



DATE: November 4, 2009

TO: Chair Sheffels, Members of the Planning Commission

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SUBJECT: Shoreline Master Program (SMP) Update—Bellevue File # 07-122342 AC

INTRODUCTION

At the November 4th meeting of the Planning Commission, David St. John and Hans Berg of King County Department of Natural Resources and Parks will present a brief overview of issues surrounding late-run Kokanee. They will discuss factors potentially impacting fish populations in Lake Sammamish and provide information about actions to restore and preserve the species.

This study session is the fourth in a series of science and technical presentations aimed at providing the Commission and the public with background information on key issues relevant to the Update process. Attached is an executive summary from the Lake Sammamish Late Run Kokanee Synthesis Report. Additional information related to the topic will be available on the City's web page prior to the meeting.

David St. John is the chair and coordinator of the Lake Sammamish Kokanee Work Group, the intergovernmental and multi-stakeholder group that has been charged with creating and implementing a strategy to recover this population of Kokanee. He is a Government Relations Administrator in the Director's Office of the King County Department of Natural Resources and Parks. His work there has focused on developing and implementing collaborative regional solutions to salmon recovery problems and on the protection and recovery of Puget Sound. He has worked on Kokanee conservation issues for King County for a decade.

Hans Berge is an Environmental Scientist in the Water and Land Resources Division of the King County Department of Natural Resources and Parks. He has earned a B.S. degree from Utah State University in Fisheries and Wildlife and an M.S. Degree from the University of Washington's School of Fisheries and Aquatic Sciences. Hans is a technical expert on our local Kokanee population, having recently completed his UW master thesis "Effects of a Temperature-Oxygen Squeeze on Distribution, Feeding, Growth and Survival of Kokanee in Lake Sammamish, Washington" and leading a current tagging study that is providing ground-breaking data on how Kokanee and their prey and predators are using Lake Sammamish. Hans provides

scientific support to the Lake Sammamish Kokanee Work Group and is a member of the Kokanee Technical Committee.

NEXT STEPS

At the November 18 study session, Roger Tabor from the U.S. Fish and Wildlife Service will present information about his findings on the ecology of freshwater fish in Lake Washington and Lake Sammamish. Recent projects include movement patterns of Chinook salmon smolts, smallmouth bass, and northern pikeminnow; nearshore habitat use of juvenile Chinook salmon in lakes; predation of juvenile sockeye salmon and Chinook salmon by predatory fishes; and distribution, habitat use, and diet of freshwater sculpins. He will be joined on this program by Jose Carrasquero and Jeff Parsons from Herrera Environmental Consulting. They will discuss their work on the impacts of shoreline armoring.

Lake Sammamish Late Run Kokanee Synthesis Report

Submitted to:

King County
City of Issaquah
City of Bellevue
City of Sammamish
City of Redmond
and
U.S. Fish and Wildlife Service

Submitted by:

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Executive Summary

The authors of this document seek to identify factors that are potentially impacting the late-run kokanee populations in Lake Sammamish, so that local jurisdictions, agencies, tribes, non-profits and citizens can identify and take action to restore and preserve the species. While the data describing the abundance of spawning kokanee now spans a decade and provides a relatively sound picture of at least recent population size, the information and data currently available concerning the potential causes for the population's decline are extremely limited. This circumstance calls for significant caution in drawing definitive conclusions about causes for decline and their cures. It indicates the need for recovery strategies and actions that incorporate a precautionary approach and prioritized data collection activities that will greatly improve the scientific basis for action.

This analysis focuses on the late run kokanee. Of the three historic kokanee runs in the Lake Washington/Sammamish watershed, the late run provides the greatest certainty of native origin and current presence. The early run, which inhabited Issaquah Creek, is believed to be extinct. The middle run, which may have inhabited several streams from Lake Sammamish downstream into Lake Washington, presents a relatively uncertain picture of native origin and current presence. The current status of and limiting factors for middle run kokanee in the Lake Washington watershed need a more thorough assessment, from basic data collection to analyses and conclusions, than this document was intended to provide.

Analysis of existing stream flow data weakly implicates high fall/winter flows and lower spring flows as dominant limiting factors. High flows may act to scour redds reducing egg survival, while lower flows may reduce the survival of fry during the stream to lake migration. As a result, the actions taken to protect and restore stream habitat functions are beneficial to kokanee and should continue.

Adult escapement data for the remaining three late-run spawning aggregations indicate generally uniform trends among populations suggesting that factors limiting the population size likely occur when the populations are co-mingled in the lake. The lake environment may be unfavorable for kokanee survival in the summer period due to low dissolved oxygen in the lower depths and high water temperatures near the surface. Kokanee appear to avoid the upper and lower portions of the lake which may limit access to food or increase predation. Food (zooplankton) does not appear to be limiting and in fact kokanee appear to grow faster in Lake Sammamish than in many other lakes of the Pacific Northwest. The fast growth appears to be due to the bountiful supply of *Daphnia* and the availability and consumption of Mysids by kokanee, and may be confounded by low densities of kokanee in Lake Sammamish. Predation by cutthroat trout and other predators may be the most significant factor limiting population, particularly during the summer period when temperature and dissolved oxygen constraints may restrict kokanee into a narrow band within the lake facilitating overlap with pelagic piscivores, such as cutthroat trout.

To address the recent precipitous decline of Lake Sammamish late-run kokanee, we recommend that the Washington Department of Fish and Wildlife implement an emergency supplementation program in the fall of 2008; governments, NGOs and citizens continue with habitat protection and restoration actions; and appropriate entities implement a robust monitoring plan capable of evaluating the benefits of habitat and supplementation actions. Necessary monitoring includes the collection of information to understand the population structure, dynamics and factors playing a primary role in limiting population success.

To be most useful in informing future management decisions, the monitoring program should generate information addressing the following:

- An understanding of age class structure and growth rates for fish in the lake and of returning adults.
- Escapement and egg-to-fry survival at each spawning area, including beach spawning.
- Predation rates of cutthroat and quantification of the impacts to the kokanee population at each life stage.
- Environmental variables including stream flow, bed scour, zooplankton abundance and the physical environment of the lake and correlate with fry, juvenile, subadult and adult kokanee.

An integrated supplementation, habitat restoration and research plan should be created and agreed to prior to implementation, to ensure the supplementation, habitat and research actions are complementary and have the greatest opportunity to 1) further clarify factors limiting the kokanee population and 2) determine which of the factors are the most important obstacle to recovering the population.