Response to ISRP Questions

Generated from the May 16 – 17, 2007
Umatilla River Field Visit

CTUIR DNR Fisheries Program
and
Oregon Department of Fish and Wildlife
June 29, 2007

Request 1A: Can you present graphs of flows in the lower Umatilla during an unusually wet year (e.g., 1991 or 1998) and an unusually dry year (e.g., 2001)?

Response: Figure 1 provides monthly average flows for calendar years 2004 (a relatively high water year) and 2005 (an extreme low water year) measured at the United States Geological Survey (USGS) UMAO gauging station (# 14033500) located at river mile 2.1. These two years were selected because they were representative of the range of flow years requested as well as having occurred after full implementation of the Umatilla Basin Project (UBP). The figure depicts monthly average flows for both years along with both the UBP target flows for each month and the Stored Water Release Guidelines flow levels. Keep in mind that the target flow for the period of July – August 15 was not established until 2006 so the target flow for this period during these two years was actually 0 cfs. The raw data used to create Figure 1 is shown in the Appendix.

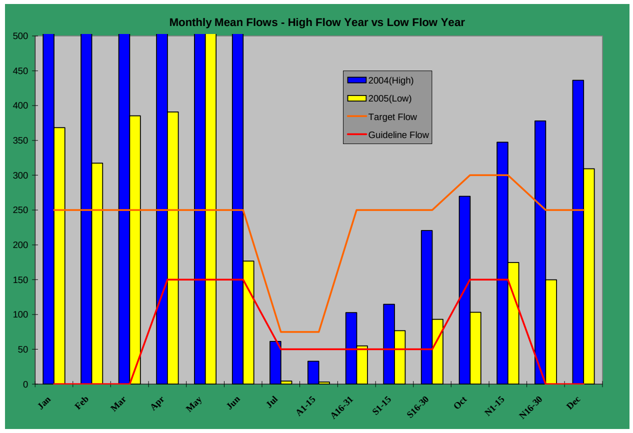

Figure 1: Monthly average flows at the UMAO gauge for calendar years 2004 and 2005 along with the UBP target and storage release guideline flow levels.

Request 1B: Provide the ISRP with a set of graphs showing flows in cfs at the gauging station at Umatilla during the months of adult and juvenile salmonid migrations in the years prior to Phase I, the years during Phase I alone, and during the years after both Phases I and II went into effect. The same graphs could also show the corresponding migration timing of natural and hatchery spring Chinook, steelhead, and other fishes. As part of that analysis, would it be helpful to provide corresponding information on numbers of fish transported at times relative to the flows illustrated.

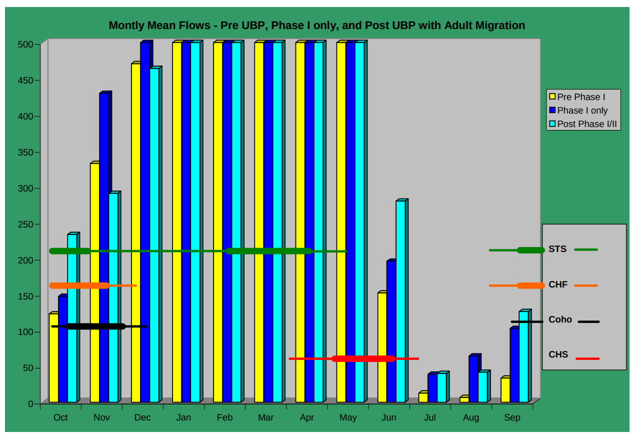

Figure 2: Monthly averaged flows for several stages of the UBP and juvenile migration timing. The horizontal lines show the primary range of migration for each species with the thicker portion of the line designating the heaviest period of migration

Response: Figures 2-4 show monthly average flows for the pre-Phase I time period (water years 1983-1992), Phase I only (water years 1993-1995), and post-Phase II (water years 1996-2006) as measured at the USGS UMAO gauging station (# 14033500) located at river mile 2.1. The Phase I only period includes one year (1995) of Hermiston Irrigation District (HID) Phase II implementation but no Phase II storage releases were made that year. There were other pre-UBP releases of storage water made during all three of the Phase I only years. Phase II storage releases began in 1996 but were not fully implemented until 2000.

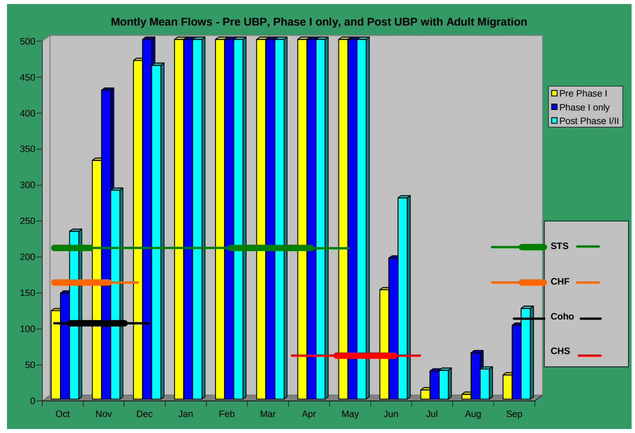

Figure 3: Monthly averaged flows for several stages of the UBP, with adult migration timing depicted in horizontal lines. The horizontal lines show the primary range of migration for each species with the thicker portion of the line designating the heaviest period of migration within the range.

Figure 2 relates the monthly averaged flows during the pre and post UBP phases to juvenile migration timing. Figure 3 relates the flow information with adult migration timing and Figure 4 shows transportation periods instead of migration timing. As can be seen in all three of these figures, the primary months affected by implementation of the UBP are the late spring/early summer and fall transitions periods.

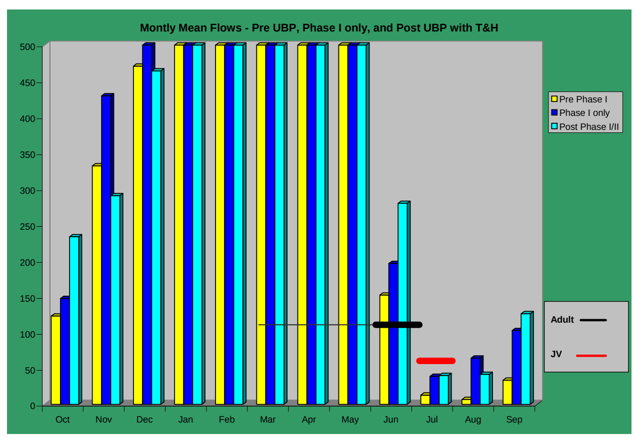

Figure 4: Monthly averaged flows for several stages of the UBP, with transportation type and timing depicted in horizontal lines.

The raw and summarized flow data associated with Figures 2, 3 and 4 can be found in the Appendix. The trap and haul data used for Figure 4 is also presented in the Appendix. Individual trap and haul annual data is shown for years 2000-2006. These years were selected as they cover the complete period since full implementation of the UBP.

Request 2A: It would help to summarize the basis the USFWS used to arrive at the flow numbers. Do these flow targets deserve to be revisited? What new data could serve to inform revision of the flow targets?

Response: The United States Fish and Wildlife Service study (USFWS 1981) was used initially to establish trap and haul flow criteria used by the Fish Passage Operations Project (Zimmerman et al. 1991) and subsequently to identify the Stored Water Release Guidelines flow levels. The study employed incremental methodology utilizing a two point rating curve hydraulic simulation technique to analyze available habitat under varying instream flow regimes. The study concludes that passage problems in the mainstem Umatilla River reaches are directly related to water depth since velocities were well below salmonid swimming speeds. For estimating passage conditions the study used the following depth parameters; adult Chinook 0.8 ft, adult coho and steelhead 0.6 ft, and 0.1 ft for all juveniles. Results indicated similar improvements in passage conditions for adults and juveniles with large increases generally noted up to 100 cfs and again from 200-250 cfs. The USFWS study recommended minimum passage flows of 50 cfs for juveniles, 100 cfs for coho and steelhead adults, and 150 cfs for adult Chinook below Three-mile Dam.

The UBP target flows were not based on the USFWS study but rather adopted, with one exception, from the year round minimum streamflow program established by the Oregon Water Resources Commission (OWRC) in 1985. The one exception being that OWRC established minimum flows for the July – September 15 period (July 120 cfs, August and September 1-15 85 cfs) rather than the 0 cfs which was cited as had been agreed upon and adopted by the fisheries agencies (National Marine Fisheries Service, United States Fish and Wildlife Service, Oregon Department of Fish and Wildlife, and Confederated Tribes of the Umatilla Indian Reservation) and included in the UBP Final Environmental Impact Statement (FEIS) (BOR 1988). Near as can be determined, these instream flow targets were adapted from recommendations in a 1973 report by Allan Smith of the Oregon State Game Commission (Smith 1973). The methodology described in that document is what is generally considered the “Oregon Method” for determining flow needs. The recommendations appear to be based on series of flow measurements taken from different stream reaches and tributaries in 1970. These documents are not attached but could be supplied if needed.

Do these flow targets deserve to be revisited?

Yes, the flow targets need reanalysis. Since 1981, there have been four channel forming floods that have resulted in geomorphic change in the lower Umatilla River. McDowell and Hughes (2003) have demonstrated that the flooding in the 1996/97 events promoted straightening in channel sections that were previously straightened. However, their investigations are limited to a few (3) sites along the mainstem Umatilla River. A large volume of sediment was moved in these floods and the resulting changes in channel form are unknown. The reoccurrence interval of a channel forming flood on the Umatilla River, is 13.5 years. Further, the CTUIR and their cooperators (Oregon Department of Environmental Quality, United States Department of Agriculture – Agricultural Research Service, United States Forest Service, Umatilla Basin Watershed Council and Natural Resource Conservation Service) have outlined a set of geomorphic assessment methods that take advantage of a detailed topographic dataset. These data span the length of the mainstem Umatilla River. Separately, the CTUIR has begun investigating an enhanced IFIM approach to estimating flows in the mainstem Umatilla River. Combining new datasets and detailed measurements of flow in the lower Umatilla River could yield a rich source of data for better management of the flows associated with the UBP.

What new data could serve to inform revision of the flow targets?

In the fall of 2000 the CTUIR and the Bureau of Reclamation (BOR) cooperated on collection of a LIDAR dataset for the entire mainstem Umatilla River. These data have been used to develop several new methods that extend the use LIDAR data to classify subtle floodplain topography. Slight variations in surface topography drive important hydrologic processes that create and maintain habitat for Pacific Salmon (ex. exchanges between surface and groundwaters) (O'Daniel 2003, Jones et al. *Accepted for publication*). However, these dataset have not been created for the lower Umatilla River. Additionally, flow estimates will benefit from additional gauges on the mainstem Umatilla River that were not in place during the 1981 USFWS study. Currently both the enhanced IFIM and the mainstem geomorphic classification using LIDAR data are seeking support to continue work.

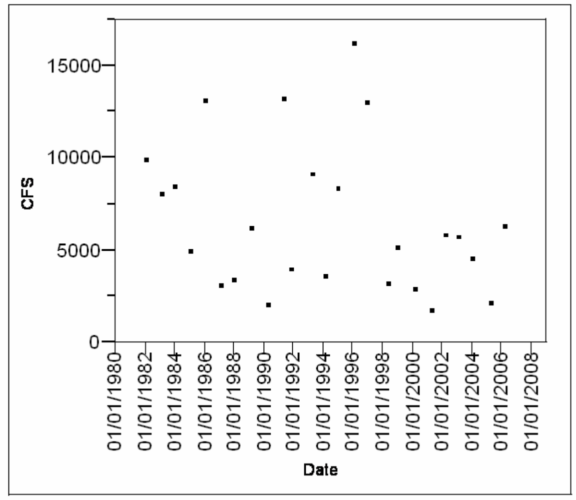

Figure 5: The graph above describes the annual peak flows at the Umatilla gauge (USGS station 14033500) located near the mouth of the Umatilla River. Channel forming events are evident in 1986, 1991, 1996 and 1997.

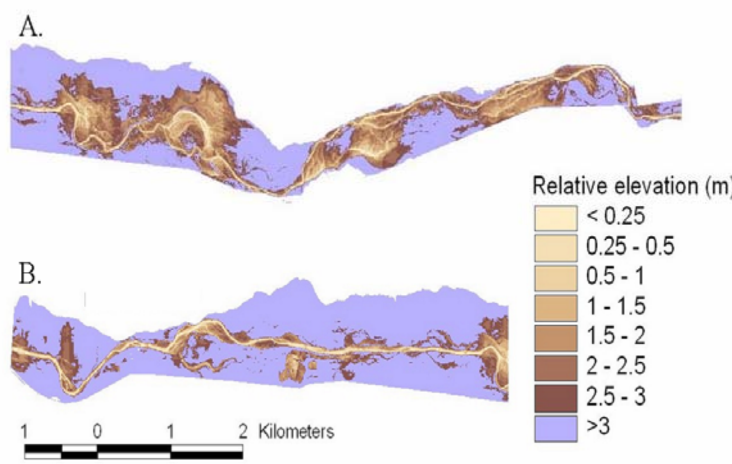

Figure 6: *LIDAR data from the Minthorn Spring area of the Umatilla River floodplain, processed to relative elevation (Images from O'Daniel et al. 2003). The upper image (A). describes the section of the Umatilla River from Minthorn Springs to the Upper Mission floodplain. Channel connectivity is highest in the dark brown to light tan areas. The lower image (B) shows the middle and lower portion of the Mission floodplain that have been dredged and leeved channel that expresses less geomorphic variability.*

Request 3A: Please provide the ISRP with electronic copies of, or links to, the water use plan for the Umatilla subbasin.

Response: Attached are electronic copies of two documents; the Umatilla Basin Project Annual Operating Plan (BOR 2007) and the Umatilla Hatchery and Basin Annual Operating Plan (ODFW and CTUIR 2006). The first document outlines the history of the UBP and provides a description of the associated facilities as well as laying out the process by which the UBP is operated. It was initially drafted in 2004 in response to in-basin concerns that we needed to define how the UBP was operated for future involved parties and to ensure that institutional knowledge wasn't lost. Although it is called an Annual Operating Plan, it has only been updated once, in 2007. The one major change in the updated version is the establishment of a summer flow target of 75 cfs for the period of July 1 to August 15 in order to allow operation of Phase I through the summer.

Another document referenced in the UBP AOP is the McKay and Umatilla River Water Management Plan (OWRD 1991). The primary focus of this document is for water use accounting and regulation of irrigators in the mid and lower Umatilla River. It was developed prior to implementation of the UBP but is still used as the management tool for regulating irrigation diversions. This document is not attached but could be supplied if needed.

The second AOP document was first developed in 1990, prior to Umatilla Hatchery going into operation. Initially, it was called the Umatilla Basin Artificial Production Plan and subsequently was changed to the Umatilla Hatchery AOP and finally the Umatilla Hatchery and Basin AOP. It outlines, by species, such information as production schedules, brood needs, adult returns, dispositions, and passage/hauling criteria. The Stored Water Release Guidelines are included in this document as they were established prior to development of the UBP AOP. The hatchery AOP also contains M&E information as it relates to the artificial production programs. It is truly an Annual Operating Plan and is updated every year.

Request 3B: …..and the associated irrigation flows (mean and annual variation).

Response: After talking with both BOR (Chet Sater, personal communication) and OWRD (Paul Hendricks, personal communication) it does not appear that an annual water budget is developed or available that encompasses all the aspects that is requested in the 6/06/07 email from Dr. Eric Loudenslager regarding amounts and sources of water, subbasin location, usage, etc. What has been provided are the graphs shown in Figure 7 which depict the change in instream surface water diversions pre and post UBP for each of the individual canals involved in the exchange (West Extension, Feed, and Stanfield).Two comments specific to the Stanfield Canal diversion graph; the pre-UBP instream diversion amount includes both "live non-storage" flow and storage water released from McKay Reservoir and it compares the pre-UBP hydrograph to the hydrograph after full implementation of Phase II and does not include the years from 1996-99 when only a partial exchange with Stanfield Irrigation District (SID) was occurring. As can been seen from Figures 7 and 8, instream diversion by all these canals has decreased significantly during the critical late spring/early summer and fall passage months since implementation of the UBP exchange resulting in major reductions in trap and haul of both juveniles and adults. The raw data for the graphs included in Figure 7 as well as full size copies of the graphs are presented in the Appendix.

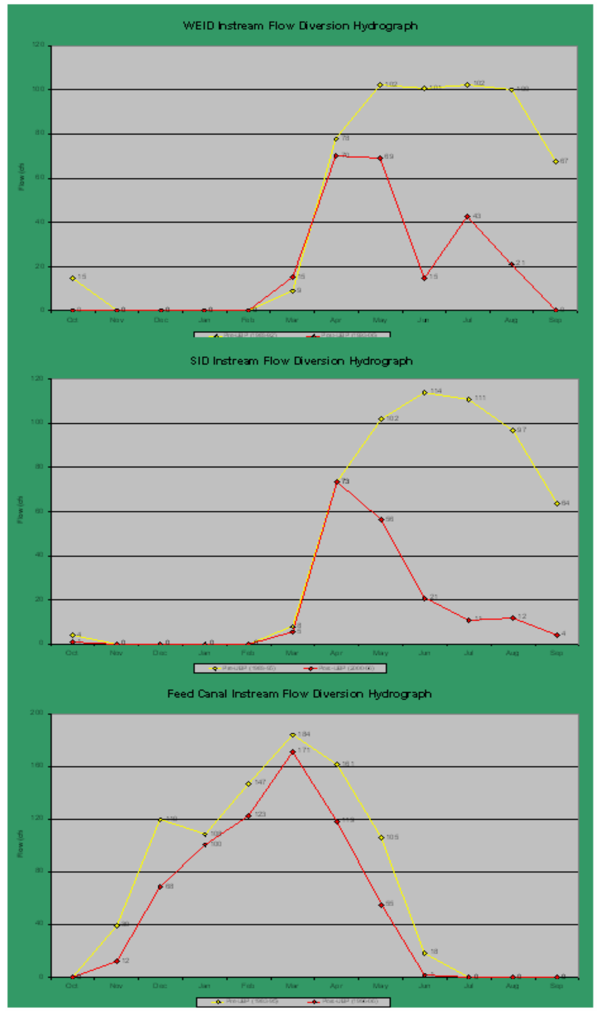

Figure 7: Averaged monthly instream flow diversions pre and post UBP implementation for each of the three canals included in the exchange program.

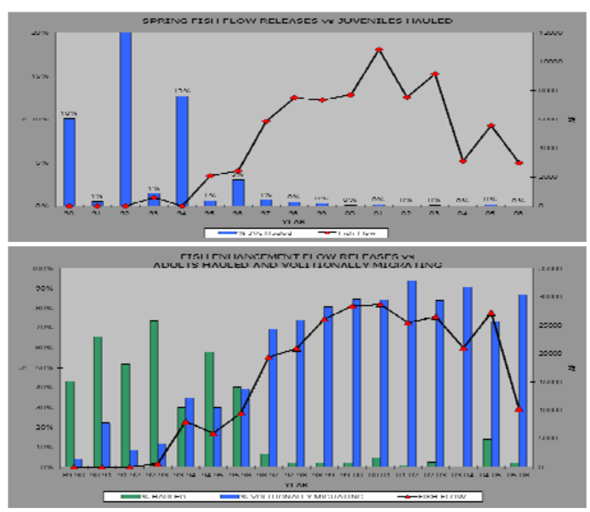

Figure 8: Reduction in required transport of juveniles and adults and increase in natural migration of adults.

Request 4: There was very little discussion of restoration in the Butter Creek watershed, although this is one of the major Umatilla River tributaries, and it was identified by EDT as a site of significant habitat degradation. Was the lack of emphasis on Butter Creek related to an agreement with the agricultural community that restoration would be focused on the upper watershed in tributaries such as Meacham Creek, instead of streams in the lower subbasin?

Response: There were no agreements with the agricultural community that focused restoration on upper watershed tributaries. Rather, restoration priorities in the Umatilla River Subbasin were determined with the EDT model (Umatilla Subbasin Plan, CTUIR and ODFW, 2004), physical criteria that included flow and habitat connectivity within each tributary, and biological criteria that included the number of salmonid species and life history stages benefited, Butter Creek possesses lower restoration potential than either Meacham Creek and Birch Creek for several reasons. The majority of the Butter Creek watershed is low elevation in the Umatilla Basin relative to other tributaries, and therefore yields relatively lower flows except during periods of heavy rain. While Butter Creek is identified in the EDT modeling process as a site of significant habitat degradation and relatively high potential for steelhead and coho population condition, it possesses relatively low restoration priority due to private land management control and the need to develop agreements for access and easements, significant floodplain manipulations in the lower reaches due to agricultural activities, and habitat discontinuity between the Umatilla River and upper reaches of Butter Creek that are attributed to irrigation withdrawals and physical passage barriers. Habitat enhancement in upriver tributaries of the Umatilla River Subbasin would generally benefit a greater number of species, more life history stages, and habitat continuity in Meacham Creek is not impacted irrigation withdrawals. Habitat conditions in Butter Creek would therefore logically be addressed subsequent to completion of restoration projects in prioritized Umatilla tributaries higher in the Umatilla watershed.

Request 5: Please provide the ISRP with electronic copies of, or links to, the updated monitoring and evaluation document referenced during the presentations.

Response: Attached is an electronic copy of the requested document:
ODFW and CTUIR (2006) Comprehensive Research, Monitoring and Evaluation Plan for Umatilla Subbasin Summer Steelhead and Chinook Salmon. Prepared for Bonneville Power Administration and Northwest Power Planning Council, Portland, Oregon.

Request 6: Please provide the ISRP with electronic copies of, or links to, Grant, J., J. D. M. Schwartz, D. W. Cameron, R. Stonecypher, Jr., and R. Carmichael. 2007. Comprehensive assessment of salmonid restoration and enhancement efforts in the Umatilla River Basin. CTUIR, Pendleton, OR and ODFW Portland, OR.

Response: Attached is an electronic copy of the requested document.

<u>Bibliography</u>

BOR (Bureau of Reclamation) (1988) Umatilla Basin Project, Planning Report – Final Environmental Impact Statement. Department of the Interior, Bureau of Reclamation, Pacific Northwest Region, Boise, Idaho.

BOR (Bureau of Reclamation) (2007) Umatilla Basin Annual Operating Plan. Umatilla Basin Project, Oregon. Department of the Interior, Bureau of Reclamation, Pacific Northwest Region.

CTUIR and ODFW. 2004. Umatilla/Willow Subbasin Plan. Prepared for the Northwest Power and Conservation Council, Portland Oregon.

Jones, K. L., Poole, G. C., O'Daniel, S. J., Mertes, L. A. K. and Stanford, J. A., Surface hydrology of low-relief landscapes: an assessment of hydrologic connectivity and flow impedance using LIDAR-derived digital elevation models. Accepted for publication in Remote Sensing of Environment.

McDowell, P. F., Hughes, P. F. and Marcus, W.A. (2003) Geomorphic Change in Two Historical Flood Events on the Umatilla River, Oregon. American Geophysical Union, H31C-0483, Fall Meeting, San Francisco.

O'Daniel, S. J., Poole, G. C. and Mertes, L. A. K. (2003). Habitat diversity in alluvial rivers. Portland, Bonneville Power Administration: 114.

ODFW and CTUIR (Oregon Department of Fish and Wildlife and Confederated Tribes of the Umatilla Indian Reservation) (2006) Umatilla Hatchery and Basin Annual Operating Plan, For the Period October 1, 2006 – September 30, 2007. Prepared for Bonneville Power Administration, Portland, Oregon.

OWRD (Oregon Water Resources Department) (1991) McKay and Umatilla River Water Management Plan. McKay and Lower Umatilla River Water Users Task Force, Pendleton, Oregon.

Smith, A. K. (1973) Fish and Wildlife of the Umatilla Basin, Oregon, and Their Water Requirements (Revised). A Report with Recommendations to the Oregon State Water Resources Board. From the Oregon State Game Commission. Federal Aid to Fish Restoration Completion Report. Fisheries Stream Flow Requirements, Project F-69-R-8, Job Number 123, Portland, Oregon.

USFWS (United States Fish and Wildlife Service) (1981) Instream Flow Study of the Umatilla River. U.S. Fish and wildlife Service, Fisheries Assistance Office, Vancouver, WA.

Zimmerman, B. C., James, G. A., Duke, B. and Witty, K. (1991) Umatilla River Basin Trap and Haul Program, September 1990 – August 1991. Annual Progress Report for Contract No. DE-BI79-89BP98636, Project No. 88-022. Submitted to Bonneville Power Administration, Portland, Oregon.

h:\docs\isrp umatilla\isrp follow-up questions response 7-07- final 1.doc