

The Big Questions

What is an appropriate rehabilitation goal for the physical habitat of the Colorado River, given the limited supply of fine sediment and the characteristics of the large-scale flow regime?

How can a non-native trout sport fishery in Glen Canyon coexist with an endangered humpback chub population in Marble and Grand Canyons?



Questions, Expectations, Concerns

Secretarial Directive concerning Environmental Assessments for (1) High-flow Experimental Releases, and (2) Non-native Fish Control (May 23, 2012: “I direct ... USGS ... to undertake coordinated implementation of the actions and commitments described and analyzed in the Environmental Assessments ...”)

2011 Desired Future Conditions Ad Hoc Group

(April 30, 2012: Sol directed AMWG “to utilize these DFCs to inform and guide the AMWG’s future considerations”)

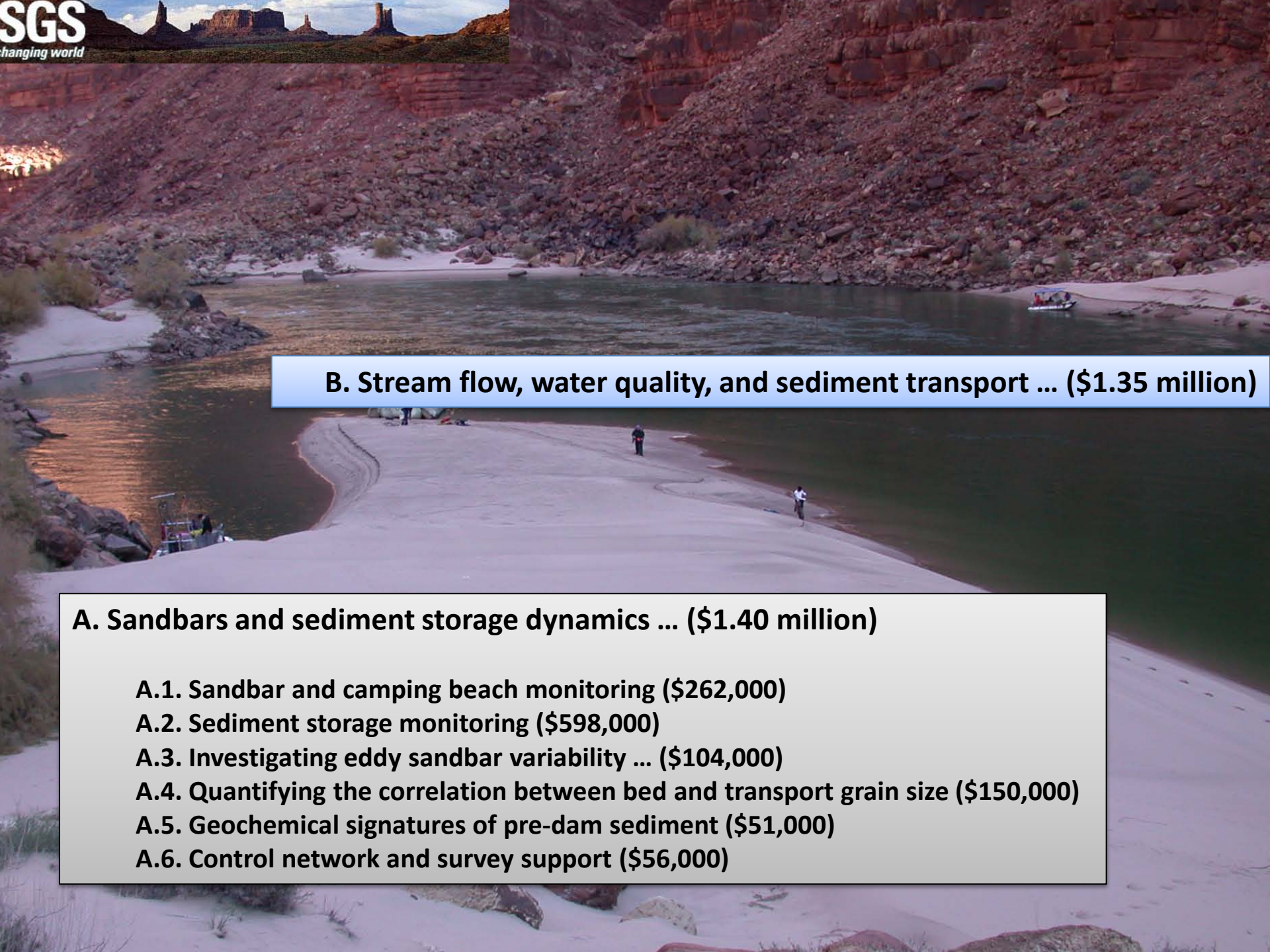
General Science Plans for the Environmental Assessments

Research and Monitoring Priorities in GCMRC science planning (March 31, 2011, memo from Assistant Secretary for Water and Science)

Core Monitoring Plan (February 18, 2011, draft)

Monitoring and Research Plan (April 2009)

Priority Questions and Program Goals



B. Stream flow, water quality, and sediment transport ... (\$1.35 million)

A. Sandbars and sediment storage dynamics ... (\$1.40 million)

- A.1. Sandbar and camping beach monitoring (\$262,000)**
- A.2. Sediment storage monitoring (\$598,000)**
- A.3. Investigating eddy sandbar variability ... (\$104,000)**
- A.4. Quantifying the correlation between bed and transport grain size (\$150,000)**
- A.5. Geochemical signatures of pre-dam sediment (\$51,000)**
- A.6. Control network and survey support (\$56,000)**



C. Water quality monitoring of Lake Powell and Glen Canyon Dam releases (\$0.25 million)



D. Mainstem humpback chub aggregation studies (\$0.37 million)

D.1. Aggregation sampling (\$199,000)

D.2. Natal origins of humpback chub(\$167,000)

E. Humpback chub early life history near the Little Colorado River (\$0.48 million)

E.1. July Little Colorado River marking (\$129,000)

E.2. Describing food web structure and the potential for food limitation within the Little Colorado River (\$257,000)

E.3. Population modeling (\$90,000)





F. Monitoring of native and nonnative fishes in the mainstem Colorado River and the lower Little Colorado River (\$2.32 million)

- F.1. Systemwide electrofishing (\$217,000)**
- F.2. Glen Canyon monitoring (\$264,000)**
- F.3. Mainstem monitoring of native and nonnative fishes near the Little Colorado River; juvenile chub monitoring (\$464,000)**
- F.4. Little Colorado River monitoring (\$811,000)**
- F.5. Stock assessment and structured mark recapture model of humpback chub abundance (\$20,000)**
- F.6. Detection of rainbow trout movement from Glen Canyon into Marble Canyon (\$276,000)**
- F.7. Food base monitoring (\$272,000)**



**G. Interactions between native fish and nonnative trout
(\$0.28 million)**

G.1. Laboratory studies ... (\$93,000)

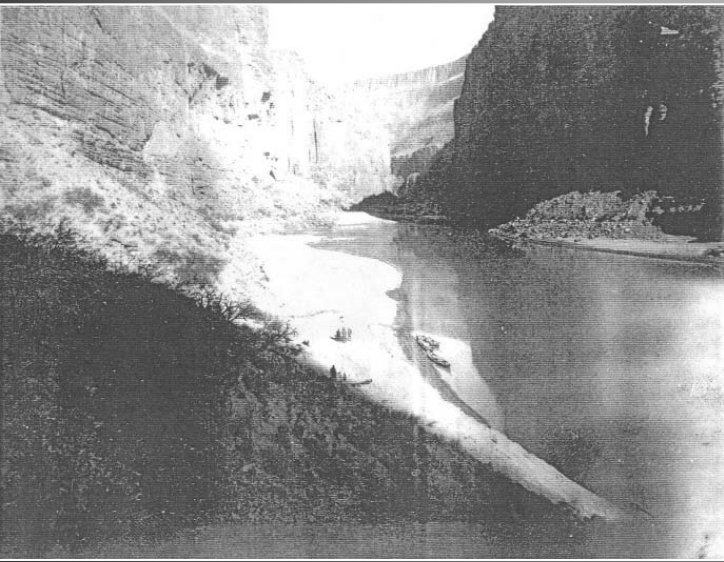
**G.2. Efficacy and ecological impacts of brown trout
removal (\$182,000)**

H. Understanding the factors limiting the growth of rainbow trout in Glen and Marble Canyons (\$0.61 million)



- H.1. Laboratory feeding studies (\$38,000)**
- H.2. Understanding the links among dam operations, environmental conditions, and the food base (\$244,000)**
- H.3. Developing a bioenergetics model for large rainbow trout (\$138,000)**
- H.4. Learning from other Tailwaters -- a synthesis (\$147,000)**
- H.5. Contingency planning for HFEs and subsequent rainbow trout population management (\$45,000)**

I. Riparian vegetation studies (\$0.38 million)



I.1. Monitor vegetation and channel response using response guilds and landscape scale vegetation change analysis (\$377,000)



J. Monitoring Cultural Resources at a Small Scale and Defining the Large-Scale Geomorphic Context of the Processes Affecting Cultural Resources (\$540,000)

J.1. Cultural site monitoring in Glen Canyon (\$162,000)

J.2. Monitoring of Select Cultural Sites in Grand Canyon (\$191,000)

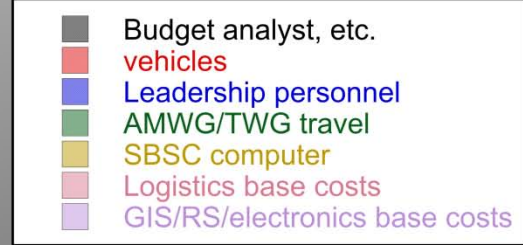
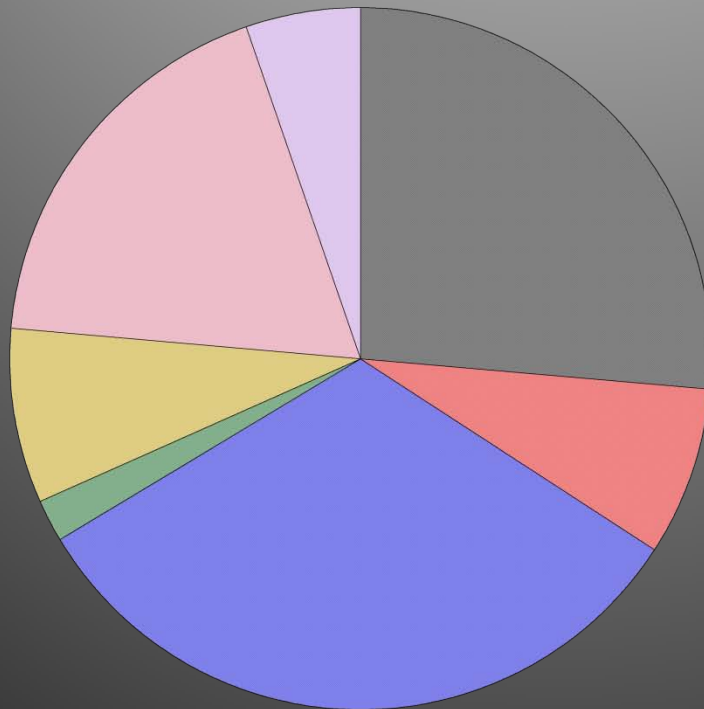
J.3. Defining the Extent and Relative Importance of Gully Formation and Annealing Processes in the Colorado River Ecosystem (\$187,000)



GCMRC economist and research support
\$199,000

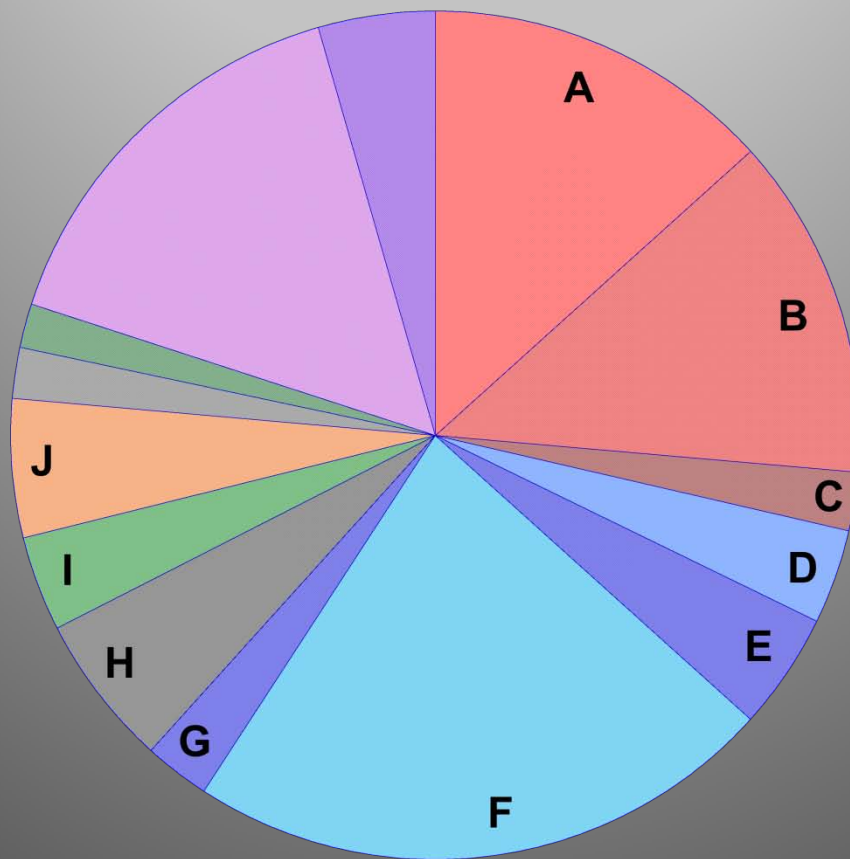
Independent Reviews (*\$24,000*)

Science Advisors (*\$144,000*)



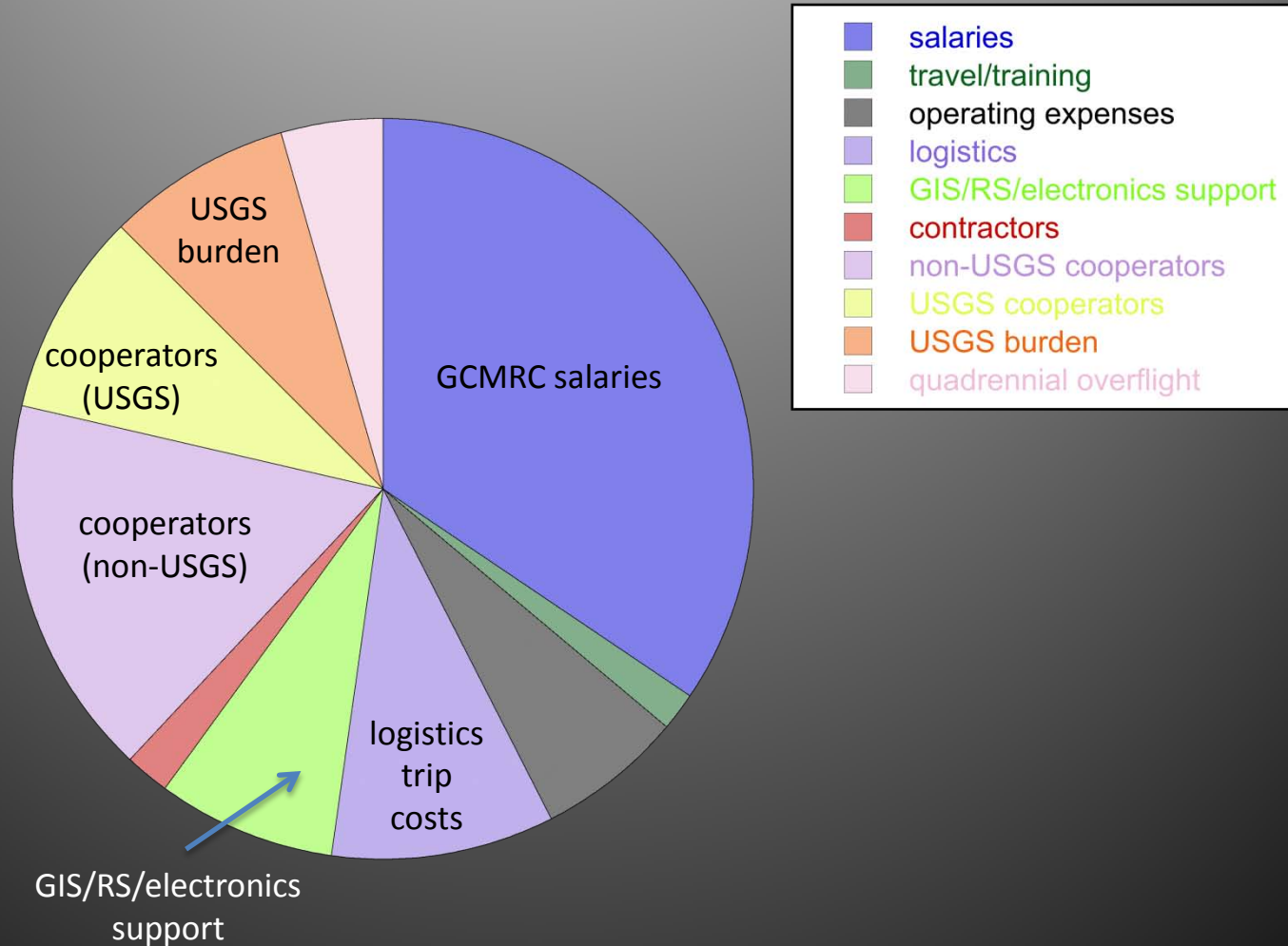
USGS administration costs
\$1,606,000
does not include indirect costs on projects

FY 13: \$10,441,000

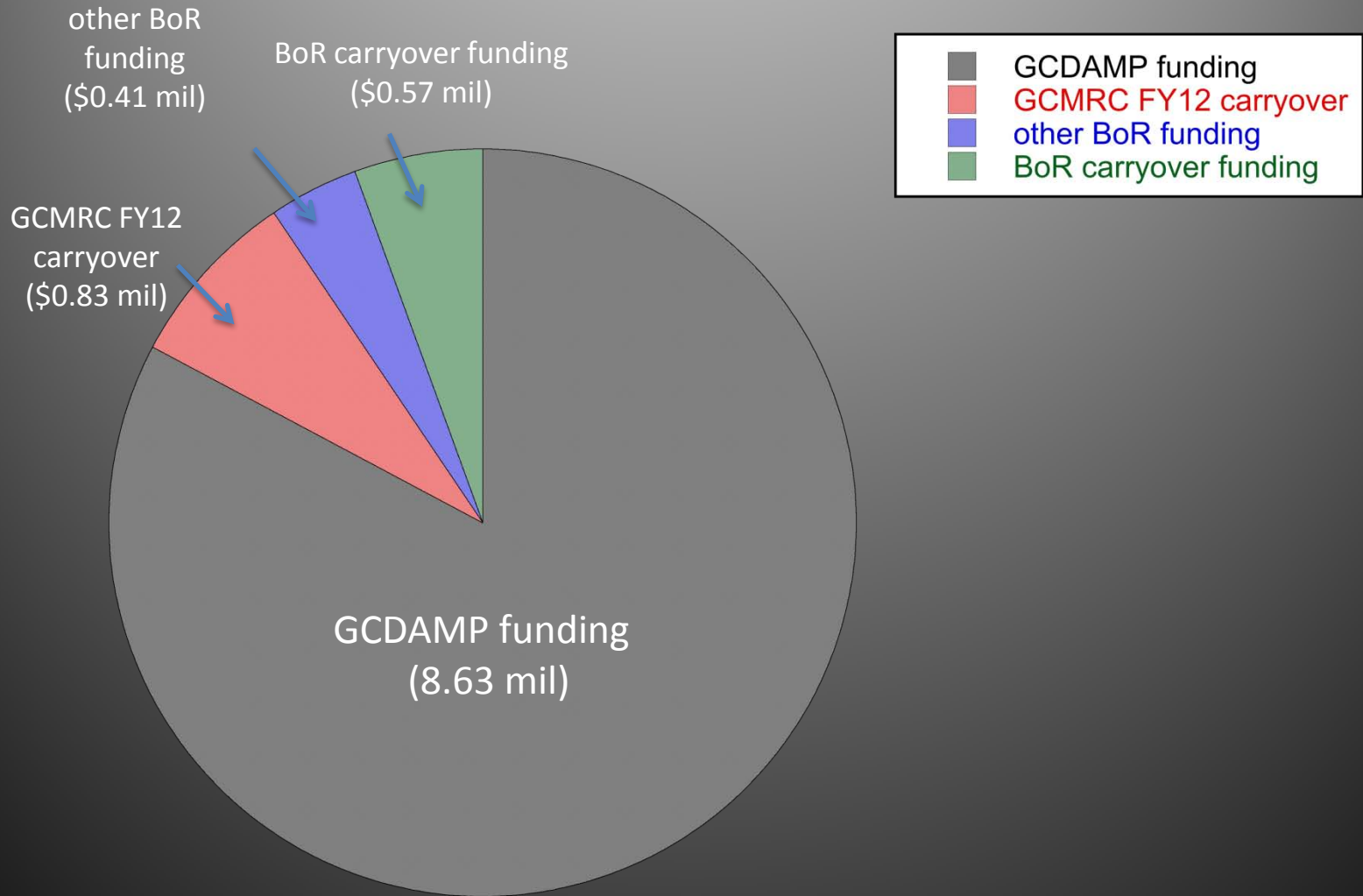


- **A. Sandbars and sediment storage dynamics**
- **B. Stream flow, water quality, sediment transport**
- **C. Lake Powell water quality monitoring**
- **D. Mainstem humpback chub aggregation studies**
- **E. Humpback chub early life history ...**
- **F. Monitoring of native and nonnative fishes ...**
- **G. Interactions between native fish and nonnative**
- **H. Factors limiting the growth of rainbow trout**
- **I. Integrated riparian vegetation studies**
- **J. Monitoring and research of cultural resources**
- **GCMRC economist and support**
- **Independent Review**
- **USGS Administration**
- **Quadrennial Overflight**

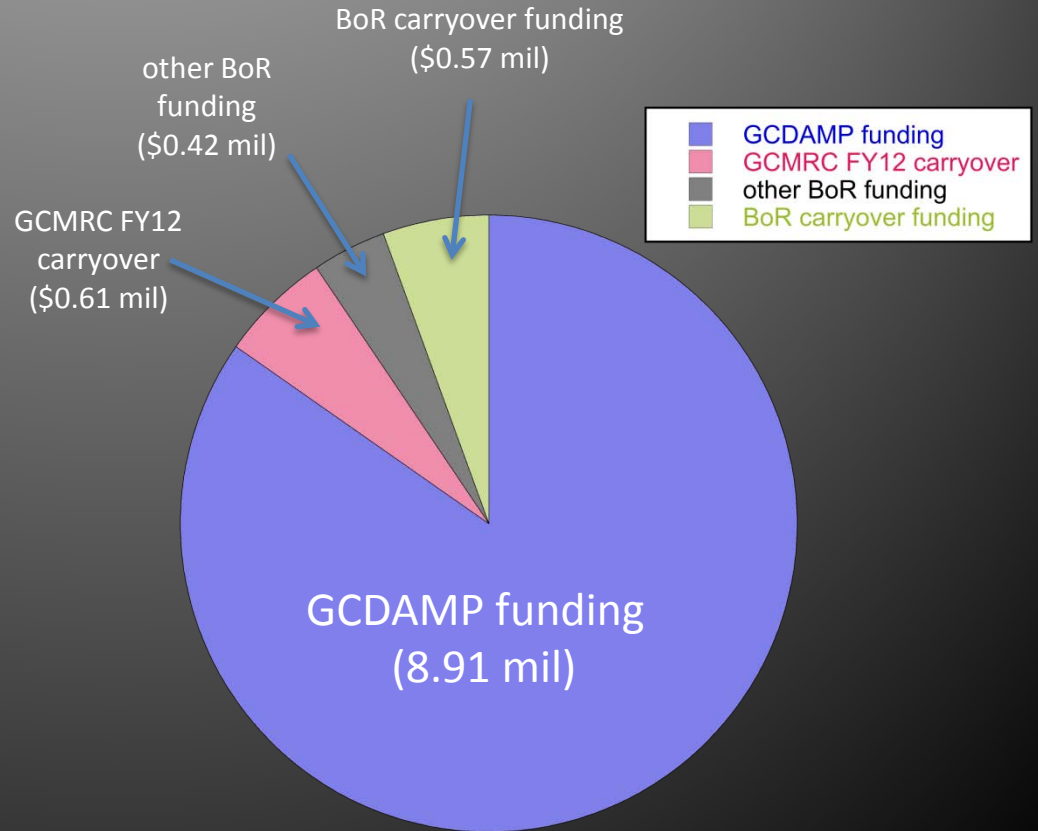
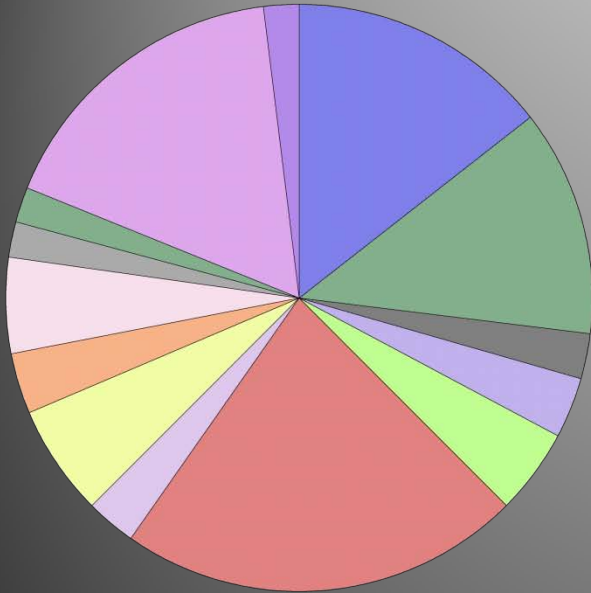
FY13: general budget categories



Sources of funding for FY13



- A. Sandbars and sediment storage
- B. Streamflow, water quality, sediment
- C. Lake Powell
- D. Mainstem humpback chub aggregations
- E. Humpback chub early life history
- F. Monitoring native and nonnative fishes
- G. Interactions between trout and native fish
- H. Factors limiting growth of Rainbow Trout
- I. Riparian vegetation monitoring
- J. Cultural resources monitoring and research
- Economist and support
- Independent review
- USGS administration
- quadrennial overflight



FY14 -- \$10,518,400