

**Department of Natural Resource Sciences  
Washington State University**

**A Report to the Colville Confederated Tribes**

**PREY SELECTIVITY AND POPULATION DYNAMICS OF A  
LENTIC FISH COMMUNITY, TWIN LAKES, WASHINGTON**

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A Report to:  
Department of Fish and Wildlife  
Colville Confederated Tribes  
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# Prey Selectivity and Population Dynamics of a Lentic Fish Community, Twin Lakes, Washington

## Abstract

*The establishment of non-native species, largemouth bass (Micropterus salmoides L.) and golden shiners (Notemigonus crysoleucus M.) in Twin Lakes, Washington is of concern for potential negative impacts on resident trout populations. Bass were first documented in Twin Lakes in the 1980's and shiners were confirmed there during the early 1990's. Since then, golden shiners have become a particular problem, as they compete with trout for food resources and, unlike bass, are not a game fish.*

*Other problems related to eutrophication, such as dense weed beds are also believed to impact Twin Lakes fisheries. A floating-leaved macrophyte, watershield covers about 6% (58 acres) of the summer North Twin surface area and about 2% (19 acres) in South Twin Lake. Because these plants grow in the littoral area, crucial to fish spawning and feeding, the varying coverage between the lakes may affect fish interactions, including bass piscivory.*

*The goal of this study was to develop information on water quality and trophic interactions within the Twin Lakes fish communities to guide fishery management decisions. In particular, data were developed to examine specific management options, including macrophyte reduction and whether bass slot-limits could enhance bass predation on shiners. Increased predation could serve as an indirect control mechanism for shiners, preventing further population growth.*

*Seasonal trophic interactions within the Twin Lakes fish community were examined by monthly sampling from June to September in 2004 and 2005. Length/weight measurements were made and stomach contents were taken by gastric lavage on electrofish- and gillnet- captured individuals. Fish diets were characterized by identification of stomach contents. Population estimates were calculated from mark-recapture data using the Schnabel multiple-census method. Length class histograms were constructed for each species to assess population size distribution. Growth and condition factors were also calculated and compared to regional and national averages. Basic water quality data, including dissolved oxygen and temperature profiles were determined on the same dates. Available trout habitat volume for each lake was calculated from this data.*

*There was significant variation in diets of different age fish as the season progressed. Large bass primarily consumed crawfish, golden shiners, and other fish. Diets of medium bass consisted principally of macroinvertebrates and golden shiners; while small bass diets were feeding on macroinvertebrates and a few golden shiners. The smallest bass consumed only zooplankton and macroinvertebrates. Brook and rainbow trout consumed primarily midges, scuds, and zooplankton.*

*High relative weight ( $W_r$ ) condition factors and growth rates indicate that current Twin Lake trout populations are generally healthy. However, combined effects of eutrophication and invasive species could have a detrimental impact on Twin Lake salmonids in the near future. Our results indicate that measures to increase bass survival that would shift the population histogram to larger sizes would likely increase predation*

*pressure on shiners. Also, reducing macrophyte densities could also increase predation on shiners by reducing available shelter and by opening lanes for ambush feeding. Implementation to achieve these goals could include fishing slot limits for take of larger bass and varying schemes for mechanical macrophyte harvesting.*

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