

Operational/Secondary Losses and Wildlife Monitoring Issues
Wildlife Advisory Committee
Conclusions & Recommendations
11/3/15

Introduction

The Council's 2014 Fish and Wildlife Program provides following direction on dealing with wildlife operational losses:

- (a) Mitigation agreements should be considered to address operational losses in lieu of precise assessments of impacts.
- (b) The need for new methods to assess operational losses that incorporate the results of ongoing pilot projects. This could include technical testing and evaluation of operational loss models and methodologies, or other alternative habitat evaluation methods.

Construction and inundation losses have a unique role within the Fish and Wildlife Program in relationship to wildlife species. Wildlife habitat inundated by the dams no longer exists and the Program's mitigation effort focused on replacing protecting and enhancing the remaining habitat through the acquisition, restoration and enhancement of lands containing priority habitats for wildlife. Operational impacts have an ongoing effect that changes with the nature of the operations of the hydrosystem. While some operational impacts may include continued erosion of terrestrial habitats, others are more functional in nature. Similar to Construction and Inundation, mitigation may focus on protecting lands with some level of ecological function along with enhancing habitat conditions over the long-term. In many cases, the ecological process of the river have been altered to the point where the river no longer interacts with its floodplain.

Operational impact mitigation needs to focus on reconnecting the river and its floodplain (e.g. topographic alteration, alteration of operations) and/or replacing the effects of the river with human intervention (planting where natural recruitment is no longer occurring due to reduced riverine processes). These actions likely will have localized benefits, but due to costs and manpower, likely cannot be applied at the scale needed to fully mitigate operational impacts. The protection and restoration of existing habitats can only partially mitigate for the effects of operational impacts that have disrupted food chains or caused other eco-systemic effects.

Due to the unique nature of operational impacts, an environment where fish and wildlife intersect, the Council should seek out mitigation with dual benefits and strive to mesh both fish and wildlife resources in the development of these ecosystem-based approaches. Projects that re-establish floodplain habitat; that restore fish passage to previously blocked areas; or that reduce the ramping rates of hydro projects allowing reliable edge habitats to form in riparian areas all provide benefits to both fish and

wildlife populations. Often operational impacts might be addressed and mitigated in a similar fashion as the Council would address the impacts on fish. Moreover, the Council should encourage coordination between Wildlife Managers and Fisheries Managers for the development of ecosystem approaches to mitigation that benefit both fish and wildlife resources, while keeping in mind that not all operational impacts to wildlife will be addressed by projects at rivers edge¹.

The following describes several approaches for addressing the impacts of hydro systems operations on wildlife populations.

Operational/Secondary Losses

Wildlife Managers are divided on the level and nature of technical analysis needed to adequately characterize wildlife impacts resulting from the operation of the Federal Columbia Basin Hydropower system. Managers are in agreement that these impacts vary widely from hydro project to hydro project in both nature and extent. The upper river storage projects are widely believed to suffer the greatest unmitigated losses due in part to the wide range of operating levels and immediate downriver and floodplain impacts not found in the lower “run of the river” projects. However, the effects of hydropower system operations extend throughout the river, even to the estuary.

The complex nature of operational and secondary impacts to wildlife makes their full quantification and characterization challenging. Previously funded work has greatly improved our understanding of the nature of operational impacts, and consequences to wildlife habitats and populations, but the ability to extrapolate that information to other hydro projects is limited, and other impact types has not yet been demonstrated. (See http://www.nwcouncil.org/media/7149707/102115mfwp-ktoiframework-guide_final.pdf) - A quick guide to a Framework for assessing Operational Losses). There is a general desire amongst the managers to have some landscape level, basin wide approach but no mutually agreed to pathway to achieve it. There are several well developed peer reviewed assessment methodologies currently in use in the Columbia Basin that could help inform regional negotiations for long-term agreements. However, new studies needed to fully understand the extent of these losses could take many years and cost millions of rate payer dollars while the unmitigated losses continue to accrue. In recognition of this point, the Council’s Program calls for negotiated agreements to address operational losses between the Bonneville Power Administration and the management agencies and tribes. However, the critical uncertainties surrounding the nature and magnitude of operational impacts remain a significant concern for the wildlife managers when considering the adequacy of any long term agreement. The managers believe these concerns can, to some extent, be addressed through reopener clauses in agreements, shorter term agreements with reassessment and renewal clauses and/or more robust conservation funding provisions.

¹ For a history of the Council’s Wildlife Program see Appendix 1

The level of comfort with moving to agreements in the absence of consistent and comprehensive analysis of impacts varies by management entity and hydropower project based on the extent of past analysis and magnitude and complexity of unmitigated impacts. While it is expected that all operational losses will ultimately be addressed through agreements, the timing and nature of those agreements will be determined by the needs of the individual parties to those agreements. Some managers may opt for peer reviewed assessment methodologies currently in use in the Columbia Basin, or more extensive and intensive assessment of impacts prior to reaching agreement with the funding agency. Others may be comfortable moving forward based on existing knowledge of the nature and extent of the impacts in the interest of offsetting those impacts in the near term.

Because of the complexity of these issues there is concern from many regional F&W managers that the current agreement models may not be an appropriate approach. This is because agreements, in the absence of full knowledge, may not effectively capture potentially significant impacts to fish and wildlife that we just do not fully understand right now. There was a lot of discussion at WAC about this over the last year, which essentially came down to two approaches; One, either take the time and use the resources necessary to understand these complexities before signing agreements (i.e., as stated above using peer reviewed assessment methodologies or more extensive and intensive assessment of impacts) or; recognize that you may not fully understand these complexities, proceed with agreements as a practical manner, but recognize the critical uncertainties and accommodate them, perhaps with a "re-opener" clause in agreements.

It is important to keep in mind that most "mitigation" to date has been "compensation", in that the lost habitats from inundation are "replaced" via the purchase or improvement of other lands to create, improve, or maintain their wildlife values. In operational and secondary losses, protection of functioning habitats along with securing long-term restoration opportunities may provide some localized assurance of wildlife habitat maintenance, however, the overall scale of impacts to fish and wildlife are functionally ongoing as processes, so they may not be (completely or simply) replaceable with purchased acres. As an example, it might be possible to mitigate the impacts of hydrofacility by modifying ramping to allow successfully planting mudflats or varial zones with vegetation; it might be possible to mitigate the loss of salmon above a dam by carcass placement; these both would be ongoing programs that can't necessarily be replaced by buying and protecting acres somewhere else, however, purchasing lands in which to conduct these activities may be needed.

Technical Approach

Issues

WAC participants raised a number of issues regarding time required and availability of Bonneville funding to carry out the needed assessments. There were also concerns over the ability to transfer the existing assessment tools developed in the Kootenai

basin and in other venues to other Columbia River subbasins (See attached addendum). There was discussions of possibly developing a process that would provide a) an abridged assessment methodology for subbasin level baseline impacts and b) a systemwide estimate of operational impacts rather than carrying out the process at the subbasin level. Several technical issues were discussed, including how the results could be translated into mitigation programs and the potential relationship to ongoing fish mitigation projects.

Pros

This approach would provide a technical and scientific basis assessing wildlife operational losses. It could follow several different paths, from carrying out assessments at the subbasin level, utilizing findings from the Kootenai River Project or focus on developing a basinwide approach.

These types of assessments would provide a quantitative basis for hydrosystem responsibility for wildlife operational losses.

This approach is also consistent with the 2014 Fish and Wildlife Program that calls on: The need for new methods to assess operational losses that incorporate the results of ongoing pilot projects that have explored how best to fulfill that specific need. This could include technical testing and evaluation of operational loss models and methodologies, or other alternative habitat evaluation methods.²

Cons

This approach will require both technical support and funding to develop the tools required to meet either the subbasin or regional approach. There are likely to be additional costs in addressing the issues tied to this approach (See- http://www.nwcouncil.org/media/7149707/102115mfwp-ktoiframework-guide_final.pdf); estimated cost examples). Development of the necessary technical tools and funding for implementation could take years; carrying out the technical (mitigation necessary and inflationary cost for hydro related wildlife operational losses).

Agreements

Issues

Because of the aforementioned complexity, there is concern from many regional F&W managers that the current models for agreements may not be an appropriate approach. This is because agreements, in the absence of full knowledge, may not effectively capture potentially significant impacts to fish and wildlife that we just do not fully understand right now. There was a lot of discussion at WAC about this over the last

² For the Flathead River case study, the existing Army Corp of Engineers (ACE) HecRas model and LiDAR, that was developed for the Columbia River Treaty, were used to quantify the hydraulic changes on the floodplain. Many dams have a working HecRas model and LiDAR potentially available to conduct a baseline assessment in an affordable and timely fashion.

year, which essentially came down to two approaches; 1) Take the time and use the resources necessary to understand these complexities before agreements are reached, or; 2) recognize that you may not fully understand these complexities, proceed with agreements as a practical manner, but recognize the critical uncertainties and accommodate them, perhaps with a "re-opener" clause in agreements or budgets able to deal with long-term uncertainties.

Another concern could be the timing and availability of Bonneville funding and the potential time frame to carry out the necessary agreements.

Pros

Under this approach, Bonneville and regional fish and wildlife agencies and Tribes would negotiate agreements to provide mitigation for the remaining wildlife losses, including wildlife operational losses. These agreements could be similar to agreements in the Willamette Basin and Southern Idaho, or more like many of the accord agreements throughout the basin. Agreements are often less costly than other approaches in that they require a lesser amount of technical assessment but rely on the expertise of the fish and wildlife managers.

Agreements can provide greater management and implementation flexibility for wildlife managers as well as assured funding under terms of the agreement.

This approach is also consistent with the Council's 2014 Fish and Wildlife Program: Mitigation agreements should be considered to settle operational losses in lieu of precise assessments of impacts.

Cons

A lack of formal operational loss assessment means that the losses are not quantified but are based on estimates from wildlife managers. Some managers have expressed concern over negotiated agreements without some quantified estimate of impact due to hydro operation.

Financing multiple agreements in a timely manner could be difficult to include in the Bonneville Fish and Wildlife Program budget. This has the potential to delay mitigation some areas, or would require significant increases in BPA's capital authority.

Combination

Issues

The issues surrounding this option include most of those identified in the technical and agreement approaches, including timing and availability of Bonneville funding and the length of time to complete the process.

Pros

This approach would combine agreements with a modified technical approach to provide a landscape level characterization of the operational impacts of the hydro system which could then inform negotiations for the operational portion of wildlife agreements. This could be tailored to each subbasin using an approach based on the findings of the Kootenai River Studies and tested on the Flathead River system. This approach would appear to be consistent with the Council's 2014 Fish and Wildlife Program which stresses the use of agreements while at the same time recognizing the need for new methods for assessing wildlife operational losses as described in the Introduction.

Cons

This approach will require both technical support and funding to develop the high level, basin-wide assessment process required to meet either the regional approach. There are likely to be additional costs in addressing the issues tied to this approach but likely would be less than required by technical approach.

Definitions

The committee was unable to come to agreement on definitions for operational and secondary losses. Several definitions were proposed for Council consideration.

Alan Wood (MDFWP)

- 1) Operational Impacts - Direct changes in river hydrology, hydraulics, sediment and nutrient availability and/or transport that cascade throughout the ecosystem to alter physical and ecological processes, vegetation communities, which directly affect fish and wildlife communities. Operational impacts can also occur within reservoirs as a result of fluctuating water levels which cause shoreline erosion. Operational impacts are expressed over time and will continue for the life of the hydropower system operation.
- 2) Secondary Wildlife Losses - The indirect changes in ecosystem functions directly attributable to the on-going operation of the hydropower system, such as food web alterations, contaminant concentrations in reservoir sediments, and other systemic changes stemming from the construction, inundation, and/or operation of the hydropower system. Secondary losses also include the changes in human land uses within the historic floodplain enabled by dam operations. All of these changes cause direct reductions in wildlife communities and/or their habitats.

Gregg Servheen (IDFG)

- 1) Operational Impacts - Direct changes in river hydrology, hydraulics, sediment and nutrient availability and/or transport that cascade throughout the ecosystem to alter physical and ecological processes, vegetation communities, which directly affect fish and wildlife communities. Operational impacts can also occur within reservoirs as a result of fluctuating water levels which cause shoreline erosion. These impacts should be assessed and mitigated for in terms of extent,

magnitude, duration, reversibility, timing, frequency, and cumulative effect. These impacts may exceed those of construction and inundation.

Examples:

- Reduction or elimination of spawning salmon in undammed tributaries above FCRPS projects.
- Erosion and degradation of riparian and wetland areas where operations of reservoirs and water flows erode and degrade these habitats.
- Changes from normal historical averages in water temperatures and flows due to water and power management needs of FCRPS projects.

- 2) Secondary Wildlife Impacts - The changes in ecosystem functions attributable to the construction and on-going operation of the hydropower system, such as contaminant concentrations in reservoir sediments, land use changes, and other systemic changes stemming from the construction, inundation, and/or operation of the hydropower system including its network of powerlines, power stations, canals, etc. Secondary impacts also include the changes in human land uses within the historic floodplain enabled by dam operations. All of these changes cause direct effects in wildlife communities and/or their habitats.

Examples

- Loss of marine derived nutrients from returning adult spawning salmon in tributaries.
- Changes in land use resulting from development of the hydropower system, for example, in floodplains below or above FCRPS projects.
- Changes in wildlife connectivity, wildfire frequency, noxious weeds and human disturbance resulting from development of FCRPS powerlines.

UCUT

- 1) Operational Impacts: Impacts to wildlife through direct operations (power production, flood control, fish flows, and etc.) of the hydropower projects that negatively affect wildlife habitats and/or ecological processes.
- 2) Secondary Impacts: Impacts to wildlife from direct and indirect hydropower development that have or had negative effects on wildlife habitats or ecological processes, but have not been mitigated by construction and inundation losses or Operational Impacts.

Revised from comments

- 1) Operational Impacts: Impacts to wildlife resulting from (through) the direct operations (power production, flood control, fish flows, and etc.) of CRB (the) hydropower projects that negatively affect wildlife habitats and/or ecological processes resulting in losses to wildlife species or populations.

Examples:

- Reduction or elimination of spawning salmon in undammed tributaries above FCRPS projects.
- Erosion and degradation of riparian and wetland areas where operations of reservoirs and water flows erode and degrade these habitats.

- Changes from normal historical averages in water temperatures and flows due to water and power management needs of FCRPS projects.
- 2) Secondary Impacts: Direct and indirect Impacts to wildlife that are the result of (from the direct and indirect) the operation and construction of the CRB hydropower (development) system and that have or had negative effects on wildlife habitats or ecological processes, but have not been mitigated by construction and inundation losses or Operational Impacts.

HEP Issues

In the 1970's, the U.S. Fish and Wildlife Service developed Habitat Evaluation Procedures (HEP) to quantify the impacts of changes made through land and water development projects. HEP is an accounting procedure used not only to assess impacts of a project on wildlife habitat but also to assess the success of mitigation activities undertaken to offset the negative effects of a project on wildlife. HEP was widely used throughout the country including the region's fish and wildlife agencies and tribes as the preferred scientific method for assessing wildlife mitigation efforts. Instead of using an acre for acre replacement as a standard for mitigation (under which an acre of high quality wetlands could be replaced with an acre of low quality wetland), HEP uses two measures in determining impacts, acres impacted and habitat value. By multiplying area (usually acres) times the habitat value, a standardized unit (Habitat Unit) is determined for comparison of alternatives. One Habitat Unit equals one acre of optimum habitat. Under HEP, the acres and their habitat value are assessed before the project and at different time periods following completion of the project. A determination of the number of habitat units that would have accumulated over the life of the project⁸ is made. In the same manner, a determination of the number of Habitat Units that would have accumulated for the same time period had the project not been built is also made.

Habitat Unit gains or losses (with and without the proposed action) are then annualized by summing the Habitat Units across all years in the period of analysis and dividing that amount by the number of years in the life of the project. In this manner, pre-operational habitat changes can be considered in the analysis. This calculation results in Average Annual Habitat Units (AAHUs). The difference in Habitat Units (between the analysis with the project and the analysis without the project) represents the project's net impacts on wildlife and also represents the number of habitat units necessary to offset the impact of construction and/or operation of the hydroelectric project. So, for example, a net impact of negative 361 AAHUs means an average of 361 fewer 1-rus will be available every year during the life of the project than would be available if the proposed action was not implemented.

A true HEP analysis thus includes an estimate of "annualized losses" or the number of habitat units which would have been present in each of the previous years had the project not been constructed.

While the modified HEP process implemented in the served its purpose, it was, by necessity imperfect. As more and larger projects were implemented it was clear that this "objective accounting" was an imperfect science. HEP was essentially used as an accounting tool to try and keep a ledger of costs and benefits. This too was imperfect, in that interpretation and understanding of the process was made by individuals and organizations with different perspectives over time.

Due to these imperfections, the movement of the region towards agreements, and general skepticism about the accounting process when applied to habitat quality determination, it has become clear that the region is not going to re-initiate HEP.

The question now is functionally three choices; do we attempt to institute a "better" accounting system, do we have no accounting system beyond the individual agreements that are being made, or do we have some third approach that monitors and estimates the mitigation values and losses and provides regional feedback long term at a broader scale than the individual agreements?

One possibility for the modified or combined approach could be to recommend to the Council that they include as a part of the next F&W program a long term (every five years, every 10 years?) report by Bonneville and each of the parties that have implemented agreements on the state of each agreement; habitat condition, issues, problems, etc. This would provide some of the oversight and feedback that many WAC members appear concerned about giving up with agreements, without instituting some complex unit type accounting that could get us arguing again about it rather than the issue.

APPENDIX 1: History of the Council's Wildlife Program

I. Northwest Power Act of 1980

The Northwest Power Act recognizes the development and operation of the hydroelectric dams of the Columbia River and its tributaries have impacted fish and wildlife resources. The Act calls upon the Council to promptly develop a program to protect, mitigate, and enhance fish and wildlife, including related spawning grounds and habitat, on the Columbia River and its tributaries³ while also assuring the Pacific Northwest an adequate, efficient, economical, and reliable power supply.⁴

The legislative history of the Act and the Act itself are silent on the issues of how wildlife losses should be measured and how habitat acquired for wildlife mitigation purposes should be credited. In authorizing the Council to develop a program that protects, mitigates and enhances fish and wildlife affected by the “development, operation, and management” of the Columbia River Basin hydropower facilities⁵, Congress essentially requires the Council to determine the hydroelectric facilities’ positive and negative impacts on fish and wildlife and to develop an appropriate mitigation response.

Assessing the construction and operation impacts of the Basin’s hydropower facilities through impact assessments and development of mitigation crediting guidelines enables the Council to track whether or not it is fulfilling its obligation to develop a program that protects, mitigates and enhances fish and wildlife affected by the development and operation of the Basin’s hydroelectric facilities.

II. Habitat Evaluation Procedures (HEP)

In the 1970’s, the U.S. Fish and Wildlife Service developed Habitat Evaluation Procedures (HEP) to quantify the impacts of changes made through land and water development projects.⁶ HEP is an accounting procedure used not only to assess impacts of a project on wildlife habitat but also to assess the success of mitigation activities undertaken to offset the negative effects of a project on wildlife.⁷ HEP was widely used throughout the country including the region’s fish and wildlife agencies and tribes as the preferred scientific method for assessing wildlife mitigation efforts.⁸

³ Northwest Power Act, § 4(h)(1)(A).

⁴ Northwest Power Act, § 4(h)(5).

⁵ The Act distinguishes between two types of impacts: 1) Development impacts caused by dam construction and subsequent inundation of land; and 2) Operational impacts caused by fluctuating levels of the river due to flood control operations, etc. The Act expressly requires mitigation for both impacts.

⁶ U.S. Fish and Wildlife Service. 1977. A Handbook for Habitat Evaluation Procedures. Citing manual distributed by the U.S. Fish and Wildlife Service (Division of Ecological Services 1976).

⁷ Northwest Power Planning Council. 1994. Draft Wildlife Plan, version 5. The Wildlife Working Group. Midcontinent Ecological Science Center. 1999. Habitat Evaluation Procedures Workbook.

⁸ Northwest Power Planning Council, 1995. Findings on the Recommendations for Amendments to the Resident Fish and Wildlife Portions of the 1994 Fish and Wildlife Program and Response to Comments, p. 16-209.

Instead of using an acre for acre replacement as a standard for mitigation (under which an acre of high quality wetlands could be replaced with an acre of low quality wetland), HEP uses two measures in determining impacts, acres impacted and habitat value⁹. By multiplying area (usually acres) times the habitat value, a standardized unit (Habitat Unit) is determined for comparison of alternatives. One Habitat Unit equals one acre of optimum habitat. Under HEP, the acres and their habitat value are assessed before the project and at different time periods following completion of the project. A determination of the number of habitat units that would have accumulated over the life of the project¹⁰ is made. In the same manner, a determination of the number of Habitat Units that would have accumulated for the same time period had the project not been built is also made.

Habitat Unit gains or losses (with and without the proposed action) are then annualized by summing the Habitat Units across all years in the period of analysis¹¹ and dividing that amount by the number of years in the life of the project. In this manner, pre-operational habitat changes can be considered in the analysis. This calculation results in Average Annual Habitat Units (AAHUs). The difference in Habitat Units (between the analysis with the project and the analysis without the project) represents the project's net impacts on wildlife and also represents the number of habitat units necessary to offset the impact of construction and/or operation of the hydroelectric project. So, for example, a net impact of negative 361 AAHUs means an average of 361 fewer HUs will be available every year during the life of the project than would be available if the proposed action was not implemented.¹²

A true HEP analysis thus includes an estimate of "annualized losses" or the number of habitat units which would have been present in each of the previous years had the project not been constructed.

III. History of Wildlife Mitigation in the Council's Fish and Wildlife Program

A. 1982 Program

The 1982 Program noted the development and operations of the hydroelectric power system in the Columbia River Basin had both beneficial as well as adverse effects on wildlife.

The Council called on Bonneville to (1) fund a review and analysis of the status of past, present, and proposed future wildlife planning and mitigation programs at each hydroelectric project in the Basin; (2) fund studies to measure the losses of wildlife and wildlife habitat and establish

⁹ The habitat value is known as the Habitat Suitability Index--an indexed value based on the life requirements of a species or community. Midcontinent Ecological Science Center. 1999. Habitat Evaluation Procedures Workbook. Except where noted, the remaining references to HEP procedure in Section II come from this manual.

¹⁰ The "life of the project" starts from the time the project becomes operational. The end of the project life is determined by the construction, or lead, agency.

¹¹ The "period of analysis" includes the life of the project plus gains and losses in wildlife habitat that occur before the project becomes operational.

¹² U.S. Fish and Wildlife Service. 1980. HEP Annualization, Chapter 5. Attached as Appendix B.2 to Audit of Wildlife Loss Assessments for Federal Dams on the Columbia River and its Tributaries prepared by Beak Consultants Incorporated, 1993.

mitigation levels at specific projects and (3) submit a mitigation and enhancement plan for each facility to the Council.

If parties could agree on a level of mitigation for a particular project, then the program called for elimination of any further planning.

B. 1984 Program

The 1984 Program outlined a specific process for addressing the impacts of the development and operation of the Columbia River Basin hydroelectric system on wildlife.

The process included:

1. Development of mitigation status reports by each state to assess the extent to which wildlife populations have been positively and negatively impacted by the construction of hydroelectric projects and the extent to which previous programs have succeeded in mitigating wildlife losses;
2. Development of wildlife loss assessments for each hydroelectric facility in need of further mitigation as identified by the mitigation status reports; [loss assessments then took place over the next half decade]
 - o The program did not specify what method parties were to use to complete loss assessments instead leaving it to Bonneville in consultation with appropriate fish and wildlife agencies, tribes, federal project operators and regulators, and Bonneville customers.
3. Development of mitigation plans to address the impacts identified in the loss statements;
4. Subsequent incorporation of approved mitigation plans or appropriate alternatives into the Council's program.

The 1984 program continued to emphasize that if parties agree that a satisfactory level of protection, mitigation or enhancement for a particular facility has been achieved, then the need for further planning is eliminated.

The 1984 Program also established a process for wildlife habitat land acquisitions including:

1. Determining the need for and level of mitigation at specific hydroelectric projects based on documentation or agreed upon by the appropriate agencies, tribes and project operators
2. Developing a plan for implementing the mitigation project based on the best available scientific knowledge, cost-effectiveness, etc.
3. Documentation that consultation and coordination activities have been done
4. A detailed management plan outlining responsibilities of all involved and describing a plan for monitoring.

C. 1987 Program

The Council incorporated wildlife mitigation plans for Montana's Hungry Horse and Libby dams into the Fish and Wildlife Program.

The Council decided ratepayers should not be held accountable for funding 100 percent of wildlife mitigation at Hungry Horse and Libby facilities. So, to determine ratepayer obligation, the Council selected the Congressional repayment allocation (percent of invested dollars returnable to the Federal Treasury to repay borrowed funds) as a method to determine Bonneville's fiscal responsibility. Using this method, the ratepayers' share was reduced to approximately 77 percent of total mitigation costs for both facilities. The Council made clear that this allocation method was not to be construed as precedent for future mitigation plan decisions because the Council did not think there had been sufficient discussion and analyses of the allocation issue to adopt one method for all future wildlife mitigation plans.

The Council also decided all future wildlife mitigation plans should be considered in program amendment proceedings before inclusion in the program.

Since 1987, the Council has accepted into the program other mitigation proposals allocating ratepayer responsibility differently.¹³

D. 1989 Adoption of Wildlife Mitigation Rule

In 1989, the Council formally adopted the Wildlife Mitigation Rule as an amendment to the 1987 Fish and Wildlife Program.

The Wildlife Mitigation Rule:

- Set an interim goal to protect, mitigate and enhance 35% of the lost Habitat Units over the next 10 years.¹⁴

¹³ For example, instead of basing mitigation on a detailed loss assessment, the Grand Coulee mitigation proposal was based on a "conceptual" goal of acquiring 70,000 acres, or the right to improve and maintain 70,000 acres for the purpose of increasing wildlife carrying capacity (maximum number of animals an area can sustain without suffering habitat damage). The Washington Department of Wildlife performed an estimate of habitat losses based on interpretation of pre-project aerial photos. Losses in terms of habitat were determined for the indicator species using a modification of the U.S. Fish and Wildlife Service's Habitat Evaluation Procedure (HEP). Rather than pursue full redress for losses, the Washington Department of Wildlife proposed to protect the same number of habitat units as were lost due to inundation behind Grand Coulee dam, or approximately 70,000 acres. This was less than one-third of the estimated wildlife and habitat losses caused by Grand Coulee inundation per Washington Department of Wildlife's own estimates. The Grand Coulee mitigation proposal was developed under the supervision of an oversight committee which included representatives of wildlife agencies, tribes, the Bureau of Reclamation, Council staff, Bonneville and utilities.

¹⁴ The Council did not require that the interim goal be tied to each project. Rather, the 35 percent represented an interim goal for basinwide losses.

- The number of lost Habitat Units was determined by the loss statements previously prepared. The Council accepted the loss statements as starting points for mitigation and established an advisory committee to set wildlife priorities and review mitigation plans.¹⁵ The Council agreed there was sufficient evidence of wildlife losses due to construction and inundation to begin on-the-ground mitigation activities even without achieving consensus on the exact amount of mitigation required to satisfy Bonneville's mitigation obligation under the Northwest Power Act.¹⁶
- Based on HEP, the Wildlife Rule expressed wildlife losses in terms of Habitat Units and did not designate a specific crediting ratio for habitat acquisitions. Instead, the Wildlife Rule called on Bonneville, in consultation with other parties, to develop a monitoring and evaluation program. This was never done.
- Called for Council determination of a long-term mitigation goal after all the mitigation plans for hydroelectric facilities were submitted to the Council. Thus, the debate over the power system's ultimate wildlife responsibility was left for the future.
- Called for an independent audit of the loss assessments prior to their final acceptance. The Council recognized disagreement existed over the magnitude of losses presented by the wildlife agencies and tribes. The Council noted that while the final loss numbers could change post-audit, the assessments did contain sufficient evidence of losses to begin mitigation efforts.

E. 1993 Beak Report and Program Amendments

In February 1993, Beak Consultants reported the results of the independent review of the wildlife loss assessments the Council had called for in the 1989 Wildlife Rule. At the Council's request, Beak looked for systematic bias in the way the loss reports were prepared, i.e., did the reports systematically overestimate or underestimate losses. Beak looked at four representative loss assessments (Grand Coulee, McNary, Dworshak, and Lookout Point). The report's major conclusions concerned the omissions that occurred in preparing the loss assessments and the inconsistencies in application of HEP between projects.

Beak noted the loss assessments were less rigorous than typical HEP analysis due to time and money restrictions (i.e., the loss assessments did not assess operational losses, irrigation impacts, cumulative impacts, or annualization¹⁷).

The lack of annualization presented the greatest potential for bias in terms of estimating wildlife losses. The older hydroelectric projects accumulated more impacts than the younger projects yet no mechanism in the loss assessment procedure accounted for the increased impacts. None of the HEP studies assessed the value of habitat before the projects were built despite available

¹⁵ Northwest Power Planning Council. 1989. Wildlife Mitigation Rule and Response to Comments (89-35).

¹⁶ Northwest Power Planning Council. 1989. Wildlife Mitigation Rule and Response to Comments (89-35).

¹⁷ Annualization is a concept related to estimating wildlife losses. Annualization is a process which takes into account annual losses which have occurred from the time of inundation at each project and subtracts from that, habitat units which otherwise would have been lost to other purposes (i.e. losses which would have been caused by turning the habitat into farmland if the project had not been built).

information and Beak found that failure to assess this fundamental issue was a potential source of bias.

After the Beak report, the Council amended the 1987 Fish and Wildlife Program replacing the interim 35 percent mitigation goal with a new goal of full mitigation. The Council again called for the development of a wildlife crediting methodology. The program called on Bonneville to develop and recommend to the Council a process to address operational losses. Bonneville did not pursue this so the Wildlife Working Group comprised of representatives from state and federal fish, wildlife, and land management agencies; tribes; Bonneville; and the PNUCC, developed the plan (see below).

F. Draft Wildlife Plan

Following the 1993 Beak report, the Council decided to issue an RFP for an independent contractor to develop a method to correct the deficiencies that were identified in the Beak report. This resulted in the Draft Wildlife Plan that was included as an appendix to the 1995 program.

Developed by the Wildlife Working Group, the goal of the Wildlife Plan was to define consistent procedures for: (1) standardizing and completing the loss assessments; (2) developing and implementing mitigation plans that will fully mitigate for wildlife losses; and (3) monitoring and evaluating mitigation activities to ensure mitigation actually occurs.

The Wildlife Plan defined “mitigation” as achieving and sustaining the levels of habitat and species productivity for the Habitat Units lost as a result of the construction and operation of the federal and non-federal hydropower system. Habitat Units gained as a result of implementing Bonneville-funded mitigation activities were to be tracked on a mitigation scorecard. In this way, Habitat Units gained due to mitigation efforts, will offset losses.

G. 1995 Program

The Council called for finalizing the Draft Wildlife Plan by March 1, 1996 and funding implementation of the plan.

The Council recognized the completed loss assessments in the program as unannualized losses attributable to the construction of the hydroelectric projects. The Council recommended continued use of the loss assessments to identify wildlife measures to protect, mitigate and enhance fish and wildlife and to continue development of short-term and long-term mitigation agreements.

The Council did not agree to accept the results of the loss assessments, when completed, as full mitigation but indicated it would utilize the assessments to establish a range of total losses caused by the construction and operation of the hydroelectric projects.

The Council called for a consistent system wide method for crediting new wildlife mitigation actions. The Council specifically called on Bonneville and wildlife managers to develop a

method for crediting wildlife benefits from fish projects where the Council recognized some fish habitat projects provided benefits to wildlife as well as to fish.

As for past mitigation, the Council decided to address crediting for past actions as part of the operational loss assessments yet to be completed. Any past benefit resulting from habitat improvement projects on project land or benefits from past dam operation expected to occur in the future would be accounted for in the operational loss assessment along with any negative impacts. Past and future credits would therefore be reflected in the Habitat Suitability Index and, as such, would be fully considered in the calculation of Habitat Units. In this way, Bonneville will receive credit for existing value on any land acquired through the program (by virtue of showing a smaller net impact in terms of Habitat Units).

The Council indicated that the yet to be completed operational impact assessments would not account for benefits to wildlife resources that occurred on project lands with existing funded mitigation plans. Those benefits would be accounted for on the mitigation scorecard and not in the operational loss assessment. So although there was a difference in how mitigation is accounted for on lands with existing funded mitigation plans and those without, in both cases, past and present mitigation effects are taken into account.

H. 2000 Program

The 2000 Fish and Wildlife Program calls for (1) completion of mitigation agreements between Bonneville and fish and wildlife managers for *construction and inundation* losses utilizing a 2:1 crediting ratio¹⁸ and (2) completion of *operational* loss assessments.

The 2000 Program recognized habitat *enhancement* credits on a 1:1 basis -- 1 HU credited for every HU gained when habitat management activities funded by Bonneville lead to a net increase in habitat value.

1. 2:1 crediting

During the 2000 Program amendment process, fish and wildlife managers called for mitigation of all construction and inundation and direct operational losses on a 3:1 basis. The managers called for 3:1 crediting for past as well as future mitigation. Bonneville called for 1:1 crediting on the grounds that anything greater was technically and legally inappropriate.

The Council, analyzing the crediting issue, decided 1:1 crediting was insufficient based on the following:

1. An appropriate crediting ratio must take into account the fact that lands acquired and protected as mitigation have pre-existing wildlife habitat values that are, in most cases, not in immediate danger of complete loss. The act of purchasing and preserving property, without anything more, does not increase the wildlife value of the acquired property.

¹⁸ Under a 2:1 crediting ration, Bonneville is responsible for acquiring two Habitat Units for every one Habitat Unit lost.

Without any actual increase in habitat value, there are no gains against which losses can be credited.

Crediting preserved acres or HUs on a 1:1 basis implies these preserved acres would necessarily have gone to zero absent preservation. While this could happen (i.e. when land is slated to be paved over for a strip-mall), Bonneville usually does not face this imminent threat at the time the land is purchased for mitigation. This threat of imminent development is also not present in enough cases to support an across-the-board crediting ratio of 1:1. Instead, it is reasonable to presume that acquired and preserved acres have a pre-existing value for wildlife that purchase alone does not increase. If purchase does not increase the habitat value of the land, then there should be no credit for the purchase without something more done to increase the habitat value.

Under true HEP analysis, credit is given only for newly-created habitat units. For example, if a parcel of land is acquired for mitigation and 10 Habitat Units are present at the time of acquisition, a HEP analysis gives no credit for those 10 existing HUs unless they otherwise would have been lost to development unrelated to the hydroelectric project. If the acquired habitat would otherwise have been undisturbed but it is improved by projects after acquisition so that 15 habitat units are now present, strict application of HEP results in a credit of 5 units of mitigation.

2. 1:1 crediting is also insufficient because the loss assessments on which mitigation agreements are based do not annualize which means the loss assessments generally represent the low end of the range of legitimate ways to conceptualize the losses. As indicated, the Council's conclusion on this is based on Beak's independent review of the loss assessments.