

Rev. 2.0 - 9/2009

SPECIES SUMMARY

Historically, the westslope cutthroat trout (WCT) was the most widely distributed and abundant of the cutthroat subspecies. In the United States, WCT are native to much of the Columbia River drainage, including river systems on both sides of the Continental Divide in Montana and Idaho, portions of Washington state east of the Cascades Divide and a small portion of the upper John Day River drainage in Oregon. Robert Behnke hypothesizes that the presence of WCT in the middle-Columbia drainages may be the result of late-Pleistocene flooding of glacial Lake Missoula.

Historic Range Relief Map



Unfortunately, habitat degradation from livestock grazing, roads, mining and timber harvest has reduced the distribution of WCT in all states. The status of genetically pure WCT is problematic as this subspecies readily hybridizes with other cutthroat trout subspecies and rainbow trout. Previous assessments indicated that genetically pure WCT may occupy only 2-4% of their historic range. WCT are not protected by the ESA but are listed as sensitive or vulnerable by state and federal agencies. They also may be displaced by non-native brook trout and brown trout.

Including populations of varying genetic purity our CSI analysis documents WCT in 1,502 of 2674 subwatersheds (56%) within their historic range in the United States. Despite this seemingly broad range, many populations are threatened by habitat losses and introductions of non-native trouts. For example, most subwatersheds in Montana's Blackfoot River Basin scored less than 10 out of 25 for Population Integrity indicating genetic concerns, vulnerability of small populations and loss of life history diversity.

Key CSI Findings

- 56% of subwatersheds within historic range are occupied by WCT
- Genetic purity of many populations is compromised by non-native trout introductions
- Expansion of isolated populations and restoration of life history diversity are highest restoration priorities
- 57% of presently occupied subwatersheds scored 81-98 out of 100 indicating large strongholds in central Idaho wilderness and roadless areas and areas near Glacier National Park

CSI analysis for management priorities indicates highest restoration priority in areas such as Montana's Bitterroot and Blackfoot rivers, and Idaho's Lemhi, Pahsimeroi, and Clearwater drainages. High reintroduction priorities are indicated for Washington's Methow, northern Idaho's Pack and Priest rivers, and Montana's Smith, Madison, Big Hole and other systems.

Highest priorities for habitat restoration consist of expanding and reconnecting isolated habitats and restoring migratory life histories. Instream flow improvements are needed in many systems. However, site-specific knowledge is critical to planning effective restoration because of continuing problems with hybridization with introduced trouts. While fragmented populations are at high risk of extinction, removal of barriers and reconnection of tributaries may render populations more vulnerable to hybridization.



WCT also are highly susceptible to angling pressure, and active management and harvest regulations are needed for long-term maintenance of populations that are valued as sport fisheries.

Despite all the problems and pitfalls facing WCT, pockets of genetically pure fish – in both lakes and rivers – persist across the historic range. The presence of high quality habitat in large wilderness areas provides reasons to be optimistic about the future of this subspecies.

Prepared by Jack E. Williams, TU, 12/1/2006





















Conservation Success Index

Westslope Cutthroat Trout Rule Set

August 2007

Range-wide Conditions

Scored for conservation populations as defined by assessment.

Historic habitat is all perennial streams and connected, natural lakes across historic range. Lakes less than 2 hectares that are connected to streams are considered stream habitat while lakes greater than 2 hectares or isolated lakes are calculated as lake habitat.

1. Percent historic stream habitat occupied. Portions of the stream network that coincide with natural lakes in the assessment data should be excluded as stream habitat.

Occupied stream habitat	CSI Score
0 - 9%	1
10-19%	2
20-34%	3
35 - 49%	4
50 - 100%	5

- Source: Shephard, B.B., B.E. May, W. Urie and the Westslope Cutthroat Trout Interagency Conservation Team. 2003. Status of westslope cutthroat trout (*Oncorhynchus clarki lewisi*) in the United States: 2002. Westslope Cutthroat Trout Interagency Conservation Team, Boise, Idaho.
- 2. Percent subbasins occupied.

Percent subbasins occupied	CSI Score
1-49%	1
50-69%	2
70-79%	3
80-89%	4
90-100%	5

Source: Shephard et al. 2003.

U.S. Geologic Survey, Subbasins (4th order HUCs), 1:2,000,000, July 2005.

3. Subwatersheds occupied within subbasin.

Percent subwatersheds occupied by subbasin	CSI Score
1 - 20%	1
21-40%	2
41-60%	3
61-80%	4
81-100%	5

Source: Shephard et al. 2003.

- U.S. Department of Agriculture, Wyoming Geographic Information Science Center, Idaho Department of Water Resources, Montana Natural Resources Information System. Subwatersheds, 6th order HUCs
- 4. Habitat by stream order occupied.

Occupied 2 nd order streams	CSI Score
and higher	
0 - 9%	1
10 - 14%	2
15 - 19%	3
20-24%	4
25 - 100%	5

Source: Shephard et al. 2003.

US Geological Survey, National Hydrography Dataset Plus, 1:100,000.

5. Historic lake habitat occupied.

All natural lakes within historic range are counted as historic lake habitat. Current lake habitat is based on intersection of stream network for conservation populations with lakes.

Occupied lake habitat	CSI Score
0 - 9%	1
10-19%	2
20-34%	3
35 - 49%	4
50-100%	5

Source: Shephard et al. 2003.

US Geological Survey, National Hydrography Dataset Plus, 1:100,000.

Population Integrity

Scored for conservation populations. Lake populations were incorporated as a linear distance.

1. Density – uses tables on Population Size and Fish Presence/Abundance.

Presence/Abundance	Population Size	CSI Score
R (rare)	any	1
C (common)	4 (< 50)	2
C (common)	3 (50 - 500)	3
C (common)	2 (500 - 2,000)	4
C (common)	1 (GT 2,000)	5
A (abundant)	any	5

Source: Shephard et al. 2003.

2. Population Extent – based on risk table Temporal Variability.

Rank	CSI Score
4 (LT 10 km connected)	1
3 (10-25 km connected)	2
	3
2 (25-75 km connected)	4
1 (GE 75 km connected)	5

Source: Shephard et al. 2003.

3. Genetic Purity – based on table Fish Presence Genetics.

Genetics Rank	CSI Score
D (hybridized GT 25%)	1
C (hybridized GT 10% and LE 25%)	2
J (suspected hybridized)	2
B (hybridized LE 10%)	3
N (hybridized and pure)	3
H (suspected pure)	4
A (pure)	5

Source: Shephard et al. 2003.

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4. Disease Vulnerability - based on table Disease Influence Risk Ranking

Disease Influence Risk Ranking	CSI Score
5	1
4	2
3	3
2	4
1	5

Source: Shephard et al. 2003.

5. Life History Diversity – three potential: resident, fluvial, and ad-fluvial. Based on table LifeHistory.

Conservation population	CSI Score
One life history form present	1
	2
Two present and historically	3
should have three	
	4
Three present or resident and	5
fluvial present (3) and no historic	
adfluvial.	

Source: Shephard et al. 2003.

Habitat Integrity

Scored for all subwatersheds in historic range.

Protected occupied habitat	Subwatershed protection	CSI Score
none	any	1
1 – 9%	LT 25%	1
1 – 9%	GE 25%	2
10 - 19%	LT 25%	2
10 - 19%	GE 25%	3
20 - 29%	LT 50%	4
20 - 29%	GE 50%	5
GE 30%	any	5

1. Land Stewardship - score using AND between two indicators

Source: National Atlas, Federal Land Status.

Tele Atlas/GDT, Protected areas, 1:100,000. 2004.

U.S. Department of Agriculture, Forest Serivce, Geospatial Service and Technology Center. Inventoried Roadless Areas.

2. Watershed Connectivity – use barriers data provided with assessment and dam data.

Current/historic connectivity 6th	CSI Score
LT 50%	1
50 - 74%	2
75 - 89%	3
90-94%	4
95 - 100%	5

Current/historic connectivity 5^{th:}

- GT 90%: +1
- LT 50%: -1

Source: Shepard et al. 2003.

US Army Corps of Engineers, Dams, March 22, 2006.

US Geological Survey, National Hydrography Dataset Plus, 1:100,000.

3. Watershed Conditions

Land conversion	CSI Score
GE 30%	1
20-29%	2
10-19%	3
5 - 9%	4
0 - 4%	5

CSI score is downgraded 1 point if road density is GE 1.7 and LT 4.7 mi/square mile. If road density is GE 4.7 mi/square mile it is downgraded 2 points.

Source: Tele Atlas North America, Inc./Geographic Data Technology, Inc., ESRI. Roads. 2005.

U.S. Geologic Survey, Idaho, Oregon, Washington, Wyoming GAP Analysis Project (100 meter). Land cover/Land use.

4. Water Quality

Miles 303(d)	Percent	Number	Strm mi/rd	CSI
Streams	Agricultural Land	Active Mines	mi	Score
GT 0	58-100%	GE 10	0.5 - 1.0	1
	28-57%	7-9	0.25 - 0.49	2
	16-27%	4-6	0.24 - 0.10	3
	6-15%	1-3	0.05 - 0.09	4
	0-5%	0	0 - 0.04	5

Score for worst case.

Source: Tele Atlas North America, Inc./Geographic Data Technology, Inc., ESRI. Roads. 2005.

- U.S. Environmental Protection Agency. 303(d) streams, 1:24,000; 2002.
- US Geological Survey, National Hydrography Dataset Plus, 1:100,000.
- U.S. Geologic Survey, Idaho, Oregon, Washington, Wyoming GAP Analysis Project (100 meter). Land cover/Land use.
- U.S. Geological Survey, Mineral Resources Data System: U.S. Geological Survey, Reston, Virginia. Active Mines. 2005.

5. Flow Regime

Number of dams	Number of diversions	Storage (acre- ft)/stream mile	CSI Score
GE 5	GE 30	GE 2,500	1
3 – 4	20 - 29	1,000 - 2,499	2
2	10 – 19	250 - 999	3
1	5 – 9	1-249	4
0	LT 5	0	5

Score for worst case.

Source: U.S. Army Corps of Engineers. Dams, March 22, 2006

US Geological Survey, National Hydrography Dataset Plus, 1:100,000.

Future Security

Scored for all subwatersheds in historic range.

1. Land Conversion – modeled based on slope, land ownership, roads, and existing urban areas.

Land Vulnerable to Conversion	CSI Score
81 - 100%	1
61 - 80%	2
41 - 60%	3
21 - 40%	4
0 - 20%	5

Sources: National Atlas, Land ownership.

Tele Atlas/GDT, Population centers, 1:300,000; 1997.

Tele Atlas/GDT, Road network, 1:100,000; 2002.

2. Resource extraction

Forest	Hard Metal	CSI
management	Mine Claims	Score
51-100%	51 -100%	1
26 - 50%	26-50%	2
11 - 25%	11-25%	3
1 - 10%	1 - 10%	4
0%	0%	5

Score for worst case.

<u>Source</u>: Timber management potential identifies productive forest types using the existing vegetation type in the Landfire dataset. The number of mining claims was determined using Bureau of Land Management data, and each claim was assumed to potentially impact 20 acres. Protected areas data were compiled from the ESRI, Tele Atlas North American / Geographic Data Technology dataset on protected areas and the U.S. Department of Agriculture, Forest Service's National Inventoried Roadless Areas dataset.

3. Energy Development

Leases or			CSI Score
reserves	New Dams 4 th	New Dams 6 th	
51-100%	≥0	≥1	1
26 - 50%	3		2
11 - 25%	2		3
1 - 10%	1		4
0%	0		5

Score for worst case.

<u>Source</u>: Wind resources ("Good" and better) from Wind Powering America/National Renewable Energy Lab (NREL). Coal leases are mineable types from the Coal Fields of the United States dataset. Geothermal known and closed lease areas and oil and gas leases and agreements from BLM Geocommunicator.* Potential dam sites are based on Idaho National Laboratory (INL)

^{*} Several geospatial data types are available from Geocommunicator, and they have the following definitions:

Lease: Parcel leased for oil and gas production.

Agreement: An 'agreement' between operator and host (private or public) to evaluate geological, logistic, geophysical, etc issues involving a concession. The agreement essentially allows a technical evaluation of lease feasibility.

hydropower potential data. Protected areas data were compiled from the ESRI, Tele Atlas North American / Geographic Data Technology dataset on protected areas and the U.S. Department of Agriculture, Forest Service's National Inventoried Roadless Areas dataset.

4. Climate Change

TU Climate Change Analysis		
Climate Risk Factors	CSI Score	
High, High, Any., Any	1	
High, Any, Any, Any	2	
Mod., Mod., Mod, (Mod or Low)	3	
Mod, Mod, Low, Low	4	
Low, Low, Low, (Mod or Low)	5	

<u>Source</u>: Temperature and precipitation data were obtained from the PRISM Group. Elevation data was obtained from the National Elevation Dataset, and LANDFIRE data for the Anderson Fire Behavior Fuel Model 13 was used as input for wildfire risk. The Palmer Drought Severity Index was used for drought risk, but was adjusted for elevation (elevations above 2690 have lower risk) and the deviation from mean annual precipitation (areas with more precipitation on average have lower risk).

5. Introduced Species – do not currently have rangewide data on introduced species.

Present in	Present in	Road Density	CSI Score
5th	6th		
Yes	Yes	any	1
Yes	No	GT 4.7	2
Yes	No	1.7 - 4.7	3
Yes	No	LT 1.7	4
No	No	any	5

Source: Shephard et al. 2003.

Tele Atlas North America, Inc./Geographic Data Technology, Inc., ESRI. Roads. 2005

Unit Agreements: Multiple entities go in collectively on an agreement. Implied: there are limits to the number of agreements that one individual entity can have outstanding, and a unit agreement allows them to get around the limit.

Communitization: Combining smaller federal tracts to meet the necessary minimum acreage required by the BLM (for spacing purposes).

Authorized: Bid on and sold lease or authorization, ready for production.

Lease Sale Parcel: Parcel slated for auction but not yet sold.

Closed: Not retired, just expired and may become available and open to resubmittal.

Other Agreements: Catch-all for other agreement types.