

**\*\*New Aquatic Foodbase Cooperative Agreement Awarded by the Grand Canyon Monitoring and Research Center, USGS\*\***

**Announcement No. 05WRPA0013**

**Cooperative Agreement No. 05WRAG0055**

**Project Title:**

**Linking Whole-System Carbon Cycling To Quantitative Food Webs In The Colorado River**

**Principal Investigators:**

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**Proposal Abstract:**

The Colorado River below Glen Canyon dam has been dramatically altered by modifications of flow, temperature, sediment, and non-native species which has severely reduced native fish populations. These impacts have likely changed both the amount and source of carbon input available at the base of the food web and the flows within the food web, i.e. much carbon flow may be through exotic snails or fish. The proposed research will estimate the relative importance of the various food resources to fishes in this system to establish the degree to which native fishes are limited by food resources, by either low production at the base of the food web or via shunting of carbon to exotic animals. We will measure supply of basal food resources, such as primary production by riverine algae, inputs from Lake Powell, and litterfall from riparian vegetation. We will also measure rates of secondary production (or biomass produced over time) of macroinvertebrates in the river system. We will use measurements of macroinvertebrate gut contents and stable isotopes to calculate carbon flow from basal food resources to macroinvertebrates. Finally, the flow of carbon from macroinvertebrates to native fishes (humpback chub) and non-native trout will be estimated. These data will allow us to estimate the dominant food sources for these fishes. This research will elucidate how the energy flows in the Colorado River and large desert rivers in general. Based on data from this study we will propose monitoring approaches to assess future changes to food web function. Specifically, the measurements of food resource production and inputs, secondary production and energy flow in the food web will provide a basis for developing hypotheses about how proposed management actions may affect threatened native fish species and non-native rainbow trout.