

Independent Scientific Review Panel

Umatilla Initiative Review

Fiscal Years 2007-09 Projects



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ISRP 2007-15



Independent Scientific Review Panel
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ISRP Review of the Umatilla Initiative FY 2007-09 Projects

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Proposal Number	Title	Sponsor	BPAFY07	BPAFY08	BPAFY09	ISRP FY07-09 Rec.	Final ISRP October 2007 Rec.
198343500	Umatilla Hatchery Satellite Facilities O&M	CTUIR	947,418	915,798	915,798	Fundable (Qualified)	Meets Criteria (Qualified)
198343600	Umatilla Passage O&M	Westland Irrigation	492,405	492,405	418,544	Not fundable (Qualified)	Meets Criteria
198710001	Umatilla Anadromous Fish Habitat - CTUIR	CTUIR	326,000	326,000	326,000	Not fundable (Qualified)	Meets Criteria (Qualified)
198710002	Umatilla Subbasin Fish Habitat Improvement Project	ODFW	280,264	280,264	280,264	Not fundable (Qualified)	Meets Criteria (Qualified)
198802200	Umatilla Fish Passage Operations	CTUIR	362,164	362,164	362,164	Not fundable (Qualified)	Meets Criteria
198902401	Evaluation of Juvenile Salmonid Outmigration and Survival in the Lower Umatilla River Basin	ODFW	144,131	-	-	Fundable	Meets Criteria
198902700	Power Repay Umatilla Basin Project	CTUIR	1,150,000	1,150,000	1,150,000	Not fundable (Qualified)	Meets Criteria (Qualified)
198903500	Umatilla Hatchery Operation and Maintenance and Fish Liberations	ODFW	941,664	966,664	966,664	Fundable (Qualified)	Meets Criteria (Qualified)
199000500	Umatilla Hatchery - M&E	ODFW	670,932	629,968	629,968	Fundable (Qualified)	Meets Criteria
199000501	Umatilla Basin Natural Production Monitoring and Evaluation Project	CTUIR	420,129	395,129	395,129	Not fundable (Qualified)	Meets Criteria (Qualified)
199009200	Wanaket Wildlife Area	CTUIR	225,978	225,978	225,978	Fundable	Not Re-considered
199402600	Pacific Lamprey Research and Restoration Project	CTUIR	296,000	175,000	-	Fundable in part (Qualified)	Meets Criteria (Qualified)
199506001	Iskuulpa Watershed Project	CTUIR	155,000	155,000	155,000	Fundable	Meets Criteria
200202600	Morrow County Riparian Buffers Umatilla County Riparian Buffers	Morrow SWCD	33,000	-	-	Response requested	Meets Criteria (Qualified)
200203000	Develop Progeny Marker for Salmonids to Evaluate Supplementation	CTUIR	297,000	176,000	-	Fundable	Not Re-considered
200203700	Freshwater Mussel Research and Restoration Project	CTUIR	233,000	64,000	-	Fundable (Qualified)	Not Re-considered

ISRP Review of the Umatilla Initiative FY 2007-09 Projects

Executive Summary

Background

This review implements the Northwest Power and Conservation Council's instructions to review individual Fish and Wildlife Program projects within the Umatilla River together as a comprehensive package where the interrelationships among the individual projects would be clarified and the measures for effectiveness evaluated. To facilitate the review, the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Oregon Department of Fish and Wildlife (ODFW) prepared: *Umatilla Projects Review: A presentation of the multiple Component Umatilla Basin Fisheries Restoration Program* to address specific questioned raised in the 2006 proposal review. This document and a site visit to the Umatilla Basin on May 16- 17, 2007 provided the information the ISRP used in this evaluation of the Umatilla subbasin projects.

The ISRP organized projects into Flow Enhancement and Passage, Habitat Enhancement, and Artificial and Natural Production categories that reflect a project's primary objectives and tasks, and provide a logical approach to evaluation of project effectiveness.

The Umatilla Basin Fisheries Restoration Program is progressing. Phase I and II of the water exchange program is in place; irrigation diversions have been upgraded to provide passage of both adults and juveniles; habitats have received large-wood additions and riparian zone fencing; a hatchery and satellite facilities for holding and acclimating hatchery fish have been constructed; and spring Chinook, fall Chinook, and coho salmon have been reintroduced into the watershed where they had been extirpated for many years. Some fish are returning to the river, a fishery has developed, and cooperation with landowners is improving. The program, however, has not achieved its stated salmon and steelhead escapement and harvest goals.

Flow Enhancement and Passage

Evaluating the direct benefits of flow enhancement and passage improvements in the Umatilla River to survival of fish is not possible with the data presently available. Two indirect measurements show a benefit to fish: 1) comparative numbers of fish trapped and hauled prior to and after implementation of the Phase I water transfer program, and 2) the rate of success in achieving target flows downstream of Three Mile Falls Dam.

Habitat Enhancement

Habitat enhancement efforts are in keeping with the goal of restoring a range of conditions that would occur naturally in spite of extensive habitat loss. Because the majority of habitat improvement sites are located in headwater tributaries potential gains in natural production may be partially lost by poor survival in the travel corridor of the lower river. Moreover, the biological effectiveness of habitat restoration is not being adequately evaluated. Habitat restoration effectiveness monitoring and evaluation within the Umatilla is needed.

Artificial and Natural Production

The original Umatilla Hatchery Master Plan juvenile fish production goals could not be achieved and the fish performed poorly following release, so reduced production goals have been established. Even with these reduced objectives adult returns and harvest from hatchery releases are substantially below the program goals. Natural-origin adult spring and fall Chinook are now returning to the Umatilla River, but restoration of self-sustaining spring and fall Chinook populations from colonization by hatchery salmon has not yet been achieved. Benefits from supplementing the Umatilla steelhead population remain undetermined.

The ISRP understands that hatchery production is decided upon in policy arenas within and beyond the Fish and Wildlife Program. The ISRP's recommendations follow from technical and scientific consideration of the current status of the program. Based on program monitoring results to date, the ISRP recommends that the Umatilla hatchery co-managers explicitly consider these potential hatchery production program modifications:

- estimating the productivity of spring Chinook in the absence of hatchery-origin adults and considering harvest and processing capability at Three Mile Falls Dam since in excess of 60% of the adults passed above Three Mile Dam die before spawning;
- restricting hatchery steelhead to the Umatilla River below Three Mile Falls Dam for harvest in a sport fishery and limiting passage of hatchery fish into the upper watershed for the tribal harvest, leaving no excess numbers of fish for supplemental spawning; and
- eliminating or sharply curtailing the fall Chinook hatchery program since the current fishery benefits within the Umatilla River subbasin do not appear to justify the effort expended.

The Review Process: A Model Approach

The process of "packaging" the set of closely related project proposals under a unified programmatic-type proposal in which the interrelationships can be clearly specified proved to be effective and efficient. It eliminated the need for each separate project proposal to meet standards set for ISRP review by Congress in the 1996 Power Act Amendment. We have often found in individual proposals a

failure to include sufficient provisions for monitoring and effectiveness evaluation. Often this could be corrected by improved coordination among the projects to ensure that within the set there will be metrics designed to develop some measure of effectiveness in benefiting fish, and evidence that monitoring and evaluation will actually be carried out. Displaying cooperative agreements that provide for monitoring and evaluation provides assurances that should accomplish this.

We recommend that the procedure be adopted for similar watershed-scale efforts, for example the Yakima-Klickitat Fisheries Program.

We recommend that, once the ISRP has reviewed and Council approved a set of proposals at the watershed scale, future reviews of those subbasins might be conducted on a multi-year cycle, or abbreviated to include only review of project proposals that represent some significant change in direction, as might occur as a result of adaptive management.

ISRP Review of the Umatilla Initiative FY 2007-09 Projects

I. Introduction

A. Review Background

This review is the ISRP's response to a call from the Northwest Power and Conservation Council to conduct a review of the projects in the Umatilla Basin that are funded under the Fish and Wildlife Program. The call arose from an ISRP recommendation. The Council has previously referred to this set of projects as the "Umatilla Initiative." The ISRP recommended review of the Initiative as a whole after attempting review of individual project proposals in 2006 for funding in FY 2007-09. Although the ISRP's FY 2007-09 review team included participants in the provincial review of Umatilla proposals (with site visits) and in the Umatilla Subbasin Plan review, the ISRP team found the large and complex Umatilla Initiative necessitated a review of individual project proposals within the context of the broader initiative objectives and activities. The site visit and subsequent information exchange conducted for this review of the initiative permitted an expanded time frame to 1) overcome some of the limited opportunity to interact with the project sponsors during the 2006 review and 2) access reference materials beyond those found in the project proposals.

The ISRP's review criteria are established by the 1996 Amendment to the Northwest Power Act of 1980. The criteria ask whether projects 1) are based on sound science principles; 2) benefit fish and wildlife; 3) have clearly defined objectives and outcomes; 4) have provisions for monitoring and evaluation of results; and 5) are consistent with the Council's fish and wildlife program.

Sixteen individual project proposals calling for work in the Umatilla Basin were reviewed by the ISRP in 2006 during the review of the region-wide set of 540 proposals submitted for FY 2007-09 funding. Of the 16, six were rated as "Not fundable" by the ISRP, and five were rated as "Fundable (Qualified)." The basis for these ratings was the ISRP judgment that the proposals needed to be reviewed in a larger context, beyond their own limited scope. The ISRP concluded that most of the projects were not stand-alone projects, primarily because it was not possible for the sponsors to satisfy Congress' requirement that individual ISRP project reviews include an evaluation of benefits to fish and/or wildlife. Information on benefits or potential benefits to fish was rarely, if ever, provided in the individual proposals. At the same time, the judgment of the ISRP was that to include such an evaluation for each proposal would be counterproductive. That is not to say the ISRP concluded there was no benefit likely to result from each project, but that these proposals needed to be reviewed in a larger context.

For example, the Power Repay Project, proposal 198902700, consisted of an estimate of the cost of electricity required to pump water from the Columbia River at McNary Dam and to distribute it among the irrigation ditches and two storage reservoirs in the Umatilla Basin. The objective is to add a volume of water in the lower 30 miles of river that could be used to assist in maintaining flows to benefit both irrigation and fish. However, the proposal itself made no mention of the volume of water expected to be pumped, nor did it discuss details of how or to what extent this water might benefit fish. The ISRP concluded that the proposal needed to be reviewed in the context of other projects designed to make those measurements.

Our recommendation visualized wrapping the set of proposals for restoration and enhancement of fish and fisheries in the Umatilla River into a unified proposal in which the interrelationships among them would be clarified and the measures for effectiveness evaluation would be identified (the “Umatilla Initiative”).

In response to Council’s call, the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Oregon Department of Fish and Wildlife (ODFW) (the Umatilla Team) presented a document to Council and the ISRP entitled, “Umatilla Projects Review: A presentation of the multiple Component Umatilla Basin Fisheries Restoration Program,” dated May 1, 2007. This document was reviewed by an ISRP subcommittee prior to a site visit to the Umatilla Basin on May 16- 17, 2007, which began with a set of oral presentations and moved into a tour of the river and pertinent facilities. We appreciate very much the helpful spirit demonstrated by tribal, Oregon Department of Fish and Wildlife, Bureau of Reclamation, and Irrigation District representatives who provided information to us as we developed an understanding of the complex Umatilla Initiative.



Site Visit with Umatilla program, Council, and ISRP participants

Arising from these efforts was a set of six follow-up questions from the ISRP addressed to CTUIR and ODFW, whose answers we felt would generate additional information needed to effectively and efficiently complete our final report (Loudenslager memo of May 25, 2007 to the Umatilla Projects Review Team). The Umatilla Team responded to these questions in a document titled

“Response to ISRP Questions: Generated from the May 16-17, 2007 Umatilla River Field Visit.”

In addition to these sources, we referred to the Umatilla Willow Subbasin Plan, which contains a concise description of the historical development of the Bureau of Reclamation Umatilla River Project. This ambitious construction project was the basis for what now has developed into Bonneville funded projects for portions of its operation, maintenance, and effectiveness evaluation, per the Council’s Fish and Wildlife Program.

The Umatilla Team organized their text into three types of management efforts: (1) instream flow enhancement, (2) artificial production, and (3) natural production of fish (including habitat improvement).¹ For the benefit of adaptive management, which the Council has adopted as its mode of operation, we believe it is important to isolate, where possible, the relative contributions of each of these categories of management efforts.

The ISRP’s review is organized and projects are included under headings on the basis of what would be a logical approach to evaluation of project effectiveness. These headings include Flow Enhancement and Passage, Habitat Enhancement, and Artificial and Natural Production. Within the headings, each project is reviewed according to the criteria specified in the 1996 Amendment to the Northwest Power Act of 1980. As noted above, sources of information used in this review are the “Umatilla Projects Review: A presentation of the multiple component Umatilla Basin, Fisheries Restoration Program”; the “Response to ISRP Questions Generated from the May 16 – 17, 2007 Umatilla River Field Visit; the Umatilla Willow Subbasin Plan; and the Bureau of Reclamation report “Phase I and II Water Exchange Project, 1998”; “Comprehensive Assessment of Summer Steelhead and Chinook Salmon Restoration and Enhancement Efforts in the Umatilla River Subbasin Report Years 1991-2006 (CTUIR and ODFW 2007)”; and the individual project proposals submitted in 2006 during the basin-wide review of FY 2007-09 proposals. Other references are cited at the end of the report.

To date many of the components of the Umatilla anadromous salmon and steelhead rehabilitation plan (Boyce 1986) have been accomplished. A unique water exchange program is in place; irrigation diversions have been upgraded to provide both upstream passage of adults and downstream passage of juveniles; habitats have received instream treatments like large-wood additions and riparian zone fencing; a hatchery and satellite facilities for holding and acclimating hatchery fish have been constructed; and spring Chinook, fall Chinook, and coho

¹ The Projects Review also includes a management effort entitled “Passage improvement.” For our purposes, we decided to include passage improvement measures other than flow enhancement within the category of habitat improvements because they are primarily located on the tributaries where the focus is upon providing habitat for natural production. They consist mainly of culverts and irrigation diversion dams (Table 3 of the Projects Review).

salmon have been reintroduced into the watershed where they had been extirpated for many years. Consequently, some fish are back in the river (albeit mostly hatchery fish), a fishery has developed, and cooperation with landowners is progressing. The CTUIR has received awards and recognitions for their work.

B. Umatilla Initiative

1. Rehabilitation of Anadromous Salmon and Steelhead in the Umatilla Subbasin

Primarily under the aegis of the Northwest Power and Conservation Council's Fish and Wildlife Program, in the 1980s the CTUIR and ODFW developed a restoration plan for salmon and steelhead inhabiting the Umatilla River. To the ISRP's knowledge, the first description of the plan was published as *A Comprehensive Plan for Rehabilitation of Anadromous Fish Stocks in the Umatilla River Basin* (Boyce 1986). The vision and strategy was to employ water transfers from the Columbia River to the Umatilla River watershed for irrigation, instream, and riparian habitat improvement to increase the productivity and capacity of the freshwater environment for natural salmon production, and hatchery rearing to provide steelhead, spring and fall Chinook, and coho salmon smolts to provide adult fish for harvest and restoration of natural populations. This basic outline has been reiterated in the *Umatilla Hatchery Master Plan* (ODFW/CTUIR 1989), the *Umatilla Subbasin Summary* (ODFW/CTUIR 2001) and *Umatilla/Willow Subbasin Plan* (CTUIR/ODFW 2004). A substantial portion of the infrastructure required to accomplish the water transfer and hatchery production has been completed and those components have transitioned from planning to routine annual activities. Approximately 78 miles of stream have received active in-channel or riparian zone improvements.

2. Brief Description of Development of the Umatilla Initiative (BOR Water Exchange Project)

Crucial for understanding its effectiveness in providing benefits to fish is an understanding of the essential features of the Bureau of Reclamation (BOR) Umatilla Water Exchange Project. The following information was taken from the BOR web page, July, 2007: http://www.usbr.gov/pn/project/umatilla_details.html

“Farmers in the Umatilla Basin began developing irrigation in the 1860s, using Umatilla River water. It soon became apparent that a large-scale irrigation project would be needed to sustain the agricultural demands. Congress authorized the ‘Umatilla Project’ in December, 1905, and BOR started construction the following year by connecting many of the private canals to BOR project facilities. Cold Springs Reservoir provided irrigation

water by 1908 and McKay Reservoir by 1927. Even at that time, the irrigation removals occasionally dried up the river.”

In those early days, the federal government’s primary focus was upon assisting agriculture. Impetus for protection of fish came later. A crucial landmark came with the 1969 Decision of the Hon. Judge Robert Belloni in *U.S. v the States of Oregon and Washington*,² which established that the Treaty Tribes in the Columbia Basin are entitled to a share of the catch of salmon and steelhead.³ The Power Act of 1980 added further legal recognition of fisheries interests in its call for development of a Fish and Wildlife Program designed to restore fish runs in the Columbia Basin

A coalition of agencies and tribes was formed to address the issue of salmon restoration while maintaining irrigation activities for agriculture. The following text, copied from the Umatilla/Willow Subbasin Plan, describes the coalition’s plan:

“In the Umatilla River, the dewatering of reaches and the creation of passage barriers that were necessary for irrigation activities resulted in the extirpation of Chinook and coho salmon stocks and the endangerment of the steelhead stock in the 1920s (Phillips et al. 2000). In response to the need for continued irrigation and the desire to restore steelhead and salmon populations a unique coalition formed in the 1980s between the CTUIR and local irrigators. With the help of the BOR [Bureau of Reclamation], Bonneville Power Administration (BPA), Oregon Water Resources Department (OWRD), and ODFW [Oregon Department of Fish and Wildlife], this coalition has made substantial progress in recovering salmon populations in the subbasin without harming irrigated agriculture. The coalition led to the development of the Umatilla Basin Project Act (102 Stat. 2791, Public Law 100-557), which was passed by Congress on October 28, 1988.

The Act allows irrigators to exchange Umatilla River water for Columbia River water. This allows water historically appropriated for irrigation to remain in the Umatilla River during times when flows are critical for steelhead and salmon. Water exchanges are made possible by the construction of exchange facilities, which include pumping plants that take water out of the Columbia River and a series of pipelines [and canals] that deliver that water to the irrigation districts. Two phases of the Act have been completed and a third phase has been proposed. Phase I involves exchange of water with the West Extension Irrigation District, which withdraws water at Three Mile Falls Dam. The purpose of this exchange is to provide target instream flows in the lower 3 miles of the Umatilla River. Construction of the Phase I exchange facilities began in 1991 and the first

² *U.S. v Oregon and Washington* (302) Fed. Supp.899

³ The Umatilla River flows through the Umatilla Indian Reservation in Oregon.

exchange occurred in 1993.⁴ The primary operational months for this exchange are critical months for salmon and steelhead adult returns and juvenile outmigration: May, June, September, and October. An average annual exchange of 9,700 acre-feet is made under this Phase.

Phase II involves exchanges of water with the Hermiston and Stanfield Irrigation Districts above Three Mile Falls Dam. Historically, Hermiston Irrigation District diverted water from the Umatilla River off season (November-May) to fill Cold Springs Reservoir. The purpose of the exchange with the Hermiston District is to provide additional instream flow during critical months of adult returns and juvenile outmigration below the Feed Canal Diversion (RM 28). This exchange began in 1995 and involves an average annual exchange of 11,200 acre-feet of water. Stanfield Irrigation District historically diverted both live flow and McKay irrigation releases at the Stanfield diversion (RM 32). The purpose of this exchange is to provide additional instream flow during the irrigation season and to cool water temperatures through cold water releases from McKay Reservoir. A partial exchange with Stanfield Irrigation District began in 1996 and full exchange started in 1999. Annually, an average of 18,600 acre-feet of water is exchanged with Stanfield Irrigation District under full operation.⁵

While these phases have helped the recovery of the steelhead population and assisted the reintroduction of Chinook and coho populations in the Umatilla River, irrigation still removes approximately half of the instream flows during the summer months (June – September) (ODEQ et al. 2001). The proposed Phase III of the Umatilla Basin Project would involve a complete exchange of water in the Umatilla River used by Westland Irrigation District with Columbia River water and would allow nearly all of the Umatilla River surface water to remain instream.”

Further Clarification

In the operation of Phase I, West Extension Irrigation District (WEID) foregoes diversion of Umatilla River water at Three Mile Falls Dam and depends on pumped Columbia River water for its needs. Water for Phase I is diverted from the Columbia River at McNary Dam at the left bank fish ladder into a canal, then pumped into the existing WEID Canal, all of which is downstream of Three Mile Falls Dam.

⁴ Phase I exchanges are said to be on a “bucket for bucket” basis.

⁵ The Projects Review text credits BOR, 1998 as the source of information in these two paragraphs. [BOR (Bureau of Reclamation), 1998. Phase I and II Water Exchange Overview, Umatilla Basin, Oregon. BOR, Boise, ID]

For Phase II, Columbia River water is drawn from the reservoir about 7 miles upstream of McNary Dam (Lake Wallula) and pumped into the Columbia-Cold Springs Canal from which it can be directed either into Cold Springs Reservoir or a network of irrigation canals where it is available in exchange for leaving live flow in the Umatilla River.



McNary Dam – spill, ladders, smolt by-pass, phase I ditch

Phase I

The WEID pumping facilities can deliver about 140cfs of Columbia River water for irrigation in exchange for flows WEID leaves in the Umatilla River to pass below Three Mile Falls Dam (Bureau of Reclamation, Pacific Northwest Construction Office, 1998, p. 4). The objective of flow manipulation in Phase I is to achieve flow targets established for anadromous fish passage in the three mile reach of river below Three Mile Falls Dam. Those fish flow targets were recommended in 1981 by the U.S. Fish and Wildlife Service during the BOR planning stage for the water exchange project. In Phase II, manipulations are much more complex, and accounting is not so simple.

Phase II

Phase II focuses upon water exchanges above Three Mile Falls Dam, though the effects can obviously extend below the dam as long as diversions there are appropriately regulated. The combined Phase II facilities can pump a maximum of 240cfs from the Columbia River by means of the plant in the reservoir upstream of McNary Dam, in exchange for water left in the Umatilla River. Two Irrigation Districts are included in Phase II, the Hermiston (HID) and Stanfield Irrigation Districts (SID).



Three Mile Falls Dam

HID operates the Feed Canal Diversion Dam at RM 28, which during the winter runoff period (November – May) fed Umatilla River water into Cold Springs Reservoir. Upstream from HID’s Feed Canal, at RM 32, is the Stanfield Irrigation District (SID) Diversion Dam which is the uppermost point of irrigation removals from the Umatilla River. Prior to the Water Exchange Project, SID diverted water from the Umatilla River at their diversion dam and also supplied natural runoff water from McKay Reservoir which fed into their Furnish Ditch. Now, both Umatilla and McKay water are used to meet target flows downstream for fish passage. Foregone diversions and McKay releases used to meet target flows for anadromous fish are replaced by Columbia River exchange water delivered directly into the SID system. (BOR 1998).

II. Review of the Major Components of the Umatilla Initiative

A. Instream Flow Enhancement

Highly artificial flows⁶ are created in the Umatilla River by the Bureau of Reclamation water exchange program. Benefits to fish from the Artificial Production and Natural Production programs from these flows are dependent upon the total amount of instream flow and their location, as provided by the water exchange program. For example, implementation of flow enhancement in

⁶ The Umatilla Projects Review 2007 states, “The Umatilla Fisheries Restoration Program is highly artificial with expensive operation and maintenance requirements that are necessary to accomplish fisheries objectives while minimizing the impacts to the local agricultural community.” page 5

Phase I of the program was necessary to make it possible for adult chinook and steelhead (and probably lamprey) to reach Three Mile Falls Dam, where they can be trapped and taken for spawning as part of the hatchery operation.⁷ Prior to Phase I, the river was frequently dry below the dam. Thus, the Three Mile Falls Dam hatchery brood-take operation depends upon flow enhancement to return fish for spawning.⁸ The Natural Production effort is also affected by the fact that some adults trapped at Three Mile Falls Dam are transported to suitable areas in the upper reaches of the Umatilla Basin, above the mainstem irrigation diversions, where they might contribute to natural production.



Three Mile Falls Dam - Sorting and Trucking Spring Chinook

Phase II of the flow enhancement at times is sufficient to provide access to those areas above Three Mile Falls Dam. But in most years there is not sufficient water available to be able to maintain minimum flows or target flows for fish. In fact, the river still runs dry at times in that reach. At times when flows are not adequate for passage, a portion of adults are hauled by truck upstream, and juvenile salmon and steelhead trucked upstream and reared for a time in ponds for “acclimation” to upstream waters are trapped and hauled downstream to below Three Mile Falls Dam. Phase III, which is under study, would be designed to alleviate those

⁷ We make no analysis of the question of whether the source of fish might better have been located elsewhere. Carson National Fish Hatchery was the source of the initial successful outplants of spring Chinook into the Umatilla River, beginning in 1983 (apparently – see p. 21). Other hatcheries continue to serve as the source of juvenile fall chinook (Bonnevillie), and coho salmon (Cascade Hatchery and Lower Herman Creek Ponds). Adult fall chinook from Priest Rapids and Ringold Springs are also outplanted.

⁸ The Council approved the hatchery at Three Mile Falls Dam for funding in 1987. (Projects Review, page 9). It became operational in 1996 (Phillips, Ory and Talbot, 2000). Prior to that time juvenile fish from other sources were reared at “acclimation facilities” located at Bonifer (1983), and Minthorn (1986), Imeques (1994), and Thornhollow (1995).

Congress approved the Umatilla Water Exchange Project in 1988. The Three Mile Falls Dam Hatchery commenced operation in 1996 (at half design capacity due to insufficient water; see p. 20). This situation was a primary force in the ISAB recommending what became the Three-Step Process of review of proposed hatcheries. The Water Exchange Project, Phase I became operational in 1993.

problems. Even after such acclimation, some returning adult fish have difficulty finding their way to the Columbia.

1. Review of Individual Flow and Passage Projects

Because flow enhancement is the key management strategy that affects the other strategies, our review begins with an analysis of effectiveness of the flow enhancement measure. There are four projects most directly involved in this measure. They are the Power Repay Umatilla Basin Project (198902700), Umatilla Passage O&M (198343600), Umatilla Fish Passage Operations (198802200), and Evaluation of Juvenile Salmonid Outmigration and Survival in the Lower Umatilla River Basin (198902401).

198902700 - Power Repay Umatilla Basin Project

Sponsor: Confederated Tribes of the Umatilla Indian Reservation

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$1,560,000 FY08: \$1,560,000 FY09: \$1,560,000

Short description: Provides reimbursement of power costs to Umatilla Electric Cooperative and Pacific Power & Light Company for the Umatilla Basin Project pumping plants that provide Columbia River water to irrigators in exchange for Umatilla River water left instream.

ISRP 2007 Final Recommendation: Meets Scientific Criteria (Qualified)

The Power Repay project provides an avenue for funding the costs of electricity required for pumping water to accomplish the BOR Umatilla Water Exchange Project. The Congressional Act that approved the Exchange Project specifies that BPA shall fund its operation and maintenance costs.⁹

Clear accountability and/or predictability seemed lacking in the water exchange exercise. It should be possible to develop in advance an annual water use plan based on averages and expectations. Alternatively, a set of plans might be developed that would apply to a range of conditions that might be expected. These plans may be assisted by simulation modeling of precipitation/evaporation within the watershed, water movement, including flow, discharge to irrigation, augmentation via Columbia River pumping, groundwater movement, and farm and fish needs on a seasonal and species-specific basis. The purpose of a water-use planning process, which could be facilitated by simulation modeling, is to develop recommendations defining a preferred operating strategy for facilities such as irrigation, using a multi-stakeholder consultative process. The modeling

⁹ Whether the total cost of this project should be charged to the Fish and Wildlife Program of Council, or whether a portion should more appropriately be included in BPA's operating costs is a question that merits attention by the Council and BPA. Both irrigators and fisheries interests share in whatever benefits may accrue.

may allow for “what-if” scenarios and linkage to other modeling exercises (e.g., EDT); all of which would assist the decision process.

Qualifications

Annual water use plans should be developed based in part on simulation modeling. A structured decision management plan should be developed with the aid of modeling workshops and involving stakeholders. Personnel in all four of these projects should be closely involved in order to assist in development of methods for evaluation of effectiveness of the flow enhancement strategy. See the outline for structured decision making in section III A of this report.

198802200 - Umatilla Fish Passage Operations

Sponsor: Confederated Tribes of the Umatilla Indian Reservation

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$380,238 FY08: \$399,249 FY09: \$419,211

Short description: Increase survival of migrating juvenile and adult salmon and steelhead in the Umatilla Basin by operating passage facilities, flow enhancement measures, trapping facilities, and transport equipment to provide adequate passage conditions.

ISRP 2007 Final Recommendation: Meets Scientific Criteria

The Umatilla Fish Passage Operations Project provides the avenue for decision-making about the schedule for water exchange. The volume of water available varies from year to year, as described above, so decisions are required to optimize the effectiveness of flow enhancement. Personnel employed in this project are responsible for providing biological information necessary for operational decisions under the Umatilla Water Exchange Project, i.e., when and how much water to exchange to achieve target flows for fish. This information is forwarded from the tribe to Westland Irrigation District, sponsors of the Umatilla Passage O&M project for implementation. The Operations personnel also accumulate and evaluate information useful for evaluation of benefits of the project to fish, measured in our review in terms of reduced need for trapping and hauling fish around areas with insufficient water for passage.

198343600 - Umatilla Passage O&M

Sponsor: Westland Irrigation District

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$502,253 FY08: \$512,298 FY09: \$522,544

Short description: Westland Irrigation District, as contractor to Bonneville Power Administration, and West Extension Irrigation District, as subcontractor to Westland, provide labor, equipment, and material necessary for the operation, care, and maintenance of fish facilities

ISRP 2007 Final Recommendation: Meets Scientific Criteria

The Umatilla Passage O&M project provides the engineering component of the set of four projects involved in the flow enhancement measure. This project and the Umatilla Fish Passage Operations project work in close cooperation to optimize effectiveness of the Water Exchange Project in supplying Columbia River water into irrigation canals to benefit farmers, leaving equivalent volumes in-river to benefit fish.

198902401 - Evaluation of Juvenile Salmonid Outmigration and Survival in the Lower Umatilla River Basin

Sponsor: Oregon Department of Fish & Wildlife (ODFW)

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$549,550 FY08: \$398,065 FY09: \$416,435

Short description: Evaluate migration patterns, abundance & survival of hatchery & natural smolts in the Umatilla basin using PIT tags; install an adult ladder detector at Three Mile Falls Dam; assess effects of river variables on fish migration; monitor life history characteristics.

ISRP 2007 Final Recommendation: Meets Scientific Criteria

Monitoring and evaluation components of this project are essential in gathering information needed to establish benefits of the other three projects in this Flow Enhancement category.

2. ISRP Comments on Review Criteria for Flow Enhancement and Passage Projects

1. *Scientifically sound*

Taken together, the four projects responsible for implementation of the Flow Enhancement Measure of the Council's Umatilla Initiative (BOR Umatilla Water Exchange Project) make up a logical, scientifically sound basis for restoration of anadromous fish in the Umatilla River.

That is not to say that approaches other than pumping water from the Columbia River in exchange for foregone irrigation use, such as purchase of water rights in order to leave live flow in the river, might have been equally effective. However, that decision properly belongs in the policy arena, where the choice in this case was made by the U.S. Congress. We reviewed the Initiative from this perspective.

The Projects Review notes that shortages of water still occur at times, to the point of inability to achieve target flows set for the river below Three Mile Falls Dam, even to drying up the river between Three Mile Falls Dam and the Stanfield Irrigation District upstream at about river mile (RM) 32. To deal with this problem for passage of anadromous fish at such times, adult fish are trapped at Three Mile Falls Dam and hauled by truck around this reach. Juveniles are trucked

downstream from a set of acclimation ponds. For steelhead there is little to support the continued use of acclimation ponds since the wild population appears to be producing smolts at capacity. Adult hatchery steelhead might be released to areas where they are available for harvest and less likely to negatively interact with wild fish.

2. Benefits to fish and wildlife

Benefits for the Initiative as a whole (including all of the measures being undertaken) are apparent, because spring Chinook, fall Chinook and coho salmon which had been extirpated are now returning to the Umatilla River, as documented in Table 1 of the Projects Review (p.8). Steelhead that remained in the basin as relict populations show some increases in abundance. The system chosen for restoration of salmon in the Umatilla River has succeeded in bringing an annual return of adult spring chinook (68 to 5,885), fall Chinook (98 - 2,432), and coho (5,115-22,334) to Three Mile Falls Dam. Transplanting of lamprey shows some promise. Benefits to fish are further documented in the Response to ISRP Questions.

For the benefit of the Council in its decision making process, the ISRP wishes to isolate the relative benefits of the different measures to fish. The question we address in this section is “To what extent does the Flow Enhancement measure contribute to this benefit?” A comparison of relative numbers of fish trapped and hauled prior to implementation of Phase I, and following implementation of Phases I and II might serve as an index of benefits to fish, assuming that the goal of these water exchanges is to provide a natural migratory corridor for anadromous fish.¹⁰ To address this question, we examined the records of Umatilla River flow at the USGS gauging station below Three Mile Falls Dam which were provided in the Response to the ISRP’s questions. The Umatilla Team provided the ISRP with data on monthly average flows,¹¹ illustrated in their Figures 2, 3, and 4. The months of concern are months when adult or juvenile salmonids may be attempting passage. The measurement of effectiveness the ISRP chose, and for which the Umatilla Team provided data, is the relative percentage of fish transported in three time periods: 1) prior to water exchange, 2) with Phase I only, and 3) with Phases I and II both operating.

¹⁰If it is not, then Phase II, in particular seems superfluous, because trapping and hauling could be used as a complete substitute for in-stream migration above Three Mile Falls Dam, particularly because it appears that the mainstem Umatilla River is unsuitable for natural production, as a result of which the tributaries must be depended upon for that component of fish production. Phase III might address that problem to some degree.

It is clear that the percentage of adult salmon transported prior to implementation of Phase I (1993-4), was much higher (40-70%) than after implementation when it was never above 10% (after 1996; Figures 3 and 4 of the Projects Review, p. 14). For juvenile salmon, there was more variability, but after 1993-4 there have been no years when more than about 2% have been transported, compared to three years prior to 1993-4 when more than 10% were transported.

Another approach to measuring benefits is to examine the rate of success of the flow enhancement measure in achieving target flows. Target flows were developed by U.S. Fish and Wildlife Service biologists during the planning stages of the Umatilla Water Exchange Project. Target flows for adult salmon in the Umatilla River below Three Mile Falls Dam are 100 cfs for coho and steelhead, and 150 cfs for Chinook. For juveniles target flow is 50 cfs. Success in achieving these targets can be assessed by reference to Figures 2, 3, and 4 of the Response to Questions, taking into account the times of year when these fish are expected to be present. Prior to Phase I implementation, *on average*, the target flow for spring Chinook was marginally achieved (152 cfs) in the month of June whereas after implementation of Phase I and before Phase II, average June flow was 196 cfs, and with both Phases I and II, it has been 280 cfs, and only fell below the target in one year (1996). For juveniles, the problem is access downstream through the reach of Umatilla River below Three Mile Falls Dam to the Columbia River mainstem. Prior to Phase I, the 50 cfs target was achieved, *on average*, for juvenile spring Chinook, steelhead, and coho. These fish migrate out of the Umatilla River early in the spring, before irrigation removals reach their peak. But fall Chinook migrate during July and early August, when irrigation reaches a peak. Prior to Phase I average flow in July was 13 cfs, and 7 cfs in August. With Phase I only, July flow averaged 39 cfs, and August 64 cfs. With both Phases I and II, average July flow has been 40 cfs, and August 42 cfs. These numbers do not bode well for volitional releases of fall Chinook, and the Projects Review considers the question whether the fall Chinook program should be continued.

In summary, Phases I and II of the Water Exchange Project have demonstrated an ability to improve average migratory conditions for adult and juvenile salmon. Transportation by truck is used at times when target flows are not achieved or other conditions dictate the need.

3. Clearly defined objective and outcome?

The target flows represent clearly defined goals and objectives. The criteria used to establish these objectives should be reexamined periodically, based on experience in the Umatilla River and elsewhere. We have found no goal that specifies an acceptable level of transportation.

4. Provisions for monitoring and evaluation of results?

In addition to the monitoring and evaluation discussion above, it is very important to evaluate the amount of pre-spawning adult mortality above Three Mile Falls Dam. Information on where and why this mortality occurs would be extremely valuable for adaptive management of the project.

5. Consistent with Council's fish and wildlife program?

Elements of the Umatilla Initiative have been included in the Fish and Wildlife Program since its inception. Council approved the construction of the hatchery in 1987. The Fish and Wildlife Program has been adjusted (adapted) as experience has been gained.

B. Habitat Enhancement

1. Background

The Umatilla is one of the most extensively altered rivers in the Columbia River basin. It is understood that management entities within the Umatilla have explicitly accepted the tradeoff among the interest of the user groups, and current restoration projects seek to extract what can be salvaged from the watershed's natural production potential without significantly interfering with irrigation interests. Although reduced flows caused by irrigation withdrawals have received the most attention with regard to habitat restoration, it is clear that a variety of stream improvement measures will be needed to restore even a portion of the Umatilla River's lost natural production.

The chief habitat restoration approach in the mainstem Umatilla above Three Mile Falls Dam has been to improve the river's migration corridor with enhanced flows to allow anadromous fishes to move quickly to and from spawning and rearing habitats, which are located primarily in headwater tributaries. Even though conditions in many headwater tributaries have suffered deterioration (the sponsor's Project Review document states "70% of all Umatilla tributaries are in need of riparian improvement") the upper subbasin remains the primary natural production area.

It is notable that the Umatilla subbasin's largest tributary (by area) – Butter Creek – appears to have largely been overlooked in terms of habitat enhancement, even though it is the lowermost major tributary in the drainage and would require the least mainstem passage to be accessed by salmon and steelhead. Some habitat improvement work has apparently taken place in Butter Creek (Table 4, page 18, of the Umatilla Projects Review), but there is a complete migration block about eight miles above its mouth (Table 3, page 16).



Iskuulpa Creek



Meacham Creek

The Project Review states that CTUIR, ODFW, and the USFS (Umatilla National Forest) are doing most of the habitat enhancement work funded by BPA. On the site visit, the ISRP was shown some habitat restoration on Iskuulpa Creek and Meacham Creek. We did not have an opportunity to view the Forest Service restoration efforts in the Upper Umatilla River or elsewhere on the Umatilla National Forest. Our assumption for this area is that the emphasis in the Umatilla National Forest will be on reducing sediment inputs to streams through improved road management, restoring some structure to channels through large wood placement, and taking various measures to restore forest “health”, as these measures are common to virtually all national forests in the region.

In general, the ISRP was impressed with the stream and riparian restoration work on Iskuulpa Creek and Meacham Creek. The objectives of re-establishing floodplain connections by breaching some levees, restoring native riparian plant communities, constructing deep pools for holding adults, and improving habitat complexity in the Meacham Creek channel by whole tree and log jam additions were in keeping with the goal of restoring a range of conditions that would occur naturally in spite of encroachment by the railroad line and other sources of habitat loss. The ISRP also appreciated that CTUIR and ODFW had made considerable effort to enlist the cooperation of the many private landholders in the watersheds, and that they had established reasonably strong implementation monitoring efforts. Because we did not have time to visit other tributaries we can only hope similar efforts to enlist local support for stream and riparian improvements are underway.

The ISRP continues to believe, however, that more could be done subbasin-wide to monitor the biological effectiveness of habitat restoration. Project sponsors have conducted EDT modeling in the Umatilla subbasin to forecast the ability of habitat enhancement actions to address limiting factors for salmonids. They state (p. 63 of the Projects Review document) “until funding is made available to *directly quantify* spawner-to-parr performance in the habitat restoration areas the EDT analytical framework will have to suffice.” We definitely concur that an effort to quantify the relationship between adults returning and smolts migrating out of

the tributaries with significant habitat enhancement projects will be very useful in determining whether the projects are addressing real habitat limiting factors. Tributary-specific adult and smolt counts will surely be needed for trend analysis. Because smolt enumeration is not mentioned in Table 10 – Umatilla Fisheries Habitat Project monitoring regime (page 50) – we strongly encourage sponsors to consider the inclusion of smolt estimates for some of the tributaries in the upper subbasin where the majority of natural production takes place.

As recently as 2004, the ISRP reviewed the primary monitoring effort which is conducted under projects 199000500 (Umatilla Hatchery - M&E) and 199000501 (Umatilla Basin Natural Production Monitoring and Evaluation Project) (ISRP 2004-17). Adult and juvenile salmon abundance is estimated in natural production areas by the Natural Production Monitoring and Evaluation Project. In the 2004-17 review the ISRP concluded, “The Plan does a good job of outlining an RM&E [research, monitoring and evaluation] program that will provide the information necessary to evaluate the hatchery program, the resulting natural spawning, supplementation, and some habitat improvement measures.”

The ISRP continues to conclude that the status of monitoring habitat restoration effectiveness is limited within these projects and deserves more thorough consideration. In the FY 2007-09 proposal review, the sponsor’s response to the ISRP preliminary review of proposal 199000501 reported that monitoring and evaluation priority 10 of 11 was to evaluate habitat program effectiveness based on the relationships between habitat actions and summer steelhead population responses at the watershed scale. Given the need to increase the capacity and productivity of anadromous salmonids in the Umatilla River subbasin, the priority of this task deserves to be higher.

In Meacham Creek, project sponsors suggest a before-after-control-impact (BACI) approach to evaluating restoration effectiveness. Although this part of the response did not specify what exactly would serve as the location of measurement of before-after effects, or what control site(s), would serve, i.e., upstream-downstream vs. treated watershed compared to a relatively untreated watershed, they do state (page 48) that Meacham Creek is the primary tributary targeted for restoration and “The North Fork of the Umatilla is pristine wilderness and will serve as a control for the Meacham Study,” while at the same time pointing out that BPA has not supported monitoring at this scale within the Umatilla subbasin. The ISRP agrees that a study of productivity and capacity in heavily restored Meacham Creek compared to the “pristine” North Fork would be worthwhile, but we offer the following cautions.

Although the North Fork Umatilla and some other tributary watersheds within the Umatilla National Forest are relatively unmanaged, they are currently subject to elevated wildfire risk as well as to a widespread outbreak of pests and pathogens (primarily insects) over the last several decades that have caused extensive forest mortality. The following table (Christensen et al. 2007) gives the acreages

in the Umatilla National Forest that have been impacted by forest insects and wildfires.

Year	Defoliators (budworm, tussock moth)	Bark beetles (Douglas-fir beetle, fir engraver)	Pine beetles (mountain, western)	Other insects	Wildfires (≥100 acres)
			<i>Thousand acres</i>		
1970–1979	524	403	1,670	8	3
1980–1989	4,180	271	76	2	27
1990–1999	1,794	406	18	12	82
2000–2005	80	171	23	87	40

Christensen et al. (2007) report that approximately one out of five acres in the Umatilla National Forest is currently at risk of a crowning wildfire (high severity), with the result often leading to conditions similar to the photo below.

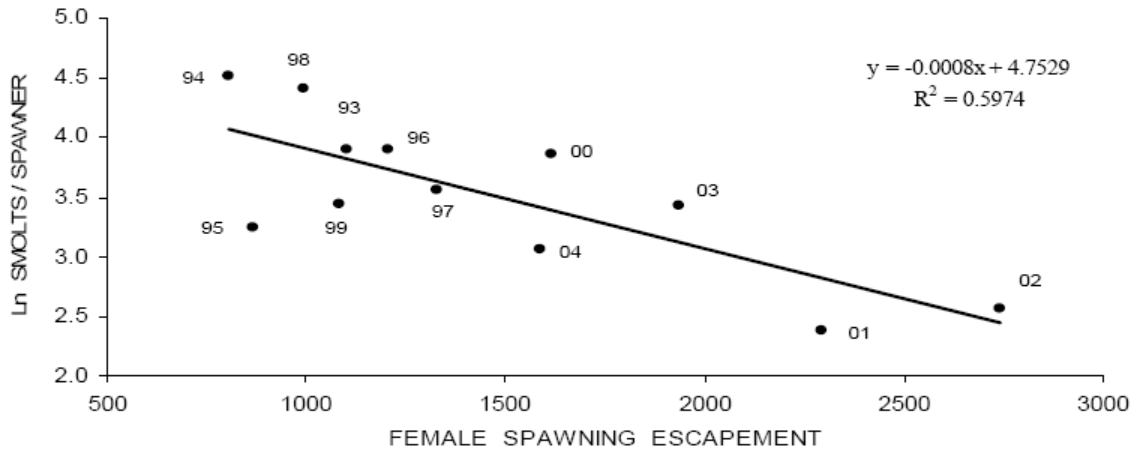


Photo: Umatilla National Forest

Much of the area considered pristine in the Upper Umatilla River subbasin contains forest that has extensive tree mortality, is highly fire-prone, and is unlikely to maintain static stream conditions in the coming years. Therefore, although efforts to restore habitat in headwater tributaries will require careful monitoring, it may be unrealistic to expect that both treatment and control streams will be immune to natural disturbances, which will add to the difficulty of measuring true treatment effects. The ISRP appreciates this dilemma and encourages CTUIR, ODFW, and Umatilla National Forest staff to work closely with the Integrated Status and Effectiveness Monitoring Program (ISEMP), Collaborative Systemwide Monitoring and Evaluation Project (CSMEP), and Pacific Northwest Aquatic Monitoring Partnership (PNAMP) where appropriate to formulate an effectiveness monitoring plan that can distinguish, to the extent

possible, the effects of habitat enhancement from the effects of natural disturbances.

An example of the need to partition the effects of natural disturbances from the effects of habitat enhancement is shown in the following graph (Figure 12, upper graph, from the Umatilla Projects Review, page 35).



This graph plots the natural log of steelhead smolts per spawning female against the estimated number of female steelhead spawning in the Umatilla system. The graph shows a declining relationship, suggesting that higher numbers of spawners result in reduced survival of progeny to smolting, i.e., a compensatory response. The declining relationship appears to have been forced by the years 2000-2004 – a period of drought but also a period of greater adult returns. If habitat conditions had significantly improved in the subbasin during this time the relationship between smolts/spawner and escapement should have a positive slope, although an analysis of the data with the years 2002-2004 omitted was not performed. The decline in smolts per spawner may have been related to the drought or to some other combination of factors including an increased presence of hatchery steelhead in the naturally spawning populations. However, the graph does not support a strong argument that habitat enhancement has resulted in a significant improvement for the species. Additionally the apparent compensatory relationship suggests that the natural production system may be operating at carrying capacity and thus there may be no need for hatchery supplementation – a conclusion that may or may not be true. This is one of the reasons why the ISRP stresses the need for careful, long-term, tributary-specific effectiveness monitoring, so the benefits of habitat improvements can actually be measured and not obscured by other factors.

2. Review of Individual Habitat Projects

There are currently two main BPA-funded habitat enhancement projects in the Umatilla subbasin: 19871002 with ODFW being the lead entity, and 198710001 with CTUIR being the lead entity. In addition, project 199506001 (CTUIR lead entity), which is specific to the Iskuulpa Creek watershed, is designed to enhance habitat for focal wildlife and fish species. Project 200202600 (Morrow County Soil & Water Conservation District lead entity) involves enrolling farmers in riparian conservation programs to improve riparian zones. Finally, project 200729300 (CTUIR lead entity) was proposed but not recommended by the Council or funded by BPA. It proposed a continuation of stream temperature monitoring at 31 long-term monitoring sites.

198710002 - Umatilla Subbasin Fish Habitat Improvement Project

Sponsor: Oregon Department of Fish & Wildlife (ODFW)

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$321,767 FY08: \$335,282 FY09: \$349,395

Short description: The ongoing Umatilla Subbasin Fish Habitat Improvement Project (19871-100-02) is aimed at protecting (where possible) and enhancing/rehabilitating (where required), degraded fish habitat on private lands using passive and active restoration techniques.

ISRP 2007 Final Recommendation: Meets Scientific Criteria (Qualified)

Based on feedback and information presented to the ISRP at the site visit, we agree that progress is being made to improve fish habitat on private lands. It was clear that ODFW is making a reasonable effort to consider whole drainage systems when prioritizing restoration actions. The ISRP continues to maintain, however, that smolt monitoring and other effectiveness M&E within the Umatilla are needed. Tributary-specific smolt monitoring programs exist in many other subbasins, and we strongly encourage ODFW to establish such a program for the Umatilla. It can be modest at first, but it would be helpful to compare smolt production in a tributary with private land restoration (e.g., Birch Creek) with production in a tributary without much restoration (e.g., Butter Creek).

Qualification: This project meets scientific criteria, contingent on implementation of a plan for expanded effectiveness monitoring and evaluation.

198710001 - Umatilla Anadromous Fish Habitat - CTUIR

Sponsor: Confederated Tribes of the Umatilla Indian Reservation

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$372,245 FY08: \$385,085 FY09: \$405,960

Short description: Instream and riparian habitat restoration for fisheries and wildlife in the Umatilla River Basin.

ISRP 2007 final recommendation: Meets Scientific Criteria (Qualified)

For basically the same reasons given above for proposal 198710002, the ISRP supports the habitat restoration efforts of the CTUIR. We also strongly endorse a comparison of salmonid populations and smolt production between the heavily enhanced Meacham Creek and the less extensively altered (and thus less restored) Upper Umatilla. Establishing a smolt monitoring program for these two headwater areas would be most helpful in evaluating the success of the Meacham Creek restoration work, although we do offer some caveats concerning natural disturbances (see above).

Qualification: This project meets scientific criteria, contingent on implementation of a plan for expanded effectiveness monitoring and evaluation.

200729300 - Umatilla River Basin Stream Temperature Monitoring

Sponsor: Confederated Tribes of the Umatilla Indian Reservation

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$23,267 FY08: \$25,805 FY09: \$26,404

Short description: CTUIR Water Resources Program will monitor stream temperatures in the Umatilla River Basin at 31 long term monitoring sites.

ISRP 2007 final recommendation: Meets Scientific Criteria

Although we did not have an opportunity to examine the stream temperature monitoring program in detail at the site visit, the ISRP is satisfied that the CTUIR has a reasonable basis for location of the temperature monitors and has a valid justification for adding 10 new loggers.

199506001 - Iskuulpa Watershed Project

Sponsor: Confederated Tribes of the Umatilla Indian Reservation

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$180,983 FY08: \$187,222 FY09: \$193,764

Short description: Continue operations and maintenance of the Iskuulpa Watershed to protect and enhance watershed resources to provide benefits for seven HEP Target Species and anadromous and resident salmonids.

ISRP 2007 final recommendation: Meets Scientific Criteria

The ISRP liked the original project proposal and continues to feel that this project is well justified.

200202600 - Morrow County Riparian Buffers Umatilla County Riparian Buffers

Sponsor: Morrow County Soil & Water Conservation District (SWCD)

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$176,471 FY08: \$175,097 FY09: \$178,516

Short description: The Morrow County Riparian Buffers Initiative is requesting funding during fiscal years 2007 through 2009 in conjunction with the Columbia

River Basin Fish and Wildlife Program and addressed needs identified in the subbasin plan. The Morrow and Umatilla County Soil and Water Conservation Districts (SWCD's) jointly propose to implement riparian buffer systems throughout the Umatilla/Willow Subbasin.

ISRP 2007 final recommendation: Meets Scientific Criteria (Qualified)

The ISRP was not given an opportunity to review the progress on this project in detail during the site visit. In principle, the project has very worthwhile objectives, but in its original review the ISRP was somewhat concerned about the lack of metrics to track how well the riparian buffers were working. We continue to echo this concern, and suggest that project sponsors examine the ISRP's recent retrospective report (ISRP 2007-1) for alternative approaches to implementation and effectiveness monitoring for riparian improvement projects.

Qualification: This project meets scientific criteria, contingent on development of a better defined monitoring and evaluation plan.

3. ISRP Comments on Review Criteria for Habitat Enhancement Projects

1. Scientifically sound

At the site scale, the habitat enhancement projects viewed by the ISRP were consistent with sound ecological principles, including floodplain reconnection, creation of habitat complexity, and providing access to potentially productive tributaries. The majority of habitat improvement efforts are located in headwater areas of the subbasin because the middle reaches of the mainstem Umatilla River still go dry at times, resulting in a situation where potential gains in natural production in the headwaters may be offset by poor habitat in the travel corridor of the lower river. Apart from augmenting flow in the lower river to benefit fish passage, the presence of good habitat in the lower subbasin (for example, for overwintering) might be needed to better realize the gains in natural production that are achieved in the headwaters. We believe a landscape-based strategy is needed to provide not only for spawning and rearing habitat in the upper tributaries but also for implementation of a program to improve rearing habitat in the mainstem Umatilla River. Additionally, some consideration should be given to improving habitat in tributaries of the lower subbasin, e.g., Butter Creek, where fish will be somewhat less vulnerable to passage problems in the mainstem.

2. Benefit fish and wildlife

The ISRP finds that the habitat enhancement measures being implemented in the Umatilla subbasin are likely to benefit fish and wildlife. There are significant

portions of the subbasin where habitat restoration is lacking despite being strongly needed and adequately assessed.

3. Clearly defined objective and outcome

The objectives and desired outcomes of habitat improvement projects are clearly stated in terms of physical conditions. For the time being, modeling (EDT analysis) is being used to forecast the biological outcomes of tributary restoration. Over time, and as biological monitoring information improves, it should be possible to predict the response of focal species to restoration projects based on actual data.

4. Provisions for monitoring and evaluation of results

Participating organizations (CTUIR, ODFW, and USFS) have a good start on implementation monitoring, but as the ISRP has stated for virtually every other subbasin in the Columbia River system, biological effectiveness monitoring could be improved. As stated above (e.g., project 198710002), we encourage an initially modest effectiveness monitoring program based on an assessment of adults entering and smolts leaving selected watersheds with and without habitat restoration. And as stated above, it will be very important to attempt to separate the effects of restoration from the effects of natural disturbances such as wildfire, as one example, thus careful attention should be paid to designating treatment and control sites that are properly matched from a disturbance history standpoint.

5. Consistent with Council's fish and wildlife program

The introduction to the habitat enhancement section of this report explains how it was a policy decision to emphasize artificial production in the Umatilla subbasin. In terms of consistency with the Council's program, the goals and strategies implemented in the Umatilla differ from those of the adjacent John Day subbasin (and to a somewhat lesser extent, from the Grande Ronde subbasin). However, the presence of three adjoining subbasins – John Day, Umatilla, and Grande Ronde – with restoration approaches that differ in their emphasis on natural and artificial production should make for a landscape-scale analysis useful in the employment of adaptive management.

C. Artificial and Natural Production

1. Background

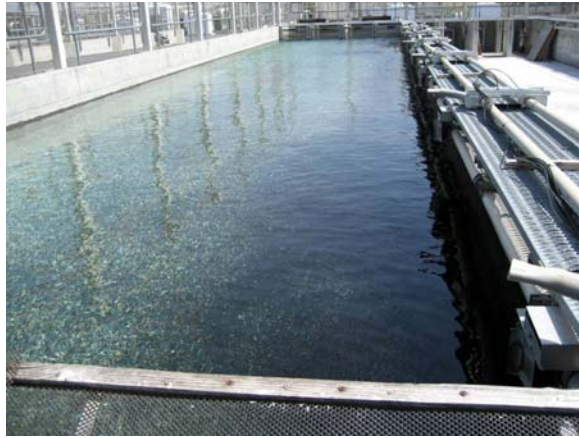
Summer steelhead, spring and fall Chinook, and coho salmon are produced in hatcheries for release into the Umatilla River watershed. Facilities for producing these fish include the Umatilla Hatchery, Bonneville Hatchery, Cascade Hatchery, Lower Herman Creek Ponds, Walla Walla Hatchery and juvenile

acclimation and adult holding and spawning satellite facilities (Bonifer Pond, Minthorn Springs, Imequies C-men-ini-kem, Thornhollow, and Pendleton) within the Umatilla River subbasin. Summer steelhead and spring Chinook programs are funded through the Fish and Wildlife Program. There are two components of fall Chinook production – a subyearling component funded through the Fish and Wildlife Program and a yearling program funded by the U.S. Army Corps of Engineers, John Day Mitigation Program. The coho program is operated under the Mitchell Act.

Summer steelhead are spawned at the Minthorn satellite facility, eggs incubated and juveniles reared at the Umatilla Hatchery, and smolts acclimated at the Pendleton and Minthorn satellite facilities with additional direct releases at Meacham Creek. Spring Chinook adults are held and spawned at the South Fork Walla Walla Hatchery, eggs incubated and juveniles reared at the Umatilla Hatchery, and smolts acclimated at Imequies. Fall Chinook subyearlings are produced from fish spawned at the Three Mile Falls Dam adult holding facility; eggs are incubated and juveniles reared at the Umatilla Hatchery; and smolts are acclimated at Thornhollow with an additional direct release in the Umatilla River. Fall Chinook yearlings are produced from fish spawned at the Three Mile Falls Dam adult facility; eggs are incubated at Umatilla Hatchery; juveniles are reared at Bonneville Hatchery; and smolts acclimated and released at Thornhollow. Coho salmon are Tanner Creek stock from either Cascade or Oxbow Hatcheries; spawned at Bonneville Hatchery; with the eggs incubated at Cascade or Oxbow Hatchery; and juveniles reared at Cascade Hatchery or Lower Herman Creek Ponds. Coho smolts are acclimated and released at Pendleton.



Umatilla Hatchery - Egg incubators



Michigan-type high density raceways

It has been nearly 25 years since the initial planning, and ten years since water transfers, hatchery fish production, and habitat restoration actions have been underway to restore anadromous salmon and steelhead in the Umatilla River. Enough time has passed to assess the extent to which these strategies have been able to meet the goals initially produced in the planning documents, what lessons have been learned, and how might monitoring and evaluation inform the

future direction of the projects. For all of the projects together, a contrast of the fish production before the program was initiated, the production identified in the planning process, and the production actually realized is the necessary minimum for assessing the Umatilla program. It would also be useful to account for the production by life-history stage (eggs, parr, smolts, and adults) together with their life-stage survivals. This subdivision is necessary to attempt to identify how the water transfer, habitat improvements, and hatchery components have functioned individually to either contribute to, or conversely, thwart the rehabilitation efforts. The individual components of the Umatilla plan have their own requirements. For example, for the hatchery component the need is for a comparison of the expectations of the hatchery to produce fish, and the survival of those fish once released. For the harvest component, the need is for numbers of fish harvested in the various fisheries. For the monitoring and evaluation components, an evaluation of the sufficiency of the data collected is needed.

Prior to the initiation of the Umatilla River program, spring and fall Chinook and coho were extirpated from the subbasin, and there was a 14-year average of 1,861 steelhead arriving at Three Mile Falls Dam (1966/67 – 1982/83; 768 – 3,080 steelhead). From 1967- 1969, hatchery steelhead smolts from outside the subbasin were released, and in 1966-1969, coho salmon from outside the subbasin were released. Boyce (1986) employed a life-cycle survival model to estimate the capacity of the river to produce salmon under existing conditions and with water transfers, improved passage at dams, and tributary habitat improvement. Under existing conditions his analysis indicated that 687 steelhead, 3 fall Chinook, and 41 spring Chinook could be produced. If upstream and downstream passage was addressed, habitat improvement projects completed, and adults and smolts trucked when necessary, 2,965 steelhead; 5,204 fall Chinook; and 603 spring Chinook could be produced. Finally, with water transfers, passage, and habitat improvement, 5,229 steelhead, 11,920 fall Chinook, and 2,460 spring Chinook could be produced. Boyce (1986) acknowledged that the modeling exercise was intended to provide a contrast of the relative potential production with different restoration actions and that the precision of the estimates was unknown. He pointed out that realized improvements to anadromous fish population would need to be determined by monitoring and collecting data.

Boyce (1986) concluded that if improved capacity and productivity were realized from actions in the Umatilla plan, and the numbers of adults needed to fully seed the river for smolt production were allowed to escape and spawn, an estimated 2,370 steelhead, 517 fall Chinook, and 1,294 spring Chinook would be available for harvest from natural production. Further, the evaluation and analysis concluded that hatchery production might yield up to 4,980 steelhead, 8,030 fall Chinook, and 9,629 spring Chinook adults above broodstock needs and could be used for harvest or supplementation

Based on these planning estimates, the Umatilla Hatchery Master Plan (1989) established the following abundance goals¹ for adults returning to the mouth of the Umatilla River:

Species	Return to the Umatilla River			Disposition of Returning Adults		
	Natural	Hatchery	Total	Spawning Escapement	Hatchery Broodstock	Harvest
Spring Chinook	1,000	11,000	12,000	600	1,200	ND ²
Fall Chinook	11,000	10,000	21,000	5,200	4,600	ND
Steelhead	4,000	5,760	9,760	3,000	210	ND
Coho	ND	6,000	6,000	ND	ND	ND

¹ From Chess (2003); ² Not Determined

Hatchery smolt production established in the 1989 Umatilla Hatchery Master Plan was:

Species	Number of Smolts		
	Umatilla Hatchery	Carson/Bonneville Hatchery	Other Hatcheries
Spring Chinook	1,290,000	450,000	589,000
Fall Chinook	5,940,000	1,060,000	
Steelhead	210,000		

Because of difficulties in achieving the production levels within the hatcheries, and because of difficulties in achieving sufficient survival of smolts once released (smolt to adult returns), these natural and hatchery production, and harvest goals have been reduced.

The ISRP understands the current hatchery smolt production plan is¹:

Species	Number of Smolts		
	Umatilla Hatchery	Carson/Bonneville Hatchery	Cascade Hatchery/Lower Herman Creek
Spring Chinook	810,000	0	0
Fall Chinook	600,000	480,000	
Steelhead	150,000		
Coho			1,500,000

¹CTUIR and ODFW (2007) Umatilla Projects Review, May 1, 2007

The ISRP understands the current adult abundance goals to be¹:

Species	Returns to the Umatilla River			Disposition of Adult Fish		
	Total	Natural	Hatchery	Natural Spawning Escapement	Hatchery Broodstock	Harvest
Spring Chinook	8,000	2,000	6,000	3,000	1,000	4,000
Fall Chinook	12,000	6,000	6,000	6,000	1,000	5,000
Steelhead	5,500	4,000	1,500	4,000	116	1,384

¹CTUIR and ODFW; Umatilla Subbasin Summary (2001)

With these goals in mind, the ISRP poses the following questions: To what extent can the hatchery facilities meet the smolt release goals? How many adult salmon and steelhead are returning to the Umatilla River? To what extent are the hatchery returns meeting the adult return objectives? To what extent are the adult returns meeting the harvest objectives? To what extent are the hatchery returns rehabilitating natural salmon production?

For this brief summary assessment, these questions are best answered by contrasting the revised program goals to the actual results observed the last decade or so.

Hatchery Smolt Production¹:

Species	Years	Range in Numbers of Smolts Released	Mean
Spring Chinook	2003 – 2004 ²	654,222 – 790,039	722,130
Fall Chinook	2000 - 2004	1,045,667-1,167,560	1,103,467
Steelhead	1992 - 2005	121,633 – 158,630	142,832

¹CTUIR and ODFW; Umatilla Subbasin Summary (2001); ² from 1994 through 2002 the planned production varied each year from the current plan.

Adult Returns to the Umatilla River Subbasin:

Species	Hatchery				Natural			
	Years	Range	Median	Mean	Years	Range	Median	Mean
Spring Chinook	1988 - 2002	13 - 4785	1518	1774	1996 - 2002	22-348	161	166
Fall Chinook ¹	1988 - 2001	98 - 2432	623	821				
Steelhead	1988 - 2002	165 - 1958	656	731	1988-2002	724 – 3562	1298	1637

¹ The available numbers were not divided into hatchery and natural returns, i.e., no specific information for natural returns of fall Chinook.

Disposition of Adult Fish:

Species	Released Above TMFD			Hatchery Broodstock		
	Range	Median	Mean	Range	Median	Mean
Spring Chinook	64 - 4104	1231	1620	200-677	600	502
Fall Chinook	33 - 1778	474	180	0 - 603	348	322
Steelhead	857 - 5360	1867	2144	107 - 332	131	153

Harvest of Adult Fish:

Species	Tribal Harvest		Non-Tribal Harvest	
	Range	Mean	Range	Mean
Spring Chinook	0 ² - 695	159	0 ² - 755	168
Fall Chinook ¹	0	0	2 - 32	12
Steelhead ¹	25 - 99	46	26 - 260	108

¹ Non-tribal fall Chinook and steelhead harvest is the catch of hatchery fish; tribal harvest of steelhead includes both natural and hatchery fish. ² Zero catch occurred in four years with no fishery.

2. ISRP Assessment of Natural and Hatchery Salmon Production in the Umatilla River

To what extent can the hatchery facilities meet the smolt release goals?

The juvenile fish production goals in the original Umatilla Hatchery Master Plan were ambitious and could not be achieved with the inadequate facilities available, and/or the fish performed poorly following release. Consequently the fish release goals for all the focal species have been reduced. The Umatilla Hatchery, associated acclimation facilities, and other Columbia River basin hatcheries that have been made available for rearing juveniles for release in the Umatilla generally appear adequate; steelhead smolt releases have averaged 95% of the program goals, spring Chinook juvenile releases have averaged 89% of program goals, and fall Chinook releases have exceeded the program goals (102%).

How many adult hatchery salmon and steelhead are returning to the Umatilla River? To what extent are the hatchery returns meeting the adult return objectives?

Spring Chinook

Adult spring Chinook returns to Three Mile Falls Dam ranged from 68 fish in 1989 to 4785 fish in 2002 (Appendix B, Table 2, Umatilla Subbasin Plan 2004). Grant (2007; Figure 14) shows adult spring Chinook returns to Three Mile Falls Dam in 2003-2005 were less than in 2002 but does not report the number. The goal of 6000 adult spring Chinook returning to the Umatilla River has not been achieved in any year. There was a modest increase in the number of spring Chinook adults returning from 1996 through 2002, compared to 1990 through 1996 (1119 versus 2715 salmon), but returns in 2003, 2004, and 2005 decreased and then increased in 2006 (Figure 14B, Grant 2007). Spring Chinook returns are variable, and there is no obvious trend. The recent average production is 60% of the current 6,000 fish production goal. The spring Chinook program appears to be limited largely by the smolt-to-adult-survival rate of released smolts. The program is sufficiently successful to enable collection of all of the eggs for hatchery production.

Steelhead

Steelhead hatchery returns to Three Mile Falls Dam have ranged from 165 in 1988 to 1,958 in 2001/2002. After accounting for out-of-subbasin stray hatchery steelhead, returns ranged from 247 in 1993/94 to 1275 in 2001/02. The goal of 1500 hatchery steelhead from the Umatilla Hatchery has not been achieved in any year. Steelhead returns have been variable, with a modest trend of increasing returns. The average annual return in the seven year period from 1992/93 through 1998/99 was 540 fish, and for the seven years from 1998/99 through 2004/05 was 717 fish. The natural steelhead population is larger than the hatchery population and supplies the eggs for hatchery production.

Fall Chinook

Adult fall Chinook returns to Three Mile Falls Dam have ranged from 91 in 1988 to 2,432 in 2004, and declined only slightly to 2,215 in 2005 (Appendix B, Table 2, Umatilla Subbasin Plan 2004, Grant 2007). The goal of 6,000 adult fall Chinook returning to Three Mile Falls Dam has not been achieved in any year. There has been an increase in the number of adults returning from 2001 through 2005, compared to 1995 through 2000 (544 versus 1,605 salmon). If the average of fall Chinook returns to Three Mile Falls Dam in 2000 through 2005 are representative of the current capabilities of the program, the hatchery returns should average 1,605 fish, 27% of the current production goal of 6,000 adults. The fall Chinook program performance is hampered by a large stray rate to the upper Columbia and Snake Rivers and a large proportion of jack and subjack fish in the population. Eggs for the 480,000 yearling smolts produced at Bonneville Hatchery have been supplied by fall Chinook adults returning to Three Mile Falls Dam since 1997. Eggs for the 600,000 subyearling juveniles reared at the Umatilla Hatchery are supplied by Priest Rapids, Bonneville, and Lyons Ferry hatcheries.

To what extent are the adult returns meeting the harvest objectives?

Spring Chinook

Summarizing from Grant (2007), from 1990 through 2006 spring Chinook salmon fisheries have been open on the Umatilla River for 12 of 17 years. A non-tribal fishery occurred between Pendleton and Three Mile Falls Dam before 2000, and below Three Mile Falls Dam from 2000 to the present. A tribal fishery occurs on the CTUIR Reservation between river miles 60 – 82. Each fishery has been allocated 10% of the run returning to the mouth of the Umatilla River. The fishery is not opened until fish counts at Three Mile Falls Dam indicate that the run is large enough to provide for hatchery broodstock collection and natural spawning escapement. The Pendleton to Three Mile Falls Dam non-tribal fishery only achieved the 10% harvest goal once in nine seasons (1996). The fishery below Three Mile Falls Dam achieved the 10% harvest goal in the first five of seven seasons (2000 – 2004), but did not achieve the 10% goal in 2005 or 2006.

The combined tribal and non-tribal fisheries have harvested from zero (in years with salmon harvest closures) to 1,420 salmon in 2000. In the last seven years the combined spring Chinook harvest ranged from 1,420 to 156 fish, averaging 881 salmon (22% of the 4,000 fish spring Chinook harvest goal). There is no apparent trend in the numbers of salmon harvested

Steelhead

A natural- and hatchery-origin, tribal and non-tribal fishery for steelhead existed prior to developing the Umatilla steelhead hatchery program. The tribal fishery harvests both natural- and hatchery-origin fish. Prior to development of the program, the tribal fishery harvest was estimated at 75 fish per year and the non-

tribal fishery was estimated at 545 fish per year (76 to 1,913 fish). Harvest of hatchery steelhead since development of the fishery program has averaged 84 fish (range 19-204 fish). Catch of natural steelhead averaged 263 fish (range 37 - 733 fish). All of the natural fish were released. Anglers released 23.5% of the hatchery steelhead caught. There is no apparent trend in the number of steelhead harvested annually. Average tribal harvest of natural-origin steelhead is 4 (range 0-11 fish), and average harvest of hatchery-origin steelhead is 54 (range 20-118 fish). The combined tribal and non-tribal steelhead fisheries harvest has averaged 138 fish annually, 10% of the current harvest planning goal of 1,380 fish.

Fall Chinook

Since 1994 fall Chinook season opens on September 1. Upstream of the Highway 370 bridge over the Umatilla River, only jacks and subjacks can be harvested and all adults must be released. Below the bridge anglers are permitted to harvest adults, jacks, and subjacks. Average harvest of adult fall Chinook is 12, jack fall Chinook is 27, and subjack fall Chinook is 123 fish annually. There is no active tribal fishery for fall Chinook in the Umatilla River. With a combined average annual catch of 162 fish, the harvest is 3.24% of the current planning goal. The goal of harvesting 5,000 fall Chinook annually has not been achieved in any year. There have been more adults harvested annually since 2000 (18 fish) compared to the numbers harvested annually from 1992 through 1999 (7 fish).

To what extent are the hatchery returns rehabilitating natural salmon production?

Spring Chinook

Spring Chinook were extirpated in the Umatilla subbasin and the hatchery program initiated under the Council's Fish and Wildlife Program is intended to reintroduce and establish a natural population in addition to providing harvest benefits. Beginning in 1989 and continuing to the present, spring Chinook have been released above Three Mile Falls Dam in the hope that they would spawn and produce progeny that could complete their life-cycle in the wild. Through 2004, releases above Three Mile Falls Dam ranged from 64 to 4,104, and averaged 1,620 (Grant 2007). Beginning in 1996 natural-origin adult spring Chinook began returning to the Umatilla River. Through 2002, from 22 to 348 natural-origin adults returned, averaging 161 salmon. This average is 17% of the current program goal.

Achieving the program goal of 1,000 adult natural-origin spring Chinook salmon appears limited by pre-spawning mortality of females which is estimated at 63%. The high pre-spawning mortality is due to a number of factors including poor spawning site selection by hatchery females, unsuitability of Meacham Creek as spring Chinook rearing habitat, and a small number of smolts per female

compared to the Master Plan expectations. High pre-spawning mortality perhaps occurs because hatchery-origin females spawn lower in the watershed (where water quality is poor) than natural-origin females, Meacham Creek has about half the spring Chinook rearing capacity as anticipated, the smolt yield per female is low, and the total smolt production is about 55% of what was expected from a spawning cohort. The progeny/parent ratio has been above one in only one year. This means that the natural portion of the spring Chinook population is not replacing itself, so it is not sustainable. The progeny/parent ratio is less in Umatilla spring Chinook than in spring Chinook from the Tucannon, Imnaha, Yakima, Minam, and John Day rivers. The ISRP defines a successful reintroduction of a natural-population to be one that is self-sustaining in nature. Applying this definition, the Umatilla spring Chinook reintroduction is not yet complete. It is not certain whether additional habitat restoration can be sufficient for spring Chinook productivity to reach the threshold of sustainability.

Steelhead

The hatchery steelhead population in the Umatilla is not as large as the natural population and is drawn each broodyear almost exclusively from natural-origin adults. Since 1988, natural adults released above Three Mile Falls Dam ranged from 623 to 3,509 fish, averaging 1,568 fish; and hatchery adults released above Three Mile Falls Dam ranged from 102 to 1,661, averaging 626. The proportion of natural-origin adults in the spawning escapement ranged from 93 to 41%, averaging 72%.

One question is whether this addition of hatchery fish in the spawning escapement yielded additional natural adults in the next generation (referred to as the immediate demographic effects of supplementation) and a second question is whether domestication selection during the hatchery phase reduces the inherent productivity of the naturally spawning population (referred to as the long-term fitness effects of supplementation). Answering these questions requires a sophisticated experimental design involving comparing trends in abundance between supplemented and unsupplemented populations.

On the primary question of demographic effects, increased abundance of natural fish as a consequence of spawning by hatchery fish in the previous generation could be off-set if the population is actually at the carrying capacity of the stream. Under these circumstances progeny from the hatchery fish would replace, rather than add to, natural production.

Grant (2007) proposes there is a demographic response in the abundance of natural-origin steelhead in the Umatilla River from hatchery-origin steelhead spawning in the river. The analysis they present is a comparison of the redds/mile in the John Day River (a population without hatchery influence) to the natural-origin adult steelhead abundance in the Umatilla between time periods when the Umatilla was not being influenced by hatchery supplementation and time periods when it was. They estimate that during a period of minimal hatchery

influence the ratio of redds/mile in the John Day to those in the Umatilla was 1.21 and during a period of increased hatchery influence it was 1.89, suggesting that hatchery fish reduced reproductive performance in the Umatilla when compared to the John Day. Grant (2007) points out that the analysis assumes that the redds/mile estimate from the John Day reflects steelhead abundance in that river system and that production of steelhead in the John Day has not declined recently, relative to the Umatilla. These assumptions are not verified. Without more detailed explanation of the calculation of this statistic, the ISRP is unable to endorse the conclusion.

In the Umatilla Projects Review (CTUIR and ODFW 2007) Figure 12 shows steeply declining smolts per spawning female, and a stock recruit curve with the largest smolt production around 1,500 females. These analyses suggest that density dependence may be influencing smolt production, although drought or other conditions may also be having an effect (see habitat Enhancement section). A density-dependent effect would suggest that even if there has been some gain in natural steelhead abundance from supplementation, the habitat is at or near capacity and increased abundance via smolt production above current levels is unlikely.

Comparisons of smolt out-migration timing, ocean residency, and hatchery and natural adult return timing has been used to evaluate genetic changes to the Umatilla River steelhead population from hatchery supplementation. The analysis is useful base-line information but does not directly address the long-term fitness of the population owing to the effects of supplementation.

The ISRP concludes that both the immediate demographic effects and long-term fitness effects from supplementing the Umatilla steelhead population are not yet known. The ISRP also concludes that the goal of maintaining the genetic characteristics of the natural steelhead population is not a particularly relevant question. The question is whether the long-term fitness of the population that has been supplemented has deteriorated from interbreeding with fish that have had parents (or grandparents) reared in a hatchery. There is a solid empirical basis for this concern. The ISRP recommends that the co-managers remain engaged with the Council subgroup exploring approaches to answering this latter question.

The ISRP recommends that the co-managers consider restricting hatchery steelhead to the Umatilla River below Three Mile Falls Dam for their removal in a sport fishery and limiting hatchery fish in the upper watershed for tribal harvest, but not to allow excess numbers of fish to escape upstream to where they would supplement natural spawning.

Fall Chinook

Most of the fall Chinook hatchery production from the Umatilla is harvested in out-of-subbasin fisheries, and returns to the river have not achieved in-subbasin program goals. Fall Chinook have been released above Three Mile Falls Dam

each year since 1988. Numbers of adults averaged 471 fish, ranging from 33 to 1,778 fish. Because of the limited number of adults for release, adults from Priest Rapids and Ringold Ponds have been translocated to the Umatilla and released above Three Mile Falls Dam since 1996. Numbers of adults translocated and released averaged 706 and ranged from 200 to 943.

From 0 to 53% of the female adults released above Three Mile Falls Dam are believed to have spawned. Spawning was observed from Three Mile Falls Dam to river mile 48. Based on the number of redds observed, from 15,290 to 233,430 (average 115,024) fall Chinook smolts were expected to pass Three Mile Falls Dam, but from 1,292 – 242,100 (average 41,806) actually were counted. This is 36% of the number of smolts anticipated to be produced based on the observed redds. On a brood-year basis, from 56 to 302 (average 163) natural fall Chinook have returned to Three Mile Falls Dam.

3. Review of Artificial Production Projects

There are four Fish and Wildlife Program projects involved with hatchery production and evaluation in the Umatilla Subbasin. These projects are oriented toward specific facilities and agencies (CTUIR and ODFW) rather than anadromous fish species. Consequently one set of comments directed to each of the artificially produced species (summer steelhead, and spring and fall Chinook) is provided that is appropriate to all four projects: 198343500 - Umatilla Hatchery Satellite Facilities O&M; 198903500 - Umatilla Hatchery Operation and Maintenance and Fish Liberations; 199000500 - Umatilla Hatchery - M&E; and 199000501 Umatilla Basin Natural Production Monitoring and Evaluation Project. These species specific comments follow the individual project reviews.

198343500 - Umatilla Hatchery Satellite Facilities O&M

Sponsor: Confederated Tribes of the Umatilla Indian Reservation

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$1,059,166 FY08: \$1,102,743 FY09: \$1,143,182

Short description: Acclimate juvenile salmon and steelhead prior to release in the Umatilla Basin. Collect, hold, and spawn steelhead, coho, and chinook salmon and provide eggs to ODFW and other hatcheries for incubation, rearing, and later release in the Umatilla Basin.

ISRP 2007 Final Recommendation: Meets Scientific Review Criteria (Qualified)

198903500 - Umatilla Hatchery Operation and Maintenance and Fish Liberations

Sponsor: Oregon Department of Fish & Wildlife (ODFW)

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$951,664 FY08: \$981,110 FY09: \$1,011,412

Short description: This proposal funds operation and maintenance of Umatilla Hatchery and fish transfers from the Umatilla, Cascade, Oxbow, Bonneville, and Little White hatcheries to acclimation facilities on the Umatilla River.

ISRP 2007 Final Recommendation: Meets Scientific Review Criteria (Qualified)

Qualification

This qualification, which pertains to hatchery production proposals 198343500 – Umatilla hatchery satellite facilities O&M, and 108903500 – Umatilla hatchery operation and maintenance and fish liberations, is that the benefit measured in terms of adult returns, harvest, and natural stock reintroduction and supplementation that arise from release of juvenile steelhead, and spring and fall Chinook are critically below the goals established in the Master Plan and Umatilla Subbasin Plan.

On the basis of this result the ISRP recommends that the co-managers consider modifying the spring Chinook and steelhead program goals and eliminating the fall Chinook program as explained in the Conclusions and Recommendations section below.

199000500 - Umatilla Hatchery - M&E

Sponsor: Oregon Department of Fish & Wildlife (ODFW)

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$684,278 FY08: \$714,367 FY09: \$745,852

Short description: This proposal is for ongoing research, monitoring and evaluation of the Umatilla Hatchery program. The Umatilla Hatchery RM&E Project evaluates hatchery practices for steelhead supplementation and spring and fall Chinook salmon reintroduction.

ISRP 2007 Final Recommendation: Meets Scientific Review Criteria

The ISRP recognizes the CTUIR and ODFW co-managers for producing and providing the updated Comprehensive Assessment of Summer Steelhead and Chinook Salmon Restoration and Enhancement Efforts in the Umatilla River Subbasin (CTUIR and ODFW 2007). The ISRP did not peer-review the methods or confirm the calculations presented in the assessment. The ISRP relied entirely on this document to provide this summary of the hatchery programs and salmon restoration for Council. The information supplied provides the basis for conclusions from the co-managers, which the ISRP largely concurs with, and the basis for adaptive management and decisions on implementing the work

elements and tasks in Fish and Wildlife Program projects. The ISRP recommends to Council and BPA that they continue supporting collection of the vital statistics from fish populations that form the basis of evaluation of the projects.

199000501 - Umatilla Basin Natural Production Monitoring and Evaluation Project

Sponsor: Confederated Tribes of the Umatilla Indian Reservation

Province: Columbia Plateau **Subbasin:** Umatilla

Budget request: FY07: \$779,657 FY08: \$795,314 FY09: \$831,704

Short description: Salmonid Monitoring and Evaluation: Provide ecological information and technical services to decision makers in support of adaptive management for sustainable restoration, conservation, and preservation of salmonid and aquatic resources.

ISRP 2007 Final Recommendation: Meets Scientific Review Criteria (Qualified)

Qualification

In the FY 2007-09 proposal review the ISRP concluded that this project was very likely collecting important information on the status of natural production of salmon and steelhead but that it was not clear how that information was being used to inform management decisions within the subbasin. In this latest review, proposal 199000501 was not included in the table of proposals on page 26, and there was no text dedicated to explaining how data from this proposal were being used to evaluate the water transfer, fish stocking, and habitat restoration actions. The project was mentioned as a component of evaluation efforts in the monitoring and evaluation section of the *Umatilla Projects Review: A presentation of the multiple Component Umatilla Basin Fisheries Restoration Program*. The ISRP continues to believe that this project produces important information but needs to focus on addressing the essential management questions. The ISRP is concerned that the expansive list of objectives is likely to yield data that are less informative once analyzed than was believed they would be when collected. This is particularly true for evaluating the effectiveness of habitat restoration. The ISRP therefore recommends that project managers examine each component of the monitoring program, the question(s) it is designed to answer, and the mechanism by which its ability to answer the question is evaluated. This will help eliminate the collection of data that are not providing useful information and locate significant knowledge gaps that require additional monitoring and evaluation.

4. ISRP Comments on Review Criteria for Artificial and Natural Production Projects

1. Scientifically sound

The use of artificial production to provide direct fish harvest benefits, supplementation for demographic improvement of summer steelhead, and reintroduction of extirpated fall Chinook and coho salmon assumes that fish culture facilities are sufficient to produce fish for release, environmental conditions for survival of hatchery fish are sufficient, hatchery effects on steelhead (which are of native origin) are minimal, and the stocks chosen for reintroduction for spring Chinook, fall Chinook, and coho are suitable to adapt to the contemporary environmental conditions within the Umatilla River and Columbia River and Pacific Ocean migration routes.

The original planning (Boyce 1986) was thorough in incorporating all available scientific knowledge of life-stage specific survival and production of these salmonid species. There was considerable uncertainty about the actual life-stage specific survival and production that would be realized when implementing the hatchery components of the restoration plan. The Umatilla Basin project(s) have been implemented and mortality of salmon during portions of their life-cycle have been estimated and evaluated.

Scientific understanding of fish – habitat relationships, both generally and specifically for the Umatilla River – have advanced considerably since the production plan was developed and published in 1986. For the combined projects in the Umatilla to remain scientifically sound, the 1986 plan needs to be updated to reflect these recent advances in the evaluation of the productive capacity of watersheds.

2. Benefit fish and wildlife

The combined efforts to use a water exchange to provide fish passage, and hatchery production to provide fish to take advantage of access to blocked habitat has led to natural production of small numbers of spring Chinook, but it is not likely this is sustainable. Evidence of demographic benefit to steelhead from hatchery supplementation is lacking. Harvest benefits have been less than projected and may not justify the program. An economic analysis may be prudent to ensure the costs and benefits of the entire program are transparent.

3. Clearly defined objective and outcome?

There are clearly identified objectives for production of juvenile hatchery salmon and steelhead for release, adult returns to provide harvest, and a component for natural spawning.

4. Provisions for monitoring and evaluation of results?

Monitoring by project 199000500 - Umatilla Hatchery - M&E has been essential for providing the data and analysis to evaluate the hatchery components of the Umatilla Basin projects specifically, and the water exchange, fish passage and habitat restoration components.

The contribution of the individual hatchery, water exchange, fish passage and habitat restoration components are not established in the current monitoring and evaluation reports. It is not clear whether the updated monitoring plan can separate the effects of these individual actions.

Additional information on life-stage specific mortality is likely to be essential for deciding how the project might be modified to close the gap between the goals of the subbasin plan and what is actually being achieved.

5. Consistent with Council's fish and wildlife program?

The Umatilla hatchery projects have received independent review and incorporation into the Council's Fish and Wildlife program. After the Umatilla Hatchery Master Plan was produced in 1989, the Council has provided additional guidance on using artificial propagation in the Fish and Wildlife Program. Given the lower than expected adult returns from hatchery production, ambiguous evidence of benefit from steelhead supplementation, and likely unsustainable natural spring Chinook production from the reintroduction, the Umatilla subbasin co-managers are encouraged to review these production efforts.

D. Lamprey

1. Background

Lamprey are important spiritual and cultural resources and a food source for Native Americans. Anecdotal evidence suggests that lamprey once were abundant in the Umatilla River but have significantly declined in recent years. It is believed that this decline was due largely to construction of mainstem dams but also to other factors such as habitat degradation and passage barriers in the Umatilla River. The Umatilla Tribe has developed a research and restoration plan to restore a self-sustaining and harvestable population. The objectives of the plan are: 1) document historic and current abundance of Pacific lamprey in the Columbia River and tributaries in northeast Oregon; 2) perform research to address critical uncertainties for Columbia River Pacific Lamprey; and 3) restore

Pacific lamprey to the Umatilla River. Considerable progress has been made on each of these objectives.

Based upon production of larval lampreys in the upper basin, the sponsors suggest that habitat may not be a factor limiting larval abundance. While abundances of larvae due to outplanting adults have increased, the carrying capacity of the habitat apparently is not known. Therefore, the conclusion that habitat is not limiting larvae may be premature. Moreover, with the exception of 2000-2001, the number of larvae and metamorphosed lamprey captured during their outmigration has remained low suggesting that habitat and/or passage factors may contribute significantly to mortality between larval and outmigrant stages.

Outplanting of adult lamprey into the upper reaches of the Umatilla where they were previously absent has been relatively successful. Larval lamprey abundance in this section of the river has increased substantially. Unfortunately returns of adults has continued to be depressed, indicating that substantial mortality of larvae is occurring in the lower reaches of the Umatilla, in the mainstem Columbia, and/or in the ocean. It is well established that adult lamprey are hampered in their upstream migrations through the Columbia River mainstem due to passage problems at the mainstem dams. In the Umatilla Project Review document, the sponsors did not provide a numerical goal for returning lamprey adults, but it is clear that the population at this point cannot be self-sustaining.

2. Review of Individual Lamprey Projects

199402600 - Pacific Lamprey Research and Restoration Project

Sponsor: Confederated Tribes of the Umatilla Indian Reservation

Budget request: FY07: \$528,041 | FY08: \$507,930 | FY09: \$533,161

Short description: The purpose of this study is to provide the critical information to restore Pacific lampreys *Lampetra tridentata* in the Umatilla River that is called for in the Draft Umatilla/Willow Subbasin Plan.

ISRP 2007 Final Recommendation: Meets Scientific Criteria (Qualified)

Some objectives of the lamprey restoration project have been achieved. Successful spawning of outplanted adult lamprey into the upper basin has led to increased larval lamprey abundance but outmigrant survival and adult returns remain low.

Qualification:

The ISRP reiterates the qualification that it gave in its 2006 review pertaining to pheromone research. It is unclear whether pheromone studies will lead to increases in lamprey abundance in the Umatilla basin. The impact of

pheromones on migration is at best a hypothesis, based on studies of sea lamprey in the Great Lakes. This segment of the project should be low priority.

3. ISRP Comments on Review Criteria for Lamprey Projects

1. Scientifically Sound

The sponsors have initiated a program to restore self-sustaining populations of lamprey to the Umatilla River. Outplanting of adults to increase larval abundances and identification of passage barriers have shown some promise, however, adult returns to the river remain low. The role of larval pheromones in attracting migrating adults is, at this point, little more than a hypothesis drawn primarily from work with sea lamprey in the Great Lakes. The value of this approach is questionable. Consequently most of the research and recovery effort should be directed at habitat and passage improvement. The ISRP has expressed similar concerns in previous reviews of lamprey pheromone research proposed by CTUIR.

2. Benefits to Fish and Wildlife

At this point in time it is unclear whether the efforts undertaken will lead to establishment of self-sustaining, harvestable lamprey populations. Some initial efforts at increasing larval abundance at upriver sites have shown some success, but adult escapement remains low. A principle concern is that factors in the mainstem Columbia and ocean at this time may have such a controlling effect on lamprey population dynamics that in-river improvements to habitat and passage may have little impact on adult returns of lamprey.

3. Clearly defined objective and outcome?

The objectives are clear. They address all phases of the lamprey life cycle except adults as noted above.

4. Provisions for monitoring and evaluation of results?

Although some monitoring is being conducted (e.g., larval abundance estimates, enumeration of outmigrating larvae and metamorphosed lamprey and returning adults), a systematic, comprehensive monitoring program for lamprey including a sampling design was not described.

5. Consistent with Council's fish and wildlife program?

The plan to restore lamprey to the Umatilla River is consistent with the Fish and Wildlife Program. It specifically addresses needs outlined in the Umatilla Subbasin Plan and biological objectives in the 2000 Fish and Wildlife Program.

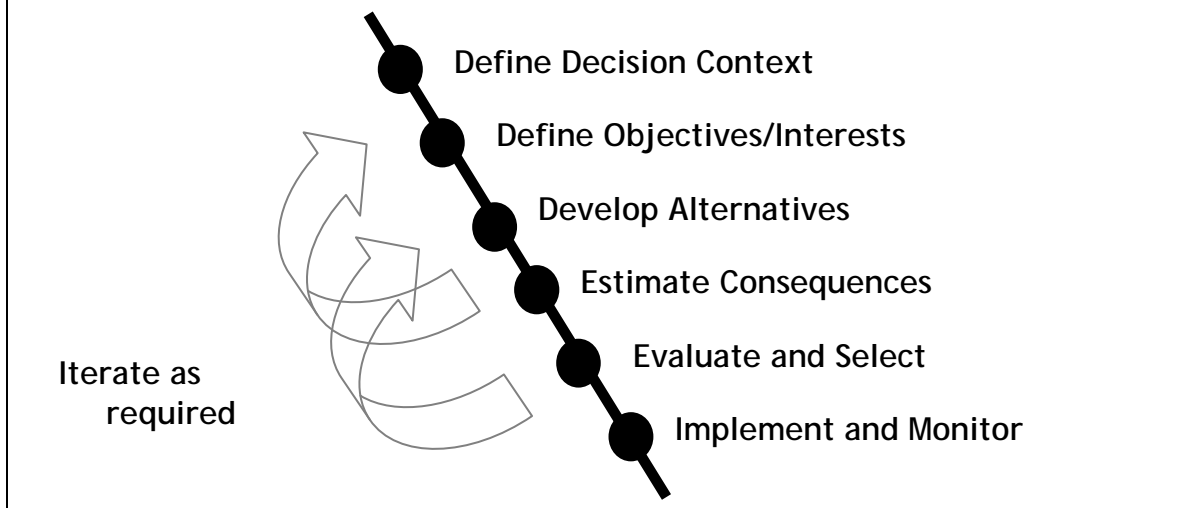
III. Conclusions and Recommendations

A. General Conclusion

The Umatilla Basin Fisheries Restoration Program is progressing toward achieving some of its stated objectives. A unique water exchange program is in place; irrigation diversions have been upgraded to provide both upstream passage of adults and downstream passage of juveniles; habitats have received instream treatments like large-wood additions and riparian zone fencing; a hatchery and satellite facilities for holding and acclimating hatchery fish have been constructed; and spring Chinook, fall Chinook, and coho salmon have been reintroduced into the watershed where they had been extirpated for many years. Consequently, some fish are returning to the river, a fishery has developed, and cooperation with landowners is progressing. The program, however, has failed to date to reach salmon and steelhead escapement and harvest goals. This is the ultimate measure of success of the combination of flow enhancement and passage, hatchery production, and habitat restoration actions. Because the major components of the salmon restoration and rehabilitation plan are now in place, it is likely that the current status of the salmon and steelhead populations is what this program is capable of producing. Future gains owing to additional improvements in tributary passage and instream habitat restoration are likely to be modest in comparison to the accomplishments to date.

Additional progress toward achieving the goals outlined in the 1986 plan for rehabilitating anadromous fish in the Umatilla River, the 1989 Umatilla Hatchery Master Plan, and the 2004 Draft Umatilla Willow subbasin plan will require evaluating options beyond those already implemented. A structured or integrated decision management process seems required, linking requirements and decisions on flow and fish, and other aspects of harvest, hatchery fish, and habitat within the subbasin. Exploration of decisions and alternatives involves modeling workshops, and requires clear problem definition, establishment of agreed objectives, development of choices and alternatives over several iterations, and evaluations of consequences. The latter requires stakeholder and expert input, aided by simulations. The process of structured decision management is an emerging science that is amenable to application in the Umatilla subbasin. A decision, once reached, requires an adaptive environmental assessment modeling and monitoring procedure, where management actions are treated as experiments, with modeled results tested in control and treatment studies. For examples of its application, see Failing, L., G. Horn, and P. Higgins. 2004. Using expert judgment and stakeholder values to evaluate adaptive management options. *Ecology and Society* 9(1): 13. URL: <http://structureddecisionmaking.org/>

Steps in the Decision Process



Recommendations for consideration for the three categories of mitigation and restoration strategies are outlined below.

B. Flow Enhancement and Passage

1. Conclusions

a. Evaluation of direct benefits of flow enhancement in the Umatilla River to survival of fish is not possible with data presently available. To evaluate effectiveness of the flow enhancement strategy as a benefit to fish, the ISRP had to depend on two indirect measurements: 1) comparative numbers of fish trapped and hauled prior to and after implementation of the Phase I water transfer program, and 2) the rate of success in achieving target flows downstream of Three Mile Falls Dam. Both approaches show a benefit according to the criterion chosen. These are indirect measures because they require an assumption (perhaps reasonable) that these measures will lead to improved survival or production of fish. The first assumes that transportation results in no delayed effect on survival of the fish transported or their offspring. The second depends upon a general assessment of depths and velocities of water that experts felt were adequate for passage of salmon. The basis for each of these assumptions deserves closer examination.

b. Evaluating the benefits of flow enhancement is complicated by difficulties in obtaining “real time” measurements of flow as enhanced by the water exchange program that could be related to real time estimates of survival of fish. The data provided to us are averages over extended time periods. We would expect that schedules for irrigation removals might occur periodically, from day-to-day and

during a given day. Fish that might be present would be affected more or less instantaneously, rather than “on the average.” The ISAB has called attention to this problem with respect to hydroelectric system manipulations of flow in the Snake River that occur on an hourly basis and can be substantial enough to significantly affect behavior and survival of fish.

2. Recommendations

a. Analysis of benefits to fish of the three strategies would be aided by development of a structured decision management system that would be employed to develop a formal, written operating plan for flow enhancement that would consider requirements of the irrigation system, as well as fish. Flexibility would be incorporated to take into account annual variations in natural runoff and other variables. Requirements for fish include issues of access to the hatchery, harvest, and availability of habitat.

b. Demonstration of direct benefits of flow enhancement to fish will require finer-scale measurements of flow and fish abundance or survival rates, rather than a dependence upon average flows over extended periods. Data on periodic (daily and time of day) irrigation removals should be developed and compared to corresponding information on fish.

c. Targeted flows for anadromous fish below Three Mile Falls Dam should be revised according to more recent information on requirements of migrating fish that are available in the fisheries literature.

C. Habitat Enhancement

1. Conclusions

a. The ISRP was impressed with the stream and riparian restoration work on the two headwater tributaries. The objectives of habitat enhancement efforts are in keeping with the goal of restoring a range of conditions that would occur naturally in spite of extensive habitat loss.

b. The ISRP continues to believe that more could be done subbasin-wide to monitor the biological effectiveness of habitat restoration. We conclude an effort to quantify the relationship between adults returning and smolts migrating out of tributaries that have significant habitat enhancement projects would be very useful in determining whether restoration projects are addressing real habitat limiting factors.

c. The ISRP agrees that a study of productivity and capacity in heavily restored Meacham Creek compared to the “pristine” North Fork would be worthwhile, with the caution that while the North Fork Umatilla and some other tributary

watersheds within the Umatilla National Forest are relatively unmanaged, they are currently subject to considerable natural disturbance.

d. It appears that the majority of habitat improvement efforts are located in headwater tributaries of the subbasin, resulting in a situation where potential gains in natural production in the headwaters may be partially lost by poor survival in the travel corridor of the lower river. Measurements are lacking.

2. Recommendations

a. We encourage the sponsors to consider the inclusion of adult and smolt estimates for some of the tributaries in the upper subbasin, and an effort to quantify the relationship of smolt-to-adult returns with significant habitat enhancement projects should be undertaken; tributary-specific adult and smolt counts will surely be needed for trend analysis. The ISRP continues to maintain that smolt monitoring and other effectiveness monitoring and evaluation within the Umatilla are needed.

b. For the Meacham Creek study, the ISRP encourages CTUIR, ODFW, and Umatilla National Forest staff to work closely with ISEMP, CSMEP, and PNAMP where appropriate to formulate an effectiveness monitoring plan that can distinguish, to the extent possible, the effects of habitat enhancement from the effects of natural disturbances.

c. A landscape-based strategy is needed to provide not only for spawning and rearing habitat in the upper tributaries but also for measuring survival as the naturally produced smolts migrate downstream. Observations ought to lead to implementation of a program to improve passage and rearing habitat in the mainstem Umatilla River. Additionally, some consideration should be given to improving habitat in tributaries of the lower subbasin, e.g., Butter Creek, where fish will be somewhat less vulnerable to passage problems in the mainstem.

D. Artificial and Natural Production

1. Conclusions

a. The original Master Plan included juvenile fish production goals that were ambitious and could not be achieved with the facilities available. Furthermore, the fish performed poorly following release. Consequently the fish release goals for all the focal species have been reduced consistent with contemporary limitations. The existing hatchery facilities appear adequate to meet this reduced production goal.

b. Adult returns from hatchery releases of juvenile fish are substantially below the program goals. Adult returns to Three Mile Falls Dam ranged from 68 to 4785 spring Chinook, from 247 to 1275 steelhead, and from 91 to 2,432 fall Chinook. The program goals of 6,000 adult spring and fall Chinook and 1,500 steelhead returning to the Umatilla River have not been achieved in any year.

c. The harvest of salmon and steelhead produced in the hatchery program has not met the program goals. In the last seven years the combined tribal and non-tribal spring Chinook harvest averaged 881 salmon, 22% of the 4,000 fish spring Chinook harvest goal. Annual harvest of hatchery steelhead since development of the program has averaged 84 fish. The combined tribal and non-tribal harvest of hatchery and natural steelhead has averaged 138 fish annually, 10% of the harvest goal of 1,380 fish. Average annual harvest of adult fall Chinook is 12, jack fall Chinook is 27, and subjack fall Chinook is 123 fish. With a combined average annual catch of 162 fish, the harvest is 3.24% of the current goal of harvesting 5,000 fall Chinook.

d. Restoration of self-sustaining spring and fall Chinook populations from colonization by hatchery salmon has not yet been achieved. While natural-origin adult spring and fall Chinook are now returning to the Umatilla River, the natural spawning component of the population is not replacing itself. Achieving a self-sustaining natural population appears limited by pre-spawning mortality of females, poor spawning site selection by hatchery females, and possibly other factors.

e. The ISRP concludes that any benefit from supplementing the Umatilla steelhead population remains unresolved.

2. Recommendations

Spring Chinook

a. Determine the replacement rate of natural spring Chinook in the absence of hatchery Chinook.

The estimate of the replacement rate of the natural-origin spring Chinook may be biased because so many hatchery fish that are failing to produce progeny are incorporated into the calculation. It is possible that the reintroduced population might be actually replacing itself. The ISRP recommends eliminating the hatchery fish from natural spawning for a period of years to get a better estimate of the productivity.

b. Consider developing harvest and processing capability at Three Mile Falls Dam.

Co-managers report that 60% of the adults passed above Three Mile Falls Dam die before spawning. At the same time, harvest levels hardly justify producing the fish. Consider harvesting and processing hatchery spring Chinook that are not needed for broodstock and tribal harvest at Three Mile Falls Dam. During the ISRP visit most of the run was being inspected, segregated, and transported to Walla Walla Hatchery or trucked upstream. Many excess fish that are likely to die before spawning could be processed at that location.

Steelhead

- a. Restrict spawning of hatchery steelhead above Three Mile Falls Dam.

No compelling case for a demographic benefit to the natural steelhead population from natural spawning by hatchery steelhead has been demonstrated. Stock/recruit analysis suggests the subbasin may be at capacity for steelhead juveniles. This possibility should be tested by adopting a period of time when hatchery steelhead are not permitted onto the spawning grounds.

- b. Focus sport harvest of hatchery steelhead below Three Mile Falls Dam.

The ISRP recommends that the co-managers consider restricting hatchery steelhead to the Umatilla River below Three Mile Falls Dam for removal in a sport fishery and limiting passage of hatchery fish into the upper watershed for removal in the tribal harvest, leaving no excess numbers of fish for supplemental spawning.

Fall Chinook

- a. Consider eliminating the fall Chinook hatchery program.

The Umatilla fall Chinook salmon hatchery program contributes to out-of-subbasin ocean and Columbia River tribal and non-tribal fisheries, but contributes little to within Umatilla subbasin fisheries or restoration. The fishery benefits within the Umatilla River subbasin do not appear to justify the effort expended on the program.

E. Lamprey

1. Conclusions

- a. A major concern is that out-of-basin effects may be so overwhelming that lamprey in the Umatilla basin may not be able to establish a self-sustaining, harvestable population despite the most earnest efforts of managers to improve passage and enhance habitat within the Umatilla basin.

- b. The evidence that habitat in the upper sections of the river is not limiting is not compelling. In fact, to the contrary, some evidence suggests that habitat factors might be limiting survival from the larval to outmigrant stage.
- c. The ISRP remains concerned about the usefulness of pheromone research to attract adult migrant to the Umatilla basin. This supposition is based primarily on work with sea lamprey and at this point should only be considered an hypothesis.
- d. A goal for adult escapement into the river was not given.

2. Recommendations

- a. The sponsors should establish a goal for adult escapement as they have done for salmon.
- b. The sponsors should attempt to estimate carrying capacity of larval lamprey in the upper river.

IV. Programmatic Recommendations

1. The process of “packaging” the set of closely related project proposals under a unified programmatic-type proposal in which the interrelationships can be clearly specified proved to be effective and efficient. It eliminated the need for each separate project proposal to meet standards set for ISRP review by Congress in the 1996 Power Act Amendment. We have often found in individual proposals a failure to include provisions for monitoring and effectiveness evaluation. Often this could be corrected by improved coordination among the projects to ensure that within the set there will be metrics designed to develop some measure of effectiveness in benefiting fish. Packaging provides a unified text that should accomplish this.
2. We recommend that the procedure be adopted for similar watershed-scale efforts, for example the Yakima River Program.
3. We recommend that, once the ISRP has reviewed and Council approved a set of proposals at the watershed scale, then future reviews for those might be conducted on a multi-year cycle, or abbreviated to include only review of project proposals that represent some significant change in direction, as might occur as a result of adaptive management.

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