Fish and Wildlife Program Categorical Assessment, 1980-2022: Wildlife Mitigation

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This is a staff product and has not been reviewed or approved by the Council. This working draft functions as supplementary documentation for the Categorical Assessment presentations and contains information to inform the upcoming amendment process. While elements within this document were developed in collaboration with the region's state and federal fish and wildlife agencies and tribes, the document itself has not been reviewed by anyone other than Council staff and should be considered preliminary. We welcome feedback and/or corrections for future drafts of this documentation.



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Wildlife mitigation

Purpose

The objective of this assessment is to describe the status of wildlife mitigation implemented through the Northwest Power and Conservation Council's Fish and Wildlife (F&W) Program and to describe key topics for the Council and region to consider as we approach the next Program amendment cycle. Numerous issues regarding wildlife losses and mitigation approaches have been resolved through the Crediting Forum, Regional HEP Team (Habitat Evaluation Procedure) and Wildlife Advisory Committee. Other issues remain. This assessment acknowledges differences in policy and perspectives on the status of mitigation throughout the region but does not attempt to resolve any outstanding issues or support any particular perspective. The assessment of wildlife overlaps entirely with the Program's wildlife strategy and incorporates all wildlife strategy performance indicators (SPIs) for which data exist. It also overlaps with a portion of the Habitat Strategy and contributes to one SPI.

Concurrent with this assessment, the Council will be initiating a project review cycle in the spring/ summer of 2025 and the first set of projects will be contemporary wildlife projects. Questions identified in this assessment, along with other targeted questions in the anticipated review, will be provided to project sponsors. Subsequently, information received from sponsors will be incorporated into the final version of this assessment.

Effects of hydrosystem on wildlife

- Development and operation of the hydrosystem has caused various effects for wildlife
- Negative effects (as described in Wildlife section of the Council's F&W Programs) include:
 - o Inundation of floodplain and riparian habitats important to wildlife
 - Fluctuating water levels create barren vegetation zones can expose wildlife to predators
 - Other associated activities have altered land and stream areas, including construction of roads and facilities, draining and filling of wetlands, stream channelization, and shoreline riprapping
 - Construction and maintenance of transmission corridors has altered vegetation, increased access to and harassment of wildlife, and increased erosion and sedimentation of the Columbia River and tributaries

- There may also be beneficial effects for certain species (as described in Wildlife section of Council F&W Programs):
 - Reservoirs create habitat for waterfowl and other focal species that utilize the aquatic zone. Reservoirs also allow for irrigation to occur in arid regions, creating habitat or food that would not otherwise exist.
- The Power Act requires mitigation for wildlife affected by development and operation. We refer to these effects individually construction and inundation impacts and operational impacts
 - The Program defines *construction and inundation* as the wildlife losses that occurred as a direct result of construction of a dam and the flooding of the area upriver of the dam
 - Operational losses cover the direct wildlife losses caused by the day-to-day fluctuations in flows and reservoir levels resulting from the operation of the hydrosystem
- There has also been discussion of "secondary impacts." There is no established definition for this term, but in 2015 the Wildlife Advisory Committee developed a working definition (draft):
 - "The changes in ecosystem functions attributable to the construction and ongoing 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 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."
- Efforts to update the definition of operational and secondary losses were summarized by the Wildlife Advisory Committee in 2015 but no agreement was reached.
 - Parties generally agreed on a definition of operational losses that covered: "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."
 - IDFG added on to this general definition that: 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.

- MTFWP added on to the general definition that: "Operational impacts are expressed over time and will continue for the life of the hydropower system operation.
- Losses/gains by species are outlined in <u>Appendix A</u>

Approach to mitigation

Mitigation for wildlife losses at federal hydro dams occurs through the F&W Program. Losses for each dam are defined and mitigation occurs through protecting or enhancing habitat. That means that this is a habitat-based target, not a population abundance-based target. Protection can occur through fee title acquisition or through a conservation easement, and enhancement can occur in association or separately from protection. BPA provides funding for the power-share of mitigation for losses- not for losses attributed to other authorized purposes of the dams. Once parcels are protected and/or enhanced, the conservation value for which they were purchased must be maintained in perpetuity through O&M. Specific actions are described in a Land Management Plan (LMP) produced by the entity in charge of maintaining the parcel and approved by BPA. BPA receives credit for wildlife mitigation in an amount agreed upon by managers and BPA and applied to the adopted set of losses listed in <u>Appendix A</u> (more details below).

Crediting occurs either in acres (if there is an agreement to do so) or in habitat units. Habitat units (HUs) are determined using the U.S. Fish and Wildlife Service Habitat Evaluation Procedure (HEP; USFWS 1980). The USFWS defines HEP as "a species-habitat approach to impact assessment; and habitat quality for selected evaluation species is documented with … the Habitat Suitability Index (HSI). This value is derived from an evaluation of the ability of key habitat components to supply the life requisites of selected species of fish and wildlife. … Optimum conditions are those associated with the highest potential densities of the species within a defined area." in 2008, the Council prepared a white paper on Wildlife (Hirotsu 2008) including definitions of HEP, Habitat Units, and a term called "wildlife stacking":

"The USFWS developed HEP to quantify impacts on wildlife habitat. 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."

Multiple HEP model species are required to evaluate all habitat variables of concern within the riparian forest cover type (One species might represent snag presence, another basal tree area, another canopy, etc. The habitat unit numbers for each HEP model species are then added (stacked) to establish the total number of habitat units (±) for this cover type.

This concept is the basis of habitat unit "stacking" used in development of the hydro facility loss assessments and HU gains associated with related mitigation/compensation projects.

In an ideal situation, proper application of HEP principles (USFWS 1980, 1980a) require that wildlife managers mitigate/compensate for the same cover types ("in kind") as stated in hydro facility loss assessments and use identical HEP species models/stacking as those employed to determine the losses. This "ideal" situation, however, rarely occurs. Instead, wildlife managers purchase compensation lands that include dissimilar cover types and/or sub-cover types of those lost e.g., a riverine wetland was lost, but an isolated "bog" wetland was acquired to mitigate for the lost riverine wetland. This raises several key questions that must be addressed. First and foremost, "are loss assessment HEP model species applicable to the dissimilar or sub-cover types"? If not, "what HEP model species should be used to evaluate dissimilar or sub-cover types"? Lastly, "how will the stacking issue be addressed relative to dissimilar or sub cover types"?

This approach toward mitigation and crediting was developed over several decades through Fish and Wildlife Programs and external advisory groups. Program measures detailing the use of this approach are described below.

	Measures
1982	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 mitigation levels at specific projects and (3) submit a mitigation and enhancement plan for each facility to the Council
1984	 Called for project-by-project assessment and plans for wildlife mitigation "Brown book" assessment of losses developed in mid-1980s
1987	The Council incorporated wildlife mitigation plans for Montana's Hungry Horse and Libby dams into the Fish and Wildlife Program
1989	Wildlife Mitigation Rule – interim mitigation goals and 10-year mitigation effort until long-term goal adopted
1993	Interim goal replaced by full mitigation; losses tables added as starting point for mitigation; audit conducted (Beak); called for crediting method
1995	Loss estimates recognized as unannualized construction and inundation losses; call for mitigation agreements

Table 1. Brief timeline of wildlife mitigation measures in the Council's Fish and Wildlife Programs and related documents

2000	Completion of mitigation agreements for 2:1 ratio of unaddressed construction losses; assessment of operational losses
2009	Called on BPA and managers to reach agreements on completing Construction and Inundation losses by 2011. Set forth conditions for agreements. Recognizing differing perspectives on crediting, established the Wildlife Crediting Forum to resolve differences and issues between BPA and managers. Adds in concept of Habitat Unit Stacking
2010	Wildlife Crediting Forum
2013	Wildlife Advisory Committee chartered
2013	Wildlife Advisory Committee chartered Calls for completion of C&I losses by 2016. Asks Wildlife Advisory Committee to report on how to resolve Operational losses. Continues to endorse HEP as preferred method of evaluation
2013 2014 2015	Wildlife Advisory Committee charteredCalls for completion of C&I losses by 2016. Asks Wildlife Advisory Committee to report on how to resolve Operational losses. Continues to endorse HEP as preferred method of evaluationRegional HEP Team WAC Report on subregional issues; some resolved, some remain

Status assessments

The earliest wildlife mitigation was initiated just after the 1982 F&W Program. Measures described the need to consider wildlife when planning, managing, and operating the hydrosystem, and to do so through a new position – a wildlife coordinator. The first step was to assess the status of wildlife planning and mitigation programs for each hydroelectric project and to develop a status report.

1982	 Impact assessments for a list of dams, both federal and non-federal, in the near term Research to understand the effect of transmission corridors on wildlife
1989	Mitigation status reports have been completed for all federal hydro projects in Columbia Basin

Loss assessments

1982	Call for mitigation status reports
1987	Loss statements based on the mitigation status reports
1989 Wildlife Rule	 Initial loss assessments provide starting point for beginning mitigation Develop loss assessments for remaining dams and mitigation plans; plans must identify mitigation targets (e.g., habitat units to acquire) Not everyone agreed on the magnitude of the losses presented by the wildlife agencies and tribes, so called for independent audit of loss statements before they would be adopted in the Program. This audit became known as the Beak Report
1993, phase 4	 Within 90 days, fund loss assessment at Cascade project Assess operational losses at federal projects
1994	 Upon submission of the Corps final report, amend wildlife losses and mitigation credit for the Lower Snake River Fish and Wildlife Compensation Plan into the Columbia River Basin program. Within one year, adopt final loss estimates Within three years following the adoption of this program, develop long-term agreements for all wildlife mitigation
2000	 An assessment should be conducted of direct operational impacts on wildlife habitat. Subbasin plans will serve as the vehicle to provide mitigation for direct operational losses and secondary losses. Annualization will not be used in determining the mitigation due for these losses. However, where operational or secondary losses have already been addressed in an existing wildlife mitigation agreement, the terms of that agreement will apply. Council will consult with the wildlife managers and Bonneville on the value of committing Program resources at this time to assessing direct operational impacts on wildlife habitat. Operations loss assessment work under way in the Kootenai Subbasin in 2008. The wildlife managers and Bonneville should also consider using mitigation agreements to settle operational losses in lieu of precise assessments of impacts.
2014	Where appropriate prioritization exists and agreements exist on the methodology, complete wildlife loss assessments for losses caused by operation of the hydropower projects

Crediting for mitigation

1993, phase 4	Crediting for existing mitigation, new mitigation, fish/wildlife lands
1994	Because there are inconsistencies throughout the basin in how to determine the amount of credit given for acquisitions of habitat involving the protection of existing habitat, develop a consistent, systemwide method for crediting new wildlife mitigation actions for adopted losses
1995	The Council recognizes some fish habitat projects provide benefits to wildlife as well as fish. Because of this, the Council calls upon Bonneville and the wildlife managers to develop a method for crediting wildlife benefits from fish projects
2000	 2:1 crediting for all habitat units not yet mitigated; does not apply to settled losses Habitat enhancement credits should be provided to Bonneville when habitat management activities funded by Bonneville lead to a net increase in habitat value when compared to the level identified in the baseline habitat inventory and subsequent habitat inventories. This determination should be made through the periodic monitoring of the project site using the Habitat Evaluation Procedure (HEP) methodology. Bonneville should be credited for habitat enhancement efforts at a ratio of one habitat unit credited for every habitat unit gained.
2009	The Council adopted and continues to endorse the 2:1 crediting ratio for the remaining habitat units. However, when loss estimates appear inaccurate due to habitat unit stacking and those inaccuracies cannot be resolved through use of a different, cost-effective tool or approach recommended by the crediting Forum and approved by the Council, then the 2:1 ratio will not apply to the remaining stacked habitat units
2014	 HU credits for habitat enhancement BPA and managers will reach agreement on how fish and wildlife projects are credited toward losses The Council will continue to endorse habitat units as the preferred unit of measurement for mitigation accounting and the HEP methodology as the preferred method for estimating habitat units lost and acquired. Parties to a wildlife mitigation agreement may develop and use another method for evaluating potential mitigation actions if, in the Council's opinion, that alternative method adequately takes into account both habitat quantity and quality adequate to mitigate for the identified losses

Mitigation plans and settlement agreements

1987	 Develop mitigation plans to address losses and amend into Program Settlement agreements may substitute for mitigation planning if all parties agree Libby and Hungry Horse mitigation plan adopted into Program
1989 Wildlife Rule	 Evaluate mitigation plans against specific criteria Mitigation at non-federal projects occurs through FERC licensing/ relicensing agreements
1993, phase 4	 5-year interim agreements with Idaho, Oregon, appropriate tribes within 90 days of Program adoption Develop long-term agreements for all wildlife mitigation within 3 years of Program adoption
1994	To ensure that wildlife mitigation proceeds expeditiously, within 90 days following the adoption of this program consummate interim five-year agreements, similar to the interim Washington Wildlife Mitigation agreement, with the states of Idaho and Oregon and appropriate Indian tribes
2000	To provide an orderly transition between the past fish and wildlife program and this program, Bonneville and the fish and wildlife managers should complete mitigation agreements for the remaining habitat units. These agreements should equal 200 percent of the habitat units (2:1 ratio) identified as unannualized losses of wildlife habitat from construction and inundation of the federal hydropower system as identified in Table 11-4, which is included in the Appendix to this program. This mitigation is presumed to cover all construction and inundation losses, including annualized losses. In addition, for each wildlife agreement that does not already provide for long-term maintenance of the habitat, Bonneville and the applicable management agency shall propose for Council consideration and recommendation a maintenance agreement adequate to sustain the minimum credited habitat values for the life of the project.
2009	 Complete mitigation agreements for the remaining habitat units identified in Table C-4 representing the unannualized losses of wildlife habitat from construction and inundation of the federal hydropower system. Develop agreements by 2011 and report back to the Council on progress Wildlife mitigation agreements should include the following elements: Measurable objectives, including acres of habitat types and number of habitat units by species to be acquired, and a statement estimating the contribution to addressing the identified wildlife losses Demonstration of consistency with the wildlife policies, objectives, and strategies in the Council's Program

	 Adherence to the open and public process language found in the Northwest Power Act When possible, protection for riparian habitat that can benefit both fish and
	wildlife
	 Incentives to ensure effective implementation of the agreement, plan or action, with periodic monitoring and evaluation (including a periodic audit) and reporting of results
	 Provisions for long-term maintenance of the habitat adequate to sustain the minimum credited habitat values for the life of the project
	 Sufficient funding to demonstrate a substantial likelihood of achieving and sustaining the wildlife mitigation objectives.
2014	 Complete mitigation agreements for C&I by 2016, including O&M When possible, achieve wildlife mitigation through long-term agreements, including objectives, committed funding, and periodic monitoring and evaluation

Criteria for land acquisition and monitoring

1982	The 1982 Program called for developing criteria for how land could be acquired to mitigate the effects of the hydrosystem on wildlife
1987	Land acquisition requires associate management plan that includes O&M requirements, objectives, and associated monitoring
1989 Wildlife Rule	 Contained criteria for protection and monitoring and specified that BPA shall develop a comprehensive program to monitor and evaluate the effectiveness of the wildlife Program. BPA rate payers responsible for hydropower share of mitigation
2000	Habitat acquired as mitigation for lost habitat units identified in Table 11-4 must be acquired in the subbasin in which the lost units were located unless otherwise agreed by the fish and wildlife agencies and tribes in that subbasin.
2014	 Develop standardized approach to monitoring wildlife response to mitigation Maintain conservation values of parcels
2020	2 SPIs regarding Land Management Plans (LMPs) and maintaining conservation value

Goals and objectives

1989 Wildlife Rule	Interim goal is to mitigate 35% of lost HUs over next 10 years
1994	For purposes of this program, mitigation is defined 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.
2014	 Goal: Mitigate for wildlife losses Objective: Acquire habitat units (HU) to offset losses or fulfill settlement agreements Bonneville and the fish and wildlife agencies and tribes will complete wildlife loss mitigation agreements for at least the remaining construction and inundation losses by 2016
2020	 Goal: Mitigate for wildlife losses caused by the development and operation of hydropower dams Objective 1: Complete mitigation for construction and inundation losses over the next five-year period by acquiring lands or through settlement to turn the entire C&I portion of the Wildlife Loss Mitigation table to Dark Blue or Light Blue Objective 2: Assess and mitigate for losses due to the operation of the hydroelectric facilities. Mitigate for the assessed losses of wildlife associated with the ongoing operations of Hungry Horse and Libby at 26,321 acres for Hungry Horse Dam and 35,571 acres at Libby Dam. The objective for the next five-year period will be to turn the Purple portions of the Operation Loss portion of the Wildlife Loss Mitigation Table Yellow or Light Blue Objective 3: All parcels and/or management units operate under an approved management plan Objective 4: Maintain existing habitat mitigation values on the parcels and/or management units as described in their individual management plans

Decision making and planning

1989 Wildlife Rule	 Called for establishing an advisory committee, chaired by the Council and staffed by the region, to review mitigation plans from a basinwide perspective and make recommendations to the Council on priorities. This role was taken on by the Columbia Basin Fish and Wildlife Authority (CBFWA) Council approves all loss assessments and mitigation plans before implementation by Bonneville Implementation of specific actions described in 5-year action plan
1994	 Before any agreement is signed, the Council will review the agreement in an open, public process, and determine whether it is consistent with this program The Council will monitor the Federal Energy Regulatory Commission licensing and relicensing proceedings and comment or intervene where appropriate.
2000/2009	Project selection will be guided by subbasin plans incorporating wildlife focal species and management strategies. The subbasin plans will reflect the current basinwide vision, biological objectives, and strategies and also will outline more specific short-term objectives and strategies for achieving specific wildlife mitigation goals
2009	 The Council will initiate a Wildlife Mitigation Crediting Forum to 1) recommend a commonly accepted ledger of habitat units acquired; 2) recommend to the Council ways to resolve issues about accounting for habitat units; and 3) develop a common data base for tracking, assigning and recording habitat units. Crediting criteria include: (1) Project areas must be permanently protected and dedicated to wildlife benefits through covenants, easements, fee title acquisitions or other appropriate agreements for the life of the hydroelectric project, (2) Projects must benefit priority wildlife habitat, species, or populations as defined by federal, state, or tribal wildlife management plans or subbasin plans, (3) A project-area management plan must be completed., and (4) A long-term funding agreement adequate to support implementation of the management plan must be in place. As part of the crediting forum, the Council will work with Bonneville and the managers to develop a comprehensive agreement on the proper crediting method for construction and inundation losses or strategies that will allow parties to reach long term settlement agreements.
2014	 Implement and coordinate acquisition and enhancement Wildlife Advisory Committee make recommendations by 2015 on need for future HEP reporting and tracking, and approach to operational loss assessments

Fish and Wildlife Program strategies associated with assessment

The range of wildlife actions that have appeared in Programs over the last 40 years fall into two contemporary Program strategies – Wildlife and Habitat (Table 2). Each of these has associated Strategy Performance Indicators (SPIs) that were catalogued in the 2020 addendum. These SPIs align closely with data needed to track the Wildlife goal and objectives in the 2020 addendum (available in <u>Program Tracker</u>).

Table 2. Summary of Fish and Wildlife Program strategies and strategy performance indicators (SPIs; NPCC 2020) associated with the Wildlife portion of the Habitat Assessment

Strategy SPI	Description
Wildlife	Mitigate wildlife losses caused by the development and operation of hydropower dams in the Columbia River Basin.
W1-1	Amount of construction and inundation mitigation acquired at each hydro-facility or number of settlement agreements covering C&I losses.
W2-1	Number of operational loss assessments or settlement agreements covering operational losses completed for each hydro-facility.
W3-1	Number of parcels and/or management units being managed though an approved management plan.
W4-1	Number of parcels or management units that report concerns related to meeting their habitat mitigation values.
Habitat	Protect, enhance, restore and connect aquatic and terrestrial habitat. Protecting existing quality habitat is as important as enhancing degraded habitats.
E1-1	Acres of habitat protected by purchase or lease



Summary of mitigation, by location

Figure 1. Location of dams and associated facilities comprising the Federal Columbia River Power System (FCRPS)

Data sources

We summarized the status of wildlife mitigation throughout the basin for the Federal Columbia River Power System (FCRPS) dams and associated facilities, organized by geographic location. This summary draws on information from:

1. Settlement agreements and MOAs (see appendix B)

Settlement agreements and MOAs are listed in Appendix B. These agreements include a description of total acreage or HUs to be acquired over a period of time and a total amount of funding available to do so. Some agreements include lists of parcels that were

previously purchased or enhanced and for which BPA will be given mitigation credit in exchange for continued O&M funding or other agreed terms.

2. Wildlife Crediting Forum Report (<u>NPCC 2011</u>), revised based on new information

The Wildlife Crediting Forum was an attempt by wildlife managers and BPA to develop a complete ledger of the acquisitions and enhancements that had been implemented, and the associated mitigation credits that BPA would receive. BPA hosts the table of data from this forum on CBFish. Subsequent to this effort, there have been some revisions to the amount of habitat units that BPA receives as credit. Those modifications occurred following additional HEP surveys and information provided by managers.

3. Wildlife Advisory Committee meeting <u>summaries</u>

Meeting minutes and other archived information from the Wildlife Advisory Committee provide context around key issues that were discussed at the time and the perspectives of the people involved.

4. Regional HEP Team summary <u>reports</u>

The Regional HEP Team project was closed out at the end of 2015. The coordinator of the RHT, Paul Ashley, produced a series of reports on the resolved and outstanding mitigation issues that exist in different regions of the basin. Those reports are available on StreamNet.

5. PISC 1056S report on acquisitions

BPA generates a report titled "PISC 1056S" on land acquisitions for both fish and wildlife. This contains information on project sponsors, wildlife areas, acreage, purchase totals, and more. The report is focused on those assets in which BPA maintains some level of investment, including ongoing O&M. It does not include acquisitions or conservation easements for the Montana Wildlife Settlement Agreement or the Dworshak Settlement Agreement.

6. Sponsor uploads from the 2017 Project Review

As part of the NPCC project review process, wildlife project sponsors provided summaries of the implementation of their project, which typically contained lists of acquired or enhanced parcels. They also provided Land Management Plans, when available, which contained a history of the project and descriptions of the efforts, to date.

7. NPCC Program Tracker Lands Mapper

The Lands Mapper shows the location of parcels acquired outside a settlement agreement. Information is provided by the realty department at BPA. Some wildlife lands do not appear in the mapper if they were enhanced but not acquired, if they represent older acquisitions, or if they were part of a settlement agreement <u>and BPA does not retain</u> any kind of ownership (i.e., not a BPA asset).

Method to assess mitigation credit status

Mitigation prior to 2012 was reviewed by the Wildlife Crediting Forum and credits- either habitat units or acres- were assigned to a particular dam to mitigate for losses at that dam in the 2011 Wildlife Crediting Report. Some additional HEP surveys or re-assigning of habitat units credited to dams occurred through the Regional HEP Team up until 2015. Since that time, mitigation credits (as habitat units or acres) have only been assigned to a dam or set of dams when there is a wildlife settlement agreement in place that defines how many credits Bonneville may receive for acquisition, protection, or enhancement actions at each parcel.

For mitigation implemented through settlement agreements, we tallied acreage or habitat units purchased through projects sponsored by parties to the agreement and which explicitly note the settlement agreement in the project description.

For all mitigation implemented outside of settlement agreements, mitigation credits are not assigned to a dam and it is not possible to determine whether progress has been made in resolving any outstanding mitigation. For the purpose of assessing the status of mitigation, we relied on the 2011 Crediting Report as the baseline for all mitigation outside of settlement agreements. When there was disagreement between values reported in 2011 and in the 2015 Regional HEP team reports, we treated the more recent report as the controlling document. The only limitation to this approach was that the 2011 report presents dam-by-dam totals and the 2015 reports present aggregated crediting totals by sub region (e.g., lower Columbia River). In some cases, the difference between presenting crediting totals for each individual dam versus totals for the aggregate of dams by subregion affects whether mitigation is considered complete. We present both individual dam and aggregate dam crediting totals.





Upper Columbia Tributaries



Figure 3. Location of Libby, Hungry Horse, and Albeni Falls dams in the Columbia Basin, USA

Loss assessments and parties implementing mitigation

Construction and inundation resulted in a loss of 23,750 habitat units at Hungry Horse Dam, 32,950 HU at Libby Dam, and 4,225 Ac + 23,233 HU at Albeni Falls Dam (Table 3). Operations resulted in a loss of 26,321 HU at Hungry Horse Dam, 35,571 HU at Libby Dam, and 2,002 acres along with unassessed losses at Albeni Falls Dam (Table 3).

- Hungry Horse/Libby Dam
 - Impact assessment completed in 1984 by Montana Department of Fish, Wildlife, and Parks (MFWP 1984a; MFWP 1984b)
 - Settlement agreement with MFWP (Appendix B)
 - No C&I agreement with Confederated Salish and Kootenai Tribes
 - KTOI + FWP collaborating on assessing and mitigating Op losses at Libby as of 2017 Project Review
- Albeni Falls
 - Impact assessment completed in 1988 by IDFG (Martin et al. 1988)
 - C&I and Op agreement with IDFG
 - C&I MOA with Kalispel Tribe, no Op agreement (Appendix B)
 - No C&I or Op agreement with Coeur d'Alene or Kootenai Tribe of Idaho

At Libby and Hungry Horse, C&I mitigation occurs through the settlement agreement and is implemented by MFWP. For operational losses, FWP and KTOI are collaborating on mitigation. At Albeni Falls, mitigation occurs through a combination of settlement agreements (with IDFG; C&I and Op Losses), under an MOA (with the Kalispel Tribe; C&I), and through projects or Accords (Coeur d'Alene Tribe and Kootenai Tribe of Idaho; C&I).

Table 3. Construction and Inundation (C&I) and operational (Op) loss assessments for Hungry Horse Dam, Libby Dam, and Albeni Falls. Losses reported in habitat units (HU; see Appendix A for details; NPCC 2014) unless there is a settlement agreement in which case losses reported in acres (Ac) and values match those in settlement agreement or MOA. Entity listed for each dam is either the settlement/ MOA party or a project sponsor implementing wildlife mitigation.

Project	Site	Entity ¹	C&I Loss	Op Loss
Hungry Horse Dam	Flathead	FWP	23,750 Ac	26,321 Ac ²
Libby Dam	Kootenai	FWP	32,950 Ac	35,571 Ac ²
Hungry Horse and Libby Total			56,700 Ac	61,892 Ac ²
Albeni Falls Dam	Pend Oreille	IDFG	4,225 Ac	2,002 Ac
Albeni Falls Dam	Pend Oreille	KT Tribe	12,794 HUs	Not assessed
Albeni Falls Dam	Pend Oreille	CDA; KTOI	10,439 HUs	Not assessed
Albeni Falls Total			4,225 Ac + 23,233 HU	2,002 Ac + remainder not assessed

¹ Montana Fish, Wildlife, and Parks (FWP); Idaho Fish and Game (IDFG); Kalispel Tribe (KT); Coeur d'Alene Tribe (CDA); Kootenai Tribe of Idaho (KTOI)

² Operational losses for Libby and Hungry Horse Dams appear in NPCC 2020.

Status of mitigation

Libby and Hungry Horse

- C&I covered in settlement agreement is fully mitigated
- Operational losses assessed
- Initial mitigation for Op losses at Libby Dam

Albeni Falls

- IDFG
 - C&I mitigated
 - OP loss mitigated through settlement and implemented as restoration. 2018 MOA included 624 acres already mitigated and 1,378 to mitigate through enhancement According to IDFG (personal communication, Pete Rust) as of August 2024, 584 of the 1,378 acres have been mitigated and a total of 794 acres of enhancement remain
- KT
- o C&I largely mitigated (941 HU left)
- No Op losses have been assessed or mitigated
- CDA and KTOI
 - Remaining C&I losses to be settled are 13,655 HU
 - No Op losses have been assessed or mitigated

Table 4. Status of mitigation for construction and inundation (C&I) and operational (Op) losses at Hungry Horse, Libby, and Albeni Falls dams. Mitigation is shown in habitat units (HU) or acres (Ac), depending on whether losses have been settled (see Table 3). Following NPCC 2000, any remaining losses outside of a settlement agreement were to be acquired at a 2:1 ratio (i.e., two habitat units acquired for every one lost).

Project and sponsor ¹	C&I mitigated	C&I remaining	Op mitigated	Op remaining
Hungry Horse FWP	See below	0 Ac	0 Ac	26,321 Ac
Libby FWP (C&I) and FWP + KTOI (Op)	See below	0 Ac	107.6 Ac ²	35,463.4 Ac
Libby and Hungry Horse Total	272,104 Ac ³	0 Ac	107.6 Ac	61,784.4 Ac
Albeni Falls <i>IDFG</i>	4,225 Ac	0 Ac	1,208 Ac	794 Ac
Albeni Falls <i>KT</i>	11,853 HU⁴	941 HU	0 HU	Not assessed
Albeni Falls CDA; KTOI	6,392 HU	13,655 HU⁵	0 HU	Not assessed
Albeni Falls Total	4,225 Ac + 18,245 HU	14,596 HU	2,002 Ac	Not fully assessed

¹ Montana Fish, Wildlife, and Parks (FWP); Idaho Fish and Game (IDFG); Kalispel Tribe (KT); Coeur d'Alene Tribe (CDA); Kootenai Tribe of Idaho (KTOI)

² Total from 2017 project review- Kootenai River op loss assessment, accomplishments 2011-2016. <u>https://nwcouncil.app.box.com/file/163096104607?s=n2v8tmdp7r16k79nos2d2fciwnyg31eq</u>.

³Total from 2019 FWP report on wildlife mitigation <u>https://fwp.mt.gov/conservation/habitat/wildlife-mitigation-trust</u>

⁴Total from 2017 project review table + recent purchases in CBfish. HU totals reflect MOA ratio of 2.25 HU/Acre.

⁵ Calculation of C&I remaining is influenced by 2:1 crediting. Pre 2001 = 831 HU acquired; unmitigated loss in 2001 doubled and total =19,216 HU; Post 2001 acquisitions = 5,561 HU. Remaining C&I = 13,655 HU.

Discussion

Libby and Hungry Horse

- Data on parcels comes from report released every five years. They are not available from CBfish nor are the GIS data available.
 - Montana C&I parcels do not appear in BPA reports or in lands mapper. Reported totals are current as of 2019. Expecting another 5-year report to be released soon.
 - Montana op loss parcel(s) do not appear in BPA reports or lands mapper. Total current as of 2017. Has the reported value changed since that time?
- Where are land management plans?
- Are conservation values being maintained?
- How will operational losses be mitigated? New agreement?
- Are all parties part of settlement or funded to mitigate? Do all parties agree that C&I losses are settled via Montana agreement?
- Do acquisitions prior to 1980 or prior to settlement agreement count toward the total? Pre-act mitigation was discussed in the Wildlife Crediting Forum. It was determined that this was an issue with varying significance throughout the basin and should be addressed by managers within each subregion. Because mitigation for C&I in Montana was already complete at the time of this forum, there is no subregional review addressing pre-act mitigation for Montana. For construction and inundation losses, it is really just an inconvenience to not have an established value for the ledger, but it is not a consequential issue because mitigation has been completed. On the other hand, operational losses were recently adopted. Program measures had identified enhancement efforts as critical for addressing operational losses and some of these go back decades in Montana. It is unclear to what degree, if any, any pre-act mitigation or enhancement efforts count toward operational losses.

Albeni Falls

- RHT expressed concerns about habitat unit stacking at Albeni Falls and that the reported HUs mitigated thus far are an underrepresentation of the total mitigation that has occurred (Ashley 2015b).
- In the 2018 MOA between IDFG and BPA, BPA characterizes their perspective that Albeni Falls should be mitigated at a 1:1 ratio (i.e., no 2:1 crediting) because of the potential errors from HEP surveys.
- In assessing the status of implementation, we deferred to parcel acreage or HUs reported in settlement agreements or MOAs, or information reported in CBFish or by the Regional HEP team. The parcel information available in the various CBfish reports or other data sources does not add up to the totals reported in agreements. It would be useful to have a database that matches those reported totals.
- There were also challenges in combining different data sources because there was some ambiguity about different names of parcels potentially referring to the same parcel- this could cause double counting or missed counting of acres/ HUs
- Are conservation values being maintained and are O&M budgets adequate?



Upper Columbia Mainstem

Figure 4. Location of Grand Coulee and Chief Joseph dams in the Columbia Basin, USA

Loss assessments and parties implementing mitigation

Construction and inundation resulted in a loss of 111,515 habitat units at Grand Coulee Dam and 8,833 HU at Chief Joseph Dams (Table 5; NPCC 2014). Operational losses have not been assessed.

- Grand Coulee
 - Impact assessment completed in 1986 by WDFW (Howerton et al. 1986)
 - No C&I or Op agreement with Colville Confederated Tribes (CCT), Spokane Tribe of Indians (STOI), and Washington Department of Fish and Wildlife (WDFW)
- Chief Joseph
 - Impact assessment completed in 1992 by CCT and WDFW (Berger and Kuehn 1992)
 - No C&I or Op agreement with CCT or WDFW. The STOI reservation borders Lake Roosevelt above Grand Coulee Dam and therefore the STOI do not mitigate for losses downstream at Chief Joseph Dam.

Table 5. Construction and Inundation (C&I) and operational (Op) loss assessments for Grand Coulee and Chief Joseph Dams. Losses reported in habitat units in the Council's Fish and Wildlife Program (NPCC 2014)

Project	Site	C&I Loss	Op Loss
Grand Coulee Dam	Columbia	111,515 HUs	Not assessed
Chief Joseph Dam	Columbia	8,833 HUs	Not assessed
Subregion total		120,348 HUs	Not assessed

Mitigation occurs primarily through projects implemented by Washington Department of Fish and Wildlife (WDFW), Spokane Tribe of Indians (STOI), and Colville Confederated Tribes (CCT). There is no settlement agreement for C&I or Op losses. These parties developed and agreed upon a formula to divide losses among themselves for the purpose of mitigation (<u>Ashley 2015b</u>; Table 6). BPA did not agree to the division of losses among these parties. According to the formula, all parties were allocated losses at Grand Coulee, and the CCT and WDFW were allocated losses at Chief Joseph. STOI was not allocated any losses at Chief Joseph because their reservation borders Lake Roosevelt above Grand Coulee Dam. In 2002, WDFW transferred 600 HU to CCT and 400 HU to STOI in exchange for transfering Grand Coulee losses totaling 1,000 HU out of basin to provide BPA HU credit for an aqcuisition in the Lower Snake River subregion (<u>Ashley</u> 2015b). This revised total was carried forward in the RHT 2015 summary of mitigation (Table 6).

Table 6. Construction and Inundation (C&I) habitat unit (HU) loss allocations at Grand Coulee and Chief Joseph Dams to the Colville Confederated Tribes (CCT), Spokane Tribe of Indians (STOI), and Washington Department of Fish and Wildlife (WDFW). Losses reported in habitat units in the 2015 Regional HEP Team summary for the Upper Columbia (Ashley 2015b).

Project	CCT HUs	STOI HUs	WDFW HUs	Total HUs
Grand Coulee	31,404	6,679	73,628	111,711 ¹
Chief Joseph	4,416	0 ²	4,416	8,832
Total	35,820	6,679	78,044	120,543
Adjusted total ³	36,420	7,079	77,044	120,543

¹Total HUs do not match total reported in NPCC 2014. The adopted loss total is 120,348 HUs.

²The STOI reservation borders Lake Roosevelt (above Grand Coulee Dam) and therefore was not allocated any HUs for Chief Joseph Dam.

³In 2002, WDFW transferred 600 HU to CCT and 400 HU to STOI in exchange for transfering Grand Coulee losses totaling 1,000 HU out of basin to provide BPA HU credit for an aqcuisition in the Lower Snake River subregion (Ashley 2015b).

Status of mitigation

Loss assessments and mitigation are described in NPCC F&W Programs on a dam-by-dam basis unless a settlement agreement is in places that addresses multiple dams at once (e.g., Willamette Basin). In the upper Columbia, there have been several reports on the status of mitigation at Grand Coulee and Chief Joseph dams (reviewed in NPCC 2011, Ashley 2011, and Ashley 2015b). Across reports, there is variation in credit assignments, credit totals, parcel HU or acreage, and parcel names. With respect to assigning credits, approaches include single parcels credited (1) to one dam, (2) to Grand Coulee and Chief Joseph, combined, or (3) to either dam along with other dams in the basin (e.g., McNary). This makes it challenging to specifically quantify the status of mitigation, including the effect of 2:1 crediting on remaining mitigation. Rather than weighing the value of each approach or attempting to establish a "correct" value, we present the mitigation totals from each data source below.

In the Wildlife Crediting Forum report (NPCC 2011), mitigation status is reported for the dams or groups of dams to which parcels were credited. At the time of the 2011 report, the forum determined that a total of 123,718 habitat units had been protected to mitigate construction and inundation losses (Table 7). No mitigation was identified for operational losses. These data are not organized in a way that would allow determination of remaining mitigation by facility or assessment of the role of 2:1 crediting in affecting remaining mitigation totals.

Table 7. Status of mitigation for construction and inundation (C&I) and operational (Op) losses at Grand Coulee and Chief Joseph dams as reported in the Wildlife Crediting Forum Report (NPCC 2011). Mitigation is shown in habitat units (HU) because no settlement of losses has occurred.

Project	C&I mitigated	Op mitigated
Chief Joseph	3,941 HU	0 HU
Chief Joseph, Grand Coulee	41,884 HU	0 HU
Chief Joseph, John Day, McNary	1,193 HU	0 HU
Grand Coulee	76,700 HU	0 HU
Total	123,718 HU	0 HU

The data on wildlife mitigation were maintained in a Pisces Desktop Application. In early 2011, Paul Ashley reviewed this data and issued a report to the Forum including a simplified description of mitigation status by individual dam and the addition of new parcels that had been protected since the original summary (Ashley 2011). His approach to revise credit assignments was described this way:

"Habitat units were automatically credited against whatever hydro facility is assigned in Pisces...I did, however, have to consider how to break out "mitigated acres" for projects credited against more than one hydro facility. Acres were determined by multiplying the percentage of HUs assigned to each respective dam by the total project acres..."

At the time of the 2011 report, a total of 11,027 HUs had been mitigated at Chief Joseph and 122,604 HUs at Grand Coulee Dam (Table 8). The data reviewed in Ashley are also summarized in the Pisces report- 1114s (the dam-by-dam summary), available on CBfish. The Pisces report provides slightly different totals for mitigation at each dam: 11,534 HU at Chief Joseph and 119,683 HU at Grand Coulee, for a total of 131,217 HUs. Other Pisces reports summarizing the same data used in report 1114s provide slightly different totals per dam than the Pisces 1114s report. It is not clear what contributes to these differences.

Table 8. Status of mitigation for construction and inundation (C&I) and operational (Op) losses at Grand Coulee and Chief Joseph dams as reported in Ashley (2011). Mitigation is shown in habitat units (HU) because no settlement of losses has occurred.

Project	C&I mitigated	Op mitigated
Chief Joseph	11,027 HU	0 HU
Grand Coulee	122,604 HU	0 HU
Total	133,631 HU	0 HU

In Ashley 2015b, C&I mitigation was summarized by subregion. A total of 136,263 HUs have been protected to mitigate construction and inundation losses at Grand Coulee and Chief Joseph dams, combined, which exceeds the total HUs lost (Table 9). Losses were divided among parties implementing the mitigation. Accordingly, CCT and STOI have completed mitigation for their shares of losses and WDFW has 860 HUs remaining, as of 2015 (Table 9). Both CCT and STOI mitigated more HUs than their allocated shares. If remaining mitigation is calculated based on a per-party basis, then 860 HUs remain for WDFW to mitigate. However, if mitigation is summed across parties, then C&I losses at both dams have been mitigated. BPA and parties differ in opinion on this issue.

No mitigation for operational losses has occurred at this time as no losses have been assessed.

Table 9. Status of mitigation at Grand Coulee and Chief Joseph dams, combined, by the Colville Confederated Tribes (CCT), Spokane Tribe of Indians (STOI), and Washington Department of Fish and Wildlife (WDFW) as reported in Ashley 2015b. Mitigation only covers construction and inundation losses and is shown in habitat units (HU) because no settlement of losses has occurred.

Grand Coulee and Chief Joseph Dams	CCT HUs	STOI HUs	WDFW HUs	Total HUs
Adjusted loss	36,420	7,079	77,044	120,543 ¹
Mitigated loss	52,647	7,432	76,184	136,263
HUs remaining	0	0	860	Either 0 or 860
Percent mitigated	144.56%	104.99%	98.8%	113.04%

¹Total HUs do not match total reported in NPCC 2014.

With no settlement agreements in place at these dams, unmitigated losses in 2001 were subject to 2:1 doubling (NPCC 2000). To assess remaining mitigation, we would need to identify the fiscal year each parcel was protected, the specific (individual dam) to which it was credited, and the total HU that was credited. In CBfish, reports exist that follow the Ashley approach and assign mitigation to individual dams, but they do not characterize the year mitigation occurred. Other reports offer data at the parcel scale, but parcels are still credited to multiple dams in some cases. When simply looking at crediting before and after 2001 (as listed in the reports with data on the fiscal year parcels were protected), a total of 99,311 HUs were protected prior to 2001 (Table 10). While it is not clear to which dam these credits should be applied, the total loss at both dams was 120,348 HUs indicating that some level of doubling would occur to those unmitigated losses. If Chief Joseph Dam were not over mitigated, then the minimum amount of C&I mitigation remaining today would be 5,122 HU. However, it is often reported that Chief Joseph dam was over mitigated (but the degree of over mitigation varies among sources), meaning that fewer mitigated HU are credited to Grand Coulee than shown below and more mitigation remains.

Table 10. Status of mitigation at Grand Coulee and Chief Joseph dams, combined, after accounting for 2:1 doubling of unmitigated losses in 2001, using totals reported in Ashley 2015a. Mitigation only covers construction and inundation losses and is shown in habitat units (HU) because no settlement of losses has occurred.

Project	C&I losses	C&I mitigated before 2001	Doubling of unmitigated C&I losses	C&I mitigated after 2001	Minimum C&I mitigation remaining
Chief Joseph	8,833 HU				
Grand Coulee	111,515 HU				
Total	120,348 HU	99,311 HU	42,074 HU	36,952 HU	5,122 HU ¹

¹This represents an estimated <u>minimum</u> total of remaining mitigation, assuming that Chief Joseph Dam was not over mitigated. However, it is considered to be over mitigated meaning that the remaining mitigation for Grand Coulee would be higher than 5,122 HU, although it is not clear how much higher.

Discussion

• Crediting report guidelines and NPCC program call for mitigating dam by dam. Managers implementing mitigation treat Grand Coulee and Chief Joseph as a single project. In NPCC 2011, the technical team recommended that going forward, parcels be credited to a single facility. However, in the Ashley 2015b, summary, the status of crediting was determined for both projects, together. Does this approach meet the needs of all parties implementing wildlife mitigation?

- 2:1 crediting affects remaining mitigation totals for Grand Coulee Dam and perhaps Chief Joseph (although unlikely, given the much lower loss). Available crediting data are insufficient to calculate remaining mitigation at the individual dam level.
- There is a need to address inconsistencies in parcel-level data, including crediting, total HUs, and parcel name, along with identifying whether Land Management Plans exist and if mitigation values are being maintained.
- Since the RHT report, parcels have been protected by WDFW and CCT to benefit fish, but no additional parcels have been protected for wildlife.
- Are conservation values being maintained and are O&M budgets adequate?
- Where are land management plans?



Mid Columbia Tributaries

Figure 5. Location of Roza and Chandler dams in the Columbia Basin, USA

Loss assessments and parties implementing mitigation

No construction, inundation, or operational losses have been assessed at Roza and Chandler dams (Table 11). In the status review of wildlife mitigation at Washington facilities (aka brown book), the following is listed for Roza and Chandler Dams:

Roza Dam – "USFWS (1968) provides no description of wildlife and/or habitat in the Yakima Canyon prior to construction of Roza Dam...No Record of the amount of habitat inundated by Roza Dam was found. Since the storage capacity is small, inundation impacts probably involved minimal acreage. The type of habitat inundated is likewise undocumented..." **Chandler Dam** – "The Prosser Diversion Dam is operated on a run-of-the-river basis and has no storage capacity. Consequently, there are no inundation-related wildlife impacts...The Prosser Game Reserve was established in 1935 to provide a refuge for resident and migratory wildlife...

The report concludes with "No wildlife mitigation has been proposed or implemented for the Roza or Chandler Hydroelectric projects. USFWS (1947) and (1968) provided recommendations to [Bureau of Reclamation] for fish and wildlife enhancement/ mitigation for primarily irrigation-related impacts, but power development wildlife impacts were not discussed."

In a comment letter on the status report, the USFWS note: "In view of location, operational history, and surrounding terrain we tend to believe that the projects probably had minor impacts to wildlife of priority interest to the FWS. The Washington Department of Game may not concur with our position and may seek redress for wildlife resources under their purview. Should that be the case, the FWS would be supportive even though not actively involved in such efforts."

Table 11. Construction and Inundation (C&I) and operational (Op) loss assessments for Roza and Chandler Dams. Losses reported as habitat units in the Council's Fish and Wildlife Program (NPCC 2014)

Project	Site	C&I Loss	Op Loss
Roza Dam	Columbia	Not assessed	Not assessed
Chandler Dam	Columbia	Not assessed	Not assessed

Discussion

- No specific estimates of losses in either acres or HUs could be found.
- No losses have been adopted into the F&W Program
- Any future mitigation at these facilities will likely only occur if regional entities believe there is a loss to be mitigated and pursue the process to determine that loss and a mitigation approach.

Lower Columbia Mainstem



Figure 6. Location of McNary, John Day, The Dalles, and Bonneville dams in the Columbia Basin, USA

Loss assessments and parties implementing mitigation

Construction and inundation resulted in a loss of 23,545 habitat units at McNary Dam, 36,555 HU at John Day Dam, 2,330 HU at The Dalles Dam, and 12,317 HU at Bonneville Dam (Table 12). Operational losses have not been assessed.

- McNary, John Day, The Dalles, and Bonneville dams:
 - Impact assessment completed in 1990 by USFWS (Rasmussen and Wright 1990) with major contributions from ODFW, WDFW, USFW, USACE, and YN.
 - Geiger Report in 1991– this was a review of pre-Act mitigation in the lower Columbia River, including the John Day Mitigation Program implemented by the Corps of Engineers (described in Ashley 2015c).
 - Washington Wildlife Mitigation Agreement between Washington Wildlife Coalition of Resource Agencies and Tribes and BPA (1993; Appendix B)
 - Coalition members (and % of agreement budget): WDFW (48%), CCT (20%), CTUIR (11.3%), YN (10.7%), USFWS (6%), STOI (4%)
 - WDFW agreement in 1996 (Appendix B) transfers WDFW funds from Washington Coalition account into WDFW account
 - No C&I agreement with Yakama Nation (YN), Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Confederated Tribes of the Warm Springs Reservation (CTWSR), or the U. S. Fish and Wildlife Service (USFWS).

Mitigation occurs primarily through projects implemented by Washington Department of Fish and Wildlife (WDFW), Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation,

Confederated Tribes of the Warm Springs Reservation, and the U.S. Fish and Wildlife Service. There is no settlement agreement for C&I or Op losses.

Table 12. Construction and Inundation (C&I) and operational (Op) loss assessments for McNary, John Day, The Dalles, and Bonneville dams, as allocated to Washington and Oregon. Losses reported as habitat units (HU) for each dam in the Council's Fish and Wildlife. Losses for each dam were allocated between Oregon and Washington (Ashley 2008).

Project	Site	C&I Loss	Op Loss
McNary (WA)	Columbia	18,835 HU	Not assessed
McNary (OR)	Columbia	4,710 HU	Not assessed
Total McNary		23,545 HU	Not assessed
John Day (WA)	Columbia	18,277.5 HU	Not assessed
John Day (OR)	Columbia	18,277.5 HU	Not assessed
Total John Day		36,555 HU	Not assessed
The Dalles (WA)	Columbia	1,165 HU	Not assessed
The Dalles (OR)	Columbia	1,165 HU	Not assessed
Total The Dalles		2,330 HU	Not assessed
Bonneville (WA)	Columbia	6,158.5 HU	Not assessed
Bonneville (OR)	Columbia	6,158.5 HU	Not assessed
Total Bonneville		12,317 HU	Not assessed
Total lower Columbia		74,747 HU	Not assessed

The 1993 Washington Wildlife Agreement allocated funding among coalition members implementing mitigation but did not determine a specific amount of habitat units or acres to be protected under the agreement. Each member has different perspectives on how to interpret that agreement with respect to allocation of losses and assessment of crediting.

• WDFW interpreted the funding allocation as an allocation of losses to be mitigated by each party, in recognition that funding allocations were "developed with the intent to generally reflect the magnitude of losses by jurisdiction" (Ashley 215C). This would result in 21,329 HUs available for WDFW to mitigate.

- BPA's position is that the agreement only covers funding and they do not recognize an allocation of losses among coalition members or an obligation to track mitigation by entity (Ashley 2015c).
- The Yakama Nation requested BPA fund protection and O&M of 27,000 acres of habitat on the Yakama Reservation as mitigation for the four dams on the lower Columbia, collectively. The YN did not accept the use of HEP or habitat units as a method to determine when mitigation is complete, although they did permit HEP surveys to occur on their properties for the sake of wildlife crediting (Ashley 2015c).
- The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) agreed to mitigate for losses within their ceded territory, which included all of the McNary pool and half the John Day pool in Washington. In communications with the HEP team (reported in Ashley 2015c), the CTUIR identified that YN mitigation should not be credited against losses at McNary and John Day dams because of ceded territory issues. If YN credits were removed from these dams, more losses would be available for WDFW and CTUIR to mitigate.
 - BPA does not recognize an allocation of losses among coalition members or an obligation to track crediting by entity.

BPA has not entered into a settlement agreement to fund mitigation on the Oregon side of the lower Columbia River.

Status of mitigation

Loss assessments and mitigation are described in NPCC F&W Programs on a dam-by-dam basis unless a settlement agreement is in places that addresses multiple dams at once (e.g., Willamette Basin). In the lower Columbia, there have been several reports on the status of mitigation at McNary, John Day, The Dalles, and Bonneville dams (reviewed in NPCC 2011, Ashley 2011, and Ashley 2015c). Across reports, there is variation in credit assignments, credit totals, parcel HU or acreage, and parcel names. With respect to assigning credits, approaches include single parcels credited (1) to one dam, (2) to multiple dams in the lower Columbia River, or (3) to lower Columbia River dams, along with Chief Joseph or Grand Coulee dams. This makes it challenging to specifically quantify the status of mitigation, including the effect of 2:1 crediting on remaining mitigation. Rather than weighing the value of each approach or attempting to establish a "correct" value, we present the mitigation totals from each data source below.

In the Wildlife Crediting Forum report (NPCC 2011), mitigation status is reported for the dams or groups of dams to which parcels were credited. At the time of this report, the forum determined that a total of 75,221 habitat units had been protected to mitigate construction and inundation losses (Table 13). No mitigation was identified for operational losses. These data are not organized in a way that would allow determination of remaining mitigation by facility or assessment of the role of 2:1 crediting in affecting remaining mitigation totals.

Table 13. Status of mitigation for construction and inundation (C&I) and operational (Op) losses at McNary, John Day, The Dalles, and Bonneville dams as reported in the Wildlife Crediting Forum Report (NPCC 2011). Mitigation is shown in habitat units (HU) because no settlement of losses has occurred.

Project	C&I mitigated	Op mitigated
Bonneville OR, Cougar, Hills Creek	1,319 HU	0 HU
Bonneville WA	226 HU	0 HU
Bonneville WA, John Day WA	2,359 HU	0 HU
Bonneville WA, John Day WA, The Dalles WA	199 HU	0 HU
Bonneville WA, McNary WA	894 HU	0 HU
Grand Coulee, John Day WA, McNary WA	5,171 HU	0 HU
John Day OR	18,976 HU	0 HU
John Day WA	4,047 HU	0 HU
John Day WA, McNary WA	24,975 HU	0 HU
John Day WA, The Dalles WA	1,177 HU	0 HU
McNary OR	7,655 HU	0 HU
McNary WA	5,826 HU	0 HU
McNary WA, The Dalles WA	2,397 HU	0 HU
Total	75,221 HU	0 HU

In early 2011, Paul Ashley reviewed wildlife mitigation data in the Pisces Desktop Application and issued a report to the Forum including a simplified description of mitigation status by individual dam and the addition of new parcels that had been protected since the original summary.

At the time of the report, a total of 43,554 HUs had been mitigated at McNary Dam, 31,747 HUs at John Day Dam, 377 HUs at The Dalles Dam, and 2,815 HUs at Bonneville Dam (Table 14). Total mitigation for the Lower Columbia was 78,493 HU.

Table 14. Status of mitigation for construction and inundation (C&I) and operational (Op) losses at McNary, John Day, The Dalles, and Bonneville dams as reported in Ashley (2011). Mitigation is shown in habitat units (HU) because no settlement of losses has occurred.

Project	C&I mitigated	Op mitigated
McNary (WA)	34,897 HU	0 HU
McNary (OR)	8,657 HU	0 HU
Total McNary	43,554 HU	0 HU
John Day (WA)	12,771 HU	0 HU
John Day (OR)	18,976 HU	0 HU
Total John Day	31,747 HU	0 HU
The Dalles (WA)	377 HU	0 HU
The Dalles (OR)	0 HU	0 HU
Total The Dalles	377 HU	0 HU
Bonneville (WA)	2,225 HU	0 HU
Bonneville (OR)	590 HU	0 HU
Total Bonneville	2,815 HU	0 HU
Total lower Columbia	78,493 HU	0 HU

The data reviewed in Ashley (2011) are also summarized in Wildlife Crediting Summary (Pisces report 1114s), available on CBfish. The Pisces report provides different totals for mitigation at each dam and for all four dams collectively (115,869 HUs instead of 78,493 HUs; Table 15). Other Pisces reports summarizing the same data by other categories (e.g., by dam and by species or by dam, species, and area) provide different totals per dam than the main crediting report and different overall totals (Table 15). Across the three reports shown here, total construction and inundation mitigation ranges from 108,389 HUs to 142,094 HUs. It is not clear what contributes to these differences or why a subsequent report produced in 2015 showed lower totals for each dam and for the total amount of mitigation for construction and inundation that has been completed, thus far.

Table 15. Status of mitigation for construction and inundation (C&I) losses at McNary, John Day, The Dalles, and Bonneville dams according to data presented in the following three BPA reports on CBfish (formerly Pisces): (1) Wildlife Crediting Summary (WCS; includes minimum estimated HUs + Protected + Enhanced), (2) summary by Dam and Species (DS; includes Protected + Enhanced), and (3) summary by Dam, Area, and Species (DAS; includes Protected + Enhanced). Mitigation is shown in habitat units (HU) because no settlement of losses has occurred.

Project	C&I mitigated WCS	C&I mitigated DS	C&I mitigated DAS
McNary (WA)	29,097 HU	27,993 HU	36,911 HU
McNary (OR)	33,213 HU	33,322 HU	20,546 HU
Total McNary	62,310 HU	61,315 HU	57,457 HU
John Day (WA)	11,587 HU	5,377 HU	22,023 HU
John Day (OR)	36,820 HU	36,820 HU	57,303 HU
Total John Day	48,407 HU	42,197 HU	79,326 HU
The Dalles (WA)	581 HU	576 HU	816 HU
The Dalles (OR)	0 HU	0 HU	0 HU
Total The Dalles	581 HU	576 HU	816 HU
Bonneville (WA)	2,225 HU	2,225 HU	2,419 HU
Bonneville (OR)	2,076 HU	2,076 HU	2,076 HU
Total Bonneville	4,301 HU	4,301 HU	4,495 HU
Total lower Columbia	115,869 HU	108,389 HU	142,094 HU

According to Ashley 2015c, 107,878 HUs have been protected to mitigate construction and inundation losses at McNary, John Day, The Dalles, and Bonneville dams, combined, which exceeds the total HUs lost (Table 4.11). The YN has completed the largest share of mitigation on the Washington side of the lower Columbia and the CTWSR has completed the largest share of mitigation on the Oregon side (Table 16). The CTUIR has completed mitigation on both sides of the river (Table 16). No mitigation for operational losses has occurred at this time as no losses have been assessed.

Table 16. Status of mitigation at McNary, John Day, The Dalles, and Bonneville dams, combined, by the Washington Department of Fish and Wildlife (WDFW), Yakama Nation (YN), Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Confederated Tribes of the Warm Springs Reservation (CTWSR), and U.S. Fish and Wildlife Service (USFWS), as reported in Ashley (2015c). Mitigation only covers construction and inundation losses and is shown in habitat units (HU) because no settlement of losses has occurred.

Location of mitigation	WDFW HUs	YN HUs	CTUIR HUs	CTWSR	USFWS	Total HUs
Oregon			19,901 HU	31,866 HU	1,484 HU	53,251 HU
Washington	7,317 HU	35,319 HU	11,991 HU			54,627 HU
Total	7,317 HU ¹	35,319 HU	31,892 HU	31,866 HU	1,484 HU	107,878 HU

¹ From Ashley 2015c: "The 1993 Washington Wildlife Mitigation Agreement states in Section 5.a.iv., "48% of the annual and total budget amounts shall be available for projects proposed by WDFW and approved by BPA" (NPCC 2011). WDFW ... interpreted this to mean that the State of Washington was entitled to mitigate 48% of the loss HUs [i.e., 21,329 HUs]. BPA's position was that Interim Agreement governed only the allocation of funds to the parties under the agreement. The agreement did not address HU distribution among the parties, and all parties did not agree on an HU allocation."

With no settlement agreements in place at these dams, unmitigated losses in 2001 were subject to 2:1 doubling (NPCC 2000). To assess remaining mitigation, we would need to identify the fiscal year each parcel was protected, the specific (individual dam) to which it was credited, and the total HU that was credited. In CBfish, reports exist that follow the Ashley approach and assign mitigation to individual dams, but they do not characterize the year mitigation occurred. Other reports offer data at the parcel scale, but parcels are still credited to multiple dams in some cases. Because of the ambiguity in HU totals for each dam or even for the lower four Columbia River dams together, it is not possible to determine to what degree 2:1 doubling affects remaining mitigation. In Ashley 2015c, there was a discussion around continuing to re-allocate HUs among the four dams to address over mitigation upriver and under mitigation downriver- largely due to the accounting of how parcels were credited.

Discussion

- There are two overarching issues in the lower Columbia River- one related to data availability and quality, and one related to policy.
- Data issues in this subregion are significant. Every parcel acquired or protected should have a location, sponsor organization, acreage, habitat units, crediting dam, and

determination of whether the parcel was protected for the benefit of fish, wildlife, or both. In addition, land management plans are required to be in place within 18 months of the acquisition. Many parcels do not appear in our Lands Mapper, many have conflicting acreage or HU totals, and many do not appear to have land management plans. All of these issues complicate assessing the status of C&I mitigation and how much, if any, remains.

- Operational losses have not been assessed and no mitigation has occurred.
- Crediting report guidelines and NPCC program call for mitigating dam by dam. Determination of whether mitigation is complete depends on whether dams considered individually or as a set.
- In the lower Columbia subregion, the main parties implementing mitigation express different viewpoints on how that mitigation should be credited to dams. Yakama Nation treats the four dams as a system accounted for in acres, whereas the other parties apply mitigation credits to individual dams in HUs. To standardize crediting, HEP surveys were conducted on YN parcels, so it is possible to account for those credits in HUs but there is disagreement on which dam(s) should be credited. In NPCC 2011, the technical team recommended that going forward, parcels be credited to a single facility. However, in Ashley (2015c), the status of crediting was determined for both projects, together. Does this approach meet the needs of all parties implementing wildlife mitigation? Do all parties agree on the status of mitigation?
- 2:1 crediting may affect mitigation at Bonneville and The Dalles dams. Despite variation in reported HU totals for construction and inundation mitigation, it appears that mitigation is lower than the accepted loss for each dam. Ashley (2015c) notes that there were accounting issues early on in the lower Columbia River which resulted in many parcels being initially credited toward McNary or John Day dams. There was discussion that these parcels should be re-assigned to Bonneville or The Dalles using the species HU data for each parcel and ensuring that parcels protected by tribes were assigned to a dam within their reservation or ceded lands. It does not appear that re-assignment has occurred, or perhaps it occurred partially. As such, the ledger shows that there should be 2:1 crediting at two dams, but the context around the crediting suggests that mitigation in the lower Columbia may be complete. Available crediting data are insufficient to calculate remaining mitigation at Bonneville and The Dalles dams, but C&I mitigation at John Day and McNary dams is complete.
- There is a need to address inconsistencies in parcel-level data, including crediting, total HUs, and parcel name, along with identifying whether Land Management Plans exist and if mitigation values are being maintained. Likewise, is O&M funding sufficient to maintain those values?

- Since the Wildlife Crediting Report, additional parcels have been protected or enhanced in the lower Columbia River by the Columbia Land Trust, WDFW, CTWSR, CTUIR, and YN. This mitigation may count toward remaining credits at Bonneville or The Dalles, but credits have not been assigned and it is not consistently clear if the parcels were purchased to benefit wildlife, fish, or both.
- There is a substantial number of parcels protected for fish and described as tiers 1 3 in the lower Columbia. The Wildlife Forum noted that discussion was needed around these parcels and that certain criteria had to be met for them to count toward wildlife mitigation. I did not find records of these discussion and could not determine to what degree, if any, resolution on these fish lands had been reached.

Upper Snake River Basin



Figure 7. Upper Snake River Basin dams associated with wildlife mitigation in the Columbia Basin, USA

Loss assessments and parties implementing mitigation

Construction and inundation losses at Palisades, Minidoka, Anderson Ranch, and Black Canyon dams totaled 59,430 HUs (divided between the Shoshone-Bannock and Shoshone-Paiute Tribes) and 16,645 acres allocated to IDFG in their settlement agreement (Table 17). Construction and inundation losses were also assessed at Deadwood Dam but there is disagreement on whether BPA has an obligation to mitigate for those losses as Deadwood Dam does not produce hydropower but does regulate water for a hydropower dam. Losses were assessed for the Boise R. Diversion, part of the FCRPS, but are not currently being mitigated because hydropower at that dam is on reserve status. Operational losses were assessed at Deadwood Dam through the settlement agreement with IDFG and total 1,330 acres, of which IDFG is allocated half for mitigation.

- Impact assessment completed for:
 - Anderson Ranch, Black Canyon, Deadwood, and Boise River Diversion dams in 1986 by IDFG (Meuleman et al. 1986)
 - Palisades Dam in 1985 by USFWS (Wolflin et al. 1985)
 - Minidoka Dam in 1989 by IDFG (Martin and Meuleman 1989)
- Agreement to divide C&I losses 50/50 with IDFG and Tribes (Shoshone-Bannock and Shoshone-Paiute) in 2010 (Appendix B)
- IDFG settlement with BPA- original MOA in 1997, current agreement in 2014 (Appendix B).
- Agreement between BPA and Shoshone- Bannock Tribe in 1997 describing process to protect, operate and maintain, and provide credit for habitat
- Agreement between BPA and Shoshone- Paiute Tribe in 2009 describing process to protect, operate and maintain, and provide credit for habitat
- Agreement to divide remaining losses between Shoshone-Bannock and Shoshone-Paiute (Appendix B)

Table 17. Construction and Inundation (C&I) and operational (Op) loss assessments for Palisades, Minidoka, Anderson Ranch, Black Canyon, Boise River Diversion, and Deadwood dams. Losses reported as habitat units and match totals established in the Council's Fish and Wildlife Program (NPCC 2014) when there are no settlement agreements. Losses reported in acres when mitigated through a settlement agreement or MOA and values match those reported in agreements.

Project	Site	Entity	C&I Loss	Op Loss
Palisades Dam	Snake River	Shoshone- Bannock Tribe	37,070 HUs	Potentially a share of 665 acres ²
Minidoka Dam	Snake River	Shoshone- Bannock Tribe	10,503 HUs	Potentially a share of 665 acres ²
Anderson Ranch Dam	S.F. Boise River	Shoshone- Paiute Tribe; Shoshone- Bannock Tribe	9,619 HUs	Potentially a share of 665 acres ²

Black Canyon Dam	Payette River and tributary	Shoshone- Paiute Tribe; Shoshone- Bannock Tribe	2,238 HUs	Potentially a share of 665 acres²
Deadwood Dam	Payette River and tributary	Potentially Shoshone- Paiute Tribe; Shoshone- Bannock Tribe	7,413 HUs ¹	Potentially a share of 665 acres²
Boise River Diversion	Boise River	NA	42 HUs ³	Not assessed
Palisades, Minidoka, Anderson Ranch, Black Canyon Dam	Snake River basin	Idaho Department of Fish and Game	16,645 acres	665 acres

¹ Deadwood Dam is part of the Black Canyon Dam complex but does not produce hydroelectricity. Construction and inundation losses in the Council's Program are listed as 4,787 HUs. Losses in the IDFG recommendation in 1995 and in the impact assessment are listed as 7,413 HUs. The difference in value is a single value of 2,626 HU to Yellow-rumped warbler.

² Operational losses were assessed in acres during the IDFG settlement agreement, of which IDFG receives half the total. The Tribes have not identified if they accept 50% of IDFG's settled Op Losses or proposed an alternative total.

³ Construction and operation losses were assessed at Boise River Diversion Dam. Hydropower has been on reserve status at this dam since 1982 and no mitigation has occurred.

Status of mitigation

By the end of 2025, IDFG will have completed their share of mitigation for Southern Idaho dams (Table 18). The Shoshone-Bannock and Shoshone-Paiute Tribes continue to mitigate for C&I losses. No mitigation has occurred at Black Canyon Dam by either tribe and no operational mitigation has occurred at any dam by either tribe.

Table 18. Status of mitigation for construction and inundation (C&I) and operational (Op) losses at Palisades, Minidoka, Anderson Ranch, Black Canyon, and Deadwood dams as of the end of FY 2023. Mitigation is shown in habitat units (HU) or acres (Ac), depending on whether losses have been settled (see Table 17). Following NPCC 2000, any remaining losses outside of a settlement agreement were to be acquired at a 2:1 ratio (i.e., two habitat units acquired for every one lost).

Project totals by sponsor ¹	C&I mitigated	C&I remaining	Op mitigated	Op remaining
Southern Idaho	14,284 Ac	2,361 Ac	0 Ac	665 Ac
IDFG Total	14,284 Ac	2,361 Ac	0 Ac	665 Ac
Palisades	9,643 HU	22,840 HU ²	0 HU	Not assessed ⁶
Minidoka	3,442 HU	3,845 HU ³	0 HU	Not assessed ⁶
Anderson Ranch	0 HU	1,924 HU⁴	0 HU	Not assessed ⁶
Black Canyon	0 HU	447.6 HU⁵	0 HU	Not assessed ⁶
SBT Total	13,085 HU	29,056.6 HU	0 HU	
Anderson Ranch	3,486 HU	4,210 HU⁴	0 HU	Not assessed ⁶
Black Canyon	0 HU	1,790.4 HU⁵	0 HU	Not assessed ⁶
SPT Total	3,486 HU	6,000.4 HU	0 HU	

¹ Idaho Fish and Game (IDFG); Shoshone-Bannock Tribe (SBT); Shoshone-Paiute Tribe (SPT)

² Calculation of C&I remaining is influenced by 2:1 crediting. Pre 2001 = 4,587 HU acquired; unmitigated loss in 2001 doubled and total =27,896 HU; Post 2001 acquisitions = 5,056 HU. Remaining C&I = 22,840 HU.

³Calculation of C&I remaining is influenced by 2:1 crediting. Pre 2001 = 3,216 HU acquired; unmitigated loss in 2001 doubled and total =4,072 HU; Post 2001 acquisitions = 226 HU. Remaining C&I = 3,845 HU.

⁴ Calculation of C&I remaining at Anderson Ranch Dam is influenced by 2:1 crediting. Pre 2001 = 0 HU acquired; unmitigated loss in 2001 doubled and total =9,620 HU; This total is divided between SBT (20%) and SPT (80%). Post 2001 acquisitions by SBT = 0 HU and SPT = 3,486 HU. Remaining C&I for SBT = 1,924 HU and SPT= 4,210 HU.

⁵ Calculation of C&I remaining at Black Canyon Dam is influenced by 2:1 crediting. There have been no acquisitions. Unmitigated loss in 2001 doubled and total =2,238 HU; This total is divided between SBT (20%) and SPT (80%).

⁶Operational losses were not assessed by Tribes but were assessed for the set of dams, including Deadwood, as part of the IDFG settlement with BPA. IDFG is mitigating for half of their assessed operational losses at the set of dams. If the Tribes accept their determination of losses, there would be 665 acres of operational losses to be split among dams and between the Tribes.

Discussion

- C&I losses at Deadwood were assessed but there is disagreement on whether BPA has responsibility to mitigate these losses. In the 1995 Program findings, page 16-201, the Council "noted that the authorizing legislation and legislative history for Deadwood indicated that the project was authorized in part for power purposes....The State of Idaho [provided] information indicating that Deadwood Reservoir was designed in part to provide water to generate power at Black Canyon Dam power plant, clearly part of the FCRPS...On the basis of the information before the Council, the Council concluded that while the Snake basin projects at issue in that rulemaking were primarily irrigation dams, they have also been authorized for and are used to generate or store water for power. This makes them "power-related facilities within Congress' broad use of the term 'hydropower facilities'. It is therefore appropriate to include mitigation measures for the facilities in the Council's program...The Council also continues to believe that the hydropower share of the expenditures to address these losses will be small."
- Operational losses were assessed as part of the IDFG settlement. The Tribes are entitled to half of the losses according to the IDFG settlement. The Tribes have not indicated whether they accept that loss assessment and operational losses do not appear in the settlement agreements through which they conduct wildlife mitigation.
- An emerging issue in the upper Snake is a proposal to raise the height of Anderson Ranch Dam 6 feet to add 29,000 acre-feet of new storage space for irrigation. This would increase the area of inundation by 146 acres. The hydropower share of costs for the proposed dam raise would be 3.47%. The Shoshone-Bannock and Shoshone-Paiute Tribes have expressed interest in understanding whether the increased inundation area would affect wildlife crediting.
- Are conservation values being maintained and are O&M budgets adequate?
- Where are land management plans?

Lower Snake River Basin



Figure 8. Location of Dworshak, Lower Granite, Little Goose, Lower Monumental, and Ice Harbor dams in the Columbia Basin, USA

Loss assessments and parties implementing mitigation

Construction and inundation resulted in a loss of 26,774 habitat units, combined, for Lower Granite, Little Goose, Lower Monumental, and Ice Harbor, and 70,000 acres at Dworshak through the settlement agreements with IDFG and NPT (Table 19). Operational losses have not been assessed at any of these dams (Table 19).

Lower Snake

The Lower Snake River dams (Ice Harbor, Lower Monumental, Little Goose, and Lower Granite) were authorized in 1945; no mitigation for fish and wildlife losses due to these projects was included in the authorization. The 1985 Fish and Wildlife Coordination Act required that those losses were assessed and mitigated, and that subsequently occurred through the 1975 Lower Snake River Fish and Wildlife Compensation Plan (USACE 1976). This plan was a negotiated settlement between the Corps, WDFW, and the USFWS. Mitigation would occur through management of 31,600 acres of land already owned by the Corps, for the benefit of wildlife.

"In the 1994 program amendment process, the Council decided to subtract the pre-Act mitigation done by the Corps from the C&I losses (Section 11.3H.1 in the December 1994 Program). The result was 26,774 unmitigated Lower Snake HUs recommended for BPA to mitigate under the Program. The RHT and/or project sponsors conducted compensation site HEP surveys on the BPA-funded projects, which determined the number of HU gains used to offset these Lower Snake River HU losses." (Ashley 2015a). The 1994/1995 Program called for completing and implementing the Comp Plan program.

"The Corps of Engineers is in the final stages of implementing mitigation plans for the Lower Snake River Fish and Wildlife Compensation Plan. The Compensation Plan was authorized by Congress in 1976. The Corps has acquired 97 percent of the acreage called for in the plan and intends to acquire the remaining acreage by September 1994. Final habitat developments on acquired lands will be completed by September 1996. The Council believes that when complete; the wildlife portion of the Compensation Plan developed by the Corps will meet acreage/funding obligations mandated by Congress. However, based on preliminary findings, the Council is concerned that the plan enacted by the Corps may not fully mitigate the habitat unit losses identified for the Lower Snake River hydroelectric projects" (NPPC 1994/1995).

Losses from the Lower Snake River dams were first amended into the program in 1994/1995. These reflected the hydropower share of losses not mitigated through the Comp plan.

- Loss evaluations were completed by the USFWS in 1991 and the Corps in 1994 (NPPC 1995; program findings, page 16-222).
- Lower Snake River Compensation Plan- 1975 (Appendix B)
- No operational loss assessment
- Dworshak
 - Impact assessment completed in 1985 by IDFG (Mehrhoff and Sather-Blair 1985)
 - IDFG settlement agreement (Appendix B)
 - NPT settlement agreement (Appendix B)

Table 19. Construction and Inundation (C&I) and operational (Op) loss assessments for Dworshak, Lower Granite, Little Goose, Lower Monumental, and Ice Harbor dams. Losses reported as habitat units and match totals established in the Council's Fish and Wildlife Program (NPCC 2014) when there are no settlement agreements. Losses reported in acres when mitigated through a settlement agreement or MOA and values match those reported in agreements.

Project	Site	Entity ¹	C&I Loss	Op Loss
Dworshak	NF Clearwater River	IDFG	60,000 acres	Not assessed
Dworshak	NF Clearwater River	NPT	10,000 acres	Not assessed
Total for lower Snake River ²	Snake River		26,774 HUs	Not assessed

¹Idaho Fish and Game (IDFG); Nez Perce Tribe (NPT)

² Covers Lower Granite, Little Goose, Lower Monumental, and Ice Harbor dams

Status of mitigation

- Settlement agreements are in place for C&I mitigation at Dworshak.
- IDFG has completed acquisitions and NPT had acquired at least 7,576 acres, as of 2019. Data on recent acquisitions were not available as of this report.
- Mitigation in the Lower Snake River occurred through the LSCRCP and an excess of mitigation has occurred.
- Most mitigation in the Lower Snake River was implemented by USACE but mitigation also implemented by Burns Paiute Tribe and CTUIR (Ashley 2015a).

Table 20. Status of mitigation for construction and inundation (C&I) and operational (Op) losses at Dworshak, Lower Granite, Little Goose, Lower Monumental, and Ice Harbor dams. Mitigation is shown in habitat units (HU) or acres (Ac), depending on whether losses have been settled (see Table 19).

Project totals by sponsor ¹	C&I mitigated	C&I remaining	Op mitigated	Op remaining
Dworshak (IDFG)	60,000 Ac	0 Ac	0 Ac	Not assessed
Dworshak (NPT)	7,576 Ac	2,424 Ac ²	0 Ac	Not assessed
Dworshak Total	67,576 Ac	2,424 Ac	0 Ac	Not assessed
Lower Snake Total	35,908 HU ³	0 HU	0 HU	Not assessed

¹ Idaho Fish and Game (IDFG); Nez Perce Tribe (NPT)

²Total current as of 2019

³Total matches Pisces Report 1108S. In contrast, Ashley (2015a) reports 37,467 HU have been mitigated.

Discussion

- Mitigation was settled at Dworshak with IDFG and NPT. Do any other parties recognize a role in that mitigation that should be addressed?
- Location of parcels? Information on parcels purchased for Dworshak Mitigation does not appear in the lands mapper. Can we get this location data?
- LMPs complete? Where are there land management plans for these Dworshak and Lower Snake parcels? Have mitigation values been maintained? Is O&M funding adequate?
- Operational losses have not been assessed or mitigated.

Willamette



Figure 9. Location of Hills Creek, Lookout Point, Dexter, Cougar, Green Peter, Foster, Detroit, and Big Cliff dams in the Columbia Basin, USA

Loss assessments and parties implementing mitigation

Construction and inundation resulted in a loss of 25,537 acres, total, at Hills Creek, Lookout Point, Dexter, Cougar, Green Peter, Foster, Detroit, and Big Cliff dams in the Willamette Basin (Table 21). Operations resulted in a loss of 1,000 acres at these dams (Table 21).

- Willamette Basin
 - Impact assessment completed in 1986 (Noyes and Potter 1986)
 - Mitigation obligation is 26,537 acres

- Parcels acquired before 2010 (called legacy parcels) were incorporated into the total described in the 2010 settlement agreement. Total =23 legacy properties for a total of 9,657 acres.
- 2010 settlement agreement between BPA and Oregon (117 Million over 15 million years to protect remaining 16,880 acres by 2025; 26 million to manage the Willamette Wildlife Mitigation Program, mitigation priorities consistent with Oregon conservation strategy and NPCC subbasin plans; Appendix B).
- ODFW runs the program and coordinates with three tribes: Confederated Tribes of the Grand Ronde Community of Oregon, Confederated Tribes of the Warm Springs Reservation of Oregon, and Confederated Tribes of the Siletz Indians of Oregon. These and other parties may propose projects for mitigation under the settlement agreement.
 - ODFW holds accounts
 - Technical Review Team (group of multiple agencies) reviews proposals
 - Recommends to Wildlife advisory group who votes on what to send to the ODFW director
 - Long term O&M of these parcels occurs through the stewardship fund
 - LMPs need to be developed within 18 months and approved. These describe how mitigation values are maintained

Table 21. Construction and Inundation (C&I) and operational (Op) loss assessments for eight dams in the Willamette River basin: Hills Creek, Lookout Point, Dexter, Cougar, Green Peter, Foster, Detroit, and Big Cliff dams. Losses were settled in acres and these totals match the settlement agreement.

Project	Site	C&I Loss	Op Loss
Total for Willamette River basin	Willamette River basin	25,537 acres	1,000 acres
Hills Creek Dam	M.F. Willamette		
Lookout Point Dam	M.F. Willamette		
Dexter Dam	M.F. Willamette		
Cougar Dam	McKenzie		
Green Peter Dam	M.F. Santiam		
Foster Dam	S. F. Santiam		

Detroit Dam	N.F. Santiam
Big Cliff Dam	N.F. Santiam

Status of mitigation

By the end of FY 2026, all mitigation in the Willamette is scheduled to be completed (Table 22). The last slate of projects has been reviewed and recommended for funding. Additional money was left in the settlement agreement after the total acreage for the agreement had been met. This allowed for additional acquisitions above the target and additional funding to be transferred to the Stewardship fund.

Table 22. Status of mitigation for construction and inundation (C&I) and operational (Op) losses for eight dams in the Willamette River basin: Hills Creek, Lookout Point, Dexter, Cougar, Green Peter, Foster, Detroit, and Big Cliff dams.

Project	C&I mitigated	C&I remaining	Op mitigated	Op remaining
Willamette Total	24,754 Ac	783 Ac	0 Ac	1,000 Ac

¹ Covers Hills Creek, Lookout Point, Dexter, Cougar, Green Peter, Foster, Detroit, and Big Cliff dams.

Discussion

Next steps in the Willamette Basin include completing Land Management Plans and making them accessible. Funding remains for ongoing stewardship. Information is needed on whether any conservation issues have been reported and whether mitigation values are being maintained on all properties protected through the settlement.

General discussion points (across all areas)

- The 2014 Program recommended that all remaining losses be resolved and funded through long-term settlement agreements, rather than through more time-intensive and expensive HEP surveys and subsequent agreements or projects. Settlement of C&I losses at Grand Coulee, McNary, John Day, The Dalles, and Bonneville Dams would greatly simplify tracking the status of mitigation. Additional settlement agreements may also be needed at Albeni Falls and potentially other dams where existing settlement agreements did not include all parties who have an interest in mitigation.
- Going forward, if operational losses are to be assessed and settled, it would be extremely valuable to first establish a process for developing settlements (including re-opener

clauses), an approach to assigning and tracking credits, and a single database including all relevant information on parcels, land management plans, and continued maintenance of conservation value. In addition, every parcel for which location data are not sensitive should have a polygon available so that higher level analyses (such as migration corridors or risk assessments) can be conducted.

- The Wildlife Advisory Committee (WAC) resolved certain issues around wildlife mitigation but did not resolve others. In particular, WAC members did not agree upon a definition of operational or secondary impacts and the final report from WAC includes several proposed definitions. The Act requires mitigation for operational impacts and the 2014 Program indicates that it may be preferable to develop settlement agreements for operational impacts rather than attempt to establish them through field surveys, which would be expensive and time consuming. In Ashley 2015A, the RHT describe pros and cons of this approach and recommended that any settlement agreement for operational losses have a re-opener clause in case future surveys should indicate the losses are more extensive than currently thought. With no single definition of what constitutes an operational or secondary loss, there is potential for variation in the losses that would be settled at each dam. It is not clear to what degree the differences in proposed definitions of these losses have not been assessed or settled at this time.
- There are key topics in the 2014 Program that have yet to be implemented. They cover:

(1) Completing mitigation agreements for remaining construction and inundation (C&I) losses by 2016 at 2:1. [specific Program language: Bonneville and the fish and wildlife agencies and tribes will complete wildlife loss mitigation agreements for at least the remaining construction and inundation losses by 2016. In addition, for each wildlife agreement that does not already provide for long-term maintenance of the habitat, Bonneville and the applicable management agency shall propose a management plan adequate to sustain the minimum credited habitat values for the life of the project. Whenever possible, Bonneville shall work with the agencies and tribes to ensure that wildlife mitigation shall take place through long-term agreements that have clear objectives, a plan for action over time, a committed level of funding that provides a substantial likelihood of achieving and sustaining the stated wildlife mitigation objectives, and provisions to ensure effective implementation with periodic monitoring and evaluation.]

(2) Complete operational loss assessments [specific Program language: Where appropriate prioritization exists and agreements exist on the methodology, complete wildlife loss assessments for losses caused by operation of the hydropower projects. Develop and implement habitat acquisition and enhancement projects to fully mitigate for identified losses. 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.]

(3) Settlement agreements [discussion around development of long-term agreements]

- Data availability
 - Wildlife (available from beginning of program) All acquisition or O&M projects are listed in cost report and can be queried from CBfish.
 - Wildlife lands data on individual projects in CBfish summary reports in CB haven't been updated since 2012. Some disagreement about how credits should be assigned.
 - Missing wildlife parcels in CBfish from early mitigation or from settlement agreement lists
- LMPs
 - LMPs are meant to be in place within 18 months of completing an acquisition or agreement and then subsequent O&M is meant to be funded and implemented to maintain the conservation value for which the parcel was protected. As of 2024, LMPs are not available for approximately 45-50% of parcels. It is not clear if the LMPs don't exist or if they just have not been provided to BPA or NPCC. Regardless, it impedes tracking conservation values and determining whether wildlife mitigation is working as designed from a habitat quality perspective.
- Implementation issues
 - Implementation gaps (e.g., loss assessments)
 - Leads to issues with how these gaps are assessed (i.e., data accuracy and availability)
- Data accuracy
 - Some parcel acreage information is incorrect and sponsors noted some locations are incorrect.
 - Data limitations and need for better reporting of geographic pieces and updated summary reports on CBfish to address redundancies or inaccuracies in data
- Tracking
 - Not all parcels have approved management plan, but this list is not readily available or complete
 - Are conservation values being maintained? BPA does remote sensing every 5 years to evaluate parcels- is this sufficient?
 - No tracking of non-federal wildlife mitigation by Council staff.

- Mitigation occurring as enhancement or conservation easement may not pass through BPA realty, so where are records? Example = Montana mitigation. 13 parcels in mapper, 90 in their 2019 annual report.
- Core issue is that no single database exists to track all the wildlife mitigation. So, at the Program level, how is mitigation proceeding? At Program level, are conservation values being maintained? Issues reported? All the Goals/objective/SPIs require some kind of database or aggregation or ledger tracking. This doesn't exist outside of what the Council is currently working on. Is this a need? Who could maintain this? How often should it be updated?
- Funding issues
 - Differences in where funding has been applied geographically and which sponsors have received funding or settlement agreements for wildlife mitigation, and which are under-funded.
 - O&M needs and the rising cost of acquisition and maintenance. 2018 Asset Management Strategic Plan highlights adequacy of funding to maintain lands, along with other assets
- Policy issues
 - Lingering wildlife policy issues- differences of opinion between BPA and Council on whether mitigation is complete; no final list that credits each parcel to a dam and notes the accepted mitigation credit in acres or in Hus
 - Lingering crediting issues, in general as described in NPCC 2011 and Ashley 2015a, 2015b, 2015c, 2015d)
 - o Not all entities included in mitigation at a particular project
 - Non-standard way of assessing losses and implementing mitigation
- Areas of progress
 - Substantial amount of mitigation has occurred through Program
 - Majority of C&I losses have been mitigated
 - Many of the issues identified above are also of interest to BPA and are actively being addressed. From their 2022 Strategic Asset Management Plan (SAMP; BPA 2022):

"This Strategic Asset Management Plan covers fish and wildlife acquisition of approximately 344,000 acres of land throughout Oregon, Washington, Idaho and Montana. BPA secures its assets in this category through the right to enforce conservation and mitigation in conservation easements and land management plans. The BPA Lands Program assumes fulfillment of all Memorandum of Agreements (MOA) signed by BPA, including the Columbia Basin Fish Accords, Willamette Wildlife Mitigation and Southern Idaho Wildlife Mitigation agreements. The maturity of the program has developed since the last plan. Particularly, the program has been able to significantly improve the tracking of the inventory of acquired lands by incorporating it into the Pisces database with readily retrievable metrics. The team continues to work on long-term objectives to improve sponsor compliance for new and updated land management plans.

Population influx throughout the region has increased land costs, and market influences continue to affect the project partners' ability to purchase mitigation property at the appraised, fair market value. These are some of the main risks that affect the strategy execution. Where feasible, BPA is pursuing settlement agreements with stakeholders. The settlements are intended to permanently extinguish BPA's mitigation obligations to acquire lands for fish and wildlife mitigation, within defined geographic areas, or pertaining to specific dams, in exchange for the provision of funds to accountable entities."

• In table 6.2 of the 2022 SAMP, BPA describes long term objectives for their lands program. These objectives are to:

(1) "assess the feasibility of permanently extinguishing BPA O&M expense obligations through the pursuit of settlements by 2027, (2) improve sponsor compliance to 100% for submitting new and updated land management plans post acquisition or expiration by FY 2027, and (3) develop a system to provide regular reporting on the condition of acquired lands with comprehensive characteristics and ability to measure the status of the program and progress relative to mitigation obligations by 2027."

Wildlife mitigation resources

Lands mapper: https://projects.nwcouncil.org/ProgramTracker/Modules/Lands/DashboardMap

Strategy Performance Indicators:

https://projects.nwcouncil.org/ProgramTracker/Modules/Assessments/Indicators

- 2017 Project Review: https://www.nwcouncil.org/reports/final-2017-wildlife-project-review/
- Wildlife Advisory Committee webpage: <u>https://www.nwcouncil.org/fish-and-wildlife/fw-forums-and-workgroups/wildlife-advisory-committee/</u>

Wildlife Crediting Forum archived webpage: <u>https://www.nwcouncil.org/fish-and-wildlife/fw-forums-and-workgroups/wildlife-advisory-committee/wildlife-crediting-forum-archive/</u>

SN HEP reports: https://www.streamnet.org/home/data-maps/hep/

CBfish crediting and acquisition tables: https://www.cbfish.org/Report.mvc/LandWildlifeCrediting

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"Funding will be provided for the Tribe's Albeni Falls Wildlife Mitigation project to help cover the costs of operating and maintaining 1,139 acres already purchased with ratepayer funds for wildlife mitigation. Funding will also continue for the operations loss mitigation project that the Tribe implements in coordination with the Montana Department of Fish, Wildlife, and Parks."

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Appendices

Appendix A. Losses in Program appendix

Estimated habitat unit (HU) losses (-) and gains (+) due to hydropower construction and inundation as they appear in the Fish and Wildlife Program (NPCC 2014). Total HUs lost per dam only sums losses, not any gains.

		HUs lost (-) or gained (+) by	Total HUs lost
Dam	Species	focal species at each dam	at each dam
Albeni Falls	Mallard Duck	-5,985	-28,658
	Canada Goose	-4,699	
	Redhead Duck	-3,379	
	Breeding Bald Eagle	-4,508	
	Wintering Bald Eagle	-4,365	
	Black-Capped Chickadee	-2,286	
	White-tailed Deer	-1,680	
	Muskrat	-1,756	
	Yellow Warbler	+171	
Lower Snake Projects	Downy Woodpecker	-365	-26,775
	Song Sparrow	-288	
	Yellow Warbler	-927	
	California Quail	-20,508	
	Ring-necked Pheasant	-2,6467	
	Canada Goose	-2,040	
Anderson Ranch	Mallard	-1,048	-9,619
	Mink	-1,732	
	Yellow Warbler	-361	
	Black Capped Chickadee	-890	
	Ruffed Grouse	-919	
	Blue Grouse	-1,980	
	Mule Deer	-2,689	
	Peregrine Falcon	-1,222 acres*	
		* Acres of riparian habitat	
		lost. Does not require	
		purchase of any lands.	
Black Canyon	Mallard	-270	-2,170
	Mink	-652	
	Canada Goose	-214	
	Ring-necked Pheasant	-260	

	Sharp-tailed Grouse	-532	
	Mule Deer	-242	
	Yellow Warbler	+8	
	Black-capped	+68	
	Chickadee	- 00	
Deadwood	Mule Deer	-2080	-4,787
	Mink	-987	
	Spruce Grouse	-1411	
	Yellow Warbler	-309	
Palisades	Bald Eagle- breeding	-5,941	-37,070
	Bald Eagle- wintering	-18,565	
	Yellow Warbler	-718	
	Black Capped		
	Chickadee	-1,358	
	Elk/Mule Deer	-2,454	
	Waterfowl and Aquatic	5 700	
	Furbearers	-5,703	
	Ruffed Grouse	-2,331	
	Peregrine Falcon (forested wetland)	-1,677 acres*	
	Peregrine Falcon (scrub- shrub)	-832 acres*	
	Peregrine Falcon	+68 acres	
	(omorgone workand)	* Acres of riparian habitat	
		lost. Does not require	
		purchase of any lands.	
Willamette Basin		17.05.4	
Projects	Black-tailed Deer	-17,254	-94,868
	Roosevelt Elk	-15,295	
	Black Bear	-4,814	
	Cougar	-3,853	
	Beaver	-4,477	
	River Otter	-2,408	
	Mink	-2,418	
	Red Fox	-2,590	
	Ruffed Grouse	-11,145	
	California Quail	-2,986	
	Ring-necked Pheasant	-1,986	
	Band-tailed Pigeon	-3,487	
	Western Gray Squirrel	-1,947	
	Harlequin Duck	-551	
	Wood Duck	-1,947	

	Spotted Owl	-5,711	
	Pileated Woodpecker	-8,690	
	American Dipper	-954	
	Yellow Warbler	-2,355	
	Common Merganser	+1,042	
	Greater Scaup	+820	
	Waterfowl	+423	
	Bald Eagle	+5,693	
	Osprey	+6,159	
Grand Coulee	Sage Grouse	-2,746	-111,515
	Sharp-tailed Grouse	-32,723	
	Ruffed Grouse	-16,502	
	Mourning Dove	-9,316	
	Mule Deer	-27,133	
	White-tailed Deer	-21,362	
	Riparian Forest	-1,632	
	Riparian Shrub	-27	
	Canada Goose Nest	74	
	Sites	-74	
McNary	Mallard (wintering)	+13,744	-23,545
	Mallard (nesting)	-6,959	
	Western Meadowlark	-3,469	
	Canada Goose	-3,484	
	Spotted Sandpiper	-1,363	
	Yellow Warbler	-329	
	Downy Woodpecker	-377	
	Mink	-1,250	
	California Quail	-6,314	
John Day	Lesser Scaup	+14,398	-36,555
	Great Blue Heron	-3,186	
	Canada Goose	-8,010	
	Spotted Sandpiper	-3,186	
	Yellow Warbler	-1,085	
	Black-capped	860	
	Chickadee	-809	
	Western Meadowlark	-5,059	
	California Quail	-6,324	
	Mallard	-7,399	
	Mink	-1,437	
The Dalles	Lesser Scaup	+2,068	-2,330
	Great Blue Heron	-427	
	Canada Goose	-439	
	Spotted Sandpiper	-534	

	Yellow Warbler	-170	
	Black-capped Chickadee		
	Chickadee	100	
	Western Meadowlark	-247	
	Mink Black-capped	-330	
	Chickadee	000	
Bonneville	Lesser Scaup	+2,671	-12,317
	Great Blue Heron	-4,300	
	Canada Goose	-2,443	
	Spotted Sandpiper	-2,767	
	Yellow Warbler	-163	
	Black-capped	-1 022	
	Chickadee	-1,022	
	Mink	-1,622	
Dworshak	Canada Goose-	-16	-28 /52
DW013HdK	(breeding)	10	20,402
	Black-capped	-91	
	Chickadee	51	
	River Otter	-4,312	
	Pileated Woodpecker	-3,524	
	Elk	-11,603	
	White-tailed Deer	-8,906	
	Canada Goose	+323	
	(wintering)	020	
	Bald Eagle	+2,678	
	Osprey	+1,674	
	Yellow Warbler	+119	
Minidoka	Mallard	+174	-10,503
	Redhead	+4,475	
	Western Grebe	+273	
	Marsh Wren	+207	
	Yellow Warbler	-342	
	River Otter	-2,993	
	Mule Deer	-3,413	
	Sage Grouse	-3,755	
Chief Joseph	Lesser Scaup	+1,440	-8,833
	Sharp-tailed Grouse	-2,290	
	Mule Deer	-1,992	
	Spotted Sandpiper	-1,255	
	Sage Grouse	-1,179	
	Mink	-920	
	Bobcat	-401	
	Lewis' Woodpecker	-286	

Ring-necked Pheasant	-239	
Canada Goose	-213	
Yellow Warbler	-58	

Appendix B. Settlement agreements and details

Agreement	Dams	Year	Details
 Wildlife mitigation agreement for Libby and Hungry Horse Dams BPA - State of Montana 	Libby Hungry Horse	1988	 Construction and inundation: Wildlife mitigation trust fund established Permanently resolves loss Operational: None Stewardship/O&M: All O&M associated with purchased lands is paid for out of the trust fund. Settlement agreement requires a minimum of 4 million be held in that fund to generate sufficient interest.
Northern Idaho MOA for wildlife habitat stewardship and restoration • BPA - IDFG	Albeni Falls	1997- programmatic agreements 2012- letter agreement 2018- MOA	 Construction and inundation: 4,225 acres (purchased under 1997 agreement) Permanently resolves loss Operational: Operational losses primarily addressed through habitat enhancement at Clark Fork Delta 2012 agreement = 624 acres 2018 MOA = 1,378 acres Resolves loss for 30 years Stewardship/O&M: BPA provided funding for Idaho to permanently operate and maintain acquired and enhanced parcels
Albeni Falls MOA • BPA - Kalispel Tribe	Albeni Falls	2012 Accord	 Construction and inundation: Funds acquisition of 2,869 HUs (fixed credit; equivalent to 1,275 acres) If BPA settles additional C&I losses or increases mitigation required at Albeni Falls, Kalispel Tribe can renegotiate

			Operational: • None Stewardship/O&M: • Funding exists within accord project 1991-060-00
 Washington Wildlife Mitigation Agreement (Interim) BPA - Washington Wildlife Coalition Coalition members: WDFW, CCT, CTUIR, YN, USFWS, STOI 	Grand Coulee, Chief Joseph, McNary, John Day, The Dalles, Bonneville	1993	 Construction and inundation: Agreement establishes funding, method to disburse funding, and commitment to generate long- term agreement. No specific protection or enhancement targets defined for these dams
Disbursal of Wildlife mitigation funds and mitigation crediting (Washington agreement- final) • BPA - WDFW	Grand Coulee, Chief Joseph, McNary, John Day, The Dalles, Bonneville	1996	 Construction and inundation: Once WDFW signed MOA, their share of the funds remaining in the interim agreement was transferred to WDFW
Southern Idaho Wildlife mitigation MOA • BPA - Shoshone- Bannock Tribes of the Fort Hall Indian Reservation	Minidoka Palisades Black Canyon Anderson Ranch Agreement can extend to other S. ID hydroelectric projects amended into Council's Program and agreed to by parties	1997	 Construction and inundation: Funds provided to purchase or enhance; conduct HEP surveys, develop management plans; HU credits provided to BPA at established rates No specific HU target identified Operational: Not specifically noted Stewardship/O&M: By 1999, BPA shall start providing funds for continued O&M By 2001, the parties shall negotiate an O&M funding scheme
Southern Idaho MOA BPA - Shoshone- Paiute Tribes of the Duck Valley Indian Reservation 	Black Canyon Anderson Ranch	2009	 Construction and inundation: Agreement described as "similar" to the MOA with the Shoshone-Bannock Tribe in the 2014 IDFG agreement, but details on the Shoshone-Paiute MOA were not available at the time of this report.

			Operational: • NA Stewardship/O&M: • NA
Southern Idaho MOA • IDFG - Shoshone- Bannock - Shoshone- Paiute	Anderson Ranch Black Canyon Minidoka Palisades	2010	 Allocates 50% of losses to IDFG and 50% of losses to tribes, combined Tribes split their 50% differently by dam: Shoshone- Paiute 80% Shoshone-Bannock 20%: Anderson Ranch and Black Canyon Shoshone-Bannock 100%: Minidoka and Palisades
Southern Idaho Wildlife mitigation MOA • BPA - IDFG	Minidoka Palisades Black Canyon Anderson Ranch Deadwood	2014 (replaces original 1997 agreement with IDFG)	 Construction and inundation: 16,645 acres = Idaho share 8,722 acres already mitigated 7,923 acres remain Operational: Deadwood Dam is a BOR irrigation project that provides flow regulation for power production at Black Canyon Dam. BPA pays the power share of annual operating costs. 665 acres across 5 dams (this is Idaho's share) Stewardship/O&M: 14,000,000 for all properties purchased under 1997 MOA;
 Wildlife Mitigation agreement for Dworshak Dam BPA - Nez Perce Tribe BPA - State of Idaho 	Dworshak Dam	1992	 Construction and inundation: NPT- 40% of lost HUs; funding provided in a trust account IDFG- 60% of lost HUs- settled through acquisition of ranch Stewardship/O&M: Funds provided to IDFG for stewardship of above lands
Lower Snake River Compensation Plan	Lower Granite Little Goose	1976	<u>Plan</u> included wildlife mitigation and this was implemented by Corps,

USACE- FWS- WDFW	Lower Monumental Ice Harbor		primarily through enhancement of existing lands.
Willamette River Basin MOA regarding wildlife habitat protectionBPA - ODFW	Big Cliff Detroit Foster Green Peter Cougar Dexter Lookout Point Hills Creek	2010	 Construction and inundation: 25,537 acres Operational: 1,000 acres Stewardship/O&M: A portion of project funding is dedicated to stewardship at time project is approved; money then transferred into a stewardship account O&M for the grants program funded through 2043