

## **DRAFT**

### **RECOMMENDED INFORMATION NEEDS AND PROGRAM ELEMENTS FOR A PROPOSED AMP SOCIOECONOMIC PROGRAM**

#### **SOCIOECONOMIC AD HOC GROUP**

**JANUARY 20, 2012**

#### **AMWG Charge to TWG (August 2010)**

The AMWG supports implementation of studies to further our understanding of the socioeconomics of adaptive management decisions within the GCDAMP; this includes and is not limited to market, non-market, and non-use studies. Thus, the AMWG directs TWG to further develop an economics implementation plan to be provided to AMWG at its next meeting for possible implementation starting in FY 2012. That implementation plan will include the following components:

- a) Information needs associated with each study or analysis and the prioritization of those needs,
- b) Scope and costs associated with each project and potential funding sources,
- c) A description of how the information would be useful to the program, and
- d) A more thorough review of the economics panel report.

#### **BACKGROUND**

Economic values related to hydropower production under differing flow regimes have been developed by the Western Area Power Authority on a continued basis since development of the Adaptive Management Program (AMP). However, economic values related to other resources, although addressed in the 1995 GCD EIS process have since received minimal program attention. Although a broader socioeconomic science and management program emphasis has been discussed by the AMP and its operating entities (AMWG, GCMRC, TWG, Science Advisors), a formal program has not been developed and approved by the AMWG to date.

In 2009 AMWG charged the GCMRC and TWG to develop a socioeconomic program proposal that could be reviewed and evaluated by AMWG. This effort has involved prospectus development by the GCMRC and SAs, proposal development by a group of economists working with GCMRC and the TWG, and continued guidance, reviews and input by the TWG Socioeconomic Ad Hoc Group (SEAHG). An outline of elements of a Proposed Socioeconomic Plan, including draft information needs and program activities was developed by the SEAHG in January, 2010 as a Table 3 which is attached as Appendix A (TABLE 3, SEAHG 1/10/2010). Information needs in Table 3 also draws upon earlier work of the Science Planning Group (SPG

2006) as well as development efforts by the GCMRC and TWG on the Core Monitoring Plan (GCMRC 2009).

At the February, 2011 AMWG meeting a Survey Instrument Ad Hoc Group (SIAHG) was charged to review two survey instruments proposed for use by the National Park Service to evaluate economic values for recreation in the CRE. It was felt that the NPS ongoing recreation science and management surveys and assessments represented similar efforts, at least in part, to those being proposed in the AMP, and both programs might benefit from the interaction. The SIAHG provided recommendations to the NPS on several economic values being developed in the two surveys, including market, non-market and non-use values. The recommendations were proposed for consideration by the NPS and were also considered as potential information needs for the AMP. These information needs are provided in the SIAHG final report power point attached as Appendix B.

At the August, 2011 AMWG meeting the SEAHG was charged to review the existing hydropower information needs and determine if additional needs should be proposed in this area. The review did identify potential additional information needs to be considered by the AMP. These information needs are provided in the SEAHG final power point report attached to this document as Appendix C.

In September, 2011 the SEAHG was charged by the TWG to review its past efforts and recommend a revised set of information needs and program elements for consideration by the TWG at its January, 2012 meeting. The October-December SEAHG development of this report on information needs and program elements utilizes the outcomes of the above noted efforts referenced in Appendix A-C.

The first task of the SEAHG was specification of a revised set of succinct socioeconomic information needs. This revised set of information then became the primary basis for establishing a required set of science and management activities, i.e. program elements to respond to these needs. The effort involved development of a progression of revised and improved IN and program element revisions captured in power points from meetings on 11/2/11, 11/14/11 and 12/8/11. This progression of program refinements is presented in the power point reports in appendix D.

## **DEVELOPING RECOMMENDED SOCIOECONOMIC INS AND PROGRAM ELEMENTS**

A SEAHG review of developed socioeconomic information needs by the SEAHG and SIAHG in Appendices A-C determined that significant duplicity existed, and many information needs lacked clarity. In addition, there was a need to winnow extraneous information that addressed questions, protocol, process, methods, costs etc. The SEAHG proposes that this information is more adequately addressed once the TWG agrees to a set of information needs to pursue and specifies the program elements for addressing these needs.

As noted above, the SEAHG first addressed information needs. Significant duplicity was reduced in earlier work on information need. Issues of clarity were resolved and statements involving questions, costs, methods, etc. were gleaned to gain focus on the information needs. Without succinct statements on information needs, development of program elements to accomplish the individual needs becomes problematic.

In general this effort of the SEAHG has resulted in a significant expansion of socioeconomic information needs recommended for consideration by the TWG. Several general areas of socioeconomic information needs were considered important to the stakeholder group, i.e. recreation, cultural, water, and power resources. In addition a general information need category was also identified. For each area three or more types of socioeconomic values are specified for development, including market, non-market and non-use values. The effort also became more focused on delineating clear distinctions among differing social and economic values being proposed for evaluation, a direction encouraged in the October TWG meeting.

The area of information needs that received greatest attention by the SEAHG was recreation. The area was the focus of an earlier effort by the SIAHG and was expanded by this SEAHG effort. Market, non-market, non-use, etc. evaluations of alternative management actions on recreation are now proposed for development. The diversity of recreation resources in both Glen Canyon and the Grand Canyon are proposed for evaluation, i.e. angling, boating, camping, hiking, wilderness values, etc.

Intra-regional market efficiency impacts of alternative dam operations have traditionally been the AMP focus in hydropower. This direction is modified in the SEAHG proposal with the new direction incorporating inter-regional impacts and assessments of total economic implications that incorporate market, non-market, non-use etc. values.

Evaluating implications of alternative GCD operation scenarios on associated values of water resources has not been an element of the AMP. The SEAHG is proposing that assessments be developed related to market, non-market, non-use and other values.

Determination of alternative dam operation impacts on various values of cultural resources is recommended by the SEAHG. Because cultural resources per se often do not enter the arena of market exchange, much of the need lies in determination of non-market, non-use, existence value etc. of impacts associated with operations changes.

The SEAHG also determined that a category of general information needs was important to capture both needs and program elements that are important to effective implementation of the proposed socioeconomic program. The general area could expand but currently incorporates an IN that addresses valuation needs in resource areas currently not defined by SEAHG. It also addresses the need of the AMP to continue to educate members on the meanings, benefits and costs, and utility of information from market, non-market, non-use, etc. evaluations being proposed for the program. It addresses as well the need for a workshop for specification of how

information proposed for development might best be utilized by the AMP, in core monitoring and other areas.

## **MORE COMPLETE EVALUATIONS OF RESOURCE ECONOMIC VALUES**

In its deliberations the SEAHG decided to propose that more complete economic values be evaluated for the identified resources of concern. This relates primarily to the fact that both market and non-market resource values of the CRE that may be impacted by alternative dam operations are not being completely accounted for in current AMP evaluations. Therefore, more comprehensive market and non-market economic resource values of concern to the AMP, including cultural values and sites, recreation, water quantity and quality, hydropower etc., are proposed for development in the socioeconomic program. The following brief overview highlights general characteristics of more complete economic evaluations. More specific definition of needed valuations to be pursued in individual resource areas would be developed in a general science and management plan proposed for 2012.

Market exchanges of goods and services of economic value has persisted for thousands of years as has societal methods and requirements for creating uniform economic basis for these exchanges. This has resulted in monetary systems and theories of the economy of these exchanges being applied globally in the last century. The most common existing theories of market exchange relates to scarcity and the free or quasi-free interaction of supply of goods and services by producers and demand for these supplies by consumers. The agreed upon price for the exchanges is determined to reflect the market value of the good or service. The theoretical and practical performance of this system in existing societies uses different forms of money as the uniform basis to define the actual market value.

Market values of exchange of goods and services, although they reflect individual consumption measures, may not reflect the total economic value of the good or service to society. Goods and services not normally exchanged in the market and even those which are exchanged and do have established market values may also have non-market values. Included are many natural resources that society values and provides to the public. Examples include goods and services provided by governments as public goods. These are desired, accessed and benefited from by the public, and often with minimal or no market exchanges. They are generally provided through taxation or minimal fee structures established exogenous to the market system. Examples in the CRE are rafting and recreational fishing, camping and hiking, tours of archeological sites, etc.

Although market exchanges (fees) occur for some public goods and services the prices paid are not established by the free market mechanism and often are assumed to be less than the true economic value of the resource. That is, even though some market exchange occurs, additional non-market value in the form of consumer surplus would normally exist at higher prices consumers would be willing to pay. Even exchange fees established for water and power resources in the CRE may not express the true economic value of these resources. Additional non-market value may also exist in the form of consumer surplus.

Current proposed assessments of varied flow and non-flow management alternatives for Glen Canyon Dam and the CRE and the resulting marginal changes to market and non-market values of recreation, cultural, hydropower, water and other resource values, presents a classic example of the need for complete economic valuation of this large social investment. In many assessments of this type

evaluation of impacts utilize cost/benefit or other economic analyses which attempt to express change in total economic value of goods and services in monetary terms.

Several different forms of economic non-market values have been defined for assessment purposes as are methodologies for deriving these values. Generally in science, management and legal applications two general types of non-market values have had significant application, revealed preference and stated preference approaches.

The first approach, revealed preference, studies actual revealed behavior on closely related markets to define the non-market value of a good or service. Two widely used methods for determining revealed preference are the hedonic pricing and travel cost methods. The revealed preference approach has a strong attribute in that it utilizes actual choices and market transactions to derive non-market values. A weakness is its use of only current and past levels of the non-market values. It also cannot be used to evaluate passive or non-use values such as existence values.

A second approach, stated preference, has received greater use in the past thirty years because it can be used to develop willingness to pay values over a range of conditions, including expected or proposed future conditions. It also can be used to develop non-use values including existence, altruistic and bequest values. The approach utilizes surveys to define individuals stated behavior under hypothetical conditions and settings. Development of actual willingness to pay values has involved several methodologies including conjoint analysis, contingent valuation, and choice experiments. Contingent valuation methods have had greatest application.

Greater specification of where and how market, non-market, non-use evaluations may be applied in the socioeconomic program will depend first upon what information needs and program elements proposed by SEAHG are approved by the TWG for further assessment. If all proposed information needs and program elements are approved for evaluation, a Socioeconomic Program Plan can be developed by summer 2012 that can provide greater specification of exactly what market and non-market values will be pursued for each information need, appropriate methods, and projected costs and timelines.

Important to all proposed market and non-market economic assessments is the context in which these assessments will be eventually applied. The direction of the AMP in pursuit of goals outlined in the GCPA is to evaluate impacts of alternative dam operations and other management actions proposed on resources of the CRE, i.e. water, recreation, cultural, power resources, etc. Before one can effectively ascertain the impacts of these alternative actions on the economic value of the resources it first must be determined with some measure of certainty the biological, social or physical impact of the actions. The AMP is expending resources to improve the certainty of these impacts to varied resources, but significant uncertainty still exists. Without knowing these impacts with reasonable certainty the additional step of defining marginal economic impacts is most difficult.

## **DEFINING PROPOSED SOCIOECONOMIC INFORMATION NEEDS AND PROGRAM ELEMENTS**

The following Table 1 contains the information needs and associated program elements developed by the SEAHG for consideration by the Technical Work Group. The current lists do not incorporate any recommendations for prioritization, proposed expenditures, specific

application to managers or policymaker’s needs, etc. These recommendations will be addressed by the SEAHG when TWG approves a set of information needs and program elements for further evaluation.

**Table 1: Proposed Information Needs and Program Elements**

<b>PROPOSED SEAHG INS</b>	<b>PROPOSED PROGRAM ELEMENTS</b>
<p><b>Recreation Information Needs</b></p> <p><b>RIN 1.</b> What are the total market, non-market, non-use, etc. values for the following recreational uses of the Colorado River Ecosystem downstream from Glen Canyon Dam, including pre-rod and post rod demand and economic assessments</p> <ul style="list-style-type: none"> <li>• Glen Canyon boating and walk-in trout fishery and related components</li> <li>• Glen Canyon recreational boating industry</li> <li>• CRE day hiking and overnight camping</li> <li>• Grand Canyon Private and commercial rafting operations including Native American enter prizes</li> </ul>	<p>Conduct recreation expenditure analysis of Lees Ferry anglers and boaters, and Grand Canyon boaters</p> <p>Initiate and conduct recreation non-market and non-use assessments</p>
<p><b>RIN 2.</b> Define and value key attributes and key benefits that effect the Grand Canyon wilderness and Glen Canyon recreation experiences</p> <ul style="list-style-type: none"> <li>• How do they affect market values for these different CRE recreation activities</li> <li>• How do they affect non-market and non-use values for these different CRE recreation activities</li> <li>• How do they differ under differing flow regimes and events such as HFEs, Low Steady Flows and other experiments</li> <li>• How do they differ under differing management actions</li> </ul>	<p>Conduct focus groups and pilot non-market and non use surveys</p> <p>Conduct full non-market and non- use value surveys</p>
<p><b>Tribal Information Needs</b></p> <p><b>CRIN 1.</b> What are the market, non-market and non-use values for CRE resources valued by tribes as effected by dam operations?</p>	<p>Scoping; identify tribes for specific surveys. Determine if separate tribal studies are needed.</p> <p>Conduct tribal market, non market, non-use scoping and value assessments</p>

<p><b>Hydropower Information Needs</b></p> <p><b>HIN 1.</b> What are the impacts to federal hydropower customers from implementation of Record of Decision dam operations and various other flow regimes and segregate those effects from other causes such as changes in the power market.</p> <p><b>HIN 2.</b> What would be the market impacts on marketable capacity and energy of:</p> <ul style="list-style-type: none"> <li>• Increasing the daily fluctuation limit</li> <li>• Increasing up-ramp and down-ramp limits</li> <li>• Raising maximum power plant flow limit above 25,000 cfs</li> <li>• Lowering the minimum flow limit below 5,000 cfs</li> </ul> <p><b>HIN 3.</b> What are the total market, non-market and non-use impacts on upper and lower basin water users from proposed alternative dam operations?</p> <p><b>HIN 4.</b> What are the socioeconomic impacts of Glen Canyon Dam operations and experiments to tribal communities, including market, non-market and non-use?</p> <p><b>HIN 5.</b> What are the market, non-market and non-use values associated with Glen Canyon electrical power, and determine these values.</p> <p><b>HIN 6.</b> What is the market, non-market and non-use values associated with water released through Glen Canyon Dam, and determine these values.</p>	<p>Define GCD operational base cases and change cases. base cases proposed: MLFF and pre-rod</p> <p>Conduct base case with GTMAX; spillover effect with WECC</p> <p>Develop market, non-market and non-use values for power and water resources</p>
<p><b>General Information Needs</b></p> <p><b>GIN 1.</b> What are merits of market non-market, non-use, existence, etc. values being proposed for development, i.e., reliability of information gained, costs, area of proposed use in program, etc.</p> <p><b>GIN 2.</b> Define how socioeconomic research information should be used by AMP</p>	<p>Develop workshop to inform TWG/AMWG of various socioeconomic information types and their utility.</p> <p>Conduct workshop on appropriate socioeconomic research information use.</p>

<p><b>GIN 3.</b> Determine methods to assist more real time assessments of resource impacts of alternative management activities.</p> <p><b>GIN 4.</b> Evaluate, as needed, market, non-market, and non-use values for other resources also found to have impacts from dam operations and deemed important to the AMP</p>	<p>Develop real time model capability to evaluate biophysical and socioeconomic resource impacts and tradeoffs under differing flow and non-flow alternatives.</p> <p>Develop general program capability to evaluate market, non-market and non-use values for resource impacts not yet defined by the AMP</p>
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