United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Region
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1110
Portland, Oregon 97232-2135

IN REPLY REFER TO:

LCA-1000
ENV-7.00

JAN 16 2004

Mr. Michael P. Tehan
Oregon State Director
Habitat Conservation Division
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
525 N.E. Oregon Street
Portland, Oregon 97232-2737

Subject: Endangered Species Act, Section 7 – Bureau of Reclamation (Reclamation) Projects in the Deschutes River Basin, OR (NOAA Fisheries Reference # OSB2001-0142)

Provision of Supplemental Information to the *Biological Assessment on Ongoing Operation and Maintenance of the Deschutes River Basin Projects and Effects on Essential Fish Habitat under the Magnuson-Stevens Act* -- Deschutes, Crook, Jefferson, and Wasco Counties, Oregon

Dear ~~Mr. Tehan~~: Mike

The Bureau of Reclamation submitted a biological assessment (BA), which you received on October 1, 2003, describing the effects of ongoing operations and maintenance activities at three Reclamation projects in the Deschutes River basin (Deschutes, Crooked River, and Wapinitia Projects). The BA concluded the proposed action "may affect, but is not likely to adversely effect" (NLAA) Middle Columbia River steelhead and essential fish habitat (EFH). You sent us a letter on October 29, 2003, that stated you did not concur with the NLAA conclusion and requested that we initiate formal consultation.

After discussing NOAA Fisheries' non-concurrence with Scott Hoefer of your staff, we learned of stream habitat data that we had not considered while preparing the BA. We have since reviewed this information and reexamined our analysis of the proposed action's effects to MCR steelhead and EFH. We are providing a written discussion of our review and some additional analysis with this letter to supplement the information contained in the BA. For the reasons stated in the attachment, we reaffirm our conclusion that the proposed action "may affect, but is not likely to adversely affect" MCR steelhead and EFH.

Please contact Ms. Karen Blakney, Endangered Species Act Program Manager, at 503-872-2839, if you have any questions.

Sincerely,

Ronald J. Eggers
Area Manager

Enclosure

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(w/encl to each)

Additional information and analyses to supplement the Biological Assessment on Continued Operation and Maintenance of the Deschutes River Basin Projects and Effects on Essential Fish Habitat under the Magnuson-Stevens Act.

U.S. Bureau of Reclamation
Pacific Northwest Region
Boise, Idaho

13 January 2004

INTRODUCTION

Some additional information came to light after Reclamation submitted its final biological assessment (BA) on operation and maintenance of its Deschutes River projects to NOAA Fisheries. Some of this information was pointed out by NOAA Fisheries and used in their review of the final BA. To put this supplemental analysis in perspective, NOAA Fisheries did not concur with Reclamation's "not likely to adversely affect" determination for the Middle Columbia River steelhead ESU in the lower Deschutes River in the final BA. The information Reclamation overlooked in preparation of the BA pertained to a wetted perimeter study described in the Pelton-Round Butte Hydroelectric Project FERC relicensing joint application (PGE 2001), and another study in the FERC relicensing application that estimated the amount of steelhead spawning habitat, based on depth and water velocity, at four transects downstream from Pelton Reregulating Dam. Below we comment on that information and provide some additional analysis, as well as discuss a steelhead Smolt Density Model for the lower Deschutes River. Aney et al. (1967) reported that most of the suitable spawning gravel for anadromous salmonids in the lower Deschutes River occurs in the reach of river immediately downstream from the Pelton Reregulating Dam where the two studies described below were conducted.

WETTED PERIMETER STUDY

A study conducted for the Pelton Round Butte Hydroelectric Project relicensing application estimated the wetted perimeter at 24 transects in an about 7.8-mile reach of the lower Deschutes River just downstream from the Pelton Reregulating Dam. Wetted perimeter was measured at 24 transects at flows ranging from 4,000 cfs to 8,000 cfs in 500 cfs increments (PGE 2001, Exhibit B, Section 3). NOAA Fisheries used the information generated in this study and looked at the results in the 4,000- to 6,000-cfs range at 500-cfs increments (Scott Hoefer, NOAA Fisheries, pers. comm., 12 Nov 2003).

From the data presented in tables 3-2 to 3-6 in Exhibit B, "Wetted Perimeter Analysis, Sites B-I" (PGE 2001), NOAA Fisheries determined that for a 500-cfs reduction in flow as measured at the Madras gage, for example, a reduction from 4,500 cfs to 4,000 cfs averaged over 24 transects, there was about a 0.3-foot reduction in water surface elevation (WSE), with a corresponding reduction in top width and wetted perimeter (Table 1). WSE decreased less at 500-cfs flow reductions for higher river flows (6,000 to 5,500 cfs) than for lower river flows (4,500 to 4,000 cfs). The reduction in wetted perimeter for incremental 500-cfs flow reductions from 6,000 cfs to 4,000 cfs that corresponded to the 0.26- to 0.31-foot water surface elevation decrease is 2.12 to 3.39 feet (Table 1) [Wetted Perimeter Study summarized by Hoefer (2003 pers. comm.) and Exhibit B Section 3 (PGE 2001)]. There is a slightly greater reduction in wetted perimeter at the lower flows than at higher flows (Table 1). NOAA Fisheries then used the calculated difference in wetted perimeter at 500-cfs increments to estimate a reduction in shoreline rearing habitat for young steelhead (Table 1). Overall, the reduction in calculated shoreline habitat for juvenile fish amounts to about a 1% reduction in wetted perimeter for each 500-cfs reduction in flow (Table 1).

For each 500-cfs change in flow from 4,000 to 6,000 cfs, NOAA Fisheries matched as closely as possible Reclamation's modeled monthly 50% exceedance reduction in flow at Madras attributable to Reclamation's proposed action (Table 2; also see Table 6-2, page 6-7 of Deschutes Final BA). The estimated reduction in wetted perimeter for 500-cfs reductions in river flow was matched to the months October to April, a time when Reclamation stores irrigation water and where the modeled reduction in flow attributable to the proposed action ranges from 257 to 761 cfs (Table 2). Flows out of the Pelton Round Butte Hydroelectric Project fluctuate to some degree on a daily basis, and over a month time period will periodically inundate and dewater the shoreline as described below. Daily flow fluctuations were not considered in development of Reclamation's hydrologic model; the model used monthly flows to assess the flow conditions at Madras with and without Reclamation's proposed action. Development of the model is described in the final Deschutes BA. Any comparison of modeled flows and actual flows should be done cautiously.

To assess flow conditions in the lower Deschutes River in greater detail as they relate to habitat change and the analysis described above, Reclamation selected the recent period 1990 to 2002 to examine actual flows as measured at the Madras gage (http://nwis.waterdata.usgs.gov/or/nwis/discharge/?site_no=14092500&agency_cd=USGS), and found that the documented monthly flows for this period always exceed the existing flow targets as well as the new target flows proposed by the Oregon Department of Water Resources (Table 3). In addition, an examination of the daily flows at the Madras gage showed that daily flow fluctuations not attributable to Reclamation operations occurred during the months from October to April, which in some cases exceeded the 500-cfs flow differences examined in the wetted perimeter study (Table 3 and Figure 1). These data illustrate that over a monthly period, the band of shoreline habitat estimated to be dewatered during the staged 500-cfs reduction in flow, that is, the reduction in wetted perimeter, does in fact experience some degree of inundation and dewatering on a regular basis during the month, in some months exceeding the amount of area estimated to be dewatered with a 500-cfs flow reduction. Recall that the 500-cfs change in flow was the change examined in the wetted perimeter study and not the flow changes in Reclamation's hydrology model. In some of the months examined in the recent period 1990-2002, the actual change in flows over the month exceeded the difference in flows for the two scenarios modeled for the proposed action. Although the 1% reduction in wetted perimeter and potential shoreline habitat for 500-cfs reductions in flow is measurable, daily flow fluctuations in excess of 500 cfs have been documented. Therefore the amount of potential habitat dewatered as shown in the wetted perimeter study is offset to some degree by the daily and seasonal flow fluctuations.

Rearing fry and juvenile salmonids will seek preferred depth along river margins that provide a combination of cover, food and suitable water temperature. Fry will generally select the slower, generally warmer relatively shallow water depths, while the larger juveniles will move to deeper water with higher velocity (Bjornn and Reiser 1991). A reduction in flow may reduce the wetted perimeter because the shoreline or "edge" recedes as the water surface elevation decreases depending on channel morphology. Fry and juvenile steelhead rearing in the shallow water of the lower Deschutes River will be motivated to follow the water down as it recedes unless they are stranded in isolated pockets, pools or side channels due to a rapid ramping rate. Since ramping rates from the Pelton Round Butte hydroelectric project have a maximum rate of 0.1 foot/hour and 0.4 foot/day (Draft EIS, August 2003) for the period 16 October to 14 May, it is unlikely that juvenile fish rearing in the relatively shallow nearshoreline habitat would be stranded at this ramping rate. It is unknown if rearing juvenile steelhead are displaced downstream as a result of water level fluctuations of the limited magnitude described here, or simply move laterally to nearby suitable habitat. Steelhead fry and juveniles most likely respond to the limited fluctuating water levels described here by moving with the water to maintain preferred depth as flows and water levels change in the lower Deschutes River.

As flows decrease and water surface elevations decrease, in some areas of the Deschutes River mid-channel gravel bars may become more accessible to rearing juvenile steelhead and provide suitable habitat.

STEELHEAD SPAWNING HABITAT

Associated with changes in wetted perimeter and river width mediated by changes in flow, there is a change in the amount of suitable steelhead spawning area, based on depth and velocity. PGE (2001) used Fassnacht's (1997) data and observations of locations where steelhead were documented to spawn in four transects D3 through E5 to estimate spawning habitat. The amount of suitable spawning gravels at these four transects was estimated for flows ranging from 3500 to 6500 cfs in 1000-cfs increments. The study showed that in general at higher flows in this reach, the total amount of suitable steelhead spawning habitat decreased (Table 4). The PGE (2001) analysis showed that there was no clear correlation between flows and suitable spawning habitat in the river at large; variations in spawning suitability appeared to be more a function of channel characteristics than total flow. Some transects have more suitable spawning areas at lower flows than at higher flows, as shown in Table 4, but overall, there was less total spawning area at higher flows.

SMOLT DENSITY MODEL

Reclamation looked at the Smolt Density Model for summer steelhead in the lower Deschutes River (http://www.streamnet.org/subbasin/2001-subbasin-data.html and Table 5). For the 12.8 miles of the lower Deschutes River just downstream from the Pelton Reregulating Dam, the Smolt Density Model estimated a total capacity of 116, 448 steelhead smolts. This 12.8-mile reach is further subdivided into four sections, as shown on Table 5, starting from the bottom of the table. The first section, Reregulation Dam to Shitike Creek (3.1 miles long) has a habitat rating of "good." The next three downstream sections, Shitike Creek to Dry Creek (2.8 miles), Dry Creek to Unnamed (3.7 miles), and Unnamed to Trout Creek (3.2 miles), are all listed as having excellent habitat for summer steelhead, with a smolt capacity of about 9810 smolts per mile. Table 5 also lists habitat constraints; interestingly, habitat constraints for the "good" habitat and the "excellent" habitat are identical, except for the section Unnamed to Trout Creek. Although the Smolt Density Model is somewhat dated, it probably represents the best information available that addresses potential steelhead production capacity in the Deschutes Basin. Reclamation's operations were ongoing when the model was developed, so conditions prevailing with Reclamation's operations were apparently considered or incorporated into the model.

As described in detail in the BA, the number of adult steelhead returning to the Deschutes River has increased substantially over the past few years, although a large percentage of the returning adult steelhead are of hatchery origin.

The August 2003 Draft Environmental Impact Statement on the Pelton Round Butte Hydroelectric Project from the Joint Applicants (DEIS 2003) determined that continued operation under the conditions proposed by the Joint Applicants is considered not likely to adversely affect the Middle Columbia River steelhead ESU.

CONCLUSION

With a mostly "excellent" habitat quality rating in the Smolt Density Model for the Deschutes River where Aney et al. (1967) indicated the better spawning habitat for steelhead occurred, Reclamation reaffirms that its proposed action as described in the biological assessment may affect, but is not likely to adversely affect, the Deschutes River population of the MCR steelhead ESU.

REFERENCES

Aney, W.W., M.L. Montgomery, and A.B. Lichens. 1967. Lower Deschutes River, Oregon; Discharge and the Fish Environment. Oregon State Game Commission, Portland, Oregon.

Bjornn, T.C. and D.W. Reiser. 1991. Habitat Requirements of Salmonids in Streams. American Fisheries Society Special Publication 19:83-138.

Federal Energy Regulatory Commission. 2003. Draft Environmental Impact Statement for Hydropower Relicensing. Pelton Round Butte Hydroelectric Project, FERC Project No. 2030-036. 381 pp. plus appendices. August 2003.

Hoefer, S. NOAA Fisheries, November 2003, personal communication.

PGE (Portland General Electric). 2001. Final Joint Application Amendment. Pelton Round Butte Hydroelectric Project, FERC No. 2030.

U.S. Bureau of Reclamation. 2003. Biological Assessment on Continued Operation and Maintenance of the Deschutes River Basin Projects and Effects on Essential Fish Habitat under the Magnuson-Stevens Act.

Table 1. Wetted perimeter analysis for flows ranging from 4,000 cfs to 6,000 cfs summarized in part by NOAA Fisheries (Scott Hoefer 2003 pers. comm.) for 24 transects in the lower Deschutes River.

	Flow, cfs	Avg. WSE, ft.	WSE diff, ft. (b-a, etc.)	Avg. WP, ft	Avg. WP diff, ft. (b-a, etc.)	Avg. WP diff 6000-5000cfs (e-c)	Change in shoreline area (ft ^{2}) [1]	Total Area (ft^2) [2]	Percent change
a	4000	1335.38	0.31	250.45	2.97	-	122,316.48	10,314,533	1.17
b	4500	1335.69	0.31	253.42	3.39	-	139,613.76	10,436,849	1.32
c	5000	1336.00	0.28	256.81	2.18	-	89,781.12	10,576,463	0.84
d	5500	1336.28	0.26	258.99	2.12	-	87,310.08	10,666,244	0.81
e	6000	1336.54		261.11		-		10,753,554	
						4.30	177,091.20	-	1.65

[1] Area of shoreline dewatered by a 500-cfs or 1000-cfs change in flow, based on 7.8 miles of river.

[2] Total area of wetted perimeter at a specified flow for a 7.8 mile reach of river.

Note: Difference in area of wetted perimeter as flows increase in 500 cfs increments is based on the increase in wetted perimeter and the 7.8-mile (41,184 ft) length of the lower Deschutes River just downstream from Pelton Reregulating Dam. The total area is based on the wetted perimeter at each flow and the length of river reach.

Table 2. Adjusted wetted perimeter based on the modeled differences in flows per month and the corresponding 500-cfs flow change.

Month	Model flow [1] (cfs) w/ USBR	Model flow [1] (cfs) w/o USBR	Matched with flows (cfs) from WP study	Modeled flow (cfs) diff, w/ - w/o	Modeled diff/500	Modeled diff/1000	Avg. WP reduction (ft.) at 500 cfs	Adjusted WP reduction (ft)
Oct	4201	4593	4500-4000	-392	0.78	-	2.97	2.32
Nov	4635	5208	5000-4500	-573	1.15	-	3.39	3.90
Dec	5144	5526	5500-5000	-382	0.764	-	2.18	1.66
Jan	5395	5652		-257	0.514	-		
Feb	5548	6001	6000-5500	-453	0.906	-	2.12	1.92
Mar	5170	5931	6000-5000	-761	1.522	0.761	4.3	3.27
Apr	5090	5822	6000-5000	-732	1.464	0.732	4.3	3.14

[1] Modeled flows were developed by Reclamation using MODSIM. See Deschutes Final BA, pages 6-2 to 6-11 for a summary of the modeled approach and results.

Table 3. Existing minimum flows, proposed flows, modeled flows "with" and "without" Reclamation at 50 percent exceedance, average monthly flows at Madras for 1990- 2002, monthly range across the period of record, daily average flows, etc.

	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Existing [1]	3000	3000	3500	3500	3500	3500	3000	3000	3000	3000	3000	3000
Proposed [2]	4500	4500	4500	4000	4000	4000	4000	3500	3800	3800	3800	4500
Mdl. w/ BOR	5395	5548	5170	5090	4399	4181	4212	4074	4007	4201	4635	5144
Mdl w/o BOR	5652	6001	5931	5822	4734	4231	4119	3963	3999	4593	5208	5526
Difference	-257	-453	-761	-732	-335	-50	+93	+111	+8	-392	-573	-382
Avg. Flow 1990-2002	5159	5443	5295	5005	4416	4292	3962	3908	3945	4286	4705	5023
Flow Range 1990-2002	3610-12,800	3290-17,800	3550-10,300	3630-8980	3460-9320	3600-9490	3270-5620	3370-5270	3390-5550	3390-7770	3620-8900	3470-9010
Avg. Daily Low	4937	5238	4864	4584	4231	4092	3846	3836	3845	4097	4532	4838
Avg. Daily High	5412	6258	5815	5695	4613	4634	4092	3936	4077	4759	5264	5285
Difference	475	1020	951	1111	382	542	246	150	232	662	732	447

[1] Existing recommended minimum flows

[2] Minimum flows recommended by ODWR in the Pelton Round Butte FERC Relicensing

Table 4. Estimated amount of suitable steelhead spawning habitat summed across four transects in the lower Deschutes River (PGE 2001).

River flow, cfs	Width of suitable spawning area in river channel, by transect (ft. of channel width), and totals, at specified flows.				Total spawning width, ft.
	D3	D4	E4	E5	
3500	47	38	109	112	306
4500	52	49	93	25	219
5500	44	64	70	9	187
6500	24	70	34	7	135

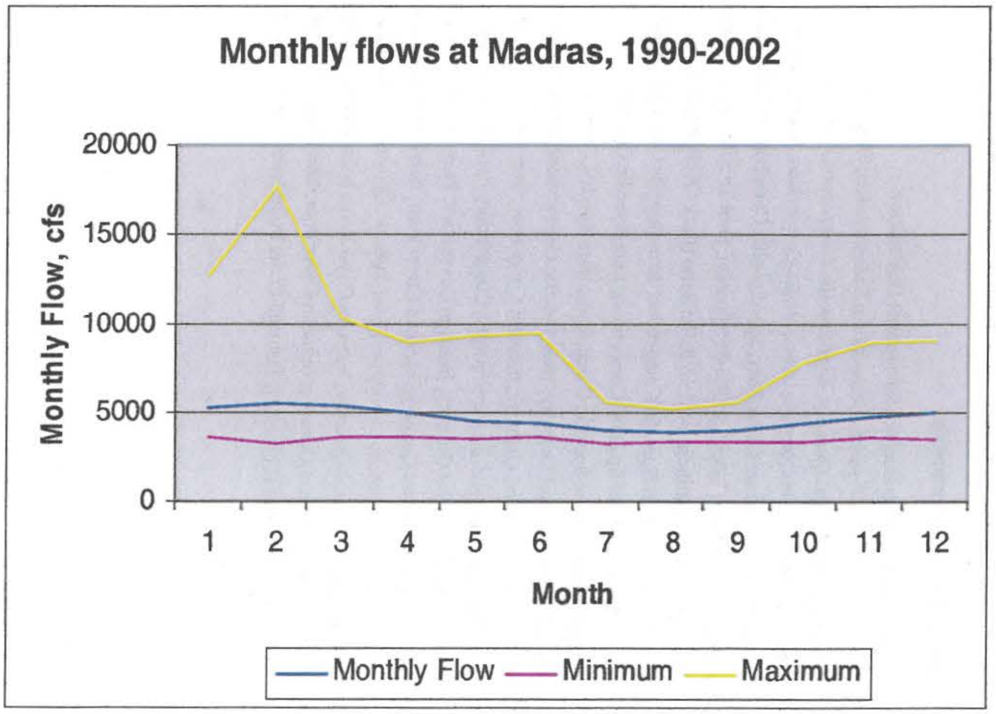

Figure 1. Monthly flows at Madras averaged from 1990 to 2002.

s River.

	Habitat Quality	Constraints
	Not Rated	
	Not Rated	Gravel Quality; Gravel Quantity; Sedimentation; Streambank Degradation
	Not Rated	Gravel Quality; Sedimentation
	Not Rated	Gravel Quality; Sedimentation; Streambank Degradation
ition	Fair	Gravel Quality; Inter-Specific Competition; Sedimentation; Streambank Degradation
ition	Fair	Gravel Quality; Gravel Quantity; Inter-Specific Competition; Sedimentation; Streambank Degradation
ition	Fair	Gravel Quality; Gravel Quantity; Inter-Specific Competition; Sedimentation
ition	Fair	Gravel Quality; Instream Cover Poor; Inter-Specific Competition; Sedimentation; Streambank Degradation
ition	Good	Instream Cover Poor; Inter-Specific Competition; Pool To Riffle Ratio (Lack Of High Quality Pools); Streambank Degradation
ition	Good	Inter-Specific Competition; Pool To Riffle Ratio (Lack Of High Quality Pools); Streambank Degradation
ition	Good	Gravel Quantity; Inter-Specific Competition; Intra-Specific Competition; Streambank Degradation
ring	Good	Gravel Quantity; Inter-Specific Competition; Intra-Specific Competition; Pool To Riffle Ratio (Lack Of High Quality Pools); Streambank Degradation
ring	Good	Gravel Quantity; Inter-Specific Competition; Intra-Specific Competition; Pool To Riffle Ratio (Lack Of High Quality Pools); Streambank Degradation
ring	Good	Gravel Quality; Gravel Quantity; Inter-Specific Competition; Intra-Specific Competition; Streambank Degradation
ring	Good	Gravel Quality; Gravel Quantity; Instream Cover Poor; Inter-Specific Competition; Intra-Specific Competition; Pool To Riffle Ratio (Lack Of High Quality P
ition	Fair	Inter-Specific Competition; Intra-Specific Competition; Pool To Riffle Ratio (Lack Of High Quality Pools); Streambank Degradation
ring	Good	Gravel Quality; Gravel Quantity; Instream Cover Poor; Inter-Specific Competition; Intra-Specific Competition; Streambank Degradation
ring	Excellent	Gravel Quality; Gravel Quantity; Instream Cover Poor; Inter-Specific Competition; Intra-Specific Competition
ring	Excellent	Gravel Quantity; Instream Cover Poor; Inter-Specific Competition; Intra-Specific Competition
ring	Excellent	Gravel Quality; Gravel Quantity; Instream Cover Poor; Inter-Specific Competition; Intra-Specific Competition
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