

Chester Morse Lake Bioenergetics (Food Web Dynamics) Model Project Description

PROJECT BACKGROUND

This agreement defines an investigation of the bioenergetic (food web dynamics) of the Chester Morse Lake/Masonry Pool reservoir complex. The text below describes the project background for this work.

Adfluvial bull trout, rainbow trout, pygmy whitefish and shorthead sculpin are the four fish species residing in the reservoir complex upstream of the Masonry Dam. These species are sympatric in the reservoir and streams associated with the reservoir complex. In order to better understand the ecology of these species and the potential impacts of water supply operation decisions on their populations, a model explaining the relationships between a wide range of environmental parameters (including reservoir operation), available habitat, and the behavior of these species is needed.

Bull trout are listed as threatened under the Endanger Species Act, and are protected in the Cedar River Municipal Watershed (CRMW) under the Cedar River Watershed Habitat Conservation Plan (CRW-HCP 2000). Previous studies in the early 1990s in the reservoir complex estimated the bull trout population at 3,123 individuals and determined that a major food source for this species in Chester Morse Lake is pygmy whitefish.

Little information exists for pygmy whitefish in the Pacific Northwest. The species is relatively rare and is currently found in 5 of the 9 lakes it historically occupied in Washington State. An ongoing acoustic telemetry study in Chester Morse Lake has begun to provide important information on areas in the reservoir complex used by pygmy whitefish throughout the year. This study will further investigate life history of pygmy whitefish and define their ecological relationship within the reservoir complex.

This modeling effort will ultimately provide a method to quantify the food web dynamics in Chester Morse Lake and determine the relative importance of different factors in limiting survival and production of adfluvial pygmy whitefish, bull trout, and rainbow trout during lake residence (i.e., predation mortality, food supply, competition, temperature regime) through a synthesis of existing data and literature from the basin, processing of existing samples, additional directed sampling as needed, and simulations with bioenergetics models. It is important to define these relationships prior to installation/operation of the planned, land-based pumping station in the reservoir complex to better understand potential impacts to the fish community.

This project was also recommended by the HCP Oversight Committee as one element in meeting financial and project commitments under the HCP agreement with the U.S. fish and Wildlife Service.