

An Experimental evaluation of competition between rainbow trout *Oncorhynchus mykiss* and humpback chub *Gila cypha*.



Confluence of Little Colorado River and Colorado River

Rylan Morton-Starner, rmorton-starner@usgs.gov
 David Ward, dlward@usgs.gov
 US Geological Survey, Grand Canyon
 Monitoring and Research Center, Flagstaff, AZ



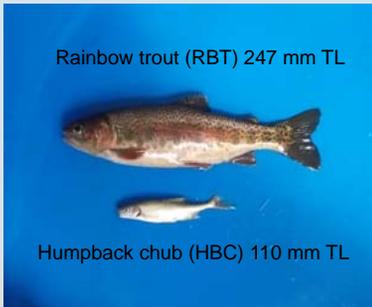
Rocky Mountain
 Research Station



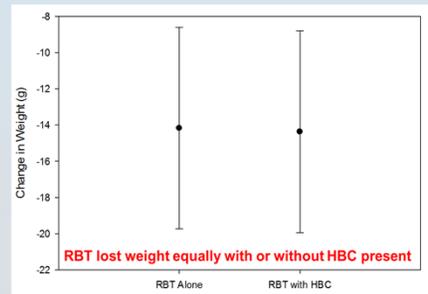
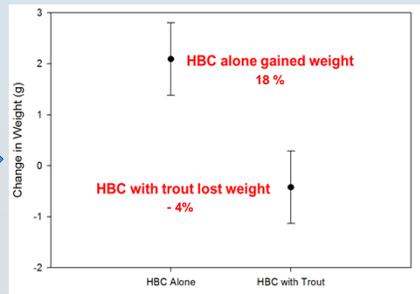
Replicate artificial stream systems used for competition studies

Introduced rainbow trout *Oncorhynchus mykiss* inhabit many of the same environments as endangered humpback chub *Gila cypha* in Colorado River in Grand Canyon. Competition for limited food resources between these two fish species may play an important role in humpback chub population dynamics. We evaluated competitive interactions between humpback chub and rainbow trout in 30-day laboratory trials at 16 degrees C using 12 replicate artificial stream systems. PIT tagged fish were fed a maintenance ration of 2 percent body weight per day and monitored for changes in weight. Small humpback chub (114 mm mean TL) lost weight (4 %) when held in systems with adult rainbow trout (247 mm mean TL) and control humpback chub (110 mm mean TL) increased their body weight by 18 % over the same time period. Size matched roundtail chub *Gila robusta* (236 mm mean TL) (as a surrogate for humpback chub) and rainbow trout (259 mm mean TL) showed a similar pattern, but less pronounced. These data suggest young humpback chub in Grand Canyon could be adversely impacted by competitive interactions with adult rainbow trout.

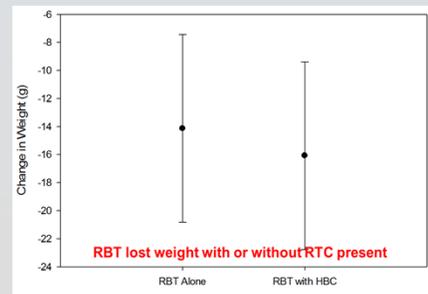
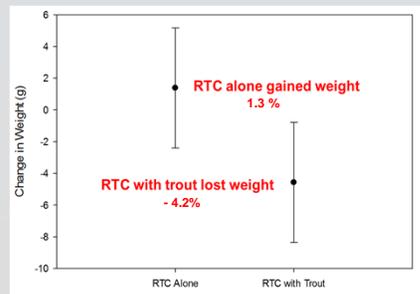
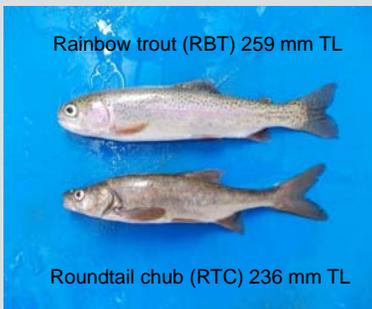
Sizes of fish in each competition trial



Mean change in weight (g) after 30 days. Error bars represent 95% confidence intervals



Juvenile HBC in treatments with adult trout showed obvious signs of fin abrasion (bottom two fish) compared with HBC from trials without trout (top two fish)



Live red wigglers *Eisenia fetida* and amphipods *Gammarus lacustris* were fed twice daily at 2% body weight /day.