Restoring Bright Angel Creek: Saving Colorado River Native Fish One Tributary at a Time

Emily Omana, *Sarah Haas, Kurtis Shollenberger[3], Laura Tennant[4], Susan Wood[5], Ryan Green[6], and Rebecca Koller[7]*
Grand Canyon National Park, AZ, USA

Predation and competition by invasive species present threats to native fish conservation, particularly in arid-land rivers where extensive damming have homogenized flows. Native river fishes of arid regions are particularly vulnerable to the impacts of invasive species and habitat alteration, as many evolved specialized life history strategies for highly dynamic ecosystems. Once established, invasive fishes are difficult and costly to remove and can displace native species. Five native fish species currently persist with invasive brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) in the tributaries and mainstem Colorado River in Grand Canyon National Park. Additionally, new warm water invasives including smallmouth bass (*Micropterus dolomieui*) are being detected below the Glen Canyon Dam and represent new threats to native fish conservation in Grand Canyon.

We report on a multi-year trout suppression program in Bright Angel Creek, a tributary to the Colorado River in Grand Canyon. Across eight seasons, mechanical suppression resulted in an 89% decline in the abundance of brown trout and rainbow trout, and concurrent increases in native fishes of 480%. Our results suggest rapid recovery of native fishes can be achieved through suppression efforts of non-natives, but additional effort may be necessary where stream temperatures are cooler and where environmental barriers exist to mechanical removal. Additional restoration of Bright Angel Creek via chemical treatment is in the planning stages, including analysis of environmental impacts to non-target species and consultation with tribal partners on effects to traditional properties. A wholistic approach to watershed restoration, including clear management objectives and ecosystem resilience potential, can lead to improved native fish habitat, and reduction in costs related to mechanical removal efforts. Protecting native fish habitat in tributary streams may become critical to protecting Colorado River native fish diversity and providing a sanctuary to invading non-natives.

Contact Information: Emily Omana, Deputy Chief, Grand Canyon, National Park Service, Science & Resource Management, 1824 S Thompson St, Suite 200, Flagstaff, AZ, 86001, USA, Phone: 928-638-7475 or 435-690-9558, Email: emily_omana@nps.gov