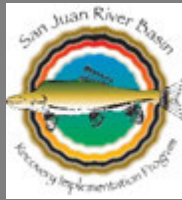
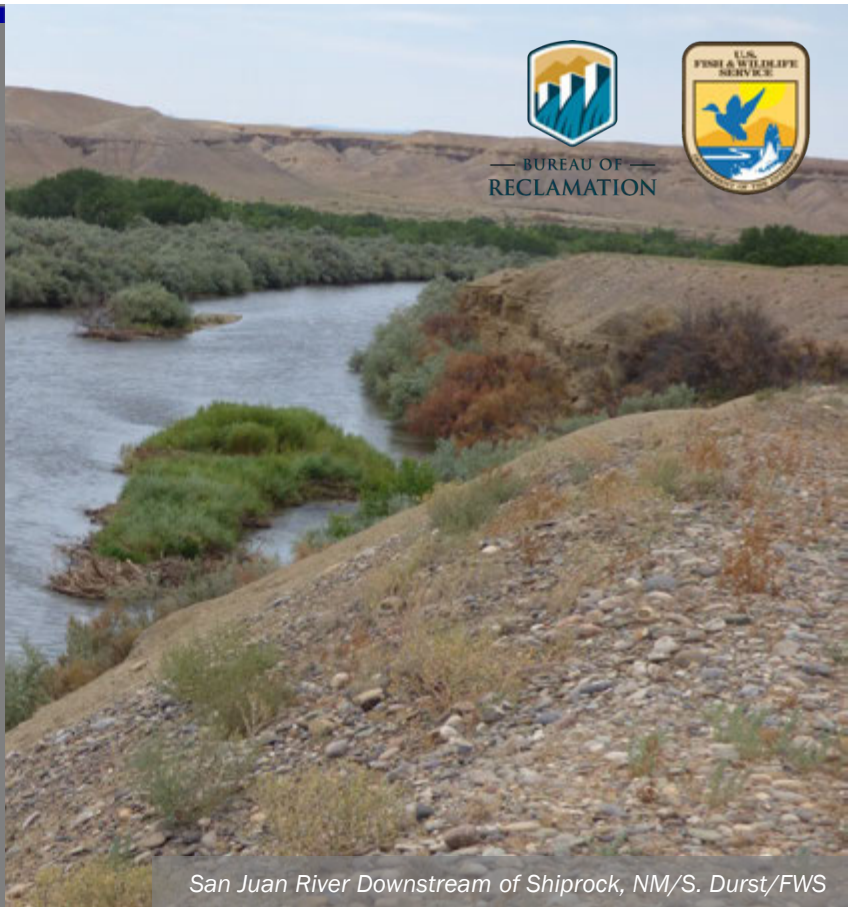
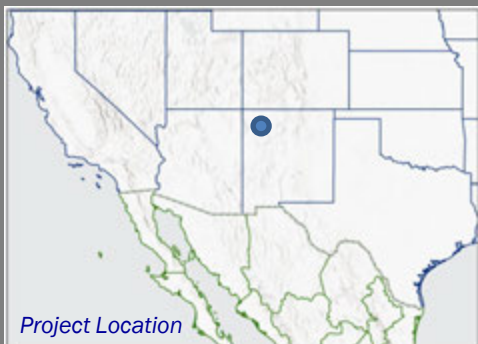


ACTIONABLE SCIENCE

Quantitative Assessments of Native Fish Recovery in the San Juan River Basin



Two federally endangered fish species, the Colorado Pikeminnow (*Ptychocheilus lucius*) and the Razorback Sucker (*Xyrauchen texanus*), have decreased in numbers after dam construction on the San Juan River. Scientists also believe that non-native Channel Catfish (*Ictalurus punctatus*) negatively affect native fish populations. Since 1991, the San Juan River Basin Recovery Implementation Program (SJRBRIP) has been removing Channel Catfish and stocking native fish in the river. However, researchers are unsure of the impacts of these actions. Therefore, in 2016 the SJRBRIP began research to quantify the effects of catfish on native fish species, assess the efficacy of catfish eradication efforts, and evaluate native fish stocking success.



KEY ISSUES ADDRESSED

Flow alterations in the San Juan River Basin have decreased critical habitats for the Colorado Pikeminnow and Razorback Sucker. Though the SJRBRIP regularly stocks the river with these native fish, their populations are not self-sustaining. SJRBRIP is supporting research to evaluate why. Non-native fish can also present a barrier to native fish recovery. Channel Catfish populations have grown since their introduction in the 1900s, and eradication efforts have been ongoing since the 1990s. However, the effects of catfish on the endangered fish and the benefits of their removal have been unclear. This uncertainty fueled the drive for scientific, quantitative analyses to better inform conservation efforts.

PROJECT GOALS

- Quantify Channel Catfish impacts on native fish populations
- Evaluate how current eradication efforts are impacting Channel Catfish populations
- Determine what factors impact the survival of stocked Colorado Pikeminnow and Razorback Sucker populations in the first three years post-stocking

MAKING PROGRESS

Management by the SJRBRIP and other organizations in the Colorado River has benefitted the Razorback Sucker, resulting in a proposal to downlist the species from endangered to threatened.



Channel Catfish from the San Juan River/M. McKinstry/USBR

PROJECT HIGHLIGHTS

Non-Native Removal Techniques: The SJRBRIP conducted Channel Catfish removal using raft-mounted electrofishing. This work is labor intensive and hard to implement in large river systems, which prompted the drive for a quantitative evaluation of these efforts.

Diet Analysis: Biologists quantified how much native fish Channel Catfish consume per year. They discovered that fish prey accounted for 6.1% of the average Channel Catfish diet, and the population consumes an estimated 215,000-735,000 native fish per year in the San Juan River Basin, depending on river conditions.

Removal Rates: Biologists found that current removal rates using electrofishing reduce catfish density but are too low to fully eradicate non-native Channel Catfish.

Native Fish Survival: Biologists working for the SJRBRIP found that juvenile Colorado Pikeminnow had a 25% lower survival rate compared to wild populations in the Green River, leading to low adult recruitment. One possible reason could be the negative effects of electrofishing and mark-recapture methods on juvenile fish.

Collaborators

- San Juan River Basin Recovery Implementation Program
- U.S. Fish and Wildlife Service
- U.S. Bureau of Reclamation
- See online for full list of collaborators

Authors: Angela Schmitt, UPenn, Mark McKinstry, USBR, Scott Durst, USFWS, Sky Hedden, AZGFD, April 2022.

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LESSONS LEARNED

Data suggests that Channel Catfish have lower susceptibility to electrofishing than other species because of their preference for deep benthic (bottom-associated) habitats. Electrofishing can also unintentionally harm native fish. Thus, it is important to carefully evaluate impacts of removal techniques.

Researchers noted spatial and temporal challenges in non-native control. Biologists conducted more intense removal in the upper reach of the river, but researchers are unsure of Channel Catfish movement patterns and spatial location of spawning habitats in the San Juan River. These factors could be affecting the success of removal efforts in the lower and upper reaches of the river. It is important to take spatial and temporal variability into account when constructing management strategies.

Researchers noted the importance of considering the life history stages of native and non-native fish. The catfish diet study data showed that larger Pikeminnow were less likely to be preyed upon by catfish. By raising Colorado Pikeminnow in the hatchery for an additional year, the estimated consumption by Channel Catfish could be reduced by almost 40%.

NEXT STEPS

- Conduct further studies to understand how catfish may limit recovery of native fish
- Optimize eradication efforts by developing new strategies that increase removal efficiency
- Increase survival rates in the wild by giving fish an extra year of growth in the hatchery and enrichment such as increased water flow rates

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Researchers Sampling Catfish/M. McKinstry/USBR