

Fish and Other Aquatic Resources

A key part of the Yellowstone ecosystem is the 12 species of native fish and many other aquatic plants and animals found in the park's rivers and lakes. For example, the Yellowstone cutthroat trout provides food for at least 42 species of animals, including bald eagles, white pelicans, ospreys, loons, otters, and bears.

As a result of the park's location atop a volcanic plateau, where waterfalls and cataracts deterred upstream migration, many waters were without fish when it was established. Because it was originally thought that Yellowstone should accommodate the growing popularity of sport-fishing, for decades park waters were stocked with both native and non-native fish. However, biologists now recognize many problems created by stocking non-native species. This interference changed the ecology of many Yellowstone waters, especially as non-native fish displaced or interbred with native species, diluting their genetic makeup. Fish stocking also affected the quality of the fishing experience, because the abundance of fish attracted so many anglers that, even with continual restocking, the annual trout harvest could not be sustained. The Yellowstone cutthroat trout is easy for anglers to catch, a fact that nearly led to its demise. By the 1960s, Yellowstone's fish populations were in poor condition and the angling experience had declined, prompting a major change in fisheries management.

Although angling remains an exception to the "take nothing but photographs" rule that generally applies in national parks, by the late 1980s Yellowstone's native trout had recovered under angling restrictions that still provide opportunities for visitors to catch wild fish in a natural setting, but discourage the killing of fish. Despite changes that have taken place in the composition and distribution of aquatic species, park policies have prevented or reduced the kind of habitat degradation that has occurred elsewhere from water pollution, dam construction, mineral extraction, silting from deforestation, major water diversion for irrigation, and livestock grazing.

As a result, Yellowstone has one of the most significant near-pristine aquatic systems in the United States. Nonetheless, the fluvial Arctic grayling, the upper Missouri morph of westslope cutthroat and the Snake River finespotted cutthroat have nearly become extinct, and the illegal introduction of non-native lake trout into Yellowstone Lake created a new threat to the Yellowstone cutthroat trout. Total ecosystem restoration would mean that waters like Lewis and Shoshone lakes would be returned to their fishless state, but there is no feasible way to extirpate non-native fish without seriously damaging native resources. Although many Yellowstone waters were consistently stocked throughout the first half of this century, they now contain valuable gene pools of both native and introduced species. In recent cooperative programs with Wyoming and Montana, cutthroat brood stock were collected to restore the species to lakes and streams outside the park.

Whirling disease, which has been linked to an apparent decline in rainbow trout in nearby Montana waters, was found in Yellowstone Lake cutthroat trout in late 1998, posing yet another threat to an already imperiled population. The uninvited and rapidly proliferating New Zealand mud snail, recently found in the Firehole, Madison, and Gardner Rivers, may directly affect aquatic invertebrates, thus disturbing fish populations and the natural functioning of the ecosystem. Biologists remain alert for other non-native aquatic invaders such as zebra mussels that are present outside the park.

For many years, management of the park's fisheries was based on research and monitoring done by a resident unit of the U.S. Fish and Wildlife Service (USFWS) that contributed \$188,000 and up to five biologists to the park's program as recently as 1993. Since a shift in USFWS priorities led them to close the Yellowstone office in 1996, taking their staff and funding elsewhere, fisheries work has had to be handled by two biologists hired by the park. During 1996 and 1997, a retired biologist served as a volunteer aquatic resources program leader; the position remained vacant throughout 1999.



Yellowstone Fishes

	Native Species	Introduced Species
Sport Fish	<ul style="list-style-type: none"> • Cutthroat trout (3 races): Yellowstone, westslope and Snake River finespotted 	<ul style="list-style-type: none"> • Brook trout
	<ul style="list-style-type: none"> • Arctic grayling 	<ul style="list-style-type: none"> • Brown trout
	<ul style="list-style-type: none"> • Mountain whitefish 	<ul style="list-style-type: none"> • Lake trout
		<ul style="list-style-type: none"> • Rainbow trout
Other Fish	<ul style="list-style-type: none"> • Minnows: longnose dace, speckled dace, redbside shiner, Utah chub, and redbside shiner/speckled dace hybrid 	<ul style="list-style-type: none"> • Lake chub
	<ul style="list-style-type: none"> • Suckers: longnose, mountain, and Utah suckers 	
	<ul style="list-style-type: none"> • Mottled sculpin 	





FISH WATCHING

Fishing has been prohibited from Fishing Bridge since 1973 to protect native cutthroat trout. Today people equipped only with cameras can be found at the bridge just *looking* at fish and other aquatic resources. After the crumbling ice sheets from Yellowstone Lake move into the river and grind along under the bridge in late spring, visitors can witness the primordial drama of the spawning run, as millions of trout eggs are laid in gravel within sight of the bridge. Longnose suckers also spawn in this area in June and July. A great concentration of wildlife occurs for almost two months, as the fish attract pelicans, gulls, and mergansers, as well as an occasional bald eagle, osprey, or bear. A 1994 study estimated that 67,000 observers at Fishing Bridge watched hundreds of trout feed and mate in the water below, and about 176,400 people stopped to see the cutthroat jump LeHardy Rapids downstream on the Yellowstone River.

PROGRAM SUCCESSES

Recovering fish populations. The restrictions on fishing gear and on the number and size of fish taken have helped restore native fish populations since the 1970s. Many streams are designated catch-and-release-only for certain species. A few waters have been closed to fishing in order to protect spawning runs or scenic views, or to allow waterfowl and other wildlife to use habitats undisturbed. The resurgence of trout has helped increase some bird and mammal populations that depend on it as a food source. While the angler landing rate has returned to high levels and the proportion of older and larger cutthroat trout in both angler catch and in spawning streams has increased, the number of cutthroat trout removed from Yellowstone Lake is less than one-tenth of what it was 30 years ago.

Recasting the fishing experience. Yellowstone offers some of the finest trout fishing in America, both for the expert with a fly rod and for parents with children on their first fishing trip. Catch-and-release fishing has made it possible for a great many people to catch wild trout, which is one of the most important factors in a satisfying fishing experience. Since catch-and-release fishing was established on the Yellowstone River between Yellowstone Lake and the Grand Canyon in 1973, the percentage of anglers who land at least one trout has almost doubled to 62 percent. Although Yellowstone Lake remains the most popular fishing spot, with about one-third of all angler days spent there, visitors who want to fish now distribute themselves more widely throughout the park. About 59,900 park visitors purchased fishing permits in 1998, and 10,377 children received free permits.

Fishing fees. In 1994, the park began charging \$5 for a 7-day permit and \$10 for a season pass. Although the fees were doubled in 1996, anglers have generally been supportive of the program, especially since the fees directly benefit the park's aquatic resources. During the first three years of the program, the \$1.5 million generated by fishing fees has been used

to provide better information and service to anglers through a larger number of better trained permit issuers, purchase of the first new patrol boat in more than 20 years, increased ranger patrols for enforcement of fishing regulations, and enhanced monitoring of fish populations. Even before fees were charged for angling, the permit system had become valuable in creating a fisheries database by including a form on which anglers are requested to record where they went fishing and what they caught.

Removing lake trout.

Biologists have estimated that predation by lake trout could eventually reduce the Yellowstone Lake cutthroat population to 10 percent of current levels. Although lake trout eradication is not feasible, minimizing their impact is a necessary goal. As the first step toward long-term lake trout control, park staff experimented extensively to determine when and where to set gillnets in order to capture the maximum number of lake trout with a minimum by-catch of cutthroat trout.

In 1998, nearly 8,000 lake trout were captured in the lake, including spawners each capable of consuming up to 50 cutthroat trout per year. The total number of lake trout in Yellowstone Lake, probably in the tens of thousands, consumes an estimated 500,000 cutthroat trout per year. Even at the peak of consumptive fishing in the 1950s, anglers removed fewer than 400,000 cutthroats a year from Yellowstone Lake. Under the two-fish limit, about 21,000 cutthroats are now creel by anglers each year.

Working with the Idaho Department of Fish and Game, Utah State University, and the Biological Resources Division of the U.S. Geological Survey, the park assessed the threat that lake trout pose by testing dual-beam hydroacoustic technology to estimate population sizes for both lake trout and cutthroat trout and to locate concentrations of fish in the lake. Radio telemetry has also been used to locate additional lake trout spawning areas, which were then targeted for control actions.

THE TROUBLE WITH LAKE TROUT



Lake trout, also known as mackinaw, are native to the Great Lakes region. They were deliberately introduced into several lakes early in the park's history, but not until 1994 was their illegal planting confirmed in Yellowstone Lake, long regarded as the most pristine subalpine lake in America. In many places lake trout provide trophy sport fishing. But in Yellowstone Lake they pose a major threat to the native cutthroat trout, which must compete with juvenile lake trout for the same insect and invertebrate food, and are eaten by adult lake trout. Nowhere do lake trout coexist naturally with cutthroat trout, and they have reduced or eliminated native trout in some places, including Heart Lake in Yellowstone and Jackson Lake in Grand Teton National Park. And because they spend most of the year in deep water, lake trout cannot replace the cutthroat trout in the food chain. Unfortunately, potential spawning habitat for lake trout in Yellowstone Lake is extensive.

Program Needs

Yellowstone has been widely acclaimed as a model of progressive fisheries management. To maintain this reputation and to continue to improve the park's role in preserving native fish and habitats, threats to the aquatic ecosystem must be addressed through increased research and management actions. Although the fisheries program has been augmented by donations to the Yellowstone Fisheries Fund from private individuals and from institutions such as Canon U.S.A., Inc., Trout Unlimited, and the Montana Trout Foundation, lack of funds resulted in a termination of stream and lake inventory and monitoring programs in the early 1990s.

- **STRENGTHEN FISHERIES STAFF AND INFRASTRUCTURE.** Funding efforts in recent years have been focussed on restoring staff and funds lost as a result of the USFWS departure and budget shortfalls, and securing equipment, including a fleet of boats and vehicles. Old buildings in the Lake Fish Hatchery Historic District that have been traditionally used by the fisheries project staff are on the verge of collapse. Significant restoration could make these facilities functional for fisheries management operations and return the buildings' historic value.
- **INVENTORY AND MONITOR RESOURCES.** Another primary need is to restore stream and lake inventory and monitoring programs, begun in the 1960s, that are critical for assessing the status of aquatic systems, evaluating the effectiveness of fishery regulations, and estimating the impacts of threats such as the mud snail and whirling disease on the native aquatic environment. Increased monitoring of cutthroat trout spawning runs will be needed to determine the effects of lake trout on the native Yellowstone cutthroat.
- **SPECIES RESTORATION.** Additional funding is needed to return westslope cutthroat trout and fluvial Arctic grayling to selected waters by removing or suppressing non-native fishes and by constructing barriers to prevent their re-entry. The feasibility of restoring Snake River finespotted cutthroat trout should also be determined.
- **COMBAT EXOTIC SPECIES AND DISEASES.** Additional professional staff could help assess and develop mitigation plans for ecologically disruptive exotic species such as the New Zealand mud snail and whirling disease, along with the introduced lake trout.



AQUATIC RESOURCES AND FISHERIES

STEWARDSHIP GOALS



A full complement of aquatic resources biologists oversee programs to monitor and interpret fish populations and other aquatic components as functioning elements of the ecosystem.



Staff manage fisheries using angler licenses, enforcement of fishing regulations, and visitor education.



Native aquatic species and their habitats are preserved and, where necessary, restored; exotic species and their effects on native resources are carefully managed.



Visitors enjoy opportunities to safely observe and fish for wild trout in natural settings.

CURRENT STATE OF RESOURCES/PROGRAMS



A small staff carries out a well-established program of fish and water quality monitoring assisted by outside researchers. Additional positions may be filled when funds are available. Infrastructure and some equipment is in great need of repair.



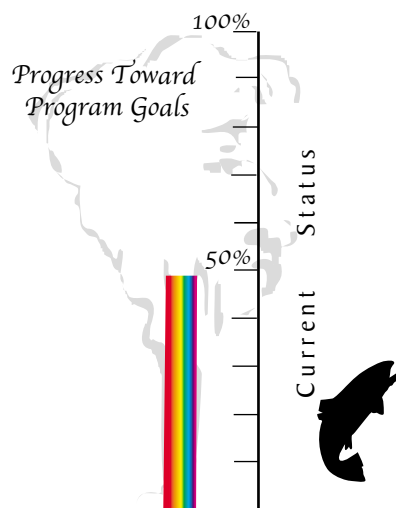
Rangers enforce regulations and interpret aquatic resources; revenue from anglers' fees helps offset the costs of the fisheries program.



Lake trout loom as a major threat to the native Yellowstone cutthroat trout population and their predators; other native fishes also need help, and new non-natives (whirling disease, New Zealand mud snail) are invading.



Sport anglers and wildlife watchers spend significant time and money in appreciation of Yellowstone fish.



1998 FUNDING AND STAFF

Recurring Funds	
Yellowstone N.P. Base Budget	\$ 118,000
Cost Recovery/Special Use Fees	\$ 342,800
Non-Recurring Funds	
One-time Projects	\$ 20,500
Staff	5.7 FTE

The human resources and funding necessary to professionally and effectively manage the park to stewardship levels will be identified in the park business plan.