Yellowstone Cutthroat Trout (Oncorhynchus clarkii bouvieri)
Data: Range-wide Status of Yellowstone Cutthroat trout – 2001, 2007; Memorandum of Agreement for Conservation and Management of Yellowstone Cutthroat Trout -2002
Partners: ID, MT, NV, UT, WY, FWS, FS, BLM, Tribes

Status of the Yellowstone Cutthroat Trout:

On August 18, 1998, a group of conservation groups led by Biodiversity Legal Foundation filed a petition with the U.S. Fish and Wildlife Service (FWS) to list the Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvieri*)under the Endangered Species Act (ESA). FWS failed to complete the required 90-day finding and in January of 1999, the conservation groups filed a Notice of Intent to Sue over the delay in response. Eventually, the groups settled out of court and a deal was struck to have a decision by February 2001. On February 23, 2001, FWS published their 90-day finding in the Federal Register, and denied the request to list Yellowstone cutthroat trout (YCT). On January 20, 2004, the conservation groups filed a lawsuit against FWS over violations regarding procedure and ESA considerations for failure to list YCT. On December 17, 2004, the U.S. District Court of Colorado ruled in favor of the petitioners and ordered FWS to engage in a 12-month review of the current status of YCT. On February 21, 2006, the FWS issued their 12-month finding on the petition to list YCT. The FWS determined, based on the 12-month review, that YCT did not warrant listing under the ESA. Each of the states with YCT have YCT management plans in place.

Sportfishing Status of the Yellowstone Cutthroat Trout:

Yellowstone cutthroat trout are managed as sportfish in all states where they are native. In certain water bodies, economically valuable recreational fisheries are supported by this subspecies (e.g., Yellowstone Lake, South Fork Snake River). Special regulations such as catch-and-release, size restrictions, reduced bag limits, and terminal tackle restrictions have been successful in protecting YCT populations in the face of a wide range of fishing pressure, and have been applied to native cutthroat trout waters in all five states. Many YCT populations lie in remote headwater drainages with difficult access which has served to minimize angling pressure. Within Yellowstone National Park, the National Park Service has closed four YCT waters to fishing to protect broodstocks, small populations, and spawning fish. Managing sport fisheries for YCT across its range keeps anglers engaged in the management of the subspecies and maintains interest in conservation.

Historic and Current Distribution of the Yellowstone Cutthroat Trout:

Biologists estimate that YCT historically occupied 17,721 miles of habitat ranging from the waters of the Snake River drainage (Columbia River basin) upstream from Shoshone Falls in Idaho, to the Yellowstone River drainage (Missouri River basin), including the Tongue River in eastern Montana. The historic range in the Yellowstone River drainage included large parts of Wyoming and southern Montana, and the Snake River drainage included large portions of Wyoming and eastern Idaho, along with small areas in northern Utah and Nevada. Today, it is estimated that YCT conservation and sportfish populations occupy 7,527 miles of riverine habitat (43% of historical) and 205 lakes.

A total of 383 separate populations of YCT (both fine and large spotted forms combined; occupying 7,204 miles or 41% of historical range) were identified as conservation populations. These designated conservation populations were spread throughout the historical range, occurring in 35 of the 39 Hydro Coded watersheds (HUCs)) historically occupied by YCT.

Yellowstone Cutthroat Trout (Oncorhynchus clarkii bouvieri)

Range of the Yellowstone Cutthroat Trout:

The remaining conservation populations are more densely concentrated within the core of the historical range. Many of the remaining conservation populations are isolated to small sections of water. In fact, many occupy less than 1 mile of stream habitat. Genetic testing has been conducted on 4,052 miles of stream occupied by conservation populations. No evidence of introgression has been detected in samples taken from 3,112 miles (80%) of the tested area. Although genetic testing data do not yet exist, an additional 1,854 miles of stream are suspected to be unaltered genetically based on the lack of hybridizing species.
Much of the habitat currently occupied by YCT is located in designated parks (13%), wilderness areas (15%), and 65% of the current distribution exist on federally managed lands

Yellowstone Cutthroat Trout Habitat Requirements: Three life history forms of YCT occur across their range. YCT naturally occur in a small number of lakes across the range and these fish are considered adfluvial. The adfluvial life history comprises a small part of the range of YCT; however, Yellowstone Lake constitutes the majority of existing habitat for the adfluvial life history form. The stream-dwelling resident and fluvial YCT populations comprise the most common life-history forms and occur in over 90% of the estimated habitat currently occupied. YCT are found in a wide diversity of habitats from small ponds to reservoirs and large lakes, and from headwater streams to large rivers. In Yellowstone National Park, YCT occur in water as warm as 79°F.

Spawning occurs between March and July when water temperature approaches about 50^{o} F. Fertilized eggs are deposited in stream gravels where the developing embryos incubate for several weeks. Within days of hatching from the egg, YCT fry emerge from the gravel and disperse into the stream. Spawning and rearing streams tend to be cold and relatively infertile. For spawning, YCT seek out clean gravel substrate in riffles and pool crests.

Yellowstone cutthroat trout require cold, high quality water and suitable winter habitat that includes deep pools important to survive during long harsh winters. They tend to thrive in streams with more pool habitat and complex cover than uniform, simple habitat. Juvenile cutthroat trout overwinter in the interstitial spaces of large stream substrate. To survive the winter, adult cutthroat trout need deep, slow moving pools that do not fill with anchor ice.

Issues and concerns or limiting factors related to the Conservation and Improvement of the status of YCT:

As with other cutthroat trout subspecies, the distribution and numbers of YCT have declined due to human-induced influences. As a result of anthropogenic land and water use practices (e.g., agricultural practices, dam construction,

water management, logging, road building, etc.), YCT habitat has been degraded and fragmented over time. Loss of riparian habitat, sedimentation, and placement of barriers to fish migration have been identified as threats to YCT. Competition from and predation by introduced, non-native salmonids are considered to be a key issue in the diminishment of YCT. Genetic introgression with introduced stocks of rainbow trout (*O. mykiss*); competition from non-native species through historic stocking; and the incidence of fish diseases are concerns. Non-point source pollution, sediment and runoff associated from urban development, reduced instream flows from drought and/or climate change, and habitat damage from large forest fires are growing concerns.

Introduced Species Concerns

The introduction and subsequent spread of non-native trout and the resultant adverse effects is considered to be a significant long-term threat to YCT. Across the range of YCT, non-native trout have become extensively colonized. Among the non-native species are brook trout, rainbow trout, brown trout, and lake trout. Rainbow trout and brook trout are considered the most significant competitors with all subspecies of cutthroat trout in streams. In Yellowstone Lake, the expansion of lake trout has caused a significant decline in the YCT population. Competition, predation, and hybridization from introduced salmonids continue to pose a threat to the expansion and conservation of YCT. In the 2007 Range-wide Status Report, 1,854 miles of occupied habitat (24% of occupied habitats and 10% of historical habitats) were identified as having the potential of being hybridized due to the presence or past stocking, of hybridizing non-native species or subspecies. The Idaho Department of Fish and Game implemented a statewide sterile hatchery rainbow trout program in 2000 as an important means of significantly reducing the potential for interspecies hybridization. Competition and predation in lakes from illegally introduced lake trout or other non-native species is especially troublesome since the adfluvial life history form of YCT is not widely distributed across the range.

Genetic Considerations and Concerns

The amount of stream habitat with genetic testing data increased to 4,052 miles, representing a 34% increase in miles of stream with genetic information versus the previous range-wide status assessment (May et al. 2007). A high percentage of results revealed that a substantial number of YCT populations occur in a genetically unaltered condition. Although genetic testing has occurred in 54% of the currently occupied habitats, inferences can not be made to all currently occupied habitats since the samples were not collected using a statistical sampling frame that would allow for extrapolation. Recognizing that genetic data are time sensitive, introgression may have occurred in some populations since genetic samples were collected.. Slightly more than one-half of stream-dwelling YCT co-existed with non-native fish.

YCT within 1,854 miles (24% of occupied habitats) were suspected of being genetically unaltered, based on the absence of introduced hybridizing species and/or the lack of stocking records. YCT sampled from another 1,614 miles of occupied habitat were identified as having the potential of being hybridized due to the presence of, and/or stocking records of non-native hybridizing species. One hundred and sixty nine miles were linked to YCT that occupied habitat as a mixed stock of genetically unaltered and altered individuals.

YCT populations are described according to the inland cutthroat protocols developed

by Utah in 2002*(Utah Division of Wildlife Resources Publication Number 00-26*).

Disease and ANS Concerns

Cutthroat trout are susceptible to common salmonid diseases including whirling disease caused by the microscopic organism *Myxobolus cerebralis*. Diseases of concern are not limited to whirling disease but also include furunculosis and infectious pancreatic necrosis virus. Transmission of diseases to wild cutthroat trout populations through stocking of hatchery fish was recognized as a potential threat; however, the states have policies and regulations to address fish health, disease certification of stocked and imported fish, and stocking protocols, all designed to reduce disease risk. Additionally, in many areas harboring conservation populations, stocking of hatchery fish no longer occurs. Invasive mollusk species such as New Zealand mud snails are now present in the YCT range. This poses a new threat not just to YCT, but perhaps entire aquatic ecosystems.

Habitat Concerns and Obstacles

Continued habitat degradation is one of the major threats to the continued improvement of the YCT status (I think this pales in comparison to the threats of introgression with non-native trout, maybe you could change so it is not a major threat). The YCT status report and conservation strategy identified over-appropriated water, livestock grazing, oil and gas energy development, mining, poor forest management, and associated road building as significant habitat threats to YCT. In addition, natural climatic events such as drought, floods, and fires can threaten populations of YCT, especially when stream populations remain fragmented, small and isolated.

Regulatory Issues

There are numerous federal and state regulatory mechanisms in place, that if appropriately administered and implemented, provide a high degree of protection to Yellowstone cutthroat trout and their habitats throughout the range of the subspecies. Federal land management agencies such as the Forest Service and Bureau of Land Management must adhere to federal laws (e.g., National Environmental Policy Act, Clean Water Act) and regulations and policies contained within Forest Plans and Land and Resource Management Plans. As part of implementing or permitting management actions on public lands, federal agencies must routinely interact with state fish and wildlife agencies regarding potential effects on fish and fish habitat. Western states have laws, rules, or regulations dealing with forest practices, stream channel and wetlands protection, water quality, water rights and instream flows, habitat mitigation, the import or transport of fish, private ponds, fishing regulations, and the control of scientific fish collection permits. State fish and wildlife agencies also generally have fish management plans either on a statewide or species-specific basis, or both. These plans tend to be comprehensive in nature and outline how an agency intends to protect and conserve native species and manage recreational or sport fisheries.

State fish and wildlife agencies establish fishing regulations to protect native cutthroat trout populations. Angling regulations are in place to protect YCT populations from impacts due to fishing by recreational anglers. In addition, controls governing scientific collection permitting and collection for genetic testing have helped to reduce the risk that monitoring programs could have on the reduction of YCT.

Opportunities for Improving the Status of Yellowstone Cutthroat Trout:

Yellowstone Cutthroat Trout (Oncorhynchus clarkii bouvieri)

The goal of YCT conservation is to ensure the persistence of the subspecies within its historic range in the face of the challenges listed above. Two different conservation management strategies are needed and being implemented to conserve YCT. This dual approach recognizes differences in conditions between the major YCT geographical management basins, i.e., the Columbia River versus the Missouri River. The first strategy concentrates on preventing genetic introgression, disease, and competition risks through isolation of YCT (stopping the losses), while the second strategy concentrates on connecting or reconnecting occupied habitats and populations to preserve metapopulation function and multiple life history stages of the YCT.

The conservation, recovery, and enhancement of YCT will depend on an approach that actively addresses the obstacles described above. The specific approaches are described in numerous state and federal agency plans. Actions need to be prioritized and implemented within the five major river basins across the range of the subspecies.

Typically the actions fall within these categories:

- genetic testing and analysis
- fish population manipulation (non-native fish removal, Yellowstone cutthroat trout reintroductions, and genetic swamping)
- aquatic habitat manipulation (barrier placement or removal, instream habitat enhancement, enhanced flows, increasing connectivity, isolation of fragments, etc.)
- regulatory actions (fishing regulations, water use, land management)

Yellowstone Cutthroat Trout Restoration potential:

In order to objectively evaluate the restoration or expansion potential within the unoccupied area of the the historical range of YCT, biologists developed a protocol during the 2006 range-wide status assessment to determine restoration potential. The protocol considered environmental conditions, sportfishing interests, presence of non-native fish, and other factors. Through this process, about 250 miles of stream were identified throughout the historical distribution that had high or intermediate potential for expansion of YCT populations.

Primary Actions to be addressed:

Information in the 2007 Status report (May et al. 2007) will be used for prioritizing YCT conservation efforts described in the Conservation Strategy, and will assist in conservation planning by the state and federal agencies.

Population Surveys, genetic analyses, and fish population manipulation

Key actions include:

Continue to locate and assess YCT populations and habitat
Conduct standardized surveys and genetic analyses to measure genetic purity or introgression
Expand YCT populations through restoration, reintroductions, reconnections, and non-native fish control in priority watersheds
Implement actions to protect core and conservation populations
Manage hatchery broodstocks and use of stocked fish to maintain genetic diversity and appropriate stocking protocols

Yellowstone Cutthroat Trout Habitat Manipulations:

Habitat loss and fragmentation, as well as isolation of existing populations, are principal habitat issues facing YCT. Restoration of YCT habitat must address both habitat quality and spatial limitations. Current efforts have been directed toward improving instream conditions

and restoring limited stream fragments, as well as putting in place protective barriers to isolate key populations, and developing best management practices for use in land management.

Key actions include:

Restore and improve altered stream channel and riparian zone habitats
Restore and enhance instream flows, water quality and sediment regimes, and physical integrity of stream channels where feasible
Expand small, isolated populations where possible and maintain or develop high quality habitats to prevent extirpation due to small population size or stochastic events
Monitor and evaluate natural catastrophe impacts like fire and drought
Implement best management practices on federal and private lands to benefit YCT habitats

Regulatory Actions to enhance YCT status:

State agencies must maintain the sport fish/game fish status of YCT. Managing sport fisheries for YCT across its range keeps anglers engaged in the management of the subspecies and maintains interest in conservation. State and federal agencies and their constituents must continue fostering close working relationships in order to effectively ensure that regulatory and administrative mechanisms are understood, maintained, and implemented to protect and restore YCT.

Key Actions to be addressed*:*

State fish and wildlife agencies shall enforce existing fishing regulations and promulgate new regulations if necessary to protect YCT populations.
Maintain and protect YCThabitat from degradation through compliance with existing laws, regulations, guidelines, and policies.
Agencies should provide technical assistance, cost-share on funding, and expertise to private landowners, water users, and industry to protect YCT habitat on private lands.
State and federal agencies must become more vigilant regarding fish diseases and aquatic nuisance species, and promulgate or enhance existing regulatory mechanisms.
State and federal agencies should devote more resources as is feasible, both financial and personnel, to habitat restoration activities to benefit YCT.
Continue to review the effectiveness of existing regulatory mechanisms that provide benefits to YCT.

Highest Priority Needs and Objectives for the YCT GMU's are:

Bighorn River Basin GMU :

1. Work with private landowners and public land management agencies to identify, protect, and improve habitat for YCT. Investigate and initiate where feasible, habitat improvement projects in Soldier, Marquette, Bear Creek, and Mill Creek (3-5 years, $80,000).
2. Gather biological and physical information to file for instream flow water rights to protect YCT water sources. File for five instream flow segments within the Wind River and continue to monitor existing filings on 15 other segments within the Bighorn GMU (2 years, $50,000).
3. Investigate fish passage issues throughout the Bighorn GMU. Identify barriers to fish movement, develop plan to remove or modify structures to allow unrestricted movement by YCT and other aquatic organisms. (5 years, funds needed minimum-$50,000).
4. Install barriers to fish movement where necessary to eliminate/isolate competing and hybridizing non-native fish species from pure YCT populations. Install one structure on Lodge Grass Creek if necessary, a permanent structure on Elkhorn Creek, one on the West

Fork Little Bighorn River, and one on Crooked Creek (5 years, possible funding needed- $80,000-$100,000 per structure).
5. Identify irrigation structures with fish entrainment issues. Formulate remediation/mitigation plans to reduce YCT and other aquatic organism losses. Install screening and/or by pass on at least two structures in the Bighorn GMU within a 3-5 year period (Funding needed ~ $30,000 per small structure, up to $500,000 or more for large structures). Funding should also include maintenance component.
6. Explore opportunities for treatment to remove non-native species followed by reintroduction of YCT. Investigate non-native species removal and reintroduction on nine stream segments within Bighorn GMU (3-5 years, $90,000).
7. Explore opportunities to expand YCT range into presently unoccupied historical habitat. Conduct YCT reintroduction feasibility studies of habitat and biological condition, and complete NEPA analysis as necessary to address wilderness issues on three headwater streams in Shoshone River Drainage (3 years, $36,000).
8. Evaluate waters receiving restoration stocking of YCT with success measured through establishment of viable naturally reproducing populations (3-5 years, $30,000).
9. Remove non-native species and reintroduce YCT in 6 stream segments of tributaries to the upper Tongue River (3-5 years, $75,000).

2. Lower Snake River GMU –

1. Remove non-native salmonids from key YCT watersheds
2. More accurately determine the distribution, abundance, and connectivity of populations
3. Assess genetic purity and/or introgression of populations
4. Enhance habitat conditions as the highest priority by working with state and federal agencies, NGOs, and private landowners
5. Assess and restore fish passage in cooperation with other parties
6. Assess and mitigate entrainment losses from unscreened irrigation diversions
7. Establish selenium sampling and analysis standards through a multi-agency process to ensure that mine-generated selenium is not having population level impacts on YCT

3. Upper Snake River GMU –

1. Remove non-native salmonids from key YCT watersheds
2. More accurately determine the distribution, abundance, and connectivity of populations
3. Assess genetic purity and/or introgression of populations
4. Enhance habitat conditions as the highest priority by working with state and federal agencies, NGOs, and private landowners
5. Assess and restore fish passage in cooperation with other parties
6. Assess and mitigate entrainment losses from unscreened irrigation diversions

4. Yellowstone River GMU -

1. Remove non-native salmonids from key YCT watersheds
2. More accurately determine the distribution, abundance, and connectivity of populations
3. Assess genetic purity and/or introgression of populations
4. Enhance habitat conditions as the highest priority by working with state and federal agencies, NGOs, and private landowners
5. Assess and restore fish passage in cooperation with other parties.
6. Assess and mitigate entrainment losses from unscreened irrigate diversions
7. Protect key watershed areas from development or land management

impacts through the use of conservation easements or land purchases
8. Prevent further introduction of invasive, nuisance, and non-native species

Potential or existing Partners or Joint-ventures:

1. **Yellowstone Park Foundation**

2. **National Fish and Wildlife Foundation – Jackson Hole One Fly Foundation**

3. **Trout Unlimited**

References:

1. May, B.E., S.E. Albeke, and T. Horton. 2007. Range-wide status assessment for Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvieri*): 2006. Prepared for Yellowstone Cutthroat Trout Interagency Coordination Group.

This publication was funded (or partially funded) by Federal Aid to Sportfish Restoration Funds through the Multistate Conservation Grant Program (Grant WY M-8-P), a program supported with funds from the Wildlife and Sport Fish Restoration Program of the U.S. Fish and Wildlife Service and jointly managed with the Association of Fish and Wildlife Agencies, 2006-9.