IEAB Independent Economic Analysis Board

Scoping Investigation of Available Project Information

Task Number 105

June 20, 2006

Executive Summary

The purpose of this task is to review the status of available information for fish and wildlife projects in 2007 fish and wildlife project proposals (proposals) and in Pisces, and to recommend whether a larger task is advisable to develop ways to improve the cost effectiveness of the project selection process. Pisces is a computer program developed by BPA's Fish and Wildlife Division to improve management of Fish and Wildlife projects, and to improve the ability to report information about the Fish and Wildlife Program.

The objective is to see if costs of different strategies can be approximated in a way that could support cost-effectiveness analysis or cost benchmarking. Cost-effectiveness analysis compares the costs of alternatives, usually on a per-unit basis, to determine which is least costly, or to obtain an objective at least cost. Cost benchmarking uses costs of existing activities to develop cost standards or guidelines to help judge the reasonableness of future proposed costs.

The IEAB has examined information available in a subset of proposals and examined information for ongoing projects available in Pisces. In general, the quality of information available for cost-effectiveness analysis or cost benchmarking is variable among proposals, and in Pisces, among the standardized work elements and metrics. Work elements are standardized definitions of work activities. Metrics are standardized quantitative measures of accomplishment associated with some work elements.

Among the proposals, there is great variation in the types of projects, their objectives, and local conditions that affect activities and their expected costs. For most work elements, no metric is reported. For some projects, BPA pays for a fraction of the total cost and the proposals do not show the other cost shares. For most work elements there are several types of activities and costs reported across proposals. Some of the metrics in the proposals are not clear in terms of what is being reported. It appears that some work elements could have a metric but none is reported.

Some types of work elements and metrics – miles of fencing, acres of vegetation removed, or smolts produced, for example, lend themselves to cost comparisons, but for

typical questions about benchmarking and cost-effectiveness, there are still project-specific and site-specific conditions that should be considered. More analysis of these conditions might lead to a formula where expected costs can be estimated as a function of site conditions. For other work elements, some disaggregation beyond the existing work elements may be needed to isolate the costs of measurable activities within the element. It may not be possible to specify a standard metric for cost-effectiveness analysis for some work elements such as environmental compliance, data collection, analysis or reporting, but it will still be useful to show the share of total project cost devoted to these types of activities. For some applications, these "foundational" or joint costs may need to be reviewed and possibly allocated among other metrics.

Pisces improves on the proposal information in several ways. The proposals provide information on planned, rather than actual, costs and metrics. Pisces provides actual costs and metrics for ongoing projects. Some of the information in the proposals is not checked or verified. Some errors and inconsistencies are corrected before actual project information is entered into Pisces. BPA intends that Pisces will improve on the quality of information provided in project proposal forms (BPA 2006).

Pisces is a project management tool and is not designed for economic analysis. Pisces information will be helpful, but more detail will often be required for useful analysis. As with the proposals, there is a large range of activities within work elements, so additional information about the actual work and costs should be reviewed. The IEAB and Pisces developers have an ongoing dialogue to help improve the quality of economic information contained in Pisces.

For most projects, some of the important cost, engineering, and site-specific information is not provided in the proposals or Pisces. In particular, more information about the expected life of improvements and the duration of benefits would be useful for basic economic analysis. The share of cost that is a long-term investment, the expected life of these investments, and the expected timing of benefits in the future, should be provided if available. It is our understanding that contractors will provide this information for Pisces at the contracting phase when statements of work are being developed.

Metrics should be tied directly to proposal objectives. The number of fish produced is not provided as a metric for habitat, and the disposition of fish production is not provided as a metric for hatcheries. The IEAB recognizes the difficulties and uncertainties associated with estimating and providing this type of information. Still, we continue to support efforts to improve information about the amount, types and disposition of fish and wildlife produced.

Based on this preliminary review, the IEAB recommends that a larger task be developed to identify opportunities to increase the value of proposals and Pisces information for cost-effectiveness analysis and cost benchmarking. In particular, the IEAB would

- Attempt to develop some cost data for cost-effectiveness analysis and benchmarking based on all data provided by Pisces, augmented by current and

past proposals, and report on the potential use(s) and quality of the cost information developed.

- Investigate cost data that may be available from other public and private sources and determine if it could be used for cost-effectiveness analysis or cost benchmarking of fish and wildlife projects.

- With BPA, review the list of work elements and their metrics to see if more detailed work element categories and measures can be recommended, and continue working with BPA and Pisces to increase the value of information provided by proposals and Pisces for economic analysis.

Introduction

Task 105 included three tasks.

1. Select a few current project proposals and evaluate the information that is provided in the project proposal form.
2. Further evaluate the Pisces data management system to see if it organizes and maintains project information in a way that could help evaluate cost effectiveness.
3. Consider the possibility of benchmarking different types of fish and wildlife actions based on information provided in project proposal forms or in Pisces.

These guidelines might be a specific cost per unit, but they could also be expressed as a share of project cost, or as formulas for calculating cost based on site-specific factors.

Task 1. Evaluate information in a few current project proposals

Six habitat proposals and five hatchery proposals for FY2007 were examined.

Task 1.1 Habitat Proposals

The habitat proposals investigated were:

- ODFW Blue Mountain Oregon Fish Habitat Improvement
  http://www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=379

- Albeni Falls Wildlife Mitigation
  http://www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=171

- Trout Creek Fish Habitat Restoration Project
  http://www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=241

- Northeast Oregon Wildlife Project Precious Lands
  http://www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=200

- Pine Creek Conservation Area: Wildlife Habitat and Watershed Management on 33,557-acres to benefit grassland, shrub-steppe, riparian, and aquatic species.
  http://www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=109

- Libby Mitigation Program
  http://www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=500

Proposed costs and metrics were compiled and compared. Results are shown in Table 1. The six projects reported 67 metrics. The metrics examined were

- Realign, connect and create channel

- Increase instream habitat complexity
- Install fence
- Plant vegetation
- Create, restore or enhance wetland
- Remove vegetation
- Enhance floodplain
- Improve/relocate road

Observation 1. Most proposal work elements do not have metrics.

For each proposal, work elements without metrics compared to total work elements are shown in Table 2.

Many of the work elements, such as environmental compliance and planning and coordination, do not have metrics. This is intentional. For many work elements, there are no useful metrics. Some of the costs of these work elements are the "foundation costs." In economic terms, these are joint costs of the proposal. Joint costs are costs necessary to support the entire assemblage of activities making up a project. Depending on how the cost information is to be used, some of the joint costs might be re-allocated across metrics to obtain allocation by metric or total project cost by metric.

Observation 2. Some of the proposal metrics provided are not explained well.

Some of the metrics are unclear in that they do not provide enough information about the actual activities to understand what accomplishments are actually proposed.

Example: Trout Creek. Enhance Floodplain. # of acres treated: 65. What kind of acres? What kind of treatment? The metric is expressed as "floodplain and channel connectivity."

By contrast, in Albeni Falls, Enhance Floodplain is streambank, large woody debris (LWD) and streambed work. Without more information it is difficult to compare across these two proposals.

Example: NE Oregon. Work element no. 3 claims # of road miles improved, upgraded, or restored: 15, but on reading the text it is actually 11 miles of trails and 4 miles of roads. Without information on the types of roads or trails it is difficult to compare across projects.

Example: Two proposals count Planting Vegetation as acres, Libby Mitigation counts Planting Vegetation as miles. Planting Vegetation is reported by two different metrics. The metrics for planting vegetation cannot be compared when one is in miles and the other in acres.

Table 1. Summary of Selected Metrics for Eight Work Elements from Six 2007 Proposals						
Work Element	Metric	Proposal	Cost	Metric Value	Cost/Metric	Notes
Realign, connect and create channel	Miles	Blue Mtn	$47,192	15	$3,146	Tech, Design, Mgmt (T, D, M). Total cost is about 5 times
		Trout Creek	$50,000	1.4 to 1.75 after	$28,571	Trout Cr Berm removal
		Trout Creek	$60,000	4 to 4.6 after [1.]	$13,043	Antelop & Trout Cr
		Libby Mit	$101,150	0.57	$177,456	Libby Cr Lower Cleveland
		Libby Mit	$17,850	0.27	$66,111	Pipe Cr
		Libby Mit	$41,650	0.76	$54,803	Grave Cr Phase 4
		Libby Mit	$89,250	0.81	$110,185	Libby CR Highway 2 reach
		Libby Mit	$41,650	0.76	$54,803	Grave Cr Phase 5
		Libby Mit.	$71,400	0.8	$89,250	Dunn Cr
Increase instream habitat complexity	Miles	Blue Mtn	$23,596	15	$1,573	T, D, M, Meadow, End and Ladd Crs, Wallowa R, tribs
		NE Oregon	$172,800	2	$86,400	Joseph Cr large woody debris
		Libby Mit.	$89,250	0.57	$156,579	Libby Cr Lower Cleveland
		Libby Mit.	$35,700	0.27	$132,222	Pipe Cr
		Libby Mit.	$59,500	0.76	$78,289	Grave Cr Phase 4
		Libby Mit.	$107,100	0.81	$132,222	Libby CR Highway 2 reach
		Libby Mit.	$59,500	0.76	$78,289	Grave Cr Phase 5
		Libby Mit.	$95,200	0.8	$119,000	Dunn Cr
Install Fence	Miles	Blue Mtn	$106,182	30	$3,539	
		Albeni Falls	$150,000	20	$7,500	
Plant Vegetation	Acres	Blue Mtn	$58,990	1000	$59	T, D, M
		Albeni Falls	$189,000	100	$630	Native seed and plant
		NE Oregon	$137,880	100	$1,379	also 3 riparian miles
	Miles[1]	Libby Mit	$17,850	1.14	$15,658	Libby Cr Lower Cleveland
		Libby Mit	$23,800	1.62	$14,691	Libby Cr Highway 2 reach
		Libby Mit	$17,850	1.52	$11,743	Grave Creek
Create, restore or enhance wetland	Acres	Blue Mtn	$11,798	1000	$12	T, D, M
		Albeni Falls	$223,000	5	$14,867	Create nesting islands
		Albeni Falls	$550,000	100	$1,833	Restore hydrologic function
Remove Vegetation	Acres	Albeni Falls	$345,000	3800	$91	Spray, pull or mow noxious weeds
		NE Oregon	$171,000	600	$285	Thistles, blackberries, weeds chem, mech, and bio
		Pine Creek	$56,015	500	$112	Juniper cut
		Pine Creek	$59,015	550	$107	Juniper cut
		Pine Creek	$92,015	1100	$84	Juniper cut
Enhance Floodplain	Acres	Albeni Falls	$560,000	75	$2,489	Stabilize shoreline, woody debris
		Trout Creek	$25,000	65	$385	
		Trout Creek	$60,000	125	$480	
Improve/relocate road	Miles	NE Oregon	$84,000	15	$5,600	Includes some trail
		Pine Creek	$31,805	20	$1,590	

1. Started with 4 miles, ended with 4.6
2. Both sides of a 1-mile stream = 2 miles

Table 2. Numbers of Work Elements Without and With Metrics, from 6 Proposals

Proposal Name	Work Elements without a metric	Work Elements with a metric	Total work elements
Blue Mountain	14	7	21
Albeni	31	15	46
Trout Creek	9	10	19
NE Oregon Wildlife	13	4	17
Pine Creek	13	4	17
Libby Mitigation Program	14	27	41
Total	94	67	161

Example: Libby Mitigation counts Grave Cr Phase 4 and 5 metric of 4,000 feet separately; but are they the same miles? They could be double counting. Another proposal might count the same work as one 4,000 foot piece.

BPA's comments on a draft of this report note that the proposal data collection tool includes limited data verification logic; whereas Pisces has built-in data verification logic that ultimately ensures higher quality and more consistent data across all projects (BPA 2006).

Observation 3. A proposal may include just a fraction of total costs

For some of the metrics there is an enormous range in the unit costs ($ cost per unit of metric) between the proposals. Table 1 shows that, for "Increase instream habitat complexity," and "Realign, connect and create channel" the difference between the lowest and highest unit cost is 50 to 100 times. For "Create, restore or enhance wetland" the difference is over 1,000 times. In these cases, the low unit cost is associated with the ODFW Blue Mountain Proposal. The costs reported for Blue Mountain are just technical support, design and management. From the project narrative:

> "BPA funding makes possible the work of the GRMWP, ODFW and CTUIR and attracts another $4 from other sources for each $1 committed by BPA."

That is, total project costs are about five times the amount included in the proposal.

Observation 4. Some proposal metrics include a wide range of activities and costs.

For some of the metrics a large range in the unit costs ($ cost per unit of metric) between the proposals appears to be related to a large range of activities being reported.

With the ODFW project excluded, the unit cost range in Table 1 narrows to roughly 10 times. Differences in unit costs in some cases can be attributed to different activities within a work element.

Example: In "Create, restore or enhance wetland" for example, one would establish nesting islands, and one would restore hydrologic function.

Observation 5. There are some opportunities for comparison across metrics.

Even with this wide range, there appears to be an opportunity for estimating useful unit costs for comparison. Four habitat work elements that appear to have readily quantifiable activities are Install Fence, Plant Vegetation, Remove Vegetation, and Improve/Relocate Road. However, even these unit costs are dependent on a number of site-and element-specific characteristics. For these work elements, it may be possible to isolate the major causes of cost differences between projects and use resulting unit costs as a check on reasonableness for costs of similar projects.

Observation 6. Some proposal work elements could have a metric but don't.

Example. In Pine Creek, controlled burn acreage data are provided in the narrative but not as a metric.

Example. In Libby Mitigation, some riparian planting projects show miles in the narrative but they claim no metric.

BPA's comments on an earlier draft of this report note that if no metric was entered, this would be corrected in Pisces by the combination of human review and automated validation checks (BPA 2006).

Observation 7. Some of the more useful information for cost-effectiveness is found in the expanded narrative descriptions.

Some example text from the narratives is provided below.

Blue Mountain

Work Element 47 Plant Vegetation

> "Level of planting will depend on final design but will include shrubs/trees, sedge mats, sedge/rush plugs and seeding. Preliminary plans suggest between 10,000 and 25,000 shrubs/trees per project."

Albeni

> "The Work Group is confident that the members can secure fee-title and/or negotiate conservation easements at a cost of about $7,200 per acre on 2,500 acres for the period of fiscal year 2007 through 2009."

NE Oregon

Important information about vegetation planted is shown in the text:

> Trees and shrub species to be planted by stream.

Stream	Species and stream miles to be treated
Bear	ponderosa pine (0.5 miles)
Cottonwood	black cottonwood, red osier dogwood (0.25 miles)
Joseph	black cottonwood, ponderosa pine (0.25 miles)
Tamarack	black cottonwood, ponderosa pine, aspen (0.5 miles)

Observation 8. Some proposal information regarding historical accomplishments and costs could be useful for cost-effectiveness and benchmarking.

Information on project accomplishments and costs is contained in the narratives of some proposals, as illustrated below. BPA, in their comments on an earlier draft, note that some of this information may be too subjective to be meaningful and the way in which the sponsors describe their accomplishments may be too diverse to be comparable (BPA 2006). Still, the information may be useful.

Blue Mountain.

> "The projects implemented by ODFW have had a positive impact on riparian and stream habitat in the Grande Ronde subbasin. Examples include:
>
> • Projects have improved the structure and function of degraded riparian areas and streams. Restored riparian areas were more fully developed and had less bare ground susceptible to erosion. Stream channels in restored areas were narrower, deeper and had more pools. An assessment of program photopoints at projects built between 1988 and 2001 found improvement in all habitat categories (Table 5 and Figure 2)
>
> • Implementation monitoring suggests maximum summer water temperature is reduced as it passes through areas where fencing has allowed riparian restoration (Figure 3 and 4)
>
> • Meadow ground water level has been shown to rise very soon (Figure 5) after channelized streams are returned to a more natural channel/floodplain configuration (Figure 6 and 7); and

- Independent sampling has shown an increase in 0 age salmonids and a reduction in warm water fishes in exclosure projects (Kauffman et al. 2002). While not as rigorous, observations suggest salmon and steelhead use of project streams increases soon after degraded conditions begin to improve.

Limited implementation monitoring is conducted as part of this project. Funding has never been provided to perform a more rigorous evaluation of projects."

Trout Creek

"The ability of Trout Creek Watershed basin to produce a large number of steelhead smolts is reflected by the 1998 smolt trapping estimated 76,000 smolts outmigrating from the Trout Creek Watershed."

Albeni Falls

"In nine years of implementation (1997 – 2006), the Work Group has mitigated approximately 28 percent of Albeni Falls wildlife losses by securing the protection of 8,587 acres of wildlife habitat and crediting BPA with 6,602 baseline protection habitat units. Enhancement activities have resulted in a total of 1,560.73 enhancement HUs. Management plans have been completed on 49 percent (2,721 acres) of Project lands."

Observation 9. The narrative often includes good information about historical accomplishments, but more cost data could be tied to the accomplishments.

The narratives often provide information about general or specific accomplishments without reference to the costs of these accomplishments. Cost data would help to more easily document the cost effectiveness of past actions.

Example from a Proposal:

"The Trout Creek Fish Habitat Restoration project has accomplished the following:

- Installed and maintained riparian exclosure fencing on 55 stream miles. This provides protection on 68% of the currently available steelhead habitat.
- Created 14 off channel watering sites, placed 3,397 habitat boulders and 498 pieces of LWD.
- Planned designed and constructed 5.34 stream miles of berm removal and channel reconstruction on Trout Creek.
- Worked with private landowners to solve aquatic and riparian habitat problems.
- Rotary Ditch Screens Installed 9
- Self Cleaning Pump Screens Installed 35

Project budgets and expenses costs by fiscal year:

Fiscal year	Expense billed to BPA
1982-2000	Approx $1.8 million
2001	$338,693
2002	$292,978
2003	$271,767
2004	$328,001
2005	$332,336”

(Note these annual costs do not provide any detail about the costs of the improvements above)

Observation 10. Data provided in the proposals is expected or planned. For cost benchmarking, and for some evaluations of project cost-effectiveness, actual cost and metrics from past projects should be used as a basis for comparison.

This observation is just to note that proposed metrics may not be attained in practice. Where a project history is available, actual performance may be preferred to planned performance for purposes of cost-effectiveness analysis. Pisces includes the actual performance data, so Pisces is preferred in this sense.

Task 1.2 Hatchery Proposals

Five FY 2007 hatchery projects were reviewed

- Johnson Creek Artificial Propagation Enhancement Project
  http://www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=188
- Hood R Prod O&M - Ws/ODFW
  http://www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=266
- Nez Perce Tribal Hatchery Operations & Maintenance
  http://www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=573
- Restoration and Conservation Aquaculture
  http://www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=152
- Sherman Creek Hatchery - O&M
  http://www.cbfwa.org/solicitation/components/forms/Proposal.cfm?PropID=151

All projects provide a request for a three year budget and estimates for annual budgets. Costs are in terms of total costs and are not species specific, when more than one species or stock is produced.

The hatchery projects provide a number of different measures of fish production, and most provide a measure of smolts released by species. Three out of five project proposals

provide expected adult returns to the hatcheries and some measure of expected pairs spawned. From these metrics total annual cost per smolt released and total annual cost per pair spawned may be calculated. (See columns 7 and 8 in Table 3; the differences across hatcheries are noticeable.)

Observation 11. For existing hatcheries, measures of actual performance are generally preferred to proposal information.

The IEAB has already shown that cost effectiveness of hatcheries can be compared using data on actual returns (IEAB 2002). Where planned operations and production is essentially the same as in past years, we must conclude that actual data on costs and returns is preferred to proposal information on costs and returns.

A summary of costs, planned production, and expected returns from the proposals is provided in Table 3.

The Johnson Creek Artificial Propagation Enhancement Project provides one quantified metric with an associated cost: summer Chinook salmon smolts released to Johnson Creek. Expected cost per smolt released is $1.00. Total cost per pair of spawners returned is $32,500.

The Hood R Prod O&M - Ws/ODFW project provides metrics for juvenile fish released, fry produced, and pairs spawned for spring Chinook and summer and winter steelhead. Smolt production costs per spring Chinook and steelhead may be calculated to be $.28 per unit, not including overhead costs. Costs per returning pair of spawners may be calculated to be $2,800.

Nez Perce Tribal Hatchery Operations & Maintenance provide a total cost for their Snake River fall Chinook program, and another cost for their spring Chinook program, and they provide smolts released by species and location. For Snake River Fall Chinook, 1.4 million smolts would be released annually at an estimated cost of $.72 per smolt and $1,428 per returning spawning pair. The expected fisheries resulting from releases for resident fish hatcheries would also be useful in developing cost effective models in terms of smolts released, expected harvest and costs per unit of these metrics. For purely enhancement projects a description of present spawning returns versus expected returns would be useful in comparing costs per returned spawners over time. For spring Chinook, 0.625 million smolts and juveniles would be released at a cost of $1.74 per unit. The returning spawners may be calculated to cost $4,770 per unit.

The Restoration and Conservation Aquaculture, and the Sherman Creek Hatchery - O&M do not provide any quantified metrics for their programs.

Observation 12. Additional data could improve the ability to use hatchery proposals for hatchery economic analysis

Table 4 provides some additional information that can be provided to improve hatchery impact analysis. None of the hatchery projects provide a description of fish harvesting that may be expected from these releases. Such information is available from the Integrated Hatchery Operation Team (IHOT) reports or from State and Federal fish managers. With this information and expected smolt production, harvest estimates could be developed. Columns 1 and 2 include information from the IEAB/NPCC report "Economic Effects from Columbia River Basin Anadromous Salmonid Fish Production" (IEAB–2005-1). This information could be used in conjunction with the metrics included in the proposals to consider the cost effectiveness of the projects.

Table 3. Comparison of Five Hatchery Project Proposals. Annual Costs, Planned Production, Expected Returns, and Unit Costs

1	2	3	4	5	6	7	8
Project Name	**Total Three-Year Budget**	**Approx. Annual Budget**	**Planned Smolts Produced/Released by Species/Area Annually**	**Expected Adult Returns**	**Expected Adult Pairs Spawned**	**Total Annual Cost per Smolt Released**	**Total Annual Cost per Pair Spawned**
Johnson Creek Artificial Propagation Enhancement Project	$3,893,000	$1,300,000	100,000 Chinook Snake River Spring/Summer ESU	152-1,000	40	$1	$32,500
Hood River Production O&M	$833,718	$280,000	Lower Columbia ESU: Spr Ch 30,000; Sum St 40,000; Win St 25,000-50,000	Spr Ch 750 Sum St 600 Win St 700	Spr Ch 60 Sum St 16 Win St 22	Spr Ch ~ $ .28 Sum St ~ $.28 Win St ~ $.28	Spr Ch ~ $2,800 Sum St ~ $2,800 Win St ~ $2,800
Nez Perce Tribal Hatchery O & M (Supplementation)	$6,305,423 ($2,616,633 for Fall Ch)=48%; ($2,791,915 for Spr Ch)=52%	$2,100,000	Mountain Snake/Clearwater: Fall Ch 1,400,000; Spr Ch 625,000	Fall Ch 1413 Spr Ch 722	If pairs are 1/2 of brood stock collected = Fall Ch 706; Spr Ch 361	Fall Ch $.72 Spr Ch $1.74	Fall Ch $1,428 Spr Ch $4,770
Restoration and Conservation Aquaculture Resident Fish	$8,233,000 ($300,000 for Burbot)=10%; ($3,000,000 for Sturgeon)=90%; no budget for Kokanee	$2,744,333	Mountain Columbia: Burbot; White Sturgeon; Kokanee	2,500 Burbot; 20 White Sturgeon; 250 Kokanee	Released about 36,000 young sturgeon	Cannot be calculated with given data	Cannot be calculated with given data
Sherman Creek Hatchery O&M	$885,154	$295,000	Intermountain/Columbia River	Resident fish mitigation			

Note: Information in columns 1-6 is taken from project proposals. Columns 7 and 8 are calculations made from information provided.

Table 4. Comparison of Five Hatchery Project Proposals. Other Information on Returns and Harvest

1	2	3	4	5
Project Name	**Comments**	**Historical Expected Survival Rate/Numbers of Survival to Harvest and Escapement**	**Species**	**Area of Harvest (Percentage and Numbers)**
Johnson Creek Artificial Propagation Enhancement Project	The proposals fail to estimate expected increase over years. The expected returns are higher than historical survival to harvest rates which are 0.10% to 1.00 % (from IHOT data). In general hatchery operations the overall costs of Spring Chinook are about $1.00 per smolt when capital costs are included. For this size of releases the costs are probably from $.30 to $.40 each. This seems to be somewhat in line with general cost estimates.	1.00% Spr Ch /1,000 Spr Ch	Spring Chinook	Alaska/BC 8%=80; WA/OR/CA Ocean 2.5%=25; Freshw Sport 30.5%=305; Gillnet Commercial 5%=50; Gillnet Tribal 39%=390; Research/Other 3%=30; Hatchery/Escape 11%=110 (versus Proposal Expected 152-1,000)
Hood River Production O&M	Costs not given by species, so these estimates are averages. Expected returns (from IHOT data) are as follows: Spring Chinook .35% to 1.2%; Steelhead .40% to 1.00%. Expectations seem to be high; costs seem low. They are not projecting changes in increased returns over time.	1.20% Spr Ch; 1.00% St/ 360 Spr Ch; 400 Sum St; 375 Win St	Spring Chinook	Alaska/BC 21%=76; WA/OR/CA Ocean 7%=25; Freshwater Sport 10%=36; Gillnet Commercial 10%-36; Hatchery/Escape 52%=187 (versus Proposal Expected 750)
			Steelhead	Alaska/BC Ocean 1%=8; Freshwater Sport 45%=349; Hatchery/Escape 54%=418 (versus Proposal Expected 700)
Nez Perce Tribal Hatchery O & M (Supplementation)	No expected increase over years. Expected survival rates are .40 to .73% for Fall Ch and .10 to 1.00% for Spring Ch. Their expected return rates seem low.	1.00% Spr Ch; .60% Fall Ch/ 14,000 Spr Ch; 3,750 Fall Ch.	Spring Chinook	Alaska/BC 8%=1120; WA/OR/CA Ocean 2.5%=350; Freshwater Sport 30.5%=4270; Gillnet Commercial 5%-700; Gillnet Tribal 39%=5480; Research/Other 3%=126; Hatchery/Escape 11%=1540 (versus Project Expected 722)
			Fall Chinook	Alaska/BC 33%=1238; WA/OR/CA Ocean 10%=375; Freshwater Sport 1%=38; Gillnet Commercial 14%=525; Gillnet Tribal 31%=1162; Hatchery/Escape 11%=413 (versus Project Expected 1413)
Restoration and Conservation Aquaculture Resident Fish	Very few comparable numbers.			
Sherman Creek Hatchery O&M	No quantified metrics are available to evaluate this program.			

Note: Column 2 contains relevant notes made by IEAB reviewer. Column 3 lists survival rates that may be expected for the mentioned species propagated in this geographic area of the Columbia Basin in terms of percentage and total returning adults. For an explanation, see NPCC_IEAB 2005-1 report. Column 5 lists expected harvest (by percentage) for the species in this proposal (NPCC-IEAB) and calculated number of adults that may be expected to return to the hatchery (hatchery escape) versus the proposal expected number of returns anticipated.

Task 2. Further evaluate the Pisces data management system to see if it organizes and maintains project information in a way that could help evaluate cost effectiveness.

Pisces has the potential to be useful as a platform for cost-effectiveness analysis or cost benchmarking. Pisces is a software program and database which includes information on work elements and metrics for ongoing projects. The purpose of Pisces is primarily for project tracking and management. BPA is hopeful that the data collected by Pisces will be useful in analyzing the effectiveness of the program including its cost-effectiveness (BPA 2006). However, Pisces was not designed to be used as a tool for cost-effectiveness analysis or cost benchmarking. Therefore, any findings here of limitations on the potential use of Pisces for cost-effectiveness analysis or benchmarking should not be taken as a criticism of Pisces.

The FY 2007 proposals are required to follow a format compatible with Pisces. Therefore, the examination of proposals in Task 1 reveals some of the limitations of the data in Pisces for cost-effectiveness analysis and benchmarking. In particular, many of the reported metrics will need to be placed in their site and project-specific context.

The IEAB commented on Pisces in 2005 in a letter to the Pisces developers. The following IEAB comments from that letter are pertinent to this task.

IEAB Comment: The information to be provided must first be defined, and then it must be collected. Definition is not a trivial matter. BPA should work with NPCC and other potential users to develop and agree on common metrics which can be easily tied to goals and objectives.

From the review of 2007 proposals, it appears that all projects are not using the same standardized metrics in the same way. Sometimes, the same metric is used for different types of activities or improvements. The original proposal may need to be checked to see what was actually done. More detailed categories of work might be useful for some work elements. These standardized metrics will be useful not just for cost-effectiveness analysis but also for routine project management.

IEAB Comment: Project costs should reflect all costs, not just the cost share paid by Bonneville. Costs paid by other federal agencies, by State and local governments, and by private interests should be counted.

This problem is reflected in the 2007 proposals as well as in Pisces. For Blue Mountain, for example, 2007 costs reported are just design and management, and the narrative reveals that total project costs are about five times the BPA share. Pisces developers are working to include a capability to include all costs, not just the BPA cost shares.

IEAB Comment: For cost-effectiveness, all costs must be expressed on a common basis of either cost per unit time or net present value. Information on the expected life of

investments will be required. Pisces should include information that allows a user to know when benefits will be realized.

This type of information is not provided by the proposals in a standardized way. From the June 2005 presentation for the IEAB (BPA 2005)

Based on feedback from the Summer 2004 workshops, the overwhelming sentiment from contractors and BPA project managers was not to require a line item budgeting detail for every work element. Instead, Pisces accepts an estimate of total spending for every work element in a SOW.

This reporting limitation will make cost-effectiveness analysis more difficult. The detailed costs could show, for example, types of improvements, for which an expected life could be assigned. Cost reporting by work element will not reveal this useful information. The IEAB recommends that costs be made available by every proposal applicant at the highest level of detail used by the applicant to develop the work element costs. That is, applicants should provide the more detailed costs if they are available. This should not significantly increase the applicant's work load. In any case, a short narrative explaining how costs were estimated would be useful.

IEAB Comment: Project proponents should be required to provide effectiveness estimates at several levels of detail to the extent possible; for example, miles of fence built, acres of habitat protected, increased primary productivity, and numbers of fish produced.

Most of the proposals attempt to include this type of information where possible, but not in a standardized format. Some is provided in the narratives. Some work elements allow use of more than one metric, but not both. For the Plant Vegetation work element, for example, miles and acres should both be provided (not just one or the other). From the 2007 proposals, it appears that some available metrics were not reported. It is unknown if this problem will carry into the Pisces database.

As part of this Task, a Pisces user account was obtained and metrics information was extracted. Currently, Pisces can obtain data by project (contract) on planned and actual metrics. There is no easy way to view all metrics available by work element over all contracts, but this information can be extracted.

Task 3. Consider the possibility of cost benchmarking

The IEAB proposes to attempt to develop some costs for benchmarking based on all data provided by Pisces, augmented by current and past proposals, and report on the potential use and quality of the cost information developed. Only projects active in 2005 or later have work elements, so this limits the potential scope of this effort.

We will obtain data from Pisces organized by work element, and report on this information. This data set should include:

- the work element cost
- the reported metrics
- the project number and
- data on total cost of the project for each element.

Next, we will use project numbers to go back to the proposal forms and project narratives to see how many additions, corrections and improvements to the raw data from Pisces can be accomplished. The resulting data set will be reported separately. The difference between Pisces data and total proposal information will be discussed.

We will develop some cost-benchmarking standards from this data set, and we will evaluate the possible limitations of this data. This benchmarking will include unit costs for some metrics such as building fences and removing vegetation, but will also include some administrative, overhead and RM&E costs – data collection and analysis, environmental compliance, possibly – as a share of total project costs.

We would also like to determine if reliable cost benchmarking data are available from other sources. We would conduct a literature search and investigate other sources of information about fish and wildlife project costs. USDA NRCS county offices have cost standards for a variety of environmental improvements, and other state and federal programs may keep cost information. We would also contact The Nature Conservancy to see if they keep records on costs that we could review. The result of this review will be a recommendation about the use of this other information for benchmarking or cost-effectiveness analysis of Fish and Wildlife Program costs.

Citations

BPA 2005. Pisces Presentation to the IEAB.

BPA 2006. BPA Comments on the Draft IEAB Review of Pisces and Proposal Data and their Potential Use in cost-effectiveness analysis. May.

IEAB 2002. Artificial Production Review Economics Analysis Phase I. Council document IEAB 2002-1. July 8, 2002.

IEAB 2005. Economic Effects From Columbia River Basin Anadromous Salmonid Fish Production. Council document IEAB 2005-1. December 2005.

ODFW 2005. Project 198402500 Project Narrative. Page 9

Acronyms

IEAB – Independent Economic Analysis Board
CEA – Cost Effectiveness Analysis
BPA – Bonneville Power Administration

LWD – Large Woody Debris
ODFW – Oregon Department of Fish and Wildlife
GRMWP – Grande Ronde Model Watershed Program
CTUIR – Confederated Tribes of the Umatilla Indian Reservation
HU – Habitat Units
IHOT – Integrated Hatchery Operations Teams
NPCC – Northwest Power and Conservation Council
SOW – Statement of Work
RM&E – Research, Monitoring and Evaluation
USDA NRCS– US Department of Agriculture Natural Resources Conservation Service

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