Western Native Trout

Status, Concerns and Opportunities

A Special Report of the Western Native Trout Initiative

December, 2007

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.

Any use of this document, or the individual western native trout assessment documents should be referenced to the following:

The Western Native Trout Initiative
134 Union Boulevard, Suite 665
Lakewood, Colorado 80228
Robin Knox, Coordinator

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

The Western Native Trout Initiative gratefully acknowledges the commitment and effort of the following individuals to the conservation and management of western native trout and char. Without their assistance, this western native trout assessment would not have been possible.

1. Southwest Trout Assessment Group - Apache trout, Gila trout and Rio Grande cutthroat trout:

David Propst-NM, Kirk Patton-NM, John Alves-CO, Mike Japhet-CO, Julie Meka -AZ, Kirk Young-AZ, Mike Lopez-AZ, Jeremy Voeltz-FWS, Stewart Jacks-FWS, Jerry Ward-FS, Jim Brooks-FWS, Jerry Monzingo-FS, Amy Unthank-FS, Greg Gustina-BLM, John Caid-WMAT

2. Middle and Northern Rockies Trout Assessment Group – Bonneville cutthroat trout, Colorado River cutthroat trout, Greenback cutthroat trout and Yellowstone cutthroat trout:

Dirk Miller-WY, Roger Wilson-UT, Kevin Rogers-CO, Scott Grunder-ID, Steve Yundt-ID, Jim Capurso-FS, Dave Winters-FS, Dan Duffield-FS, Jay Thompson-BLM, Bruce Rosenlund-FWS, Larry Zeigenfuss-FWS Ken McDonald-MT, Travis Horton-MT , , Lynn Kaeding-FWS, Jeff Kershner-USGS, Jo Christensen-BLM, , Kate Walker-FS

3. Western Great Basin Trout Assessment – California golden trout, Little Kern golden Trout, Lahontan cutthroat trout, and Paiute cutthroat trout:

Lisa Heki-FWS, Dave Lentz-CA, Scott Grunder-ID, Jim Harvey-FS, Joe Furnish-FS, Steve Jacobs-OR, Pete Trenham-FWS, Chad Mellison-FWS, Bob Williams-FWS, Elroy Masters-BLM, Dan Fairbank-Tribal, John Elliott-NV, Chris Crookshanks-NV

4. Northwest Trout Assessment – Bull Trout, Coastal Cutthroat Trout, Redband trout and Westslope cutthroat trout :

Steve Jacobs-OR, Roger Harding-AK, Bob Gresswell-USGS, Scott Grunder-ID, Wade Fredenberg-FWS, Michael Faler-FWS, Tim Cummings-FWS, Jim Uehara-WA, Dave Heller-FS, Kitty Griswold-USGS, Joe Moreau-BLM, Travis Horton-MT, Frank Shrier- PacifiCo.

Executive Summary

Introduction

The Western Native Trout Initiative (WNTI) was formed around the idea of having a new approach to improving the status of western native trout, which are declining and some of which are listed as threatened or endangered All of the populations are reduced from historical levels. The interest in organizing a partnership developed after several meetings discussing the status and management of western native trout in the late 1990's. The fishery managers of western state fishery management agencies, and federal land and fisheries management agencies sought a Multi-State Conservation Grant to develop a common strategic approach. The Western Association of Fish and Wildlife Agencies, through the Inland and Marine Fisheries Committee, received approval of the WNTI proposal in January, 2006 from the US Fish and Wildlife Service.

Fish Species Considered

The current list of target species is comprised of Apache trout, Bonneville cutthroat trout, Bull trout, Coastal cutthroat trout, Colorado River cutthroat trout, Gila trout, Golden trout(s), Greenback cutthroat trout, Lahontan cutthroat trout, Paiute cutthroat trout, Redband trout, Rio Grande cutthroat trout, Westslope cutthroat trout, and Yellowstone cutthroat trout. Other native trout and char that occur in the western states and Alaska (such as Dolly Varden or Arctic char), may be included in future analyses. For the ease of the reader, all fish listed are referred to as species, even though technically they may be sub-species of a given genus. Likewise all the fish are referred to generically as "trout" in the document.

Assessment Approach

The fish species were combined into four geographical areas, and a working group of agency and other fishery biologists who were knowledgeable about those species was convened to identify those obstacles, concerns and threats that may be common among the species, as well as identifying those common approaches that could be applied to improving the status of the species. The four geographical areas and associated species were:

1. Southwest Trout Assessment Group - Apache trout, Gila trout and Rio Grande cutthroat trout.

2. Middle and Northern Rockies Trout Assessment Group – Bonneville cutthroat, Colorado River cutthroat, Greenback cutthroat, and Yellowstone cutthroat trout.

3. Western Great Basin Trout Assessment – California golden trout, Little Kern golden trout, Lahontan cutthroat, Paiute cutthroat.

4. Northwest Trout Assessment – Bull trout, Westslope cutthroat, Redband trout and Coastal cutthroat trout.

Status, common concerns and impediments to improving the status of the fish

The working groups identified the common concerns and impediments to improving the status of

western native trout. They were classified into several categories:

Species Viability

- Population vulnerability (external factors): isolated recovery streams, population fragmentation, wildfire, and drought
- Population viability: small population size
- Population number: limited suitable restoration streams, few hydrologically complex drainages

Genetics

- Captive propagation: genetics, purity, public perceptions, wild vs. hatchery, broodstock management plans
- Genetic health/diversity: inbreeding depression, bottlenecking, loss of heterozygosity

Disease

- Disease: Whirling Disease, Bacterial Kidney Disease (BKD)

Introduced Species

- Nonnative salmonids: competition, predation, and hybridization with nonnative salmonids

Overutilization

- Overharvest: stocking nonnative salmonids to replace

Habitat

- Habitat degradation: timber harvest, mineral extraction, livestock grazing, water diversion, road construction

Climate Change

- Water: altered flow regimes, altered drought frequency & intensity, increased water diversion/withdrawal, modified thermal regimes, increased sediment loading
- Wildfire: altered wildfire regimes (frequency & intensity), increased individual wildfire extent

Public and Agency Opinion/Change

- User group conflicts: popularity of native fish vs. nonnative sport fish, government and tribal agencies support/conflicts
- Public perceptions/attitudes: general distrust of government, dissemination of misinformation

Regulations

- Limited resources: enforcement, implementing appropriate regulations
- Regulations/compliances: uneven application, conflicting regulations/authorities, poorly defined authorities/unresolved authority application

Management

- Limited resources for surveys, renovations, general management, monitoring (demographic and genetic), research
- Conflicts over appropriate management tools (e.g., piscicides vs. mechanical removal)

Opportunities for improving the status of the fish

The working groups identified those actions that could be taken to improve the status of western native trout. They are classified as follows:

Identify and characterize all conservation populations

- Conduct surveys to identify undiscovered populations of native trout
- Regularly spatially and genetically monitor status of established populations using standard protocols
- Routinely synthesize and analyze genetic data to assess population trends
- Increase the effort to clearly identify stronghold populations of all native trout species to help in the identification of priority conservation and protective actions for those populations.
-

Secure, enhance, and restore conservation populations

Population manipulations

- Remove non-native species, followed by restoration of native fish to create genetically pure isolated, as well as connected meta-populations, to maintain sources of genetically pure trout and char
- Protect distinct life-history traits
- Restrict introduction of non-native fish species into native trout conservation habitats
- Restrict the spread of disease agents and invasive species
- Expand small, isolated populations where possible, and maintain or enhance high quality habitats to prevent extirpation due to small population size or stochastic events.
- Determine appropriate genetic standards and protocols for genetic analysis and description of conservation populations
- Develop genetically appropriate brood-stocks as needed for conservation actions Thorough genetic assessments of both known and suspected stocks of several species of native trout are needed. These data will aid in characterization of intra- and inter-population differences/similarities and in preparation of conservation/recovery strategies
- Sometimes there are not "pure" populations available or it is difficult to get agreement among geneticists as to the best population to use for recovery purposes where stocked fish are part of the equation. Captive brood stocks of several taxa are necessary to accelerate or enhance planned and ongoing conservation/recovery efforts.

Population inventory and monitoring

- Regularly demographically monitor established populations using standard protocols
- Routinely synthesize and analyze fisheries demographic data to assess population trends
- Conduct studies to assess the effects of sportfishing on recovery populations
- Routinely develop and update GIS-based species distribution and population status reports
- Seek funding to expand the population data collection effort for the lesser known species such as Redband trout and Coastal cut throat trout in order to develop moderen status reviews.

Data Sharing and analysis

- Implement a process for data sharing to meet the requirements of the Western native Trout initiative's responsibilities as a National Fish Habitat Partnership.
- Seek additional funding to help specific species data teams maintain and update their data base systems.

Secure and enhance watershed conditions

Habitat monitoring

- Monitor the status of key native trout habitats for each of the species on a regular basis to develop baseline information on habitat condition and habitat strongholds that can be prioritized for future habitat protection.
- Assess aquatic habitats to evaluate potential for restoration of native trout and char
- Monitor and evaluate impacts from habitat disturbances such as wildfire and drought, the continuation of global warming, and other such events with particular attention to changes in water temperature flow and quality.
- Provide technical information, administrative assistance, and financial resources to assure compliance with the listed objectives and encourage conservation of native trout on private lands.
- Pursue land and access acquisitions to protect important native trout habitat.

Habitat manipulations

- Secure and enhance watershed conditions through standard habitat manipulations (e.g., barrier placement or removal, in-stream structure, flow enhancement, increasing connectivity, and isolation of fragments) and provide monitoring of implemented projects to assess success or failure.
- Implement, evaluate, and monitor land management actions that include but are not limited to: modifying grazing practices, fencing riparian areas, closing and obliterating roads in the riparian areas, addressing road, timber and mining disturbances.
- Identify, update and implement best management practices on state, tribal, NPS, FS, BLM, and private lands to benefit native trout habitats and connectivity for all life stages.
- Restore and enhance water flow, water quality, natural sediment regimes, and physical integrity of channels where feasible by replacement of culverts to allow fish passage (where passage is desirable), screening water diversions to prevent entrainment, modifying diversions to allow fish passage, and restoring and improving altered channel and riparian habitats.
- Annually update the individual native trout species habitat needs for funding, and prioritize projects that qualify for funding under the National Fish Habitat Action Plan or other sources of funds.

Implement and Enforce Regulatory Actions

- Regulate angling and enforce regulations that prevent impacts associated with recreational angling.
- Enhance and maintain regulatory mechanisms that prevent diseases or illegal introduction of nuisance species.
- Work through the FERC re-licensing process to require impoundment operators to operate dams to minimize impacts where necessary to meet cooperative agreement objectives. Investigate restoration and enhancement opportunities on FERC re-licensing of hydroelectric facilities.
- Maintain and protect native trout and char habitat from degradation by achieving compliance with existing habitat protection laws, policies, and guidelines.

Implement Public Outreach and Public/Private Partnerships

- Develop public outreach and partnerships (NGO, public) to increase the resources available for completing conservation actions

- Implement outreach, interpretive and educational programs to expand the public's knowledge about the challenges facing western native trout.
- Share data and update range-wide databases with data from a well-designed field monitoring programs to serve as a barometer on status of native trout over time.

Interagency Coordination

- The Western Native Trout Initiative should have a goal of increased levels of coordination, i.e. interagency partnerships and relationships that foster cooperative interagency work environments and coordination with other native trout and char conservation efforts.
- The Western Native Trout Initiative should seek partnerships with other non-governmental organizations and private interests to increase the overall level of effort to conserve and protect western native trout.
- The existing native trout recovery and conservation plans should be reviewed and updated on a regular basis to account for new scientific information and changes in status due to conservation and protection actions.
- States and agencies should complete and put into place conservation or recovery plans for those western native trout that do not currently have collaboratively developed plans.

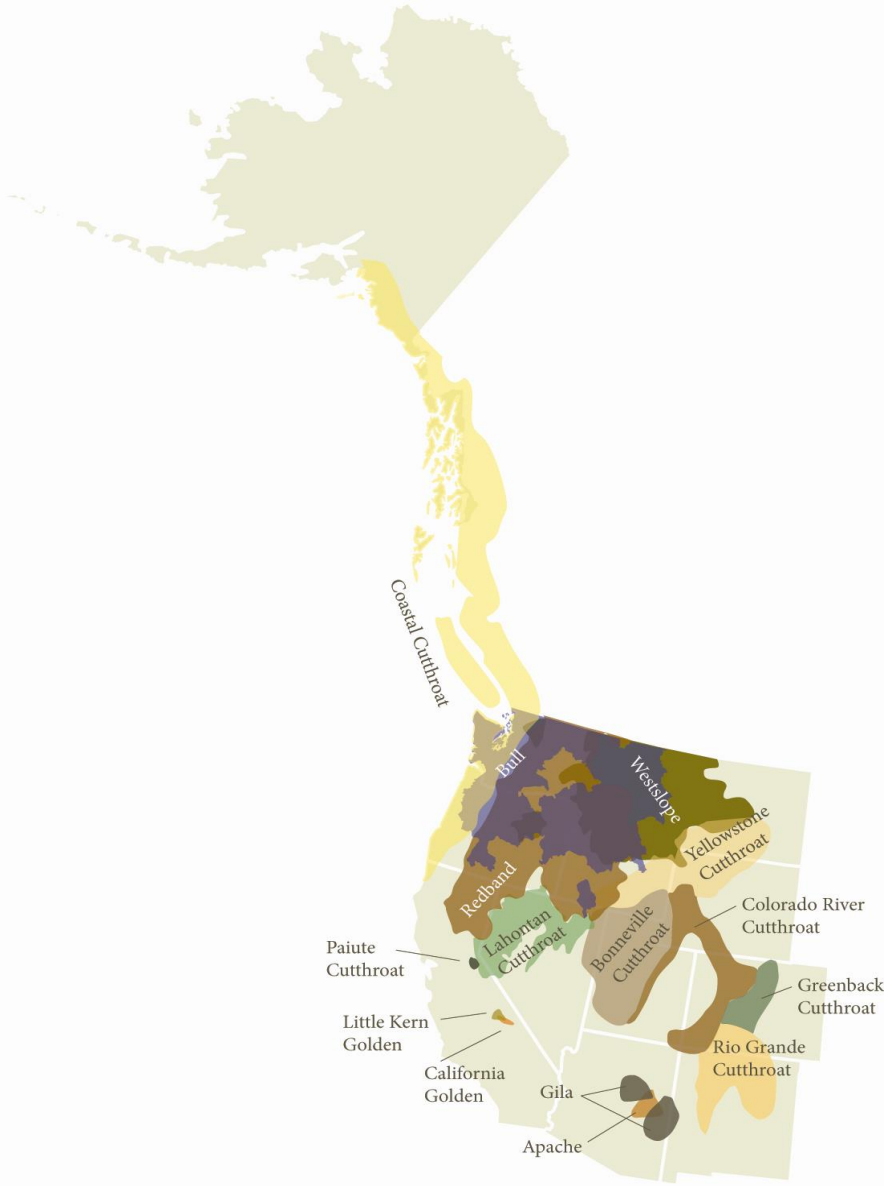
Continue Research of Native Trout

- Western states should be encouraged to complete ANS plans/procedures and put them in place to help protect native trout from ANS.
- Conduct research on population distribution, genetics, habitat, and species ecology to increase knowledge of native trout and char life stage requirements and to evaluate the success of conservation actions
- Develop new methodologies for construction of fish passage barriers.

INTRODUCTION

Before the influence and encroachment of western settlers, the western members of the genera ***Oncorhynchus and Salvelinus*** were widely distributed across a variety of coldwater habitats in the West. As a result of the westward expansion, the resulting agriculture, mining, foresting, and urbanization of the landscape began the process of diminishing the habitats available to these fish. In addition, the practice of moving and introducing exotic and non-indigenous species of fish throughout the western states added an additional burden to these native fish. Current distribution is greatly diminished from historical times. (Figure 1).

Figure 1. Current Distribution of Western Native Trout



The result of human interactions with native trout has been a loss of species and their habitats, and a drastic decrease in abundance and distributional range. The Western Native Trout Assessment Report is the first step in a new phased approach to the management of Western Native Trout that has the intent of improving the plight of these beautiful fish through cooperative application of sound management principles that address the human caused factors that have diminished the abundance and range of the native trout and Char in the west.

I. BACKGROUND

The Western Native Trout Initiative (WNTI) was formed around the idea of having a new approach to improving the status of western native trout, which are declining and some of which are listed as threatened or endangered All of the populations are reduced from historical levels. The interest in organizing a partnership developed after several meetings discussing the status and management of western native trout in the late 1990's. The fishery managers of western state fishery management agencies, and federal land and fisheries management agencies sought a Multi-State Conservation Grant to develop a common strategic approach. The Western Association of Fish and Wildlife Agencies, through the Inland and Marine Fisheries Committee, received approval of the WNTI proposal in January, 2006 from the US Fish and Wildlife Service. Actual work on the Initiative began in July, 2006.

GOAL

Many of the western native trout species have received focus from fishery managers and staffs for years or even decades. Funding for this work has not been consistent, so fishery managers are seeking approaches to conserving, managing and protecting the various native trout, and secondarily, to gain more consistent funding for the conservation and management strategies across the West.

GEOGRAPHIC SCOPE OF THE WESTERN NATIVE TROUT INITIATIVE

The 12 states within WNTI species assessment area encompass about 1,853,000 square miles, of which Alaska makes up more than one-third. WNTI is defined by state boundaries: Montana, Wyoming, Colorado, and New Mexico on the east, west to the Pacific coast, and including Alaska. The state boundaries encompass the entire U.S. range of the western trout species, though the range of trout species is discontinuous within the states. The distribution of the fish species will determine the scope of work to be completed.

FISH SPECIES CONSIDERED IN THE WESTERN NATIVE TROUT INITIATIVE

The current list of target species is comprised of Apache trout, Bonneville cutthroat trout, Bull trout, Coastal cutthroat trout, Colorado River cutthroat trout, Gila trout, Golden trout(s), Greenback cutthroat trout, Lahontan cutthroat trout, Paiute cutthroat trout, Redband trout, Rio Grande cutthroat trout, Westslope cutthroat trout, and Yellowstone cutthroat trout. Other native

trout and char that occur in the western states and Alaska (such as Dolly Varden or Arctic char), may be included in future analyses. For the ease of the reader, all fish listed are referred to as species, even though technically they may be sub-species of a given genus. Likewise all the fish are referred to generically as "trout" in the document.

ACTIVE PARTNERS IN THE WESTERN NATIVE TROUT INITIATIVE

The WNTI currently includes the 12 western states - Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah , Washington, and Wyoming; 5 federal agencies – US Fish and Wildlife Service, US Geological Survey, US Forest Service, US Bureau of Land Management, and National Park Service; Tribal representation; and several industry and non-NGOs organizations – Trout Unlimited, National Fish and Wildlife Foundation, Federation of Fly-Fishers, American Sportfishing Association, and American Fly-Fishing Trades Association. Partners on local projects include many local entities, landowners and Native American Tribes.

THE WESTERN NATIVE TROUT INITIATIVE SPECIES ASSESSMENT APPROACH

The WNTI Multi-state Grant described the approach to be used in assessing the current (as of June 2007) status of the native trout under consideration:

*" **Purpose:** The purpose of this component is to review existing recovery/management documents, use current information to determine common needs, and categorize those needs for use in other components and development of a Strategic Plan.*

***Component 1 Objective(s):** Review existing plans and agreements; Identify information gaps or management needs; Identify and categorize common conservation themes that may be applied to western native trout conservation at a broader scale and; Identify obstacles that may preclude implementation of actions.*

Actions:

A. Establish an Assessment Team of individuals to collate and review all available recovery plans, management plans, conservation agreements, and other pertinent documents or information relative to western native trout conservation and management.

B. Use the Assessment Team to identify and categorize needs for conservation and management of western native trout.

C. Estimate funding requirements associated with conservation and management needs.

D. Identify current and potential obstacles (i.e., environmental, social, regulatory, etc.) that may delay or prevent implementation of actions for western native trout.

E. Integrate current science and information into proposed actions and datasets for future reference and use. (Western Native Trout Initiative Multi-state Grant Request, 2005). "

Geographically-based assessment teams prepared a native trout species status, concerns and opportunities report. This assessment reviews the current information on individual species that are the focus of the initiative, and identifies current threats to the species as well as identifying the important potential actions that should be accomplished in the next 5 to 10 years. The commonalities of action in the assessments will be used to develop the WNTI Strategic Plan. Actions necessary for conservation and recovery of western native trout will identified in the Strategic Plan and will form the foundation of the anticipated joint ventures and partnerships that will complete the on-the-ground projects that will directly aid in fish conservation, recovery or restoration.

The trout assessments were combined into four geographical areas, to allow the expression and identification of those obstacles, concerns and threats that may be common among the species, as well as identifying those common approaches to improving the status of the species. The four geographical areas are:

1. Southwest Trout Assessment Group - Apache trout, Gila trout and Rio Grande cutthroat trout.

2. Middle and Northern Rockies Trout Assessment Group – Bonneville cutthroat, Colorado River cutthroat, Greenback cutthroat, and Yellowstone cutthroat trout.

3. Western Great Basin Trout Assessment – California golden trout, Little Kern golden trout, Lahontan cutthroat, Paiute cutthroat, and Red-band trout.

4. Northwest Trout Assessment – Bull trout, Westslope cutthroat, Redband trout and Coastal cutthroat trout.

In the development of the assessments, a general outline and format was provided, and many individuals, agencies, and recovery or conservation teams were relied upon to provide the information summarized in this report.

It is important to note that the Western Native Trout Initiative assessments were a snap-shot of what is currently occurring with each species. They do not replace or usurp the more detailed conservation and recovery plans, multi-state conservation agreements, or other developed documents that are currently helping to guide conservation of the western native trout. They are meant to provide critical and essential information for the Western Native Trout Initiative Strategic Plan.

Note: Updated individual species assessments are available for viewing on the Western Native Trout Initiative web-site: **www.westernnativetrout.org.**

II. WESTERN NATIVE TROUT ASSESSMENTS

The status, concerns and opportunities for improving the status of the western native trout are presented in the following four sections based in a geographic grouping of native trout speciesa as described in the Introduction section of this report.

A. SOUTHWEST NATIVE TROUT ASSESMENT

INTRODUCTION

The species considered in the Southwest and Southern Rockies are Apache Trout, Gila trout and Rio Grande cutthroat trout. These fish are found in New Mexico, Arizona and Colorado. Complete status reviews are found in Appendices A, B, and C. The first part of this regional review assesses the common obstacles, threats and concerns that that hinder the full recovery or conservation of species within their native ranges. The second part of the review considers the common, as well as individual, regional and local approaches that can be developed into specific strategies for improving the status of the three species. These strategies will be incorporated into the Western Native Trout Strategic Plan.

SPECIES STATUS

Apache Trout

Apache trout were listed as endangered under the Federal Endangered Species Preservation Act of 1966 (USFWS 1967), It was downlisted to threatened in July 1975 (USFWS 1975) based on recovery actions and a re-analysis of data. The Recovery Plan was completed in 1979, revised in 1983, and is currently (2007) under revision and 5-year review.

Gila Trout

Gila trout were designated endangered under the Federal Endangered Species Preservation Act of 1966 (USFWS 1967). Federal listing of the species as endangered continued under the Endangered Species Act of 1973 (USFWS 1975) until 2006, when it was down-listed to threatened (USFWS 2006). Gila trout was listed as endangered by the New Mexico Department of Game and Fish (NMDGF) in 1975 under the Wildlife Conservation Act and was downlisted to threatened in 1988, and remains listed as threatened by NMDGF. Gila trout is considered a Species of Concern by the Arizona Game and Fish Department. The Gila Trout Recovery Plan (3rd Revision, USFWS 2003) details actions necessary to down- and delist the species.

Rio Grande Cutthroat Trout

The U.S. Fish and Wildlife Service received a petition in 1998 to list Rio Grande cutthroat trout (RGCT) under the Endangered Species Act. In a 90-day finding, USFWS concluded that listing was not warranted. However, in 2001 a candidate status review was initiated in response to litigation appealing this decision and new information, particularly regarding presence of whirling disease within the native range of the subspecies (USFWS 2002). The results of this review were published in 2002, and it was again determined that listing of this taxon was not warranted (USFWS 2002). In 2005, a petition for Review of Agency Action regarding the 'not warranted' decision was denied. That decision was appealed to the US 10th Circuit Court. After briefs were filed, USFWS settled the case and agreed to conduct a new status review. In May

2007, USFWS published a "Notice of Intent to Initiate a Status Review (USFWS 2007). The subspecies is recognized as a species of special concern in both Colorado and New Mexico, and as a sensitive species within USFS Regions 2 and 3 and by the Bureau of Land Management in Colorado. In 2006, the Rio Grande Cutthroat Trout Conservation Team adopted the Inland Cutthroat Trout Protocol as a tool for assessing the rangewide status of RGCT. The first draft of a Rio Grande Cutthroat Trout Rangewide Database was completed by the Rio Grande Cutthroat Trout Conservation Team in March, 2007. The RGCT Conservation Team has a Rangewide Status Report for RGCT scheduled for completion by June, 2008. A signed Conservation Agreement (2003) is in place and a Technical Conservation Assessment was completed in 2006. Colorado and New Mexico have active conservation plans that outline strategies and implementation schedules.

COMMON OBSTACLES, CONCERNS AND THREATS

Species Viability

- Population vulnerability (external factors): isolated recovery streams, population fragmentation, wildfire, and drought
- Population viability: small population size
- Population number: limited suitable restoration streams, few hydrologically complex drainages

Genetics

- Captive propagation: genetics, purity, public perceptions, wild vs. hatchery, broodstock management plans
- Genetic health/diversity: inbreeding depression, bottlenecking, loss of heterozygosity

Disease

- Disease: Whirling Disease, Bacterial Kidney Disease (BKD)

Introduced Species

- Nonnative salmonids: competition, predation, and hybridization with nonnative salmonids

Overutilization

- Overharvest: stocking nonnative salmonids to replace

Habitat

- Habitat degradation: timber harvest, mineral extraction, livestock grazing, water diversion, road construction

Climate Change

- Water: altered flow regimes, altered drought frequency & intensity, increased water diversion/withdrawal, modified thermal regimes, increased sediment loading
- Wildfire: altered wildfire regimes (frequency & intensity), increased individual wildfire extent

Public and Agency Opinion/Change

- User group conflicts: popularity of native fish vs. nonnative sport fish, government and tribal agencies support/conflicts

- Public perceptions/attitudes: general distrust of government, dissemination of misinformation

Regulations

- Limited resources: enforcement, implementing appropriate regulations
- Regulations/compliances: uneven application, conflicting regulations/authorities, poorly defined authorities/unresolved authority application

Management

- Limited resources for surveys, renovations, general management, monitoring (demographic and genetic), research
- Conflicts over appropriate management tools (e.g., piscicides vs. mechanical removal)

COMMON APPROACHES AND OPPORTUNITIES FOR IMPROVING THE STATUS

The approaches described below are common to the three species in the southwest assessment.

Identify and characterize all conservation populations

- Conduct surveys to locate undiscovered populations of native trout
- Genetically and demographically monitor established populations using standard protocols
- Routinely synthesize and analyze genetic and demographic data to assess population trends
- Conduct studies to provide additional information on life history and ecology of each species

Secure, enhance, and restore conservation populations

Population manipulations

- Restore native trout to streams where wildfire eliminated nonnative trout
- Follow established broodstock management plans for captive propagation
- Remove nonnative salmonids and reestablish native trout with genetically appropriate donor lineages and captive stocks
- Augment restored (and remnant) populations as needed

Population inventory and monitoring

- Assess streams to evaluate potential for restoration of native trout
- Regularly monitor established populations using standard protocols
- Routinely synthesize and analyze monitoring data to assess population trends
- Conduct studies to characterize life-history and ecology of restored populations
- Conduct studies to assess the effects of sportfishing on restored populations

Secure and enhance watershed conditions

Habitat management and monitoring

- Fencing exclosures for elk and domestic livestock
- Instream habitat manipulation
- Riparian zone management

- Barrier construction to facilitate protection of extant and planned populations that lack natural barriers
- Altering land management practices (e.g., livestock grazing, forest wildfire management, timber harvest, road construction and maintenance) to protect and reduce impacts on trout populations
- Habitat surveys
- Monitor water quality, discharge, and temperature
- Water rights acquisition and minimum stream flow protection

Regulatory actions (fishing regulations, water use, land management)

- Maintain and protect habitat from degradation through Agency planning, compliance and enforcement of existing laws, regulations, guidelines, and policies
- Preventive measures (patrols, public outreach) to discourage illegal release of nonnative salmonids

Sport fishing opportunities

- No sport fisheries permitted on remnant populations (Apache and Gila trout)
- State fish and wildlife agencies enforce existing fishing regulations and promulgate new regulations as necessary to protect restored populations
- Enhance existing sport fisheries using hatchery-produced native trout that are surplus to recovery/conservation needs

Public outreach and partnerships (NGO, public)

- Agencies enhance existing fisheries with hatchery-produced native trout to improve public support
- Regularly provide outreach information on native trout recovery and management activities to agencies, user groups, WNTI website or newsletter
- Give presentations at professional meetings, schools, NGOs

Education

- Enhance existing fisheries with hatchery-produced native trout (those surplus to recovery/conservation needs) to improve public support
- Regularly provide outreach information on native trout recovery and management activities to agencies, user groups, WNTI, NGOs, and conservation groups
- Give presentations at professional meetings and NGOs
- Establish native trout websites within Agency and NGO websites (AZGFD, NMDGF, CDOW, USFWS, USFS, USBLM, USFS, WMAT, JAT, TU, etc,)

Research

- Monitor genetic structure of remnant and restored populations
- Characterize genetic consequences of mixing remnant lineages
- Characterize dynamics of populations in different-sized habitats (streams)
- Characterize species ecology and life histories
- Evaluate/compare effectiveness of mechanical removal, angling regulations, and piscicides to remove nonnative species
- Evaluate effects of climate change (e.g., reduced flows) on species & population viability
- Characterize life history response to effects of climate change (e.g., altered discharge patterns & thermal regimes)

- Characterize effects of wildfire on native trout populations and habitats
- Characterize effects of piscicides on non-target organisms

SPECIES SPECIFIC APPROACHES AND NEEDS*

Apache trout

- Complete renovations of Stinky Creek, South Fork Little Colorado River, lower East Fork Little Colorado River, Conklin Creek, and lower Bear Wallow Creek.
- Restore Apache trout to South Fork Little Colorado River, lower East Fork Little Colorado River, Conklin Creek, lower Bear Wallow Creek, Snake Creek, West Fork Little Colorado River, and West Fork Black River
- Complete revision of Apache Trout Recovery Plan and 5-year Status Review
- Finalize Apache Trout Conservation Strategy MOU among agencies and user groups
- Develop proposed delisting rule and post-delisting management plan
- Remove brown trout from recovery streams on the Fort Apache Indian Reservation

Gila trout

- Complete renovation of upper West Fork Gila River drainage and stock Gila trout following drainage specific restoration strategy
- Genetically and demographically assess status of all extant Gila trout populations within 2 years
- Initiate and complete NEPA and ESA compliance for renovation of West Fork Mogollon and Rain creeks
- Renovate West Fork Mogollon and Rain creeks
- Initiate and complete NEPA and ESA compliance for renovation of Mineral Creek
- Renovate Mineral Creek
- Restore wildfire damaged aquatic habitats on uppermost West Fork Gila River
- Construct barrier on Little Creek at NM 15 crossing
- Evaluate effects of sportfishing on Gila trout populations that have recently been opened to angling
- Obtain fish from Spruce Creek to augment populations in Dude and Raspberry creeks Establish a hatchery broodstock of Spruce Creek lineage
- Initiate and complete NEPA and ESA compliance for Blue River drainage renovations and restoration of Gila trout
- Initiate and complete NEPA and ESA compliance for renovation and restoration of Gila trout to West Fork Oak Creek
- Repair and enhance constructed waterfall barrier on Black Canyon

Rio Grande cutthroat trout

- Monitor genetic status of extant RGCT “Conservation” populations
- Complete Rio Grande cutthroat genetics analysis to determine phylogenetic origins and relationships of Rio Grande, Colorado River, Greenback, and Yellowfin cutthroat trout
- Develop and maintain RGCT GIS database
- Construct barriers on Alamitos Creek, Rio Hondo tributaries, Luna Creek, and Vermejo River
- Restore RGCT to suitable habitat in historical range by nonnative trout removal
- Establish RGCT populations in suitable habitat on Pueblo lands

- Restore and enhance habitats on selected streams
- Complete renovation and restoration of RGCT to Rio Costilla watershed

---

B. MIDDLE AND NORTHERN ROCKIES NATIVE TROUT ASSESSMENT

INTRODUCTION

The species considered in the middle and northern Rockies Native Trout Assessment include Bonneville cutthroat, Colorado River cutthroat, Greenback cutthroat and Yellowstone cutthroat. These native trout are found in the states of Colorado, Idaho, Montana, Nevada, Wyoming and Utah.

The first part of this regional review assesses the common obstacles, threats and concerns that that hinder the full recovery or conservation of species within their native ranges. The second part of the review considers the common, as well as individual, regional and local approaches that can be developed into specific strategies for improving the status of the three species. These strategies will be incorporated into the Western Native Trout Strategic Plan.

SPECIES STATUS

Bonneville Cutthroat Trout

The Bonneville cutthroat trout (BVCT) is listed as a "Tier I Conservation Species" by the State of Utah, as a "Sensitive Species" by the US Forest Service and Bureau of Land Management, and as a "Game Fish" by the State of Idaho. This species was petitioned, but precluded for listing as Threatened or Endangered by the US Fish and Wildlife Service (2001). The decision was made after a "Full Status Review," following a 90-day "Not Warranted" finding (1998). The USFWS decision not to list was challenged, but dismissed by the District Court of Colorado in

Colorado River Cutthroat Trout

The Colorado River Cutthroat Trout (CRCT) is designated a "species of special concern" by Colorado and Wyoming, and a Tier I species in Utah. Prior to 1995, it was a Federal Category 2 candidate species, but was not on the candidate list proposed by the U.S. Fish and Wildlife Service in 1996 (USFWS 1996), because category designations (e.g., 1, or 2) were discontinued in this proposed rule. The CRCT is classified as a sensitive species by Regions 2 and 4 of the USFS and by the BLM in Colorado, Wyoming, and Utah. Following a "90-day finding" that a petition to federally list CRCT was not warranted (USFWS 2004), USFWS was directed, by (which federal court district?) to conduct a "12-month review" of its 2004 finding.-month finding" review in response to Court Order following the April 2004 FWS decision.

Greenback Cutthroat Trout

Two small populations of pure greenbacks were documented by 1969, representing 4.6 km of habitat and less the 2,000 greenbacks. Following the discovery of isolated populations, the greenback was listed as an endangered species under the 1973 Endangered Species Act. To facilitate recovery, the FWS published a final determination changing the status of GBC to Threatened in 1978 (43 FR 75, 16343), and the greenback was designated as the official

Colorado State Fish in 1994. In December 2005, the U.S. Fish and Wildlife Service announced a 5-year review of greenback cutthroat trout status, and this review is currently underway. Recent genetic analyses taking advantage of new technologies have questioned the reliability of previous studies indicating purity, or non-purity of many recovery populations. The impact of these new studies is currently under review.

Yellowstone Cutthroat Trout

The United States Fish and Wildlife Service received a petition to list Yellowstone cutthroat trout under the Endangered Species Act (ESA) in 1998. Although listing was found to be unwarranted in 2001, a court-ordered status review was initiated in 2005. This status review was published February 2006, and despite acknowledged declines in Yellowstone cutthroat trout from historic levels, the presence of numerous robust populations, especially in headwater streams, precluded listing under the ESA.

The Yellowstone cutthroat trout was placed on the Regional Forester's Sensitive Species List for the US Forest Service Region 1, 2, and 4. The Bureau of Land Management has listed the Yellowstone cutthroat trout as a sensitive species, and it is also specifically designated as a sensitive species in by the agency in state offices of Idaho, Montana, Nevada, Utah, and Wyoming.

Yellowstone cutthroat trout has been designated as a "Game Fish" by the Idaho Department of Fish and Game and a "Species of Special Concern" by the Montana Department of Fish, Wildlife and Parks (MFWP). More recently, MFWP collaborated with other agencies and organizations in the state to develop a Comprehensive Fish and Wildlife Conservation Strategy (CWCS) that lists the Yellowstone cutthroat trout as a Tier 1 species. The Yellowstone cutthroat trout receives special management consideration as a native species by the Nevada Division of Wildlife and the Utah Division of Wildlife Resources. Management of the Yellowstone cuthroat has been an integral aspect of wild trout management by the Wyoming Game and Fish Department (WGFD) since the 1950s, and since 1955, the department has managed the fine-spotted Snake River cutthroat trout as a separate entity. It is considered a species of greatest conservation need by Wyoming in their CWCS. WGFD considers it a NSS2 species.

COMMON OBSTACLES, CONCERNS AND THREATS

Population Viability Concerns:

- Many of the populations have relatively few fish and are not connected to other populations.
- Inbreeding/genetic issues may result from small, isolated populations.
- Human development and land use has reduced the amount of available, well-connected habitat which reduces the long-term viability of many populations.
- Proper assessment of population viability requires a rigorous monitoring program. Sound data sets aid in discussions of population viability and provide a common basis for conservation and management decision making.

Genetic Considerations:

- Introductions of rainbow trout and other cutthroat subspecies have degraded the genetic purity of many populations. Records are incomplete regarding fish movement and fish stocking so it is difficult to determine which populations may be at risk.

- The genetic status is unknown for many populations. Genetic status from older analytical methods (original species descriptions, morphometrics and meristics, electrophoresis, etc.) may be inconsistent with current "state of the art" biochemical methods. An additional challenge is that the state of the art constantly changes and is increasingly sensitive. It is difficult to determine at what point a biochemical difference is meaningful at the species/subspecies level. Only recently have the genetic methods been sufficiently sensitive to detect introgression with other subspecies of cutthroat. Not a standard for determining percent introgression.
- Genetic work is expensive and funding is limited to analyze and reanalyze populations.
- Establishment of broodstocks is difficult. Sometimes there are not "pure" populations available or it is difficult to get agreement among geneticists as to the best population to use.

Disease and ANS Concerns

- Whirling disease is a concern. VHS and furunculosis may impact cutthroat.
- Red-mouth is a concern where there are wild brood populations, such as in Nanita Lake, in Rocky Mountain National Park.
- Presence of a disease in a watershed may preclude that watershed from being used for restoration.
- Keeping "clean" populations from being impacted by disease. Anglers and researchers as a vector are often cited as a concern.
- Standardization of analytical methods such as PTG or PCR for whirling disease detection. Not everyone adheres to the AFS Blue Book.
- Quagga mussels, zebra mussels, New Zealand mud snails are all a concern. NZMS are present within the range of some subspecies of cutthroat (Snake River, historic Greenback range).
- Didymo (*Didymosphenia geminata* or rock snot) is present in some places and the impact is still unknown.
- Trans-basin water diversions increase the possibility of movement of fish and ANS between basins.
- Aquarium trade moving ANS around.

Introduced Species Concerns

- Introductions of rainbow trout and other cutthroat subspecies has degraded the genetic purity of many populations. Salmonids have negatively impacted cutthroat populations (brook trout, brown trout, lake, rainbow, cutthroat) through competition, predation and hybridization.
- Illegal introductions by anglers may reintroduce non-native trout as well as other game fish species such as walleye in Bear Lake, burbot in Flaming Gorge Reservoir, lake trout in Yellowstone Lake, etc.

Overutilization Concerns

- Fishing regulations have been implemented and enforced to protect populations as needed. Some fisheries have been closed to fishing while others can withstand some angling mortality.

- Social trend towards catch and release is protecting populations, even when they are put and take fisheries.

Habitat Concerns

- Continued human population growth impacts the quantity and quality of habitat. Urbanization and sprawl often conflict with recreational uses and degrade habitat. Can lead to opportunity by conversion from agricultural to culinary use (that may have negative aspects as well).
- Effective implementation of regulatory mechanisms depends on consistent and adequate funding.
- Contaminants such as mercury and some pesticides are becoming an issue.
- In the face of increasing demands for water we need to maintain adequate instream flows and water quality to support native trout.
- Roads, grazing, mining, timber harvest, recreation (ATV, etc.) impact habitat (sediment, temperature, quality).
- Degraded habitat results in increased isolation and fragmentation.
- Energy Development impacts are currently a big issue. It can increase or decrease water quantity. Many other impacts such as increased sedimentation from road building, contaminant spills, access to areas that were previously closed, more people in areas that were previously less populated can all impact native trout.
- Transbasin water diversions, impact water quantity and movement of fish and ANS between basins.
- Wildfire and fire suppression may negatively impact cutthroat populations.

Climate Change Concerns

- In the face of changing precipitation patterns we need to maintain adequate instream flows and water quality to support native trout. Flow patterns are likely to change and flow may reduce or increase. Runoff will probably be earlier. All of which may impact established life history patterns and some native trout may not be able to adapt to environmental changes within certain portions of their range.
- Increased temperatures may restrict currently viable populations at lower elevations and could result in expanded range or habitat suitability for non-natives and aquatic nuisance species.
- Degraded habitat results in increased isolation and fragmentation.
- Increased wildland fire may impact cutthroat populations.
- May actually benefit Greenback, as it is believed that they are limited by low water temperatures.

Public opinion/support that translate into regulatory obstacles

- Piscicide use is a valuable management tool and is unavailable or difficult to use due to public concern or backlash.
- Recreational fishing opportunities may be negatively impacted. The public can lose angling opportunities if fisheries are closed to angling to protect populations. They can also lose opportunity (or perceive loss of opportunity) by conversion of brook trout fisheries under standard regulations to limited take of cutthroat trout. There is also the potential for animal rights concerns when populations that were closed are opened to angling.

- Institutionalized support for extractive/consumptive uses on public lands including subsidies for agricultural impacts on habitat and leasing for energy development.
- Many of these problems result from a lack of understanding by the public. Need to be sure to implement the third phase of the WNTI proposal—conservation outreach.
-

Regulatory and Administrative Issues

- Lack of intercross standard from USFWS.
- Inconsistent application of policies between adminstrative units in federal agencies (BLM Field Offices, Forest Service Ranger Districts or Forests).

COMMON APPROACHES AND OPPORTUNITIES FOR IMPROVING THE STATUS

The approaches described below are common to the three species in the Middle Rockies assessment:

Identify and characterize all conservation populations

- Conduct surveys to identify undiscovered populations of native trout
- Regularly genetically monitor established populations using standard protocols
- Routinely synthesize and analyze genetic data to assess population trends

Secure, enhance, and restore conservation populations

Population manipulations

- Remove non-native species, followed by re-introduction of native fish to create genetically pure isolated, as well as connected meta-populations to maintain sources of genetically pure cutthroat
- Protect distinct life-history traits
- Restrict introduction of non-native fish species
- Restrict spread of disease and invasive species
- Expand small, isolated populations where possible, and maintain or enhance high quality habitats to prevent extirpation due to small population size or stochastic events.

Population inventory and monitoring

- Assess streams to evaluate potential for restoration of native trout
- Regularly demographically monitor established populations using standard protocols
- Routinely synthesize and analyze demographic data to assess population trends
- Conduct studies to assess the effects of sportfishing on recovery populations

Secure and enhance watershed conditions

Habitat management and monitoring

- Secure and enhance watershed conditions
- Habitat manipulation (barrier placement or removal, in-stream structure, flow enhancement, increasing connectivity, isolation of fragments, etc.)
- Develop meaningful habitat standards and guidelines. Apply watershed-monitoring guidelines developed above consistently and evaluate and monitor land management actions

- Modify grazing practices, fence riparian areas, close and obliterate roads in the riparian area. Identify and implement best management practices on FS, BLM, and private lands to benefit cutthroat habitats.
- Restore and enhance water flow, water quality, natural sediment regimes, and physical integrity of channels where feasible.
  - Replacement of culverts to allow fish passage (where passage is desirable).
  - Screen water diversions to prevent entrainment.
  - Modify diversions to allow fish passage.
  - Restore and improve altered channel and riparian zone habitats.
- Monitor and evaluate natural catastrophic impacts like fire and drought.
- Provide technical information, administrative assistance, and financial resources to assure compliance with the listed objectives and encourage conservation of cutthroat on private lands.
- Maintain and protect cutthroat habitat from degradation by achieving compliance with existing habitat protection laws, policies, and guidelines.
- Pursue land and access acquisitions to protect important native trout habitat.

Regulatory actions (fishing regulations, water use, land management, etc.)

- Regulate angling and enforce regulations that prevent impacts associated with recreational angling.
- Enhance and maintain regulatory mechanisms that prevent diseases or illegal introduction of nuisance species.
- Work through the FERC re-licensing process to require impoundment operators to operate dams to minimize impacts where necessary to meet cooperative agreement objectives. Investigate restoration and enhancement opportunities on FERC re-licensing of hydroelectric facilities.

Public outreach and Develop public outreach and partnerships (NGO, public)

- Implement interpretive and educational programs
- Share data and update range-wide databases with data from a well-designed field monitoring programs to serve as a barometer to monitor the status of native trout over time.
- Coordination (interagency partnerships) by continue fostering cooperative interagency work environment and coordinating with other cutthroat conservation efforts

Research

- Conduct research on genetics, habitat and species ecology
- Develop methodology for construction of fish passage barriers.

SPECIES SPECIFIC ACTIONS AND NEEDS

Greenback Cutthroat Trout

- Complete genetics work on relatedness of Colorado River, Greenback and Rio Grande cutthroat trout.
- Establish additional stable populations in the Arkansas and South Platte River basins.

- Prepare and sign a cooperative long-term conservation and management plan and agreement between state, federal and private interests to guide management of the greenback cutthroat after de-listing.
- Maintain and update the rangewide data system. This will require finding an entity with sufficient technical capacity and interest in the project to assume responsiblity. It will require a consistent funding stream to provide support for the system. This could be done for all the species/subspecies using the inland cutthroat data protocol.

Bonneville Cutthroat Trout

- Complete initial surveys and monitoring
- Establish a brood source for Bear River Bonneville BVCT.
- Brood stock maintenance and disease certification at Manning Meadow, Little Dell Reservoir, Douglas Ranch (UT), Goshute Tribal Lands, and Hidden Canyon Ranch (NV) for supplemental stocking and reintroduction of BVCT.
- Monitor oil and gas exploration, timber harvest, grazing, and recreation activities on the Wasatch-Cache National Forest.
- Accomplish non-native fish eradication (rainbow trout) in Swan Creek and re-introduce BVCT.
- Mechanical removal of rainbow trout (electrofishing techniques) from St. Charles Creek. Continue to promote harvest of non-native brook trout through liberal limits and bait fishing.
- Monitor the effectiveness of fish passage projects and reconnect tributaries on the Thomas Fork.
- Accomplish Chalk Creek BVCT Fish Passage Improvement Project (Phase II). The BVCT population in Chalk Creek constitutes the largest metapopulations within the Bonneville Basin.
- Monitor and evaluate habitat/water quality conditions due to drought, groundwater extraction, and fire in Deep Creek Range (UT), North and South Snake Range (NV), Cherry Creek Range (NV), and Quinn Range (NV).

Colorado River Cutthroat Trout

- Brood source development for Lower Colorado and Lower Green River GMUs.
- Complete restoration project on Muddy Creek in the Little Snake River drainage.
- Secure barrier placement on West Fork Duchesne to protect conservation population used as brood source.
- Complete barrier renovation project on North Fork Little Snake River to protect the upstream populations.
- Complete barrier renovation on LaBarge Creek to protect 58 stream miles above the barrier from non-native trout re-colonizaztion.
- Complete genetic assessment of North Slope Uinta brood source.
- Restoration activities on Range Creek and Ferron Creek (non-native removal and re-establishment of cutthroat).
- Complete genetics work on relatedness of Colorado River, Greenback and Rio Grande cutthroat trout.
- Complete removal of existing fish barriers on Littlefield creek in the Little Snake River drainage as needed to enhance the movement of native fish in the system.
- Complete restoration of East and West Coal Creek.

Yellowstone Cutthroat Trout

- Continuation of lake trout removal in Yellowstone Lake.
- Protect and enhance spring spawning streams on the Snake River.
- Complete inventory of Wood and Greybull River drainages and begin restoration work where feasible.

C. Western Great Basin Native Trout Assessment

INTRODUCTION

Species in this assessment include Paiute cutthroat trout, Lahontan cutthroat trout, Little Kern golden trout, and California golden trout. Paiute cutthroat, Little Kern golden trout, and California golden trout are endemic to the Sierra Nevada Mountains in California. Lahontan cutthroat trout are also endemic to the hydrographic Lahontan basin of northeastern California, southwestern Oregon and northern Nevada.

This regional review looks at the status, common obstacles, threats and concerns that may exist that hinder the full recovery or conservation of the species within their specified range; the second part of the review looks at the common, as well as individual, regional and local approches that can be developed into specific strategies for improving the status of the three species. These strategies will be incorporated into the Western Native Trout Strategic Plan.

THE LISTING STATUS OF THESE FISH IS AS FOLLOWS:

Paiute Cutthroat Trout

The Paiute cutthroat trout was originally listed as endangered on March 11, 1967 (U.S. Fish and Wildlife Service 1967) under the Endangered Species Preservation Act of 1966. On July 16, 1975, the Paiute cutthroat was reclassified as threatened under the Endangered Species Act of 1973 (U.S. Fish and Wildlife Service 1975) to facilitate management and allow regulated angling. California lists the Paiute cutthroat as a Wild and Heritage Trout.

Lahontan Cutthroat Trout

The Lahontan cutthroat trout is one of approximately 14 allopatrically distributed subspecies of cutthroat trout, Lahontan cutthroat trout was listed as an Endangered Species by the U.S. Fish and Wildlife Service on October 13, 1970 (35 FR 16047 16048), and down-listed and reclassified as Threatened (40 FR 29863 29864) in 1975 to facilitate management and allow regulated angling.

Lahontan cutthroat populations have been divided into three Distinct Population Segments (DPS) by the USFWS for recovery activities: Western (Truckee, Carson, and Walker rivers); Eastern (Humboldt River); and Northwestern (Quinn River/Black Rock Desert) DPS. The Recovery Plan for LCT was approved on January 30, 1995 (Coffin and Cowan 1995), but no critical habitat has been designated.

California Golden Trout

California golden trout was designated by the U. S. Fish and Wildlife Service (USFWS) in 1991 as a Category 2 Candidate Species until deletion of that category in 1996. It is now designated as a Species of Concern. The U.S. Forest Service Region 5 has recently added California golden

trout to its Sensitive Species List and the California Department of Fish and Game (CDFG) has designated it as a Species of Special Concern. It was petitioned for Federal listing as Endangered by Trout Unlimited in 2000 (Trout Unlimited 2000). After completing the initial review of the listing package, called a 90-day finding, the USFWS determined that substantial evidence exists to support the petitioned action. The USFWS is in the process of a 12-month review to decide whether or not to propose the California golden trout for listing pursuant to the Endangered Species Act of 1973, as amended. At the end of this review period, the USFWS will determine whether listing is "not warranted," "warranted" or "warranted but precluded" due to the precedence of higher priority listing actions.

Little Kern Golden Trout

The Little Kern Golden trout (LKGT) was proposed for federal listing as Threatened under the Endangered Species Act (ESA) on September 1, 1977 by the U. S. Fish and Wildlife Service (USFWS 1978). On April 13, 1978, the Director of the US Fish and Wildlife Service officially listed the LKGT as Threatened, and designated its Critical Habitat. It has the designation of species of Special Concern with the State, and has had a long history of recovery efforts. The California Department of Fish and Game (CDFG) prepared a management plan for the species in 1978 (Christenson 1978) and revised the plan in 1984 (Christenson 1984). This plan also serves as a recovery plan, but is badly out of date and needs to be revised. LKGT is managed as a Heritage Trout by CDFG.

COMMON OBSTACLES, CONCERNS AND THREATS

Species Viability

- Population vulnerability (external factors): isolated recovery streams, population fragmentation, wildfire, and drought
- Population viability: small population size
- Population number: limited suitable restoration streams, few hydrologically complex drainages

Genetics

- Captive propagation: genetics, purity, public perceptions, wild vs. hatchery, broodstock management plans
- Overall genetic health/diversity: inbreeding depression, bottlenecking, loss of heterozygosity and genetic diversity
- Introgression and competition with non-native trout

Introduced Species

- Nonnative salmonids: competition, predation, and hybridization with nonnative salmonids

Habitat

- Habitat degradation due to hiuman activities including timber harvest, mineral extraction, livestock grazing, water diversion, road construction

Climate Change

- Water: altered flow regimes, altered drought frequency & intensity, increased water diversion/withdrawal, modified thermal regimes, increased sediment loading
- Wildfire: altered wildfire regimes (frequency & intensity), increased individual wildfire extent

Public and Agency Opinion/Change

- User group conflicts: popularity of native fish vs. nonnative sport fish, government and tribal agencies support/conflicts

COMMON APPROACHES AND OPPORTUNITIES FOR IMPROVING THE STATUS

Secure, enhance, and restore conservation populations

Historically, many native trout populations existed within inter-connected systems or "metapopulations". These interconnected aquatic ecosystems that were either lake habitats with tributary streams or large stream networks consisting of a main stem river and smaller tributary streams. Research has shown that populations with greater connectivity and larger habitat (patch) size are more likely to persist through time. The common approach to the recovery and conservation of species included in this assessment is the goal to re-establish connectivity of lake and stream habitats where feasible.

Population Viability

- Protect headwater source populations from introduced fishes, disease to maintain their genetic integrity
-

Population manipulations

- Restoring native trout to streams where wildfire has eliminated nonnative trout
- Captive fish propagation following established broodstock management plans
- Removal of nonnative salmonids and reestablishment of native trout through genetically appropriate donor populations and captive stocks
- Supplement populations as needed

Population inventory and monitoring

- Assess streams and lakes to evaluate potential for restoration of native trout
- Regularly demographically monitor established populations using standard protocols
- Routinely synthesize and analyze demographic data to assess population trends
- Conduct studies to assess the effects of sportfishing on recovery populations

Secure and enhance watershed conditions

Habitat management and monitoring

- Instream habitat manipulation
- Riparian zone management
- Conduct habitat surveys
- Monitor water quality, flow, and temperatures
- Water rights and minimum stream flow acquisition and protection

Regulatory actions (fishing regulations, water use, land management, etc.)

- Maintain and protect habitat from degradation through Agency planning, and compliance and enforcement of existing laws, regulations, guidelines, and policies
- Resource agencies will take measures to diminish the potential for illegal stockings of nonnative salmonids

Sport fishing opportunities

- State fish and wildlife agencies shall enforce existing fishing regulations and promulgate new regulations as necessary to protect populations
- Agencies may provide sport fisheries using hatchery produced native trout to gain public support

Public outreach and partnerships (NGO, public)

- Regularly provide outreach information on native trout recovery and management activities to agencies, user groups, WNTI website or newsletter

SPECIES SPECIFIC APPROACHES AND NEEDS

Paiute Cutthroat Trout

- Remove all nonnative salmonids from Silver King Creek and its tributaries down-stream of Llewellyn Falls to fish barriers in Silver King Canyon, re-establish and maintain Paiute cutthroat trout in the reclaimed reaches;
- Maintain Paiute cutthroat trout habitat in all occupied streams;
- Maintain as refugia the populations in Corral and Coyote Creeks, Silver King Creek and tributaries above Llewellyn Falls, as well as out-of-basin populations that are secured from the introduction of other salmonid species;
- Develop a long-term conservation plan and conservation agreement which will be the guiding management documents once Paiute cutthroat trout are de-listed.

Lahontan Cutthroat Trout

Western Lahontan basin comprised of the Truckee, Carson, and Walker river sub-basins:

- Explore the potential of re-establishing self-sustaining lake populations of LCT in the Lake Tahoe basin, and Walker and Pyramid Lakes through re-establishment of connectivity to main-stem rivers or tributaries to the extent practicable. Reintroductions of LCT populations into these historic lake habitats where they were extirpated in the 1940's will require reliance on broodstocks and hatchery propagation.
- Through State, Federal, and Tribal hatchery sources of LCT eggs, fry and fingerlings, catchable trout will be used to expand wild populations and provide recreational angling.
- Investigate management and research actions to determine the most effective strategies for reestablishing wild lake populations.
- Continue to raise LCT at State, Tribal and Federal hatcheries for recovery actions and continue to evaluate the feasibility of using LCT to replace nonnative trout for recreational fishing purposes. Evaluate the performance of the Pilot Peak strain in the Truckee/Tahoe and Walker basins.

- Evaluate the feasibility of recreating the native networked populations within the Lake Tahoe-Truckee River and Walker River watersheds in the Western basin DPS.
- Continue cooperation among partners to identify and address upstream barriers and entrainment in each of the three basins, as well as cooperative funding efforts.
- Secure and improve riparian and in-stream habitat for the restoration of LCT fluvial populations
- Identify critical stream and riparian zone habitats for stream treatments and Lahontan cutthroat trout reintroductions to expand and secure metapopulations and priority isolated streams in headwater populations.
- Restore and enhance water flow, including restoring the natural hydrograph, not necessarily historic volumes, in key habitats.

Northwestern Lahontan basin comprised of Quinn River, Black Rock Desert, and Coyote Lake sub-basins:

- Continue expansion of Lahontan cutthroat trout distribution for improved networked populations through the Interagency DPS Teams.
- Complete barrier development and treatment in high priority sub-basins to enhance networked populations in high priority sub-basins.
- Monitor population genetics over the long-term to determine hybridization, population genetic structure changes resulting from increases in habitat quantity and quality, and evaluate potential loss of genetic diversity.
- Monitor angler use of occupied streams.

Humboldt River basin:

- Continue stream treatments and reintroductions to expand and secure networked populations, and also within priority isolated streams where appropriate.
- Continue to improve riparian and aquatic habitats and increase essential habitat acquisitions to improve fish passage and enhance stream connectivity in order to facilitate emergence of the historic population dynamics in these watersheds.
- Continue evaluation of genetics at regular intervals to determine hybridization, phylogenetic analysis, and to evaluate the potential loss of genetic diversity. In addition, continue to monitor angler use of occupied streams.

Little Kern Golden Trout

- Complete the genetic analysis of trout samples collected from tributary streams to the Little Kern River and Coyote Creek. Use the results of genetic analyses to develop a **LKGT** genetics management plan. Monitor the genetic integrity of these populations needs to be checked on a regular basis.
- Monitor fish populations (numbers, size, condition)and continue enforcement of Fish and Game regulations, including efforts to prevent trout transplantation.
- Continue public outreach efforts, including the consequences of illegal fish transplantation and produce an annual (or as needed) backcountry user's brochure explaining the program and management action that may be occurring.

- Monitor effectiveness and integrity of the barriers to upstream fish movement. All barriers need to be evaluated and effectiveness improved as needed.
- Coordinate management activities at least annually with land management agencies (U. S. Forest Service, National Park Service) and stakeholders.

California Golden Trout

- Develop a CGT genetics management plan that may include a baseline genetic analysis with monitoring being implemented on a regular basis, measuring the degree of hybridization, and identifying other potential source populations.
- Monitor stream and meadow habitat and bioassessment of species in two rested grazing allotments. Compare these results to the two allotments that continue to be grazed.
- Monitor fish populations (numbers, size, condition) and continue enforcement of Fish and Game regulations, including efforts to prevent illegal trout transplantation.
- Monitor integrity and effectiveness of fish barriers and consider the need for additional downstream barriers in remote locations.
- Review and update Implementation Plan (work plan) annually.
- Continue public outreach efforts, including the consequences of illegal fish transplantation and continue to coordinate and use volunteers to accomplish some of the field work.
- Remove source of introgressed trout in headwater lakes, downstream reaches as appropriate, and resolve the non-native trout stocking issues.
- Establish refuges within and outside the native range for CGT based on criteria to be developed.

D. Northwestern and Coastal Native Trout Assessment

INTRODUCTION

The species considered in the Northwestern and Coastal Assessment include Bull trout, Westslope cutthroat trout, Redband trout and Coastal cutthroat trout. Bull trout are found in SE Alaska, Idaho, Montana, Nevada, Oregon and Washington, Westslope Cutthroat trout are found in Idaho, Montana, Oregon, Washington and NW Wyoming. Redband trout are found in California, Idaho, Nevada, NW Montana, Oregon and Washington. Coastal cutthroat trout are found in coastal areas of Alaska, Northern California, Oregon, Washington and British Columbia.

The complete status reviews for these species are found in Appendices L through O,
This regional review looks at the status, common obstacles, threats and concerns that may exist that hinder the full recovery or conservation of the species within their specified range; the second part of the review looks at the common, as well as individual, regional and local approches that can be developed into specific strategies for improving the status of the four species. These strategies will be incorporated into the Western Native Trout Strategic Plan.

THE LISTING STATUS OF THESE FISH IS AS FOLLOWS:

Bull trout

The bull trout (*Salvelinus confluentus*) is currently listed as Threatened under the Endangered Species Act of 1973. The original listing rule in 1998, described distinct population segments in the Columbia, Klamath, and Jarbidge River basins. A November 1, 1999 updated rule listed the species as "Threatened" throughout the coterminous United States, which included additional distinct population segments in Washington's Coastal-Puget Sound area and Montana's St. Mary-Belly River basins. Effective October 26, 2005 the FWS designated critical habitat for the Klamath River, Columbia River, Jarbidge River, Coastal-Puget Sound, and Saint Mary-Belly River populations of bull trout in the coterminous United States pursuant to the Endangered Species Act of 1973, as amended (Act). This final designation totals approximately 3,828 miles (6,161 kilometers (km) of streams, 143,218 acres (57,958 hectares) of lakes in Idaho, Montana, Oregon, and Washington, and 985 mi (1,585 km) of shoreline paralleling marine habitat in Washington.

In 2004, the U.S. Fish and Wildlife Service initiated a five-year review of the bull trout listing status. The review process solicited status assessment information from cooperators in the states within which bull trout reside (Montana, Idaho, Nevada, Oregon and Washington). On June 15, 2007, the Service announced its intent to form a State/Federal Bull Trout 5-year Review Collaboration Team to finish the final stage of the review. State fish and wildlife agencies in CA, NV, WA, OR, and ID were invited to participate.

Redband trout

Various forms of the Redband trout were petitioned to be listed as Threatened or Endangered in the late 1990's, but the U.S. Fish and Wildlife Service determined that the sub-species, in the various drainages, did not need the protection of the Endangered Species Act. The various forms of Redband trout in California, Oregon, Washington, Nevada, and Montana are considered to be sensitive species or species of concern in all the states, except Idaho where they are officially classified as "Game Fish". The BLM also considers several populations of Redband Trout to be a "sensitive Species".

Westslope Cutthroat trout

On June 6, 1997, the U.S. Fish and Wildlife Service received a petition to list the westslope cutthroat trout (*Oncorhynchus clarkii lewisi*) as threatened throughout its range. pursuant to the Endangered Species Act. On April 14, 2000, the Service published a finding (65 FR 20120) that listing the westslope cutthroat trout as either a threatened or an endangered species under the Act was not warranted at that time. On September 3, 2002, (67 FR 56257) the FWS announced initiation of a new status review for the westslope cutthroat trout and solicited comments from all interested parties. On August 7, 2003, (68 FR 68152) the Service again determined that the listing of the westslope cutthroat trout as a threatened or endangered species under the Act was not warranted at the time. Subsequently, the scientific findings were appealed, and on March 2007 and July 2008, the court agreed with the Service's determination that listing is not warranted..

Each of the states where westslope cutthroat trout are found, list the fish as a native species of concern and/or as a sportfish. Montana has also developed a Conservation Agreement signed by

nine government agencies and conservation groups (Montana Department of Fish, Wildlife and Parks 1999).

Coastal cutthroat

Coastal cutthroat trout (Oncorhynchus clarkii clarkii) have been considered a vulnerable indicator species in recent years and have been petitioned for listing under the Endangered Species Act (ESA). In 1996, National Marine Fisheries Service (NMFS) listed the Umpqua River coastal cutthroat trout (CCT) as a threatened species under the Endangered Species Act of 1973, as amended. Following this listing, NMFS conducted a status review of the species throughout their distributional range in the lower 48 state region of North America. The Fish and Wildlife Service (FWS) and NMFS have, in the past, jointly managed CCT under the ESA and on April 5, 1999, the agencies published a joint proposal to list the southwestern Washington-Columbia River cutthroat trout ESU (SWWC-ESU) as a threatened species and to de-list the Umpqua River ESU under the ESA. On November 22, 1999, the Directors of NMFS and the FWS signed a joint letter determining that the FWS would assume all ESA regulatory jurisdiction over CCT.

In 2002, there was a review and decision by FWS to "withdraw" the SWCW-ESU from listing. Included in the same Federal Register Notice for withdrawing the decision to list CCT, the FWS committed to work with interested States, Native American Tribes, and other interested parties in pursuing a Conservation Initiative which would assist in the restoration of CCT. At the state level, the sub-species is considered to be a "sensitive or at risk" fish, as well as a sportfish in AK, CA, OR, and WA, and British Columbia. There is concern and a fair amount of ambiguity surrounding the status of the anadromous form of this sub-species and there are only a few locations where long-term trend data are available. In some of these locations there is evidence that current smolt counts represent a fragment of historic counts. In addition, we are certain about the disappearance of many populations that were once fished in certain highly developed eco-regions.

CCT are the only sub-species of *O. clarkii* without a multi-agency management plan in place. In 2006, in an effort to remedy this situation and as part of the decision to withdraw the listing of the SWWC-ESU, Pacific States Marine Fisheries Commission (PSMFC) and FSW initiated a voluntary effort among state, tribal, federal and provincial agencies that represent agencies throughout the distributional range of CCT. The goal of this effort is to coordinate agency efforts, share knowledge, and advance our understanding of CCT with the long-term goal of developing a consistent framework for the management, research, restoration, and conservation of the sub-species

COMMON OBSTACLES, CONCERNS AND THREATS

Population Viability Concerns

- Populations are fragmented, isolated and small as a result of loss of habitat
- The status of small populations is uncertain
- The status of populations in terms of long-term viability is uncertain
- The potential for impacts from non-native fish is a constant concern

Genetic Considerations

- Hybridization with non-native species in local populations
- Hybridization with hatchery population
- Lack of information on genetic management units

Habitat Concerns

- Habitat degradation as a result of public and private land management including : timber harvest, mineral extraction, livestock grazing, water diversion, road construction Agriculture use of water and habitat degradation
- Urban development and associated habitat impacts
- Water diversions, reduction in flows, and reduced water quality
-

Fish Passage

- Fish passage barriers for migratory life history forms
- Fragmentation and loss of connectivity of habitat

Data Shortfall Issues

- Lack of information leads to uncertainty of status, especially for Coastal cutthroat trout
- Lack of data inhibits prioritization of actions to conserve sub-species
- Unknown historic and present distribution for some sub-species
- Lack of information on abundance
- Limited understanding of basic life history interactions (resident and anadromous)

COMMON APPROACHES AND OPPORTUNITIES FOR IMPROVING THE STATUS

Identify and characterize all conservation populations

- Address the data shortfalls by prioritizing data collection needs for distribution and abundance
- Establish monitoring programs to assess long-term trends
- Work to understand basic life history such as migratory patterns and interaction between life history forms

Secure, restore and enhance conservation populations

Population Viability

- Removal of nonnative salmonids and reestablishment of native trout through genetically appropriate donor populations and captive stocks
- Enhance connectivity
- Use artificial propagation to restore extirpated populations (tool of last resort)
- Continue to support native fish policies

Genetics considerations

- Identify genetic population structure for management purpose

Secure and enhance watershed conditions

Habitat management and monitoring

- Focus habitat conservation is areas that support stronghold populations
- Barrier placement or removal (depending on genetic integrity and threats from non-natives)
- Provide in-stream structure and flow enhancement
- Increase connectivity
- For healthy populations utilize habitat improvement to expand range including water quality and quantity
- Use water transactions to increase in-stream flows

Fish Passage

- Improve fish passage through culvert replacement
- Develop a method to prioritize projects and assess success
- Improve instream flows
- Install fish screens for hydroelectric and irrigation dams and diversions
- Maintain natural barriers
- Maintain man-made barriers to protect pure populations

Regulatory Actions

- Strong regulatory actions and regulation to prevent minimize expansion of Aquatic Nuisance Species and disease
- Regulate angling and enforce regulations that prevent impacts associated with recreational angling.

Research

- Conduct research on genetics, habitat and species ecology

Public outreach and partnerships

- Develop public outreach and partnerships (NGO, public)
- Share data and update range-wide databases with data from a well-designed field monitoring programs to serve as a barometer to monitor the status of native trout over time, especially for coastal cutthroat trout
- Continue fostering cooperative interagency work environment

SPECIES SPECIFIC APPROACHES AND NEEDS

Bull Trout

- The FWS and the States, with key Partners, need to conclude the 5-year Status review and develop a bull trout Memorandum of Agreement that describes the key components of the Recovery Plan that need to be addressed over the next 5 Years.
- Management Teams should be formed for the 4 GMU's with the goal of continuing to prioritize the key actions that need to be accomplished to improve the status of bull trout and seeking funding through the various Partnerships being developed.

- Protect and maintain key functioning Bull Trout core habitats and populations.
- Improve the connectivity and genetic integrity of bull trout populations where needed

Redband Trout

Upper Great Basin GMU

- Reduce losses to entrainment and improve passage at upstream barriers.
- Increase streamflow to improve connectivity.
- Develop and apply a monitoring and assessment program for Great Basin redband trout. Derived data will be used to assess status relative to state and federal management goals.
- Develop habitat projects to improve the status of the Great Basin redband trout.

Sacramento River Basin GMU

- Conservation measures needed for the McCloud redband focus on the following objectives: (A) establish a McCloud redband refugium, (B) enhance and/or maintain habitat, and© maintain genetic integrity.
- Utilize information developed by the UC Davis study to determine which of the inland stocks are genetically distinct from coastal rainbow, and develop appropriate management actions.

Upper Snake GMU

- Protect and maintain existing habitat and populations.
- Reduce losses to entrainment and improve passage at upstream barriers.
- Increase streamflow to improve connectivity.
- Develop and apply a monitoring and assessment program for Upper Snake redband trout. Derived data will be used to assess status relative to state and federal management goals.
- Develop habitat projects to improve the status of the Upper Snake redband trout.
- Conduct non-native trout removal projects.
- Monitor angler use trends.

Upper Columbia River GMU

- Conduct standardized surveys to assess status and trend and genetic analyses to define population structure and identify introgression from other fish..
- Restore and improve altered channel and riparian zone habitat

Westslope Trout

- Develop a State/Federal Memorandum of Agreement for the Conservation of Westslope cutthroat trout with appropriate partners with the objective of prioritizing the key actions that need to be accomplished to improve the status of Westslope cutthroat trout and seek funding through the various Partnerships being developed.
- The States, with key partners, need to update, describe and prioritize the key components of the Conservation Plan that need to be addressed over the next 5 Years based on a new WCT Status Review.
- State fish and wildlife agencies shall enforce existing fishing regulations and promulgate new regulations if necessary to protect Westslope cutthroat trout population

- Manage hatchery broodstocks and use of stocked fish to maintain genetic diversity and appropriate fish stocking protocols

Coastal cutthroat trout

- Continue the coordinated effort among tribal, state, federal, provincial agencies that identifies the priority research and management needs for CCT for the purpose of developing a range-wide conservation plan. This plan would include:
  a) Develop a monitoring framework for CCT that allows for the assessment of status, i.e., define what constitutes a "healthy" population of CCT including stream health;
  b) Identify (GMU's) throughout the distributional range of CCT
  c) Establish or enhance outreach with angling and NGO groups
  d) Determination of genetic affinities of CCT, especially in Columbia River and southwest Washington CCT populations, among/between "resident" and migratory populations, and between CCT and O. mykiss
- Complete distribution and abundance surveys to examine the following;
  a) Continuation, expansion, and/or establishment of spawner or proxy surveys of CCT escapement/recruitment.
  b) Establishment of population and stock status assessment programs for CCT
- Fund research that aids management agencies in their efforts to identify the important linkages among life history type
- Assessment and remediation of fish passage barriers
- Assessment and restoration of stream water, channel and habitat quality
- Assessment and restoration of estuarine and near-shore water and habitat quality

---

III. Summary of findings on status, concerns and opportunities of Western Native Trout

Not unexpectedly, the obstacles and threats to expanding or improving the status and population levels of native trout and char considered in this report are fairly similar across the wide geographic range considered. Opportunities and potential actions for achieving the Western Native Trout Initiative objectives are likewise relatively similar across geographic areas, but vary in design to reflect the specific needs of each taxon..

A. Summary of common concerns to viability of western native trouts that could be addressed in the WNTI Strategic Plan:

Maintaining and increasing the geographical distribution of healthy populations of all western native trout is basic to improving their status. Obstacles or concern areas common to all species assessments included habitat, population viability, genetics, regulatory, and public informational issues. Other obstacles and concerns frequently identified, but not common to all species included invasive and aquatic nuisance species, data shortfalls, climate change, and energy development and conservation planning and cooperation among agencies.

General Habitat Concerns

The old adage is that if you want good fish populations, you have to have good habitat. Clearly, habitat degradation is one of the two most frequently cited reasons for decline of western native trout. Habitat restoration, enhancement and management remain uppermost as an area for improvement in native trout conservation and recovery. The habitat obstacles and concerns were expressed individual species reviews key in a variety of ways and importance:

a) Habitat degradation from human activities and continued use of poor land management practices associated with timber harvest, mineral extraction, livestock grazing, agricultural and domestic water diversion, road construction, and dams continues to impede trout conservation;

b) Reduced water quality, water flows, and potential water temperature increases from human use and natural causes impacts available habitat as well as reducing habitat available for western trout life history needs and connectivity of habitats;

c) Detrimental impacts of energy development and climate change are increasing concerns in selected areas across the west, yet are difficult to quantify;

d) Removal of fish passage barriers that contribute to loss of migratory life forms of native trout through range fragmentation and cause population isolation is a concern on one hand; while building and maintaining fish passage barriers to protect populations from contamination by non-native trout is a concern on the other;

e) In some native trout habitat, a growing concern is the "urbanization" of large tracts of private land along riparian zones and in watersheds that are relatively pristine. Human development can adversely alter watersheds and negatively impact trout populations.

Population Viability and Genetic Concerns:

Population viability can be described as the ability of a species to remain healthy and robust in the environments in which it evolved. In the species assessments, frequently mentioned concerns and obstacles to securing, restoring, and enhancing populations included:

a) fragmentation of fish populations into small isolated segments as a result of habitat loss and barriers, thereby reducing movement of individuals to and from occupied habitats and decreasing the natural genetic mixing that allows species to thrive;

b) a lack of consistent and coordinated population data collection and monitoring that would allow rapid response to threats to the status of small or isolated populations; as well as providing information on new populations, newlocations for renovation and restoration activities, and general population health;

c) growing concern that populations are becoming more vulnerable to human-caused and natural catastrophic events (e.g., wildfire, drought, and invasive species).

d) Interactions with and proximity to introduced species, both genetically and spatially, are a continual obstacle and threat to maintaining healthy native trout populations used in conservation and public use.

e) Western native trout taxa are especially vulnerable to genetic contamination from closely related native western trout, as well as from introduced rainbow trout. The introduction of rainbow trout and unfortunate and unknowing mixing of native cutthroat subspecies across watersheds has have eroded the genetic purity of many populations, and remains a key concern in individual species management.

f) The genetic purity and status of many populations remains unknown; impeding the conservation effort. Genetic determinations based on older analytical methods (e.g., original species descriptions, morphometrics and meristics, and electrophoresis) may be inconsistent with current "state of the art" biochemical methods. An additional challenge is that the state of the art constantly changes and is increasingly sensitive. It is difficult to determine at what point a biochemical difference is meaningful at the species/subspecies level. This conundrum leads to indecision and disagreement about how to determine suitable "populations" for recovery, management and listing actions.

g) Genetic analytical methods are constantly improving, creating a situation where region-wide standards for "relative" genetic purity classes are not available. Protocols need to be established for many of the species. There are different standards for determining what a "conservation" population among species.

h) Insufficient funding of thorough genetic assessments of known or suspected stocks of many western trout populations can slow or impede conservation actions.

e) Establishment of appropriate broodstocks may stall recovery efforts for some species is difficult. Identification of and agreement about what are appropriate brood source populations is essential to development of genetically appropriate brood stocks where needed.

Regulatory Concerns

Maintaining sportfishing status of western native trout is important to sustaining broad public support for improving the status of these species. Sportfishing and conservation are not mutually exclusive. In addition, enforcing state and federal land and water management regulations through the 303d and 404d processes is essential to maintaining quality fish habitats across the west. Concerns commonly expressed included:

a) There are concerns about the adequate agency enforcement of existing fishing regulations and promulgating new regulations as necessary to protect native trout populations while ensuring their availability to the angling public;

b) While there are adequate regulations and best management practices for the public, private and industrial (timber, cattle, agricultural, and mining) use of resources, the enforcement of these land use regulations is spotty and deserves greater attention from the land managers;

c) Inconsistent application of policies between adminstrative units in federal agencies (FWS Regions, BLM Field Offices, Forest Service Ranger Districts or Forests) often creates difficulty in managing land and aquatic habitats that cross jurisdictional and state boundaries where multi-agency, multi-state conservation agreements are not in place.

d) Concerns expressed that differing agency missions, i.e. federal vs. state, lead to difficulty in getting species specific recovery agreements or conservation strategy agreements completed for wide-ranging species such as Bull trout, Lahontan cutthroat and Redband trout, or some narrowly distributed species such as Paiute cutthroat.

Public Education and Informational Concerns

The species assessments pointed out the general lack of species specific public outreach and informational materials, and the need to develop public outreach and promotional materials that foster good working relationships among agencies and with potential private partnerships that could be involved in future conservation activities.

Disease and ANS Concerns

The growing incidence of whirling disease, and the introduction nuisance species, such as New Zealand mud snail, are mentioned as limited concerns for most western native trout. Conservation of native trout may be hindered by occurrence of an invasive or disease in a watershed or fish production facility that is serving as a refugia or brood source.

The spread of whirling disease is a concern to several taxa, including Yellowstone Cutthroat Trout; Greenback Cutthroat Trout and Colorado River cutthroat trout. Keeping "clean" populations from being impacted by disease through both angler and researcher actions in waters was cited as a concern;

Data shortfall Concerns

The inadequacy of funding for increased specific population and distribution investigation and reporting was mentioned as an obstacle and concern for several taxa, especially in the Northwest Geographic area. The species assessments reported the following concerns:

a) Lack of information on abundance and basic life history interactions of the various life-forms of the fish (resident and anadromous) especially for Coastal Cutthroat Trout and Redband Trout. leads to uncertainty of status.

b) Lack of data also inhibits the development of coordinated conservation actions and prioritization of needs to conserve taxa. A lack of information leads to uncertainty of status.

B. Recommendations for Actions to be considered in developing the Western Native Initiative Strategic Plan

The Western Native Trout Status, Concerns and Opportunities Report Assessment provides a wealth of information on what needs to be done to improve the status of various taxa, regardless of their range and distribution. From the limited distribution of Paiute cutthroat and Gila trout to the wide-ranging Westslope cutthroat and Bull trout needs are similar – good data and information, protection from introduced species, adequate habitats and connectivity, cooperative management strategies and prioritized actions, adequate funding, and new partnerships.

The common categories of potential strategic actions, briefly summarized here, represent the key types of actions that should be carried forward in a Strategic Plan for Conserving Western Native Trout and improving their status. They are not in a priority ranking.

Population Viability

Identify and characterize all conservation populations

The following actions need to be based on the specific species needs. There is a need however to obtain population data and information in a statistically consistent manner across agencies so that data is comparable and transferable. The quality of population data varies considerably among taxa, and there is a lack of sufficient funding and man-power to quickly complete the surveys and additional life history studies that are needed to develop and guide future conservation agreements and strategies.

- Conduct surveys to identify undiscovered populations of native trout
- Regularly spatially and genetically monitor status of established populations using standard protocols
- Routinely synthesize and analyze genetic data to assess population trends
- Increase the effort to clearly identify stronghold populations of all native trout species to help in the identification of priority conservation and protective actions for those populations.

Secure, enhance, and restore conservation populations

Population manipulations

- Remove non-native species, followed by restoration of native fish to create genetically pure isolated, as well as connected meta-populations, to maintain sources of genetically pure trout and char
- Protect distinct life-history traits
- Restrict introduction of non-native fish species into native trout conservation habitats
- Restrict the spread of disease agents and invasive species
- Expand small, isolated populations where possible, and maintain or enhance high quality habitats to prevent extirpation due to small population size or stochastic events.
- Determine appropriate genetic standards and protocols for genetic analysis and description of conservation populations
- Develop genetically appropriate brood-stocks as needed for conservation actions Thorough genetic assessments of both known and suspected stocks of several species of native trout are needed. These data will aid in characterization of intra- and inter-population differences/similarities and in preparation of conservation/recovery strategies
- Sometimes there are not “pure” populations available or it is difficult to get agreement among geneticists as to the best population to use for recovery purposes where stocked fish are part of the equation. Captive brood stocks of several taxa are necessary to accelerate or enhance planned and ongoing conservation/recovery efforts.

Population inventory and monitoring

- Regularly demographically monitor established populations using standard protocols
- Routinely synthesize and analyze fisheries demographic data to assess population trends
- Conduct studies to assess the effects of sportfishing on recovery populations
- Routinely develop and update GIS-based species distribution and population status reports
- Seek funding to expand the population data collection effort for the lesser known species such as Redband trout and Coastal cut throat trout in order to develop moderen status reviews.

Data Sharing and analysis

- Implement a process for data sharing to meet the requirements of the Western native Trout initiative's responsibilities as a National Fish Habitat Partnership.
- Seek additional funding to help specific species data teams maintain and update their data base systems.

Secure and enhance watershed conditions

The management of water, watersheds and water quality remains a key component of the effort to improve the status of western native trout. With the growth in the amount of funding being directed to fish habitat, it is critical that efforts continue in the assessment of watersheds and the determination of priority actions that can be implemented.

Habitat monitoring

- Monitor the status of key native trout habitats for each of the species on a regular basis to develop baseline information on habitat condition and habitat strongholds that can be prioritized for future habitat protection.
- Assess aquatic habitats to evaluate potential for restoration of native trout and char
- Monitor and evaluate impacts from habitat disturbances such as wildfire and drought, the continuation of global warming, and other such events with particular attention to changes in water temperature flow and quality.
- Provide technical information, administrative assistance, and financial resources to assure compliance with the listed objectives and encourage conservation of native trout on private lands.
- Pursue land and access acquisitions to protect important native trout habitat.

Habitat manipulations

- Secure and enhance watershed conditions through standard habitat manipulations (e.g., barrier placement or removal, in-stream structure, flow enhancement, increasing connectivity, and isolation of fragments) and provide monitoring of implemented projects to assess success or failure.
- Implement, evaluate, and monitor land management actions that include but are not limited to: modifying grazing practices, fencing riparian areas, closing and obliterating roads in the riparian areas, addressing road, timber and mining disturbances.
- Identify, update and implement best management practices on state, tribal, NPS, FS, BLM, and private lands to benefit native trout habitats and connectivity for all life stages.

- Restore and enhance water flow, water quality, natural sediment regimes, and physical integrity of channels where feasible by replacement of culverts to allow fish passage (where passage is desirable), screening water diversions to prevent entrainment, modifying diversions to allow fish passage, and restoring and improving altered channel and riparian habitats.
- Annually update the individual native trout species habitat needs for funding, and prioritize projects that qualify for funding under the National Fish Habitat Action Plan or other sources of funds.

Implement and Enforce Regulatory Actions

- Regulate angling and enforce regulations that prevent impacts associated with recreational angling.
- Enhance and maintain regulatory mechanisms that prevent diseases or illegal introduction of nuisance species.
- Work through the FERC re-licensing process to require impoundment operators to operate dams to minimize impacts where necessary to meet cooperative agreement objectives. Investigate restoration and enhancement opportunities on FERC re-licensing of hydroelectric facilities.
- Maintain and protect native trout and char habitat from degradation by achieving compliance with existing habitat protection laws, policies, and guidelines.

Implement Public Outreach and Public/Private Partnerships

- Develop public outreach and partnerships (NGO, public) to increase the resources available for completing conservation actions
- Implement outreach, interpretive and educational programs to expand the public's knowledge about the challenges facing western native trout.
- Share data and update range-wide databases with data from a well-designed field monitoring programs to serve as a barometer on status of native trout over time.

Interagency Coordination

- The Western Native Trout Initiative should have a goal of increased levels of coordination, i.e. interagency partnerships and relationships that foster cooperative interagency work environments and coordination with other native trout and char conservation efforts.
- The Western Native Trout Initiative should seek partnerships with other non-governmental organizations and private interests to increase the overall level of effort to conserve and protect western native trout.
- The existing native trout recovery and conservation plans should be reviewed and updated on a regular basis to account for new scientific information and changes in status due to conservation and protection actions.
- States and agencies should complete and put into place conservation or recovery plans for those western native trout that do not currently have collaboratively developed plans.

Continue Research of Native Trout

- Western states should be encouraged to complete ANS plans/procedures and put them in place to help protect native trout from ANS.
- Conduct research on population distribution, genetics, habitat, and species ecology to increase knowledge of native trout and char life stage requirements and to evaluate the success of conservation actions
- Develop new methodologies for construction of fish passage barriers.

LITERATURE CITED

The basis of information used for this document was the 15 individual western native trout status reviews that were completed over a 18-month time frame by individual species assessment teams, and the knowledge and expertise of those individuals participating in this assessment. The completed individual western native trout status reviews, which are updated on an as-needed basis, are available for review on the Western Native Trout Initiative web site: www.westernnativetrout.org..

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.

Any use of this document, or the individual western native trout assessment documents should be referenced to the following:

The Western Native Trout Initiative
134 Union Boulevard, Suite 665
Lakewood, Colorado 80228
Robin Knox, Coordinator