

## **Review of Independent Economic Analysis Board's Activities and Contributions to NPPC Fish and Wildlife Planning**

**document IEAB 2003-1**

### **INTRODUCTION**

Under the Northwest Power Act<sup>1</sup> the Council develops a fish and wildlife program for the Columbia River Basin that will “utilize, where equally effective alternative means of achieving the same sound biological objective exist, the alternative with the minimum economic cost.” The Council created the Independent Economic Analysis Board in November of 1996 to provide the Council with advice and an increased analytical capability to help bring economics to bear in determining and prioritizing fish recovery measures. The IEAB is an advisory committee established as part of a network of advisory committees satisfying the Council's obligation under the Act to establish a Scientific and Statistical Advisory Committee. The Board's charter lays out the following scope for the IEAB:

“The Independent Economic Analysis Board will advise the Council on the appropriate methods of economic analysis for proposed fish recovery measures. This advice will include the appropriate role and limits of economic analysis in making policy decisions. The Independent Economic Analysis Board will fulfill this role by:

- (A) Interacting as a committee with the Council regarding methods of economic analysis for alternative fish recovery measures.
- (B) Assisting the Council to evaluate new analytical tools, and advising on the most appropriate study designs.
- (C) Helping to identify sources of information and data.
- (D) Performing specific tasks assigned by the Council on a cost reimbursement basis.
- (E) Assisting in the review and interpretation of study results.”

The sixth anniversary of the Board's creation seems an apt time to review and summarize the activities and contributions of the IEAB to the Council's fish and wildlife planning process, and to consider changes to the board's role in this endeavor.

This document is a self-evaluation and review by the Board, which may initiate a broader discussion of the IEAB role in fish and wildlife planning. The key questions considered are: (1) What has the IEAB done to date? (2) Has IEAB's work contributed to Council decisions in the manner desired? and (3) What is the appropriate role for the IEAB in the context of broad F&W planning -- particularly regarding sub-basin planning, artificial production review and evaluation, and mainstem operations?

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<sup>1</sup> P.L. 96-501, 16 U.S.C. §839 et seq. (Act), in Section 4(h)(1)(A),

## TASKS AND PRODUCTS

Completed IEAB tasks are discussed in this section under five categories. Table 1 summarizes the IEAB tasks included in each of these categories and indicates the corresponding budgets. Appendix A itemizes the individual tasks and their budgets. Appendix B provides a complete listing of IEAB reports and reports that the IEAB has made substantial contributions to through review and advice.

### (1) Review of Published Economic Analyses

The first category, review of reports on economics and F&W planning, occupied the IEAB during its first two years of work. These reviews served the double purpose of helping to bring IEAB members up-to-date concerning economic analyses currently in distribution in the Council setting and of informing the Council about the quality and applicability of these reports. The first such review (Task 2) covered six documents, including a BPA-funded study of 120 propagation alternatives in Columbia sub-basins (Paulsen, et al. 1993), the Columbia River System Operation Review (BPA, et al. 1995), a report by ECONorthwest for the Umatillas that criticized the methodology used in the Columbia River System Operation Review, a report to NMFS on cost-effectiveness of the March 1994 proposed salmon recovery plan (Huppert, et al., 1996), a study of Snake river stocks done for NPPC by the Environmental Defense Fund (Willey and Diamant, 1995), and a report by Harza Northwest for the Corps of Engineers evaluating the cost-effectiveness of alternative strategies for Snake river spring and fall Chinook recovery. The IEAB prepared a report entitled “Lessons from Existing Studies of the Economics of Fish and Wildlife Recovery Measures in the Northwest” (IEAB 1997-2) that summarized its findings and provided guidance on the use of economics for assessing river operations.

The second review (Tasks 8 and 9) focused on two local economic impact studies -- the “Tri-Port Economic Impact Study” by University of Idaho Center for Business Development and Research (Peterson and Merk) and “Economic Impact of Steelhead Fishing and the Return of Salmon Fishing in Idaho” (Reading). This review was requested by the Council. The IEAB provided a written report (IEAB 1997-1 “Review of Local Impact Studies”) and a presentation to a Council meeting in Helena, MT.

In Task 22, also requested by the Council, the IEAB reviewed “Restoring the Lower Snake River: Saving Snake River Salmon and Saving Money” by the Oregon Natural Resources Council, resulting in a report and a presentation to the Council in Helena, MT that highlighted some weaknesses of the analysis by Oregon Natural Resources council, summarized the findings, and placed them in perspective.

### (2) Guidance for Economic Analysis

This category consists of IEAB documents that describe and explain principles and methods for using economics in designing and selecting projects for the fish and wildlife program. Generally set at a conceptual level, these documents provide guidance on the economics of project evaluation.

In Task 3, the IEAB reviewed and contributed to a draft paper written by Council staff broadly describing methods of economic analysis for fish and wildlife projects. In Task 11, the IEAB developed a broad introduction to using economics in assessing trade-offs among options. This

project resulted in the IEAB's longest report "River Economics: Evaluating Trade-offs in Columbia River Fish and Wildlife Programs and Policies" (IEAB 1999-1).

At the request of the Council, the IEAB prepared a conceptual and practical guide on the value of water in alternative uses in the Columbia Basin and assessment of water markets. This resulted in a report entitled "Economics of Water Acquisition Projects" (IEAB 2001-1).

### (3) Technical Review for Other Agencies

The third set of tasks involves technical review of economic analyses performed for organizations outside of the Council. The IEAB has completed two such projects. At the request of the Corps of Engineers (COE), the IEAB served as technical reviewer of economic analyses by a variety of sub-contractors for the US Army Corps of Engineers for its extensive "Lower Snake River Juvenile Salmon Migration Feasibility Study" (also known as the drawdown study). The analysis was coordinated by a group called the Drawdown Regional Economic Workgroup (DREW), and the IEAB was funded by a contract from the COE to perform as the required Independent Technical Reviewer of the analysis. The comments and suggestions of the IEAB concerning the analysis were consolidated in memos from the IEAB chair to the COE. The DREW responded to the IEAB comments and the IEAB responded to the responses, ultimately resulting in a memo by the IEAB certifying that the analysis was adequate for the task of selecting from among the options considered. The IEAB's participation in the DREW project resulted in improvements in quality and accuracy of the analysis of Snake river operations.

This work occupied substantial IEAB time, funded almost entirely by the US Army Corps of Engineers, starting with a 1997 review of the proposed statement of work to the final memo of certification in October 2001. The IEAB work is documented in "Technical Review of Lower Snake River Juvenile Salmon Migration Feasibility Study Report/Environmental Impact Statement Appendix I – Economics". The results were presented to the council in Spokane in 2001.

A second project of this nature involved the IEAB acting as reviewer and advisor for the Multispecies Framework Human Effects Analysis. The final report on that analysis is "Human Effects Analysis of the Multi-Species Framework Alternatives" (Council document 2000-5)

There is currently a proposal for the IEAB to serve as a technical reviewer for economic analysis of habitat preservation alternatives for Portland METRO (Task 67).

### (4) Cost Effectiveness Reviews of Specific Fish and Wildlife Projects

The Council has requested detailed IEAB assessment of specific fish and wildlife projects. These assessments include:

- a. Review of a proposed modification to lake-level operation at Lake Pend Oreille, resulting in report entitled "Economic Effects of the Lake Level Experiment And Kokanee Net Pen Alternative at Lake Pend Oreille, Idaho". September 17, 1999.
- b. Review of the Fish and Wildlife Program's pikeminnow predation project which resulted in a report by Hankin and Richards "The Northern Pikeminnow Management Program: An Independent Review of Program Justification, Performance, and Cost-Effectiveness"
- c. Review of a proposed project to increase stream flow in Salmon Creek, a tributary of the

Okanogan River. Documented in “Economic Review of Instream Water Supply Components of the Salmon Creek Project” (IEAB 2001-2 May 2001).

- d. Review of a proposed project to increase stream flow in the lower Twisp and Methow Rivers. Documented in “Review of Proposals for Improving Methow and Twisp Rivers for Anadromous Fish”. (IEAB 2002-2 June 2002).

The Salmon Creek and Methow River projects were similar in several ways. Both projects involved irrigation system improvements that would conserve water for instream flow. Both economic studies found that expanded water marketing might increase the cost-effectiveness of local streamflow enhancement. The economic analyses showed how hydrologic, legal and cultural factors can influence the feasibility of system improvements and water marketing for environmental purposes. Both analyses raised issues with the projects being proposed by the local proponents, and identified additional needs for research and analysis.

#### (5) Analysis of Broader Fish and Wildlife Policy Issues

The Council requested the IEAB to participate in a broadly based review of artificial production policies and practices by studying the cost-effectiveness of artificial production programs in the Columbia Basin. The project, originated in July 2001, was envisioned as a two-phase approach to cost-effectiveness analysis with the objective of providing the Council with a means of appraising artificial production proposals.

Phase I developed a methodology for assessing the cost-effectiveness of artificial production projects (hatcheries) in the Columbia Basin in two steps: (1) an organized workshop of regional hatchery experts to determine the major factors accounting for variation in the cost of salmon hatchery programs, and (2) compilation and analysis of cost and performance information from a small group of diverse hatcheries in the basin. This phase was completed in July 2002 with the distribution of “Artificial Production Review - Economics Analysis Phase I” (IEAB 2002-1) and a presentation by IEAB Chair Huppert to the Council in Yakima. A proposal for the second phase is currently in progress.

### **CONTRIBUTION TO F&W DECISIONS**

Assessing whether the IEAB is contributing to the Council decision making process in a constructive and helpful way is an important task. One approach would be to compare the projects completed by the Board to the role of the Board as envisioned in the Board’s charter (i.e. the five points listed in the Introduction). If the Board is accomplishing its mission as defined by the Council, then one could conclude that it is helping in the decision process. On these grounds, the IEAB scores very well. The contributions are summarized as follows:

- (A) In informing the Council on methods of economic analysis, the IEAB has communicated through presentations, written documents, and participation in planning committees. Of particular importance here are the “River Economics” paper (Task 11) and the more recent document on “Economics of Water Acquisition Projects” (Task 47).
- (B) The IEAB has played a role in introducing new analytical tools to the Council. This was, for example, an essential part of the recent artificial production review economics analysis (Task 56), where the concept of cost-effectiveness for hatchery operations is a key issue.

- (C) Regarding identification of sources of information and data, the IEAB has accomplished this in each of the projects completed to date, especially in those listed under categories (4) and (5) above. Information has been solicited from numerous experts and authorities in the process of investigating the projects assigned to the Board by the council. The hatchery experts workshop organized in August of 2001 is an important example of this.
- (D) Specific tasks assigned to the IEAB and performed on a cost reimbursement basis are documented in the series of reports described above, including reviews of the Lake Pend Oreille lake level proposal (Task 36), the pikeminnow predation control evaluation (Task 40), the Salmon Creek project (Task 51), and the Methow River project (Task 60).
- (E) Assisting in the review and interpretation of economics study results was a main focus of the board during the first years (Tasks 1, 2, 3, 8, 9, 22)

On these, admittedly procedural rather than substantive, grounds, the IEAB has been contributing as intended to the Council's decision process. Meeting this criterion is relatively straightforward and says nothing of the quality or decision-relevance of the IEAB reports.

Another way to judge the contribution of the IEAB is to determine whether Council members themselves find the information or guidance provided by the IEAB to be helpful or crucial in specific circumstances. We have no way of assessing this rigorously or comprehensively at present, but we have some anecdotal evidence from Council members that found our presentations to be helpful. A serious effort could be made to find whether Council members or Council staff have found the IEAB work to be influential in shaping the options considered in Fish and Wildlife Planning or to be crucial in decisions to fund specific projects. In the process of determining that, it would also be useful to find out why and under what circumstances the information is found useful. The results of such an investigation would help the IEAB to frame its presentations and reports for Council use. Perhaps an effort of this sort should be pursued in the future.

Ultimately, it is hard to appraise, quantitatively or qualitatively, the contribution of technical reviews and documents to a complex, multi-party decision process, because every decision is influenced by numerous factors, both technical and non-technical. Whether the specific information provided by the IEAB will be decisive depends in large part on the accuracy of, and hence technical confidence placed in, the estimates of costs and effectiveness. And this is in part determined by whether the measures of effectiveness adequately represent and quantify the objectives of the projects being examined. The usefulness of cost-effectiveness information also depends upon whether the objectives of the project are substitutable – that is, whether there are alternative means of obtaining equivalent outcomes. When addressing a hard, unyielding objective (such as returning a specific number of fall Chinook salmon to a specific river reach), the cost-effectiveness analysis can deal only with alternative means of meeting that objective. When addressing softer objectives (such as enhancing fish available for harvest), the cost-effectiveness analysis can deal with many alternative versions of the objective (different species mixes and locations).

Finally, the usefulness of economic and other technical information depends upon whether the information is provided at the right time in an understandable way, and whether major players in the process are open to considering alternatives. Hence, it is crucial that the IEAB and other advisors to the Council remain attuned to key issues and decisions that the Council is considering.

## **FUTURE IEAB ROLE IN F&W PLANNING**

The IEAB's role to date could be described mostly as setting general guidelines for the use of economics in planning, reviewing reports and analyses of others, and completing cost-effectiveness analyses of specific projects. The IEAB has reviewed several specific projects at the request of the Council or others (e.g. the Salmon Creek and Methow River flow enhancement proposals, Tasks 51 and 60 in Appendix A). Because the options considered for streamflow enhancement were limited to those proposed by the project sponsor, a number of potentially cost-effective alternatives for restoration of the fishery may have been overlooked. The most cost-effective restoration approach for the species might involve other streams. Further, trade-offs between projects in different sub-basins were not considered; that is, we did not determine that a Methow River or Salmon Creek stream flow enhancement was the most cost-effective project for the species to be restored. The most cost-effective means of restoring Methow River or Salmon Creek fish might involve local habitat improvements or supplementation rather than stream flow enhancement. The IEAB could not address these broader issues because fish production estimates were not available for the proposed projects, for alternative projects in the watershed, or for alternative projects in other subbasins.

Recent comments by Council staff and the ISRP suggest that the IEAB might be productively involved in examining broader trade-offs in the fish and wildlife program. The IEAB has identified two general categories of trade-offs: (1) trade-offs between objectives, and (2) trade-offs in allocating funds or other resources among alternative actions intended to achieve a given objective. An example of the first type occurs when the Council must choose between enhancing hydropower or fisheries, or between anadromous fish and resident fish, or between a listed species and a non-listed species. The second type of trade-off could, for example, involve choosing among specific measures (tributary habitat enhancements, artificial production projects, or flow augmentation) to protect a given threatened or endangered salmon stock.

For the first type of trade-off, between objectives, a key difficulty is the lack of obvious and quantifiable units for comparison. We could quantify how one objective increases as the other decreases, and this would be useful. But that approach does not provide a criterion for choosing a balance among the objectives. Comparing hydropower production, flood control, and salmon enhancement requires a common unit of measurement. Economic benefits and costs provide one common measure for comparing different objectives. Other economic and non-economic measures are also possible. The IEAB should investigate the extent to which economic measures can provide useful information to the Council about trade-offs between objectives.

Similarly, the second type of trade-off, between alternative means of achieving a given objective, requires a common measure of success to compare alternatives. Increased abundance of fish is a practical common denominator for comparing many actions. For example, numbers of salmon returning was used as an indicator of hatchery performance in the Phase I hatchery economics study. In the Salmon Creek and Methow Valley study enhanced streamflow (in cubic feet per second) was the common denominator, and that can be predicted with a fair degree of confidence. Similarly, we would need to define success for mainstem operations, habitat restoration, supplementation, and other measures aimed at restoring or enhancing fish and wildlife.

The IEAB has developed the following list of potential topics for broader investigations in 2003.

- Develop better methods of cost-effectiveness analysis to meet specific Council decision needs. This would focus on measures of costs and effectiveness for artificial production, habitat enhancement, and mainstem operations. In particular, the IEAB needs to determine what sources of information and measures of effectiveness are appropriate for comparison of projects across regions and across types of improvements.
- Examine trade-offs among alternative fish and wildlife objectives, when the cost of pursuing one objective is the foregone benefit of pursuing other objectives. The IEAB will work with the ISAB and other science advisors to first, identify and develop methods for analyzing and describing the physical tradeoffs, and, second, to develop common measures of the costs, impacts, and other economic consequences.
- Collaborate with ISAB and ISRP on the selection of elements for the Council's Fish and Wildlife research plan, understanding that key biological uncertainties have consequences for fisheries management and power system operation, and that these consequences often have economic costs. The IEAB could add operational consequences and associated costs to the criteria for selection of research projects.
- Re-cast the Hatchery Economics Phase II project to focus on the economics of specific projects that are currently funded or are being considered for funding under the Fish and Wildlife program. To establish effectiveness measures for supplementation and conservation hatcheries, the IEAB should collaborate with APAC and ISAB members to develop appropriate measures of effectiveness. Also, the IEAB will need to develop a means to partition costs for supplementation and conservation programs from overall hatchery costs.
- Continue to provide reviews and comments on economic analyses submitted by other agencies and on specific F&W projects at Council request

The challenge of broadening the focus of the IEAB will require close coordination between the Board and the F&W staff and Council members, and such an expansion of work will have budgetary implications. Issues of analytical scope and relevant options for cost-effectiveness analysis must be resolved collaboratively if the broader assessments are to reach target audiences in a timely manner. The IEAB should begin a dialogue with the Council and the science advisory committees regarding the IEAB's role in this broader policy arena.

**Table 1: IEAB Projects From 1997 through 2002 – Categories and Budgets**

<b>Task type</b>	<b>Description</b>	<b>Task Numbers (see Appendix A)</b>	<b>Budget</b>	<b>Share of Budget</b>
1	Review of published economic analyses	2, 8, 9, 22	\$36,850	9.2%
2	Guidance for economic analysis	3,11,47	\$70,600	17.7%
3	Acting as a technical review team for other agencies	1,15,21,35,43,24,39	\$197,000*	49.4%
4	Cost-effectiveness reviews of specific fish and wildlife projects	36, 40, 51, 60	\$45,540	11.4%
5	Analysis of broader fish and wildlife policy issues	30, 56	\$49,000	12.3%

**\* Largely funded by the US Army Corps of Engineers.**

## Appendix A

### IEAB Analytical Projects

<b>Task</b>	<b>Description</b>	<b>Funds Allocated</b>
Task 1	Review DREW Project Study Plan	\$ 6,000
Task 2	Review and summarize previous studies	\$ 18,300
Task 3	Review draft Economic Methods paper	\$ 5,400
Task 8	Review Reading Study	\$ 5,250
Task 9	Review Tri-Ports Study	\$ 5,250
Task 11	Economic fundamentals, self initiated	\$ 40,200
Task 15	DREW Review*	\$ 15,600
Task 21	DREW Review*	\$48,000
Task 22	ONRC/Lansing Report Review	\$ 8,050
Task 24	Participation in Framework*	\$19,400
Task 30	Artificial Production Review Work	\$15,000
Task 35	DREW Review II*	\$ 40,000
Task 36	Lake Pend Oreille Analysis	\$ 12,000
Task 39	Framework, Replace Task 24*	\$ 23,000
Task 40	Pikeminnow Predation Review - Richards	\$ 10,500
Task 43	DREW EA Review *	\$ 45,000
Task 47	Water Value and Markets Analysis	\$ 25,000
Task 51	Salmon Creek Project Review	\$ 17,000
Task 56	APR - Economic Analysis, Phase I	\$ 34,000
Task 60	Review of Methow River Project	\$ 6,040
Task 67	Peer Review for Metro ESEE Analysis	Proposed

\* Tasks funded primarily from outside the Council budget.

## Appendix B

### Independent Economic Analysis Board (IEAB) Documents

1. “Comments on Lower Snake River Juvenile Salmon Migration Feasibility Study, Draft Economic Analysis Project Study Plan (PSP)”. June 1997.
2. “Lessons from Existing Studies of the Economics of Fish and Wildlife Recovery Measures in the Northwest” (IEAB 1997-2). July 1997.
3. “Review of Local Impact Studies: The Tri-Port Economic Impact Study, and The Economic Impact of Steelhead Fishing and the Return of Salmon Fishing in Idaho” (IEAB 1997-1). October 1997.
4. “IEAB Review Comments on *Restoring the Lower Snake River: Saving Snake River Salmon and Saving Money*”. October 1998.
5. “Technical Review of (Preliminary Draft) Appendix I – Economics, of the Lower Snake River Juvenile Salmon Migration Feasibility Report / Environmental Impact Statement”. August 1999.
6. “Economic Effects of the Lake Level Experiment And Kokanee Net Pen Alternative at Lake Pend Oreille, Idaho”. September 1999.
7. “River Economics: Evaluating Trade-offs in Columbia River Fish and Wildlife Programs and Policies” (IEAB 1999-1). October 1999.
8. “Technical Review of Lower Snake River Juvenile Salmon Migration Feasibility Report / Environmental Impact Statement (Draft) Appendix I – Economics”. April 2000.
9. “Economics of Water Acquisition Projects” (IEAB 2001-1). January 2001.
10. “Economic Review of Instream Water Supply Components of the Salmon Creek Project” (IEAB 2001-2). May 2001.
11. “Technical Review of Lower Snake River Juvenile Salmon Migration Environmental Impact Statement Preliminary Final Appendix I – Economics”. October 2001.
12. “Review of Proposals for Improving Methow and Twisp Rivers for Anadromous Fish Interim Report” (IEAB 2002-2). June 2002.
13. “Artificial Production Review - Economics Analysis Phase I” (IEAB 2002-1). July 2002.

### Documents with Substantial IEAB Input and Review

1. Northwest Power Planning Council. “Methods of Economic Analysis for Salmon Recovery Programs” (Council Document 97-12). July 1997.
2. Northwest Power Planning Council. “Human Effects Analysis of the Multi-Species Framework Alternatives” (Council document 2000-5). March 2000.
3. David G. Hankin and Jack Richards(IEAB). “The Northern Pikeminnow Management Program: An Independent Review of Program Justification, Performance, and Cost-Effectiveness”. April 2000.
4. U.S. Army Corps of Engineers. “Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement, Appendix I - Economics”. February 2002.