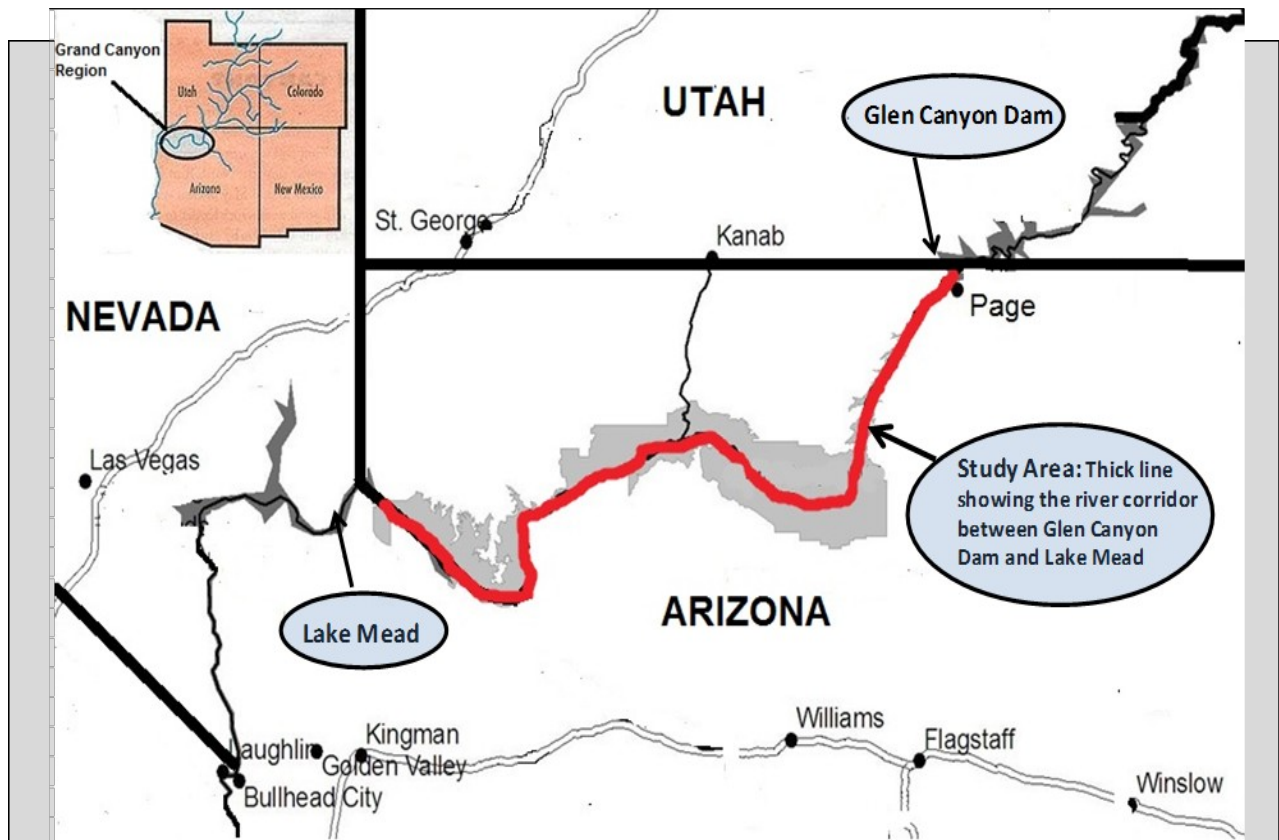


# National Park Service Glen Canyon Survey



**Paperwork Reduction and Privacy Act Statement:** The National Park Service is authorized by 16 U.S.C. 1a-7 to collect this information. This information collection will provide data for the economic analysis of the alternative management and operation protocols that will be one piece of information that the Secretary of the Interior will use to evaluate future dam operation plans associated with the current ongoing Glen Canyon DEIS. Response to this request is voluntary. No action may be taken against you for refusing to supply the information requested. The permanent data will be anonymous. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

**BURDEN ESTIMATE** Public reporting burden for this collection is estimated to average 30 minutes per response. Direct comments regarding the burden estimate or any other aspect of this form to: Chris Neher at (406) 721-2265; or Phadrea Ponds, NPS Information Collection Coordinator, Fort Collins, CO; [pponds@nps.gov](mailto:pponds@nps.gov) (email).

## BACKGROUND INFORMATION ABOUT THIS STUDY

Please read these pages before you complete the survey.

This study deals with the ways Glen Canyon Dam could be operated to benefit natural resources in the Study area. A map showing the location of the Dam and the Study area appears on the cover. A description of the resources in the Study area is contained on the following pages.

## GLEN CANYON DAM AND THE STUDY AREA

### Glen Canyon Dam

- Glen Canyon Dam is located on the Colorado River in Arizona.
  - It is just upstream from the Grand Canyon within Glen Canyon.
  - It was built to provide water supplies and hydroelectricity.
  - It was completed in 1963.
  - It controls the water flow through the Grand Canyon and a lower portion of Glen Canyon.
  - Revenues from the sale of hydroelectricity are used to repay costs of building and operating the dam.

### The Study area

- The Study area consists only of the area in and along the Colorado River at the bottom of the Grand Canyon and part of Glen Canyon.
- The Study area begins at Glen Canyon Dam.
- The Study area continues for nearly 300 miles downstream from the dam.
- The Study area ends at Lake Mead near Las Vegas, Nevada.
- Part of the Study area is within the Grand Canyon National Park and part of Glen Canyon National Recreation Area.
- Part of the Study area is bordered by American Indian reservations.

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**Q1. Have you ever been to Glen Canyon Dam in Arizona?**

- No                       Yes

**Q2. Before receiving this survey had you heard of Glen Canyon Dam?**

- No                       Yes
-

## HOW GLEN CANYON DAM AFFECTS THE COLORADO RIVER IN THE STUDY AREA

- The amount of electricity produced by Glen Canyon Dam depends on the amount of water released from the dam: the more water released, the more electricity produced.
- More water is released during periods of high demand for electricity and less water is released during periods of low demand for electricity.
  - On a seasonal basis, more water is released during the hottest summer months and the coldest winter months.
  - On a daily basis, more water is released during the day than at night.

## NATURAL RESOURCES IN THE STUDY AREA

The natural resources in the Study area are located in and along the Colorado River below Glen Canyon Dam.



**SEDIMENT** Deposits of sand and mud called **beaches or sandbars**, are scattered along the river. Most of the rest of the river bank consists of cliffs and steep slopes covered with rocks, boulders, wind-blown sand and desert vegetation. Beaches with vegetation provide habitat for birds and other small animals. Beaches also are used by river floaters for camping.



**FIVE NATIVE FISH** species, including the **humpback chub** shown, live in the Study area. Only one of these native species is found outside the Colorado River and its tributaries.



**NON-NATIVE FISH** also live in the river. Rainbow trout are not native to the Colorado River. They were introduced to this section of the Colorado River for recreational fishing following the construction of Glen Canyon Dam. People fish for rainbow trout primarily in the first 15 miles downstream from

Glen Canyon Dam. **Several other non-native fish species**, including brown trout, common carp, channel catfish, and fathead minnow, also live in the study area.

- Only a small percentage of visitors to the Grand Canyon National Park or part of Glen Canyon National Recreation Area actually see or directly use the natural resources in the study area.
  - The only people who directly interact with the resources in the study area are visitors who float the river, backpack or recreationally fish, American Indians using resources in the study area, scientists studying the river and National Park Service personnel.

## SOME PEOPLE ARE CONCERNED ABOUT THESE RESOURCES

Because of a reduction in sediment supply below Glen Canyon Dam, erosion has decreased the number and size of **beaches along the river**.

- In the first 30 years following construction of Glen Canyon Dam the total size of Grand Canyon beaches decreased substantially. For example, during this period the total acreage of beaches **decreased by more than 25%**. In the past 20 years, controlled floods released from Glen Canyon Dam have resulted in periodic rebuilding of beaches, slowing the decline in size.
- The loss of beaches is most severe along the narrow sections of the Colorado River.

Populations of native fish in the Study area declined during the 1990s, but have increased over the last ten years.

- Eight species of native fish evolved in the Colorado River when the water was warmer in the summer, colder in the winter, and much more turbid year round than it is today.
- Three of the eight native fish species are no longer found in the Study area.
- Two of five remaining native species, the humpback chub and razorback sucker, are in danger of becoming extinct.
- Consistently cold water released year-round from Glen Canyon Dam may be the most important cause of the decline of native fish populations.
- Predation and competition from non-native fish (trout, carp, catfish, and minnow species) may have contributed to the decline of native species.

Conditions for **trout are affected by daily fluctuations in water level**.

- Trout eggs can warm-up or dry out and die if they are laid at high water levels and then the water level drops.
- The diversity of aquatic invertebrates, many of which feed on trout eggs, may be reduced because of exposure of eggs during low-water periods. This may reduce food options for juvenile and adult trout to a very small number of invertebrate species.

## WHAT CAN BE DONE TO BETTER PROTECT THE RESOURCES?

**There are a number of tools available for improving natural resource conditions below Glen Canyon Dam. The tools available are:**

**River flow controls** --Dam managers can modify the water releases from the dam to make changes to the timing, fluctuations and average river levels. These modifications may affect sandbar erosion, hydropower revenue, and native and non-native fish. The frequency of short periods of high water releases may affect the rebuilding of sandbars in the Grand Canyon.

**Fish management tools** -- Resource managers use various tools to increase or decrease native and non-native fish. These controls include direct removal of non-native species, flows designed to promote healthy trout populations (fewer numbers but larger trout), and flows designed to partially control the temperature of water through low summer flows to affect the growth and survival of native fish species.

**Native fish and native vegetation restoration** - All approaches for this project would include non-flow experimental actions for native re-vegetation/restoration and weed removal and restoration of native fish to certain tributary locations.

**Cost of tools** -- River managers are able to use these tools in combinations in order to benefit the river corridor resources. All of these tools have costs associated with them. These costs would be passed on to the public through a combination of:

- higher electric power bills for households in the six-state Colorado River Basin, and
- increased federal taxes from all U.S. Residents

Assume that the costs for using the management tools mentioned above for your household (and similar households in your area) would begin in 2015 and would last for the next 20 years.

We presented a lot of material in the background information. We would like to ask a few questions about the background information to make sure it was clearly presented. Please feel free to refer to the first few pages of the survey when answering these questions.

**Q3. For each statement below, please circle the letter "T" if you think the statement is true or the letter "F" if you think the statement is false. (Only one answer for each statement)**

	TRUE	FALSE
There are now many <b>more</b> beaches along the Colorado River than there were before Glen Canyon Dam was built.	T	F
Native fish populations in the Colorado River <b>have fluctuated dramatically</b> since the dam was built.	T	F
The decrease in river beaches is most severe along <b>wide</b> sections of the river.	T	F
Trout are <b>not native</b> to the study area.	T	F
<b>All</b> native fish species have disappeared from the Grand Canyon.	T	F
<b>Nearly all</b> visitors to the Grand Canyon National Park use the beaches along the river.	T	F
Water levels below Glen Canyon Dam are <b>constant</b> throughout a 24 hour period.	T	F
The Study area consists <b>only</b> of the area in and along the Colorado River between Glen Canyon Dam and Lake Mead.	T	F
<b>Two</b> of the native fish species are in danger of extinction.	T	F
Reducing daily fluctuations in the amount of water released from the dam will <b>reduce</b> the total amount of hydroelectricity produced.	T	F

Below we have outlined a choice between the Existing Management Plan for operating Glen Canyon Dam, and a new Proposed Plan A. This plan includes river flow control, a specific set of fish management tools, and native fish and native vegetation restoration designed to benefit river resources below the dam. We have highlighted the differences between the plans in terms of impacts on beaches, native fish, trout and the cost of the plans. Note that for some resources, impacts may be the same for both the Existing Management Plan and Proposed Plan A.

We would like to know how you would vote if all U.S. residents were presented with two options—the Existing Management Plan and Proposed Plan A—and asked to vote for the one they prefer. The one with the most votes would be implemented.

## INSTRUCTIONS FOR NEXT QUESTIONS

Government officials will consider many factors when deciding whether or not to change dam operations. One factor they would like to consider is whether various proposals are personally worthwhile to people like you. In the next questions, we will describe the effects of different proposals to change dam operations. We would like you to tell us if you would vote for the new proposals or for the way the dam is currently operated.

Some people might vote "for the Current Policy" because:





- The cost of the New Policy is too high.
- The effects of the New Policy are not worth anything (not even 10¢) to them.
- They just can't afford the cost.

Some people might vote "for the New Policy" because:

- The cost of the New Policy is low enough.
- The effects of the New Policy are worth what it would cost them.

At this point in time, it is not certain what the cost would be to any specific individual, so we are asking different people about different amounts. Even if the amount we ask you about seems very low or very high, please answer carefully. This will allow us to determine whether people think the proposal is worthwhile at whatever level the final cost is determined to be. For this study, it is important that you tell us how you would vote, based only on **your personal evaluation** of whether changes in dam operations and their effects are worth the additional cost **to you**.

**Q4. Ask yourself whether you believe the improvements offered under Proposed Plan A are worth \$XX each year to your household for the next 20 years. Voting for Proposed Plan A would mean you would have \$XX less each year to spend on other things. You would be making a commitment to pay this additional amount each year for the next 20 years. Please check ONE box at the bottom of the table to indicate whether you prefer Proposed Plan A, or the Existing Management Plan**

Resources impacted by policies	Existing Management Plan— conditions over the next 20 years	Proposed Plan A— conditions over the next 20 years
River Beaches (Size and number) 	25% reduction in size and number	Remain at present levels
Native fish (humpback chub) populations 	Remain at present levels	25% increase
Trout populations 	Remain at present condition	50% increase in large trout
Cost to your HH 	\$ 0	<u>\$40 per year</u> for 20 years
I would vote for (check only one ✓ )	<input type="checkbox"/>	<input type="checkbox"/>

**Q5. How certain do you feel about the choice you made above?**

- Very certain
- Somewhat certain
- Not certain at all

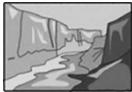



**Now consider a different choice...**

We would now like to know how you would vote if you were presented with a completely different Proposed Plan.

For this next choice, please imagine that Proposed Plan A is NOT an option.

Please consider how you would vote if you had to choose between the two plans below. When making this choice, please imagine that the ONLY two options are Proposed Plan B and the Existing Management Plan.

**Q6.** Ask yourself whether you believe the improvements offered under Proposed Plan B are worth \$XX each year to your household. Voting for Proposed Plan B would mean you would have \$XX less each year to spend on other things. You would be making a commitment to pay this additional amount each year for the next 20 years. Please check **ONE** box at the bottom of the table to indicate whether you prefer Proposed Plan B, or the Existing Management Plan.

Resources impacted by policies	Existing Management Plan —conditions over the next 20 years	Proposed Plan B— conditions over the next 20 years
River Beaches (Size and number) 	25% <i>reduction in size and number</i>	25% <i>increase in size and number</i>
Native fish (humpback chub) populations 	<i>Remain at present levels</i>	<i>Remain at present levels</i>
Trout populations 	<i>Remain at present condition</i>	25% <i>increase in large trout</i>
Cost to your HH 	\$ 0	<i>\$110 per year for 20 years</i>
I would vote for(check only one ✓)	<input type="checkbox"/>	<input type="checkbox"/>

**Q7.** How certain do you feel about the choice you made above?

- Very certain
- Somewhat certain
- Not certain at all

**Q8. Thinking about the choices you just made, please rate how much you agree or disagree with each of the following statements. (Circle one number for each statement)**

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
My choices would have been different if the economy in my area were better.	1	2	3	4	5
It is important to restore and protect the Grand Canyon ecosystem no matter how much it costs.	1	2	3	4	5
I do not think I should have to contribute to the protection of the Grand Canyon ecosystem.	1	2	3	4	5
I am concerned that the plans would hurt the economy in the Colorado River Basin.	1	2	3	4	5
The descriptions of the plans were hard to understand.	1	2	3	4	5
I do not believe the plans will actually improve the Colorado River resources.	1	2	3	4	5
Some of the plans would cost too much compared to what they would deliver.	1	2	3	4	5
The survey gave me enough information to make a choice between the options shown.	1	2	3	4	5
I think my taxes will increase if either of the proposed plans passes.	1	2	3	4	5

**Q9. If you voted for the EXISTING MANAGEMENT PLAN in either of the choices, please rate how much you agree or disagree with each of the following statements. If not, skip to Q10.**

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
I voted for the CURRENT MANAGEMENT PLAN because I am against any more taxes or government spending.	1	2	3	4	5
I voted for the CURRENT MANAGEMENT PLAN because I believe my taxes are already too high.	1	2	3	4	5

**Q10. If you voted for PROPOSED PLAN A or PROPOSED PLAN B, please rate how much you agree or disagree with each of the following statements. If not, skip this question.**

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
I voted for the Proposed Plan because I thought it would increase the chances that the government would do the same thing in river basins closer to my home.	1	2	3	4	5
I voted for the Proposed Plan more for future generations than for myself.	1	2	3	4	5



**Q11. People often have different views about environmental issues. On a scale of 1 to 5, with 1 being strongly agree and 5 being strongly disagree, please indicate how you feel about each statement written below.**  
(Circle one number for each statement)

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
When humans manipulate nature, it often produces disastrous consequences.	1	2	3	4	5
Humans will eventually learn enough about how nature works to be able to [control it].	1	2	3	4	5
The balance of nature is very delicate and easily upset.	1	2	3	4	5
If human activity continues on its present course, we will soon experience a major ecological catastrophe.	1	2	3	4	5
Plants and animals have as much right as humans to exist.	1	2	3	4	5
Human ingenuity will ensure that we do not make the earth unlivable.	1	2	3	4	5
Humans are severely abusing the environment.	1	2	3	4	5
We are approaching the limit of the number of people the earth can support.	1	2	3	4	5
The earth is like a spaceship with very limited room and resources.	1	2	3	4	5

**Q12. The following statements discuss economic and environmental issues. We would like to understand how you feel about these issues. On a scale of 1 to 5, with 1 being strongly agree and 5 being strongly disagree, please indicate how you feel about each statement written below.** (Circle one number for each statement)

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
Economic security and well-being should be considered first; then we can focus on environmental problems.	1	2	3	4	5
If business is forced to spend a lot of money on environmental protection, it won't be able to invest in research and development to innovate and keep us competitive in the international market.	1	2	3	4	5
Some pollution is inevitable if we are going to maintain and improve our standard of living.	1	2	3	4	5
The decision to develop resources should be based mostly on economic grounds rather than environmental or archeological grounds.	1	2	3	4	5

**Q13. The following statements discuss hydroelectricity. We would like to understand how you feel about these**

issues. On a scale of 1 to 5, with 1 being strongly agree and 5 being strongly disagree, please indicate how you feel about each statement written below. (One number for each statement)

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
The benefits of hydroelectric dams on the Colorado River outweigh the impacts to the natural environment and historical places along the river.	1	2	3	4	5
Hydroelectric dams should not be constructed on any section of a river that flows through a national park.	1	2	3	4	5
Hydroelectric dams can have serious impacts on the plants and animals that live in or along the river.	1	2	3	4	5
Hydroelectric dams should be developed wherever it is economically beneficial, even if it means that some rivers will be changed.	1	2	3	4	5

In this section, we would like to learn how you feel about national parks in the United States.

**Q14. Have you ever visited any national parks in the United States?**

- No  
 Yes  
 Don't Know

**Q15. We are interested in learning how you feel about national parks in general. On a scale of 1 to 5, with 1 being "strongly agree" and 5 being "strongly disagree," please indicate how you feel about each statement written below. (One number for each statement)**

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
National parks are a "luxury" we cannot afford in difficult economic times.	1	2	3	4	5
National parks help us to remember that our future is tied to the preservation of nature and natural resources.	1	2	3	4	5
It is important that national parks offer us a chance to see America as the early settlers saw it.	1	2	3	4	5
Americans need places like national parks to "recharge their batteries."	1	2	3	4	5
An important function of the National Park Service is to protect native birds, plants, and animals.	1	2	3	4	5
National parks are only valuable to the people who visit them.	1	2	3	4	5
Oil and natural gas finds on national park lands should be developed since it is in the national interest.	1	2	3	4	5
The National Park Service places too much emphasis on preservation.	1	2	3	4	5
I am glad there are national parks, even if I don't visit them.	1	2	3	4	5

People can think a place is valuable, even if they do not actually go there themselves.	1	2	3	4	5
The American people should provide greater financial support for the National Park Service to avoid more commercial activities in the national parks.	1	2	3	4	5
If the National Park Service needs more financial support, they should develop more gift shops and commercial activities to raise money.	1	2	3	4	5

In this section, we are interested in learning about trips you may have taken to Grand Canyon National Park.

**Q16. Have you ever visited Grand Canyon National Park?**

- No → *Skip to Question 19*  
 Yes

**Q17. Did you see the Colorado River while you were in Grand Canyon National Park?**

- No → *Skip to Question 19*  
 Yes

**Q18. Did you go down to the Colorado River while you were at the Grand Canyon National Park?**

- No  
 Yes

**Q19. How likely do you think it is that you will visit the Grand Canyon National Park in the future?**

- Not at all likely  
 Somewhat unlikely  
 Somewhat likely  
 Very likely

In this last section, we would like to ask you some questions about your background that will help us compare your answers with those of other people.

**Q20. Are you male or female?**

- Male  
 Female

**Q21. What is your age?**

\_\_\_\_\_ years old

**Q22. How many people live in your household?**

\_\_\_\_\_ people 18 years old or older

\_\_\_\_\_ people under the age of 18

\_\_\_\_\_ total number of people in the household

**Q23. What is the highest degree or level of school you have completed?**

- No high school diploma
- High school diploma or GED
- Some college credit but no degree
- Associate’s degree (for example: AA or AS)
- Bachelor’s degree (for example: BA or BS)
- Some graduate school or professional school credit or a graduate or professional degree

**Q24. Which of the following categories best describes your household employment status?**

*(Check all that apply)*

- |  | <b>You</b>               | <b>Spouse/Partner</b>    |
|--|--------------------------|--------------------------|
| <input type="checkbox"/> Employed full time            | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Employed part time            | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Retired                       | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Student                       | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Full-time homemaker           | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Unemployed                    | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Other <i>(please specify)</i> | _____                    | _____                    |

**Q25. Are you Hispanic or Latino?**

- No
- Yes

**Q26. Please select the racial category or categories with which you most closely identify by placing an “X” in the appropriate box. *(Check one or more)***

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or other Pacific Islander
- White

**Q27. Do you or either of your parents belong to any of the following tribes? *(Check all that apply or leave blank if not applicable)***

- Apache
- Havasupai
- Hopi
- Hualapai
- Navajo
- Pueblo
- Zuni
- Other *(please specify)*: \_\_\_\_\_

**Q28. What was your total pre-tax household income, including all earners in your household, in 2013?**

- Under \$25,000
- \$25,000 to \$34,999
- \$35,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 to \$199,999
- \$200,000 or more

**Is there anything else you would like to tell us about managing Glen Canyon Dam?**

COMMENT:

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**THANK YOU FOR YOUR HELP**

**Please return only this survey booklet in the  
enclosed, postage-paid envelope**

**For questions, contact:  
Chris Neher (406) 721-2265**

## Attachment A

### Choice Question Experimental Design: The possible attribute levels for the conjoint questions

#### Attribute Levels for Current Management Plan (fixed across all questions)

##### Erosion of sandbars

- 20% deterioration of sandbars

##### Populations of Native Fish within the Grand Canyon Corridor, including the endangered humpback chub

- Remain at present levels of native fish populations

##### Trout populations in the river

- Remain at present levels of trout health

##### Cost to your household

- \$0

#### Attribute levels for Proposed Plans

##### Erosion of sandbars

- 20% deterioration number of sandbars
- Rate of change in the number of sandbars remains at present levels
- Potential for 20% increase in the number of sandbars

##### Populations of Native Fish within the Grand Canyon Corridor, including the endangered humpback chub

- 25% decrease in native fish populations
- Remain at present levels of native fish populations
- 25% increase in native fish populations
- 50% increase in native fish populations

##### Trout populations in the river

- 25% decrease in large trout populations
- Remain at present levels of large trout populations
- 25% increase in large trout populations
- 50% increase in large trout populations

##### Cost to your household

- \$12
- \$40
- \$110
- \$280