# Technical Review of Lower Snake River Juvenile Salmon Migration Feasibility Report / Environmental Impact Statement Appendix I – Economics
# April 20, 2000

By

**The Independent Economic Analysis Board**

of the Northwest Power Planning Council

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# INTRODUCTION

The Independent Economics Analysis Board (IEAB) has reviewed Draft Appendix I, Economics of the Lower Snake River Juvenile Salmon Migration Feasibility Study (FR/EIS). This report is our technical review of the draft Economic Appendix (EA). This review is a follow-up to previous IEAB technical review of the work leading up to this draft EA. In August 1999, the IEAB provided a lengthy technical review of the preliminary draft version of the EA. We also provided comments on various versions of the underlying workgroup technical reports.

We would like to commend the Corps and its contractors for the dramatic improvement in the EA since the preliminary draft that the IEAB reviewed in the summer of 1999. The executive summary is an excellent addition to the document and does a good job of making the analysis quickly accessible to the interested public, and the contents of the report are better organized. Nearly every section has become more accurate and understandable, and the analysis has been improved in many areas. The majority of the IEAB's comments on the preliminary draft have been addressed in the draft EA.

Our review comments contain two sections. In the section on Significant Issues and Conclusions we focus on concerns that we feel are most significant. Some of these concerns should be addressed by means of revised analysis for the final Appendix I; others may not be possible to address with the time and resources available to the Corps but should be clearly noted as limitations of the analysis. The second section addresses many less significant general comments and includes editorial observations that we made in the process of our review and that may help improve the clarity and accuracy of the document.

Given all of the uncertainties surrounding estimates of fish recovery and the costs and economic impacts of the alternative scenarios analyzed, the IEAB finds that the draft Economic Appendix can be relied on as a reasonable representation of the broad economic effects of the alternatives. The methods applied are generally appropriate to the issues being addressed and their relative importance in the overall picture. We cannot vouch for the biological effects of the alternatives as these lie outside of the IEAB's charge and expertise. These are, however, crucial to the economic conclusions that are drawn from the analysis.

# SIGNIFICANT ISSUES AND CONCLUSIONS

In this section we list several comments, organized by section of the report, which we feel are potentially significant for the analysis in and interpretation of the EA.

## 3.1 Power System Impacts

The effects on electricity generation and its costs are analyzed using sophisticated models and accepted methods. We are aware that the methods for analyzing the effects on transmission system reliability and ancillary services are not as well developed. Our comments are in those areas.

- According to BPA, the lower Snake dams provide voltage control or reactive power to the system throughout the year. The costs of providing replacement voltage control for the Tri-Cities in the summer are addressed, but there is no discussion of voltage support provided from these dams in other seasons and locations on the system.
- A transmission congestion problem from Canada to the I-5 corridor is identified in Table 3.1-19 on page I3-37, but no solutions or costs of correction are included.
- There are two potential problems in the electricity reserves analysis. The first is the valuation of lost reserves in Table 3.1-21 on page I3-39. Labeling and computation problems make it difficult to understand this table, but it appears that substantially different unit values are used for sales of reserves to the market and purchases from the market in the same month. Reserves, whether bought or sold, should be valued at market rates. The second issue is that required reserves for thermal power plants are greater than for hydroelectric plants. Thus, not only must lost hydropower be replaced, but also a higher level of reserves would be required in addition. If these incremental required reserves are included in the methods for quantifying the amount of replacement thermal generation capacity, then our concern in this area is addressed, but the text should so indicate.

## 3.2 Recreation Use

Although this section has been improved since the preliminary draft appendix, it remains difficult to understand many of the analytical methods and assumptions. Consequently, the IEAB is concerned that recreation benefits may be significantly overestimated.

- The estimates of recreational values (angling and non-angling) under the dam breaching alternative are based upon substantial new data and analysis, but we find some technical problems with the interpretation and analysis. Exceedingly high estimated values per day of angling in the lower Snake river, relative to those found in neighboring rivers (lower Columbia, middle Snake, etc.), should be re-checked and verified. The estimated increase in angling days for the lower Snake River should be modified to reflect the effects of increased catch per day as salmon and steelhead runs expand. Further, various technical issues

concerning survey response rate and estimated visit rates by distance zone should be addressed in a revised analysis.

- The recreation section should evaluate increased Snake River salmon/steelhead as distributed among Snake River recreation and other fisheries (Columbia and Pacific ocean) as currently displayed in Section 3.5.
- We suggest placing the economic analysis of all recreational fishing for Snake River salmon in one section rather than separating it in two sections (3.2 and 3.5).
- The range of estimates for non-angling recreational values on a restored Snake River in Alternative 4 is extremely large. The IEAB raised issues earlier about sample selection bias due to the effect of distance on survey response in the contingent value survey. This problem has been addressed indirectly by including a range of results based on varying population exclusions. We remain most concerned about the high case, which ignores this bias. We note that the inclusion of the high case triples the overall uncertainty range.
- The EA assumes that recreational facilities will be doubled on the Lower Snake River after breaching but the costs of that increased capacity have not been included. We also note that identical figures have been used for operation and maintenance of parks under all options, which indicates incremental operation and maintenance cost may have been left out as well. While the omission of recreation capital costs is already recognized as an unresolved issue, the IEAB feels that the issue of recreation facilities capacity should receive further attention in the final draft. These effects should be addressed in this report, either in the recreation section 3.2 or in the implementation costs section.
- In the conclusion (Section 3.2.6 on page I3-56), a most likely estimate of $82 million dollars is presented for Alternative 4. This estimate should be explained in the main discussion and tables of the report. We note that this value has not been included as the nominal value in the Risk and Uncertainty section of the report (Chapter 8), and that the highly skewed shape of the uncertainty distribution is not reflected there.

## 3.3 Transportation

For the NED analysis of navigation, the Corps is supposed to be estimating the difference in cost of delivering a commodity. One way to do this is to add up all of the costs. If we elect to add up the costs, we will need to include all costs needed to achieve the benefits. For NED analysis this includes cost of new capacity if there is specific evidence that capacity is not adequate.

- We are aware that Corps policy and practice lean strongly in the direction of reliance on rates instead of reconstructed costs whenever possible. Consistent with the use of rates is the standard assumption that rates embody all past, present, and future capacity costs. In earlier stages of this analysis this offered a simplified approach with little prospect for built in bias or error.
- From the evidence now presented some members of the IEAB believe the estimated additional infrastructure cost could result in an increased cost per ton when it is averaged across the increment of tons displaced from the lower Snake River navigation system. If so, it would be reasonable to expect a change in average cost of all tons, and hence a change in rates. Of course, the more tons the cost is averaged across, the smaller the per-ton increase would be.

Such upward pressure on average cost would call into question the Corps' reliance on the existing rate structure as a measure of future transportation cost.

- Countering this concern for not including additional infrastructure costs is the opposite possibility that increased use might lead to important economies of scale or managerial and technological efficiencies.
- Given the issues noted above, we are concerned that the sensitivity of the transportation analysis to increased infrastructure cost has not been adequately tested and urge that such analysis be included in the final draft.

## 3.4 Water Supply

This section has been considerably improved from its earliest versions.

The IEAB would like to see greater emphasis given to a an issue that is relegated to the sensitivity analysis in the EA -- the point that a large part of the irrigation value in the affected area could be maintained if ways could be found to supply water to land with permanent crops. Given that many wells already are in use in the area, that would seem to be a viable option. If wells can be used to maintain tree crops, for example, the expected costs of Alternative 4 in the water supply category could be substantially lower than reported in the EA.

## 3.5 Anadromous Fish

There are many calculations in the EA that depend directly on numbers of fish. These include commercial harvest values, recreational angling values, and the cost-effectiveness analysis. However, the numbers of fish are never provided in the Anadromous Fish section. The numbers should be provided in at least enough detail to allow readers to see how calculations were done in these other sections. This is a key effect of the alternatives and it should be clearly and fully documented in this chapter.

The Executive Summary and the Cost Effectiveness chapter discuss revised PATH 1999 results. It is our observation that the revised PATH numbers are very significant in terms of the cost-effectiveness conclusions. Specifically, those results apparently show that all alternatives meet survival standards and perhaps recovery standards as well. If this is the case, a cost-effectiveness analysis would simply select the lowest cost alternative. In view of the potential significance of the revised PATH numbers, we recommend that the Economic Appendix be revised to reflect those results everywhere. If it proves infeasible to actually incorporate the PATH 1999 results, they should at least be discussed prominently in the Anadromous Fish, Recreation, and Risk and Uncertainty sections.

The IEAB finds that to a significant degree the Economic Appendix fails to distinguish between increases in wild or natural fish and increases in hatchery fish. The EA should regularly remind readers that the FI/EIS is intended to be about selecting an alternative to salvage the WILD Snake River fish, but that some of the data and estimates etc. contain varying fractions of hatchery fish. The "Conclusions" of each of the relevant chapters should clearly and positively

state the believed extent to which the estimates do refer to wild fish, or the extent to which they include hatchery fish as well.

The IEAB is recommending that the Tribal Circumstances section 3.6 be removed from the NED chapter. This change increases the importance of showing more clearly, in the A-fish section, the portion of the change of total NED benefits (commercial) that will be allocated to the treaty fishery. This should be exhibited separately.

## 3.6 Tribal Circumstances

It is made clear in this section that it contains little or no material that contributes to the measurement of NED. The IEAB recommends that the references to the treaty fishery part of NED benefits in Section 3.5 be clarified and shown separately. Other material in this section should be transferred to Chapter 5 on Tribal Circumstances, so that section 3.6 can be deleted.

Note that Tribal Circumstances should also be deleted from the NED section of the Executive Summary.

## 3.8 Implementation / Avoided Costs

Some observers of the fish and wildlife policy debates expect that there could be avoided fish and wildlife recovery costs with dam breaching. The analysis in this section however assumes there would be no change in current programs, and no avoided costs. We do not advocate trying to make an assumption about how these costs might change, but a discussion of the possible relationship to the alternatives would be useful.

## 4. Passive Use

In Chapter 4, the "passive use value" section, the Economic Appendix endeavors to capture the amounts the public would be willing to pay to preserve endangered or unique species and free-flowing rivers. These amounts are over and above the market-derived amounts the public will pay for fishing, recreation and other uses. Lacking funds and authorization to make a special survey of values of Snake River salmon species, the Corps analysis was forced to make do with values transferred from surveys of other rivers, under other circumstances – a process called “benefits transfer”. Consequently the values obtained are less well defined, and have a much larger margin of error, than other values in the EA. Among the specific elements that reduce the precision of the PUV estimates are the following:

- In the absence of a Snake survey, the analysis of passive use values in Chap. 4 takes estimated PUV benefits per fish from other salmon rivers (e.g. the Elwha River or Columbia River) and attributes an equivalent value to increased salmon runs in the lower Snake River. Because the various salmon populations are unique "species" under the Endangered Species Act, these populations are not strictly identical public goods. Hence, the valuation procedure used does

not meet the first standard for a valid "benefits transfer", i.e. that the good being valued at the study site and the new site are identical.

- If, as assumed in the draft EIS, the PUV for recovering salmon populations grows with the size of the population, the annual PUV value needs to be calculated using the net present value and annualized value formulas. To the extent that the salmon recovers slowly, the PUV will grow slowly and the annualized value will be less than the PUV values reported in the draft EIS.
- In developing a range of PUVs for salmon recovery the EIS authors insert a non-PATH analysis of salmon trends (which shows declining future populations) to create a very high-end PUV for Snake River salmon from the Layton, et al value per household. We think that it is inadvisable to use the non-PATH analysis at this point in the report, and that its introduction here creates an unreasonably high range of PUV values.
- In adapting Colorado-river results to the Snake, the Colorado respondent household's valuation of a free flowing river per mile was transferred to each mile of the Snake River. Also, the EIS analysis assumes that the PUV of salmon increases with fish population size. Both procedures ignore the usual observation that such economic values per unit of a good generally diminish as they are applied to greater and greater numbers of units.

The IEAB agrees that, for a variety of theoretical and empirical reasons, PUVs for salmon and for free flowing rivers are very difficult to estimate. In this particular case, the IEAB believes that these problems have led to a very large uncertainty, and probably to an upward bias in the PUV estimates reported in the EA.

Some of the IEAB feel that these methodological and empirical problems are fatal, and as a consequence PUVs do not provide any information useful for selecting among the alternatives. Others among the IEAB feel that PUVs are real and perhaps large, so measurement difficulties should not be allowed to become a reason for excluding PUVs from the analysis altogether. The IEAB notes that our own spirited discussion on this topic reflects a similar debate in the economics profession over the role of PUVs. The IEAB would like to see more discussion of these methodological and empirical problems in the EA, so the reader can better evaluate the validity and usefulness of the PUV values presented.

In our earlier IEAB reviews of the EA, we recommended that PUV concepts be kept strictly separate from other NED values. The IEAB reaffirms that position. The separation of the main PUV discussion into its own chapter in this draft is an improvement. However there are several other parts of the EA that discuss PUVs, most notably the Risk and Uncertainty chapter, where the PUVs need to be kept explicitly separate from the other values, and the large uncertainty and possible biases of these estimates emphasized.

## 6. Regional Economic Development Analysis

We expected that each alternative would be evaluated from different regional perspectives so that total impacts on the region, states, coastal fishing areas, and Lower Snake subareas could and would be shown. Instead, specific areas were chosen to illustrate specific effects. As a result, there is no place in the document where the reader could go to find the income and employment

effects on the whole Pacific Northwest, or on any particular state or region, of implementing an alternative. If it was assumed that all effects were isolated to the area chosen for analysis for each direct effect, then one could maybe add up all of the various effects to get a regional effect. This was not done, however, so it is difficult to determine the relative impacts resulting, for example, from hydroelectric effects and transportation changes or fishery effects. An unfortunate effect of this treatment is that by far the largest regional impact, hydropower related expenses, gets lost in the discussion and tables and does not even show up in the Executive Summary.

Section 6.3.4.4 notes that increased transportation costs as a result of breaching could have a number of effects including a "substitution effect", an "output effect", and a "stages of production effect". The last paragraph of the section then asserts that "No studies exist to project the possible changes in shipping volume". The IEAB notes, however, that it was the purpose of the transportation section of the Economic Appendix (Section 3.3) to estimate such effects. The "substitution effect" estimated in Section 3.3 is that of the 3.8 million tons diverted from upper Snake navigation, 2.7 million would be trucked to Tri Cities and barged to Portland from there, and 1.1 million tons would go by rail to Portland. Section 3.3 did not find the case for either "output effects" or "stages of production effects" sufficiently compelling to estimate such effects -- and the IEAB concurs in this. However, the IEAB recommends that the transportation substitution effects as estimated in Section 3.3 be incorporated as a part of Alternative 4 RED effects in Section 6.3.4.4.

## 8. Risk and Uncertainty

This is the only remaining section of the draft Economic Appendix where passive use values are still pooled with other NED effects, with recreation values in particular. This section should treat PUV uncertainty separately from other uncertainties.

This section needs to be checked against the individual detailed sections for consistency with the ranges developed there. In particular, we note that the range of recreational benefits was highly skewed in the preliminary draft economic appendix and in the recreational chapter. However, in the Risk and Uncertainty section, the range is treated as though it were symmetric. Further, the numbers shown under recreation in Table 8-1 don’t match any numbers in the recreation section (3.2). There is difficulty matching ranges and methods for other sectors as well.

## 11. Cost Allocation

Even if all the items in the net cost of the alternatives are fixed, it does matter for the behavior of the actors and the final equilibrium of the economy, who among federal taxpayers, local taxpayers and users will pay the net cost. Thus, the effects of cost allocation remain a significant IEAB concern. While we realize it may be too late to address these issues correctly in the analysis, we would like to see more discussion of these issues in the final draft. For example:

- In the transportation section, it matters not only that there must be more investment in capacity, but also that it is not agreed yet who will/ought to pay for it, and so the final effects on traffic benefits are uncertain and disputed.
- In the recreation section, because the Corps would have to finance sufficient recreation capacity in a particular way, and may not request it, there may not be enough capacity to handle the projected recreation use.
- In the power section, there is insufficient attention paid to the potentially significant differences between retail and wholesale elasticities of demand; wholesale elasticities are likely to be higher than retail elasticities. Overlooking this distinction means that the economic effects of cost allocation among the three groups (federal taxpayers, regional taxpayers, and users) are simply not analyzed.

# OTHER ISSUES AND EDITORIAL COMMENTS

## ES.1 Executive Summary

General Comments

In general, the executive summary is a very nice compilation of the results of this large and diverse study. However, there are a few areas of confusion and presentation that need improvement.

The treatment of tribal circumstances needs to be clarified. On page IES-2 it is assigned to the environmental account (EQ), but on pages IES-5 and IES-13 it is included in NED accounts. (See also page I1-3 in the introduction, paragraphs 2 and 4.) It actually has components of both accounts, and should be described in that way.

In section ES.1.4, biological effects are shown for NMFS jeopardy standards. However, numbers of fish are used to calculate fishery effects and cost-effectiveness. Numbers of fish are never shown in the analysis and should be included. Numbers of wild fish should be identified separately from hatchery origin fish to clearly separate responses relevant to endangered species recovery and those relevant to harvest values.

Because of the separation of the commercial and ocean recreational fishery from the in-river recreational fishery, it is difficult to determine the relative contribution to value of these different fisheries and of steelhead stocks. The first paragraph on page IES-12 would be a good place to make this comparison.

Section ES.5 on regional economic development effects does not present a clear and balanced description of the effects. It should be made clear whether the effects described are annual values or totals over a period of years. More importantly, the impact of increased electricity costs is not presented. All of the tables and numbers presented are for Lower Snake study area and its subregions, there is no quantitative discussion of state or regional level effects. This is particularly important for the effects of increased power costs. For example, compare the long-term jobs effects presented in Table ES-12 of minus 711 jobs with the unreported long-term job

losses from increased power costs of 2,382 jobs. The unreported power effects are clearly the dominant long term effect of Alternative 4 and need to be clearly reported.

Editorial Comments

Page IES-2 - The "Environmental Quality Account" appears here but never again in the Appendix. Change to "Tribal Circumstances."

Page IES-6 - The statement at the bottom of the second paragraph is incorrect. The effects of hydropower changes on the market price of electricity were not estimated as a part of this study. The study assumed, based on sensitivity tests in another study, that market prices would be invariant to major changes in the capability of the hydro system.

Page IES-10, Table ES-4 - The river recreation numbers under alternative 4 are for the low case only from Tables 3.2-4 through 3.2-7 in the NED recreation section. These should be the medium case numbers. Using the low case only also results in the total being for the low case. For example, at the 6.875 percent discount the min-max range should be 56,000 to 336,850 instead of 11,326 to 151,436.

Page IES-11, 1st paragraph - Near the bottom of this paragraph, .6 km is equated to 1 mile. This is, of course, backwards. 1 km equals .6 miles, or 1 mile equals 1.67 km.

Page IES-17, 1st line in last paragraph - "following" is redundant with "presented below".

## 1. Introduction

Editorial Comments

Page I1-3 – 1.3.2 Environmental Quality (EQ) - The IEAB has recommended that this title be scrapped, and the subject referred to as Tribal Circumstances.

Page I1-6, first line - The IEAB is incorrectly referred to as the Independent Economic *Advisory* Board. The correct reference is "Independent Economic Analysis Board".

## 2. Existing Conditions and Alternatives

Editorial Comments

Table 2-4, p. I2-8 - This table should include the same alternative numbers used throughout this report and the FR/EIS.

## 3.1 Power System Impacts

General Comments

This section contains a generally good analysis of hydro system effects. There are a number of editorial and expositional problems noted below, but in general the methodology is appropriate in method and scope. Some significant remaining issues regarding transmission and reserves were raised in the first section of these comments.

Editorial Comments

Pages I3-3 and I3-4, Figures 3.1-1 and 3.1-2 - These figures have no horizontal scale.

Page I3-7, Figure 3.1-3 - The figure leaves it unclear how HYSSR and HYDROSIM results are combined with AURORA. Was AURORA run with both regulator model results or just one?
Page I3-9 - The definition of system production cost at the bottom of this page should make it more clear that variable costs include the variable cost of any new resources, as well as of existing resources.

Page I3-12 - Toward the bottom of the paragraph following Table 3.1-6, sentence starting "The Alberta Energy Company…" is discussing price differences between AECO and Henry Hub. Otherwise, you would be talking about negative gas prices.

Page I3-16, Section 3.1.6.1, last sentence in 1st paragraph under "Variable Production Costs" - The number for the PROSYM model results does not match Table 3.1-11 ($202.6 vs. $192.2). In the same section, Table 3.1-10 is missing a column heading for the first column of numbers. We think they are electricity generation. Table 3.1-11 refers to Alternative 4 with the old number Alternative 3 in the column headings.

Page I3-19, third paragraph under "Fixed Production Costs" - A sentence in the middle of the paragraph may misstate the model's decision about plant building. The sentence reads "To be justified a new power unit must produce enough energy in that year at the marginal costs to equal or exceed the fixed and variable costs of the new resource." In AURORA, and we assume in the BPA model, the building decision is on a life-cycle basis not an individual year.

Page I3-21, Table 3.1-13 - The table shows changes in production cost from Alternative 1, but doesn't say so anywhere. Similar clarification is needed on Table 3.1-14 and 3.1-15; in addition, both of these tables seem to be using old alternative labels in places. It isn't clear whether the middle column in Table 3.1-14 is Alternative 2 and 3, or just 2 or just 3. We assume the right hand column is Alternative 4, Breaching.

Pages I3-23 and 24, Section 3.1.6.2, 3rd and 4th paragraphs - There are some incorrect statements regarding the AURORA model in these paragraphs. Near the end of 3rd paragraph, it is stated that it was a study assumption that all new resources would be combined cycle combustion turbines. However, that is a result in AURORA, not an assumption. The last sentence in the first

paragraph on page I3-24 seems to indicate that variations in price at different times of the day and in different seasons are not modeled in AURORA. But in fact that is the essence of the AURORA model and the variation in price was used in the valuation of the changes in generation. Perhaps what was intended was a statement that commodity cycles and over- and under-building of resources are not modeled, which would be true. In this regard, it would help if the next paragraph made it clear how the time structure of prices was used in the multiplication of price times change in generation.

Page I3-26, Table 3.1-17 - The column labels on the top half of the table are wrong, probably should be same as bottom half headers.

Page I3-27 - The last two paragraphs on the page (and going over onto the following page) are exact repeats of text on page I3-19.

Page I3-29, last sentence in 1st paragraph - It is unclear whether the numbers are the increase or the original analysis. If they are the increase, then suggest rewording the sentence as follows: "This is an increase of 7,040 and 6,950 from…"

Page I3-30, last sentence - It would be useful to compare the planning reserves to current conditions.

Page I3-35, last paragraph - This states that ancillary services used to be provided without charge. It would be more correct to say that the cost of these services were bundled into power rates and not charged for separately.

Page I3-39, Table 3.1-21 – There appears to be some difficulty with the monthly value calculations or the display of data. The purchase cost column doesn't specify units, but the text on page I3-36 indicates that it is $/MW-month. In Table 3.1-20 the monthly value is simply the product of the columns, i.e. megawatt-hours X percent of time X value per hour.

## 3.2. Recreation

General Comments

This section has been improved. It attempts to identify the value gains and losses in the lower Snake River associated with angling and non-angling recreation in both the reservoirs (Alternatives 1-3) and free-flowing river (Alternative 4). It identifies and describes the sources of information used to estimate these economic values. However, it is still difficult to follow the methodology and the justification of some key assumptions. Further, this section apparently deals only with recreation in the Snake river and its tributaries. Enhanced Snake River salmon and steelhead runs will contribute to recreational fisheries in the ocean and in the lower Columbia River as well. All recreational fishing affected by the alternatives should be examined and summarized in one section of the report. The substantive comments below are intended to improve the understandability of the Snake River recreational values covered in this section.

The first unresolved issue on page I3-56 concerns the visits per year to the lower Snake River for angling and non-angling households. In principle, the contingent behavior travel cost model used in the analysis should show how the number of trips per household per year drops off with distance and travel cost. The number of trips would drop below 1 per year for some households at some great distance (and travel cost). To illustrate the underlying behavior of the estimated model, the report should include a table showing the predicted visitation per household, number of households, and net value per trip for a range of distance zones. For example, from the mailed survey, responses on returned questionnaires for distance zones of 0-50 miles, 50-100 miles, 100-200 miles, … to 1100-1200 miles would show how stated visitation rate declines with distance.

However, the survey response that an individual "would definitely" or "would probably" visit the Snake river may have been interpreted to mean "would visit at least once per year". If this interpretation of the survey response is not correct (because some individuals would visit once only, or once per five years), then the travel cost model, using data reflecting the misinterpretation, will overestimate trips generated from larger distance zones, where people are likely to visit less than once per year. The IEAB cannot determine whether this error plagues the reported estimated recreation values, but we recommend that some re-analysis be done to assure that the reported results are free from this interpretation bias.

We would also recommend additional focus on the role of declining survey response rates with distance. This would show how response to the survey instrument is affected by distance from the lower Snake River. If the response rate declines with distance, as expected, this lends support to the veracity of the survey results. The IEAB continues to believe that the recreational value analysis should constructively explore the relationship between distance (residence to Snake River) and survey response and visitation rate. Rather than pursuing this analysis, the report makes extreme assumptions and then uses those assumptions to generate a huge range of possible values per household. For example, the High NED value in Table 3.2-1 makes the unreasonable assumption that non-respondents are as likely as respondents to visit the lower Snake River. Experience derived from past recreational survey indicates that non-response is often tied to individual interest in the subject of the survey. Non-respondents are much less likely than respondents to participate actively in recreation on the lower Snake River. We feel that display of the huge range of value estimates, generated by application of extreme and unrealistic assumptions, is inappropriate. In further revisions, the High and Low NED values should not be used. More reasonable assumptions should be developed (e.g. that lower, but non-zero, rates of participation would occur among non-responding households). Adjustments to account for lower participation among non-respondents can be extracted from the literature.

The overall value of recreation depends upon both the participation level (days or trips) and the value per day or trip. One check on reasonableness of the estimated value per trip involves a simple comparison of calculated value per day for hypothetical natural lower Snake river angling with actual natural river angling in Idaho and in the mid-Snake river (Table 3.2-1). Since the lower Snake is contiguous to the free-flowing Hell's Canyon reach and is near the Clearwater and Salmon rivers in Idaho, there is at least a gross similarity in the expected angling experience at these alternative fishing sites. Yet the estimated willingness to pay per trip based on the contingent behavior survey for the lower Snake ($256/trip) is several-fold the estimated value per trip for angling in the alternative sites ($35.71/trip for "upriver" and $37.68/trip for central Idaho).

LSR trips are expected to be of longer duration (3.36 days/trip), so the value per day of fishing is $76. Whether this partially explains the value differential is unknown, because the trip lengths for "upriver" and central Idaho are not reported.

Further, the A-Fish DREW study summarized estimated values per day of salmon and steelhead fishing from 21 studies. These values ranged from $21 to $79 per day in 1998 $ (average of $45/day). Unless we can explain why fishing in the particular stretch of river affected by dam breaching should be so highly valued, the estimated value of $76/day raises some concern about the accuracy of the estimated WTP for lower Snake river recreation under the breaching alternative. The difference between estimated value per day of fishing in the natural river ($76/day) and value for fishing salmon in the reservoir ($39/day) accounts for a substantial part of the estimated increase in recreational value associated with dam breaching. As currently calculated, the value of a salmon is taken to be the value per angling day times the number of days it take to catch a fish. So, even if the number of salmon and steelhead did not increase after dam breaching, the estimated angling value would almost double. This clearly represents a crucial point in the valuation process and should be subject to further investigation.

Another issue concerning the estimated value per fish concerns the assumption of fixed catch rates. When salmon and steelhead runs increase after dam breaching, a natural assumption would be that catch per day increases in proportion. This is a typical assumption in fisheries population analysis that is frequently adopted by economists in bio-economic modeling. With this assumption, there will be no increase in number of days fishing as the population recovers, but there will be an increase in net value per day due to improved fishing success. The value of the increased fishing success can be calculated using the relationship between net recreational value per trip and catch (as estimated, for example, by Donnelly, Loomis, Sorg, and Nelson in "Net Economic Value of Recreational Steelhead Fishing in Idaho", USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station, Resource Bulletin RM-9. 1985). The truth may lie somewhere between the two assumptions; some increase in catch per day and some increase in number of days fished. Assuming that the only consequence of fish recovery is increased fishing days is at the extreme end of the spectrum of assumptions, and it creates a particularly high value increase for steelhead where catch per day is extremely low.

It is not clear from the text how the schedule of recovery in recreation suitability levels (Table 3.2-2) was incorporated in the discounted value of recreation benefits. We suggest that the calculations be re-checked and that the text be modified to show the reader how the combined discount factors and suitability levels were incorporated.

The Risk and Uncertainty chapter uses an average or midpoint value for recreation, apparently calculated from data displayed in Tables 3.2-3 or Tables 3.2-4 through 3.2-7. For consistency, either these midpoint values should be displayed and emphasized in the recreation chapter, or the R & U chapter should use the value ranges that are displayed in the recreation chapter.

As noted on page I3-43, increased river recreation projected to occur under Alternative 4 may require expansion of recreation facilities (parking, boat ramps, campgrounds, etc.) along the river. If the capacity of the existing or planned facilities is exceeded by the projected recreation level, then the analysis assumes that facilities are expanded to meet the increasing demand. The DREW

report apparently does not include the cost of expanding these facilities. The facilities cost analysis might belong in the implementation cost section, but it could as easily be included in the Recreation section. This comment addresses the recommendation listed at the bottom of page I3-56 that costs of expanded facilities be estimated and then "netted out" of the recreation benefits. We also note that identical figures have been used for operation and maintenance of parks under all options including dam breaching, indicating incremental operation and maintenance cost may have been left out as well.

We continue to find the separation of recreational values into two sections (3.2 and 3.5) to be unnecessarily confusing. Why not take the recreational value analysis for ocean and lower river salmon and steelhead fishing out of section 3.5 and place it in a subsection of 3.2? This would array the linked and similar information in one contiguous section. The difference in analytical method between these two sections would logically be explained in the chapter introduction as follows: The ocean and lower Columbia river angler value could be calculated from an array of past studies, and these are reliable to use here because no significant change in ancillary fishing conditions are expected to occur. In the lower Snake, a new survey and study were needed to account for the projected effects of dam breaching.

Editorial Comments

Page I3-44 - Section 3.2.2 would benefit by adding to Table 3.2-1, or adding a second table that addresses, restored natural river recreation. Even as is, Table 3.2-1 leaves out the central Idaho non-angling survey results that are described in section 3.2.2.3. It sounds like this was a part of the central Idaho survey that the central Idaho angling value came from. This is an existing natural river non-angling recreation activity with 497,480 trips, with a willingness to pay of $87.24 per trip and a total value of $43.4 million dollars a year. It would be very informative to add the contingent value survey results to Table 3.2-1 also.

Page I3-47, 6th line from bottom - "Primitive camping and primitive camping would be limited…"

Page I3-48, Table 3.2-3 - The title should make it clear that this table is about non-angling recreation.

Page I3-51, second paragraph, next to last sentence - There is something wrong in this sentence's structure.

Page I3-54, Table 3.2-7 - The last two rows are shifted one column to the left. The last line of the 1st paragraph on page I3-55 describing this table contains a wrong number, it should be $337 instead of $342.

## 3.3. Transportation

General Comments

The section would be improved by discussing the Griffen work and its implications for the potential magnitude of any rail rate increases. We recognize that costs were used as the basis for most of the NED analysis, but in the regional analysis rate exposure to the shipper has relevance. Griffin found that the railroads would only raise their rates to the extent of any increase in the truck portion of any truck-barge rate caused by moving the grain a longer distance. For the case of the lower Snake, the marginal cost that rail competes with would change from lower Snake barging to trucking to the Tri-Cities, which would become a new limit on rail rates. Because of the low profitability of the existing rail rates (barely above out-of-pocket or marginal costs) lines have little hope of approximating fully allocated costs, even with the slight increase of the truck cost component. Thus, no there is incentive to be aggressive in rate competition. Secondly, railroads base rates to individual destinations on a system wide basis. Thus, if the lucrative long distance hauls from the Midwest have a claim on the existing car fleet, and the returns in the Pacific Northwest are too low to warrant new investment, no additional cars will be made available to the PNW. It can therefore be expected that there will continue to be seasonal shortages of railcars in the region and that rail rates will only increase in proportion to the truck-barge increase.

Model results that show decreased cost on specific transportation paths as a result of breaching are negated by model adjustments. The reason given is that decreased cost would violate the assumption that current conditions represent an optimized system. The existing system may be optimized in some sense, but the simple model that is being used should not be expected to reflect all of the factors that enter into decisions. The model is only an approximation, and one with weak data and incomplete information. Errors in data and theory could cause the model to err in both directions. To correct for errors in only one direction biases the analysis results. The IEAB opposed these adjustments in its earlier comments and this issue was listed as one of the unresolved issues. The footnote on Table 3.3-20 says that these adjustments totaled to $0.8 million.

Overall, the analysis seems to emphasize the negative impacts of alternative 4. Wouldn't there any gainers from the drawdown? Possibilities include benefits from increased rail utilization, and stimulation of technological change such as unit trains. The RED analysis of breaching should both positive and negative job impacts on various sectors. The text needs to recognize the positives as well as the negatives.

<u>Editorial Comments</u>

Page I3-65, 1st paragraph - Commodity shipments growth assumptions after 20 years need to be clarified. The paragraph says "growth" is held constant after 2017. Does that mean that there is no more growth after 2017, or that the growth rate is constant after 2017? On page I3-82, it says there is no increase in volume after 2017. If the assumption is that there is 0% growth in commodity traffic after 2017 isn't this asymmetric with the result elsewhere in the EA that salmon numbers increase from about 15,000 fish in 2017 to around 35,000 fish in 2100 under dam breaching? Does this asymmetry bias the results?

Page I3-77 - Rail system congestion is discussed at the top of this page. The results of the TVA and Marshall University study are described and then it is noted that BNSF and Union Pacific were asked about congestion also. What did they say about it?

Page I3-77, Table 3.3-16 - It isn't clear what the first column of this table is. It is labeled "Sum of Total Bushels". Is it the change in bushels shipped by truck between A1 and A4? If so, it would be clearer to label it the increase in bushels trucked.

Page I3-79 - The discussion of capacity at country elevators is unclear, unless there is a distinction to be made between country elevators and railhead facilities in the paragraph. There are only 3 sentences in the paragraph. The first and last sentences say that capacity is adequate, but the middle sentence gives the cost to upgrade. The costs to upgrade are then included in the list of infrastructure improvements in Table 3.3-19 with the label "country elevator improvements".

Page I3-80 - The role of the infrastructure improvements in the analysis is still somewhat confusing. The first paragraph on this page attempts to describe their role. However, one sentence is misleading. A sentence in the middle of the paragraph reads, "A key assumption in the analysis is that capacity can be added to the system at a cost that is no higher than the cost of the capacity that now exists." Taken at face value this statement says that new capacity is free, which sounds unreasonable. What is really being assumed is that increased traffic volumes can be met with capacity upgrades and additions that will not change the <u>average cost</u> to ship a unit of product. This would be consistent with economies of scale in shipping and handling and with the improved productivity of newer technology and facilities and does not sound unreasonable.

Page I3-86, Table 3.3-26 - This table is a commendable effort to present qualitative evidence about sensitivity of results. However, it should go on to show the authors' best belief about the quantitative sensitivity or uncertainty, as published in the Risk and Uncertainty chapter, Table 8-2 and others. The same numbers should appear in both places and the basis for the range needs to be described in Section 3.3.7.

Page I3-87, Table 3.3-26 - The second alternative description under storage costs ends with "harvest that do not require harvest". We suspect that the second harvest should be "storage". In the right column at about the same line the end of a paragraph is replaced by extraneous symbols.

Page I3-90 - The truck costs error described in section 3.3.8.4, should be corrected in the final analysis.

## 3.4. Water Supply

<u>General Comments</u>

This section has been substantially improved from earlier drafts that the IEAB reviewed.

It is interesting to note that, based on the sample farms in Table 3.4-7, that preservation or replacement of one third of the acres, those in permanent high valued crops (Farms B, C, and D), would preserve 70 percent of the farm values. This is recognized in the design of sensitivity Scenario 1, but it would be very useful to note this phenomenon earlier in the section.

The importance of the affected farms to the state of Washington is discussed, but it would be useful to note their relative importance in a broader regional perspective as well.

Editorial Comments

Page I3-99 - The discussion of Option 2 at the bottom of this page is very puzzling. Given that there are many groundwater wells operating in the area (209 is the estimate on page I3-112), it seems strange to dismiss the possibility of replacing some of the current river pumped water with ground water. This is especially puzzling since the estimate of effects on existing wells is based on modifying those wells at a cost of roughly $3 million a year.

Page I3-101 - Acknowledge that the extent of any increased operation and maintenance are not fully understood.

Page 104, 3rd sentence from the bottom - "of " should be "is"; change “verify” to “investigate”.

Page I3-113, second line after Table 3.4-13 - “An orchards” probably should be “One orchard”.

Page I3-116, Scenario 2 - There is really no support for the 50,000 acres of Snake River irrigated acres sensitivity and it should simply be deleted. Note that it was left out of the summary paragraph at the bottom of page I3-117.

Page I3-117 - The sensitivity analysis discussion looks like one of the best in the Economic Appendix; but the numbers at the foot of page I3-117 are not those that appear in the Risk and Uncertainty section Table 8-2, page I8-13.

## 3.5 Anadromous Fish

General Comments

This section has improved a great deal since the last draft we saw. It now deals primarily with NED values, deals less with extraneous scenarios, and tries to clarify the relationship between the recreational fishing section and this anadromous fish section.

Numbers of salmon and steelhead, both wild and hatchery, are used in the report to calculate recreational values, commercial fishing values and cost effectiveness. Yet the numbers of fish expected in the different alternatives are never shown. A table showing the estimated numbers of each species of fish, of wild or hatchery origin, in years 24, 48 and 100 would be extremely useful. As it is, it is not possible to track the calculations done in various parts of the report.

Figures 3.5-3 through 3.5-6 are useful, but are only wild fish and numbers can't be read off of the scale.

The treatment of recreational angling is confusing. Apparently, in-river economic values were reviewed by the A-Fish team, and recreational values per day are displayed in Table 3.5-4, but are excluded from the summary Table 3.5-5. However, in this section's sensitivity analysis, in-river recreational fishery values are included and are discussed on page I3-131 (3rd paragraph). (1) It would be very interesting to compare the estimates of in-river recreational fishing values in Section 3.5 with those in Section 3.2 as part of an uncertainty discussion somewhere in the document. (2) It wasn't clear whether the Anadromous Fish section or the Recreation section included recreational fishing values in the Columbia River (This may be a clarification needed in the recreation section.). (3) It isn't clear whether the treaty (or tribal) fishery is evaluated as commercial or recreational. (See Page I3-133 top paragraph, Table 3.5-5 and the rather better Table ES-7.) Generally, the entire report would be clarified by the a simple description (possibly a table) of how salmon/steelhead runs were accounted for among ocean fisheries, lower Columbia River fisheries, and Snake River/tributary fisheries, under the three alternatives, and how the economic value is divided among recreation, commercial and treaty.

It is not clear how the risk and uncertainty discussion here (Section 3.5.5) relates to the numbers in Chapter 8. It would be useful to describe the relationship between the uncertainty ranges in Table 3.5-6 and the sensitivity tests in section 2.5.5.

Editorial Comments

Page I3-121, Section 3.5.2.1 - As we understand this discussion, it is centered on projections of improved SAR over the next 50 years. Fig 3.5-2 shows the trends. All of them start near zero and make drastic increases over the first 20 years of the alternatives. It seems that something external to the system is expected to happen to increase the SAR since even the base case alternative experiences this increase. Table 3.5-1 lists assumptions needed to expand SAR estimates but does not reveal what it is that causes the universal increase in SAR regardless of what is done to the dams.

Page I3-126, Fig. 3.5-2 - This graph that shows the trend in SAR over time is interesting. It would be more useful however to also include a graph showing the trend in increased numbers of returning adults as well. This is because one would not expect the SAR increase to be an acceptable stand-alone indicator of returning adults in the out-years. Something must first be known about the number of smolts in preceding years. For example, if one assumes habitat will be available to accommodate growing numbers of wild smolt resulting from improved SAR, returning adult population will increase very rapidly. Suggest the author might want to explain the assumptions a bit more, how they might have had a limiting affect, and how they were applied? Table 3.5-1 gives a partial explanation. In particular, the fall chinook SAR, which rises to roughly 30%, should be explained or corrected, as SAR's this high have not been observed before under even the best of conditions.

Page I3-127, Table 3.5-1 - The footnotes give sources for the data in the table, but reference tables that must be in the subgroup report or something without saying what the source document is.

Page I3-131, Section 3.5.4 - The second paragraph describes primary seafood processing as being included in the NED evaluation. Page, I3-144 says contributions from other affected business are included as justification for using the 70% ex-vessel value as well. There appears to be some confusion about the nature of NED analysis. Processing and other affected businesses should be presented in the regional analysis not the NED account. The analysis needs to exclude these secondary impacts from NED.

Page I3-133, last paragraph before section 3.5.5 - The reference to Table 3.5-6 incorrectly states that the table shows values "by species". And second sentence should say "Values *are* presented by…"

Page I3-136, 1st paragraph, 2nd sentence - There is a problem with this sentence or the preceding period should be something else.

Page I3- It is not clear what Table 3.5-7 shows results for; in-river only, ocean and in-river combined, or what. As it is, this sensitivity can't be related to a base result. A similar comment applied to some other tables in this section.

## 3.6 Tribal Circumstances (NED)

General Comments

As we note in our Significant Issues and Conclusions section, the IEAB recommends that section 3.6 of the EA be eliminated (along with its summary in the ES), that the tribal NED benefits from fish be more clearly covered in the Anadromous Fish chapter, and that the material on the five chosen study bands and the rest of the 14 bands in the Snake River area be transferred to this chapter.

Editorial Comments

Page I3-145, 3rd paragraph - There is a reference to Table 4-2, but there is no Table 4-2 in the report.

Page I3-146, 1st paragraph, last sentence - The sentence refers to Section 1.3, and identifies it as a discussion of WRC guidelines. Actually, it is a section that identifies and describes the alternatives.

## 3.8 Implementation/Avoided Costs

General Comments

This chapter is pretty clear in most respects. There is one presentation issue and one remaining technical issue.

The numbers in this section are based on the Engineering Appendix. The IEAB strongly recommends that clear cross-references be given to the Engineering Appendix, or other sources of data, so that readers of the Economic Appendix can understand the basis of the implementation and avoided cost numbers. The nature of the engineering cost estimates is central to the IDC issue described below, for example.

Interest during construction (IDC) seems to still be an issue. IDC is a real cost of construction, not just a time value of money issue. It should be calculated at the Corps' borrowing rate, assuming that that rate is a reasonable approximation of the market cost of capital. Whether it is appropriate to use the "discount rate" (especially zero) to move the construction costs in time depends on whether the engineering estimates already include the "real" IDC. If the capital cost estimates that are the input to this implementation analysis already include IDC and are, for example, expressed as capital cost evaluated at the midpoint of construction, then it seems appropriate to move the base year around using discount rates. But if these movements are intended to be an estimate of the IDC costs it seems wrong. In the IEAB's review of the preliminary draft economic appendix, we stated that if "financial flows are calculated using reasonable costs of capital", using zero discount rates would probably do "little harm".

The calculation of avoided costs, although improved, remains confusing. Much of the confusion results from an arbitrary distinction between "project related OMRR&R costs" and "non-project related OMRR&R costs". These two components of cost that could be avoided with dam breaching are treated differently. The first is not included in avoided cost, but is buried in the differences between construction and acquisition costs among the alternatives. The second one is explicitly treated as avoided costs. If there are reasons for this asymmetric treatment, they need to be justified.

Editorial Comments

Page 151, Table 3.8.1 - The table rows for dam breaching are not properly lined up.

Page I3-152, Figure 3.8-1 and associated text - The diagram includes avoided costs but these haven't yet been defined, and aren't until 6 pages below, at page I3-158. We suggest borrowing a few sentences from there and inserting them into the text of page I3-152, or into a note to the figure, or delete avoided costs from diagram.

Page I3-155 - Presumably BOR water acquisition costs are explained or discussed more fully elsewhere in the FR/EIS. If so, need a sentence or two to explain source of the per acre foot water price.

Page I3-156, Section 3.8.3.4 - The last sentence in this one paragraph section contains inconsistent dollar units. The AFEP costs are expressed in millions of dollars, while the monitoring costs are incorrectly stated in dollars (they are actually thousands of dollars as expressed). It would be better to use consistent units such as AFEP at $38.4 million and monitoring at $41.2 million.

Page 157, Table 3.8-4 - Define AFEP in footnote to table.

Page I3-159, first bullet - Change “Avoidance” to “Avoided”. Clarify that this whole paragraph applies to Alternative 4 only. In the same paragraph, what portion of the O&M would be discontinued if the dams were all breached by 2007?

Page I3-160 - Explain source of these contingency ranges. Are they standard construction cost estimating practices by the Corps?

Pages I3-160 and 161, Table 3.8-6 - For Alternative 4, the difference from most likely to high is about 5%, not the 30/2 = 15% suggested by Section 3.8.6. Perhaps moving from total costs to annual costs reduces the contingency range “estimate”, but that needs to be explained.

Page I2-160, Table 3.8-5 - The row label for alternative 4 @ 6.875 percent is mislabeled as Alternative 3.

## 4. Passive Use Values

General Comments

We appreciate the work devoted to revising and improving this chapter. The topic has been moved into a separate section as recommended by the IEAB. Additional work has been done to incorporate the study by Layton et al. A substantial amount of text has been taken from the paper written by Mary Jo Kealy of CH2M-Hill for the Multi-Species Framework Human Effects Analysis. Some of this probably needs to be updated and the reference should now be to Human Effects Analysis of the Multi-Species Framework Alternatives, Appendix E, Northwest Power Planning Council (Pub. 2000-5), March 2000. While we commend the ingenuity of the analysts in developing benefit transfers for Snake river salmon and free-flowing river conditions, several major points of weakness still exist in the passive use value estimates displayed for Alternative 4, dam-breaching.

The overall logic of benefits transfer for passive use values of salmon is laid out clearly on page I4-3. The first of three criteria is that the nonmarket commodity valued at the study site should be identical to that being valued at the policy site (the Snake River). The authors conclude that this condition is met because the source studies and the Snake River study site both involve salmon. Given that 56 ESUs for salmon have been identified on the Pacific coast of the United States, and that these ESUs are considered distinct enough to be considered “species” under the Endangered Species Act, it is hard to draw the implication that the various salmon runs represent identical nonmarket commodities. To suggest that people place special, non-use value on endangered species; while holding that all the various endangered species are identical, seems wildly inconsistent. This logical defect is particularly apparent in the Sec 4.1.1 Regression Approach, where the salmon populations from four specific areas are assumed to be individually unique (hence, the object of passive use value), yet identical to one another (hence, a single estimated value function can be used for any such population). We think the regression approach lacks theoretical underpinnings and should be abandoned.

The necessary benefit transfer condition is perhaps better met by either Loomis' Elwha River study or the Layton, et al. study, although as noted in the chapter, neither of these strictly meets the criterion. The Elwha River values salmon in a specific western Washington river, but there are significant differences in policy context, especially the location of the proposed restoration on the Elwha in a well-known National Park. The location and relative depletion of this stock should give these fish an especially high value per fish. Layton, et al. estimate a total value function for increases in eastern Washington and Columbia River migratory fish – a category that encompasses the various Snake River endangered and threatened runs along with numerous other salmon, steelhead, and shad populations. As noted by the authors, this category is broadly defined and does not reflect the focus on endangered and threatened runs that pertains to the Snake river site. Hence, this Layton, et al. study might provide a relatively low value per fish for endangered and threatened Snake River fish. Consequently, the estimated benefits transferred from these two studies might be used to "bracket" the likely PUV for Snake River wild fish recovery under the alternatives.

Because the studies used to transfer values estimated <u>total</u> values (use plus non-use values) for increasing salmon runs, there is a problem of separating out the use value in order to avoid double counting. The main use value, due to recreation, is already accounted for in Sections 3.2 and 3.5 of the report. The problem is "addressed" in this chapter by multiplying the estimated value per year per household times the estimated population of non-users. But this procedure is incorrect. Both users and non-users may hold passive use values, but non-users presumably hold only passive use value. The value applied to the non-users in Section 4 contains use value. The correct value to attribute to nonusers would be the fraction of total value that is passive use value, a fraction about which we have no evidence. The procedure actually used is correct only if passive use value, as a fraction of average estimated total value, just happens to equal the fraction of households without salmon users. Since we don't know which fraction is greater, we do not know whether the procedure adopted yields an overestimate or an underestimate of passive use value. This is contrary to the statement on page 4.1.1, second paragraph, that the procedure avoids double-counting. In fact, if most of Layton's estimated total value per household is use value, while most households are non-users, the procedure used in Section 4.0 would be a vast overestimate of passive use value. We see no way to correct this problem with the data available, and we do not know whether it imparts a large or small error to the resulting PUV estimate.

Finally, the entire suite of economic values associated with improved Snake river salmon runs is based upon the 1998 PATH results. Yet, in Section 4.1.3 (page I4-6) the authors introduce alternative analyses of trends in salmon populations that contradict the PATH results. The IEAB is in no position to evaluate the merits of these competing biological analyses. However, the rest of the DREW report would need to be revised if we are to give equal credence to the Weber (1999) analysis promoted by CRITFC. We suggest that the portion of the passive use value analysis that depends upon this alternative view of salmon populations be deleted from Chapter 4.

In transferring passive use values for free-flowing rivers, the key assumption used in Section 4.3 is that these values are proportional to the length of the free-flowing river. While this is plausible for a use value (the longer the boat trip or transit through rapids, the greater the recreation value), we have no evidence to support the notion that passive use value for a unique river segment is proportion to its length. Possibly, the several studies cited in Colorado could be

used to establish this relationship. Perhaps it would be reasonable to assume that free-flowing river miles (like salmon) generate diminishing marginal value. Until such a relationship is shown, it seems inappropriate to calculate values for a free flowing Snake River based upon an average passive use value per mile of river in Colorado.

Editorial Comments

Page I4-4, Table 4-1 - The units in this table are million of dollars, not thousands as the title says.

## 5. Tribal Circumstances

General Comments

This chapter also needs some reference to the results of the 1999 PATH model. There is a brief stab at this in chapter 10, page I10-4, but not here. It is important, for it suggests that the 5 tribes' decided preference for breaching could be reduced if based on the 1999 model.

Among the material that should be moved and incorporated into chapter 5 (from the old Section 3.6) is that identifying the affected tribes. There are five study tribes selected from a group of 14 tribes and bands in the vicinity of the lower Snake River, all of which might benefit from actions taken to improve salmon survival. Only the five selected tribes have lands along the river and lakes behind the dams, and only they have treaty and other entitlements to engineering and environmental modifications to remedy historic losses. Yet the other tribes and bands in the group of 14 have a firm right to harvest at accustomed sites. That gives some of them, at least, a strong interest in engineering and environmental changes.

Beyond this vicinity are other tribes that might benefit to a lesser degree: possibly the Cowlitz (new status), Makah, Quinault and/or Quileute. Their ties to marine resources in general indicate Columbia basin and lower Snake salmon may be of cultural importance to them as well. According to page I3-119 most of the fish produced in the Columbia River basin were harvested in marine waters from California to Alaska. These other tribes might also benefit from an increase in numbers of salmon available for harvest.

The material brought to this chapter from the old Section 3.6, combined with what is already on Page 15-1, provides a good nucleus for discussing the greater tribal interest in the alternatives. However, the IEAB notes that in the rest of Chapter 5, only the five study tribes are ever mentioned. We recommend that, to the extent that information is available, the interests of tribes without land or extensive treaty rights also be kept before the reader, not least if it is known that their interest in the river or the salmon differ from those of the study tribes.

The report text constructs a relationship between economic circumstances and treaty history. It is clear that the fairness of some treaty related actions could be questioned. However, the issue here is not one of economic impacts of possible future treaty changes, it is economic impacts of possible dam removal. Therefore, one looks for information characterizing what the tribal circumstances would be under existing institutions and treaties with, and without, the dams in

place. To a great extent, tribal consequences of dam removal will depend on treaty enforced rights to harvest of salmon. This has been taken into account in this chapter's estimates of increased harvest resulting from increased numbers of salmon, but as we recommended above, this should already have been made explicit in the Anadromous Fish section.

Editorial Comments

There are repeated references to a report called Tribal Circumstances and Perspectives developed for CRITFC. The report was not listed in the sources at the rear of the report. We were able to locate a similarly named document, Tribal Circumstances and Impacts of the Lower Snake River Projects on The Nez Perce, Yakama, Umatilla, Warm Springs and Shoshone Bannock Tribes, Final Draft, developed for CRITFC as a draft by Meyer Resources in April 1999. We suggest that the proper document be included in the list of sources.

Page I5-9, Table 5-7 - This table is noted as having Meyer Resources, 1999, Table 50, as the source. We were able to find a Table 50 in an April 1999 Myers Resources Final Draft report but the numbers there are very different from the harvests listed in this Table 5-7. The difference should be reconciled either by explaining it, or by more careful identification of the supporting source document. This could also clear up data in the bottom paragraph of Page I5-10, which does not agree with Table 50 in the April 1999 Meyer Resources Final Draft document.

Page I5-9, paragraph 2 - In the last two sentences, the text promises comparison between Columbia/Snake River predicted and current salmon and steelhead harvests. Eventually several rates of increase are given (e.g. under alternative 4, 2.4 times more tribal harvest of salmon and steelhead than under 1.) But the comparisons are confusing:

- Does Columbia River/Snake River mean all catches in all rivers (not just the Snake) by these five tribes? Does it mean mid-Columbia, as in footnote 4/ of Table 5-2? Or does it mean Snake only?
- For purposes of comparison, the final sentence of this paragraph mentions 1.3 million pounds current harvest of *steelhead.* These are to be compared with historic harvests of unspecified "Fish" in Table 5-2, while the comparisons with future harvests in the paragraphs following, on Page I5-11, are variously with " chinook," " wild and hatchery salmon," and "steelhead"
- The comparisons on page I5-11 are not easy. "Tribal salmon recovery objectives" are directly compared with "cultural and material circumstances"; are these the same thing? One alternative has the harvest increasing by a percentage, while the next alternative has it increasing a number of "times."

## 6. Regional Analysis

General Comments

This regional analysis chapter has been substantially improved and fleshed out since the preliminary draft. There is now a good discussion of the limitations of I/O analysis. While many of our earlier concerns have been addressed, other questions and concerns remain. The IEAB

agrees that I-O methodology is generally appropriate for the task of this section, and that the methodology has in general been correctly applied. The concerns we list below are mostly concerns over how information from the other studies feeds into the RED analysis, the treatment of different regions, and how the results of the analysis are presented.

It would be useful to add a discussion of how various NED effects relate to changes in final demand. For example, what role does WTP play in estimating changes in final demand? What is the process for estimating changes in final demand?

In section 6.3.1.1 there is a good discussion of the importance of cost distribution for the effects of changes in electricity generation. However, it is never stated what cost allocation was assumed in the analysis in order to get expenditures changes for each sector.

Section 6.3.3 on commercial and ocean fishing has been added from the A-Fish group's work. However, the discussion of this material is not adequate. It isn't clear what the regional definition is. Does this include areas in Alaska and Canada? Is it just selected coastal communities? How does it relate to where the expected catch would occur? Since most of the impacts are from in-river commercial Fall Chinook are coastal areas very much affected? Etc.

Section 6.3.4.4 notes that increased transportation costs as a result of breaching could have a number of effects including a "substitution effect", an "output effect", and a "stages of production effect". The last paragraph of the section then asserts that "No studies exist to project the possible changes in shipping volume". The IEAB notes, however, that it was the purpose of the transportation section of the Economic Appendix (Section 3.3) to estimate such effects. The "substitution effect" estimated in Section 3.3 is that of the 3.8 million tons diverted from upper Snake navigation, 2.7 million would be trucked to Tri Cities and barged to Portland form there, and 1.1 million tons would go by rail to Portland. Section 3.3 did not find the case for either "output effects" or "stages of production effects" sufficiently compelling to estimate such effects -- and the IEAB concurs in this. The IEAB recommends that the transportation substitution effects as estimated in Section 3.3 be incorporated as a part of Alternative 4 RED effects in Section 6.3.4.4.

The national and regional income and product accounts are designed to avoid double-counting the values produced at various stages in the production process. The sum of incomes earned at each stage of production will equal the market value of final output. This occurs because we specifically avoid double-counting value added by any firm or economic sector. Hence, when we add up the incomes or employment attributed to, say, farmers, crop storage and transportation, food processing and distribution, and food retailers, the sum correctly reflects the total market value of the food sector of the economy. In contrast the "Gross Sales" figures commonly reported from regional input-output analysis adds together the sales at each stage of productions, resulting in double, triple counting and more. The Gross Sales is many times greater than the value of goods produced or the incomes earned. It represents the total number of dollars changing hand in transactions throughout the economy. This aggregate number may be of some interest to bankers and monetary theorists. When reported to the public and non-economist decision-makers, the Gross Sales figure is often mistakenly interpreted as reflecting economic production or incomes.

Because these Gross Sales figures serve no useful purpose in the RED chapter, and because they are likely to be misused by non-specialists, we recommend their deletion.

Section 6.3.4.5 discusses cruise ship purchases of jet boat services. At the same time, one of the substantial increases in economic activity is river recreation on the restored Lower Snake River. Are these effects related to jet boats reasonably sorted out in the regional analysis? Have some of the increases in river recreation activities been allocated to jet boat services? Section 6.3.2.3 is silent about what sectors' final demands are affected by increased recreation and tourism.

Editorial Comments

Page I6-9, Section 6.3.1.6 - Electric utility multipliers are shown in this one paragraph section. It would be useful to give the units for these multipliers.

Page I6-7 - The last line references a section 6.6.6, which doesn't exist in this document.

Page I6-8, last paragraph - It is not clear how the fact that "the adjacent reservoir subregion could also be affected by construction activities" relates to the choice of modeling regions.

Page I6-16, Table 6-8 - In the table title, "of" should be "on".

Page I6-9, first full paragraph - This is the same issue we raised in our comments on the preliminary draft economic appendix, although the numbers seem to have changed somewhat. Given that natural gas will be imported to the region, we question how supplying imported natural gas for two combined cycle combustion turbines could involve $11.56 million in annual personal income and 416 jobs. This seems like it could be a serious overestimate of the RED effects.

Page I6-10, Table 6-5 - This table illustrates a timing problem that may also occur elsewhere in the Draft. This table designates years as 0 through 100 – apparently referring to the years 2005 through 2104 – although one has to refer back to page I1-6 to figure this out. Starting with Table 6-8, the years are given explicitly, starting with 2001, sometimes running to 2100. The years covered by the analysis need to be consistent. This probably means developing a consistent way to treat the pre-implementation years 2001 through 2004.

Page I6-11, 2nd line - We assume that "upriver" should be "reservoir" in this sentence.

Page I6-13, bottom - Surely it is possible to be more definitive than this about the RED effects that loss of lower Snake navigation would have on grain and other shippers. The Navigation section of the Draft Economic Appendix says the increased cost of grain shipping would be about $22 million, and that significant change in production and product destination are not anticipated. Most of this cost would be borne by farmers as reduced regional net farm income. The Navigation section also gives a first estimate of how traffic would shift from barge to rail and truck. Given estimates of local ownership it should be possible to estimate job and revenue effects by transportation mode. If the reduced competition from loss of barges leads to increased rail and truck rates, this would increase the regional farmer costs, and perhaps the regional

rail/truck incomes. The IEAB feels that the failure to elaborate on the RED effects of Navigation is a major failing of this section.

Page I6-14, cruise ship effects - Ending flatwater cruise ships would certainly reduce this source for charter jet boat tour revenues. However, the restoration of a substantial new stretch of natural river could provide an opportunity for new jet boat tours between Lewiston and Tri Cities.

Page I6-18, Table 6-15 - This table, along with many subsequent tables in this section, applies to the dam breaching alternative. This needs to be stated clearly in the table heading.

Table 6-16 through 6-21 - These tables need improved formatting to clarify and separate the different types of information included. For example, showing total 1995 income etc. at the bottom of the table after the total impacts, and with the change as a percent of total, would help. Better indication of subtotals and net effects would help a lot too.

Page I6-20, Table 6-16 - Pump modification costs are shown as occurring entirely in the "Upriver Region". Presumably the Potlatch Corporation pump modification costs, occurring in Nez Perce County, Idaho, are a major part of this. Note however, that modifications were also listed for several Clarkston, Washington pumps, which would be located in Asotin County in the "Reservoir Subregion".

Page I6-21, Table 6-17 - The "Net Long-Term Loss in Business Sales" is incorrectly computed for the Upriver and Reservoir Subregions. The Upriver net should be 24.90 – 14.93 = 9.97, and the Reservoir net should be 8.07 – 167.36 = (167.36). The percentages need to be corrected accordingly.

Page I6-24, last paragraph - The paragraph talks about corrections used to convert part to full-time jobs. It is unclear which jobs are being converted – is it the jobs in Table 6-19, or those in Figure 6-2, or perhaps somewhere else?

Pages I6-29 through I6-33 - This section discusses the valid concerns about businesses that might be affected by the various impacts of dam breaching. Our concern is that the discussion is one sided – other businesses might be benefited by breaching. Some of these are discussed elsewhere in the section, such as the various recreation service and equipment providers. More specifically, Lewiston has several major aluminum jet boat manufacturers, and Moscow is the home of one of the largest manufacturers and retailers of whitewater equipment in the world.

Page I6-32, last sentence above table - If the cost of shipping logs and wood chips is increased by 3 percent as stated here, this would tend to depress the price of such products at Lewiston. Since these products are raw materials to the mill at Lewiston, this could be a benefit for the Lewiston mill, offsetting some of the other costs of breaching.

Page I6-33, 1st sentence - This is not a sentence. There may be an extraneous "that".

## 7. Social Impact Analysis

General Comments

This section is well written and structured. The discussion seems internally logical and consistent.

The discussions of individual communities are still relatively long and very general, and could be further reduced.

## 8. Risk and Uncertainty

General Comments

Throughout the discussion in Section 8.2, there is confusion about signs and net benefits versus net costs. It is said that net benefits are being computed, but the actual calculations are usually net costs. The equations on page I8-3 are unnecessarily complicated and end up wrong. [see suggestion below] For example, the first equation on page I8-3 gives benefits a negative sign and costs a positive sign. The values in the equation are in thousands of dollars. Making the calculations in the first line would result in a value of $132,049. The discussion would lead one to think this was a positive net benefit. But this is really a positive net cost because the costs are entered as positive values and the benefits as negative values. Note also that the answer in the text is $132,049,000. If we are looking at net benefits, as the text states, then the answer should be negative. The second equation on the page leaves out the first negative sign so doesn't work at all.

As noted in other sections of this review there are problems with the consistency between uncertainty ranges identified in specific topic sections and the corresponding ranges presented in this chapter. Reading this chapter leads us to wonder how the various workgroups calculated their ranges and the middle values. Each chapter has a section on risk and uncertainty but they're not uniform in approach. The text would benefit from having a table similar to Table 8-1 in which each workgroups' method is summarized. The IEAB has raised this matter before. In their response the authors of this chapter repeatedly responded that they were not responsible for the workgroups' ranges. Perhaps so, but the Corps needs to take responsibility for an integrated presentation, and in any case there appear to be substantial discrepancies between this chapter and the ranges derived in the individual sections.

Passive use values have not been adequately separated from the rest of the discussion in this chapter. On page I8-18 there is a discussion of passive use values and a table that adds passive use values to the NED estimates. Discussion of passive use values is sprinkled through the following pages as well. This is the only place we are aware of in the document where PUV are still combined with other NED values. This appears to violate the previous IEAB recommendations on this issue, and the general approach adopted for the Economic Appendix,

which separates NED and PUV estimates. We suggest that the PUV discussion follow the discussion of the other NED components and should be strictly separated.

Probably too much attention is given to defining and explaining the normalized nominal range sensitivity of each category (parameter). The authors insist this is their main purpose, but the concept is not too difficult and its treatment is overly technical considering the simple concepts involved. The PATH analysis on the other hand needs more space. Even if the PATH data are never up-dated, the standards concepts on pages I8-25 and 26 need a less compressed treatment.

At several places the authors usefully show how the ranking of the alternatives by their total net costs changes when extremes of the components' ranges instead of their central values are used. This helps with the exposition. But remember that the FP/EIS probable aim is to rank the projects not by net costs but by cost effectiveness of survival or other biological objective.

This chapter would benefit from a summary. The effort to explain the overall uncertainty by the uncertainty in the components' net costs is worth while, and there are good paragraphs using actual examples. These paragraphs would benefit if there were a sort of summary section where the general magnitude of the overall total net cost, and its range, were displayed, by itself, and given a short general discussion. The materials are in Table 8-2 now, but not in the text.

Editorial Comments

Page I8-3 and following, Tables 8-1 through 8-3 - These tables would benefit from having a total net benefits section (or rows) at the bottom that simply add up the corresponding numbers from the columns above. This would give a correct estimate of net benefits in thousands of dollars. This would also make available the values for the denominator of the equation on page I8-7 for "normalized nominal range sensitivity for parameter i", which is shown in Tables 8-2.

Page I8-11 and following, Tables 8-2 - The "nominal range sensitivity" and the "normalized nominal range sensitivity" columns should not have negative signs. Also what good is the "average change" column? There are also some odd results in this Table. (1) Some "high-end" negative implementation costs are larger in absolute value than their "low-end" counterparts. (2) In the 6.875 percent pages (I8-12 and I8-13), most values shown are the same across the parameters, which does not comport with data presented elsewhere in the Appendix.

Pages I8-2 to I8-7 - The text is separated into discussions, one of method (NED method) and a few pages later "results" in the form of the Tables 8.1 and 8.2. This does not work very well, because the method is explained by using the actual numbers, so the reader has sometimes to look ahead to see where they came from. Probably it would be better to integrate the two discussions.

Pages I8-4 and I8-5, Table 8-1 - Suggest that table show totals at foot, especially of Column 1, nominal value in $. This is the key source of Table 8.2, Column 1. To fit with that table, the table's title should end "…Difference from Alternative 1."

Pages I8–8 to 19 - Consideration should be given to the bar chart. It now brings out from Table 8.2, Columns 4 and 5, the uncertainty in the estimates for each net cost category. In view of the emphasis in the text and table to deriving each category's contribution to total uncertainty, and to

normalization, the numbers beside each bar should be stated in terms of 100 % (e.g. Power, instead of " –15% to + 15%" would be "12%. " Doing this brings out even more the weight of recreation ("82%") in uncertainty of total net cost.

Page I8-10, last paragraph - The reliability of the power system estimates, highlighted by the anecdote about the workgroup on the next page, is impressive. But it is not clear how this reliability "tends to dampen" any effects of possible changes in the range of estimates of other categories of cost. The next sentence, beginning "In other words…" does not put the reliability dampening effect into other words. A little discussion is needed.

Page I8-18, first line in 2nd paragraph - There is a reference to Table 8-5. Table 8-5 doesn't exist; it should probably refer to Table 8-3.

Page I8-19, Figures 8.3 through 8.5 - The discussion of Figures 8.3 through 8.5 at the top of this page imply that PUV may be included with the recreation bar. The graph is not labeled as such. This is serious, because the figure shows the recreation range as + 106% to – 106 %, same as Table 8.2. Then is PUV also in *that* Table? See suggestions above regarding separation of PUV uncertainty from other NED ranges.

Pages I8-23 to I8-24 - Tribal risk and uncertainty. These pages are clear. Suggest however that, in parallel with other sections of Chapter 8 (risk and uncertainty) the authors state whether most of the sources of risk and uncertainty would change the tribes' ordering of the alternatives in terms of net benefits.

Page I8-26, Table 8-4 - To fit with rest of chapter, "Action" should be written as "Alternative".

Page I8-26 - How were the above performance measures used, or are they there to illustrate how opinions can differ? The text does not explain the relationship if any between this procedure (an expert weighted-average belief exercise at a workshop) and the PATH Monte-Carlo simulations and their distribution ranges mentioned next. Point out that the four alternatives here are not the same as the four alternatives in the rest of the appendix.

Page I8-26 - Last sentence: incomplete.

## 9. Cost effectiveness

General Comments

This chapter does a nice job of presenting a summary of costs and effectiveness. It is good to see it all pulled together in this way. It was also good to actually see some numbers of fish and other biological objectives associated with the costs. It would be helpful to include somewhere the estimated number of fish under Alternative 1 for perspective on the changes that are shown. It should also be noted how different the jeopardy standards are from the numbers of salmon. Numbers of salmon presumably include a substantial component of hatchery fish, whereas the jeopardy standards apply to natural fish only. Hatchery fish may have NED and RED effects, but may not help meet the jeopardy standards. Thus, the cost-effectiveness analysis would differ

substantially, depending on the biological objective (i.e., the number of fish versus the probability of avoiding jeopardy).

The relatively modest differences in meeting jeopardy standards among alternatives seem at odds with the very dramatic differences in the numbers of fish expected. For example, over the 48 year period, A4 is predicted to produce 25 times more salmon than A1 and 16 times more salmon than A2. It may be that having a base for salmon numbers, or expressing the change as a percent increase would help explain this difference. It would probably also help if Figure 9-1 were disaggregated into separate figures for the various species or runs of salmon, and if distinctions were maintained between hatchery and wild fish. In any case, when the results are expressed in terms of increased salmon numbers, A4 produces far greater benefits than Alternatives 2 or 3 albeit at substantially higher costs.

Editorial Comments

Page I9-1, central three paragraphs in Section 9.2 - This is a good explanation of how PATH was used. Apparently there is nothing like it elsewhere, though it should also be in the ES or the Introduction.

Page I9-1, 5 lines from bottom - Replace "…by considering the stock's response to…" with "…by considering the probability that the stock will meet…" ?

Page I9-1, Section 9.2, second paragraph - We think PATH was based on six indicator stocks not the "sixth weakest of seven"? This should be checked and clarified. ("weakest" is repeated p. I9-5 , top full paragraph.)

Page I9-2, Three lines from bottom - "…which, as *stated* above, require a 70 percent probability." Presumably these are percentiles and median of a distribution of model results with abundance arrayed from lowest to highest. It would be useful to say something like: Thus, the first line should be read to say that the lowest 25% of PATH results for S/S Chinook show a probability of only 55% or less [or more?] of reaching the 24-year survival standard. However half show a probability of almost 70 percent, and the lowest 75 percent…, etc .

Page I9-7, Table 9-3 - Most of the sources for numbers are wrong. Perhaps they are old sources? The numbers could all be obtained from the tables in the executive summary.

Page I9-8 Third line from foot - To match text elsewhere, and the label of the horizontal axis, the variable should be " improved survival *probability*." The captions for the figures and the tables hereabouts use the words "Biological effectiveness". This seems a good term to replace survivial probability, but it is never used in the text and so needs to be introduced.

Page I9-9, Table 9-4 - The third column header, "Percent" mistakenly has "($)" included.

Page I9-9, Figure 9-2 - The three words Most Likely Points need to be bunched, or perhaps have a line circling them, to avoid the impression that each word has its own arrow. Same for next two figures.

Page I9-13, Sections 9.4.2.2 and 9.4.2.3 - Several errors have slipped into these sections. In each section, the dollars are mistakenly referred to as million dollars per year. However, these are the sum of annualized costs over the relevant period of years. Further the second paragraph in section 9.4.2.3 is wrong in a couple of respects. First, there is no benefit in going from A1 to A3, there is a decrease in survival expectations of 5 percent over the 100-year period (see Table 9-5). Second, there is no cost of going from A1 to A3, there is a savings in cost. Therefore, the 96,207 is thousands of dollars saved for each percent reduction in survival.

Page I9-14 - At the end of each sub-section, the reader is told: " (see Figure 9-5 and Table9-6.)" But that Figure refers to Fall Chinook only.

## 10. Summary of Effects

Editorial Comments

Page I10-4, section 10.3 - This section repeats earlier summaries of the change in harvests by the tribes in Chapter 5. See the IEAB comments on the units used in, and the presentation of, that material.

Page I10-4, Section 10.3 - Here, as in the A-fish section and in chapter 5, effects are displayed as a pro rata share of the overall NED-relevant harvest.. The allocation of salmon and related NED benefits is guided by treaty rights, which are applied to a projection of output of the various alternatives. This is an appropriate application if the overriding concern is to suggest how the tribes will share in the harvest, and thus to suggest the NED aspect of the alternatives. This however may not be the tribes' main concern. They also seek enhancement and restoration of cultural, and ceremonial, and treaty related values, that typify a way of life. These things have not been quantified in dollar terms in the NED framework, nor in the regional analysis, or in any other part of the report. Consistently with the IEAB's recommendations for previous chapters and sections, it is recommended that this brief section note these goals for a way of life, and the place of increased stocks and harvests in them.

Page I10-2, Table 10-1 - This table presents the same data, for medians, as Tables 9.1 and 9.2. What was called probability there is called ability here. It would be best to use same terminology, and cross-reference.

Tables 10-2 and 10-3 - The title or a footnote should make clear these are annualized costs. Note that the numbers for Power do not actually appear in the power section; they are midpoints of high and low costs, as is properly done in Table 10-4 footnote 1.

Tables 10-2 and 10-3 - In column head, replace "description" with "category" or "type"

Section 10.4 - For consistency and clarity, capitalize word appendix here and elsewhere.

## Chapters 11 through 13

General Comments

Chapter 11, Cost allocation - It should be noted that cost allocations are necessary in order to develop financial implications of alternatives and also to estimate regional economic impacts. The allocation assumptions should be consistent in these analyses. The IEAB has noted before that cost allocations may have significant economic effects.

Chapter 12. Financial Analysis, Page I12-6 - In the previous draft the IEAB recommended that the discussion of the impact of high and low power costs on the industrial sector and other classes of rate payers be dropped from this chapter, since the tricky necessary assumptions were not presented along with the numbers. It is drawn from DREW HIT 1999, and is pretty fully included already in the Appendix's regional section (see page I.6-6.) In response, BST did agree. It still remains, and should be dropped.

Chapter 13, Compensatory Actions - Table 13-1 on Cultural resource protection, has been changed from 1998 to 2005 dollars. Why? The total expected cost is halved from $52 to 25 million. Does DREW expect a deflation? There is no explanation. Table 13-2 again presents all-category NED costs, and is followed by discussions of the amount in each category, which conclude that there is no current means of compensating for these costs. In connection with the transportation sub-section of this, there is a new Table 13-3 presenting cost of transportation infrastructure upgrading. This is the same as Table 3-3-19 except for much higher export terminal rail storage. Explain or correct.