

# Glen Canyon Dam

Long-Term Experimental and Management Plan EIS

## Draft EIS Public Open House



## WELCOME

Welcome to the public open house for the Glen Canyon Dam Long-Term Experimental and Management Plan Draft Environmental Impact Statement!

The Bureau of Reclamation and National Park Service request your input on the LTEMP Draft EIS, issued on January 8, 2016.

Please sign in at the registration desk, pick up handouts, and use one of our options for providing comments here. You can also browse the project Website (<http://ltempeis.anl.gov>) and provide comments online at one of the computer stations. The public comment period ends on April 7, 2016.

### Draft EIS Public Open House Agenda

6 pm to 8:30 pm

- ▶ Open house
- ▶ Presentation
- ▶ Questions and answers
- ▶ Open house

# Glen Canyon Dam

## Long-Term Experimental and Management Plan EIS



## PROJECT AREA

The project area consists of the Colorado River and adjacent lands that could be affected by operations of Glen Canyon Dam including portions of Glen Canyon National Recreation Area, Grand Canyon National Park, and Lake Mead National Recreation Area.

### Glen Canyon Dam

- ▶ Completed in 1963 for the primary purposes of water storage and flood control.
- ▶ Produces hydroelectric power.

### Glen Canyon National Recreation Area

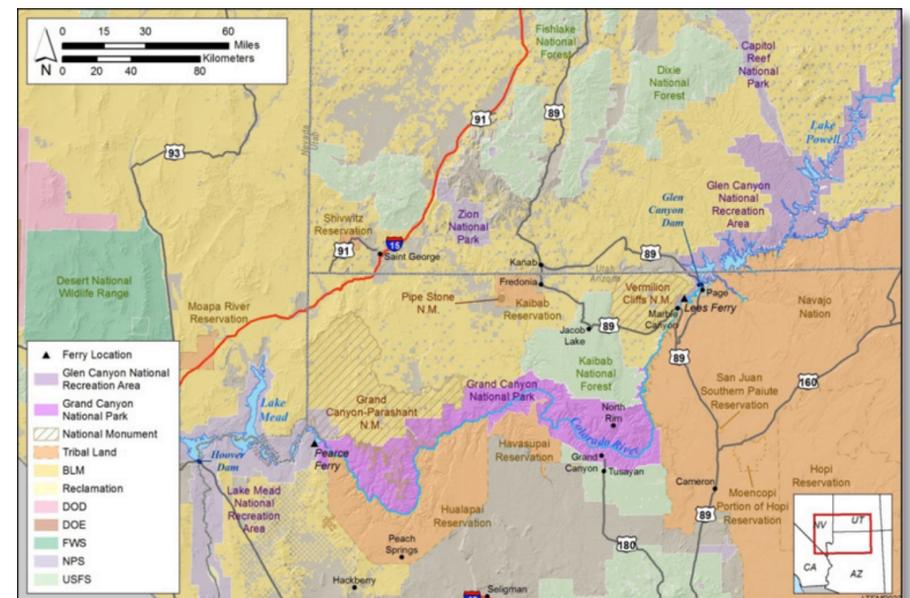
- ▶ Encompasses more than 1.2 million acres of land in northern Arizona and southern Utah.
- ▶ Includes Lake Powell and a 15 mile stretch of the Colorado River within Glen Canyon downstream of Glen Canyon Dam.

### Grand Canyon National Park

- ▶ Encompasses 1.2 million acres in northern Arizona.
- ▶ The Colorado River flows through the park for over 277 miles from Lees Ferry to Pearce Ferry.

### Lake Mead National Recreation Area

- ▶ From the western end of the Grand Canyon, Lake Mead follows the Arizona-Nevada border along what was formerly 140 miles of the Colorado River.
- ▶ Lake Mead was formed by the construction of Hoover Dam.



Locations of Glen Canyon Dam, Lake Powell, the Colorado River between Lake Powell and Lake Mead, and Adjacent Lands. (This map is for illustration only, not for jurisdictional determinations; potential area of effects varies by resource)

# Glen Canyon Dam

## Long-Term Experimental and Management Plan EIS



# PURPOSE, NEED, AND OBJECTIVES

## Purpose

- ▶ Provide a comprehensive framework for adaptively managing Glen Canyon Dam over the next 20 years consistent with the GCPA and other provisions of applicable federal law.

## Need

- ▶ The need for the proposed action stems from the need to use scientific information developed since the 1996 ROD to better inform DOI decisions on dam operations and other management and experimental actions so that the Secretary may continue to meet statutory responsibilities for protecting downstream resources for future generations, conserving species listed under the Endangered Species Act (ESA), avoiding or mitigating impacts on National Register of Historic Places-eligible properties, and protecting the interests of American Indian Tribes, while meeting obligations for water delivery and the generation of hydroelectric power.

## Objectives\*

- ▶ Develop an operating plan for Glen Canyon Dam in accordance with the Grand Canyon Protection Act (GCPA) and the “Law of the River.”
- ▶ Ensure water delivery to the communities and agriculture that depend on Colorado River water consistent with the Law of the River.
- ▶ Consider potential future modifications to Glen Canyon Dam operations and other flow and non-flow actions to protect and improve downstream resources.
- ▶ Maintain or increase energy generation to the greatest extent practicable, consistent with improvement and long-term sustainability of downstream resources.
- ▶ Respect the interests and perspectives of American Indian Tribes.
- ▶ Make use of the latest relevant scientific studies, especially those conducted since 1996.
- ▶ Determine an experimental framework that allows for a range of programs and actions, including ongoing and necessary research, monitoring, studies, and management actions in keeping with the adaptive management process.
- ▶ Ensure Glen Canyon Dam operations are consistent with the GCPA, ESA, National Historic Preservation Act, Colorado River Storage Project Act, and other applicable federal laws.

\* Wording of the objectives has been modified from that in the Draft EIS for summary presentation. Please see the Draft EIS for exact wording.

# Glen Canyon Dam

## Long-Term Experimental and Management Plan EIS



# ALTERNATIVES

Seven alternatives were analyzed in the Draft EIS that specify Glen Canyon Dam operations and experimental flow and non-flow actions over the 20-year LTEMP period.

- ▶ None of the alternatives include changes to existing dam or other infrastructure
- ▶ Operations must comply with 2007 Interim Guidelines
- ▶ None of the alternatives affect annual water delivery requirements
- ▶ Adaptive management would continue

### Alternatives considered in the LTEMP EIS\*

| Alternative      | Operations  | Experiments  |
|------------------|---|--|
| A<br>(No Action) | Same as current. Higher volume in Dec., Jan., Jul. and Aug. Daily fluctuations range from 5,000 to 8,000 cfs/day  | Sediment-triggered spring and fall high flow experiments (HFEs) and mechanical removal of trout until 2020.  |
| B                | Monthly pattern same as current. Higher fluctuations in all months.   | Sediment-triggered spring and fall HFEs (no more than one every other year), trout management flows, and mechanical removal.   |
| C                | Monthly volumes reduced in Aug., Sep., and Oct. Fluctuations reduced compared to current operations in all months.  | Sediment-triggered spring and fall HFEs, proactive spring HFEs, extended duration fall HFEs (volume limited), low summer flows, and trout management actions.  |
| D<br>(Preferred) | Monthly volumes relatively even and follow the pattern of electricity demand. Fluctuations proportional to monthly volume, and comparable to current operations. Maximum daily fluctuation 8,000 cfs. | Sediment-triggered spring and fall HFEs, proactive spring HFEs, extended duration fall HFEs (not volume limited), low summer flows (second 10 years), trout management actions, and steady low weekend flows to improve aquatic food base. |
| E                | Monthly volumes relatively even, but reduced in Aug. and Sep. Fluctuations proportional to monthly volume, and higher than current operations.  | Sediment-triggered spring HFEs (second 10 years only) and fall HFEs, low summer flows (second 10 years), and trout management actions.   |
| F                | Steady flows higher in the spring and lower in other months to more closely mimic the natural flow regime.  | Sediment-triggered spring and fall HFEs, but no trout management actions.  |
| G                | Flows steady year round and vary only to meet changes in inflow forecasts.  | Sediment-triggered spring and fall HFEs, proactive spring HFEs, extended duration fall HFEs (not volume limited), low summer flows (second 10 years) and trout management actions.   |

\* Descriptions of alternatives have been shortened for summary presentation. Please see the Draft EIS for full descriptions.

# Glen Canyon Dam

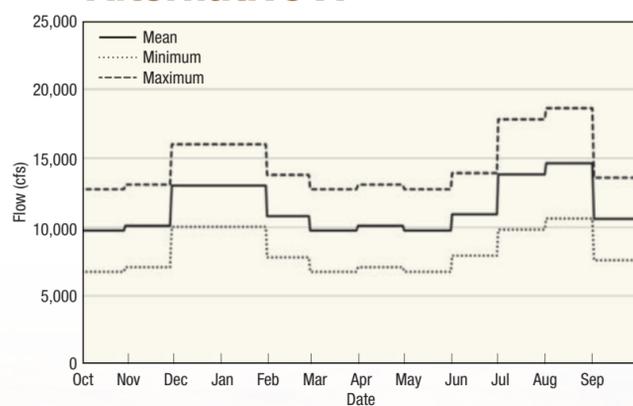
## Long-Term Experimental and Management Plan EIS



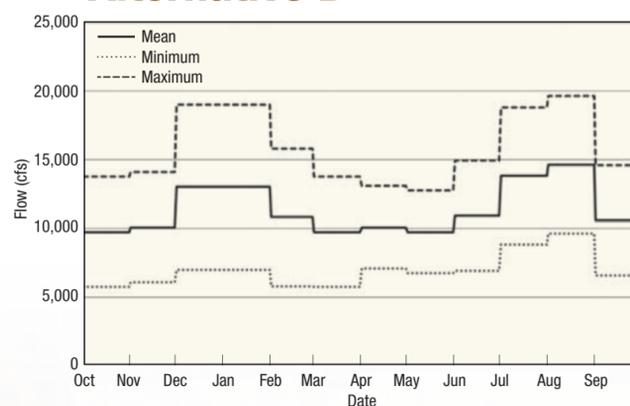
# RELEASE PATTERNS OF ALTERNATIVES

The release patterns of alternatives in an 8.23 million acre-feet year are shown below. Within a year, monthly operations may be increased or decreased based on changing annual runoff forecasts and other factors.

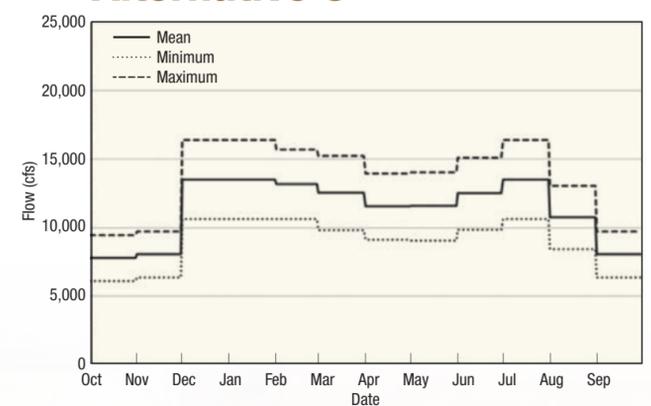
### Alternative A



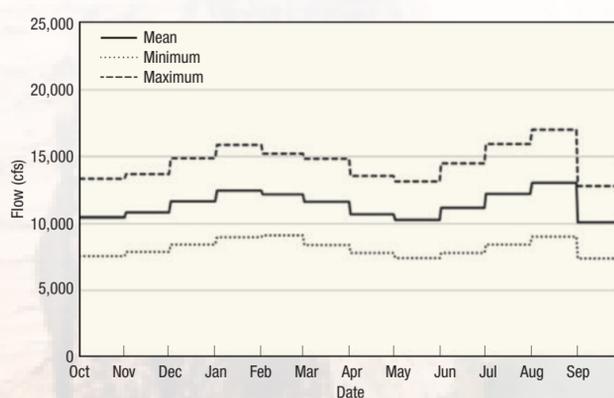
### Alternative B



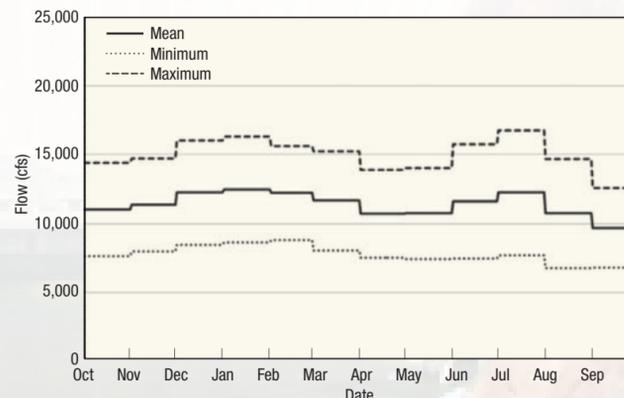
### Alternative C



### Alternative D



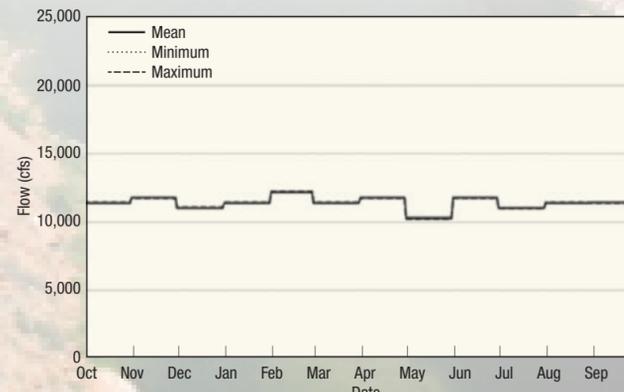
### Alternative E



### Alternative F



### Alternative G



# Glen Canyon Dam

## Long-Term Experimental and Management Plan EIS



# ALTERNATIVE D THE PREFERRED ALTERNATIVE

Alternative D was developed to combine beneficial aspects of other alternatives to provide overall better performance and lower impacts.\*

| Component   | Preferred Alternative  | Comparison to Current Operations   | Comparison to Other Alternatives  |
|---|--|--|---|
| Monthly volumes   | Relatively even release pattern that follows electricity demand  | Current operations have high flows in Dec., Jan., Jul., and Aug.               | More even monthly distribution of flows than all but Alternative G.   |
| Daily fluctuations  | 10 x monthly release volumes (kaf) in Jun.-Aug.<br>9 x kaf in other months<br>Maximum daily range 8,000 cfs<br>Example: Daily range in a 800 kaf August = 10 x 800 = 8,000 cfs | Under current operations, fluctuations are 5,000 cfs, 6,000 cfs, or 8,000 cfs. | Fluctuations less than Alternatives B and E, more than others.  |
| Proactive spring High Flow Experiments (HFEs)             | Not in first 2 years, but then possible in the remaining years   | Not tested under current operations.   | Alternatives C and G also feature proactive spring HFEs.  |
| Spring HFEs   | Not in first 2 years, but then possible in the remaining years   | Under current operations, spring HFEs would not be tested after 2020.          | Comparable number of spring HFEs under Alternatives C, F, and G. Fewer would occur under Alternatives B and E.    |
| Fall HFEs   | Possible in all 20 years   | Under current operations, fall HFEs would not be tested after 2020.            | Comparable number of spring HFEs under Alternatives C, E, F, and G. Fewer would occur under Alternative B.        |
| Extended duration fall HFE                                | Up to 250 hr, but implemented in phases and limited to 4 per 20 years  | Not tested under current operations.   | Would occur whenever triggered under Alternatives C (volume limited) and G, but never in others.                  |
| Reduced fluctuations                                      | Possible in all 20 years after fall HFEs only  | Not required under current operations.   | Would occur before and after fall HFEs and spring HFEs under Alternative C; before fall HFEs under Alternative E. |
| Low summer flows  | Test possible in second 10 years   | Not tested under current operations.   | Same as Alternative E. Test possible in all 20 years under Alternative C, no test in other alternatives.          |
| Trout management flows (TMFs)                             | Test early in the LTEMP period and implement with trout triggers if successful   | Can only be tested under current operations.                                   | Same as most alternatives. No TMFs under Alternative F.   |
| Mechanical removal of trout                               | Possible in all 20 years   | Under current operations, mechanical removal would not occur after 2020.       | Same as other alternatives. No removal under Alternative F.   |
| Steady low weekend flows for aquatic food base production | Test without triggers  | Not tested under current operations.   | Not tested under other alternatives.  |

\* Descriptions of alternatives have been shortened for summary presentation. Please see the Draft EIS for full descriptions.

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# OPERATIONS AND HYDROELECTRIC PRODUCTION

Hydroelectric power from Glen Canyon Dam is a critical component of the Colorado River Storage Project and may be affected by LTEMP actions.

- ▶ Glen Canyon Dam delivers water from the Upper Basin to the Lower Basin according to the “Law of the River.”
- ▶ Lake Powell provides more storage capacity than all other storage features of the CRSP combined.
- ▶ The powerplant produces 5 billion kWh each year, which helps supply the electrical needs of about 5.8 million customers, enough energy for about 400,000 households.



### Impacts of Alternatives on Operations and Hydropower\*

| Alternative A<br>(No Action<br>Alternative)   | Alternative B   | Alternative C   | Alternative D<br>(Preferred<br>Alternative)   | Alternative E   | Alternative F   | Alternative G   |
|---|---|---|---|---|---|---|
| <b>Dam Operations</b>   |   |   |   |   |   |   |
| No change from current condition  | Monthly release volumes similar to no action, higher fluctuations in all months | Some change to monthly release volumes, lower fluctuations in all months. | More even monthly release volumes than most other alternatives; fluctuations in most months similar to no action. | More even monthly release volumes than no action; higher fluctuations in most months. | Large changes in monthly release volumes; steady flows throughout the year.   | Even monthly release volumes; steady flows throughout the year.   |
| <b>Hydropower</b>   |   |   |   |   |   |   |
| No change from current condition. Second highest marketable capacity and next to lowest total cost to meet electric demand. | 3.8% increase in marketable capacity and 0.02% decrease in cost.                | 17.5% decrease in marketable capacity and 0.41% increase in cost.         | 6.7% decrease in marketable capacity and 0.29% increase in cost   | 12.2% decrease in marketable capacity and 0.25% increase in cost.                     | 42.6% decrease in marketable capacity (lowest of alternatives) and 1.2% increase in cost (highest of alternatives). | 24.2% decrease in marketable capacity and 0.73% increase in cost. |

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# SEDIMENT

Fine sediment in Glen and Grand Canyons is a vital component of the canyon ecosystem, provides camping areas for rafters, protection of cultural resources, and may be affected by LTEMP actions.

- ▶ Ecological resources of the Colorado River are adapted to and depend on a sediment-rich environment.
- ▶ River users need numerous and well-distributed sand bars of sufficient size for camping.
- ▶ Erosion at some archaeological sites along the river may be related to the decrease in sediment.
- ▶ Essentially all of the sediment that flows into Lake Powell is trapped in the reservoir.
- ▶ Most of the fine sediment in the river downstream from the dam comes from tributaries of the Colorado River, especially the Paria River.
- ▶ High flow experiments have been conducted to redeposit sediment at higher elevations along the river banks, but these high flows also reduce the amount of sand retained in the upper river.
- ▶ Higher fluctuations increase the rate of erosion of sandbars.



### Impacts of Alternatives on Sediment Resources\*

| Alternative A<br>(No Action<br>Alternative)                                     | Alternative B  | Alternative C   | Alternative D<br>(Preferred<br>Alternative)  | Alternative E   | Alternative F   | Alternative G  |
|---|--|---|--|---|---|--|
| Fewest HFEs, highest sand mass balance, lowest potential for building sandbars. | Number of HFEs and bar building potential similar to no action, higher fluctuations would result in lower sand mass balance. | High number of HFEs, high bar-building potential, lower sand mass balance than no action. | High number of HFEs, high bar-building potential; sand mass balance comparable to no action. | Intermediate number of HFEs and bar-building potential; lower sand mass balance than no action. | Highest number of HFEs and bar-building potential; lowest sand mass balance because of sustained high spring flows. | Second highest number of HFEs and bar-building potential; second lowest sand mass balance. |

\*Descriptions of impacts have been shortened for summary presentation. Please see the Draft EIS for full descriptions.



# AQUATIC ECOLOGY

Aquatic resources that could be affected by LTEMP actions include a variety of native and nonnative species and the food base on which they depend.

- ▶ Aquatic insects, other invertebrates, and plants make up the food base for fish in the Colorado River ecosystem.
- ▶ A persistent and increasing population of the endangered humpback chub occurs in the Little Colorado River and adjacent portions of the Colorado River.
- ▶ Introduced trout are most abundant in Glen Canyon, and, to a lesser extent, down to the confluence of the Little Colorado River.
- ▶ Dam operations affect flow patterns, which in turn affect the aquatic food base, humpback chub, trout, and other fish.
- ▶ Experimental trout management actions may result in a healthier trout population in Glen Canyon and reduce impacts of trout on humpback chub.
- ▶ Operations under the LTEMP would have relatively minor effects on water temperatures.



## Impacts of Alternatives on Aquatic Ecology\*

| Alternative A<br>(No Action<br>Alternative)  | Alternative B  | Alternative C   | Alternative D<br>(Preferred<br>Alternative)   | Alternative E   | Alternative F   | Alternative G   |
|--|--|---|---|---|---|---|
| No change from current conditions for the aquatic food base, trout, and humpback chub. | Compared to no action, slightly lower productivity of food base, lower trout abundance, slightly higher humpback chub abundance. | Compared to no action, slightly higher productivity of food base, higher trout abundance, no difference in humpback chub abundance. | Compared to no action, slightly higher productivity of food base, negligible change in trout abundance, slight increase in humpback chub. | Compared to no action, slightly higher productivity of food base, lower trout abundance, and slightly higher humpback chub abundance. | Compared to no action, increased productivity of food base, higher trout abundance, slightly lower humpback chub abundance. | Compared to no action, increased productivity of food base, higher trout abundance, slightly lower humpback chub abundance. |

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# Glen Canyon Dam

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# VEGETATION

Riparian vegetation along the Colorado River downstream from Glen Canyon Dam is diverse, and reflects variation in land forms, geologic features, and flow patterns. Vegetation in the project area could be influenced by LTEMP actions.

- ▶ Areas nearest the river have higher soil moisture levels and support dense patches of small trees and shrubs.
- ▶ Riparian areas tend to support more species and higher density than adjacent, higher-elevation areas.
- ▶ Changes in flows could affect the mix of native and nonnative riparian plants and wetland area.
- ▶ Proposed vegetation restoration activities are expected to reduce nonnative species and increase native species.



### Impacts of Alternatives on Vegetation\*

| Alternative A<br>(No Action<br>Alternative)  | Alternative B   | Alternative C   | Alternative D<br>(Preferred<br>Alternative)  | Alternative E  | Alternative F   | Alternative G   |
|--|---|---|--|--|---|---|
| Relative to current conditions, decrease in native plant cover and diversity, increase in arrowweed; decrease in wetlands. | Similar to no action, but less decrease in native plant cover and diversity, no change in arrowweed, and less decrease in wetlands. | Overall decline compared to no action; greater decrease in native plant cover and diversity, arrowweed, and wetlands. | Overall improvement compared to no action; less decrease in native plant cover and diversity, arrowweed, and wetlands. | Overall decline compared to no action; slight decrease in native plant cover and diversity, arrowweed, and wetlands. | Overall decline compared to no action, greater decrease in native plant cover and diversity, increase in arrowweed, and greater decrease in wetlands. | Overall decline compared to no action, greater decrease in native plant cover and diversity, increase in arrowweed, and greater decrease in wetlands. |

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# Glen Canyon Dam

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# WILDLIFE

Wildlife in the project area includes terrestrial invertebrates, amphibians, reptiles, birds, and mammals that occur along the river corridor. These species could be affected by LTEMP actions.

- ▶ Terrestrial invertebrates (insects, scorpions, and spiders) function as decomposers, herbivores, predators, and pollinators, and are an important source of food for other wildlife.
- ▶ Terrestrial vertebrates in the project area include amphibians (frogs and toads), reptiles (snakes and lizards) birds (waterbirds, raptors, and songbirds), and mammals (small mammals, semiaquatic species, carnivores, bats, and ungulates).
- ▶ Federally listed special status species that could occur in the project area include Kanab ambersnail, bald eagle, California condor, golden eagle, southwestern willow flycatcher, western yellow-billed cuckoo, and Yuma clapper rail.
- ▶ In general, the effects of the LTEMP on wildlife and their habitat are expected to be relatively minor.
- ▶ HFEs could affect wildlife in areas inundated by high flows, but impacts are expected to be short-lived.
- ▶ Vegetation restoration activities are expected to benefit wildlife.



### Impacts of Alternatives on Wildlife\*

| Alternative A<br>(No Action<br>Alternative)  | Alternative B  | Alternative C   | Alternative D<br>(Preferred<br>Alternative)  | Alternative E   | Alternative F   | Alternative G   |
|--|--|---|--|---|---|---|
| No change from current conditions for most wildlife species, but ongoing wetland decline could affect wetland species. | Similar to no action for most species, some adverse impacts on species using nearshore habitats or feeding on insects; less impact on wetland species. | Similar to no action for most species, some benefit to species using nearshore habitats or feeding on insects; greater impact on wetland species. | Similar to no action for most species, some benefit to species using nearshore habitats or feeding on insects; less impact on wetland species. | Similar to no action for most species; greater impact on wetland species. | Similar to no action for most species, some benefit to species using nearshore habitats or feeding on insects; greater impact on wetland species. | Similar to no action for most species, some benefit to species using nearshore habitats or feeding on insects; greater impact on wetland species. |

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# Glen Canyon Dam

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# CULTURAL RESOURCES

Cultural resources include archaeological sites, historic sites, and Traditional Cultural Properties. These resources may be affected by LTEMP actions.

- ▶ Most cultural resource sites in the Canyons include past living places, agricultural fields, roasting pits, trails, and other evidence from past inhabitants or visitors.
- ▶ Some sites reflect past activities of miners, scientists, the federal government, and recreationists, including mines, houses, inscriptions, and boats.
- ▶ Traditional Cultural Properties are places of importance to Tribes, and include the Colorado River corridor and related natural and cultural resources.
- ▶ Most sites in the Canyons are above the area directly affected by river flow, and thus would not be directly affected by LTEMP actions.
- ▶ Dam operations could affect the availability of sand for wind transport to high elevation cultural resource sites. Windblown sand may reduce the rate of erosion at these sites.
- ▶ High flow experiments and other sustained high flows could affect cultural resources that occur in elevated terraces in Glen Canyon by eroding the toe of terrace slopes.



### Impacts of Alternatives on Cultural Resources\*

| Alternative A<br>(No Action<br>Alternative) | Alternative B         | Alternative C   | Alternative D<br>(Preferred<br>Alternative)  | Alternative E             | Alternative F             | Alternative G  |
|---|-----------------------|---|--|---------------------------|---------------------------|--|
| No change from current conditions.          | Similar to no action. | Compared to no action, increased potential for windblown sediment to protect resources; negligible effects on the stability of Spencer Steamboat, and Glen Canyon terraces. | Similar to Alternative C, but extended-duration HFEs could affect terraces in Glen Canyon. | Similar to Alternative C. | Similar to Alternative C. | Similar to Alternative C, but extended-duration HFEs could affect terraces in Glen Canyon. |

\*Descriptions of impacts have been shortened for summary presentation. Please see the Draft EIS for full descriptions.



# AMERICAN INDIAN TRIBES AND TRIBAL RESOURCES

Areas and resources important to American Indian Tribes could be affected by LTEMP actions.

- ▶ The Colorado River and Glen, Marble, and Grand Canyons, have a prominent place in the traditions of the indigenous peoples and contemporary American Indian cultures and economies. The Hopi, Havasupai, Hualapai, Navajo, Zuni, Southern Paiute, and Fort Mojave Tribes have strong cultural ties to the Canyons.
- ▶ Resources of concern to culturally affiliated Tribes include Traditional Cultural Properties, archaeological sites, tribal origin locations, historic sites, landforms and geologic features, ceremonial sites, springs, and resource collection areas.
- ▶ Tribal concerns may include recreational activities, lethal removal of fish, water rights, hydropower, and commercial recreation operations.
- ▶ Tribes have been involved in the LTEMP EIS process as sovereign nations. Six Tribes are Cooperating Agencies for the EIS, and provided input during its development.

### Impacts of Alternatives on Tribal Resources\*

| Alternative A<br>(No Action<br>Alternative)   | Alternative B   | Alternative C  | Alternative D<br>(Preferred<br>Alternative)  | Alternative E  | Alternative F  | Alternative G  |
|---|---|--|--|--|--|--|
| No change from current conditions. Mechanical lethal removal of trout (potential adverse impact to some Tribes) would expire in 2020. | See impacts on hydropower, aquatic ecology, vegetation, wildlife, cultural resources, and recreation. Relatively few mechanical removal trips and trout management flows. | See impacts on hydropower, aquatic ecology, vegetation, wildlife, cultural resources, and recreation. Relatively frequent mechanical removal trips and trout management flows. | See impacts on hydropower, aquatic ecology, vegetation, wildlife, cultural resources, and recreation. Relatively frequent mechanical removal trips and trout management flows. | See impacts on hydropower, aquatic ecology, vegetation, wildlife, cultural resources, and recreation. Fewer mechanical removal trips and trout management flows. | See impacts on hydropower, aquatic ecology, vegetation, wildlife, cultural resources, and recreation. No mechanical removal trips or trout management flows. | See impacts on hydropower, aquatic ecology, vegetation, wildlife, cultural resources, and recreation. Relatively frequent mechanical removal trips and trout management flows. |

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# Glen Canyon Dam

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# RECREATION

Recreation is a significant resource and an important part of the regional economy. Boating, fishing, and camping could be affected by LTEMP actions.

- ▶ Flatwater and whitewater boating are popular downstream from Glen Canyon Dam. Regulated flows make year round boating possible.
- ▶ Studies have shown a decline in the size and availability of camping beaches, but improvement since initiation of experimental high flow releases.
- ▶ High flows can adversely impact flatwater boating upstream of Lees Ferry. Low flows and large fluctuations can make whitewater boating navigation difficult.
- ▶ Glen Canyon Dam created ideal conditions for a trout sport fishery. Since 1991, changes in dam operation have resulted in natural reproduction and increases in population size.
- ▶ Dam operations and high flows can adversely affect fishing on the river in Glen Canyon, especially for wading fishermen.



### Impacts of Alternatives on Recreation\*

| Alternative A<br>(No Action<br>Alternative) | Alternative B   | Alternative C   | Alternative D<br>(Preferred<br>Alternative)   | Alternative E  | Alternative F  | Alternative G  |
|---|---|---|---|--|--|--|
| No change from current conditions.          | Compared to no action, higher fluctuations, lowest trout catch rates; higher navigation risk. | Compared to no action, lower fluctuations, slightly higher trout catch rates; fewer large trout, lower navigation risk, increase in camping area. | Compared to no action, similar fluctuations, slightly higher trout catch rates; more large trout, higher navigation risk, increase in camping area. | Compared to no action, higher fluctuations, similar trout catch rates; more large trout, higher navigation risk, increase in camping area. | Compared to no action, steady flows, higher trout catch rates, but fewest large trout; lower navigation risk, most lost Glen Canyon rafting trips, increase in camping area. | Compared to no action, steady flows, higher trout catch rates, fewer large trout, lowest navigation risk, greatest potential increase in camping area. |

\* Descriptions of impacts have been shortened for summary presentation. Please see the Draft EIS for full descriptions.



## IMPORTANT MILESTONES

- ▶ Secretary of the Interior Ken Salazar announced the need to develop the LTEMP for Glen Canyon Dam on December 10, 2009.
- ▶ Public scoping for the LTEMP EIS began in July 2011, with scoping meetings held in November 2011. The scoping period ended on January 31, 2012, and a scoping report was published in 2012.
- ▶ Two public web-based meetings were held on March 27, 2012, to provide a summary of comments on the scope of the LTEMP EIS.
- ▶ A facilitated public workshop was held on April 4 and 5, 2012, to formulate and discuss alternative concepts.
- ▶ Cooperating Agency and Tribal meetings were held on August 10, 2012, to discuss alternative concepts.
- ▶ A workshop with Tribes was held on March 14, 2013, to discuss Tribal resource goals.
- ▶ A workshop with Adaptive Management Working Group (AMWG) stakeholders was held on August 5–7, 2013, to discuss initial modeling results and start a Structured Decision Analysis Process.
- ▶ A workshop with AMWG stakeholders was held on March 31–April 1, 2014, to discuss final model results and complete the Structured Decision Analysis Process.
- ▶ A webinar with AMWG stakeholders was held on December 3, 2015, to present general findings of the Draft EIS.

# Glen Canyon Dam

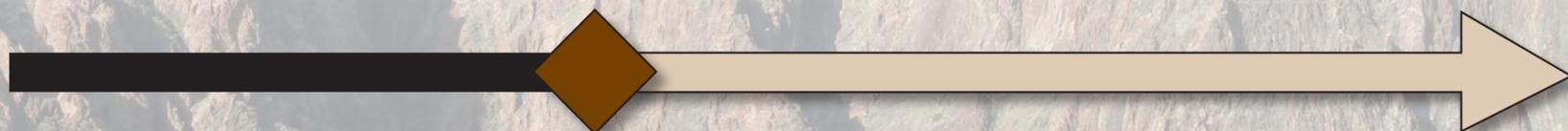
## Long-Term Experimental and Management Plan EIS



# SCHEDULE

Reclamation and the National Park Service anticipate that the **LTEMP EIS** will be completed by summer of 2016.

| Public Scoping  | Draft EIS   | Final EIS  | Record of Decision  |
|---|---|--|---|
| <p><b>What Happens:</b><br/>Gather Public Comments on Scope</p> <p>Use Public Comments in Determining Issues and Alternatives</p> | <p><b>What Happens:</b><br/>Publish Draft EIS</p> <p>Public Review and Comment Period</p> <p>Accept Public Comments</p> | <p><b>What Happens:</b><br/>Review and Incorporate Public Comments</p> <p>Revise Draft EIS</p> | <p><b>What Happens:</b><br/>Write and publish Records(s) of Decision no sooner than 30 days after Final EIS publication</p> |
| July 2011 through January 2012  | Publish Draft EIS January 2016  | Publish Final EIS Summer 2016  | Publish ROD Late Summer 2016  |



|  |  |   |   |
|--|--|---|---|
| <p><b>Public Involvement Activities:</b><br/>Public Scoping Meetings</p> <p>Submit Public Comments via Mail, Web, or in Person at Meetings</p> | <p><b>Public Involvement Activities:</b><br/>Public Meetings</p> <p>Submit Public Comments via Mail, Web, or in Person at Meetings</p> | <p><b>Public Involvement Activities:</b><br/>Public Distribution of Final EIS</p> | <p><b>Public Involvement Activities:</b><br/>Public Distribution of ROD</p> |
|--|--|---|---|

# Glen Canyon Dam

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## GETTING INVOLVED

You can review and provide comments on the Draft EIS, attend public meetings to receive more information on this document, and read the Final EIS and supporting materials provided on the website.

Reclamation and the National Park Service request your input on the Draft LTEMP EIS no later than April 7, 2016.

We are particularly interested in your input on:

- ▶ The resources or issues that were evaluated in the LTEMP Draft EIS
- ▶ The alternatives that were analyzed in the LTEMP Draft EIS
- ▶ The preferred alternative identified in the Draft EIS
- ▶ The assessment of impacts and conclusions presented in the Draft EIS
- ▶ Your comments will be considered in preparing the Final EIS and Record of Decision. The Record of Decision will identify the alternative to be used for Glen Canyon Dam operations and experimental flow and non-flow actions that will take place over the next 20 years. These documents and supporting materials will be provided on the project website (<http://ltempeis.anl.gov>) as they become available.