TROUT UNLIMITED'S MISSION IS TO CONSERVE, PROTECT AND RESTORE NORTH AMERICA'S COLDWATER FISHERIES AND THEIR WATERSHEDS

Trout Unlimited's Conservation Success Index (CSI)

Greg Espegren
Trout Unlimited
October 9, 2008

What is CSI?

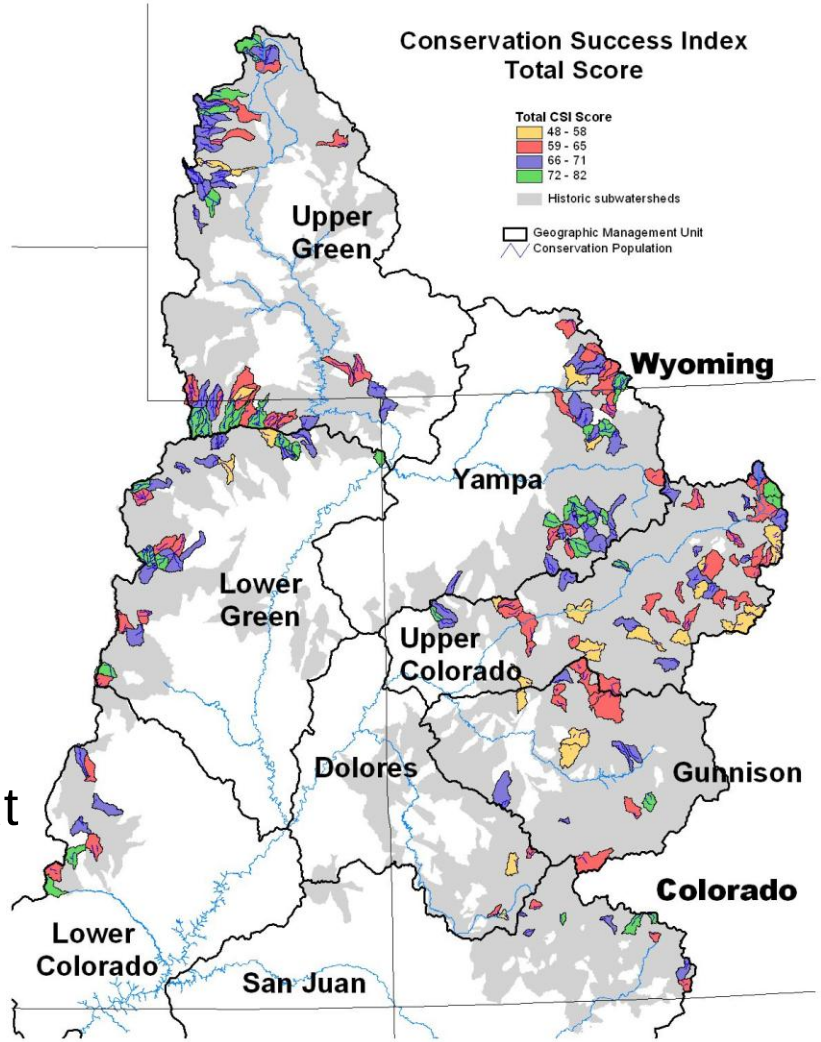
- No, it's not that…..

TU's Conservation Success Index

CSI is:

- A tool that can be used to help conserve and restore trout populations.
- Based on 4 Scoring Categories:
  - Range-wide Condition
  - Population Integrity
  - Habitat Integrity
  - Future Security

CSI uses Geographic Information System (GIS) technology to evaluate range-wide status of trout species through characterization of native and wild status at the sub-watershed scale.



TU's Conservation Success Index

TU has completed CSI Analyses on most of the native trout species in the U.S. including Colorado natives:

- Colorado River Cutthroat
- Greenback Cutthroat
- Rio Grande Cutthroat

TU also plans to complete CSI Analyses on Colorado's wild trout species in the near future:

- Brown Trout
- Rainbow Trout
- Brook Trout

This presentation will focus on TU's Colorado River Cutthroat trout (CRCT) CSI analysis


Greenback Cutthroat


Colorado River Cutthroat

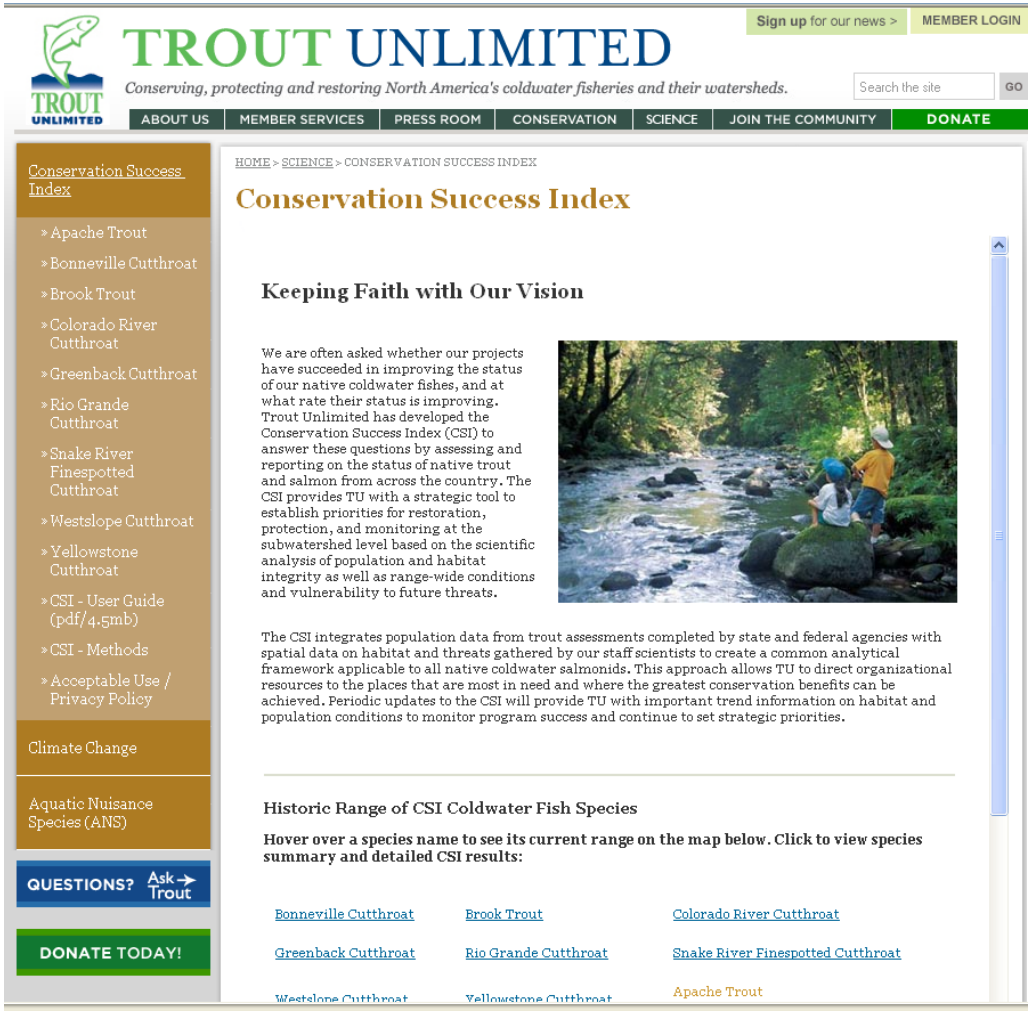
TU's Conservation Success Index

Today:

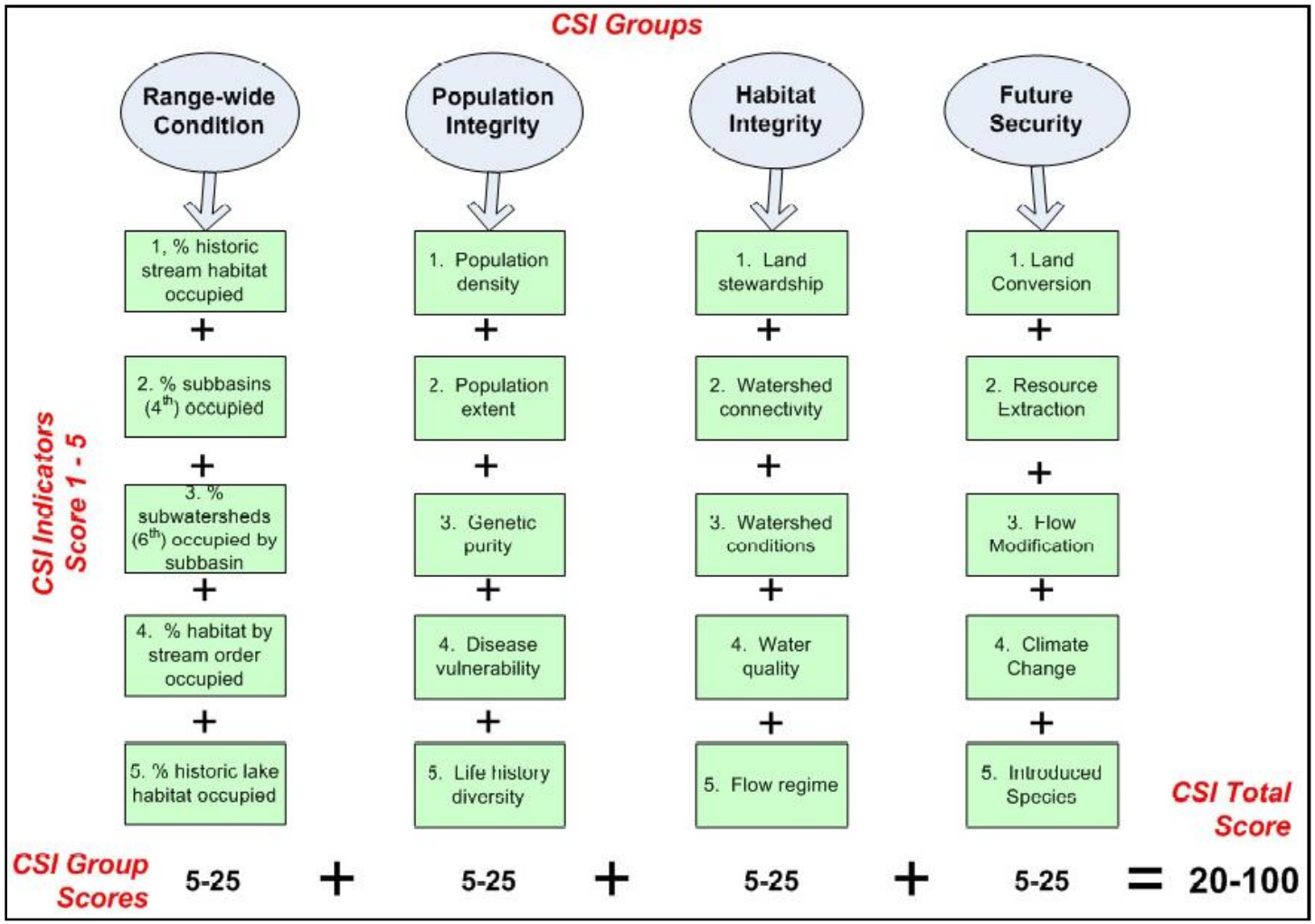
- Provide a brief overview of the CSI model,
- Discuss how TU uses CSI to develop conservation strategies, and
- Talk about TU's CSI Climate Change application.

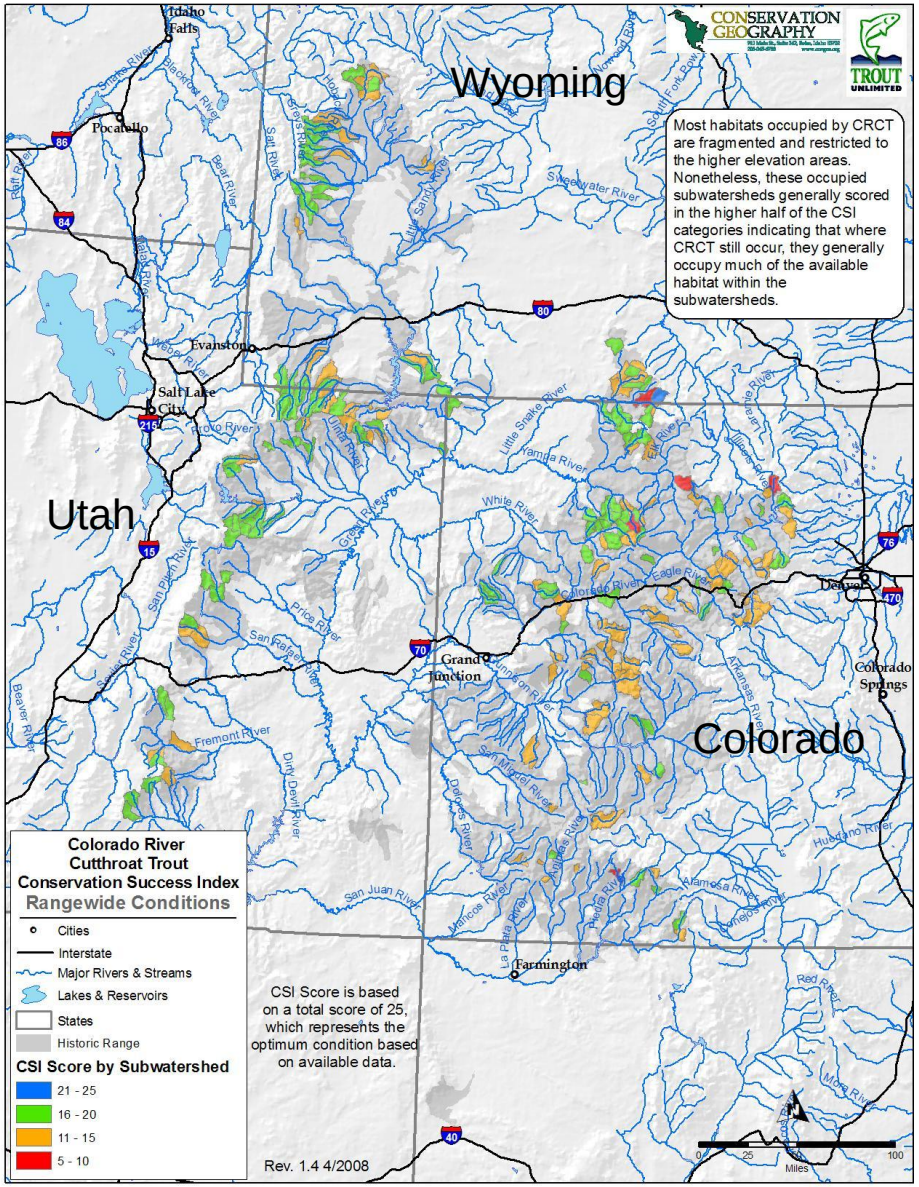
Most of the information in my talk can be found on TU's website at:

www.tu.org



CSI Overview - Scoring Categories

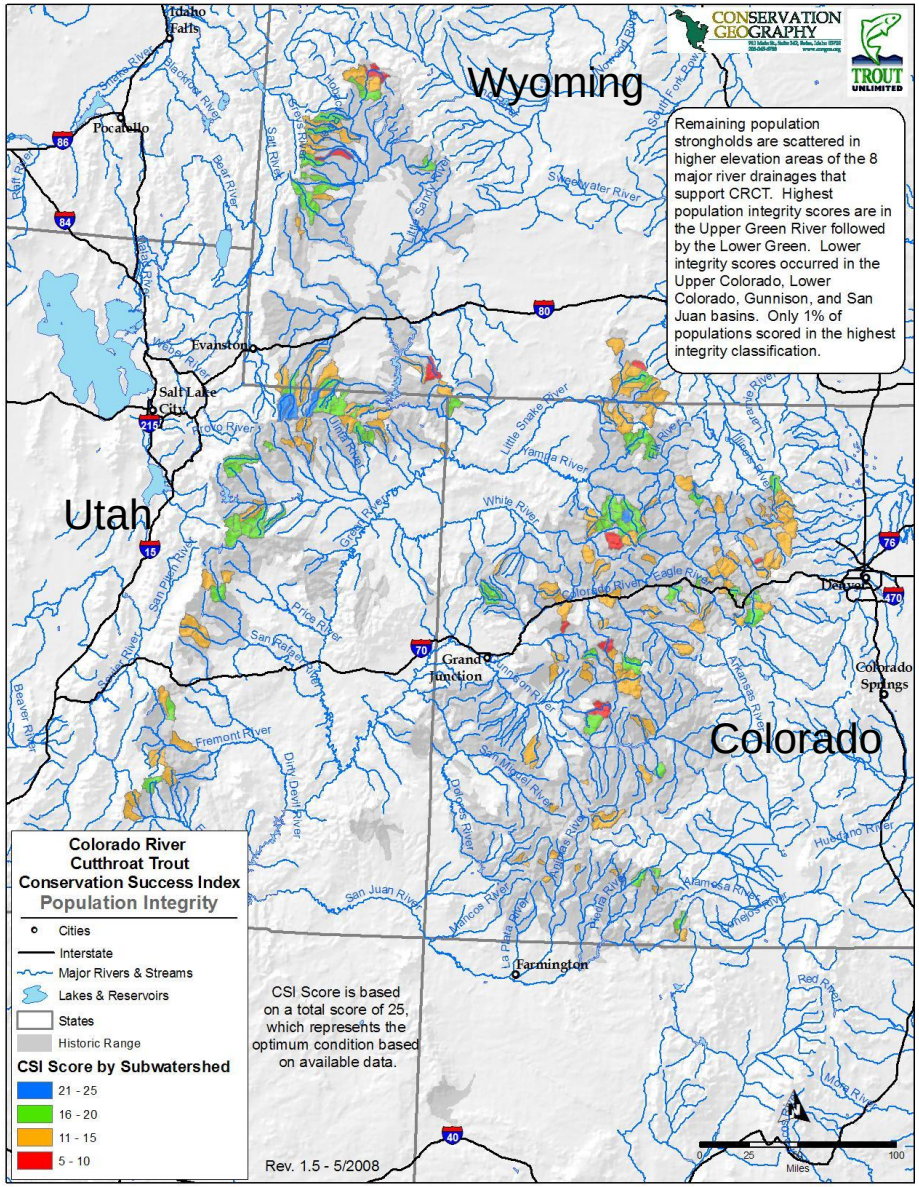




Range-wide Conditions- Historic vs. Present CRCT status

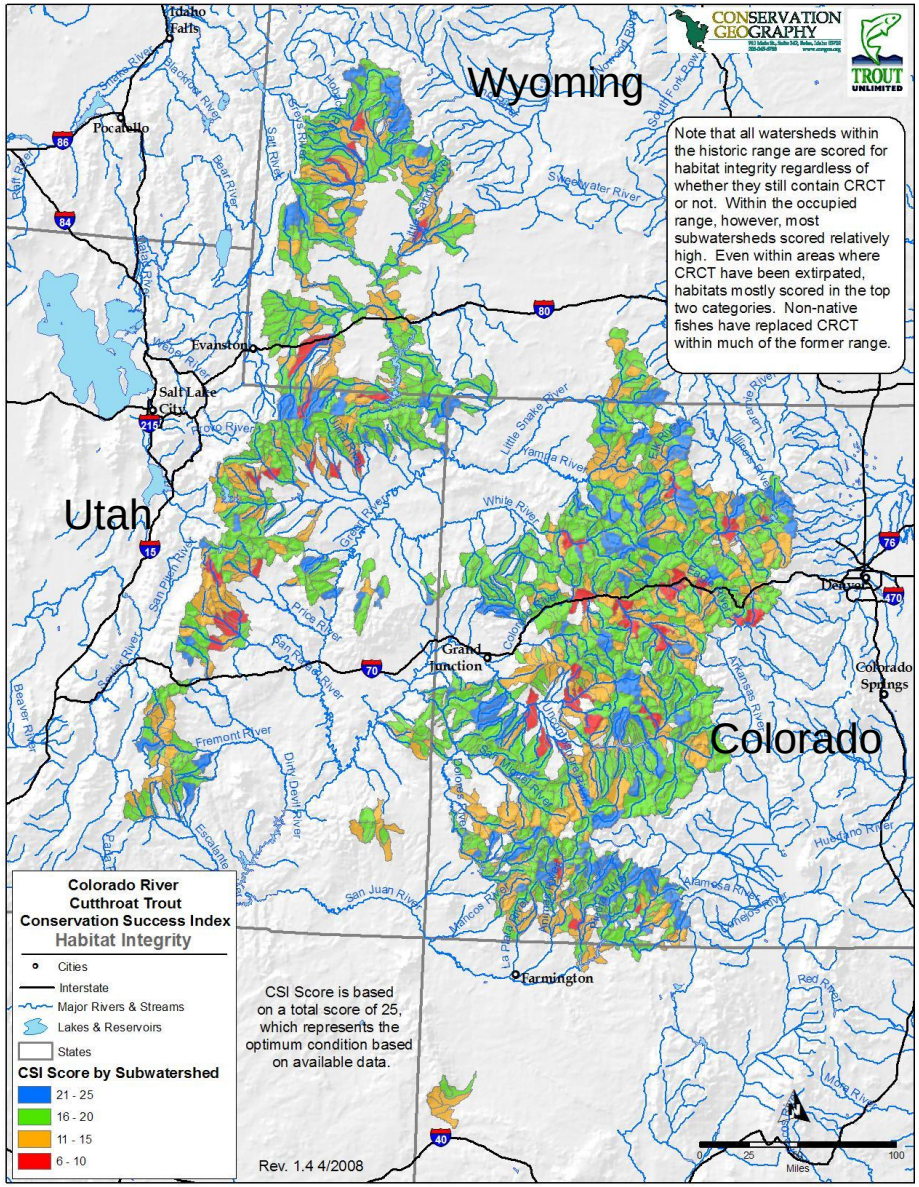
- Range-wide CSI scores are low
- Just 15% of historic CRCT subwatersheds now contain conservation populations (1) of CRCT
- No basins or subbasins are occupied at historic levels – (blue)
- At subwatershed and river reach level, local strongholds emerge – eg. Yampa/Green River (green)

(1) Conservation Populations are either genetically pure (90%) or exhibit unique characteristics worth preserving.



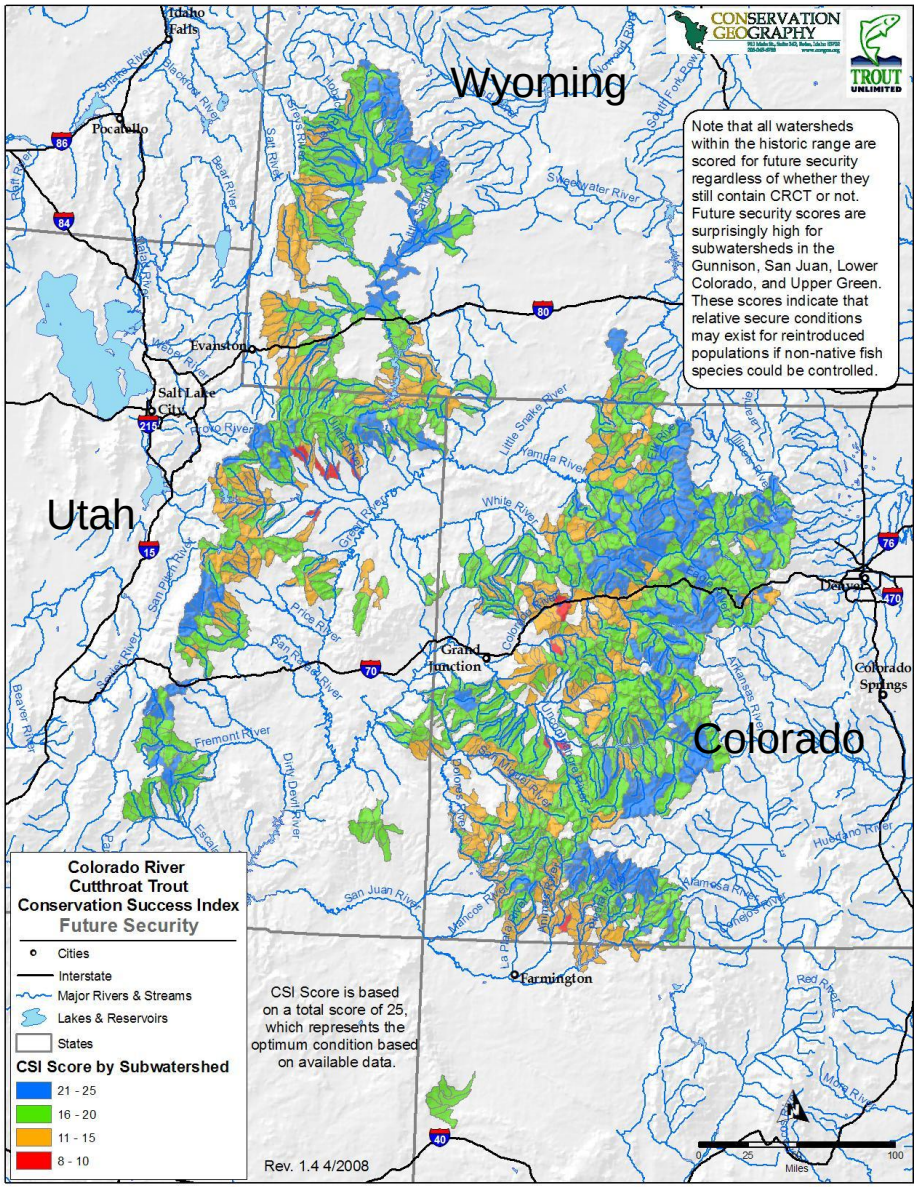
CRCT Population Integrity

- Population Integrity is the greatest challenge facing CRCT
- Only 4 subwatersheds score high (blue)
- Population integrity was highest in roadless and wilderness areas.
- Headwater isolation has helped maintain genetic integrity & disease-free populations.
- But, isolation comes at a cost; i.e., life history diversity and population extent



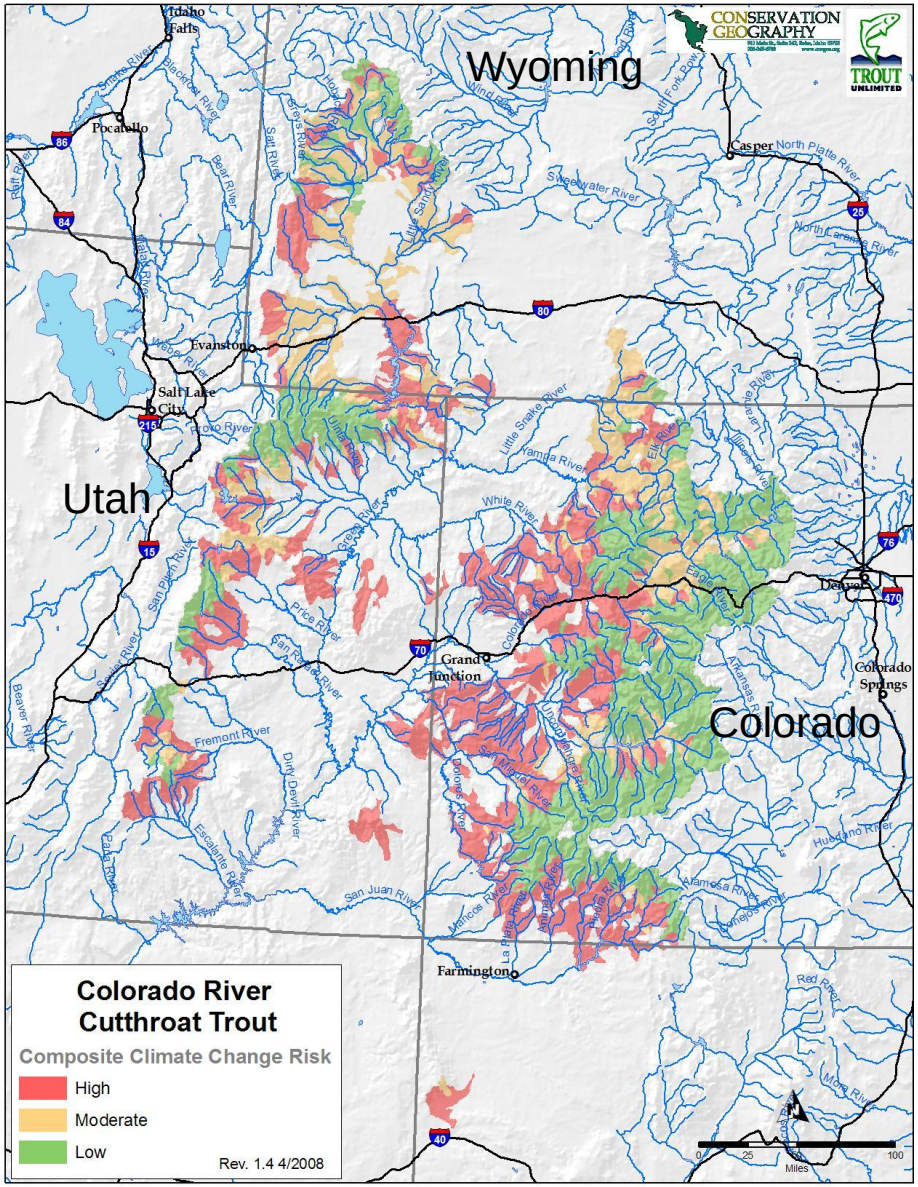
CRCT Habitat Integrity

- CRCT Habitat Integrity is high in occupied habitats
- High habitat quality provides opportunity to restore integrity of remaining populations.
- 82% of high integrity watersheds are located in roadless areas.
- Continued protection of backcountry is critical to successful implementation of long-term conservation strategy for CRCT



Future Security – What's at risk for CRCT?

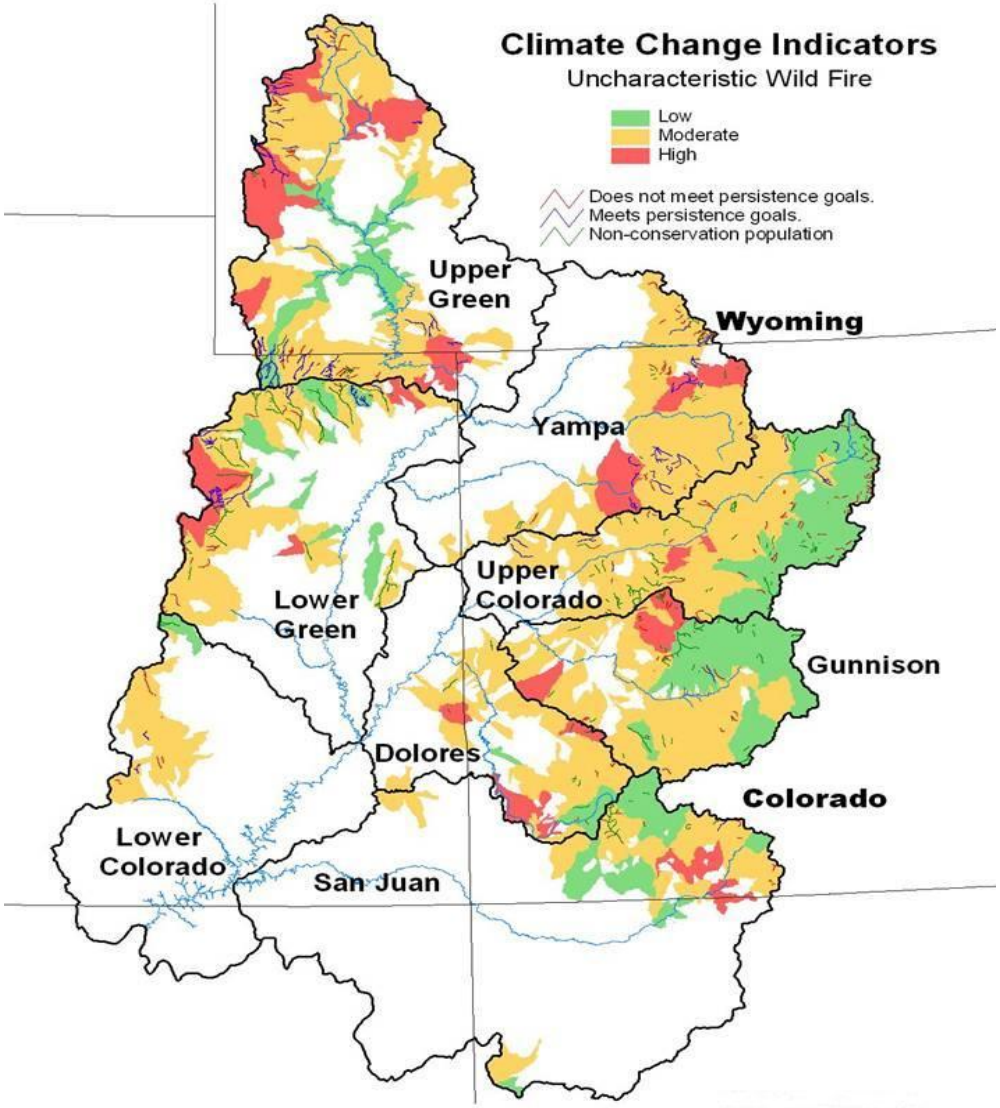
- Climate change, energy development and introduced species pose the greatest risk to current CRCT populations
- Risks from climate change include:
  - Increased summer temps exceed CRCT thermal limits
  - Increased wildfire risk
  - Increased winter flooding



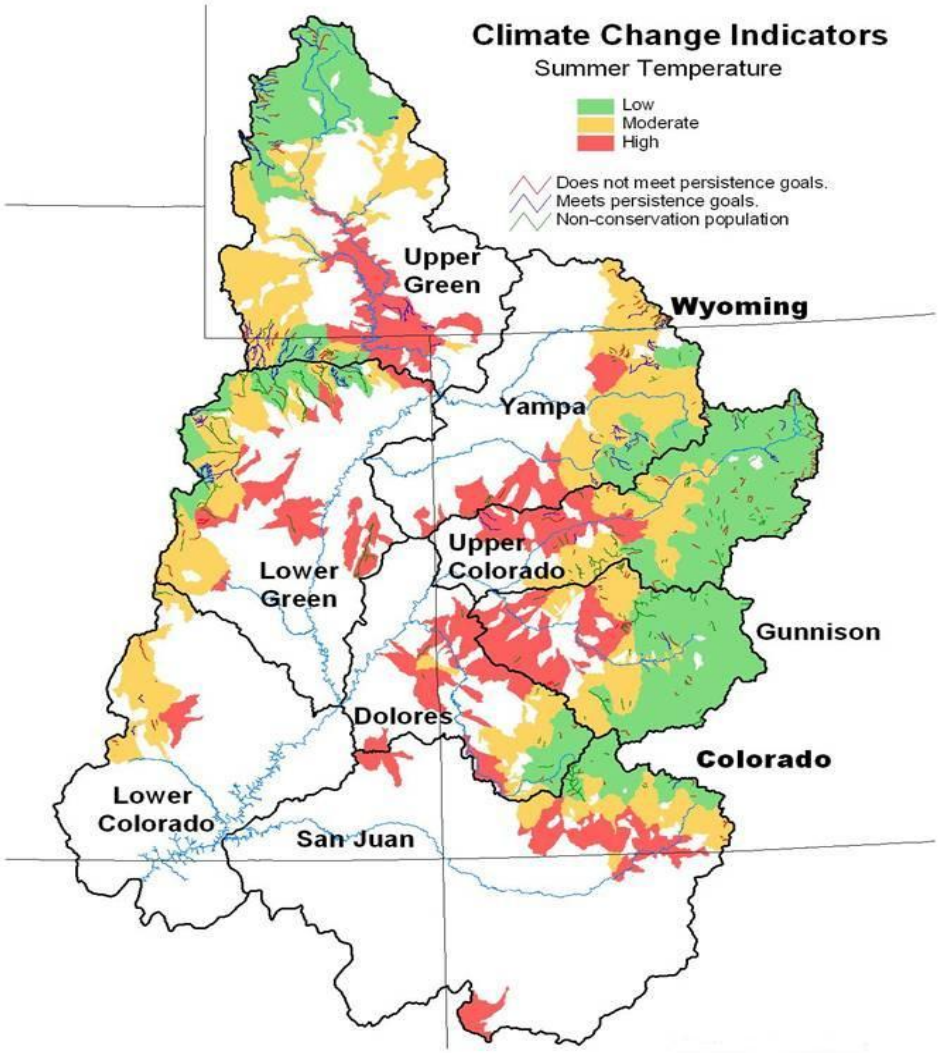
Climate Change

- TU's CSI model assumes a 3^0C (5.4^0F) increase in mean July temperature and CRCT preference for temps < 22^0C (72^0F) to evaluate climate change
- Composite climate change map (left) shows combined risks from uncharacteristic wildfires, warmer temperatures and increased winter flooding.
- Highest risk from climate change occurs at lower elevation subwatersheds (red), the risk is less at higher elevations (green)

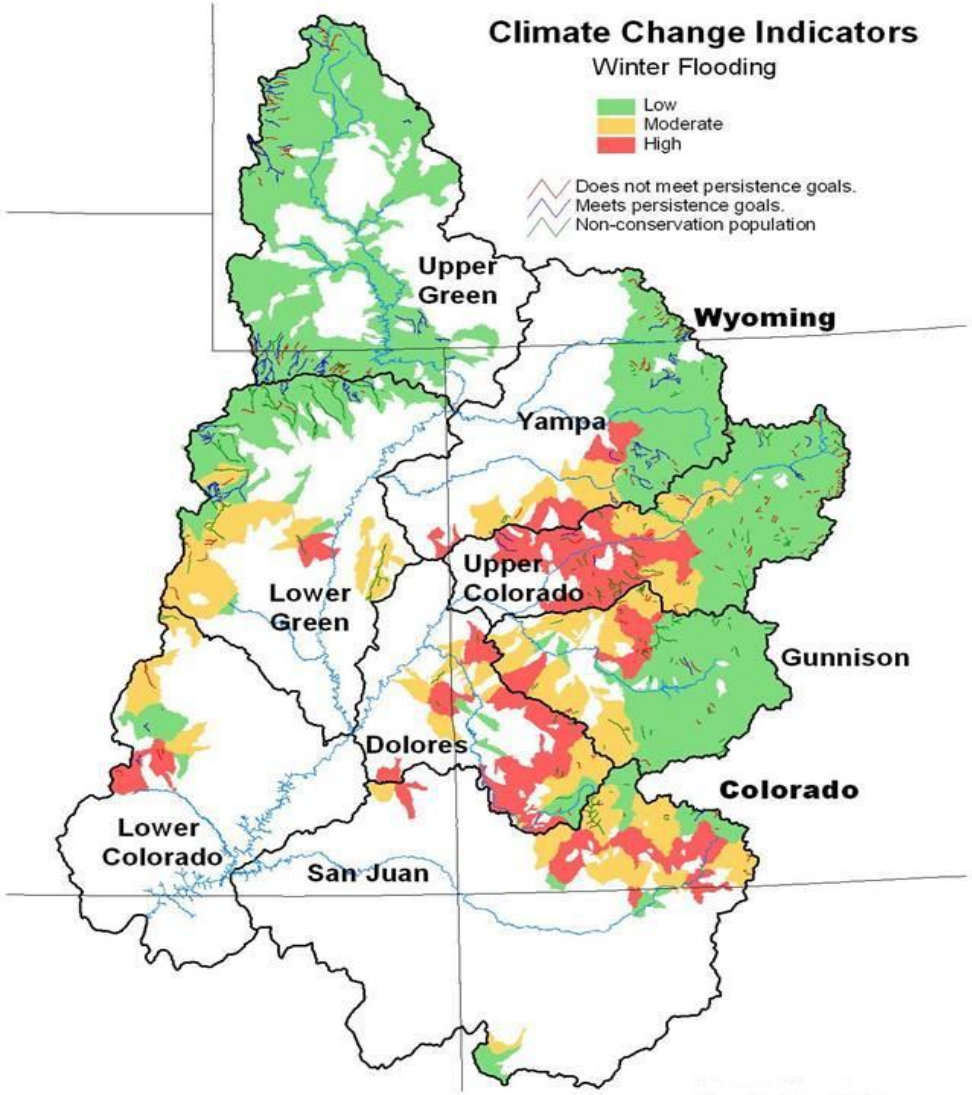
Threats -- Fire



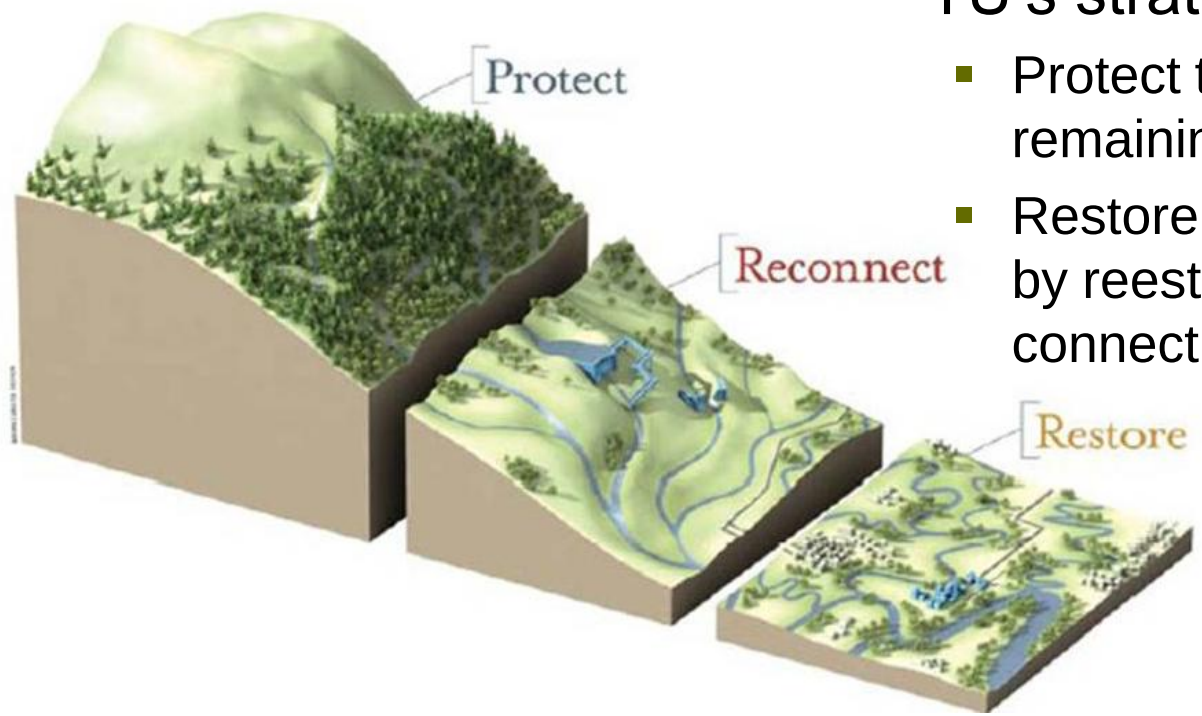
Threats -- Temperature



Threats – Winter Floods



TU's Conservation Strategy: Protect, Reconnect, Restore

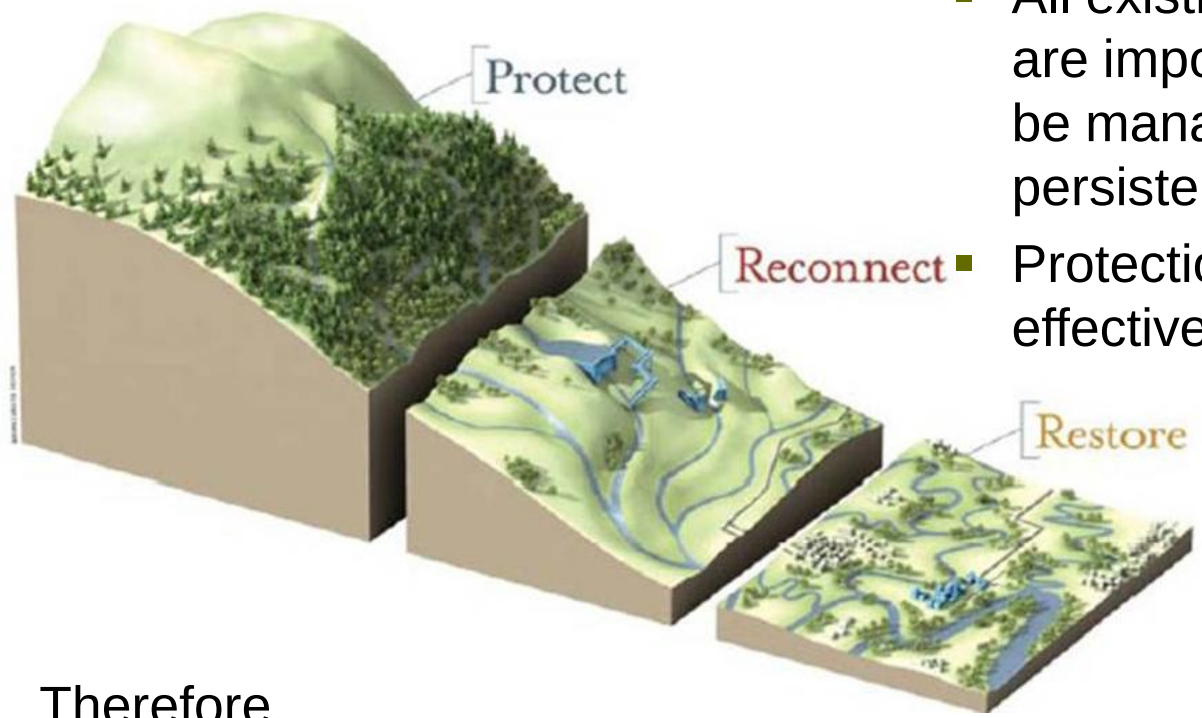


- TU's strategy:
  - Protect the best remaining habitats,
  - Restore degraded areas by reestablishing habitat connectivity and integrity.

- Reconnect headwaters to valleys giving fish the opportunity to migrate and move when disturbances such as wildfire and floods make their habitat unsuitable; resulting in more persistent populations.

Conservation Assumptions

- TU's assumes that:
  - All existing populations are important and should be managed for long-term persistence.
  - Protection is more cost-effective and more likely to succeed than restoration.



Therefore,

- Persistent populations are given highest priority
- Tradeoffs may be needed between non-persistent, genetically pure populations and larger connected populations that are hybridized.

Conclusions

CSI is a science-based, analytical tool that can be used to establish priorities and develop “place-based” conservation strategies designed to:

- protect
- reconnect,
- restore,
- and monitor cold water fish species.

Long-term viability of native and wild trout can be achieved by focusing efforts on opportunities where the greatest conservation benefits can be achieved in a responsible, cost-sensitive manner.

Conclusions

Future climatic changes, such as global warming, are likely to increase the need to protect critical aquatic habitats in all years, including years when stream flows are low due to drought.

By understanding present conditions and future threats, conservation efforts can be directed to:

- reduce future losses,
- optimize habitat and population attributes,
- restore historic conditions where possible, and
- help strike a balance between resource protection and future water development needs

Trout Unlimited's Conservation Success Index (CSI)

Greg Espegren, Aquatics Specialist, Trout Unlimited

Presentation to "Governor's Conference on Managing Drought & Climate Risk"
October 8-10, 2008

Trout Unlimited's Conservation Success Index (CSI) is a tool that can be used to help conserve and restore trout populations through characterization of native and wild trout status at the subwatershed scale. CSI uses Geographic Information System (GIS) technology to display and evaluate range-wide status of trout species. CSI presents an overall view of where a species exists today, as well as the viability of existing species populations.

TU has completed CSI Analyses on most of the native trout species in the U.S. including all Colorado native trout species; i.e., Colorado River Cutthroat (CRCT), Greenback Cutthroat, and Rio Grande Cutthroat. TU also plans to complete CSI Analyses on Colorado's wild trout species in the near future including brown trout, rainbow trout, and brook trout.

CSI evaluates the status and trends of each salmonid species using a suite of 20 population and environmental indicators that influence salmonid persistence. These indicators are grouped within each of four CSI categories: Rangewide Condition, Population Integrity, Habitat Integrity and Future Security. Each indicator is given a score between 1 and 5 based on criteria defined in species-specific rule sets. Consequently, cumulative scores for each CSI category can range from 5 to 25 and the composite score for each subwatershed can range from 20 to 100. High CSI scores indicate better population and environmental conditions than low scores. GIS technology is then used to display and evaluate spatial trends in the resulting CSI data.

Focusing on TU's CRCT CSI analysis, the Rangewide Condition shows that only 15% of watersheds that were historically occupied by CRCT currently contain conservation populations of CRCT. Historically, CRCT occupied numerous Colorado River tributaries upstream of Grand Canyon. Today, the Upper Green River watershed (Wyoming and Utah) contains many extant populations and remaining strongholds. In Colorado, more scattered and fragmented populations remain in the upper Gunnison, Dolores, Yampa, Little Snake White, and San Juan watersheds.

TU's CSI indicates that population integrity is the greatest challenge facing CRCT. Only four subwatersheds scored high in habitat integrity and these occurred in roadless and wilderness areas. While headwater isolation has helped maintain genetic integrity and disease free populations of CRCT, it has also limited their life history diversity and population extent.

Fortunately, CSI indicates that habitat integrity is high for CRCT in both occupied and unoccupied subwatersheds. High habitat quality provides opportunities to reintroduce and restore the integrity of remaining populations. As with population integrity, the majority of high integrity habitat (82%) occurs in roadless areas; highlighting the need for continued backcountry protection.

Lastly, CSI indicates that climate change, energy development and introduced species pose the greatest future security risks for CRCT. Risks from climate change include

increased summer temperatures that could exceed CRCT thermal limits, increased risk of wildfire, and increased risk of winter flooding.

TU is using its CSI climate change model to help develop conservation strategies for CRCT. In developing its conservation strategy, TU hopes to protect the best remaining habitats, restore degraded areas by reestablishing habitat connectivity and integrity, and reconnect headwater habitats to valleys thereby giving CRCT the opportunity to migrate and move when disturbances such as wildfire and floods make their habitat unsuitable. TU believes that all existing CRCT populations are important, that these populations should be managed to maximize long-term persistence and that protection of existing, persistent populations is more cost-effective and more likely to succeed than restoration.

Future climatic changes, such as global warming, are likely to increase the need to protect critical aquatic habitats in all years, including years when stream flows are low due to drought. By understanding present conditions and future threats, TU hopes to direct its conservation efforts towards reducing future losses, optimizing habitat and population attributes, restoring historic conditions where possible and striking a balance between resource protection and future water development needs.

For more information on CSI, please visit TU's website at: www.tu.org.

Greg Espegren is currently employed by Trout Unlimited's (TU) Colorado Water Project as an aquatics specialist. In this position he works as an agency liaison, instream flow, water quality, and aquatic habitat analyst, and river restoration project manager. Prior to coming to TU, Greg spent 15 years working for the Colorado Water Conservation Board (C WCB) as a Senior Water Resource Specialist with the Board's Instream Flow and Natural Lake Level Program. Greg has also worked as a private consultant on various water-related projects including the completion of the CWCB's ArcGIS-based Instream Flow Decision Support System and the Town of Avon's Recreational In-Channel Diversion (RICD) water right. Greg holds M.S. and B.S. degrees in Fishery and Wildlife Biology from Colorado State University.