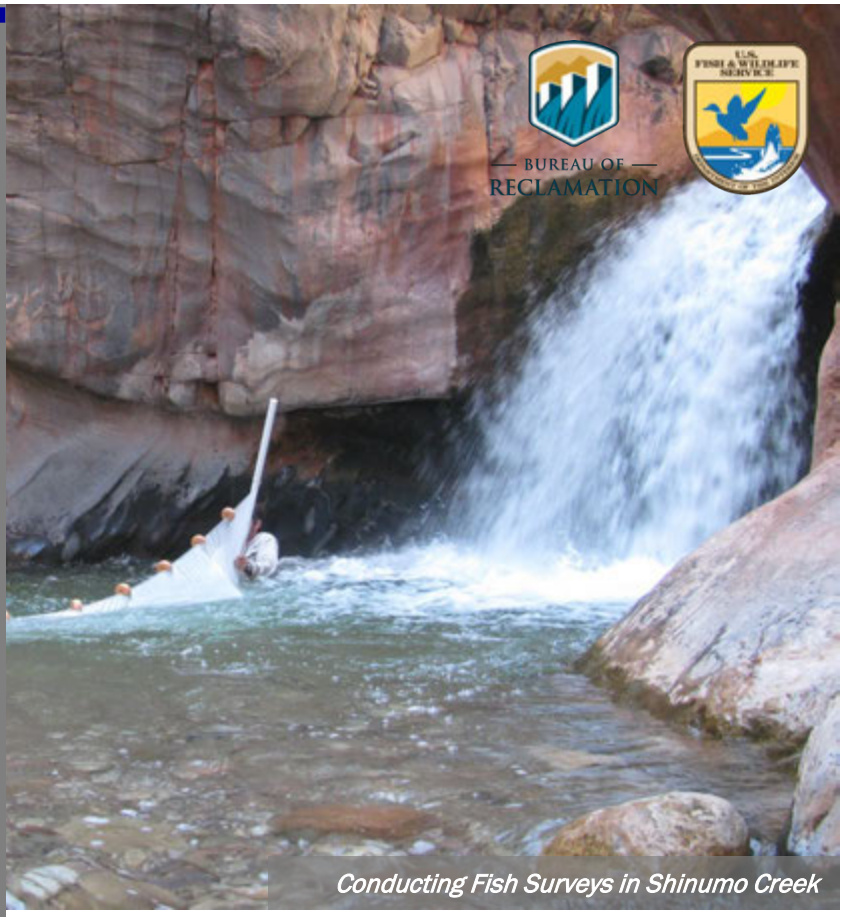
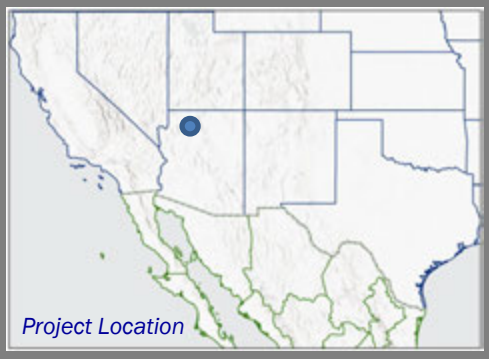
RESTORATION

Non-Native Trout Removals for Native Fish Conservation in Grand Canyon National Park



Conducting Fish Surveys in Shinumo Creek

The Colorado River Basin is home to many endemic species of fishes, ranging from long-lived Razorback Suckers (*Xyrauchen texanus*) to distinctly-shaped Humpback Chub (*Gila cypha*). Yet, extensive water withdrawals and hydroelectric dam development have drastically altered riverine conditions of the Colorado River, including the populations of its unique fish species. In the Lower Colorado River, the construction of Glen Canyon Dam in 1966 changed the ecology downstream. Further, introduced fish such as trout are well-adapted to these modified conditions, outcompeting and preying on many of the threatened and endangered native species found in Grand Canyon National Park.


Project Location

KEY ISSUES ADDRESSED

The two most significant threats to native fishes in the Grand Canyon are dams and non-native species. Present day flow and temperature conditions in the mainstem Colorado River are favorable to many introduced fish, especially multiple species of trout (salmonids) like Brown Trout (*Salmo trutta*) and Rainbow Trout (*Oncorhynchus mykiss*), however, these conditions are not ideal for many native fish species. As such, non-native trout are predators of juvenile native fishes and outcompete them for resources. Habitat loss in the mainstem river has led biologists and managers to focus native fish restoration efforts on unaltered tributaries. Before reintroducing native fish, populations of non-native species must be controlled by managers.

PROJECT GOALS

- Conduct multi-year trout removal to benefit native fish populations in Grand Canyon National Park
- Effectively suppress non-native Brown and Rainbow Trout populations in Bright Angel Creek
- Prevent non-native salmonids from returning following mechanical removal
- Maintain self-sustaining native fish populations, including native Humpback Chub translocations, to tributaries devoid of non-native trout

NATIVE FISH RECOVERY

Native fish populations in several Grand Canyon tributaries have increased after non-native trout removals.

Brian Healy of NPS with a Brown Trout Collected from a Fish Weir

PROJECT HIGHLIGHTS

Seven Years of Work: Non-native salmonid suppression was successful, achieving an 89% decline in Brown Trout abundance in Bright Angel Creek from 2012 to 2019. Methods for non-native salmonid control included backpack electrofishing and the installation of a fish weir.

Positive Response of Native Fishes: Surveys have documented increasing populations (480% increase) of Speckled Dace (*Rhinichthys osculus*) and Bluehead Sucker (*Catastomus discobolus*), as well as large year-classes of Flannelmouth Sucker (*Catostomus latipinnis*).

Successful Humpback Chub translocations: Humpback Chub were successfully relocated to Bright Angel Creek in 2018, with future translocations planned for 2020.

Collaboration with local Native American tribes: Park biologists and managers have worked closely with local tribes to provide trout for beneficial use.

Collaborators

- Numerous federal and state agencies
- Utah State University
- University of Missouri
- University of Florida
- Grand Canyon Conservancy
- Arthur L. and Elaine V. Johnson Foundation

Funding Partners

- National Park Service
- U.S. Bureau of Reclamation

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Photos courtesy of National Park Service.

LESSONS LEARNED

Early efforts to suppress Brown Trout in Bright Angel Creek were not effective to prevent spawning. Effective suppression required intensive mechanical removal as well as post removal monitoring. Adaptive management enabled project managers and biologists to evaluate the degree of success and make changes accordingly. In addition to mechanical removal, a seasonal weir was placed to capture and remove trout to block spawning migrations. This weir is imperative to prevent future trout recolonization once chub were translocated to Bright Angel Creek.

Compared to other locations in the Colorado River Basin, Grand Canyon National Park provides a unique management opportunity for non-native species control. Grand Canyon management goals include reducing nonnative species impacts on native fishes, and therefore, project biologists and managers work to develop management plans that prioritize non-native species removal and native fish conservation.

NEXT STEPS

- Experimental use of rotenone to eradicate salmonids in other tributaries (Shinumo) or areas above permanent barriers that could serve as trout sources (headwaters of Bright Angel Creek)
- Conduct a “Population Viability Analysis” for Brown Trout to inform future management by identifying the most effective control methods
- Vulnerability assessments for native species
- Early detection of other non-native species

PROJECT RESOURCES

For more information on this project, contact Brian Healy: Brian_Healy@nps.gov

For additional project resources and case studies, scan the QR code below or visit the CCAST website: WWW.DESERTLCC.ORG/RESOURCE/CCAST

Field Crew Conducting an Electrofishing Survey