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?

Guiding Principles in Budget Development

1) **Combine projects** so that each project comprehensively focuses on a particular resource and specific questions; focus each project on key monitoring activities and resolving key management uncertainties; be mindful of SSQs, AMP Goals, DFCs, stated research and information needs

2) To the degree possible, projects should reference each other and be **integrate**d with each other

3) Research projects should consider **cost effective** strategies to resolve knowledge uncertainties, including field-scale experiments on the Colorado River, laboratory experiments, literature reviews, innovative data analysis, or comparative studies of other rivers

4) **Report the full cost** of each project (i.e., incorporate logistics and remote sensing/GIS costs in the associated science activity)

5) Let **scientific questions guide** program development

6) **Collaborate** with land, species, and water management agencies where appropriate/ required to ensure that projects are administratively possible)

Today, two budgets are presented …

$8.7 million

high priority monitoring program that include required support for HFEP and NNFC EAs, Biological Opinion activities, and other key monitoring activities; includes resolution of a few key scientific uncertainties in fish ecology

$10.1 million

also includes resolution of other key scientific uncertainties, especially in fish ecology and sand bar research

AMP funds available for GCMRC monitoring and research projects
~$8.8 million

GCMRC budget development – next steps

May 16 – meet with GCNP, GCNRA, BuRec regarding cultural resources monitoring program

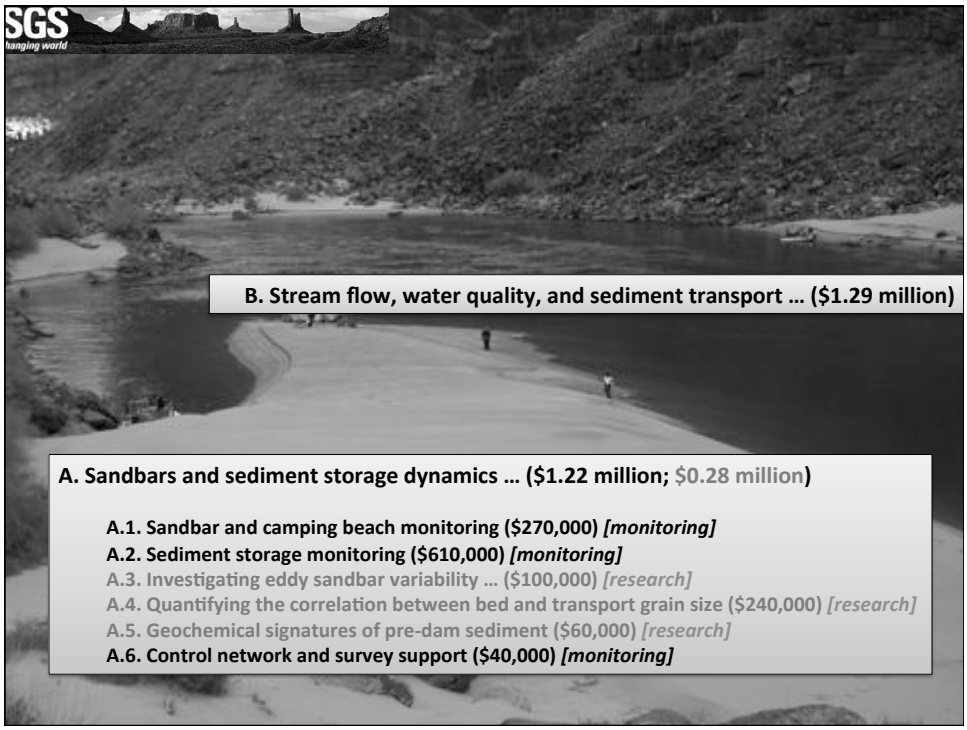
May 22 – send draft work plan, with full project proposals, to TWG and Science Advisors

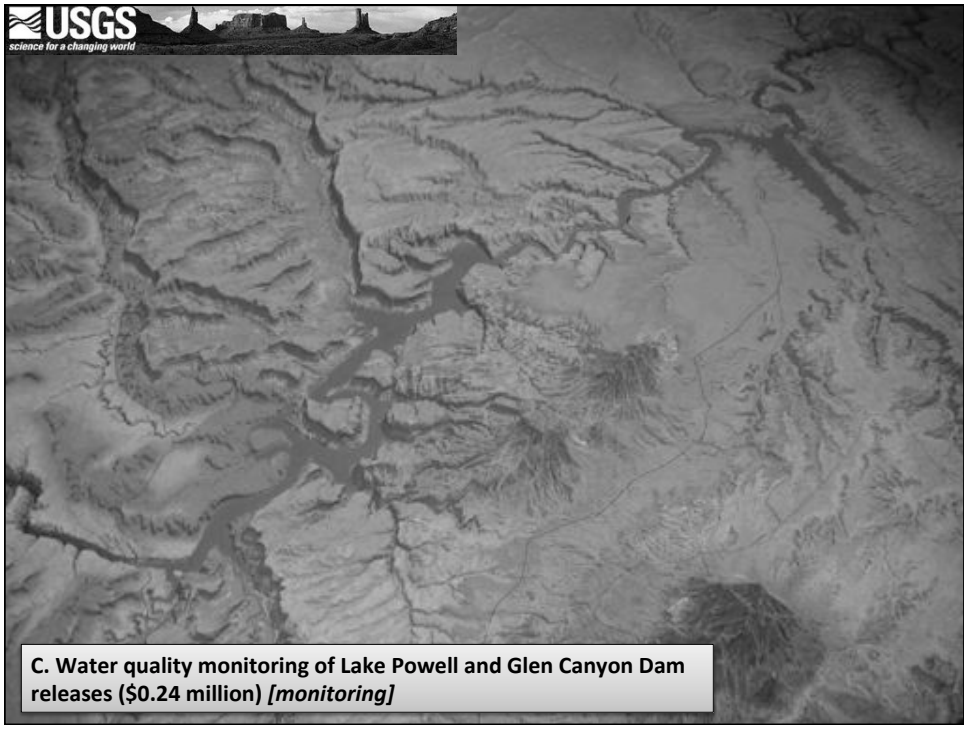
Late May / early June – Science Advisor review

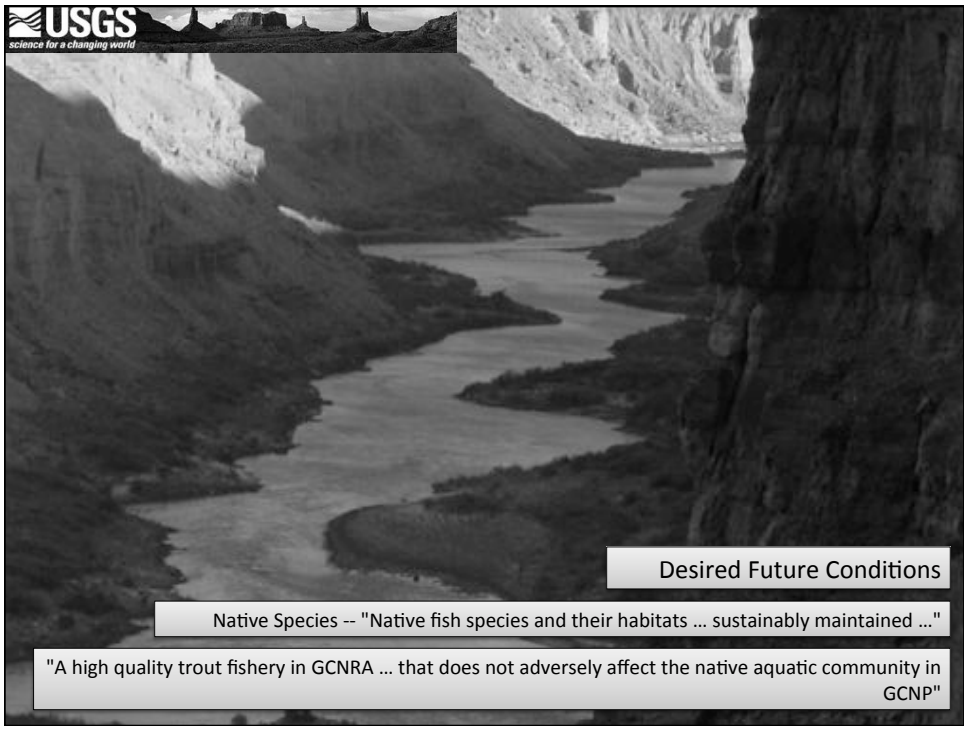
May ?? – meet with Tribes on cultural resources proposal and related activities

June 20/21 – TWG meeting

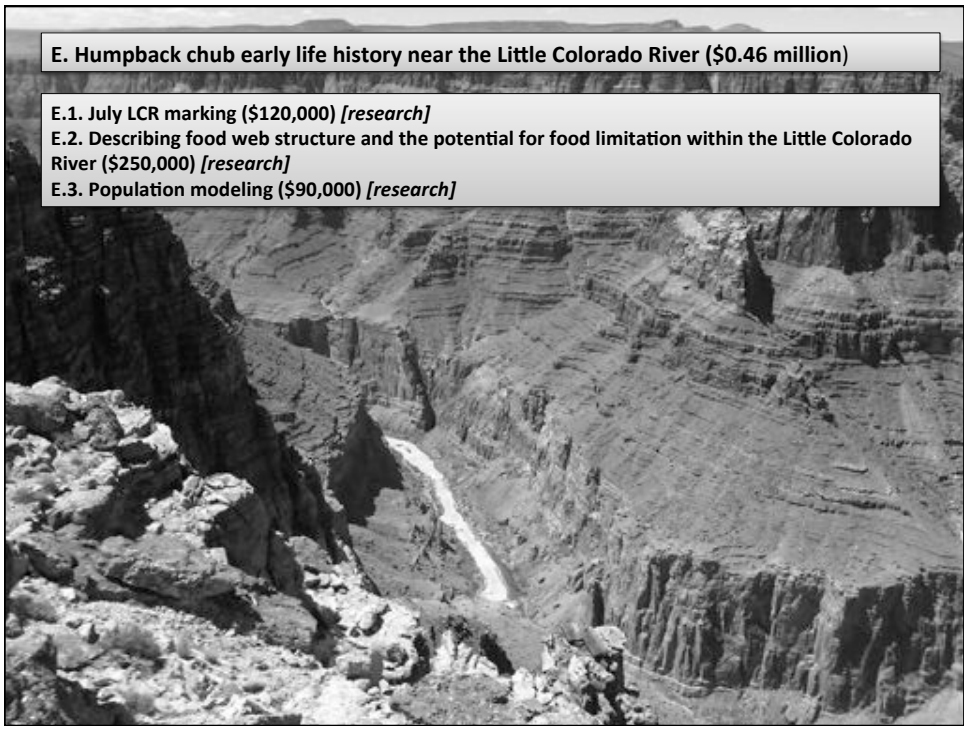

USGS
science for a changing world
Desired Future Conditions
"high elevation open riparian sediment deposits … in sufficient volume, area, and distribution …"
"Physical characteristics, including climate, site-specific geomorphology, dam-related discharge and flow
and tributary flows, generally predominate …"

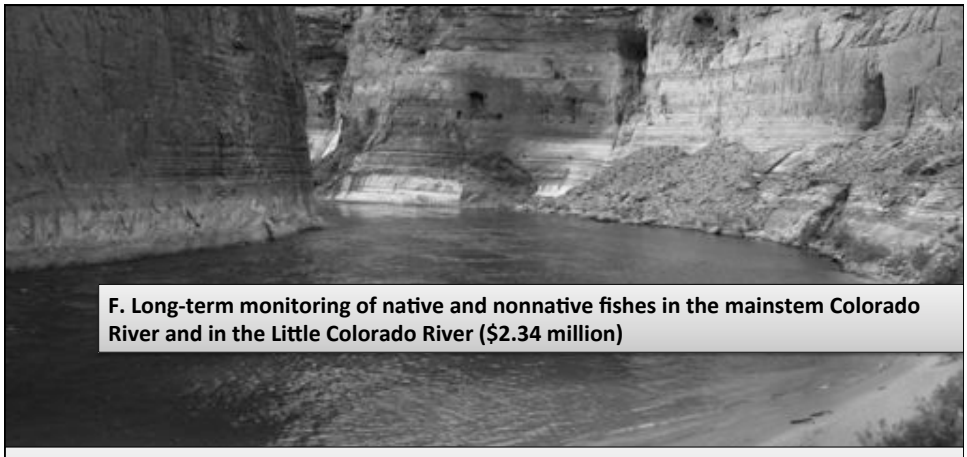

SGS
hanging world
B. Stream flow, water quality, and sediment transport … ($1.29 million)
A. Sandbars and sediment storage dynamics … ($1.22 million; $0.28 million)
A.1. Sandbar and camping beach monitoring ($270,000) [monitoring]
A.2. Sediment storage monitoring ($610,000) [monitoring]
A.3. Investigating eddy sandbar variability … ($100,000) [research]
A.4. Quantifying the correlation between bed and transport grain size ($240,000) [research]
A.5. Geochemical signatures of pre-dam sediment ($60,000) [research]
A.6. Control network and survey support ($40,000) [monitoring]


USGS
science for a changing world
C. Water quality monitoring of Lake Powell and Glen Canyon Dam releases ($0.24 million) *[monitoring]*


USGS
science for a changing world
Desired Future Conditions
Native Species -- "Native fish species and their habitats … sustainably maintained …"
"A high quality trout fishery in GCNRA … that does not adversely affect the native aquatic community in GCNP"

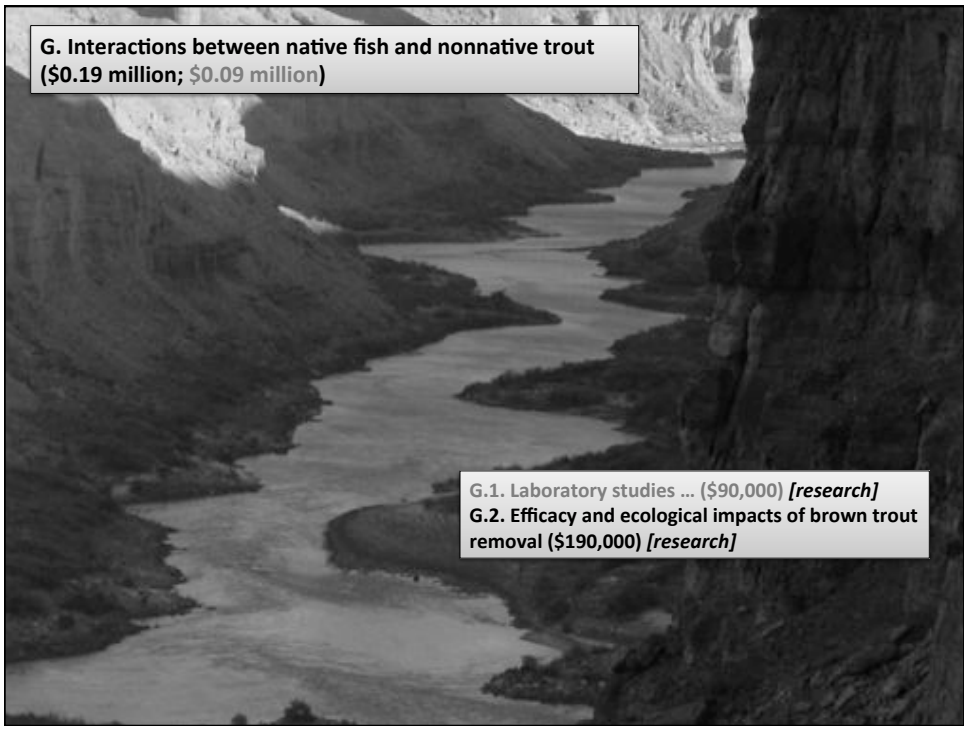

D. Mainstem humpback chub aggregation studies ($0.23 million; $0.17 million)
D.1. Aggregation sampling ($230,000) [monitoring]
D.2. Natal origins of humpback chub($170,000) [research]


E. Humpback chub early life history near the Little Colorado River ($0.46 million)
E.1. July LCR marking ($120,000) [research]
E.2. Describing food web structure and the potential for food limitation within the Little Colorado River ($250,000) [research]
E.3. Population modeling ($90,000) [research]



F. Long-term monitoring of native and nonnative fishes in the mainstem Colorado River and in the Little Colorado River ($2.34 million)

F.1. Mainstem spring native and nonnative fish monitoring in the Colorado River ($930,000) ***[monitoring]***
F.2. Native and nonnative fish monitoring and translocation in the Little Colorado River ($830,000) ***[monitoring]***
F.3. Stock assessment and structured mark recapture model of humpback chub abundance ($20,000) ***[monitoring]***
F.4. Detection of rainbow trout movement from Glen Canyon into Marble Canyon ($290,000) ***[research]***
F.5. Food base monitoring ($260,000) ***[monitoring]***

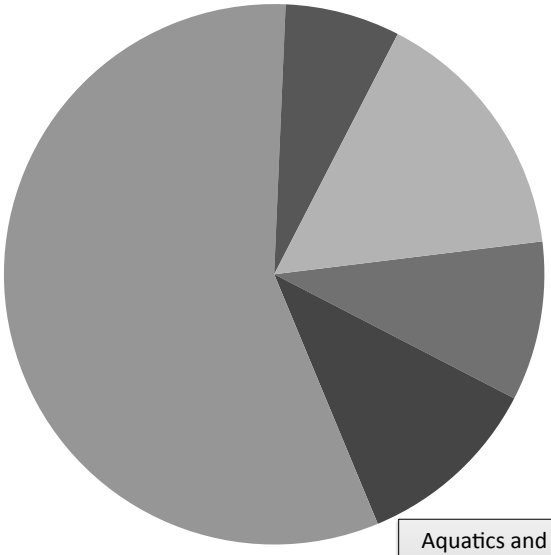


G. Interactions between native fish and nonnative trout ($0.19 million; $0.09 million)

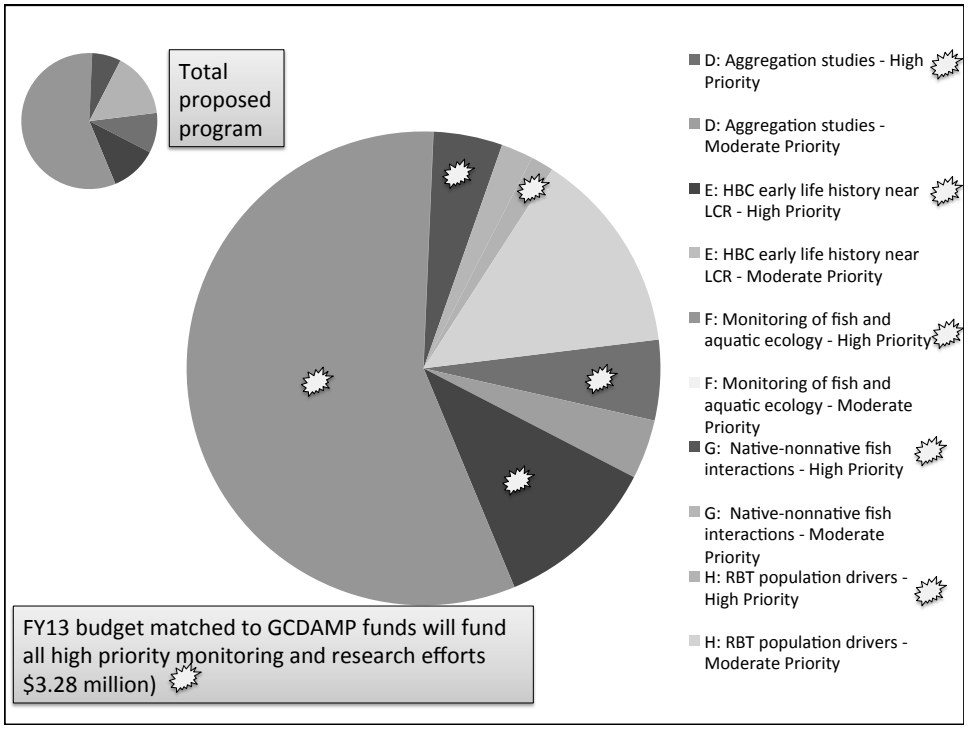
G.1. Laboratory studies … ($90,000) ***[research]***
G.2. Efficacy and ecological impacts of brown trout removal ($190,000) ***[research]***

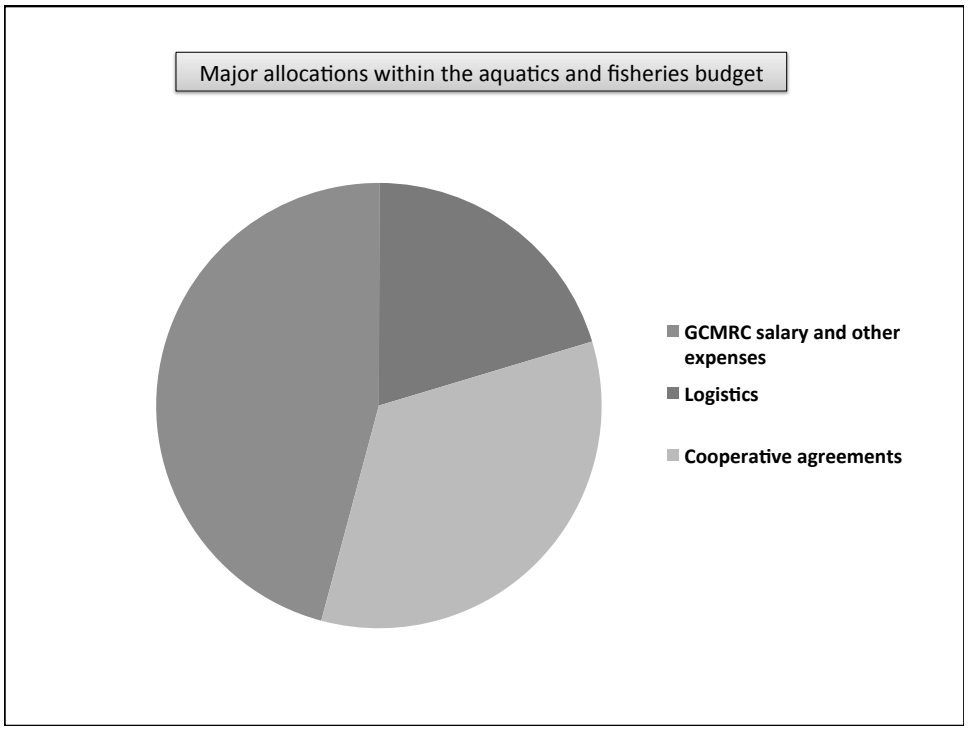
H. Understanding the factors limiting the growth of rainbow trout in Glen Canyon ($0.07 million; $0.57 million)

H.1.Laboratory feeding studies ($40,000) ***[research]***
H.2. Understanding the links among dam operations, environmental conditions, and the food base ($250,000) ***[research]***
H.3. Developing a bioenergetics model for large rainbow trout ($140,000) ***[research]***
H.4.A synthesis of tailwater fishery management in the United States ($150,000) ***[research]***
H.5. Contingency planning for HFEs and subsequent rainbow trout population management ($70,000) *[research]*



Aquatics and fisheries monitoring and research projects
$4.10 million
total proposed program


Total proposed program
D: Aggregation studies - High Priority
D: Aggregation studies - Moderate Priority
E: HBC early life history near LCR - High Priority
E: HBC early life history near LCR - Moderate Priority
F: Monitoring of fish and aquatic ecology - High Priority
F: Monitoring of fish and aquatic ecology - Moderate Priority
G: Native-nonnative fish interactions - High Priority
G: Native-nonnative fish interactions - Moderate Priority
H: RBT population drivers - High Priority
H: RBT population drivers - Moderate Priority
FY13 budget matched to GCDAMP funds will fund all high priority monitoring and research efforts $3.28 million)


Major allocations within the aquatics and fisheries budget
GCMRC salary and other expenses
Logistics
Cooperative agreements

I. Integrated riparian vegetation studies ($0.28 million; $0.05 million)

I.1. Integrated vegetation monitoring ($280,000) ***[monitoring]***
I.2. **Riparian dynamics and trophic level linkages related to tamarisk defoliation ($50,000)** ***[research]***

Desired Future Condition

"Native riparian systems, in various stages of maturity, are diverse, healthy, productive, self-sustaining, and ecologically appropriate"

J. Cultural Resources (~$300,000)

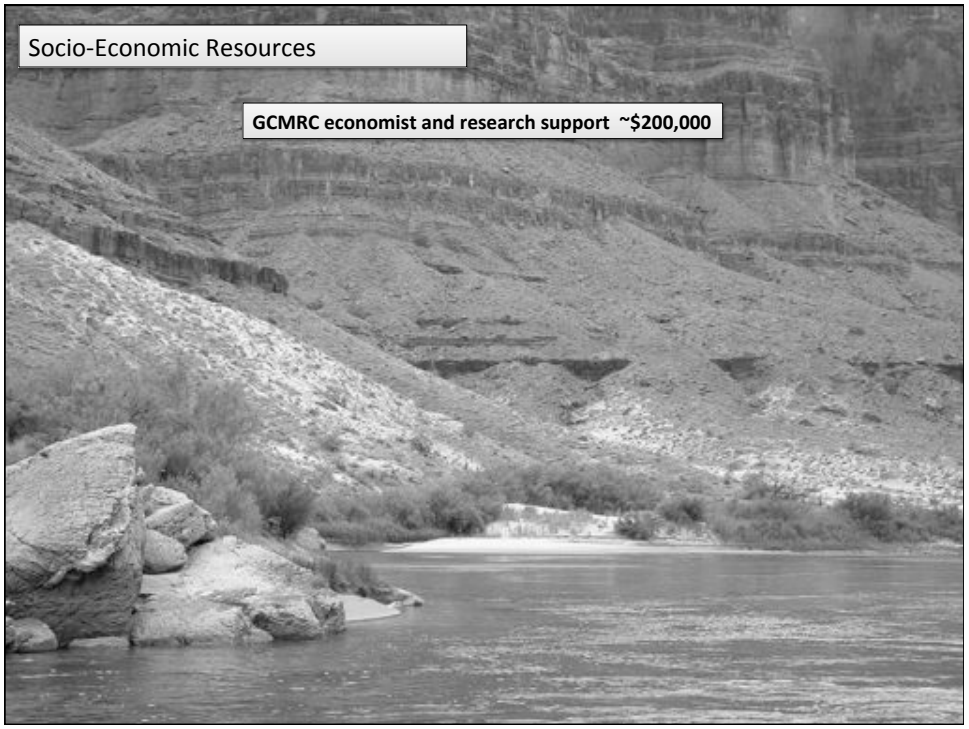
J.1. Site scale monitoring of individual sites in Glen Canyon

J.2. Monitoring strategies for individual sites in Marble and Grand Canyons

J.3. Large-scale floodplain and alluvial valley geomorphology

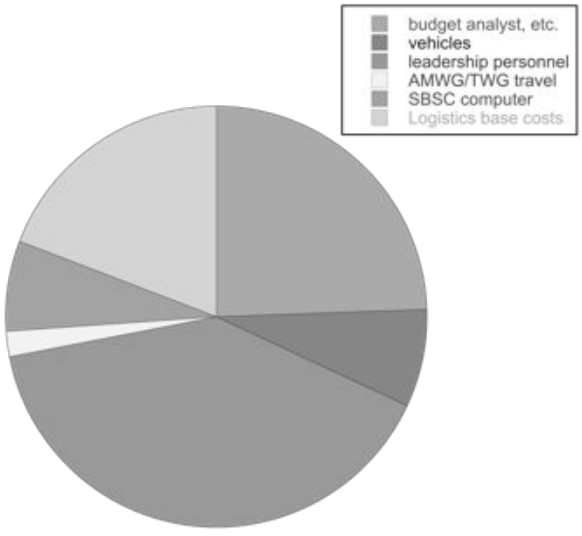
Desired Future Condition

"… maintain significance and integrity [Prehistoric archaeological sites and historic sites]"



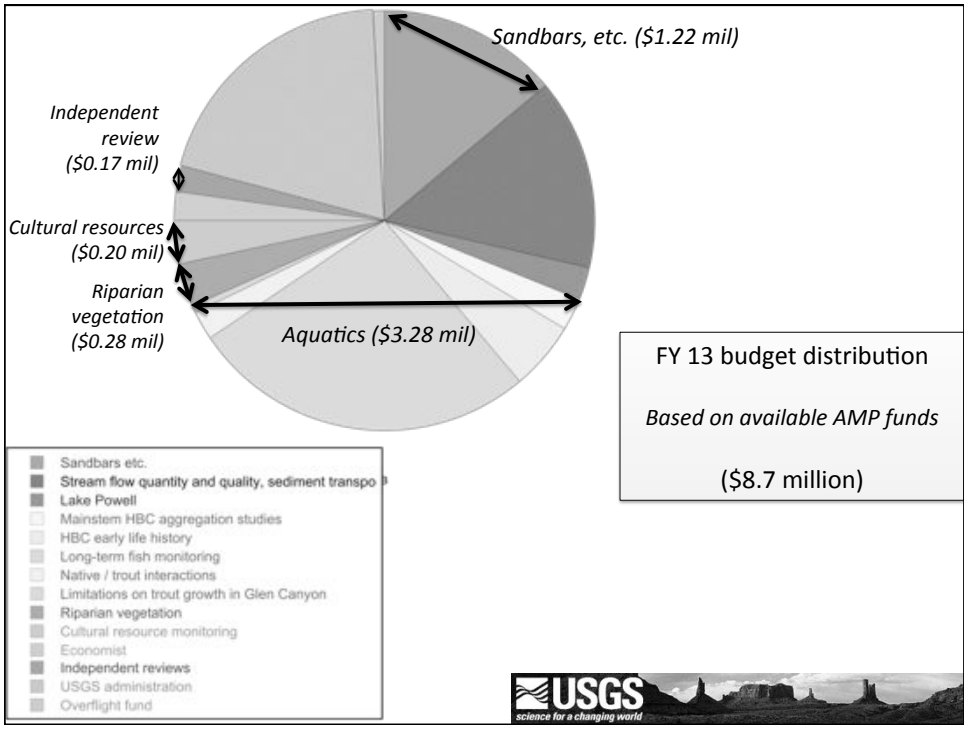
Independent Reviews *($24,000)*

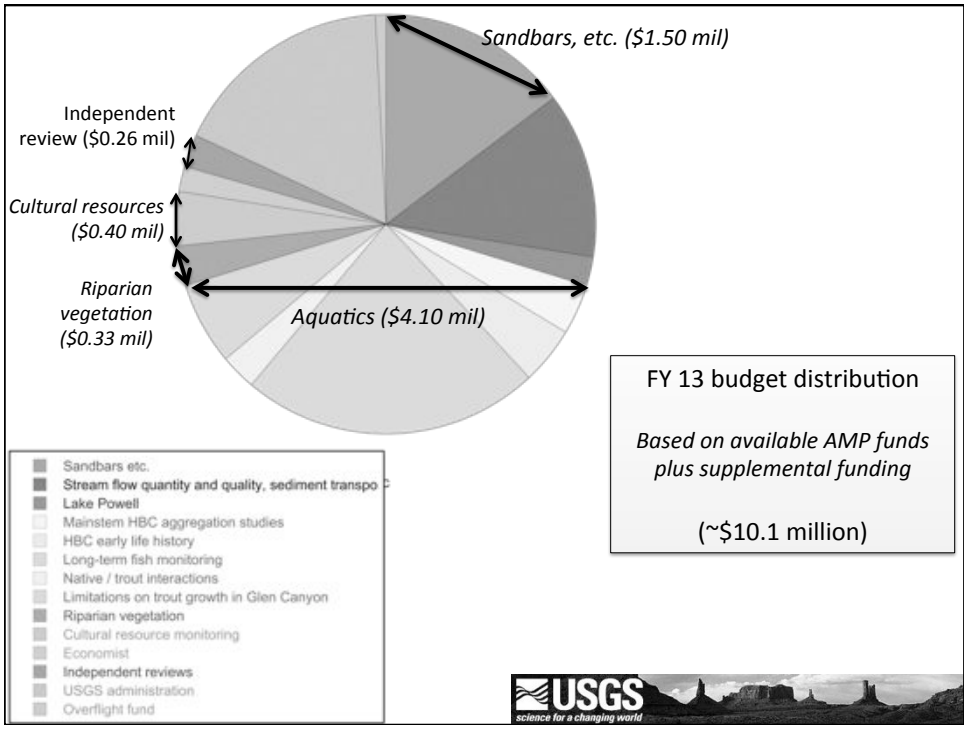
Science Advisors *($146,000; requested amount $234,000)*



USGS administration costs
$1,750,000
does not include indirect costs on projects

Estimated USGS indirect costs on projects
$870,000


Sandbars, etc. ($1.22 mil)
Independent review ($0.17 mil)
Cultural resources ($0.20 mil)
Riparian vegetation ($0.28 mil)
Aquatics ($3.28 mil)
Sandbars etc.
Stream flow quantity and quality, sediment transpo
Lake Powell
Mainstem HBC aggregation studies
HBC early life history
Long-term fish monitoring
Native / trout interactions
Limitations on trout growth in Glen Canyon
Riparian vegetation
Cultural resource monitoring
Economist
Independent reviews
USGS administration
Overflight fund
FY 13 budget distribution
Based on available AMP funds
($8.7 million)
USGS
science for a changing world


Sandbars, etc. ($1.50 mil)
Independent review ($0.26 mil)
Cultural resources ($0.40 mil)
Riparian vegetation ($0.33 mil)
Aquatics ($4.10 mil)
Sandbars etc.
Stream flow quantity and quality, sediment transpo
Lake Powell
Mainstem HBC aggregation studies
HBC early life history
Long-term fish monitoring
Native / trout interactions
Limitations on trout growth in Glen Canyon
Riparian vegetation
Cultural resource monitoring
Economist
Independent reviews
USGS administration
Overflight fund
FY 13 budget distribution
Based on available AMP funds plus supplemental funding
(~$10.1 million)
USGS
science for a changing world