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September 26, 2013

Elizabeth A.O. Moats  
Oregon Department of Fish and Wildlife  
107 20<sup>th</sup> Street  
La Grande, OR 97850

Subject: Fish Screening Exemption Request - Warmsprings Dam Hydroelectric Project, FERC No. 13570

Dear Ms. Moats:

Warm Springs Hydro LLC is seeking an exemption of fish screening requirements for the Warmsprings Dam Hydroelectric Project. Fish screening is required under ORS 498.306, and conditions for exemption are discussed under ORS 498.316. A fish screen on the deep outlet works at Warmsprings Dam would be prohibitively expensive and would be opposed by Bureau of Reclamation, which is concerned with screen plugging and loss of the ability to release water from the dam. We are therefore seeking an exemption from the fish screening requirement. In lieu of screening Warm Springs Hydro LLC proposes to fund fish stocking in the reservoir during the lifetime of the hydropower operation. Overall we believe that fish stocking by Warm Springs Hydro will promote ODFW's management objectives at Warmsprings Reservoir and will provide greater long-term benefit to the fishing public than a fish screen. Per requirements of ORS 498.316 we provide the following proposal narrative and justification for a fish screening exemption that includes (1) an impact or injury assessment; (2) a justification of why screening at the intake is not being pursued; (3) a detailed explanation of the mitigation proposal; and (4) a description of how the proposed mitigation will provide for adequate protection of identified fish in the body of water that is being diverted.

#### Project location and operation

Warmsprings Dam is located on the Middle Fork of the Malheur River near Riverside, OR. The dam was constructed from 1918-1919 and was modified in 1930 and 1939. The dam is a 106 foot high thin concrete arch structure with a crest length of 469 ft, crest elevation at 3,409 ft above sea level (ASL) and a hydraulic height of 92 ft. There is a spillway overflow section located in the central portion of the arch with a floor elevation of 3,401 ft. To provide additional water storage, stoplogs located at the spillway crest allow controlled reservoir storage to elevation 3,406 ft ASL. The capacity of the spillway at 3,406 ft is 9,700 cfs. Warmsprings Reservoir has a surface area of 4,600 acres at an elevation of 3,406 ft with a capacity of 192,400 acre-feet (Reclamation, 2002).

The existing outlet works consists of two rectangular tunnels near the right abutment that are protected by a guard gate. The invert elevation of the existing tunnels is 3,327 ft ASL and the top of the tunnels is at 3,337 ft ASL. Each tunnel is fitted with a 3.25 ft by 6 ft cast-iron slide gate that controls water

discharge into the stilling basin below the dam. Discharge capacity of the outlet works is 2,000 cfs at reservoir elevation 3,406 ft ASL.

The existing operation plan for Warm Springs Dam provides flood control regulation as well as downstream irrigation water delivery. The Bureau of Reclamation is responsible for the overall management of the Warm Springs Dam facilities. Warm Springs Irrigation District (WSID) performs day-to-day operation and maintenance at the dam, and controls irrigation releases during the water year. WSID recognizes the Vale Oregon Irrigation District's (VOID) irrigation season, which typically falls between April 15<sup>th</sup> and October 15<sup>th</sup>. The length of season and amount of water delivered depends on weather conditions and snowpack in the mountains. During the season, releases generally remain between 150 and 400 cfs but can occasionally exceed 450 cfs. During the non-irrigation season, WSID and VOID do not release any water from the Warm Springs Reservoir so that after about mid-October the Malheur River is normally dry below the dam. The Bureau of Reclamation determines the release at the dam for flood control, if needed, during late winter and early spring when snow melt runoff and precipitation are most likely to exceed reservoir capacity. These releases are made in accordance with existing standard operating procedures developed by Reclamation. This flood control operation is exclusively performed by Reclamation. Historical water release and reservoir pool elevation are depicted in Figures 1 and 2 below.

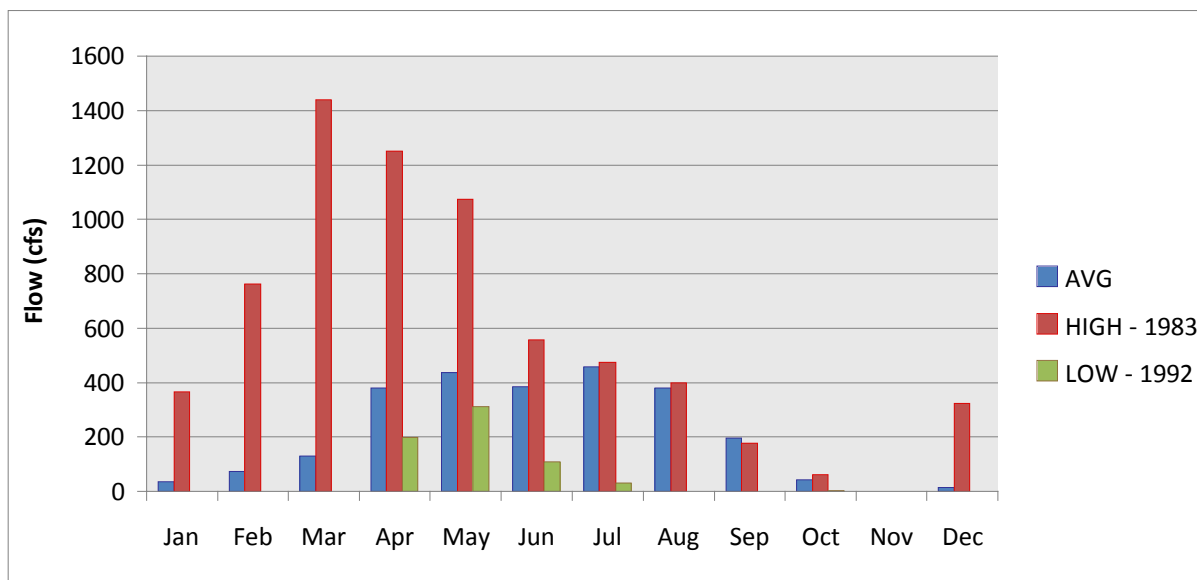


FIGURE 1. AVERAGE MONTHLY FLOWS IN THE MALHEUR RIVER BELOW WARMSPRINGS DAM FOR LOW (1992) AVERAGE, AND HIGH (1983) WATER YEARS (SOURCE: BUREAU OF RECLAMATION)

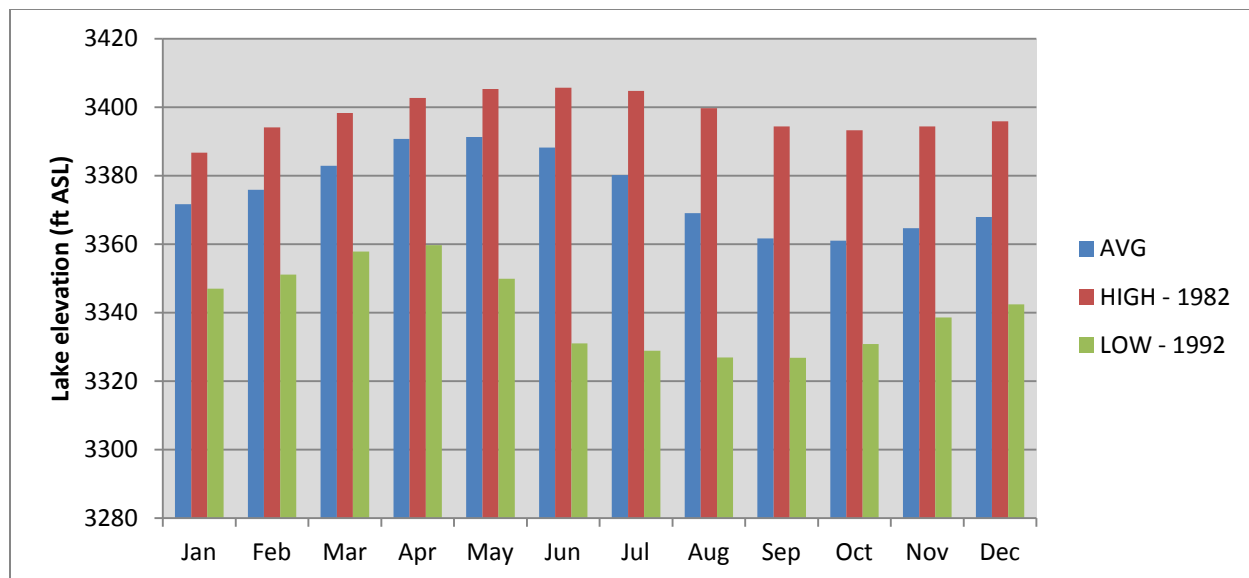


FIGURE 2. AVERAGE WATER ELEVATION IN WARMSPRINGS RESERVOIR FOR LOW (1992) AVERAGE, AND HIGH (1982) WATER YEARS (SOURCE: BUREAU OF RECLAMATION).

1. Assessment of fish entrainment

The hydroelectric project would release water from the bottom of Warmsprings Reservoir. At normal pool elevation the intake to the tunnel outlet that leads to the powerhouse are from 69 – 79 ft below the water surface. An estimate of maximum fish entrainment through the Warmsprings Dam outlet works was provided in the FERC license application as shown in the table below:

ESTIMATE OF MAXIMUM ANNUAL ENTRAINMENT BY SPECIES.

SPECIES	% COMPOSITION	MAX ANNUAL ENTRAINMENT
Yellow perch	90.7%	15714 - 56121
Brown bullhead	2.0%	3467 - 1238
White crappie	4.7%	814 - 2908
Bluegill	2.4%	416 - 1485
Rainbow trout	0.2%	35 - 124
TOTAL	100.0%	17325 - 61875

As discussed in the license application and in correspondence with ODFW during development of the application the % composition value for rainbow trout in the above table may be an underestimate. While this would mean that rainbow trout annual entrainment rate could be higher than shown, other factors associated with rainbow trout life history would likely offset this factor. These are discussed below.

Adult rainbow trout have swimming speeds in the range of 4.3 to 5 fps and trout greater than 6 inches in length have a low likelihood of entrainment when approach velocities are 3.5 fps or less<sup>1</sup>. The approach velocities at the hydropower trashrack, which is considered to be the point at which trout become irreversibly committed to leaving the reservoir through the tunnel outlets, would be about 0.4 fps at 100 cfs and 1.5 fps at 425 cfs. Thus, adult trout would be easily capable of escaping entrainment if the hydropower project is constructed. Additionally, dissolved oxygen conditions near the intake fall below the 7.0 mg/L level preferred by adult rainbow trout beginning in July and become lethal to trout in August and September. Thus the potential for adult rainbow trout entrainment is negligible except for a brief window in June. If present during this window, trout could escape entrainment with normal swimming effort.

Juvenile rainbow trout would be likely to occur in Warm Springs Reservoir since ODFW stocks fingerling trout. The potential for newly stocked juvenile fish to be entrained would depend on the time of year that stocking occurs, on the location of stocking, and on the physical condition of the fish. ODFW normally stocks Warm Springs Reservoir in May at a location approximately 3.5 miles from the dam outlet. At this distance from the outlet, even disoriented or impaired juveniles would have time to recover before entering the region of the outlet where they would risk entrainment. After stocking, juveniles would disperse throughout the reservoir. The tendency of juvenile trout to remain within littoral or other shallow water areas would limit the potential for entrainment during normal or high water years since the dam outlet would be in deep water. Juveniles that attempted to enter the vicinity of the outlet past mid-summer would encounter low DO conditions and would most likely move higher in the water column in search of more suitable conditions. However, during extremely low water years the entire reservoir, including the area surrounding the outlet, becomes shallow during the final few weeks of the irrigation season. These conditions, combined with reduced swimming capabilities for juveniles compared with adults, would cause increased risk of juvenile entrainment. One factor that would tend to lower entrainment during the late irrigation season is that water withdrawal rates tend to be lower over the final month of the season, thus lowering water velocity at the outlets (see Figure 1). Overall, because of the very low likelihood that juveniles would occur in the intake vicinity, the entrainment potential for juveniles during normal and high water years is judged to be none to minimal. During low water years when the reservoir is draw down to near minimum pool, juvenile entrainment potential is judged to be increased during the final few weeks of the irrigation season before the gates are closed.

## 2. Justification of why screening at the intake is not being pursued

The outlet works at Warm Springs Reservoir are located at the base of the dam. At normal pool elevation the outlet gate openings are from 69 – 79 ft below the water surface and are situated in a confined, rocky alcove (see photo below). Since these gates are the only outlets from the dam Reclamation would require that any screen in front of the gates must be capable of handling the maximum discharge rate of 2,000 cfs. The required screen area would be in the range of 6,000 – 15,000

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<sup>1</sup> Warm Springs Hydro LLC, 2013, Modifications to License Application for Warm Springs Dam Hydroelectric Project. Submitted to FERC in July, 2013. Idaho Falls, ID: Warm Springs Hydro LLC.

sq ft depending on the screening criteria applied. Additionally, Reclamation would require that the screen be removable to assure uninterrupted water flow in the event of screen plugging. Overall the cost of such a screen facility could not be supported by the economics of this small proposed project. The Warm Springs Dam project would not be economically feasible if outlet screening was required.



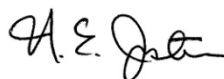
3. Detailed explanation of the mitigation proposal

In lieu of screening Warm Springs Hydro LLC will provide funding in the amount of \$3,000 annually, adjusted for inflation at an annual rate of 3%, to be used by ODFW to stock game fish in Warm Springs Reservoir. Funds may also be used to enhance fish habitat in the Middle Fork of the Malheur River, which flows into Warm Springs Reservoir, at the discretion of ODFW. A draft Agreement negotiated between Warm Springs Hydro LLC and ODFW is attached.

4. Description of how the proposed mitigation will provide for adequate protection of fish

Any stocked rainbow trout lost due to entrainment would be replaced by stocked fish funded by Warm Springs Hydro LLC. Habitat improvement funded by Warm Springs Hydro LLC would promote self-sustaining fish populations in the Middle Fork Malheur River system including Warm Springs Dam.

Best Regards,



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Attachments

Draft Agreement between Warm Springs Hydro LLC and the Oregon Department of Fish and Wildlife Concerning Funding of a Fish Entrainment Mitigation Program in Lieu of Fish Screens for the Warm Springs Dam Hydroelectric Project, FERC Number 13570

Copies

Randy Kinney, Warmsprings Irrigation District, Vale, OR