

Conservation of Columbia Basin Fish
December 15, 1999 Public Information Meeting
DoubleTree Hotel, Spokane, Washington

MEETING SUMMARY

Summary of Presentations

Overview on All-H Process

Meeting facilitator Donna Silverberg welcomed the group to what she said would be the first of a series of public meetings to be held by the Federal Caucus agencies on the conservation of Columbia Basin fish. Today the purpose of the meeting is to give members of the public a preliminary opportunity to hear about Federal Caucus activities and progress to date, she said. Silverberg indicated that formal public hearings would begin early in 2000.

Donna Darm of the National Marine Fisheries Service (NMFS) said the focus of Federal Caucus efforts is to conserve the fish of the Columbia Basin, including salmon and steelhead, resident fish, and other species. This is an entire ecosystem problem; it's not just about salmon and steelhead, she explained. Darm pointed out that the name of the Federal Caucus working paper has been changed to the "All-H paper," in response to concerns expressed by the 4-H Club about calling it the "4-H paper."

Darm said important decisions about the operation of the Columbia River hydropower system are coming up. Currently the system operates pursuant to a Biological Opinion issued by NMFS in 1995, under Section 7 of the Endangered Species Act (ESA), she noted. In the 1995 opinion, we said we didn't have enough information to know whether removal of Snake River dams was an essential part of recovery for Snake River salmon and steelhead stocks, Darm indicated. We said we would have more information by 1999 and that we would revisit the issue then and provide an answer, she said.

Darm pointed out that the Northwest Power Planning Council intends to revise its fish and wildlife plan in 2000 and that process is on a parallel track to the efforts of the Federal Caucus. NMFS will conduct a new Section 7 consultation and issue a revised Biological Opinion sometime next spring, she said. A Section 7 consultation is initiated as a result of a Biological Assessment from the three federal agencies, the Bonneville Power Administration (BPA), the U.S. Army Corps of Engineers (Corps), and the Bureau of Reclamation (Reclamation), that operate and market the power from the federal hydropower system, Darm explained. The Biological Assessment will come out this month, and that will begin the consultation process, she noted. The U.S. Fish and Wildlife Service (USFWS) will be doing its own consultation on resident fish species and will issue its own separate, but coordinated Biological Opinion, Darm added.

A final important element in the process is the tribes, Darm said. Salmon and steelhead are a trust resource of the tribes, and the tribes have rights to fish for salmon and steelhead in the Columbia Basin, she stated. Tribal rights and the federal trust responsibility are very important elements of what is going on here, Darm said.

Darm explained that in trying to determine whether a proposed Federal action would jeopardize the continued existence of a listed species, NMFS looks at what might happen in every part of an animal's life cycle. She explained the four Hs -- habitat, harvest, hydropower, and hatcheries -- that affect different stages of the salmon's life cycle.

In deciding whether the operation of the power system will jeopardize the continued existence of a species, NMFS asks such questions as, what do we assume about harvest in the future? What do we assume about future hatchery production? What do we think habitat is going to look like? You can't just look at one action in isolation, Darm said.

People tend to focus on the Snake River because the debate has been about the removal of the Snake River dams, but this is not just a Snake River problem, she continued. There are threatened and endangered salmon and steelhead runs throughout the entire Columbia Basin, Darm said. In addition, there are resident fish species that are at risk of extinction in the basin, Darm pointed out. There are also five species of snails in Idaho that are listed, she said.

Darm showed a map of the Columbia Basin dams and discussed which fish have to go through which dams to get to the ocean. There are also listed fish that don't have to go through any Columbia River dams, she noted.

Witt Anderson of the Corps of Engineers said that the Corps would release its draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement (EIS) on Friday, December 17. He said the documents would be available on this website: www.nww.usace.army.mil. The All-H paper and the Biological Assessment are also going to be released Friday, Anderson stated.

Anderson explained the background of the feasibility report and EIS. In the 1995 Biological Opinion, the Corps was asked to look at the engineering feasibility, economics, and environmental requirements that would be associated with making major changes in the configuration and operations of the four lower Snake River dams in order to avoid jeopardy to, and effect the recovery of, the listed fish stocks, he said.

Anderson described the four alternatives in the EIS. The first, he said, is "existing conditions" or the status quo, which is how the Corps currently operates the four dams. The second is "maximum transport of juvenile salmon," using existing facilities with some modifications to collect as many of the juvenile migrants into trucks or barges for transport downstream below Bonneville Dam, Anderson explained. The third alternative is "major system improvements," keeping the dams in place and emphasizing new collection technologies and bypass systems to improve conditions for fish, he said. The fourth alternative, "dam breaching," would mean removing the earthen embankment

section of each dam and eliminating the reservoirs behind the dams to get to a free-flowing river, Anderson said. There would be no hydropower production or navigation as we currently know it through the lower Snake River, he explained.

The draft EIS does not identify preferred alternatives, Anderson said. The Corps thinks the information is complex and controversial enough that it would better serve the public interest to engage the region in a dialogue on the analyses before recommending a course of action, he stated.

After the public meetings, we will pick a preferred alternative and issue a revised draft EIS, Anderson said. Then there will be one more round of public comment, which will probably be in late spring or summer of next year, and that would be followed by a final EIS, with a final decision perhaps by late calendar year 2000, he stated.

Darm explained the responsibilities of the nine agencies that make up the Federal Caucus and the processes they are carrying out. Each has a different piece of the problem, and each brings a different perspective on the problem to the Federal Caucus table, she stated. Darm noted that the Northwest Power Planning Council has tentatively agreed to hold joint public hearings with the Federal Caucus.

Charles Alton of BPA gave a brief presentation on BPA's programmatic EIS and the National Environmental Policy Act decisionmaking process. He noted that the EIS team had been conducting prescoping activities for the EIS and working with the Federal Caucus and Framework groups work over the past year. The EIS is being written to work in conjunction with the Federal Caucus All H Paper and the Power Council's Framework Process in order to allow BPA to be able to implement the outcome of these and other regional processes associated with the fish and wildlife recovery effort. The EIS will rely on the technical data developed in the All H and Framework papers. It will be a policy level document so that the greatest flexibility and understanding is available to cover the broad perspectives of the region on the recovery effort. The official Notice of Intent to prepare an EIS was released in the Federal Register on October 20, 1999. The public scoping meeting is being scheduled for in February of 2000. Charles offered copies of the Notice of Intent all participants.

Presentation on Cumulative Risk Initiative

Michelle McClure, a biologist for the Northwest Fisheries Science Center at NMFS, presented an overview of the biological analyses that will be used to support the upcoming decisions. NMFS is using a new approach, the Cumulative Risk Initiative (CRI), she said. The Plan for Analyzing and Testing Hypotheses (PATH) analyses for the Snake River stocks is completed, according to McClure, and is taken into account as part of the All H Paper. CRI analyses are due for the remainder of the stocks on various time schedules, she said.

A model is a way we organize our thoughts – a model doesn't present you with the answer, McClure observed. It's a way we organize the data and come up with our best projection, and as everyone knows, projections are fraught with uncertainty, she said.

NMFS drafted its Anadromous Fish Appendix in April, McClure explained. It was based entirely on PATH analyses because they were the only analyses that had been completed at the time, she said. We submitted it for review to the Independent Scientific Advisory Board (ISAB) and other groups and received a lot of comments, McClure noted. We have now added the CRI analyses to complement the PATH analyses, she said.

The PATH approach uses a life-cycle model to project future performance of index stocks in the Snake River Basin and indicates the likelihood of meeting specific survival and recovery goals, McClure stated. In general, the PATH results are fairly optimistic, she said. One reason is that they assume density dependence, which is a biological phenomenon where, when there are smaller numbers of fish and the fish are at lower densities, more fish are recruited, McClure said. So when you get the smaller numbers of fish, you have higher improvement, she stated.

The ISAB said that the response variables in the Anadromous Fish appendix, which was based largely on PATH, were difficult to understand, McClure reported. The ISAB was concerned about what appeared to be a drift toward delay, without a clear assessment of what the extinction risks were of delaying decisions, she said. The ISAB also thought the analyses were too "hydrocentric," too focused on the hydro system to the exclusion of what is happening in the other Hs, McClure stated.

In response, NMFS developed the CRI approach, she said. The CRI is not a single model; it's a set of very standard analyses and a pretty logical approach to looking at salmon populations, McClure stated. The first thing we do is calculate a risk of reaching a certain threshold, and the threshold we've chosen at this point is the risk of reaching one fish returning in one year, she explained. Next we look at how much change in the population growth rate would be needed to alleviate the risk of extinction for these stocks, McClure said.

The CRI uses a matrix model to identify the life stages where there is the largest mortality, she continued. If we want to reduce the risk of extinction, increase population growth rates, and reduce uncertainties, we want to direct our efforts to where we can have the biggest effect, McClure said. There's no point in directing our efforts toward something that is supporting a life stage that is not going to have a large impact on overall population growth rate, she stated.

Finally, we determine whether specific management actions can actually achieve the increases in population growth rate that we see, McClure said. For some management actions, we have an idea about how much survival will increase population growth rate, but for other management actions, we don't, she stated. We need to do additional feasibility analyses to look at, for example, if there is this kind of habitat change across

the landscape, what would that mean to salmon populations, McClure said. If we have changes in another H, what would that mean for salmon productivity, she said.

McClure offered some cautions about the CRI approach. The extinction risk estimates are based on a simple model, which means we may overestimate or underestimate extinction risk for a number of reasons, she continued. The CRI gives you a general measure of how badly the stocks are doing, McClure said.

Recovery goals for the stocks still have to be set, she noted. NMFS has released a paper that looks at what biologically is necessary for a salmon population to be self-sustaining, and the recovery goals will incorporate many of the things in that paper, McClure said.

McClure said the PATH and CRI studies looked at seven index stocks for spring/summer chinook, and that PATH projects recovery from dam breaching, while CRI doesn't. PATH projections in general are more optimistic, she noted. We looked at different amounts of indirect mortality due to the hydro system, McClure pointed out. Indirect mortality is mortality that happens after passage through the hydro system due to stresses caused by going through the hydro system, she explained. PATH assumes there is a lot of mortality due to the hydro system, McClure said.

According to the PATH results, dam breaching is very likely, almost a hundred percent, to result in recovery, she said. PATH indicates that holding harvest rates at a somewhat lower level than they are now is likely to result in reaching survival goals, and very close to, if not meeting, recovery goals, McClure stated.

The current transportation option also meets survival goals and comes very close to meeting recovery goals, she said. PATH's assessment is that habitat and hatchery actions are not likely to contribute to salmon recovery, according to McClure.

The CRI results indicate the cost to the stocks of delaying a decision is significant, she stated. All seven stocks we looked at have an average risk of about 50 percent of reaching the extinction threshold in a hundred years, McClure said. There are significant extinction risks in both the short term and long term, she said. To reduce this risk, we need to raise the population growth rate by about 12 percent, McClure stated.

When we looked at where in the life cycle increasing survival might have a big impact on population growth rate, we found that increasing direct survival through the hydro system did not produce a large impact on population growth rate, McClure said. That's largely because it wasn't one of the biggest stages of mortality, she stated. Similarly, you get a small benefit from increasing survival of adults migrating upstream, McClure said. The biggest benefits would come from reducing mortality in the two stages where there is high mortality, during that first year in the ocean, and in the estuary, she said. Reducing that mortality could have a large impact on population growth rate, McClure summed up.

For fall chinook, PATH projects recovery from dam breaching alone, while CRI results at this point support the conclusion that dam breaching would significantly reduce the long-

term extinction risk, McClure reported. Both CRI and PATH project recovery from sharp harvest reductions, from reductions of 75 percent either in the ocean or in the river or 50 percent in both, she noted. Obviously, one also has to stop the decline in the other Hs too, McClure pointed out. Anytime an action is made, you can lose any benefit you achieve in one H by allowing conditions in another H to worsen, she said.

The CRI indicates that currently the extinction risk for Snake River fall chinook is relatively low, McClure said. The risk of reaching the extinction threshold in a hundred years is 6 to 17 percent, she stated. We have some new data we'll be analyzing, McClure added. To reduce this long-term risk, we need an improvement in population growth rate of about 4 percent, she said.

The life stage with the greatest potential to increase population growth rate for fall chinook is the first year of life, which includes the estuary stage, McClure indicated. The life stages in spring chinook that were encompassed in the first two years are "all smashed together" in the first year for fall chinook, so reducing mortality in that year has the potential to have a large impact on population growth rate, she said. We also have the potential for large benefits from saving adults, according to McClure.

Dam breaching would largely affect the first year of survival, and it has the potential to yield the needed change in population growth rate, she said. For fall chinook, breaching also has the potential to increase spawning habitat, McClure stated. Reduction in harvest increases could yield enough change in population growth rates to reduce the extinction risk, she said. Hatchery impacts are unknown, but this is an area of active research right now, McClure stated.

For Snake River steelhead, we found there was a very low risk of extinction in the short term, she said. The populations are very high right now, McClure added. But the risk of reaching the extinction threshold in a hundred years was over 90 percent, she said. Even though there are a lot of fish right now, the long-term risk is very, very large, according to McClure. To reduce this risk, we need to increase population growth rate by about 10 percent, she said.

Again, dam breaching has the potential to improve downstream survival, McClure noted. This stock is subjected to substantial harvest pressure in the river, and reducing the harvest rate could yield enough change in the population growth rate to reduce the risk of extinction to a chance of one in a hundred in a hundred years, she said.

Presentation on Goals, Objectives, Evaluation Criteria, and Performance Standards

Lorri Bodi of BPA explained that before formulating options and alternatives for the All-H Paper, the Federal Caucus had come up with five goals. The first three are: conserve the species; conserve the ecosystems on which the fish and wildlife depend; and assure tribal fishing rights, she said. The fourth goal is to balance the needs of other species, according to Bodi. We wanted to make sure the conservation measures we adopt for salmon and steelhead are balanced with the needs of other fish and wildlife species, she

said. There are a few places where there is potential for conflict, particularly in areas like reservoir operations, Bodi pointed out.

Last, but certainly not least, we wanted to minimize the adverse effects on humans, she said. We want to look at ways to minimize financial, community, and social impacts, Bodi explained. So when we look at conservation of Columbia Basin fish, we are looking at all five of these goals together and trying to achieve them all in combination, she said.

Bodi moved to the topic of evaluation criteria. She said the Federal Caucus agency representatives sat down and thought, “How will we go about evaluating the options and alternatives?” We came up with a number of points we thought were relevant, Bodi stated. First is the time it takes to realize benefits, she said. How long will it take us to implement the measures called for in a particular option or alternative? Will it have immediate benefits, or will it take 50 years to achieve benefits?

The second factor we looked at is socioeconomic, said Bodi. How many dollars will it cost to implement a measure? We don’t have unlimited money to spend on salmon and steelhead recovery so dollars to implement is an important consideration, she stated. Third, we said we would look at the number of stocks to be benefited, Bodi continued. Obviously, there are advantages to benefiting more listed stocks than fewer, she said.

We also wanted to look at the level of the benefit -- what kind of boost we could get from an action, Bodi explained – and the certainty of benefit – is this really going to work for the fish? How sure are we that this is going to work? There is a lot of debate about the advantages and disadvantages of certain measures, and there’s scientific as well as political uncertainty, she said.

We also looked at certainty of implementation, Bodi stated. How certain are we that this can get implemented, even if it has a high benefit?

We also wanted to look at treaty and other tribal obligations as a screen to see how a proposed action would fit, Bodi explained. Is it consistent with those obligations? Is it leaning toward achieving those obligations over time or is it not? Here we are talking about a combination of different natural resource interests, but primarily fishing.

Another criterion was duration of benefit, according to Bodi. If we take an action, how long is the benefit going to last? Is this a long-lasting improvement in survival or a short-term boost?

Last, but certainly not least, is biological benefit to other species, Bodi said. If we take this measure, will other species benefit as well? This relates to our goal of balancing the needs of other fish and wildlife populations, she indicated.

We have not done a detailed evaluation using these criteria yet, Bodi said. We anticipate doing that in the process of coming up with the final All-H Paper, but we wanted you to know upfront what we propose to use to evaluate the options and alternatives, she stated.

Bodi moved to her next topic, performance standards. One of the things we are exploring at the Federal Caucus is how to identify some goalposts and to be able to look at where we are trying to get specifically for habitat improvements, for hydropower, for harvest management, and for hatchery reform, she said.

We are looking at a process in which we would first look at the alternatives; second, try to establish performance standards; third, look at different kinds of scientific assessments; and fourth, feed everything into survival or recovery criteria, Bodi said. We would repeat that circle over time so we can measure progress, she explained. First we lay out where we want to go, then we measure whether we are achieving it, Bodi stated. If we are falling short, we would have a mechanism for adjusting what we are doing over time, she said. We are also talking about identifying survival improvements by life stage, according to Bodi. This would help make it clear what the expectations are and what the needs are to get to survival and recovery, she said.

We would like to do this in a fairly disciplined way, with milestones and specifics, Bodi continued. That's one of the things we are soliciting public input on – how do we get from here to there? she said. We have not proposed specific performance standards, but we will be providing you with some ideas of what we are thinking of for you to comment on, Bodi indicated.

Presentations on Options and Alternatives

Darm discussed the different Hs and how they match up with survival in the life cycle of salmon and steelhead. In the first stage of life, which the fish spend in freshwater, the survival numbers are quite low, she said. The fish are influenced to a very large extent by habitat conditions, according to Darm.

When the fish get ready to migrate as smolts, the primary source of mortality is the hydropower system, which the fish have to travel through, she explained. When the fish get to the bottom of Bonneville Dam, they go out into the estuary, and their survival in the estuary is quite low, Darm continued. The survival of the fish at that point is influenced to a great degree by estuary conditions, she said. Habitat degradation and the effect of having gone through the hydropower system are influences, Darm stated.

The fish go out into the ocean, spend a couple of years there, and then come back as adults and migrate up through the hydropower system, she continued. Their survival migrating back through the system is influenced by that system and by harvest to a greater or lesser extent, depending on the fish species, Darm said.

In developing the All-H Paper, we wanted to look at all the Hs, she said. What are the actions we can take in all of the Hs throughout the life cycle of these fish that we think

might result in improvements in survival? We wanted to explore all of the options for each H, Darm stated. We didn't want to start by taking things off the table, she added. Folks who manage hatcheries don't want hatchery production on the table, and folks who have an interest in protecting harvest, especially tribal harvest, didn't want to put any harvest cuts on the table, Darm said. Obviously, there's a large faction that doesn't want dam removal on the table, she stated. Everybody's got something they want to protect, Darm said.

Finally, we came to the agreement that we were going to treat all of the Hs equally – nothing's sacred – and everything will at least be considered, she indicated. We also wanted to look at what is the most dramatic improvement you could come up with for each life stage of the fish, Darm said. You lay out the full range of options, and then you figure out what sort of improvement you might get in survival in each life stage from each of the options, all the way from the status quo to the biggest things we could think of for improvement, she stated.

I should point out that even the status quo represents an improvement over the recent past, Darm said. There have been significant improvements in all of the Hs, she noted. There have, for example, been dramatic cuts in harvest, and survival in the hydropower system has been improved, Darm said.

So the idea is to lay out the full range of options, consider how the fish populations might respond to different actions, and then talk about it in public hearings and meet with those who have a stake in the outcome, she stated. We need to talk about what we want to do because we have to do something -- the status quo will not recover the fish, according to Darm. As was pointed out earlier today, there's a high likelihood of extinction for the Snake River spring/summer chinook, and some pretty dramatic improvements in survival are required if you are going to avoid extinction, she said.

I need to give you some caveats about the options, Darm stated. This is kind of a "30,000-foot look" at what the options are – the options are not specific, she said. They are intended to illustrate broad categories of choices, Darm explained. We'll go now to the presentations on the options for each H, she told the audience.

Habitat Options

Our scientific information is telling us that habitat protection is important for survival and recovery of fish in the long term, said Bodi. That first year of life out in the habitat is especially important, and when you look at habitat options, that's a consideration, she stated. We have to stabilize the health of our tributary rivers and the estuary to make sure we have good habitat for good fish survival in the long run, Bodi said.

We laid out some objectives for our habitat protection efforts in the All-H Paper, she said. The first is to prevent further degradation of the habitat; in other words, let's at least freeze where we are and not let things deteriorate any further, Bodi explained. The

second objective is to protect existing high-quality habitats, and the third is to restore habitats that have been degraded, she said.

The options we came up with to meet these objectives are procedural, Bodi explained. They are different from our other options, which are more substantive, because Federal and private land issues are more complex in terms of implementation, she said.

Our first option is better coordinated Federal actions, according to Bodi. It doesn't really look at state or local efforts; it just says, "we Federal agencies are going to coordinate how we do our work, and we're going to coordinate how we spend our money," she said.

Our second option is broader, Bodi indicated. It says, let's be ambitious and have a coordinated regional plan, she said. Obviously, this is the most desirable option – it's best for Federal, state, and local interests to work together with tribal interests and to have a unified front, Bodi stated. It just makes sense if we can pull it off, she added.

The third option is an increased Federal role using the Clean Water Act and the ESA, Bodi explained. It's a more regulatory role, she said, adding it's certainly not the most desirable option.

These options and the All-H Paper separate the landscape into Federal lands and non-Federal lands, Bodi noted. We assume there will be a high level of protection of Federal lands as a result of ongoing efforts of the U.S. Forest Service and the BLM, and that provides a base of habitat protection we can build from, she said.

For non-Federal lands, the intent would be to try to coordinate with ongoing efforts also, Bodi stated. There's a lot going on, and we want to try to make the most of it -- that's why I say option #2 is definitely the most desired alternative, she said.

Regardless of which option we pick, certain steps will be needed to help figure out what to do with individual watersheds, Bodi continued. First, you would conduct habitat assessments, and some of these have already been done by watershed councils and other organizations, she noted. Second, we'd develop action plans, Bodi said, that would deal with nuts-and-bolts issues such as, what are the limiting factors in a particular watershed? What are the creative ways to go about correcting those shortcomings? Who do you need to talk to? Who do you need money from?

Because we have both a short-term and a long-term perspective, we also need to ask, what are the "quick fixes" that are out there? Bodi said. What are the things that can give you an immediate benefit while you wait for benefits from the actions taken that could require 10, 15, or 50 years to get results? Other questions are: how do we link up with actions going on under the Clean Water Act? How do we link up with existing watershed efforts? What's the best way to go about doing this to make it a meaningful program? Those are some of the questions we have for you, she said.

Hydropower Options

Anderson explained the objectives for hydropower in the All-H Paper. The first is to provide adequate survival and maintain healthy adult and juvenile anadromous fish inhabiting and/or migrating through the hydropower system, and the second is to provide instream and reservoir environmental conditions necessary to provide adequate survival of resident fish and other aquatic species, he said. Keep in mind we were also concerned with listed resident fish, bull trout, Kootenai River white sturgeon, and snails on the Snake River, Anderson said. We're trying to balance the hydropower system configuration and operation for all of the listed aquatic species, he stated.

The hydropower section has three options, Anderson explained. There is the current program, which as we have stated, is not static because there are things we are doing in the hydrosystem right now, he said. Anderson outlined several improvements the Corps is working on to improve fish passage at the dams. The first option is the way the Corps operates the system now, including such measures as flow augmentation, spill, and transportation, he said.

In the second option, the "aggressive program," we would assume that a whole host of configuration improvements, such as surface bypass systems and gas abatement measures, would be implemented, Anderson continued. He noted that the hydro appendix to the All-H Paper contains a detailed description of all the measures. The Federal agencies would seek increased funding to pursue more aggressive implementation of measures to improve passage survival, Anderson said. On the operations side, we would be looking at additional flow augmentation on the Snake River, he stated. For fish passage, we would implement 24-hour spill at lower river projects that do not have 24-hour spill now, within the limits of BPA's intertie facilities, Anderson said.

The third option assumes that breaching of the lower Snake dams could be implemented as soon as possible, subject to Congressional action, he explained. If Congress appropriated the funds, the Corps would start engineering design work right away, Anderson said.

The options in the All-H Paper relate fairly well to the alternatives in the Corps' lower Snake River Juvenile Salmon Migration Feasibility Report/draft EIS, he noted.

Harvest Options

Darm said there are basically two geographic categories of harvest: ocean harvest and in-river harvest. For in-river harvest, there are two temporal categories, she explained: spring harvest and fall harvest.

The ocean harvest is of primary interest to us in this discussion with respect to the fall chinook, Darm said. The ocean fishery occurs in southeast Alaska, off the west coast of Vancouver Island in Canada, and off the coasts of Washington and Oregon, she stated.

The Pacific Salmon Treaty governs harvest off the west coast of Vancouver Island and Alaska harvests, Darm indicated. While we have just completed an agreement with Canada under this treaty, it remains to be seen whether all parties will sign it, she said. The agreement considerably limits Canadian harvest from what it has been in the past, and this is a good thing, Darm stated. The Canadian harvest off the west coast of Vancouver Island has been quite a major source of mortality for fall chinook, she said.

When we get into the fall harvest in the river, there is a harvest of fall chinook that occurs in the non-tribal fishery in the lower river, and that has a couple of percent impact on the fish, Darm said. The tribal fishery in the area above Bonneville Dam has about a 10 to 15 percent impact, she stated. If you add all that up, what you come up with is a total harvest rate of the Snake River fall chinook of about 50 percent, Darm said. That's why CRI and PATH both indicate that if you could sharply reduce those harvest rates on fall chinook, it would make a big difference because 50 percent of your adult population is a lot of fish to kill.

Spring chinook are a different story, according to Darm. They aren't harvested to any significant extent in ocean fisheries, she said. In the river, in the spring, there's a small harvest by a lower river non-Indian fishery and the tribal fishery, Darm stated.

Steelhead are harvested, incidentally, not in the ocean, she continued. They are harvested in the in-river non-Indian fishery and the tribal fishery, Darm said. Harvest of steelhead has been reduced significantly since the ESA listings, and it was less than 15 percent last year, she noted.

Darm said the All-H Paper contains three harvest options. She said with respect to the first option, "fisheries benefit during recovery," it's a little bit hard to talk about status quo, at least for in-river fisheries, because in-river fisheries have been managed under the Columbia River Fish Management Plan, which has expired. You could think about the status quo regime as a regime in which the fisheries benefit during recovery; in other words, you have a harvest schedule, Darm stated: when the population is very low, you have a very low harvest rate, and when the population increases, you can increase the harvest rate, she said. The whole issue of harvest is under negotiation in the *U.S. v. Oregon* proceeding, Darm noted.

The second option, "fixed in-river harvest rates," would say because of the ESA, that harvest should be kept to the really low levels of the last few years, especially 1999, Darm said. The idea is to just hold harvest rates at low levels until the stocks recover, she stated.

The third option, "conservation fishery levels," is what we call a "conservation crisis fishery," which is a fishery that's basically similar to what we've had for Snake River spring/summer chinook, Darm said. That would be a fishery in which the harvest of fall chinook and steelhead would be held to the same low levels as spring/summer chinook, basically to jump-start your recovery efforts, she stated. We think it's worth at least

exploring the opportunities to buy out Alaskan fisheries and Canadian fisheries, Darm said.

Hatchery Options

In the last few years, there have been a lot of improvements in hatchery programs to address problems with genetic fitness and the competition of hatchery fish with wild fish, according to Darm. The first option represents the status quo, which as I said before, is an improvement over the recent past, she stated. We would continue with currently planned programs, and that would involve changing most hatchery stocks to native or indigenous stocks, Darm said.

The second option is to actually increase conservation programs, she stated. If things continue to get worse and stocks continue to decline, we would think there is a need to take more populations into conservation hatcheries, Darm said.

The third option is to increase conservation programs and significantly decrease mitigation programs, she stated. It's very difficult to quantify the damage that hatchery production does to natural fish, Darm said. We put this option on the table because we feel it is important to look at what kind of reaction we might get biologically if we reduce these mitigation programs, she stated.

Alternatives

Looking at the options tells you a little bit about the sensitivity of the fish to improvements in different parts of their life cycle and what you might be able to accomplish with individual measures, but what really makes a difference is when you add them all up, said Darm. We felt for the picture to be complete, it needed to include mixing and matching of the options across the Hs to come up with an overall, all-H plan, she stated. So in the draft paper, you will see what we call "integrated alternatives," Darm noted.

Some caveats about the alternatives are in order, she said. The alternatives are intended to represent broad choices, a strategic look at the problem from a 30,000-foot elevation, Darm stated. They aren't the only combinations; with four Hs and the three options in the paper for each, that's 81 possible combinations for a start, she said.

Finally, none of the alternatives should be seen as preferred, Darm stated. The Federal agencies at this point have not selected a preferred alternative, she said.

The first alternative that is on everybody's mind is the breaching of the lower Snake River dams, according to Darm. The question has come up, if you breach the dams, what would you do in the other Hs? In terms of habitat, you perhaps wouldn't need to focus quite as much on improvements in non-Federal habitats, so you might choose the option of just on increasing Federal coordination, she suggested. For hatcheries, you'd continue with currently planned conservation programs, and you would hope that by breaching the

dams, you wouldn't need to increase your level of conservation intervention, Darm said. Finally with respect to harvest, you might feel comfortable allowing harvest rates to increase as runs increase, she stated.

Another option that jumps out is what if we just cut back harvest? Darm continued. What if we cut the fall chinook harvest in half and reduce the steelhead harvest to 5 to 10 percent? she said. In that case, maybe you wouldn't worry so much about taking out dams, Darm stated. You might continue with the current hydropower program and not worry too much about fixing habitat, she said. You would probably need to increase your conservation hatchery programs because they are aimed mostly at Snake River spring chinook and cutting back harvest really isn't going to do a lot for those fish, Darm continued. You would probably want to decrease your mitigation hatchery production in the hope that such an action would result in some improvements in survival for those fish, she stated.

Another thing you might decide to do is everything you can do, short of dam breaching, Darm explained. If the region doesn't have the will to remove the dams or decides it's too expensive and represents too much of a loss of hydropower, what would you do? she said. You'd go for the aggressive, non-dam breaching hydropower options, and you would get state and local governments much more involved in protecting habitat, Darm suggested. You would probably still need to increase your conservation hatchery programs and be willing to spend the money it takes, she said. You would at least want to hold harvest rates to 1999 levels, Darm stated.

Or, you could decide it is worth it to do everything you can to recover these fish and to go all out, she indicated. You'd go for the most aggressive action in each of the Hs, including taking out the dams, increasing Federal regulation and enforcement for habitat protection, increased hatchery conservation programs, decreased mitigation hatchery production, and you would cut harvest back to the bare bones, to the conservation crisis level, Darm said.

Before the meeting ended, Silverberg reminded the audience that the website where one can find information about all the documents and the upcoming meetings is: www.bpa.gov/federalcaucus.

Questions and Answers

Questions on Overview and Process

- Q. All the discussion is focused on the Snake River. Is the All-H Paper designed to cover the region, or will there be an All-H paper for each river and each area of concern?
- A. The All-H Paper addresses the entire basin, and it addresses wildlife and resident fish as well as anadromous fish, replied Darm. We always start out by saying this is a basinwide problem, it's not just about the Snake River, and then we go on to talk

about the Snake River, she said. The Snake River dams are what everybody seems to focus on as the big-ticket item, Darm noted.

Q. If this All-H program covers the region, why is removal of the Snake River dams one of the major sections?

A. The hydropower options are broader than just the Snake River, replied Darm. They include different options for Columbia River operations, not dam removal, but how those dams are operated, she said.

Q. Have you scheduled the hearings for February and March yet?

A. We have a tentative schedule, but we haven't published it yet, replied Darm. It should be on the website by Friday, she added.

Q. When does the official public comment period begin and end in relation to the hearings?

A. There are different processes and documents to comment on, and some are part of an official process like the EISs, and some aren't official documents, such as the All-H Paper, replied Darm. Once all the documents are out, we'll welcome comment on all of them, she said.

Q. Will the public have a chance to comment on the feasibility studies the CRI people are going to do, or will public comment be over long before the studies are done?

A. There's a balance between needing to make a decision and waiting for the information to come in, replied Darm. But we'll try to get as much public comment as possible as the process goes along, she said.

Questions on Cumulative Risk Initiative and Science

Q. Have you identified the amount of fish loss in numbers or percentage of absolute numbers for each of the four Hs? If not, why not? If yes, are they available in the information you are going to present?

A. The problem is that a lot of the issues, particularly those associated with hatcheries, are very challenging, replied McClure. Hatcheries have the potential to affect populations in a lot of ways, and while we know hatcheries have an effect, we don't know their absolute impact on wild fish, she said. McClure drew a distribution curve showing mortality for spring/summer chinook and fall chinook at various stages of their lives.

Q. If this were a natural environment with no impact of man, what would the difference be in mortality?

A. It's difficult to sort out because in the first year of the life cycle, there are a lot of potential impacts from habitat degradation and hatchery and harvest effects, McClure replied. How much of the mortality is human-induced and how much is natural is not a question we can answer right now, she said. These are the kinds of questions we'll address in the feasibility studies, McClure added.

- Q. I've heard estimates of ocean mortality on the order of 1 percent to 5 percent. Those don't seem to fit with yours. Why?
- A. We've been using estimates of ocean mortality out of the literature, and they tend to range between 10 to 30 percent, McClure replied. We used an average of 20 percent for each year the fish is in the ocean, she said.
- Q. Under the ESA, it's illegal to take, maim, harm, trap, or endanger an endangered species whether it's a bald eagle or a salmon. I don't understand why these fish are allowed to be trapped and killed and sold on the open market. Why aren't the Federal agencies taking care of the harvest of the fish?
- A. The incidental take of listed fish in harvest is no different than the incidental take of fish in hydropower operations, replied Darm. There are many things people do that kill the fish, she said. There are abundant runs of upper river fish that provide fisheries all the way from Alaska to California, as well as fisheries in the river, Darm stated. It happens that threatened Snake River fall chinook have a similar run timing, and they intermingle with those fish, and it is impossible to separate them out, she said. They're all naturally spawned fish, so it's not possible even in a selective fishery to tell them apart, according to Darm. So if you're suggesting we should stop harvest and not every other activity that is killing these fish, then I guess we have a debate about harvest and whether operating dams or operating an irrigation diversion is anymore a legitimate activity than harvesting an abundant population of fish, she said. It's our view that all of the human activities inside and outside the basin have led to the decline of these fish and all of the activities that affect them should be adjusted to try to recover these fish, Darm added.
- Q. What about the terns who consume 25 percent of the smolts downriver? Why aren't you doing something about that?
- A. That's a tough problem, and we've been working on it, replied Darm. NMFS has been working closely with USFWS to mount an aggressive program to relocate the terns, she said. The problem with the terns is that you have an ecosystem in an estuary that is highly altered and degraded, and you have other conditions that have upset the balance of predator and prey communities, like the production of millions and millions of hatchery fish, Darm explained. It's a bigger problem than "just going out and knocking out a bunch of terns," she said.
- Q. Where will the final recommendations of the Corps' EIS go? To Congress?
- A. The decisionmaker depends on the alternative that is recommended, replied Darm. We do not have the authority to breach dams she stated. Congress would have to authorize breaching the dams and appropriate funding to carry it out, Darm said.
- Q. You've got a document here that says today only about a million fish return, and most of them originate from hatcheries, not from the wild. Are we talking about saving the wild fish, the hatchery fish, or the combination of fish?
- A. The ESA mandate is to restore self-sustaining natural populations, McClure replied.

- Q. If hatchery fish are being killed to preserve the gene pool of wild fish, and the majority of the fish are coming out of hatcheries, why are we killing perfectly good fish to save “something that maybe isn’t there?”
- A. Because we don’t know if the fish are perfectly good or not, replied McClure.
- Q. Are the hatchery fish not good? They’re not good to eat? They’re inferior?
- A. Many hatchery practices produce fish that are essentially domesticated, replied McClure. They have different behaviors and traits, and the concern is that those traits, when interbreeding, will be passed on to the wild population, and the fitness of the wild population could be reduced, she said.
- Q. Why not change the way hatchery fish are maintained?
- A. That’s one option, replied McClure. We don’t know how well hatchery fish can contribute to producing a self-sustaining population, she stated. Our ultimate goal is to produce self-sustaining populations, not populations that are reliant on hatchery production, McClure said.
- Q. Aren’t the majority of fish hatchery fish?
- A. Yes, and that’s a big problem, replied McClure.
- Q. Will taking the dams out correct that problem of hatchery versus wild fish?
- A. I’m not saying that, replied McClure.
- Q. So how do we correct the problem?
- A. Ultimately, the solution is to create conditions under which wild populations are self-sustaining in the numbers that you need them to be, said McClure.
- Q. Do our hatcheries have to be eliminated?
- A. I don’t know, replied McClure. These are questions to which science can contribute, and at some level, there is a policy element to it, she said. We are working to get a better handle on dealing with the harmful effects hatchery production has on wild production, added Darm. Ultimately, though, in making decisions under the ESA, NMFS will be opposed to hatchery production to the extent it harms naturally produced fish, she stated. The goal is self-sustaining naturally increasing populations, Darm said.
- Q. Can you tell a wild salmon from a hatchery salmon?
- A. We are not talking about fish on the plate; we are talking about fish in the rivers, replied Darm.
- Q. What’s the NMFS definition of success? How much would satisfy you when all is said and done?
- A. Recovery goals are going to include measures of abundance, the distribution of populations across the landscape, and measures of genetic diversity, among other things, replied McClure. Saying how many fish we will be “satisfied with” is, number one, not possible right now, and number two, skirts a number of important

biological issues, she said. When the recovery goals are set, and when they are achieved, that will be success, McClure stated. The point right now is that we don't have recovery goals set, added Silverberg.

Q. Are we coordinating our efforts with the Canadians who have had some of these same situations so we can share information?

A. We are not closely coordinated right now, replied McClure. We have had Canadian attendance at our monthly workshops dealing with science issues and interaction with the fishery service from Canada, she said. There's a considerable amount of coordination with the Canadians through the Pacific Salmon Commission and quite a bit of exchange of data, noted Darm.

Q. What's the effect of the temperature of the ocean on listed stocks?

A. Obviously, ocean conditions contribute to the status of the salmon population, replied McClure. One of the concerns we have is that there has been a continuous downward trend in spite of the fact we have had both drops in ocean conditions and then improved conditions where populations rebuild, she said. There is concern that when we get to the next downward cycle in ocean conditions that, in fact, there won't be enough fish to get populations back up, according to McClure.

Q. Does the Corps' EIS address the issue of survivability of salmon? If not, why not? And if so, which of its four options do you believe is best?

A. The biological analysis for the Corps' study is what Michelle [McClure] just briefed you on, replied Anderson. The information she gave you with respect to spring/summer chinook, fall chinook, and steelhead is reflected in the EIS and its supporting documentation, he said.

Q. Which of the four options is going to be the best? What's the degree of magnitude of difference between the options?

A. It depends on which analysis you use for the magnitude of difference between them, replied McClure. For PATH, breaching is the best option and is more liable to produce recovery than any of the other options, she noted. Options that rely on greater transportation are less likely than current planned operations to achieve survival and recovery goals, McClure said. That's because they assume high indirect mortality due to the transportation system, she added. According to the PATH analyses, the options, from worst to best, would be those involving the transportation system, then current planned operations, and finally dam breaching, McClure indicated. The CRI analyses indicate that the best option is dam breaching, the next best would be improving the transportation system, and the worst would be current operations, she stated. However, under the CRI analyses, dam breaching would not by itself be sufficient to reduce the extinction risk substantially, McClure said.

Questions on Goals, Objectives, Evaluation Criteria, and Performance Standards

Q. Where does BPA put flood control in its priorities?

- A. Flood control is a high priority and will remain a high priority, replied Bodi. Public safety is, of course, one of the very highest priorities, she said. These proposals do not look at restricted flood control in order to benefit salmon and steelhead – that is not part of any of these options or alternatives, Bodi said.
- Q. How do the benefits stack up compared to the sediment that is going to be moving downstream as a result of breaching? It's going to take years and years to get that all stabilized again. Every time there's high water, there will be more sediment moving. If people think these rivers are going to return to a natural state immediately, that's a big fallacy, because it's going to be nothing but mud flats for years. I haven't seen much information addressing the sediment problem.
- A. That's one of the subjects in the Corps' draft EIS, replied Bodi. There is information on the amount of sediment, how the processes would work to move that sediment downstream, and projections on how long it would take, she said. The EIS says 100 million to 150 million cubic yards of sediment has accumulated behind the four lower Snake dams since their construction, and that as a result of breaching, 50 million to 75 million cubic yards of sediment may be moved downstream, Anderson pointed out. There is a technical appendix that goes into the issue in detail, he added.
- Q. It's increasingly clear that NMFS is beginning to prepare us for the fact it is not managing for Snake River stocks, but for individual populations within the Evolutionarily Significant Units (ESUs). Was there discussion in the Federal Caucus of applying the evaluation criteria to a definition of a species in terms of tradeoffs and what size of a population we are actually managing for?
- A. No, we have not discussed how small a population you are managing for, replied Bodi. However, there's no question from a legal point of view, that we need to address survival and recovery for each one of the 12 ESUs, she said. We'll probably use indicator populations within those ESUs that we have data for, Bodi added. We have made no decisions on tradeoffs, whether between populations or size of populations or between ESUs, she said. It's possible that some of those kinds of discussions could occur down the road, but at this stage we thought it was important to lay out the legal requirements and the evaluation criteria and to take it a step at a time, Bodi indicated.
- Q. What's going to happen to the property behind the dams if they are breached?
- A. It would stay in the Corps' real estate, replied Anderson. One of the things we plan to do if we breach is to restore habitat on that land, he said.
- Q. One of the factors you said you take into consideration is how long it will take to get a healthy and viable wild population back. Last year, one redbfish returned to Redfish Lake in Idaho. If "how long" is one of your factors, aren't we already too late by a long, long way for many of the wild populations, such as those that travel up to Redfish Lake? Aren't they already in their extinction spiral?
- A. We do have a conservation hatchery program for the Redfish Lake sockeye populations, replied Bodi. We are trying to make sure that with the few fish we have, we are saving that genetic base so we can re-establish that population, she said. In the

case of other populations, there are varying risks of extinction, but I don't think we're too late to do something, Bodi stated. It is absolutely true that there is an effect if measures are delayed, she continued. Every time a beneficial measure is delayed for a year or two, it has an effect, said Bodi. It's definitely a concern, and that's why it's one of our evaluation criteria, she added. We need to get the facts out and make sure there's an honest deliberation on the choices and on what it's going to take to recover the salmon, according to Bodi.

Q. I'm concerned about the economy in Whitman County and in other counties in eastern Washington. I'm concerned about the loss of jobs, the loss of power, and our way of life. This is our culture. These dams came in in the 1960s and 1970s -- they're in there, and we should leave them alone. In a good year, Whitman County raises 30 million bushels of wheat, and on the average, dam removal would increase transportation costs by 20 cents, which is \$6 million out of the economy. What are we going to do? There are about 60 dams in the state of Washington. I've asked county commissioners statewide, "What would you do in your county if NMFS and the Corps of Engineers came along and tore out your dams?" I think there will be a revolution in eastern Washington if these dams are going to be taken out. We're talking about thousands of water-related jobs on the river. What about the economic effects of these decisions? Are fish more important than the human lives in eastern Washington?

A. There's no question these are hard issues, replied Bodi. The papers coming out from the Federal Caucus are not making a decision one way or another on breaching the Snake River dams, she said. They are saying, though, that you have to stack up these various blocks of options and have them add up to recovery, Bodi stated. So let's have a regional discussion about what the choices are and how we stack them up, she said. If, for example, the decision is to try to get an exemption not protect the fish, and let the fish go extinct, that's a potential choice also, according to Bodi. That would come with its own economic and political costs, she noted.

One of the problems we have is conflicting expectations and mandates, Bodi continued. First, we have legal requirements that come out of the general citizenry of the country to protect endangered salmon and steelhead, she said. There's not just an eastern Washington interest in this issue -- there's regional and a national interest in protecting the salmon and steelhead, Bodi indicated. Second level is that we have commitments that the Federal government made in building these dams, she said. Third, we also have folks in Astoria, Oregon, and elsewhere who expect to catch these fish as part of their local economy -- we're hearing from them as well, Bodi stated. Fourth is our legal obligations to the tribes, Bodi continued. The treaties signed years ago are still the law of the land, she said. We have a trust responsibility as Federal agencies to the tribes, Bodi states. In exchange for the lands they ceded in to the United States, the tribes reserved the right to hunt and fish at their usual and accustomed places -- we have to keep those obligations in mind too, she said.

If this were easy to resolve, we as a region would have figured it out years ago, and it wouldn't have come to such a difficult and polarized point, she said. What we are hoping with the All-H Paper is that people will discuss the pros and cons of the

various options, Bodi stated. If we're not going to breach Snake River dams, how are we going to get necessary improvements?

So the question for us as a region, to figure out what we should do to balance all of these considerations – not one at the expense of others, but to figure out what's the best bet looking at all the factors, Bodi said.

Anderson pointed out that the EIS documents contain a wealth of information, including analyses of the effects of the alternatives on Snake River corridor jobs. One of the reasons there isn't a preferred alternative in the EIS is that we want to get feedback on how accurate the analyses are, he stated. Are we in the ballpark, or did we miss the mark on some of the projections for the kinds of concerns you raised? This is also discussion of mitigation or compensation to industries and users that would be affected by implementation of any of the alternatives – it's not a detailed mitigation compensation strategy, but that's an issue that deserves debate during the public review period, Anderson said.

Q. You talked about putting hatcheries up for redbfish. Aren't you afraid of playing with the gene pool? What would you call a redbfish that came up that wasn't a true redbfish? Is that different from a salmon or steelhead?

A. The hatchery is an emergency measure to use what are called captive broodstock programs to basically keep what gene pool we have left conserved, replied Bodi. With the California condor, when they only had a few left, they took them into a captive program for breeding, then eventually released them back into the wild, she said. It's a similar concept – when you have very, very few fish left, it's best to conserve what you have, rather than let them spawn unsuccessfully, Bodi said. It's an emergency measure, and the goal is to protect the genetic diversity that's left, she stated.

If you go back in time, we once thought hatcheries were the solution for habitat damage, and that as long as we had hatcheries, we didn't have to worry about habitat damage, Bodi said. That has proven to be a convenient thought, but not actually true, she stated. The hatchery fish are as threatened by habitat destruction and degradation as the wild fish, Bodi said.

Q. Has the Corps considered the possibility that if they do breach the dams and dredge out the silt, they could create a "son of Rice Island," and that the terns would move from down there up to this island?

A. We haven't worked on that, replied Anderson.

Q. We've seen the draft information on the economic benefits and impacts associated with removal of the four lower Snake dams. Is the same analysis being done, or will it be done on the proposals in the All-H Paper, for example, regarding the amount of water southern Idaho irrigators would have to give up, or the economic impacts if sport or commercial fisheries were severely reduced, or how additional habitat restrictions would affect the timber industry? Will we see that in these documents so that we can truly weigh the choices and the economic impacts of extinction?

- A. There are existing economic analyses that touch on some of what you are asking about, replied Bodi. The economic information in the Corps' EIS includes some of those things, and the Northwest Power Planning Council's Multi-Species Framework process has a human effects work group, she said. They've done a literature review on what information now exists on these topics, Bodi noted. We are going to be using all the existing information, she said. In addition, one of our next steps will be to see if there are important information gaps we need to fill to improve the socioeconomic information we have and whether that could be done in a relatively short time, Bodi said.
- Q. There are other dams that threaten fish habitats. Why are only the four Snake River dams being looked at?
- A. The reason is because the first ESA listing happened to be in the Snake River, replied Bodi. The decision in the Biological Opinion was that the system of dams on the Snake River was a danger to the endangered fish and that alternatives that would really improve their survival in a dramatic way had to be looked at, she said. While they are not discussed in the All-H Paper, there are still studies of lowering the reservoir behind John Day Dam in the lower Columbia going on, Bodi pointed out. The Corps has an initial review of that under way, she said. One of John Day studies will come out in January, Anderson noted. That's the only other dam breaching study we have under way, he said.
- Q. What percentage of BPA's budget goes to recovery? What percentage of that is funded by taxpayer dollars?
- A. BPA spends about \$250 million a year on all fish and wildlife obligations, not just salmon and steelhead, replied Bodi. BPA's total revenues in any given year range between \$2 billion and \$3 billion, she said. None of the money that BPA spends is taxpayer money – it's all paid for by electric ratepayers, Bodi stated. It's actually still a pretty good deal to buy your power from BPA, she added.
- Q. If the dams are breached, we're going to have a lot of people whose lifestyles are going to change, many on the negative side. What happens if the breaching is done, and it's a complete failure? What if there are fewer fish than there were before we breached the dams? Who is going to pay for "that legal can of worms?" It seems to me like the taxpayers get hit both ways.
- A. I certainly don't have a crystal ball about what might happen or how that would play out, Bodi responded. I think you raise a good question, which is, "Who does pay if there is dam removal?" Is it a BPA obligation? Is it a U.S. Treasury obligation because it was a national decision to build these dams? Who pays for the mitigation to the communities that are affected? We have not really gotten into that level of detail because we're still at the very broad question of "What's the preferred path?" Bodi said. We want to have a discussion of what the choices and tradeoffs are in the region, she stated. I think the next level of discussion would be, "Who pays and how much?" Bodi said.

If you don't live in the Northwest, you'd probably say, "those Northwest folks who have electric rates that are 40 percent of the national average should pay because

otherwise they're getting a free ride," she continued. If you live in the Northwest, you say, "wait a minute, these are Federal obligations. What about Treasury covering some of these costs?" Bodi said. There are many unanswered questions about finances, she added.

- Q. When Grand Coulee Dam was constructed, there was supposed to be mitigation for lost production of fish. The hatchery for Grand Coulee Dam was supposed to be placed up in the Okanogan subbasin. But the hatcheries are all placed low in the system, while a lot of the habitat is up high. We want to get some of the production up higher in the system.
- A. As we go through and look at the future of hatchery programs, there will be opportunities to talk about how to do things differently and to make sure there's equity in how things are done, replied Bodi.

Questions on Options and Alternatives

Habitat

- Q. If the dams of the Northwest are equivalent to taking 62 million cars off the roads and saving that much carbon monoxide from the air, why is it that dams are considered nonrenewable resources?
- A. It's a debatable point, whether hydropower dams should be considered renewable or not, and under what criteria, replied Bodi. BPA is participating in a program that uses fish and wildlife criteria to determine whether a hydro project can be "green," she said. In other words, an energy project isn't green power just because it's hydropower, you have to have an adequate fish and wildlife mitigation program, Bodi stated.
- Q. Money is already being spent in our area to clean up the habitat. BPA is spending money, the state is spending money, the Federal government is spending money. If you are talking about improving the habitat over and above that, will I be put under more regulation to do more, and will it be money out of the landowner's pocket?
- A. There's no question that a lot of people are paying out of their own pockets to improve salmon habitat, replied Bodi. One of our goals is to try to coordinate the things that are going on right now, whether it's a state-sponsored watershed process, a county-sponsored watershed process, or someone who is taking steps on their own to do the right thing, she said. You raise a good point, which is that the Federal agencies have to be better able to tell people what it is that will "get us off their back" – that's where the concept of performance standards comes in, Darm said. If you know what the goalposts are, you can decide if you want to spend your money or not, and if you do spend the money, you know you will have some degree of predictability and protection, she added. In your comments back to us, give us some ideas on what you think will work, and what kinds of assurances you as a landowner and farmer would want to have, Bodi suggested.

Q. In Idaho, we have miles and miles of fantastic habitat in the wilderness that's in better condition today than it was 30 or 60 years ago, and we have no fish returning. I'm wondering what your thoughts are about focusing on habitat for Idaho stocks -- is that really the problem for them?

A. I agree we have a good amount of habitat that's in much better shape, but that is not to say there was not past degradation that's occurred that's still taking a while to recover from, replied Darm. The landscape is different all over the basin, and it's true that some habitat areas are in better shape than others, she said. For the Snake River stocks, there's still room for habitat improvement, Darm stated.

Q. We have water quality standards that we growers cannot meet. We're just up against the wall, some of us. We want to meet these requirements if we can, but it seems like the requirements for nitrate levels were picked so arbitrarily.

A. There are a lot of complexities involved with water quality issues, said an EPA representative. We have litigation in Idaho, Washington, and Oregon, and settlements and court orders on how we coordinate water quality standards, she said. We are continuing to work on the problem of temperature standards and how to look at it in the context of ecosystems, she added.

Q. The Columbia River is the fifth largest flowing river on the earth, yet people in the area have been told they're wasting water, and that there is no more water. I hear statements about wanting to make sure that people don't get hurt. People are being hurt right now, and there have been demands put on Okanogan County for one, "sign on the bottom line or else."

A. One of the problems is that a lot of the streams have been overappropriated, which means there's more water rights for those streams than there is water, if everybody took all the water they are entitled to, replied Bodi. In addition, we need to provide some minimum streamflows for salmon and steelhead, she said. There's a need to come up with a transition plan that actually gets you to where you have enough water staying in the streams for the fish and a reasonable system for other users as well, Bodi stated. We need to look at our water rights system and figure out ways to deal with these conflicts, she said. We are dealing with a system that worked at the turn of the century with the populations we had then, according to Bodi. The people of this region are smart people -- we can figure out ways to resolve these kinds of issues, she said. It's not easy -- it will involve changing how we think about things, and that's hard for everybody, Bodi added.

Hydropower

Q. Would you consider a fish ladder to be a benefit to returning adult salmon? Is it easier for adult salmon to pass through a fish ladder than jumping waterfalls?

A. Research studies at the University of Idaho have indicated that passage in total through the system is probably not any more time-consuming now than it was prior to dam construction, Anderson replied. There are, however, other factors associated with this, such as fallback, and we are looking at how to solve such problems, he said.

Q. I have been told barging fish causes a 2 percent loss, but that when water is spilled over the top of the dams, 15 percent of the fish are lost because of nitration. To me, spill is not saving the salmon, it's destroying them. I'd like to see some good science on that.

A. There are some intricacies associated with spill, particularly with respect to which project you are talking about, Anderson replied. But the operating premise nowadays is that spill survival is 98 percent, so about 2 percent per project, he said. We are initiating more spill survival research at the dams to confirm or deny the assumptions we are operating under right now, Anderson stated. We'll have to see over the next couple of years what we learn from this expanded research, he said.

Q. Under option #2, what are your projections about the amount of flow you would take from the Upper Snake, and what do you think the economic effects on the farmers down there would be?

A. The amount of flow is undetermined -- it's an open question, Anderson replied. Again, these options are not intended to be exact descriptions -- they are merely scenarios, he said. We felt it was appropriate to consider additional flow augmentation, according to Anderson. In fact, environmental interests and others in Idaho asked the Corps to study flow augmentation in the feasibility report and EIS so there would be a good picture of what the tradeoffs of not breaching are, he said. Reclamation did a study on how water might be acquired, whether it would be taken from irrigation or recreational purposes, but I don't believe that provided the final answers, Anderson noted.

Q. What are you finding with the testing of minimum gap runners at the dams?

A. We are doing biological testing of minimum gap runners in a single turbine unit at Bonneville's first powerhouse, replied Anderson. We will release information on the test results as soon as it is available, he said.

Q. Is there an implied or explicit view that if you breach the dams, you would change the flow augmentation strategy from what it currently is in either the Snake or the Columbia?

A. The question relates to whether, if we are not going to provide flow augmentation in the Snake, whether we would rely on the Columbia and "hit Coulee harder than we do now," replied Anderson. The feasibility study assumes current flow augmentation, he said.

Harvest

Q. Where do you get your data on how many fish are harvested in the different regions?

A. There are a number of different methods for keeping track of harvest, replied Darm. Some of it has to do with experience over the years of knowing what the catch per unit of effort is, she said. We probably know more about that than we do about how many fish are migrating out of the system, stated Darm.

Q. How do we know how many fish are being taken from the Snake or Columbia rivers? Do they turn in a record of catch every day or every week?

A. They do their catch, but I can't tell you the details of how often they report, Darm replied.

Q. When you say tribes, don't put the tribes all together because each tribe individually represents itself. For example, not all of the tribes have gillnets, and people need to understand that. There is a distinction when you talk about the tribes.

A. Comment noted.

Q. What do we know about the ocean habitat and ocean harvest cycle for salmon?

A. Not very much – it's pretty hard to study, replied Darm. Michelle [McClure of NMFS] showed you a graph earlier indicating roughly how many fish survive to their second birthday, and it's not as big of a loss as some other parts of the life cycle, Darm said. We strongly advocate increased research into estuary survival, she stated. That transition from the freshwater phase to the ocean phase is a challenging one and is pretty important for overall survival, Darm said.

Alternatives

Q. Is there any other role that PATH will play in assessing the options in the All-H Paper?

A. I would urge anyone who is interested in the PATH-CRI debate to look at the review done by the ISAB, Darm replied. The ISAB reviewed the products of PATH and the CRI, she said. In terms of who is criticizing whose science, there's a potential to get caught up in the ownership issue, Darm stated. The ISAB doesn't have ownership in either one, so it's helpful to look at what they said, she indicated.

In terms of the differences between PATH and CRI, they don't come to hugely different results, except in two areas, Darm said. One is the fact that the PATH results all tend to be optimistic, and that's because of a couple of assumptions they make that may or may not be right, she stated. The second difference involves the question of whether breaching dams alone will recover spring/summer chinook, Darm continued. PATH and CRI come to different conclusions about that, and it depends on what assumptions you make about delayed mortality, she said.

In terms of PATH's role in the future, the Northwest Power Planning Council voted last week to stop funding for PATH, so they will be winding up the projects they are working on, Darm stated. The PATH participants have produced some reviews of CRI products, and beginning in January, we are going to engage in discussions with the Council, PATH, and other scientists in the region, including state fish and wildlife agencies and tribes, on what sort of a follow-up process to PATH we should try to develop, she said.

Q. Let's assume we rip out all the dams, decrease the hatcheries, take all the maximum protection measures, and turn the river into a pre-Lewis and Clark pristine system. We are assuming this is going to increase our salmon and that we would not have

endangered species anymore, but I read recently that the Fraser River, which is pristine, which never had a dam and never was heavily fished, is having major problems with no fish. If we are going to destroy things we have built, how do we know it will bring improvements?

- A. There's no question there are natural patterns of variation in productivity having to do with survival in the ocean and also climatic effects, Darm said. There are reports of times, long prior to European contacts, when the salmon didn't return to the basin, she stated.

You are right that even in coastal rivers that are relatively undisturbed, there have been alarming declines in salmon runs, Darm said. Let me offer two thoughts about that. One is that in order to get through those natural variations, you need very high-quality freshwater habitat to maintain the underlying productivity of the stocks to make it through those tough times, she stated. Fish have different survivals at each part of their life cycle, and if you don't have enough survival in the freshwater phase to make up for the times when you have mortality in the ocean, then you'll have extinction's, Darm said. The other thought is that ocean conditions may have fundamentally changed as a result of global warming, but we don't know that and won't know that for a long time, she said.

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