

***Partial Workshop Report Including Polling  
Results***

**Grand Canyon Monitoring and Research Center**

**Technical Work Group  
Socioeconomic Workshop**

**Phoenix, Arizona**

**December 2-3, 2009**

*Prepared by*



1886 Deer Canyon Road  
Arroyo Grande, CA 93420  
(805) 474-8105  
[www.strategicinit.com](http://www.strategicinit.com)

*In collaboration with*

The  
**Mary Orton  
Company LLC**

## **Meeting Overview**

On December 2-3, 2009, the Grand Canyon Monitoring and Research Center (GCMRC) hosted a Socioeconomic Workshop for the Technical Work Group (TWG) of the Glen Canyon Dam Adaptive Management Program (GCDAMP), at the Department of Water Resources' offices in Phoenix, Arizona. The purpose of the workshop was to review recently completed and ongoing socioeconomic studies that are directly relevant to assessing effects and trade-offs of Glen Canyon Dam operations and, with this information as a starting point, have a facilitated discussion among GCDAMP stakeholders to assist GCMRC in identifying and prioritizing socioeconomic questions and topics that would be useful to inform future GCDAMP decision making, both within the next 3-5 years (Phase I) and farther out in time (Phase II).

Members of the GCDAMP Technical Work Group (TWG) and Adaptive Management Work Group (AMWG), representing 19 of the 24 agencies, tribes and organizations in the GCDAMP, participated in the workshop, along with seven invited presenters, four members of an expert independent panel, and four other interested parties. TWG members were asked for input on the scope and objectives of future economic studies, and to identify and prioritize information needs for Phase I and Phase II work. The members of the independent panel were asked to give GCMRC general guidance on scoping and refining the prioritization of Phase II work, as well as specific guidance to include in a future RFP for Phase I studies.

Interactive polling technology was used on the first day to obtain opinions from workshop participants. Each participant used a remote FM radio input terminal (see photo at right) to respond to questions projected on a large screen. Demographic information was also collected to better understand the perspectives of the various participants.



This report presents the results of the interactive polling surveys as well as the workshop evaluation conducted at the end of the second day. The GCMRC staff who organized the workshop recorded the observations and conclusions from the discussion and will report them separately. Because very little socioeconomic research has been previously undertaken by the GCDAMP, most of the TWG participants are in the early stages of learning the subject. Their opinions are not yet fully formed and so their preferences expressed through the technology are still tentative. Therefore, **the discussion during the workshop is one of the primary products of the workshop**; it shows the participants' evolving thinking and allows them to learn from one another. The polling results in this document can be understood only in light of those observations and conclusions. A report from the expert panel, including their observations and recommendations, is another important outcome of the workshop and will be provided in a separate report.

It is important to note that the interactive polling process was designed to stimulate discussion and understanding of the perspectives of the various participants. It was not designed to be statistically representative of a broader group of participants. The number of participants may vary among polls since not all participants participated in every poll.

**Participants**

The following people signed in or otherwise indicated that they attended the workshop on December 2.

Name	Affiliation
Cliff Barrett	UAMPS
Shane Capron	TWG Chair / Western Area Power Administration
Lori Caramanian	DOI-ASWS
Kerry Christensen	Hualapai Tribe
Kurt Dongoske	Pueblo of Zuni
L.D. Garrett	M3 Research
P.J. Garrett	M3 Research
Jay C. Groseclose	State of New Mexico
Burt Hawkes	Western Area Power Administration
Norm Henderson	National Park Service – Glen Canyon NRA
Amy Heuslein	Bureau of Indian Affairs
Linda Jalbert	National Park Service – Grand Canyon
Rick Johnson	Grand Canyon Trust
Glen Knowles	US Fish & Wildlife Service
Ted Kowalski	State of Colorado
LaVerne Kyriss	Western Area Power Administration
Nikolai Lash	Grand Canyon Trust
Andy Makinster	Arizona Game & Fish Department
Steve Mietz	National Park Service – Grand Canyon
Don Ostler	States of Wyoming and Utah
Jane Rodgers	National Park Service – Grand Canyon
Tom Ryan	US Bureau of Reclamation
Dave Slick	SRP (CREDA Board member)
Larry Stevens	Grand Canyon Wildlands Council
Jason Thiriot	State of Nevada
Bill Werner	State of Arizona
Mike Yeatts	Hopi Tribe

**Independent Panelists**

Joel Hamilton	University of Idaho - Moscow
Michael Hanemann	University of California - Berkeley
John Loomis	Colorado State University
Lon L. Peters	Northwest Economic Research, Inc.

**Presenters**

John Duffield	University of Montana - Missoula
David Harpman	US Bureau of Reclamation – Denver
Yeon-Su Kim	Northern Arizona University
David Marcus	Energy Consultant
Clayton Palmer	Western Area Power Administration
Thomas Veselka	Argonne National Laboratories
Mike Welsh	Christensen Associates Energy Consulting

**GCMRC Staff**

Helen Fairley	GCMRC
John Hamill	GCMRC
Ted Melis	GCMRC

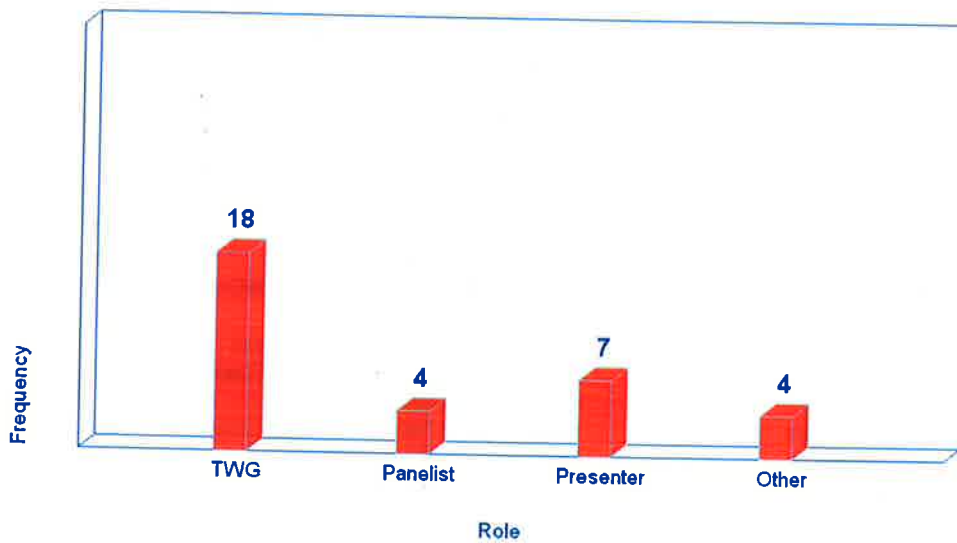
**Facilitators**

Mary Orton and Chuck Anders, The Mary Orton Company, LLC

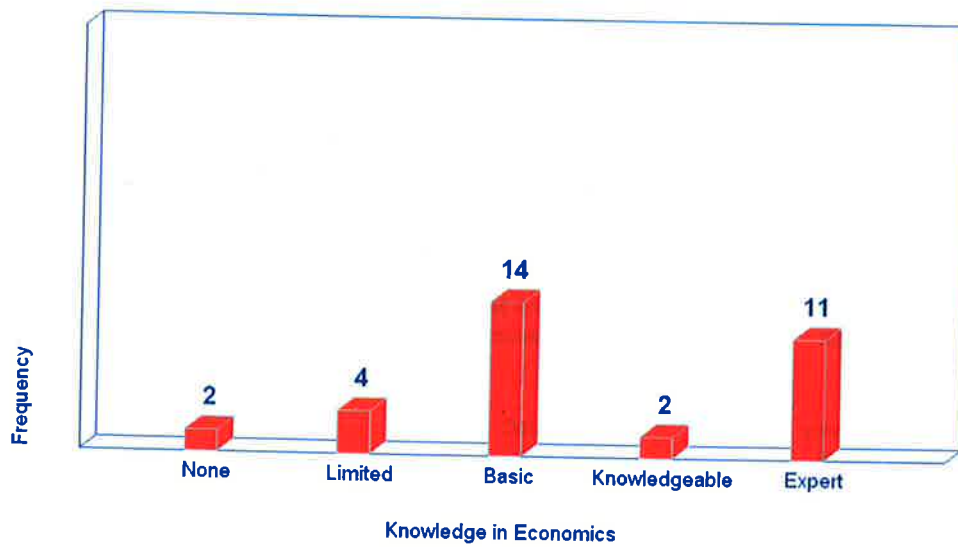
### Demographic Information

The following demographic information was collected to better understand and interpret the results of the interactive surveys.

A- Are you a:



B- How would you characterize your knowledge / expertise in economics?



**Before / After Questions**

Workshop participants were asked to rate the importance of the following three types of socioeconomic information at the beginning of the workshop (before any presentations or discussion) and again at the end of the first day of the workshop to assess the extent that the information and discussion changed their opinions.

- A. Monetary assessments of the values associated with market-based commodities, such as hydropower or the regional tourism industry
- B. Monetary assessments of the values associated with non-market commodities, such as the value of maintaining a high quality sport fishery or clean air in northern Arizona
- C. Monetary assessments of non-use values, such as those derived from knowing that an endangered species will continue to exist in the Grand Canyon

**Before Question:**

Based on what you know right now, how would you rate the importance of having accurate economic information about this item to inform decision making in the AMP?

1 = Not at all important, 2 = Not very important, 3 = Somewhat important, 4 = Important, 5 = Critical

**After Question:**

Now that you have had the benefit of additional information and discussion in this workshop, how would you rate the importance of having accurate economic information about this item to inform decision making in the AMP?

1 = Not at all important, 2 = Not very important, 3 = Somewhat important, 4 = Important, 5 = Critical

The results of the two surveys are presented in the table below and on the following scatter diagrams.

**Importance of having accurate economic information to inform decision making in the AMP?  
 Official TWG Members - December 2, 2009**

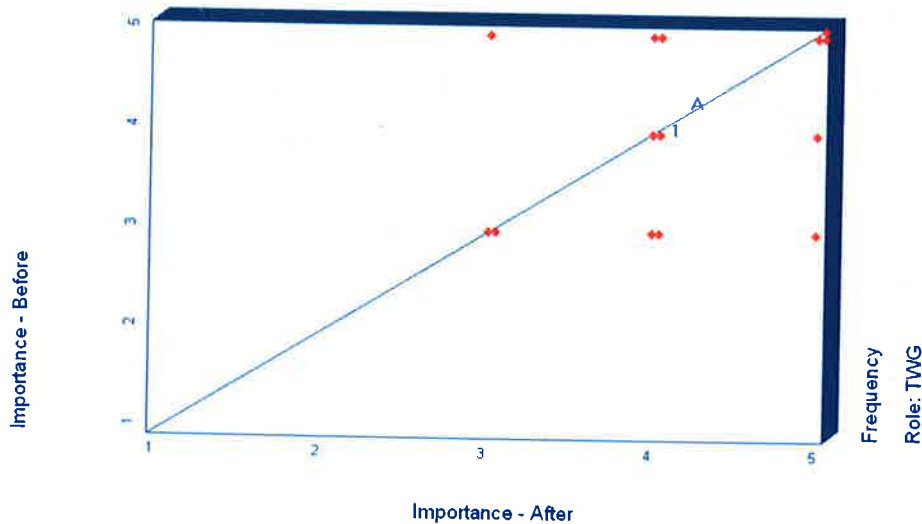
Socioeconomic Factor	Same importance before and after	More important before than after	More important after than before
A. Monetary assessments of the values associated with market-based commodities, such as hydropower or the regional tourism industry	7	3	4
B. Monetary assessments of the values associated with non-market commodities, such as the value of maintaining a high quality sport fishery or clean air in northern Arizona	7	4	3
C. Monetary assessments of non-use values, such as those derived from knowing that an endangered species will continue to exist in the Grand Canyon	8	1	5

In the following three charts, the letter on the charts (A, B, and C) represents the average of all of the participants who participated in the exercise. The red diamonds show the actual responses for each of the TWG members, and the "1" shows the average of all the TWG members. The results of the "Before" question are shown on the vertical axis and the results of the "After" question are shown on the horizontal

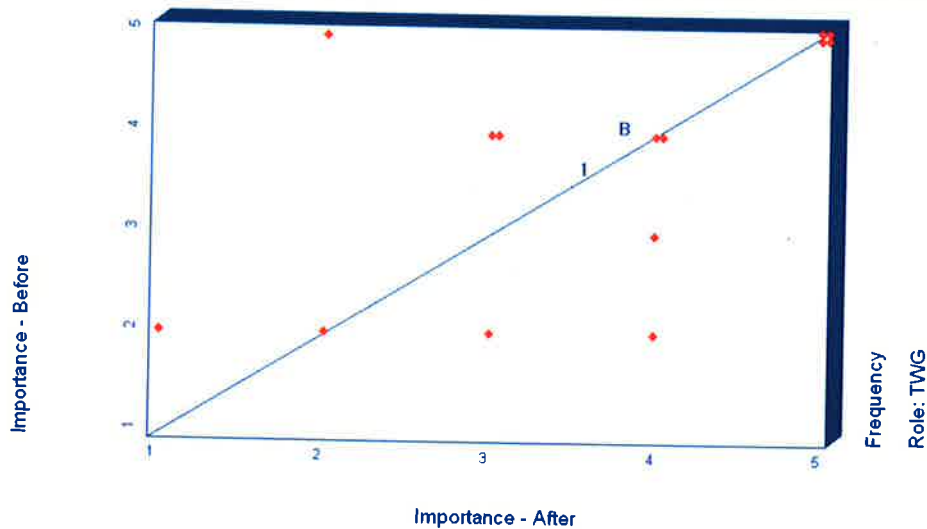


axis. Since the scale for both questions are the same, dots on the diagonal line represents TWG members who answered the "Before" and "After" question the same. If the "Before" questions got a higher rating than the "After" question the diamond, number or letter would be above the diagonal line; if the "After" question was rated higher than the "Before" question, the diamond, number or letter would be below the line. The further away from the line, the greater the difference between the "Before" and "After" question.

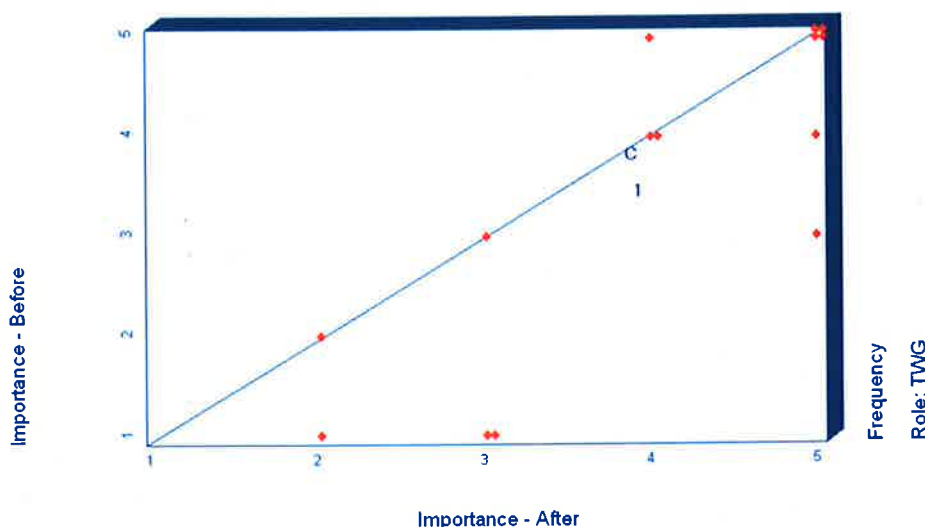
**A- Monetary assessments of the values associated with market-based commodities, such as hydropower or the regional tourism industry**



**B- Monetary assessments of the values associated with non-market commodities, such as the value of maintaining a high quality sport fishery or clean air in northern Arizona**



**C- Monetary assessments of non-use values, such as those derived from knowing that an endangered species will continue to exist in the Grand Canyon**



**Socioeconomic Questions**

Workshop participants worked in four small groups to develop the following list of potential socioeconomic questions to inform AMP decision making. Note that, due to time constraints, not all questions were gathered from the small groups; and while the groups were asked to submit their “top five” questions, there was not necessarily full consensus about those five in all the groups. After the groups submitted their top five, individuals were invited to submit any additional questions that they felt were important.

- A. What are the attributes of the river that are important to recreational users
- B. How do high flow and other experiments affect recreation (river rafting fishing guides and other associated businesses, including tribes)?
- C. Do we need to determine the value of "specialness" of resources, such as, hydroelectric power generation; visitor satisfaction; value of beaches to support rafting; values of high visibility wildlife e.g., peregrine falcon, big horn sheep; and value of a blue ribbon trout fishery?
- D. What are the points of disagreement on methodologies and assumptions in regard to power analysis?
- E. What would a consensus interagency methodology for modeling hydropower and recreation (e.g., fishing and rafting) economic outcomes look like?
- F. Integrate all use and non-use socioeconomic data into a conceptual model.
- G. What are the use and nonuse costs and benefits of HFE including the marginal costs and benefits of changes in HFE duration and size?
- H. Having heard two distinct views, what is the value of hydropower capacity of GCD?
- I. What is the base case on optimal power generation?
- J. What are the requirements for economic information in GCPA, ESA, NHPA, NEPA, CRSPA, etc.?
- K. What are the associated costs to hydropower of non-TCD warmer releases?

- L. What is the sociocultural impact of recreational use in the Colorado River on Native American values associated with resources and places in the Grand Canyon?
- M. Can the values of dependable power and water supplies be reflected in future economic analysis?
- N. How much weight should non-use values be given compared to market and non-market use values?
- O. What is the economic benefit of river recreation to tribes?
- P. What is the socioeconomic impact of mechanical removal of non-native fish and other actions?
- Q. What is the total non-use value for natural cultural, and recreational resources along the river?
- R. What are the socioeconomic benefits and costs of hydropower generation from HFE to tribal communities?
- S. What is the total economic impact to upper basin water users from changes to power generation from base case?
- T. What are the non-use values for different resources (including the tribal perspective) so we can include these values in trade-off analysis?
- U. What is the value of clean power generation at GCD nationally?
- V. Can we obtain an assessment of alternative economic consequences associated with different flow regimes at GCD from one or more CRSP customers, including indirect impacts?
- W. Determine impacts on marketed hydropower and recreation values of alternative flow scenarios in real time to support decision making.
- X. Can contracting for firm power WAPA be adjusted to be more flexible for current hydrology and operations without affecting the Basin Fund?

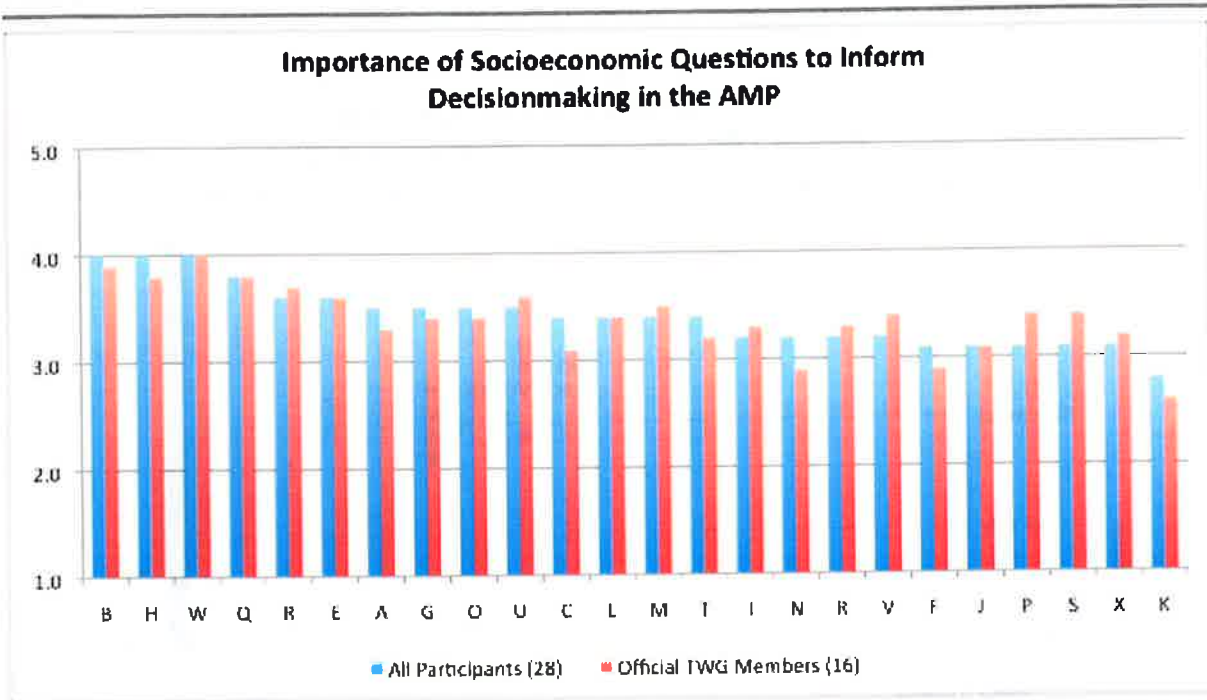
Participants were then asked to rate the importance of each potential socioeconomic question and also the timing of when that question should be addressed, using the following two survey questions.

**In order to inform the AMP decision making, how important is it that this question be addressed?**  
1 = Not at all important, 2 = Not very important, 3 = Somewhat important, 4 = Important, 5 = Critical

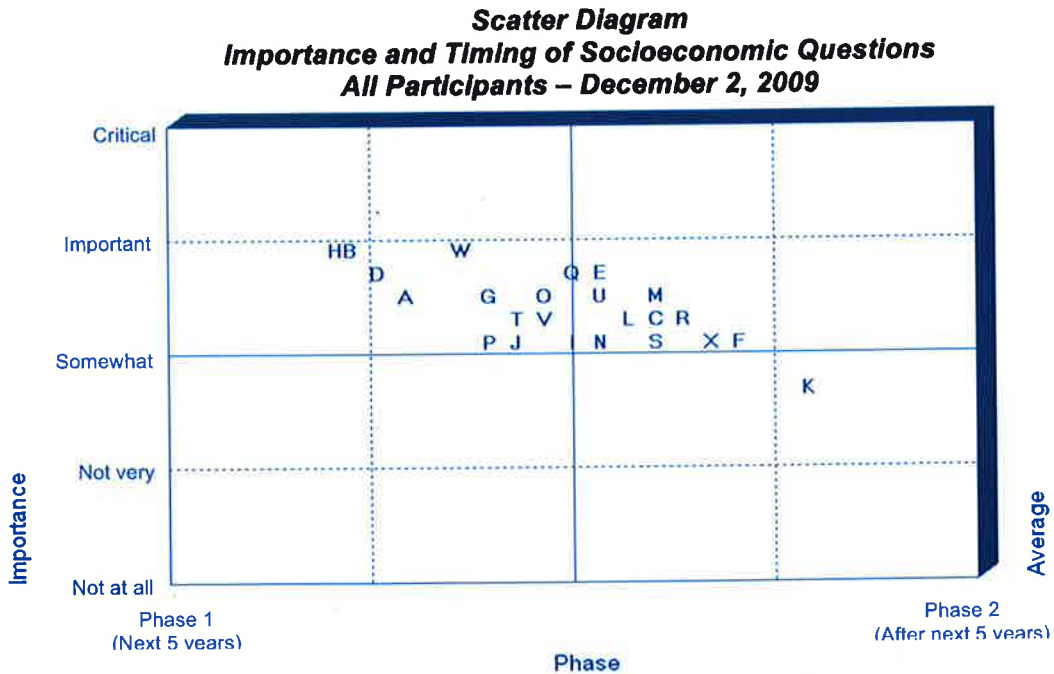
**Should this question be addressed in Phase 1 or Phase 2?**  
1 = Phase 1 (next 5 years), 2 = Phase 2 (after next 5 years)

The results of the importance question are shown in the following chart for all participants (blue) and official TWG members (red).

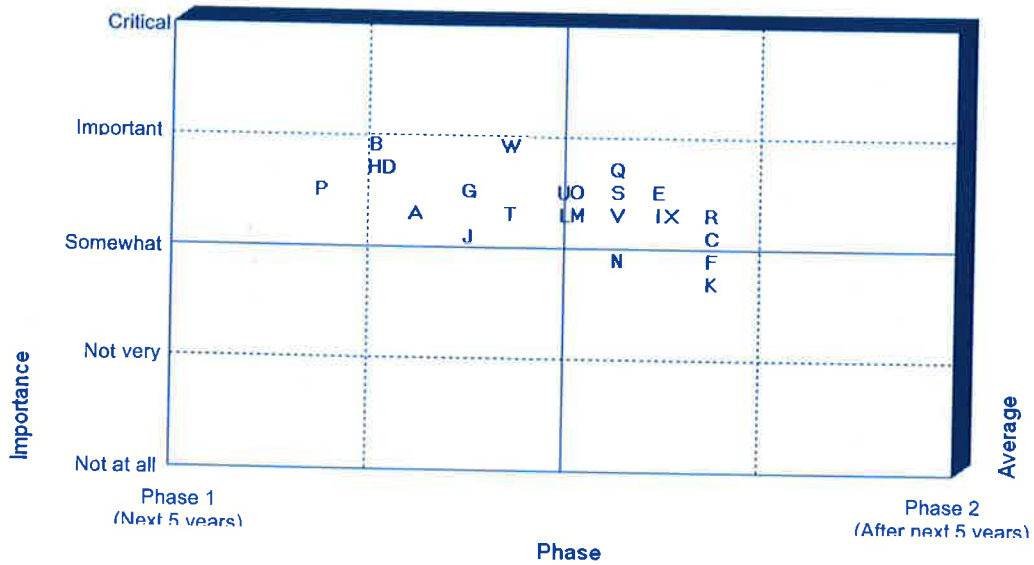




The survey results of the two questions were presented to the participants for discussion as a scatter diagram (below), where the location of the letter designating each question shows the importance on the vertical axis and the timing on the horizontal axis.



**Scatter Diagram**  
**Importance and Timing of Socioeconomic Questions**  
**Official TWG Members – December 2, 2009**



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**Importance and Timing of Socioeconomic Questions to Inform Decisionmaking for the AMP  
 All Workshop Participants and Official TWG Members**

Socioeconomic Questions	All Participants			Official TWG Members		
	Average Importance Rating	Phase 1	Phase 2	Average Importance Rating	Phase 1	Phase 2
	28 participants			16 participants		
B-How do high flow and other experiments affect recreation (river rafting fishing guides and other associated businesses, including tribes)?	4.0	79%	21%	3.9	75%	25%
H-Having heard two distinct views, what is the value of hydropower capacity of GCD?	4.0	79%	21%	3.8	75%	25%
W-Determine impacts on marketed hydropower and recreation values of alternative flow scenarios in real time to support decision making.	4.0	64%	36%	4.0	56%	44%
Q-What is the total non-use value for natural cultural, and recreational resources along the river?	3.8	50%	50%	3.8	44%	56%
D-What are the points of disagreement on methodologies and assumptions in regard to power analysis?	3.6	75%	25%	3.7	75%	25%
E-What would a consensus interagency methodology for modeling hydropower and recreation (e.g., fishing and rafting) economic outcomes look like?	3.6	46%	54%	3.6	38%	63%
A-What are the attributes of the river that are important to recreational users	3.5	71%	29%	3.3	69%	31%
G-What are the use and nonuse costs and benefits of HFE including the marginal costs and benefits of changes in HFE duration and size?	3.5	61%	39%	3.4	63%	38%
O-What is the economic benefit of river recreation to tribes?	3.5	54%	46%	3.4	50%	50%
U-What is the value of clean power generation at GCD nationally?	3.5	46%	54%	3.6	50%	50%
C-Do we need to determine the value of specialness* of resources such as hydroelectric power generation; visitor satisfaction; value of beaches to support rafting; values of high visibility wildlife e.g. peregrine falcon, big horn sheep; and value of a blue ribbon trout fishery?"	3.4	39%	61%	3.1	31%	69%
L-What is the sociocultural impact of recreational use in the Colorado River on Native American values associated with resources and places in the Grand Canyon?	3.4	43%	57%	3.4	50%	50%
M-Can the values of dependable power and water supplies be reflected in future economic analysis?	3.4	39%	61%	3.5	50%	50%
T-What are the non-use values for different resources (including the tribal perspective) so we can include these values in trade-off analysis?	3.4	57%	43%	3.2	56%	44%
I-What is the base case on optimal power generation?	3.2	50%	50%	3.3	38%	63%
N-How much weight should non-use values be given compared to market and non-market use values?	3.2	46%	54%	2.9	44%	56%
R-What are the socioeconomic benefits and costs of hydropower generation from HFE to tribal communities?	3.2	36%	64%	3.3	31%	69%
V-Can we obtain an assessment of alternative economic consequences associated with different flow regimes at GCD from one or more CRSP customers, including indirect impacts?	3.2	54%	46%	3.4	44%	56%
F-Integrate all use and non-use socioeconomic data into a conceptual model.	3.1	29%	71%	2.9	31%	69%
J-What are the requirements for economic information in GCPA, ESA, NHPA, NEPA, CRSPA, etc.?	3.1	57%	43%	3.1	63%	38%
P-What is the socioeconomic impact of mechanical removal of non-native fish and other actions?	3.1	61%	39%	3.4	81%	19%
S-What is the total economic impact to upper basin water users from changes to power generation from base case?	3.1	39%	61%	3.4	44%	56%
X-Can contracting for firm power WAPA be adjusted to be more flexible for current hydrology and operations without affecting the Basin Fund?	3.1	32%	68%	3.2	38%	63%
K-What are the associated costs to hydropower of non-TCD warmer releases?	2.8	21%	79%	2.6	31%	69%

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*In order to inform the AMP decisionmaking. How important is it that this question be addressed?*

**Official TWG Members**

Socioeconomic Questions	Number of Responses	Average of all Responses	Diversity*	Not at all	Not very	Somewhat	Important	Critical
H-Having heard two distinct views, what is the value of hydropower capacity of GCD?	16	3.8	35	1	1	4	4	6
B-How do high flow and other experiments affect recreation (river rafting fishing guides and other associated businesses, including tribes)?	16	3.9	9	0	0	4	10	2
W-Determine impacts on marketed hydropower and recreation values of alternative flow scenarios in real time to support decision making.	16	4.0	28	1	0	3	6	6
Q-What is the total non-use value for natural cultural, and recreational resources along the river?	16	3.8	45	1	3	2	3	7
D-What are the points of disagreement on methodologies and assumptions in regard to power analysis?	16	3.7	33	1	1	5	4	5
E-What would a consensus interagency methodology for modeling hydropower and recreation (e.g., fishing and rafting) economic outcomes look like?	16	3.6	25	1	1	4	8	2
U-What is the value of clean power generation at GCD nationally?	16	3.6	43	2	1	3	5	5
G-What are the use and nonuse costs and benefits of HFE including the marginal costs and benefits of changes in HFE duration and size?	16	3.4	28	1	2	4	7	2
A-What are the attributes of the river that are important to recreational users	16	3.3	21	1	2	4	9	0
O-What is the economic benefit of river recreation to tribes?	16	3.4	31	0	4	5	3	4
M-Can the values of dependable power and water supplies be reflected in future economic analysis?	16	3.5	47	2	2	3	4	5
L-What is the sociocultural impact of recreational use in the Colorado River on Native American values associated with resources and places in the Grand Canyon?	16	3.4	28	0	4	5	4	3
C-Do we need to determine the value of specialness* of resources such as hydroelectric power generation; visitor satisfaction; value of beaches to support rafting; values of high visibility wildlife e.g. peregrine falcon, big T-What are the non-use values for different resources (including the tribal perspective) so we can include these values in trade-off analysis?	16	3.1	40	2	3	5	3	3
V-Can we obtain an assessment of alternative economic consequences associated with different flow regimes at GCD from one or more CRSP customers, including indirect impacts?	16	3.2	36	2	2	4	6	2
R-What are the socioeconomic benefits and costs of hydropower generation from HFE to tribal communities?	16	3.4	28	0	4	5	4	3
I-What is the base case on optimal power generation?	16	3.3	27	1	2	6	5	2
N-How much weight should non-use values be given compared to market and non-market use values?	16	3.3	49	2	3	4	2	5
F-Integrate all use and non-use socioeconomic data into a conceptual model.	16	2.9	50	4	3	2	5	2
S-What is the total economic impact to upper basin water users from changes to power generation from base case?	15	2.9	38	2	4	4	3	2
J-What are the requirements for economic information in GCPA, ESA, NHPA, NEPA, CRSPA, etc.?	16	3.4	53	2	3	3	2	6
X-Can contracting for firm power WAPA be adjusted to be more flexible for current hydrology and operations without affecting the Basin Fund?	16	3.1	37	1	5	4	3	3
P-What is the socioeconomic impact of mechanical removal of non-native fish and other actions?	16	3.2	36	2	2	4	6	2
K-What are the socioeconomic impact of mechanical removal of non-native fish and other actions?	16	3.4	25	0	3	6	4	3
K-What are the associated costs to hydropower of non-TCD warmer releases?	16	2.6	25	2	5	7	1	1

\*Diversity is a statistic that varies between 0 and 100. A diversity score of zero means that everyone responded exactly the same way to the question whereas a score of 100 means that exactly half responded as high as they could and half as low as they could. High diversity scores indicate polarization in the group. Diversity is calculated as the Sum of Squares (Sum of Squared deviations from the mean or SS) that exists in the data divided by the maximum SS that could exist if the audience was equally split at the low and high end of the scale (times 100).

**Next Steps**

1. The panel will refine their recommendations and create a written report.
2. Report will be sent to all participants.
3. Summary report and a technology report will be sent to all participants by early 2010.
4. Mary Orton will send a draft preliminary report that is not for citation or distribution.
5. Look for funding from other agencies (AGFD?).



*This survey was structured to explore and understand the various perspectives of the participants. The results of the survey are not statistically representative of the community as a whole.*



**Workshop Evaluation**

Mary Orton invited attendees to provide one piece of feedback about what they liked about the workshop, indicated below with a plus symbol (+), and one piece of feedback about what they would like to change for the next workshop, indicated with a delta symbol (Δ). Below are the results of this exercise. Each check mark (√) indicates that someone endorsed a previously mentioned item.

+	Δ
+ The workshop brought out that this is important information. We can't let it ride.	Δ More time for small groups to refine their questions. √
+ The synthesis from the panelists this morning from their work last night.	Δ More time in the small groups.
+ I am amazed at level of detail and thoughtfulness from the panel this morning.	Δ More time for the polling exercise.
+ The thoughtful outcomes from the panelists this morning.	Δ Have more break time to allow more one-to-one interaction among the participants.
+ The report from the panel brought things together. √	Δ Focus on the conflict between the experts – have a dialogue among them.
+ The level of expertise at the workshop.	Δ More time for questions during the presentations.
+ I appreciated the expertise in the room.	Δ It would be fun and useful to have more time on presentations.
+ I was impressed with the level of expertise in the panel and presenters. √√	Δ Enjoyed the real-time polling, but there was not enough background information or time to provide a considered response.
+ The well-organized PowerPoint presentations.	Δ I am not convinced the polling was useful. It didn't resonate with me. There was not enough time to make an informed decision, and therefore my feedback was not necessarily an accurate view of my feelings.
+ The presentations covered broad array of relevant subjects.	Δ I am not sure of the value of the real-time polling. It happened too quickly. It didn't take into account budgetary issues and therefore lacked reality.
+ I appreciated the diversity of views from the presenters.	Δ It would have been nice to have had another option other than phase 1 or 2 for someone that didn't agree that a particular question belonged in the research mix. <i>(Comment added after the workshop.)</i>
+ The economists brought a lot of good information and expertise. It was enlightening to be exposed to the economic perspectives.	Δ Send background materials out in advance.
+ This was a real learning experience – I am now more comfortable with the concepts.	Δ Provide materials in advance. √
+ I learned a lot and had a great time.	Δ Send the list of definitions and acronyms provided in advance. √
+ The sharing of information. This was a good learning experience.	Δ If an example(s) of the use of this kind of study is available, send it out.
+ I learned a lot. Glad to be here.	Δ Provide a primer at the beginning to bring people up to speed.
+ I liked the polling machines. The results helped to focus the priorities for the panel.	Δ Discussion in advance for those without a background in economics. √
+ I affirm the value of the small group exercise and the polling. These gave the panel a basis on which to work. The list generated was very important.	Δ
+ The willingness of the group to discuss the issues, particularly non-use values.	
+ I appreciated everyone's openness & willingness to share.	
+	



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+	Δ
+ I appreciate the open discussion on all subjects.	Δ Request a poster from the presenters to aid in audience's understanding.
+ I was impressed with the civility of the discussion regarding non-use values. ✓	Δ Make it clear that there was not a consensus in the small groups on ranking the most important five questions.
+ I liked the small group discussion time.	Δ Make sure all the keypads work.
+ The bibliography.	Δ Online version of the bibliography with hyperlinks.
+ The hug from Leslie.	Δ Worried about an expensive plan to be executed within a tight budget. TWG will have to address what aspects to give up in order to implement anything from the workshop.
+ This workshop was a reaffirmation of why I became an archeologist and not an economist!	Δ Elevators should be working before the meeting starts.
	Δ Dave G may have infected us.
	Δ More snacks.