

Webinar on Dam Removal – Key Questions

Introduction

The SRKW Task Force Steering Committee is organizing a webinar to help its members further understand the issues, benefits, and trade-offs associated with potential removal of 4 lower snake river dams as one option to improve prey availability for the Southern Residents. This is a highly contentious issue with strong feelings among many different stakeholders about the merits – or lack thereof - of dam removal.

The Task Force's job is to recommend to the governor priority actions that could improve conditions for the Southern Residents. The first set of recommendations are focused on actions that either 1) have an immediate benefit or 2) are both essential and feasible to implement now to provide substantial benefits in the near to longer term.

Regarding the 4 lower snake river dams, the Task Force seeks to understand the potential increase in prey and associated timeframe for that potential increase that would result from dam removal. The webinar is intended to bring forward the facts and best available science to answer these questions. We recognize, however, that there is uncertainty regarding the impact of dam removal on prey and that there may be differences of opinion on how the process works, costs, and other underlying assumptions and variables. Therefore, we have invited a mix of practitioners, experts, and advocates to participate in the webinar.

We also recognize that the context - the costs and benefits of dam removal to other interests including irrigators, agriculture, and power users - is important and relevant as the Task Force makes its decision about what to recommend. Accordingly, we are inviting representatives from different stakeholder groups to participate as well.

In sum the webinar will focus on providing Task Force members with 1) an objective fact-based understanding of the process associated with dam removal and the science regarding potential increase in prey and consideration of unintended consequences; and 2) a general understanding of some of the different stakeholder perspectives and interests associated with the issue of dam removal.

Questions

Please provide written answers to the questions below where you either have a particular expertise or advocacy position. Please do not feel compelled to answer all the questions – only those that are pertinent to your expertise or interests. Answers from the panelists will be collated and provided to the Task Force. In the webinar we will focus the discussion on a subset of the questions with an emphasis on those questions that appear to have the widest disparity in responses.

Thank you so much for taking the time to assist with this important effort!

The Process of Lower Snake River Dam Removal

(Note of Clarification: The term “removal” is often taken to mean or suggest removal of all of the dam structure, Power House, Spillways, Lock etc. However, the Corps of Engineers Feasibility study and EIS completed in 2002 clearly shows that this is not necessary to achieve a free flowing river and fish passage through “channel bypass”. What is “removed” is the earthen portion of the dams and for the lower two dams some of the earthen abutment to achieve required channel width. Indeed, the cost of full removal would be over \$3 Billion, which would make breaching infeasible from an economic standpoint.)

1) What current process is underway to examine the issue of dam removal?

As a result of a 5th failed Biological Opinion the Federal court ordered the National Marine Fisheries Service, the Corps of Engineers, and other federal defendants to develop a new BiOp and Environmental Impact Statement, (EIS). Commonly referred to as the CRSO process (Columbia River Systems Operation Review) it has a massive scope covering all 17 Federal Dams and the entire Columbia basin (except for Canada). Corps staff and retirees who worked on the original CRSO review, (this review quickly focused on a study of the four lower Snake Dams that led to the current EIS in 2002), view this scope as too large to execute at any reasonable budget or in a time frame less than 8-10 years, if ever.

HOWEVER, The ongoing litigation over this BiOP and the Court’s order for a new EIS process *does not limit or constrain the Corps* from acting in the meantime to accelerate salmon and steelhead recovery via breaching and channel bypass. The January 2017 letter from the Assistant Secretary of the Army for Civil Works (ASACW) confirms that the Court’s (Judge Simon’s) direction for a new and broader NEPA process is a separate action, meaning it does not prevent the Corps from exercising its responsibilities to comply with existing law and regulation today. In other words, it is not a "get out of jail free card" to avoid any action until a new EIS comes out, which is probably 4-6 years away, since the new EIS will be a “programmatic” type for the entire Federal Columbia River Power System (FCRPS). Should breaching the 4 LSRDs be included as one of the many alternatives in the Programmatic EIS and a decision, through yet another process, be made to develop a breach plan, a specific EIS would have to be prepared. By then the endangered Southern Resident Killer Whales (SRKW), chinook and other salmonids, and steelhead will have have long since degraded to functional extinction.

a. **What entity is running the process and why was that entity chosen?**

The Corps and BPA are primarily funding and running the process. The Corps because they built and operate the dams and are responsible for insuring they meet Congressional intent, ie, economic benefit and conformance to all federal laws and state water quality standards, among others. The BPA because they must pay for 92% of all cost associated with the dams since they sell the hydro power to rate payers. They also have an interest based in the 1980 Power Planning and Conservation Act which makes them almost entirely financially responsible for mitigating environmental damages caused by the dams and reservoirs.

b. **When did the process start and when is a decision expected?**

It began around September 2016. The judge granted the agency request of 5 years for completion of the EIS. However, given the vast scope of the EIS, it will have hundreds of possible recommendations for Habitat, Harvest, Hatcheries, and Hydro actions where federal agencies have responsibility, so will be a "Programmatic Type" EIS. Assuming there is a breach alternative for the 4LSRD's in the EIS, and it is decided to further study it for implementation, a separate site specific EIS, like the one the Corps is using now for mitigation on the dams, will need to be completed. This could take another 6 months if the existing EIS is used. So, a breach decision, if any, following this process could easily take another 4-6 years. This does not include any delays. Corps technical staff are already insisting that modeling will take another year since the hydro alternatives for the lower Snake Dams are still in debate, primarily because breaching is contentious by upper management who still insist that no alternative that eliminates navigation can be considered. (Rebecca Weis, COE, Comments at the CRSO status conference in June 2018)

c. **How much will the process cost?**

In 2016 cost estimates were \$40 million BPA and \$40 million Corps. However, as noted above given the scope and delays already noted, a reasonable estimate is likely over \$120 million. This is based on my past experience managing the 2002 Feasibility Study/ EIS and consultation with NEPA specialists within the Corps and the Environmental Protection Agency (EPA). As a point of reference, the 02 FS/EIS took \$33 million and 7 years, but was quickly focused during the system operation review of the lower Columbia and Snake River dams to the 4 lower Snake River Dams. Nor, did it look at the other H's, so it is not hard to imagine the infeasibility of the new CRSO/EIS process achieving anything useful for SRKW and Snake River salmon recovery.

2) **What are the steps involved in gaining approval to remove the dams?**

If the existing 2002 EIS is used, it is a simple matter of writing a new Record of Decision (5-10 pages) which the Commander of the Corps Northwest Division, MG Helmlinger then would sign. This is possible because The Corps has a fiduciary responsibility ultimately derived from the Public Trust Doctrine to protect the public interest and to fund only beneficial projects as measured by National Economic Development benefit-to-cost ratios (BCR) that exceed 1. That means for every dollar spent, at least one dollar in benefit is returned. The 4 LSRDs have a combined BCR of .15. That means the 4 LSRDs are returning only 15¢ for every \$1 invested. This compares to projections that a free flowing lower Snake River could return at least \$4 for every \$1 invested.

Protecting the public's interest means the Corps can place an underperforming project, such as the 4 LSRDs, into a "caretaker" or "non-operational" status. This does not require a specific or new authorization from Congress to do so. Nor does it require that the project be "deauthorized" by Congress first. The underlying reason for this is that a project "authorization" is not a mandate. It gives the Corps *permission* to build and operate a project for specific purposes as long as it provides economic benefit, conforms to other applicable laws and policies, such as the Endangered Species Act, and receives appropriations. When one or more of these criteria is not met, the Corps does not have permission to build or to continue operation. So, the Corps has an inherent responsibility to make the decision to place these dams into a non-operational status. It is Corps policy to "notify" Congress of their intent to close a project. Traditionally the Corps works closely with members when such closures are required.

Importantly, the Corps would be loath to have a policy that would require authorization from Congress to stop spending money on a project, decommission, or place it into a non-operational status as it would make it impossible to make budget decision across the Corps when there are insufficient appropriations. This has been the case for 200 years. For these reasons, if Congress tried to write legislation to somehow mandate the uninterrupted operation of a project it would violate the principles of congressional authorization versus appropriations. HR 3144, sponsored by Congresswoman Cathy McMorris-Rodgers, may indeed be an attempt to do so and is likely motivated by her realization that the Corps can take action to place the 4 LSRDs into a non-operational status.

However, It is also a long held cultural or institutional norm for local Corps districts and divisions to ignore the economic reality of a project, and, instead, go to great lengths to defend the project. This is understandable to some degree, since the Corps district offices are trying to protect their budget and livelihood. But this does not conform to the Corps' stated values toward public service and avoiding squandering taxpayer dollars, nor does it comport with the Public Trust Doctrine. Compounding this problem are the special interest groups or a small number of individuals who can parlay oversized influence with elected officials by

claiming that the Corps will somehow damage locals by asserting fiscal responsibility and placing the dams into nonoperational status.

Congressional representatives and governors are often reluctant to support decommissioning a project by placing it into a non-operational status for fear of being perceived as taking something away from their constituents. This leads to frequent arguments between the Senior staff in Headquarters US Army Corps of Engineers (HQUSACE) and the Assistant Secretary of the Army for Civil Works (ASACW) on one hand, and the Corps field commander/staff and elected officials on the other hand, who are not faced with the budget priorities and limitations directed by the Office of Management and Budget (OMB). In short, there is never enough money to fund even high performing projects. And with the administration trying to further reduce the Corps' Civil Works budget, the Corps should be particularly attentive to eliminating poor performing projects in the manner proposed in this paper. Therefore, given the geographic relationship of Washington State Senators, Congressmen and the Governor to these dams and the ongoing ideological log jamb, the Corps would be reluctant to make a decision without some "ask" or "pressure" from said elected official or officials. In this case most notably, Governor Insee through his actions establishing the Orca Task Force looking for meaningful solutions to increasing chinook.

If, the court ordered CSRO is followed through, the above steps would also be used, but at least five years from now.

- a. Who has the authority to authorize removal?

As stated above, the US Army Corps of Engineers has the authority

- b. What agencies need to be involved in the decision?

The Corps and BPA. BPA, because they would need to fund the breach costs and mitigation features resulting from the drawdown of the reservoirs.

Assuming the 2002 EIS is used as the NEPA documentation, all other relevant agencies, Tribes, NGO's and the public have already played a role in this process. This is what led to the four Alternatives in the 2002 EIS. Breaching being the 4th Alternative. Which, for many years, has been the only remaining Alternative that could recover chinook and play a key role in quickly providing prey resources for the SRKW's.

- c. What role do Tribal Nations and other entities, including State of Washington play in the process?

As noted, from a formal NEPA engagement process they have already played a role. Today, they can and should play a role in pressing the Corps to utilize the existing 02 EIS to implement the breach Alternative immediately, if SRKW's are to gain the benefit of the 100's of thousands of chinook that will keep them alive as well as sustaining Tribal and state fisheries.

- d. How long might the process of gaining approval take?

If the 02 EIS is used to place the projects into a non-operational status, a matter of days. IF, another process is used, like the CRSO process and/or asking for legislation and federal appropriations, years to decades.

3) What are the steps involved in removing or decommissioning the dams?

Other than the decision process noted above, the first step would be to notify the public and shippers of the Corps intent to breach one or more dams and that the existing navigation project will be closed. This would require that vessels be moved downstream or hauled out at existing boat ramps. The original Navigation Project has a 5 foot depth so boaters able to handle those drafts could move their vessels upstream prior to drawdown so as to avoid being stranded. Existing boat ramps on the Snake and Clearwater Rivers above the pool of Lower Granite will still be useable.

It is likely that some group will file an injunction in Federal Court to stop the Corps from breaching. In such cases, where the urgency is the paramount driver in terms of timing this will be decided quickly. If properly defended in Court, it is doubtful that the injunction would be successful given the ecological/NEPA history, the use of an updated EIS, the fact that economic mitigation measures are included and the risk of significant natural resource damage if the Corps is not allowed to use its inherent discretion to act. It should also be noted that according to the White House Council for Environmental Qualities guidance on agency discretion in such matters, if the action is driven by an emergency situation, as in this case, an EIS can be developed or updated in parallel or after the action is completed. So, the 2002 EIS' even in its existing state, is far more NEPA coverage than is really required. Therefore the Corps has a highly defensible argument if properly represented in Court and the supporting documents and data.

Breaching itself is far easier than originally planned, making it possible to move from a decision to breach to breaching in a matter of months, not years.

Given the relative ease of hydraulically breaching an earthen embankment, there is no need for lengthy modeling, engineering, design or complicated/lengthy contracting. New, "dam overtopping", modeling software has been developed since the 2002 EIS was drafted which allows a safe breach plan to be created quickly. The breach itself is done in two phases. First, as drawdown of the reservoir is taking place, earth moving equipment, likely two D8 bulldozers and an excavator, will be cutting a notch in the earthen portion of the dam. When drawdown is below spillway crest and the notch cut to that depth, controlled hydraulic breaching will begin which uses the turbine gates to control flow. This takes approximately 8 hours with maximum flows not exceeding high flows normally encountered during spring runoff. Armoring protection and other channelization work can also be accomplished with several pieces of heavy equipment. The entire deconstruction effort can easily be accomplished through

“Time and Materials” or rental contracts. Details to the breach approach can be found in the 18 Feb 2016 Supplement (unofficial) to Appendix D Natural River Drawdown Engineers of the 2002 EIS. In short, what the Corps’ Walla Walla District originally estimated would take several years in modeling, engineering, design and contracting and well over \$70 million, can be done in a matter of months for around \$1 million.

a. Who will be responsible?

The Corps of Engineers, most likely the Walla Walla District Commander.

b. What mitigation/restoration is likely to be needed, if any, as part of the process?

The 2002 Feasibility Study and EIS (FS/EIS) addressed all imaginable mitigation and restoration concern in terms of regional and national economic costs or benefits. In most cases it included any mitigation cost as part of the breach plan and budget. Examples of the mitigation features assessed are: Irrigation modifications for 14 farmers on Ice Harbor pool (the 4th dam to be breached), shifting truck-barge shipments on the river to truck-rail, cost of replacement power, relocating Clearwater Paper Companies cooling pond out fall, relocating boat ramps, cultural resource protection, etc.

In terms of restoration, the fact that breaching allows for full restoration of the 140 mile stretch of the lower Snake River to a pre-dam state. That is the main restoration feature. Others include seeding the exposed riparian areas during drawdown to reduce erosion from rainfall that might expose cultural resources, reduce dust, and provide forage food for deer and elk. Another major feature of restoration could be allowing return of agriculture, such as the viticulture and orchards that once occupied roughly 10,000 of 20,000 acres now covered by the reservoirs. However, the Corps left out any benefits associated with this (1,000 jobs and \$100 million annually based on reclamation of 5,000 acres) so no restoration plan was developed to show how much riparian buffer to reestablish. Such a plan for land conveyance and use should be undertaken in parallel to breaching.

c. Who will pay for it? Are any financial commitments secured?

The mitigation features and costs identified in the 2002 FS/EIS and updated over the last 3 years, get paid for in two ways. First, mitigation features such as power replacement and navigation were not incorporated in the 02 EIS as part of the funds needed to breach. This is because shifts in National Economic costs and benefits are used for calculating the Benefit Cost Ratios (BCR) between alternatives and may not be something the taxpayers could pay in a straightforward way. Nevertheless, to some degree they represent real cost and benefits to someone and I have incorporated them into the breach cost. The second way the 02 FR/EIS these mitigation costs are accounted for is in the breach cost itself. Except for power, navigation and irrigation, they were all

included in the breach cost estimate and validated in 2016 by a small team of current and retired Corps employees and volunteers in the Reevaluation and Supplement Report to the Drawdown and Engineering Appendix of the 2002 FR/EIS. These cost were then pulled into the updated economic analysis and Benefit/Cost Tables by EarthEconomics. These reports are available at damsens.org.

Who will pay? In theory, power mitigation, that is replacement if needed, would be BPA via its rate payers. At the time of the 02 FR/EIS this was modeled by BPA to be around \$271 million on an average annual basis. However, because the Corps and BPA did not adequately anticipate the shifts in the power markets driven by: deregulation; conservation, which reduced demand; wind and solar which added nearly an equivalent amount of power to BPA hydro power.....all of which created a massive surplus of power which is sold mostly at a loss for the last 5-7 years...now combined with accelerating escalation cost for repairing and rehabilitating hydro projects, leaves us with *virtually no mitigation costs for anyone, with breaching. Indeed, breaching saves money for BPA* that should result in rate decreases or applied to other hydro projects which has a similar, but indirect, effect on rate reductions.

For navigation, the economic effects for shifting to rail was assumed to cost \$27 million on annual average basis if commodities were shipped by rail. However, the 2002 FR/EIS itself showed that there was sufficient evidence to conclude that there was virtually no economic effect by shifting to rail, but this conclusion was not drawn due to a lack funds to recalculate the BCR based on input from navigation economists contracted to field verify the original calculations generated by models. Since then, and largely driven by the fact that in most cases there was little difference between barge and rail rates, several significant strides were taken that have already shifted all petroleum shipments and 30-40% of the grain to rail shipments. Farmer CoOps built two 100 car unit train grain loaders in the lower Snake Region and are building a third only a few miles from the river; the rail lines along the lower Snake River have been upgraded to class 1 and 2 standards allowing more economical shipments from Lewiston to barge loading facilities on the Columbia or grain terminals in Portland Oregon; the State of Washington's "Grain Train" has grown from a small shuttle service of 30 cars to over 110 and have upgraded most of their rail lines. It is noteworthy that this shuttle service delivers most of the grain to a loading facility built after 2002 on the Columbia River that loads it onto barges. Because prodam advocates often state, albeit erroneously, that barge traffic has not declined on the Columbia/Snake system, this shift from the lower Snake to the Columbia gets ignored. From an

economic standpoint the Snake projects are separate from the Columbia. Similarly, petroleum shipments through the lower Snake navigation leg have ceased even though there is a viable and growing terminal at river mile 1 on the lower Snake, but it is not affected by breaching. These improvements have all been market driven and show that the conclusions drawn in the 2001 FR/EIS were wrong, even though data in the report showed otherwise. This analysis has all been updated by my work and that of EarthEconomics.

There are however further improvements that could be made to expedite the transfer of the remaining grain shipments to rail. They are; a \$29 million repair/upgrade of for the rail line between Dayton and Prescott WA owned by the Port of Columbia; Rail siding improvements and handling facilities at grain elevators and perhaps a unit train loading facility along this line, \$5-37 million; upgrade of 2 miles of rail line in Idaho to the Lewis and Clark Grain Terminal along with expansion of siding and handling facilities, \$5-32 million. Total improvements range from \$40 to \$98. Now that these mitigation cost are known they should be included in the total cost of breaching.

For irrigation, the 02 FR/EIS provided an estimate of \$291 million to modify the irrigation system as a result of drawdown of Ice Harbor pool. This was twice the assessed value of the farmland. As such the conclusion was that these 14 or so farmers would be bought out, no doubt leading to their antagonistic view toward breaching. However, it was known at the time the \$291 million was very speculative and based on faulty assumptions, but again, corrections were not made for the lack of more study funds and time. In recent months water supply engineers have recalculated the cost of pump and pipe modifications and found that in current year dollars it would cost \$19 million. Because available pipe and pump sizes inevitably lead to larger system capacities, these mods will allow for the irrigation of an additional 5,000 to 7,000 acres, further driving up farm employment and income not accounted for in the original 02 FE/EIS. The \$19 million should be part of the breach cost.

d. **How much might this cost?**

The breach costs themselves will be about \$170 million for all 4 dams. When contingencies for rail relocations and repairs, abutment armoring, channelization dikes and the additional rail and irrigation mitigation features noted above it will bring the full-up cost of the breaching of all four dams to around \$400 million. It should be noted that the first two dams to be breached would be about \$40 million for the breach costs alone. Compare that to the study costs for a new EIS.

e. How long might this take?

If a decision were made quickly, it is still possible to breach the first two dams in the in-water work window between December 2018 and March 15 2019. The remaining two dams could be breached one per year thereafter afterwards or two in one year for an additional \$15 million. The object of quickly breaching 2 dams is to prevent the death of 4 million chinook smolts in 2019, the fastest way to deliver several hundred thousand adults to SRKW while not harming and most likely benefiting the fishing industry.

4) Why have prior environmental reviews (NEPA, EIS, etc.) not concluded with breaching as the preferred alternative?

The 2002 EIS did conclude that Alternative 4 breaching provided the highest probability of meeting the survival and recovery criteria. Note the below statement from the 2002 FR/EIS.

“Overall, PATH results indicate that the chance of meeting NMFS survival and recovery criteria for the four listed species under **Alternative 1 (do nothing) would likely be the same or slightly better than Alternatives 2 and 3.** Alternative 4 provides the highest probability of meeting the survival and recovery criteria under the PATH analysis. Both the CRI and PATH analyses indicate that further improvements in the hydrosystem passage system are **unlikely to recover listed Snake River stocks** unless there is an improvement in juvenile fish survival downstream of Bonneville Dam, either through such factors as improved fish conditions or improved timing of entry into the ocean” (Page 25 of the Summary document of the 2002 FR/EIS)

Also note that the Corps, with “support” from BPA and elected officials, chose a combination of Alternatives 2 and 3, at an estimated cost of \$351 million, that were going to have less benefit than doing nothing else to the dams. This choice, even though recommendations within the Corps to proceed with breach plans were ignored. This decision was largely based on the conclusion that in the face of “devastating” economic costs of breaching, it was not necessary at this time. The economic effect of breaching, given in 15 public meetings, the draft and final FR/EIS, was around \$246 million on an average annual basis. Truly a case of “Sticker Shock” for Breaching. But as noted in the discussion above and using corrected assumptions for the cost of breaching and of dam operations, maintenance, repair and rehabilitation costs, the economic effect should have been stated as a \$69 million *benefit* with breaching, a “game changing” error of over \$300 million average annual. The \$69 million breach benefit still included a \$271 million power replacement charge, which is now known to be unnecessary, thus putting the breach benefit at \$340 million average annual (\$69 plus \$271).

The costs of implementing, what was know to be pointless Alternatives, are now reaching \$1 Billion with the predicted results of no recovery, indeed further declines.

The Impact on Prey (Chinook) Availability

5) What is the estimate - informed by best available science - of potential increase in Snake River chinook availability as a result of dam removal?

- a. How many additional Snake River chinook are estimated on an annual basis? Starting when and what were the assumptions at arriving at the estimate?

Based on the fact that roughly 20 million juvenile chinook enter the lower Snake system, and that each LSRD *and reservoir* kill on average 10% of them. Then breaching 2 dams immediately will prevent the destruction of about 4 million smolts, aged 9 to 14 months depending on run, in 2019. Of these, several hundred thousand will make it to the size suitable for SRKW 14 to 18 months later, ie., Spring, Summer and Fall runs of 2020. Four dams, would add at least a million chinook to the ocean environment. It should also be noted that the 2002 FR/EIS Appendix gave SAR's for Spring/Summer and Fall chinook at 11% and 31% respectively with breaching, far greater than the SAR estimates generated the CSS models presented in the "Spill" Webinar. These high survival rates are show that wild fish can rapidly recover. However, as wild genes continue to be diluted by hatchery fish and overall number continue to drop, recovery in any meaningful time frame will not occur. For this reason, Corps technical members working on the CRSO Alternatives are now suggesting that if breaching the 4LSRD's does not occur shortly, then it will be necessary to not only breach these four but to drawdown to

- b. What baseline or status is used as the baseline to develop the future estimate, e.g. what was the annual number of Snake River chinook over the last 50 years and what was the historical (pre-European settlement) abundance and distribution?

Current numbers of smolts passing through the lower Snake hydro System. Estimates vary widely and depend on where the question of abundance is being asked. Obviously important for SRKW is how many were in the in the coastal areas of Washington where SRKW historically fed and now, do so much more often with the near collapse of the Frasier River stocks.

- c. What assumptions have been made to develop this projected estimate related to:

i. Hatchery production

The above 20 million chinook smolts is based on hatchery and wilds. Hatcheries comprise roughly 85% of this number. The hatchery fish come from the Compensation Plan or "mitigation" hatches to offset losses by the 4LSRD's. Mitigation will not be complete until wild runs are restored. So, these hatcheries will need to be a primary course of chinook for SRKW, but should be phased out as wild fish return.

ii. Habitat conditions – restoration needs, impact of upstream dams, etc.;

With breaching, habitat work to date and future work will have a benefit and should continue as part of a broadly based recovery strategy. Without breaching, it is being sub optimized. That is, too few fish survive to return to the spawning grounds in the restored habitats to warrant continued funding in the Snake basin. Furthermore, the food web in pristine habitats in Idaho and eastern Oregon are degrading because of a lack of biomass from returning adults. In the coastal areas and Salish Sea, habitat investments will also be sub optimized since these local stocks now represent a larger proportion of the prey and harvest base, thus reducing adult returns to spawning grounds.

iii. Other

Sediment movement during and after dam breaching has been and continues to be brought up erroneously as a negative impact that must be mitigated or would prevent breaching altogether. This issue was of course looked at carefully in the 02 FR/EIS and then again in the Dredge Material Management Study for the lower Snake River. This later, \$17 million study was done to determine the feasibility of maintaining the navigation channel through roughly 100 million cubic yards of sediment and depositing the dredged material from the navigation channel into the river chinook habitat. Extensive testing for contaminants and other factors showed in water disposal of this material would have no negative impact on aquatic life. This is the same material that would be exposed and moved downstream after breaching. Corps original studies show that this bed load movement is both natural and desired for chinook habitat. Sediment movement does increase turbidity but except for the day or two in which the hydraulic breach of the earthen embankment is ongoing, turbidity levels will not be harmful. Indeed, this turbidity is beneficial in that it hides juvenile salmon from predators. A further benefit from the finer material dropping out behind McNary Dam is it will cover or "cap" radionuclides that deposited during the days of active enrichment of nuclear material at Hanford. After all four dams are breached the heavier materials, sand and small pebbles, will drop out at just below the location of Ice Harbor dam. This will not have any effect on navigation at the Pasco ports at mile 1 of the lower Snake for at least 50 years. At that time navigation dredging similar to current maintenance dredging for the Ports of Lewiston and Clarkston may be required.

- d. **What costs, if any, might be involved to achieve the estimated benefits? (other than dam removal and mitigation addressed in question 3c)**

The Corps cost for a Section 216 Disposal Study to determine final disposition (ownership) of the 40,000 acres of land and the concrete dam structures themselves. Estimated at \$5 million. Transfer to the State would be typical but may take a while through this process. In the meantime the Corps does have the authority to lease lands for agricultural or recreational use.

- e. **What science or studies are referenced? When were those studies conducted?**

Primarily the 2002 FR/EIS which is available on the Corps Walla Walla District web page, under “library”. Numerous updates and corrections to the FR/EIS have been made and are posted on the damsense.org website as a matter of public information.

- 6) What is the relationship (status and trend) between abundance of Snake River chinook and abundance of SRKW and what data was used to conclude SRKW are highly dependent on Snake River chinook?**

Previous reports provided to the Task Force show that the relationship is historically, empirically and scientifically grounded. While many desire much more certainty as to the numbers of each chinook run consumed, what is clear without the need of any further research and the delays that would ensue, is that there is an important dependency. We note that NOAA recently produced a display showing sources of chinook contribution to the SRKW diet and noted that the Columbia and Snake rivers each contribute about 25% of the diet. While a collapse of even 25% from the Snake would lead to, indeed already is, SRKW deaths related to complications from malnourishment and simple starvation, the situation is even worse now with the virtual collapse of the Fraser river runs. Also, this percentage is based on runs over the last twenty years or so but does not take into consideration the much larger potential of chinook increases resulting from immediate breaching. The data is direct observation, NOAA satellite tracking, a few scat samples and process of elimination, if they are not eating Columbia/Snake Runs in their coastal foraging, then what could they possibly eat in numbers to keep them out there?

I also offer these comments about the relationship from Ken Balcomb:

To begin, I do not think that the SRKW were forced into a migratory behavior by the collapse of Fraser and other chinook stocks; rather, I think they have always travelled up and down the coast and into the Salish Sea “cherry picking” the Chinook salmon, but never staying in one location (e.g., off a major river mouth to gorge on all of the fish). In my experience, they travelled with pulses of inbound spawners from coastal waters through the Strait of Juan de Fuca and Haro Strait to Georgia Strait where they turned around and went back to or toward the coastal waters. They travelled at 3.75 knots and covered about 75-90 miles per day, in relaxed foraging mostly

during incoming tides when the fish were moving toward the river mouth. They were and are always moving. However, as the biomass of Chinook per square mile diminishes, the whales spread out in smaller groups and appear more “busy” - attending to foraging rather than entertaining whale watchers. Now they come into these waters much less often because the fish have collapsed.

The three pods that Dr. Mike Bigg identified in southern BC waters were called J, K, and L (A-I pods were in northern BC waters), and they were discrete and separate enough for us to discern slightly different patterns in their distribution and association. J pod was encountered in Salish Sea waters in all months of the year and made forays into Puget Sound once or twice each month. They were frequently seen in Haro Strait, and they passed through the strait every day or two from May through September when the seiners were fishing daily. From the seiners we obtained a pretty good idea of how many salmon were heading toward the Fraser River, and from the test sets we had an index of how many got to the river. It took us awhile and much scale sampling in trail of the whales to figure out that they were targeting Chinook, even during runs of millions of Sockeye and Pink salmon. The scat sampling and the molecular data show the same pattern.

During big runs of Chinook, K and L pods joined J pod in the interior waters, and in the late 70s and early 80s spent much of the May through September season going back and forth from coastal waters to the Fraser plume. We know they went as far out the Strait of Juan de Fuca as Swiftsure and La Perouse Banks because a colleague, Brian Gisborne, photographed them out there whenever they were not with us in interior waters.

The satellite tagging studies of SRKW by Dr. Brad Hanson showed much the same pattern, and also illuminated the pattern particularly for winter months. L pod was most coastal in distribution, spending much time off Washington State, particularly in and north of the Columbia River plume; but, occasionally traveling for a week or so down to central California (Sacramento/San Joaquin fish). K pod sometimes went with them, but in general seemed to range intermediate between L and J pods. They were always moving at 3-4 knots, but sometimes in circles or polygons.

Because the SRKW must eat the equivalent of about 2.5-5% of their body weight pretty much daily, the coastal waters were and are important foraging areas for all three pods, but we have not documented J pod south of Newport Oregon. In total, they probably eat as many as 580,000 twenty pound Chinook per year, and we can probably calculate when and where they dine for the past. I am sure that we can come up with the Salish Sea contribution to their diet, and the rest is coastal. But, the take home message is that they go where the fish are, and they find the energy rich big ones. I am working on this from the whales' point of view, and their distribution shows me that the WA coast/Columbia/Snake contribution is vital. IF the Snake became a big wild Chinook producer again, that would be a huge benefit.

7) Why the emphasis on the 4 lower snake river dams and why not other dams, especially those that have no fish passage?

Notably, CRSO reviews in the 1990's looked at this. Major dams without fish passage such as Chief Joseph and Grand Coulee are very high head dams that makes fish passage extremely expensive, especially in light of their irrigation and flood control functions. The 4 LSRDS are not flood control dams. Idaho dams were looked at but because they are non federal were not assessed through Corps studies and the EIS. The Idaho Hells Canyon dams are undergoing FERC relicensing but this could take years. Also the uppermost dam has significant containments behind it and the historical habitat above these dams has been heavily impacted by agricultural practices,

Other Considerations

8) What is the potential impact of dam removal on:

a. Agriculture and irrigation

Impacts are positive for both as noted above

b. Transportation sector

Other than those noted above, a small number, less than 10, barging jobs will be lost but about the same amount will be hired due to increased rail traffic.

c. Energy production and cost

As noted above, dam breaching reduces surplus power by about 17%.

Surpluses are selling at a loss to BPA and its ratepayers. The 4LSRDs are twice as expensive to operate the Corps Chief Joseph dam on the Columbia which produces twice the amount of power of all four Snake Dams. Over a recent period of 93,000 hours of power production from the 4LSRD's only 2 hours were actually used by BPA customers,

d. Recreation

A review and update of the recreational analysis done in the 02 FR/EIS by Earth Economics show that the Corps left important analysis by the recreational economist. What this analysis would have shown is that the recreational benefits would produce 3,000 to 4,000 full and part time jobs in the six county area along the lower Snake River in Eastern Washington. This yields direct expenditures of approximately \$250 million per year. Claims by the Corps Walla Walla District of 2.8 million visitors currently is absurd. As a point of reference, Yosemite National Park gets a little over 3 million visitors and any one who has visited this park in the summer will have an idea what this kind of visitation looks like. For decades visitation at lower Snake recreation facilities has been so low that neither the Corps, the State or the Counties could justify the expenses to keep them all open, several have closed. Free flowing river recreation recreation and fishing combined with viticulture, orchards, wineries, country inns, restaurants, trails, etc., with multimodal transportation options can yield a tourism renaissance of these counties

e. CO2 emissions

- f. Reservoirs emit methane which is 85% more potent than CO₂. The 4LSRDs emit about 45,000 equivalent tons in CO₂ emissions from methane on a constant basis, which is several times more than any increase in CO₂ emissions resulting in a shift from truck-barge to truck-rail. The idea that thousands of trucks will be added to roads and CO₂ emissions is false.

9) What potential mitigation costs are associated with dam removal to address the adverse economic impacts on affected sectors?

- a. Have any financial commitments been made to cover these costs?

Unlikely, since no Government Agency, elected official, NGO or Tribe has pressed for immediate breaching.

- b. What assumptions or expectations do you have about how those costs would be covered?

Breaching can be financed through existing debt reduction and credits mechanisms as a fish mitigation action by BPA. New appropriations are not needed. Since BPA is the responsible bill payer for 92% of the cost of these four dams, BPA is responsible for at least 92% of the breach cost. (The 92% is an average. The cost share ranges from 98.4% for Lower Granite dam to 78% for Ice Harbor dam.) However, if BPA sought to pursue breaching the 4 LSRDs as the most cost effective “fish mitigation” measure for salmon and steelhead recovery under the 1980 Power Planning and Conservation Act, BPA can book a 22% credit against the US Treasury debt on these dams. This has the added advantage of avoiding any of the appropriation and authorization conundrums involved in attempting to get Congress to act.

Another financial component concerns the debt and debt service resulting from these 4 LSRDs. Given the failed alternatives selected by the Corps in the 2002 EIS and the nearly \$1 billion spent since 2000 on these failed alternatives, e.g., little or no improvements in Smolt to Adult Returns (SARs) for salmon and steelhead, BPA ratepayers have a good argument for not repaying this debt nor the interest bearing on it. Likewise, Corps’ mitigation expenditures on the 4LSRD’s prior to signing the EIS yielded few if any sustained recovery benefits. Therefore, these expenditures also should be exempt from repayment by the BPA ratepayers. Ratepayers should not be held accountable for the decisions made by the Corps, especially in light of the fact that over 80% of the individual comments made/sent to the Corps in 1999 supported dam breaching. While BPA has been slow at paying down its debt burden, presumably because it would significantly increase power rates, BPA must make timely interest payments to the US Treasury. These interest payments alone account for about 25% of BPA’s cost to operate, maintain, and repair the 4 LSRDs and bypass systems (mitigation), and will continue to increase without debt relief.

This approach of using \$1billion in debt relief could not only finance all breaching and mitigation cost, but could also fund additional habitat work and hatchery transitions or phase outs.

However, the economic analysis that shows that BPA can save money on breaching assumes they pay 100% of the breach and mitigation costs with ratepayer funds. Treasury credits ranging from 22%, easily done, to 100% are additional benefits.

<http://www.nww.usace.army.mil/portals/28/docs/environmental/lrstudy>