



RESTORATION OF WESTSLOPE CUTTHROAT TROUT TO SPECIMEN CREEK WATERSHED

The National Park Service (NPS) proposes to restore genetically pure westslope cutthroat trout (*Oncorhynchus clarki lewisi*, WCT) to the Specimen Creek watershed in Yellowstone National Park. The NPS is seeking public comments on issues and alternatives to be analyzed in an environmental assessment (EA) for compliance with the National Environmental Policy Act (NEPA).



Background

Yellowstone National Park supports some of the world's most famous fisheries, and has been a destination for generations of anglers for over a century. However, as park managers have witnessed, and science has clearly demonstrated, non-native species introductions from the late 1880s through the mid-1900s resulted in losses of native cutthroat trout and fluvial arctic grayling.

Westslope cutthroat trout are indigenous to headwaters of the Missouri River in Yellowstone. However, they have substantially declined in the park due to hybridization with non-native rainbow trout and introduced Yellowstone cutthroat trout (YCT). Recent analyses suggest that approximately 1,031 kilometers of stream within the park originally supported genetically pure WCT. They have been extirpated from an estimated 36% of stream and exist in a hybridized form in the remaining 64% of stream. Genetically pure WCT (no detection of introgression with rainbow trout or YCT) have not been found in any Yellowstone stream in recent years.

Throughout its entire range, WCT occupy only 19-27% of historical range in Montana and about 36% of historical range in Idaho. Genetically pure WCT are estimated to exist in only 2-4% of historic stream distributions. East of the Continental Divide, WCT are confined to small headwater streams, and most of these are at risk of extinction.

Purpose and Need

The purpose of the proposed WCT restoration project within Yellowstone is to reverse further loss of genetic integrity and reestablish genetically pure populations to waters within their historical range in the Gallatin River drainage.

The U.S. Fish and Wildlife Service has been petitioned to list this species as threatened under the Endangered Species Act. In addition, the NPS mandates that native species be preserved and restored where possible. Only through active, on-the-ground restoration efforts will the WCT be returned to park waters.

Proposed Action

The proposed action would be a multi-year project involving placement of barriers to prevent upstream movement of non-native/hybridized fish, removal of non-native/hybridized fish, and reintroduction of genetically pure WCT to the Specimen Creek watershed from other source populations within the Gallatin or Madison drainages. Over time, working in a step-wise fashion from watershed headwaters downstream, the park would restore this watershed to native species-only status.

The Specimen Creek watershed is a relatively small, remote, headwater tributary in the upper Missouri River system. At present, the technology does not exist and the NPS has no plans for native species restoration of the Madison River, which supports a world-class fishery for non-native species.

Located in the northwestern corner of the park (see map below), both the North and East forks and the mainstem of Specimen Creek contain WCT that are highly hybridized (20% genetic impurity). The East Fork has several locations well-suited for barriers (beaver dam style) to prevent future invasion into the restoration area by non-native/hybridized fish. Barriers are necessary because the greatest hybridization threat is interaction with non-native species in Specimen Creek and the Gallatin River.



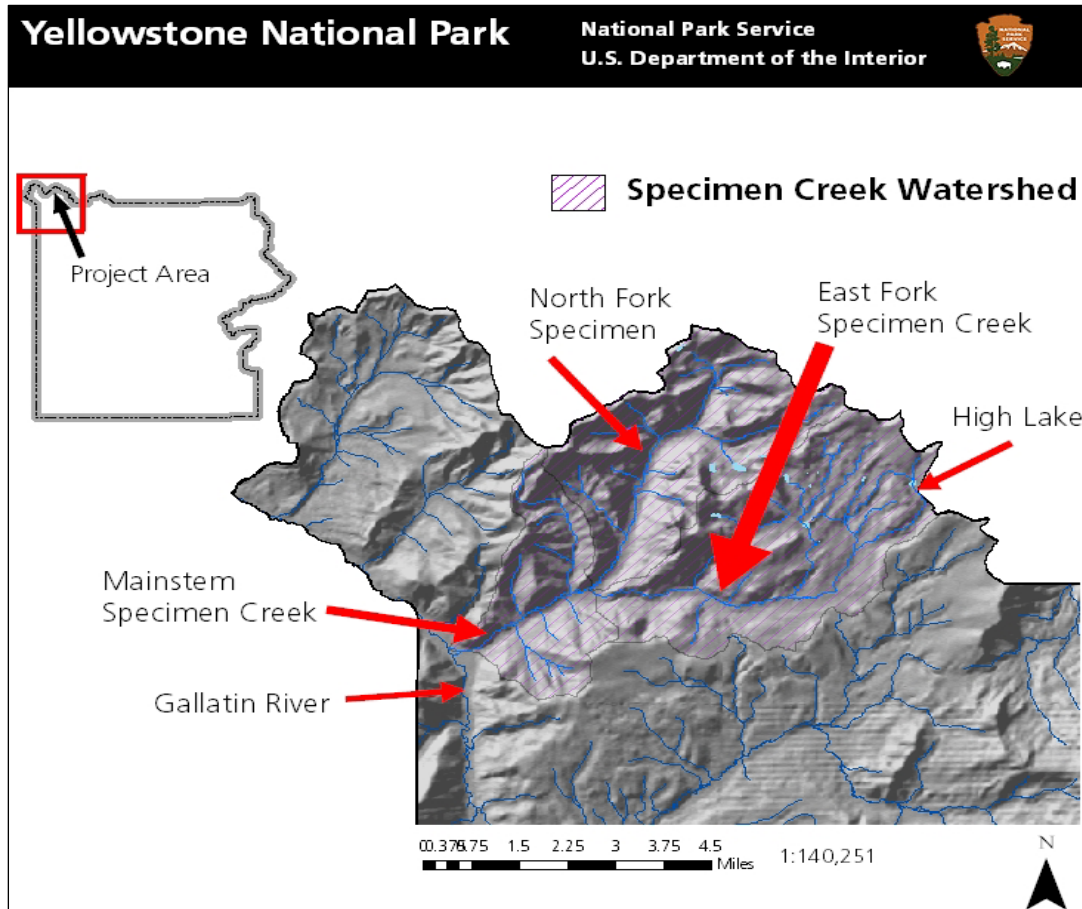
Photo courtesy of Mark Butenica, Crater Lake National Park

The NPS proposes to use approved piscicides (fish toxins) to remove fish because they are the most effective method available. Electrofishing surveys would be necessary post-treatment application to

determine whether a second piscicide treatment is needed. At the downstream end of each restoration reach, typically just below the barrier, the piscicides would be detoxified by adding potassium permanganate (KMnO_4) to the stream. KMnO_4 is a strong oxidizer commonly used in drinking water supplies to oxidize metals, kill bacteria and viruses, and remove unpleasant tastes. The effectiveness of the detoxification is monitored using sentinel fish held in small cages both upstream and downstream of the KMnO_4 station.

Each depopulated stream reach would then be restocked with genetically pure WCT (eggs, fry and/or juveniles) from an upper Missouri River strain brood source.

All headwater lakes of this watershed are fishless except High Lake of the East Fork. A waterfall downstream of High Lake provides a natural barrier to upstream fish movement. Historically fishless, High Lake was stocked with Yellowstone cutthroat trout in 1937. These existing fish could easily migrate downstream and reverse attempts to restore genetically pure WCT there. Therefore, as a part of this watershed restoration, it would be necessary to remove these fish from High Lake.



Alternatives

The NPS will consider alternatives in the EA that result in complete removal of non-native/hybridized cutthroat trout to meet project goals, including the use of approved piscicides. Angling and electroshocking could also be used to aid in some removal prior to application of piscicides. The NPS will also consider whether to restock High Lake, an historically fishless lake, with WCT to ensure successful restoration of downstream reaches. Public scoping may inform the NPS of the need to address additional issues and alternatives.

Potential Issues and Impacts

Potential impacts from construction of fish barriers, fish removal methods, and introduction of WCT will be addressed in the EA. A preliminary list of issues to be analyzed in the EA include effects to health and human safety; air quality; water quality and wetlands; geology and hydrology; aquatic resources including fish; wildlife; threatened and endangered species; and recreation (including angling).

The two piscicides most commonly used in fisheries restoration projects are antimycin and rotenone. Antimycin (brand name Fintrol) is generally considered more effective for treatment of streams while rotenone is used more often in lakes, particularly deep ones. Antimycin is a fungal antibiotic produced by several bacteria (*Streptomyces*) species that naturally occur in forest soils. This piscicide was successfully used in the park in 1985- 1986 to remove brook trout from Arnica Creek, a tributary to Yellowstone Lake. More recently, it has been successfully used in several other national parks.

Antimycin is absorbed into the fish bloodstream through the gills, and affects fishes at the molecular level by disrupting cellular respiration. Antimycin is also effective because fish cannot sense its presence in the water and survive the treatment by avoiding and seeking refuge from the toxin, as is the case with rotenone and other piscicides.

Antimycin effectively kills trout when applied at an extremely low volume per area treated. Typically, this is 5–10 parts per billion (ppb), which is 5–10

parts antimycin to every billion parts water. A concentration of 10 ppb is about 1,750 times lower than the level determined by the Montana Department of Environmental Quality to be safe for long-term human consumption, and 175,000 times lower than the safe level for short-term consumption.



Typical piscicide stream application.
Photo courtesy of Mark Butenica,
Crater Lake National Park

Rotenone is a toxin produced by several neotropical species of the Leguminosae family. It was used by indigenous peoples in Southeast Asia and South America to harvest fish for centuries, and has been used in North America for fisheries management since the 1930s. It

functions similarly to antimycin by affecting cellular respiration. As with antimycin, rotenone is highly toxic to fish at very low concentration levels.

Neither antimycin nor rotenone have been demonstrated to negatively affect birds or mammals, humans, livestock, or downstream drinking water. Both piscicides naturally degrade rapidly, depending on hydrolysis, temperature, exposure to sunlight, stream turbulence, and pH. Both can be applied using drip cans, backpack sprayers, and/or boats. In most cases, native fish can safely be restocked to a treated stream after 48 hours.

Temporary impacts can occur to gilled invertebrates from antimycin, rotenone and KMnO_4 . However, most return quickly within a few months after treatment from adjacent tributaries. Monitoring of responses by gilled invertebrates will occur post-treatment application and be compared to pre-treatment sampling to assess invertebrate recovery. Because fish toxins enter through gills, amphibian tadpoles are susceptible to treatments during the reproductive season. However, treatments can be applied during late summer/early fall to avoid impacts to tadpoles.

Public Scoping Comment Period

Public comments will help the NPS identify issues, develop alternatives, and guide the analysis during preparation of the EA. Comments may be submitted on- line at <http://parkplanning.nps.gov>, the website for the NPS Planning, Environment and Public Comment (PEPC) database, hand- delivered to the park's headquarters in Mammoth Hot Springs, Wyoming, or mailed to:

Westslope Cutthroat Trout Restoration
Yellowstone National Park
P.O. Box 168
Yellowstone National Park, WY 82190

Comments must be received by November 30, 2005.

Please note that names and addresses of people who comment become part of the public record. We will make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety. If you wish us to withhold your name and/or address, you must state this at the beginning of your comment.

Two public scoping meetings will be held during November 2005. These meetings will begin with a presentation on the proposed project followed by a question and answer session with the public. The meeting locations and times are:

Bozeman, MT

November 16, 6- 8 PM
Comfort Inn
1370 North 7th Avenue

West Yellowstone, MT

November 17, 6- 8 PM
Holiday Inn Conference Hotel (SunSpree Resort)
315 Yellowstone Avenue

Additional information on the park's fisheries program is available on- line at <http://www.nps.gov/yell/planvisit/todo/fishing/index.htm>.