RESERVOIR MANAGEMENT STRATEGIES AT LOST CREEK LAKE IN RELATION TO IMPLEMENTATION OF THE ROGUE RIVER SPRING CHINOOK SALMON CONSERVATION PLAN

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OREGON DEPARTMENT OF FISH AND WILDLIFE

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INTRODUCTION

In September of 2007, the Oregon Fish and Wildlife Commission adopted a conservation plan for spring Chinook salmon (CHS) in the Rogue River of southwest Oregon. This plan called for the Oregon Department of Fish and Wildlife (ODFW) to submit a suite of requests, to the United States Army Corps of Engineers (USACE), in relation to reservoir management operations and reservoir releases at Lost Creek Lake. As detailed in the CHS conservation plan, there are a variety of actions that, if implemented, are designed to increase the production of wild CHS in areas downstream of Lost Creek Lake. These actions are desirable because (1) fishery enhancement is a primary authorized USACE project purpose and (2) there were unforeseen negative impacts on CHS production and life history.

The purpose of this multi-agency document is to describe recent USACE progress and future actions related to the conservation plan actions requested by ODFW. A copy of the conservation plan is available on the ODFW website at the following address: http://www.dfw.state.or.us/fish/CRP/rogue_spring_chinook_conservation_plan.asp

Action 1.1 Request that Lost Creek Lake be managed to reduce the intensity of peak flows during the period eggs and sac-fry incubate in the gravel.

USACE Progress to Date: The USACE routinely operates this way whenever possible. We recognize that in years of high water supply maintaining the reservoir below the rule curve during refill enhances the capability for flood reduction and provides the potential to minimize peak flows downstream of the dam for the benefit of fish. In recent years, the USACE has filled Lost Creek reservoir following a modified fill schedule that maintains reservoir levels below the rule curve during refill. We intend to continue to operate the reservoir following this strategy.

Future Actions: The USACE will evaluate operating below the rule curve when the basin has a potential high inflow volume.

ODFW Comment: Operation of Lost Creek Lake significantly reduced the intensity of peak flows during the incubation period of CHS eggs and sac-fry. Consequently, this operation strategy increased the survival rates of CHS progeny and helped somewhat to counter the deleterious impacts of increased water temperatures during late autumn and early winter. ODFW supports the future action proposed by the USACE.

Action 1.2 Request that Lost Creek Lake be managed to release the coldest water possible during egg and sac-fry incubation.

USACE Progress to Date: The USACE will continue to implement water temperature recommendations developed jointly by ODFW and Oregon Department of Water Quality (ODEQ). The USACE requests that ODFW and ODEQ continue to develop common temperature requirements due to development of Rogue River Total Maximum Daily Load (TMDL) for temperature.

Future Actions: The seasonal temperature management of water released from Lost Creek Reservoir involves the allocation of a limited supply of cold water. The USACE proposes to continue to develop monitoring and modeling capabilities to allow for the judicious management of thermal resources during egg and sac-fry incubation.

ODFW Comment: Operation of Lost Creek Lake met, when possible, recommendations for release temperatures submitted by ODFW and ODEQ. Both state agencies will continue to submit recommendations for reservoir release temperatures, and ODFW supports the future actions proposed by the USACE.

Action 1.3 Request development of USACE simulation models for water temperature in order to determine release strategies that result in optimal strategies for reservoir management under a variety of water years.

USACE Progress to Date: The USACE has developed a two dimensional hydrodynamic and water quality model (CE-QUAL-W2 model) of Lost Creek Reservoir. Preliminary model results have been generated for years of low, average, and high water yield under alternative management strategies. Portland District staff has been trained to run the CE-QUAL-W2 model and will be able to provide findings to ODFW and ODEQ in the future. These finding will be used to support temperature management activities at Lost Creek and Applegate Dams.

The USACE has conducted temperature modeling of the Applegate Reservoir and River using the WESTEX and Heat Source models. Reservoir operations for various release temperature goals were simulated, but the results were in question.

A technical team of ODFW, ODEQ, and USACE staff was convened in October 2008 to guide development of simulations for Rogue River water temperatures under varied strategies of reservoir management.

Future Actions: By February 2010, the USACE proposes to reconvene the technical team to guide development of simulations. After the meeting, the USACE will develop staffing and budget requirements and begin to request funding to complete the work.

This Lost Creek Model will be expanded to include the Rogue River from the dam to the confluence with the Applegate River and a CE-QUAL-W2 model of Applegate Reservoir is in the process of being developed. As part of this effort, the USGS is taking cross sections of the lower Rogue River to characterize critical river features. This action is

planned for September 22-28, 2009. Gravel studies conducted in the Rogue may also overlap with this work.

ODFW Comment: ODFW supports the future actions proposed by the USACE and will participate as a member of the multi-agency technical team. Resultant modeling products are needed in order to determine the efficacy of actions designed to further reduce outflow temperatures during the incubation period of CHS eggs and sac-fry.

Action 1.4 Request implementation of procedures designed to minimize the potential dewatering of juveniles in areas downstream of Lost Creek Lake.

USACE Progress to Date: The USACE routinely operates this way whenever possible through implementation of the more restrictive ramp rates and delaying refill when possible to provide additional storage to attenuate peak flows. During the annual after action and flood exercise meeting last year, the USACE had a discussion with ODFW regarding these operations.

Future Actions: The USACE plans to continue to operate this way through implementation of the more restrictive ramp rates provided by ODFW. Ramp down will take place at slower rates when possible. With the knowledge that each flood event is different, the start and end of flood operations needs to be clearly defined. Risk analysis and modeling will need to be completed prior to adding operational strategies to the Water Control Manual. The USACE plans to continue to evaluate the more restrictive ramp rates provided by ODFW.

ODFW Comment: Reservoir releases were managed so that daily decreases in outflow did not exceed 20%. This operational strategy decreased the incidence of dewatering and stranding of juvenile CHS in downstream areas. ODFW supports the future actions proposed by the USACE and will continue to provide timely technical support to help with post-flood decisions related to ramping rates. ODFW also supports the future actions proposed by the USACE under Action 1.1 as implementation of the results will help decrease the incidence of dewatering and stranding of juvenile CHS during snow-melt events that can occur when the reservoir is near full volume.

Action 1.5 Request that Lost Creek Lake be managed to ensure minimal flow augmentation during the spawning period.

USACE Progress to Date: The USACE routinely operates this way through implementation of the annual conservation plan in coordination with ODFW, OWRD, and the Rogue Basin Water Management Advisory Group.

Future Actions: The USACE plans to continue to operate this way through implementation of the State recommended releases for the conservation season and through development of the annual conservation plan in coordination with ODFW, OWRD and the Rogue Basin Water Management Advisory Group.

If we have to operate above the rule curve to meet this request on a recurring basis, a revision to the Water Control Manual will be required. July appears to be the best month

to release surplus water in order to have the reservoir drawn down to minimum flood control pool elevation by November thereby negating the need for a deviation.

ODFW Comment: Reservoir releases were managed so that there was minimal augmentation of flow in the Rogue River during the period of CHS spawning. This operational strategy reduces the chance that CHS redds can be dewatered during subsequent filling of the reservoir. ODFW supports the future actions proposed by the USACE and believes that continued implementation of adaptive management will usually negate the possibility that the reservoir will need to be operated significantly above the rule curve during the early portion of the flood control season.

Action 1.6 Request that Lost Creek Lake be managed to minimize passage of fall Chinook salmon (CHF) upstream of Gold Ray Dam.

USACE Progress to Date: The USACE routinely operates this way through implementation of the annual conservation plan in coordination with ODFW, OWRD and the Rogue Basin Water Management Advisory Group.

Future Actions: The USACE plans to continue to operate this way through implementation of the State recommended releases for conservation season and through development of the annual conservation plan in coordination with ODFW, OWRD, and the Rogue Basin Water Management Advisory Group. The USACE would also like to see further emphasis from ODFW to restrict fall Chinook passage by reducing flows during July and August. This may also benefit egg incubation temperatures for spring Chinook salmon.

ODFW Comment: Reservoir releases were managed to discourage the upstream passage of CHF into spawning areas historically used by CHS, when it was possible to do so. During the early portion of CHF migration, flow augmentation is needed to minimize the chance of disease outbreaks among CHF in downstream areas. During the latter portion of CHF migration, less flow augmentation is needed to minimize the chance of disease outbreaks. ODFW supports the future actions proposed by the USACE, but believes that a primary fishery priority is to ensure minimal risk of major disease outbreaks among CHF migrating in downstream areas.

Action 1.7 Request that Lost Creek Lake be managed to minimize potential for disease outbreaks in areas downstream of Lost Creek Lake.

USACE Progress to Date: The USACE routinely operates this way through implementation of the annual conservation plan in coordination with ODFW, OWRD and the Rogue Basin Water Management Advisory Group.

Future Actions: The USACE plans to continue to operate this way through implementation of the State recommended releases for conservation season and through development of the annual conservation plan in coordination with ODFW, OWRD, and the Rogue Basin Water Management Advisory Group. The USACE has been working on development of a CE-QUAL-W2 model that should help clarify the impacts of the dam on temperatures downstream at the Rogue River at Agness. To date, the CE-QUAL-W2

model of the Rogue does not include Agness. See Action 1.3 for update on the temperature modeling.

ODFW Comment: Reservoir releases were managed so that there was minimal disease related losses of CHS during their upstream migration. ODFW supports the future actions proposed by the USACE because the resultant findings may increase the efficacy of use for reservoir storage allocated to fishery enhancement purposes in downstream areas.

Action 1.8 Request USACE restoration and maintenance of naturally produced spring Chinook salmon spawning habitat in the area between Lost Creek and Shady Cove.

USACE Progress to Date: In October 2006, USACE fisheries biologists floated the Rogue River from RM 156 (barrier dam) to RM 138 (Dodge Bridge) to map and quantify spawning gravel for spring Chinook salmon. USACE is in the process of analyzing the data and will share findings with ODFW. In November 2003, USACE prepared a draft Preliminary Restoration Plan under Section 1135. The plan proposes aquatic habitat restoration measures to restore more natural habitat conditions to the Rogue River, downstream of the dam, through placement of large woody debris, gravel nourishment and/or modification of dam operations. ODFW agreed to become the local sponsor for this project; however, no action has been taken since 2004 to advance the project and it is considered inactive. The USACE is not permitting any "new starts" at this time and this would be considered a "new start".

Future Actions: USACE fisheries biologists are preparing a draft report of findings and will share with ODFW when available. The draft report has been prepared and USACE biologists are adding information on survey work performed in 2007 as well as historical context. A final draft of this report will be available after March 2010.

ODFW Comment: ODFW was unable to identify any funding source that could have supported the 2004 Preliminary Restoration Plan. ODFW supports the future actions proposed by the USACE because the resultant findings may identify the quantity and quality of gravel the no longer recruits into the area downstream of Lost Creek reservoir. ODFW believes this knowledge will greatly aid the development of a new plan for the restoration and maintenance of CHS spawning habitat.

Action 1.9 Develop recommendations for reservoir release strategies on a seasonal and annual basis, and submit those recommendations to the USACE through the Oregon Department of Water Resources.

USACE Progress to Date: The USACE appreciates ODFW recommendations for reservoir releases. No USACE action needed.

Future Actions: No USACE action needed.

ODFW Comment: ODFW appreciates the opportunity to submit recommendations for reservoir operations to the USACE and will continue to do so in a timely manner. ODFW also greatly appreciates technical input seasonally developed and provided by

USACE regulation staff. Without such input, ODFW would be unable to devise effective recommendations designed to maintain and enhance fishery resources in areas downstream of Lost Creek Lake.

Action 1.10 Request an update of the water control manual for Lost Creek Lake, and support USACE efforts to incorporate those revisions designed to protect and enhance fishery resources in downstream areas.

USACE Progress to Date: The USACE began an effort to update the water control manual in 2004. The document has been reviewed internally; however, some issues remain unresolved. USACE expected the manual to be updated in two phases. Phase one included the update to the manual and the Environmental Impact Statement (EIS). Phase two included the temperature modeling of the reservoir and river downstream of Lost Creek Dam. Currently no funding exists to complete the remaining portion of phase one or phase two; however, the update has been identified as an unfunded requirement and has been submitted for funding in the normal budgeting process.

Future Actions: The USACE has identified changes that may be made to the water control manual without the NEPA process. The USACE plans to incorporate these changes into the water control manual by September 2010; however, more involved changes will still require additional funding.

ODFW Comment: ODFW supports the future actions proposed by the USACE and will provide technical support if requested to do so.

Action 1.11 Request that USACE employees, who work on reservoir management issues for Lost Creek Lake, be oriented on relevant fishery issues.

USACE Progress to Date: The USACE has been developing "fisheries issues" briefing documents in cooperation with ODFW to identify potential operations of Rogue Basin dams that enhance fisheries benefits to the greatest extent possible. Briefings are developed as issues arise from changes in season, precipitation patterns, and life history changes of fish and as needed. Briefings are distributed to USACE staff. USACE fisheries biologist prepared a "Rogue Fisheries 101" presentation focusing on Rogue Basin fisheries issues with the intent to inform existing team members and new team members within one month of entering on duty. ODFW provides a fisheries briefing at the annual after action meeting / flood exercise held at Lost Creek in the fall.

Future Actions: The USACE plans to continue to request a briefing from ODFW in the fall and plans to continue producing "fisheries issues" document for distribution. USACE and ODFW biologists are working jointly on a "Fisheries 101" document. It is currently in outline form, but will be completed as time allows. USACE requests that this document be completed by September 2010.

ODFW Comment: ODFW supports current training efforts developed by the USACE and also supports the future actions proposed by the USACE.