Resident Lake Fish

Vital Signs Monitoring- Southwest Alaska Network

Fisheries technicians tend a gill net during resident lake fish protocol testing in Lake Clark, 2006.

Importance / Issues

Resident lake fish serve an important ecological role in SWAN parks. They represent a variety of trophic levels (omnivores, insectivores, planktivores, and piscivores) and hence reflect changes that occur in the food chain. Non-anadromous fish also provide a measure of environmental contaminants in aquatic systems. In addition, resident lake fish are relatively easy to sample and use variable habitats so they are well suited to serve as environmental indicators.

Resident fish play important recreational, economic, and subsistence roles as well. Several species, such as rainbow trout (*Oncorhynchus mykiss*), lake trout (*Salvelinus namaycush*), and Arctic grayling (*Thymallus arcticus*), provide excellent recreational opportunities to local, in-state, and out-of-state anglers, which may inject significant sources of income to local and state economies. Whitefish (*Coregonus spp.*, *Prosopium spp.*) and northern pike (*Esox lucius*) are important subsistence species for local native Alaskans.

Objectives

- Monitor presence of key recreational, subsistence, and other native species of resident fish annually within high priority lakes.
- Monitor potential influx of non-native fish species within high-priority lakes in KATM and LACL.

Current and Future Monitoring

Protocol testing of capture methods (minnow trap, gill net and beach seine) for sampling resident lake fish occurred in Lake Clark and Kijik Lake (Lake Clark National Park & Preserve) in 2005, and in Lake Clark in 2006. Further efforts will occur in Katmai National Park and Preserve in 2007. In 2005, field crews captured 275 adult resident lake fish comprising eleven species (ten species in Lake Clark), and 120 adult resident lake fish of nine species in 2006. Surface gill nets and beach seines were the most effective methods for capturing resident fish, accounting for 97% of the captures in 2005 (43% and 54%, respectively). In 2006, when minnow traps were not used, seines were the most effective gear, capturing 78.3 % of the adult catch, and 88% of the species. No additional species were caught after two seine hauls at the same sample site.

Gill net mortality rate was 39% in 2005, raising concerns about the potential long-term impacts of this method in these low productivity lakes. Efforts in 2006 focused on (1) assessing sampling efficiency of sinking Swedish gill nets versus floating gill nets and (2) constant surveillance of gill nets to estimate minimum set times for maximizing catch while minimizing mortality. No fish mortality occurred with surface gill nets (30 adults caught; 25%), which captured 56% (5/9) of the total resident lake fish species sampled. Sinking gill nets were far less effective, with a mere 3% (4/120) of the adult catch and 22% (2/9) of the species sampled. Fish caught with Swedish gill nets in deepwater locations also experienced a 50% (2/4) mortality rate, but were the only gear in 2006 to capture least cisco (*Coregonus sardinella).* Two years of protocol testing have shown gill nets and beach seines to be the most effective sampling gear in Lake Clark. It has also revealed habitat differences for some species and reiterated the difficulty in capturing uncommon species or habitat specialists without focused sampling. The final protocol will address these issues.

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