Picture Window cabin; maintenance work and repairs on these structures are ongoing. In addition, an intensive program of yearly monitoring and repairs is being developed to maintain these structures in a stable condition.

Impacts of Alternative A

Analysis: Alternative A would not result in impacts to the LFLD historic district or the Lonely Dell Historic Landscape. There would be no impairment of park values or resources.

Mitigation Measures: None

Impacts of Alternative B

Analysis: While most of the proposed facilities would occur within LFLD Historic District, none of them would directly affect any of the contributing features that make the LFLD Historic District eligible for listing on the National Register of Historic Places. None of the projects would occur within the Lonely Dell Historic Landscape; though the construction of a new USGS gauging station would occur on its boundary. Impacts would be related to noise, dust and traffic issues. Improvements to all facilities in the Lees Ferry Area would also likely be the cause of increased visitor use patterns due to improved amenities.

The USGS gauging station, was originally installed in 1922 is well over 50 years old and therefore may qualify for listing on the National Register of Historic Places. The proposed replacement of this station would occur across the river from the existing station. The existing station will not be removed and interpretive signs would be installed to provide historical information on its use to the visiting public.

Conclusion: Construction related affects to the remaining projects would have only negligible, short- term, adverse impacts to the Cultural Resources at Lees Ferry. There would be no impairment of park values or resources.

Mitigation: Phasing of construction projects, set hours of construction noise, and control of fugitive dust emissions would all help lessen the impacts of construction on the cultural resources.

Arizona Road

Existing Conditions: The Old Arizona Road, known later as the “Honeymoon Trail,” was a significant travel route between Arizona and Utah from 1872 until 1928. The trail went from Kanab to Lees Ferry on the Colorado River, then south to Tuba City. From there it continued upstream along the Little Colorado to several primarily Mormon settlements that were founded in the 1870’s and 80’s. Several other historic roads and trails from southern Arizona joined the Old Arizona Road at various points. Lees Ferry was a vital part of this road. The steep walls of the Grand and Glen Canyons were a barrier for 700 miles and the only feasible crossing point for the Colorado River was at Lees Ferry. In later years, the road was dubbed the “Honeymoon Trail” for the large numbers of Mormon couples who traveled its route north to St. George in order to have their marriage sealed in the Temple there. However, in addition to this activity, the road also served as a major travel route for pioneers and settlers from all walks of life.

The Old Arizona Road runs through the Lees Ferry/Lonely Dell Ranch Historic District and is largely extant within the District. Most sections of the road are easily identifiable and the route can be plotted with accuracy. Because the road links Lees Ferry with Lonely Dell Ranch, it was seen as a perfect interpretive theme with which to unify the two historic areas, providing opportunities to talk about courage, independence, perseverance, and the adventure inherent in exploration and travel. These universal themes would resonate with nearly any type of audience and allow them to make their own personal connection with this historically rich resource.

An Interpretive Plan calls for relatively minimal work on this historic road to make it a viable walking trail for visitors to the District. There are places near the Paria where the road needs to be protected from erosion; some minor work would need to be done to define the parameters of the trail and/or correct any potential safety hazards. Numbered markers would be placed on the trail to correspond with a walking guide that the park would produce, which would give the background and history of the trail. There would be no damage or alteration of the historic fabric of the road.

Impacts of Alternative A

Analysis: Alternative A would not result in any impacts to cultural resources at Lees Ferry. There would be no impairment of park values or resources.

Mitigation Measures: None

Impacts of Alternative B

Analysis: There are places near the Paria where 150 feet of the road has been washed away and some minor work would need to be done to improve the trail in this area. Numbered markers would be placed on the trail to correspond with a walking guide that the park would produce, which would give the background and history of the trail. There would be no damage or

alteration of the historic fabric of the road. The Interpretive Plan calls for relatively minimal work on this historic road to make it a viable walking trail for visitors to the District.

Conclusion: Under this alternative the creation of the Arizona Road hiking trail would have direct, long- term, negligible impacts. There would also be short- term negligible impacts due to trail construction and installation of route markers and signage. There would be no impairment of park values or resources.

Ethnographic Resources.

Existing Conditions: Traditional cultural properties or places are locations of special heritage value to contemporary communities, including Native American groups and descendants of early pioneers, because of their association with the cultural practices or beliefs rooted in the histories of those communities. Thus, they are important in maintaining the communities' cultural identities. These resources may include archaeological sites, geographic areas, or natural resources such as springs/seeps, vegetation, wildlife, or mineral deposits.

Based on traditions passed down through the generations, natural resources found in the Lees Ferry region are important to the Navajo Nation, Hopi, San Juan Southern Paiute, Kaibab Paiute, White Mesa Ute Band of the Ute Mountain Tribe, Kanosh Paiute Band, Koosharem and Shivwits Paiute Bands, and Zuni Native American Tribes. All resources associated with the natural environment are important to the tribes' traditional beliefs about mother earth and utilizing that which she created. These resources include plants, animals, humans, rocks, water, and mountains. Tribes are often reticent to reveal information about the type or location traditional of properties. Accordingly, specific sites or locations are not listed in this public document.

Impacts of Alternative A

Alternative A would not result in any impacts to Ethnographic resources at Lees Ferry. There would be no impacts and no impairment of park values or resources.

Impacts of Alternative B

Analysis: Increased visitation due to the improved amenities may cause an increase in visitor use of the Lees Ferry Area. Increased visitation would increase the likelihood that all resources, including ethnographic resources may receive greater impacts from handling, walking, boating, etc.

Conclusion: There would be a direct long- term, negligible, adverse impact on ethnographic resources at Lees Ferry due to possible increase in visitor use of the area due to improved amenities.

Mitigation Measure: Ethnographic resources would be monitored by park staff and changes in visitor use patterns instituted if impacts of increased visitation become apparent.

Visitor Use and Experience

Existing Conditions: While visitors are drawn to the Lees Ferry area for many reasons the main reasons are boating the Colorado River and touring the Lees Ferry Historic District. The discussions in this section will be limited to the use of the river. Information on use and impacts related to the historic district and ethnographic resources are discussed in the previous sections.

Upriver Trips

Raft trips upriver are scheduled based on customer demand and the river rafting concessioner is permitted to have as many as 20 pontoon style rafts on the river at any one time. While numbers may approach this number in the busy summer season, there are often many days when no trips are made in the winter. These trips originate at Glen Canyon Dam, where customers board the rafts through the main concrete access tunnel to the dam. The trips available are half- day and full day trips and all the customers are picked up at Lees Ferry and bused back to Page at the end of the trip. If the threat level is elevated by Homeland Security, the customers are bused down to Lees Ferry where they board the rafts for the trip upriver. In this case, they would also get off the rafts at the Lees Ferry ramp at the end of the trip. These rafts will also ferry individual kayakers and canoeists upriver for a fee. Private trips upriver do not currently require permits and numbers of boats and/or passengers are not currently counted by Glen Canyon NRA staff. The flat water commercial trips that explore the first 15 miles of the Colorado River (from Glen Canyon Dam to the Lees Ferry area) are managed by contract and numbers of trips and passengers are counted.

Downriver Trips

Downriver rafting trips are either provided by concessioners contracted to Grand Canyon National Park (Grand Canyon NP) or private individuals or groups (non- commercial). All trips are based on a permit system administered by Grand Canyon NP. Grand Canyon NP completed a Colorado River Management Plan in February of 2006. This plan changes the visitor use patterns at Lees Ferry; the only launching point for rafting trips down the Grand Canyon. This plan requires that the maximum number of trips on the river at one time would be reduced from 70 to 60. To accomplish this reduction, all trip launches will be more regularly staggered from the ramp. Additionally, there will be an increase in the estimated number of trip launching to 981 (from 866) per year and an associated increase in the number of recreation passengers to 22,802 (from 22,143). While all the downriver trips start at Lees Ferry area, commercial passengers can join float trips at Phantom Ranch and Whitmore (about 70% start their trips from Lees Ferry area). River user trend analysis for trips going downriver through the Grand Canyon has shown a significant rise in the numbers of commercial and noncommercial rafters since 1965 when Glen Canyon Dam was built. Commercial and non-commercial passenger numbers have risen from less than 1,000 per year in 1965 to about 20,000 commercial and 4,000 non- commercial passengers per year in 2006.

The ramp that supports all this activity was originally built to meet the much lower use demands of the 1960s. The commercial outfitters using the large motorized rafts bring their equipment in on specially designed tractor trailer rigs. These rigs back straight down the ramp to unload the rafts and the trip provisions. The private rafters usually bring their equipment in on trailers pulled by a variety of non- commercial sized vehicles. During the past five years, the ramp space has been increased by the Grand Canyon NP Rangers in an attempt to provide more room for the private rafters. The private rafters cannot back straight down the ramp due to the presence

of a large curb left over from its original construction. The latecomers especially are forced to negotiate a gauntlet of vehicles, rafts, and supplies to reach an open area of the ramp.

Neither the existing solar powered facility nor the proposed narrowband repeater facility could be easily seen from the Lees Ferry area. The existing telephone poles and line can generally only be seen from the Lonely Dell area if pointed out and they are silhouetted by shadows. The tower would be located adjacent to the PEU pole before the line breaks over the plateau toward the Lees Ferry area. In order to make the tower unobtrusive, it would be painted a color that would blend into the surrounding rocky slopes.

Impacts of Alternative A

Analysis: Under Alternative A, impacts to visitor use and experience would be direct, minor and long- term. The experience visitors have while at the Lees Ferry area may be negatively impacted by the lack of improved amenities. Since so many of the visitors are using the graded raft ramp; without the removal of the curb, problems related to launch ramp congestion will continue to exist and may eventually become unbearable to some visitors. Additionally, lack of updated amenities, including the water treatment plant, water intake structure, courtesy dock and continued inability of Grand Canyon NP Rangers access the Glen Canyon NRA radio repeater in a timely fashion could also affect the visitors use and experience.

Conclusion: There would be direct, long- term, and negligible to minor, adverse impacts to the visitors use and experience of the Lees Ferry area.

Mitigation Measures: None

Impacts of Alternative B

Analysis: Visitors would be able to enjoy the offerings of the area without having to worry about problems related to poorly conditioned equipment and facilities. They would be slightly inconvenienced during construction of the various projects.

Conclusion: Under this alternative, there would be direct, long- term minor to moderate, beneficial impacts to the visitors use and experience of the Lees Ferry Area. There would also be negligible short- term adverse impacts due to actual construction of the proposed projects.

Mitigation Measures: Installation of proper pedestrian warnings and barricades, prevention of dust emissions and regular clean- up of construction sites will help alleviate impacts on the visitors use and experience of the Lees Ferry area. In order to make the narrowband repeater tower unobtrusive, it would be painted a color that would blend into the surrounding rocky slopes.

Table of Summary of Impacts

Table 4 briefly summarizes the effects of each of the alternatives on the impact topics that were selected for analysis at Glen Canyon National Recreation Area. More detailed information on the effects of the alternatives is provided in the “Affected Environment and Environmental Consequences” section of this document.

Table 4: Summary Comparison of Impacts of Alternatives		
Impact Topic	Alternative A, No Action	Alternative B, Lees Ferry Improvement Alternatives
Public Health and Safety	Implementation of Alternative A would result in minor to moderate short- term and long- term adverse impacts on public health and safety depending on the intensity of use of the existing facilities. Drinking water standards changes proposed by the State of Arizona cannot be met with the current water treatment facility. If the water intake is not replaced, it may fail due to ongoing corrosion and raw water will not be available for treatment for use by the visiting public. If the courtesy dock is not replaced and the existing dock fails, the ability to safely load and unload passengers and equipment would be compromised.	Implementation of Alternative B may cause short- term minor detrimental impacts to health and safety during construction periods associated with the completion of these projects. Additionally, improvements to facilities at Lees Ferry would have beneficial, minor to moderate, long-term effects to the health and safety of visitors and staff. There would be no impairment of park values or resources. There would be no impairment of park values or resources.
Water Resources (Natural and Drinking Water)	Natural Water: There would be no impacts and there would be no impairment of park values or resources. Drinking Water: Alternative A would result in negligible to minor, long-term adverse impacts to the quality of drinking water available at Lees Ferry. There would be no impairment of park values or resources.	Natural Water: Construction of the proposed projects would result in short and long- term moderately adverse impacts on water resources. There would be no impairment of park values or resources. Drinking Water: Alternative B would result in a minor, long- term beneficial impact to the quality of drinking water available at Lees Ferry. There would be no impairment of park values or resources.
Floodplains (Impacts are the same for A & B)	The Lees Ferry compound has been in its current location at least since the early 1970's, initially as the site for the water treatment plant. Facility management and maintenance activities are anchored to the water treatment plant, and resource and visitor protection activities to the Colorado River access and adjacent historic district, close to the compound. This locale is optimal for staging NPS operations and providing direct services for the parks' visitors. It provides sufficient space for upgrading existing facilities to current standards and adding needed structures for the protection of equipment and materials. Relocating these facilities out of the flood plain would be exorbitant in cost, reduce essential service to visitors, and reduce operational efficiencies. There would be no impairment of park values or resources.	
Wetlands and	There would be no impacts and no	The proposed projects would have

Table 4: Summary Comparison of Impacts of Alternatives		
Impact Topic	Alternative A, No Action	Alternative B, Lees Ferry Improvement Alternatives
waters of the U.S.	impairment of park values or resources.	direct short and long- term negligible to moderate impacts on wetlands and waters of the U.S. There would be no impairment of park values or resources.
Wildlife, vegetation and Threatened and Endangered Species	There would be no impacts and no impairment of park values or resources.	Alternative B would result in minor to moderate, short- term, highly localized adverse impacts to vegetation, wildlife and threatened and/or endangered species due to construction activities. Alternative B would not produce major adverse impacts or impairment of wildlife resources or values whose conservation is necessary to the purpose of the establishing legislation of the recreation area, key to the natural or cultural integrity of the recreation area or opportunities for enjoyment of the recreation area, or identified as a goal in the recreation area's general management plan or other NPS planning documents.
Cultural Resources	Alternative A would not result in impacts to the LFLD historic district or the Lonely Dell Historic Landscape. There would be no impairment of park values or resources.	There would be negligible, short- term adverse impacts within the LFLD Historic District due to construction related effects. There would be no impairment of park values or resources. Under this alternative the creation of the Arizona Road hiking trail would have direct, long- term, negligible impacts. There would be no impairment of park values or resources.
Visitor Use and Experience	There would be direct, long- term, and negligible to minor adverse impacts to the visitors use and experience of the Lees Ferry Area.	Under this alternative, there would be direct, long- term minor to moderate, beneficial impacts to the visitors use and experience of the Lees Ferry Area. There would also be negligible short-term adverse impacts due to actual construction of the proposed projects.

Cumulative and Secondary Impacts

Alternative A would not result in any Cumulative impacts to resources at Lees Ferry. There would be no impacts and no impairment of park values or resources.

Impacts of Alternative B

Analysis: The various projects proposed in Alternative B would contribute to an additive or cumulative effect on the resources at Lees Ferry area. Of particular interest is the possibility of impacts to the waters of the Colorado and Paria Rivers, as most projects will take place in or adjacent to one of these water bodies. While construction phasing would help alleviate any short term cumulative impacts, several other projects not included in this EA are also likely to impact the Colorado River within the same timeframe. Glen Canyon NRA is in the process of developing a restoration plan for a 15- mile stretch of the Colorado River between Glen Canyon Dam and the Lees Ferry area. Restoration activities (also dependent on funding availability) include removing large stands of non- native tamarisk and replacing these with native plant species. Restoration often requires the use of heavy equipment, which could result in construction related surface water pollution. The Grand Canyon NP has just completed their Colorado River Master Recreation Plan, which includes management planning with regards to the number of trips headed downriver from the Lees Ferry area for the next 10 years. This plan will allow a higher number of rafters heading downstream through the Canyon. Higher numbers of users often translates into increased impacts to water quality.

Conclusion: The preferred alternative, in conjunction with other past, current or foreseeable project will have a short- term (construction related) and long- term (increased number of visitors), negligible to minor adverse impact to the resources in the Lees Ferry area.

Mitigation Measures: Glen Canyon NRA has developed a water quality program that samples areas of high use to ensure water quality is not degraded. This program will be extended to the Lees Ferry area, first on an experimental basis and then if warranted on a scheduled basis.

Summary of Mitigation Measures

Table 5 provides a summary of mitigation measures for the proposed projects. These measures will help ensure that all the project impacts are less than significant.

Table 5: Summary of Mitigation Measures		
Impact Topic	Alternative A, No Action	Alternative B, Lees Ferry Improvement Alternatives
Public Health and Safety	None	<p>The Hazardous Material storage areas proposed for the Lees Ferry Compound will be designed to withstand flooding events. If a flooding event is likely to be extremely large, these materials will be relocated to high ground prior if enough prior warning if available.</p> <p>Flooding warnings will be issued to visitors and staff alike and evacuations will take place when warranted.</p>

Table 5: Summary of Mitigation Measures		
Impact Topic	Alternative A, No Action	Alternative B, Lees Ferry Improvement Alternatives
		<p>Appropriate traffic and pedestrian barriers will be placed to protect visitors and staff from construction related injuries.</p> <p>Best management practices will be instituted during project completion to ensure that the visitors, staff and the natural and cultural resources of Lees Ferry are protected to the maximum extent possible.</p>
Water Resources (Natural and Drinking Water)	<p>Natural Waters: None</p> <p>Drinking Water: None</p>	<p>Natural Water: As required by the Clean Water Act, prior to the start of each project, staff or their paid contractors will obtain an Arizona Pollutant Discharge Elimination Permit from the State of Arizona. This permit requires the completion of a storm water management plan and erosion control plan. Using the best management practices available, these plans include instructions on the placement of barriers to insure construction related pollutants and sediments do not enter surface waters in the Lees Ferry Area. Additionally, during the design of the stabilization of the Paria riverbank, special care will be given to ensure that only minimal amounts of sedimentation are captured and that the majority of sediments reach the Colorado River.</p> <p>Drinking Water: None</p>
Floodplains (Impacts are the same for A & B)	<p>To mitigate impact on the flood plain, all future construction of the identified structures will be confined to the previously disturbed area, and as a consequence, above the 100 year flood stage. The current communication and warning system will be maintained in order to evacuate visitors and their personal property in the event of a severe storm over the Paria River drainage. Glen Canyon NRA dispatch monitors the National Weather Service flashflood warnings and would initiate evacuation of facilities and surrounding area of visitors and NPS personnel as the likelihood of a flood event greater than the 100- year level occurs. Once evacuation measures are initiated, visitors and staff alike would be urged to seek higher ground, which is only a very short distance and only a very few minutes from this location, thus allowing quick</p>	

Table 5: Summary of Mitigation Measures		
Impact Topic	Alternative A, No Action	Alternative B, Lees Ferry Improvement Alternatives
	evacuation. NPS staff would assist in evacuations of visitors and complete area checks to determine all visitors are safe.	
Wetlands and waters of the U.S.	None	<p>Because a portion of the each of the proposed projects would occur in jurisdictional waters, the NPS would need to obtain the appropriate level permit from the USACE. This permit would require the development of best management practices to ensure pollution does not reach waters of the U.S. and minimizes the loss wetlands. It also requires replacement of any wetlands lost during construction. As is typical in these types of projects, if impacts are small and there is a surrounding seed bank, restoration generally consists of natural re- growth over the construction site. For a project the potential size and scope of the stabilization of the Paria riverbanks would require the development of a specific mitigation plan for wetlands. The most likely scenario would include use of erosion control structures that are able to support plant growth along with use of seeds and possibly live plants. Level of restoration is dependent on life cycle needs of plants targeted for replacement.</p>
Wildlife, vegetation and Threatened and Endangered Species	None	<p>Projects along the banks of the Colorado River will be accomplished during the low water season and appropriate water retention systems will be installed if necessary, to protect water quality. Best Management Practices would be instituted to control the movement of stormwater runoff from construction projects into the Paria and Colorado Rivers in order to protect fish species from construction impacts. All construction plans would include protective measures to ensure there are no introductions of weeds. Most</p>

Table 5: Summary of Mitigation Measures		
Impact Topic	Alternative A, No Action	Alternative B, Lees Ferry Improvement Alternatives
		<p>vegetation removed during construction projects will be replaced within a growing season through natural process. Gabion structures and finger dikes can be constructed to encourage the growth of native species on the top and sides of these structures. All of the vegetation or wildlife species being removed by the construction of the proposed projects are common throughout the northern portion of Arizona and their individual removal will not impact the overall numbers or health of the remaining members. California condor mitigation measures for construction projects will be a required part of each construction projects plans and specifications.</p>
Cultural Resources	None	<p>Phasing of construction projects, set hours of construction noise, and control of fugitive dust emissions would all help lessen the impacts of construction on the cultural resources.</p>
Visitor Use and Experience	None	<p>Installation of proper pedestrian warnings and barricades, prevention of dust emissions and regular clean- up of construction sites will help alleviate impacts on the visitors use and experience of the Lees Ferry area.</p>
Cumulative Impacts	None	<p>Glen Canyon NRA has developed a water quality program that samples areas of high use to ensure water quality is not degraded. This program will be extended to the Lees Ferry area, first on a experimental basis and then if warranted on a scheduled basis.</p>