
A CONCEPTUAL MODEL FOR PREDICTING AREAS WITH HIGH POTENTIAL FOR LAKE TROUT SPAWNING HABITAT IN YELLOWSTONE LAKE

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The presence of non-native lake trout (*Salvelinus namaycush*) has become a serious threat to native salmonid populations in many lakes throughout the West. Costly and time consuming suppression efforts have been undertaken by agencies in several of these systems with concern regarding their efficacy expressed by fisheries managers. Frequently, mature lake trout are interspersed with the native fishes, hindering removal efforts because of bycatch of fishes meant to be the beneficiary of suppression efforts. One method of improving suppression efforts that could reduce negative impacts on other species is to target areas where sexually mature lake trout congregate for spawning activities. Using theory that water movements within lakes influence habitat formation, parameters describing lake trout spawning habitat in published literature, and the capability of a GIS to mesh spatially-explicit geographical datasets, a conceptual lake trout spawning habitat model was developed for Yellowstone Lake. Important inputs to this model include detailed bathymetry of Yellowstone Lake, a sedimentation model that predicts erosion and deposition of particles within lake systems, and data on primary wind direction over the lake. The model predicts that 4.4 percent of the surface area of Yellowstone Lake has excellent potential, 8.9 percent has some potential, and 86.7 percent has no potential to contain lake trout spawning habitat. Additional data layers can be easily incorporated as new information becomes available on lake trout requirements for successful spawning. This model can be used to identify suitable spawning areas for monitoring and control, and has potential to be applied on other lakes experiencing lake trout invasion.