Mountain Lakes Restoration

PARK RESOURCE BRIEF - North Cascades National Park

National Park Service
U.S. Department of the Interior

North Coast and Cascades
Research Learning Network

IMPORTANCE

North Cascades National Park Complex contains a unique and diverse array of 561 mountain lakes and ponds. These isolated lakes, situated between 1,350 feet and almost 7,000 feet in elevation, are sensitive indicators of environmental changes.

As a general rule, lakes higher in elevation have lower temperatures, lower nutrient levels, and a decreased ability to buffer acid deposition – thus, pushing the limits of survival for organisms living in mountain lakes.

The mountain lakes in the North Cascades are naturally fishless due to barriers such as steep and rugged nature of the glacially carved valleys and abundant waterfalls. Though lacking in fish, the lakes are far from barren of aquatic life. When the glaciers receded following the last ice-age (approximately 11,000 years ago), a wide variety of aquatic organisms gradually colonized the mountain lakes including plankton, invertebrates, and amphibians. In the absence of fish, these lakes developed unique ecosystems where frogs and salamanders have become keystone predators bridging terrestrial and aquatic habitats.

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Park scientists using a gill net to study non-native fish in Lower Berdeen Lake.

STATUS

North Cascades National Park Complex currently has 62 lakes containing introduced fish. Research conducted here and other parks has demonstrated that introduced fish have a negative impact on the amphibians, insects (such as caddisflies) and zooplankton, which all need these lakes to survive. Reproducing fish populations in naturally fishless lakes tend to over-populate these systems, causing the fish to outstrip their food resources. Not only does this reduce the abundance of many of the native species like the long-toed salamander, it also leads to unhealthy and poor-quality fish.

In particular, the introduction of Eastern brook trout into the heart of the North Cascades is now pressuring a prime refuge for the threatened bull trout. In the past, people thought they were improving the natural environment by stocking non-native species of fish. But, instead, the result has been negative impacts to the ecosystem and unhealthy and non-recreationally-rewarding fisheries.

DISCUSSION

Of the lakes that contain introduced fish, 27 contain high-density reproducing populations. Research conducted in North Cascades National Park Complex has demonstrated that these populations of fish are the most damaging to native ecosystems. Mountain lakes with high-density reproducing fish populations are priorities for active restoration: recovering native biological communities and natural food webs as well as the protecting bull trout populations.

The restoration of 26 of these mountain lakes will occur through the simple act of discontinuing fish stocking. Not only is this a cost-effective and efficient means of recovering the natural biological communities, it will also allow anglers to continue to fish these lakes for several years until all of the fish are caught or die of natural causes.

North Cascades National Park Complex staff are currently testing methods to actively restore nine lakes that contain high density reproducing fish populations. The goal of these efforts is to develop restoration methods which will enable the recovery of native ecosystems while minimizing the impact to non-target organisms. Spawning habitat exclusion is being tested in one lake, targeted gill netting is being used to remove fish from six lakes, and antimycin is being used in two lakes to restore native ecosystems and protect federally threatened bull trout.

The North Coast & Cascades Network