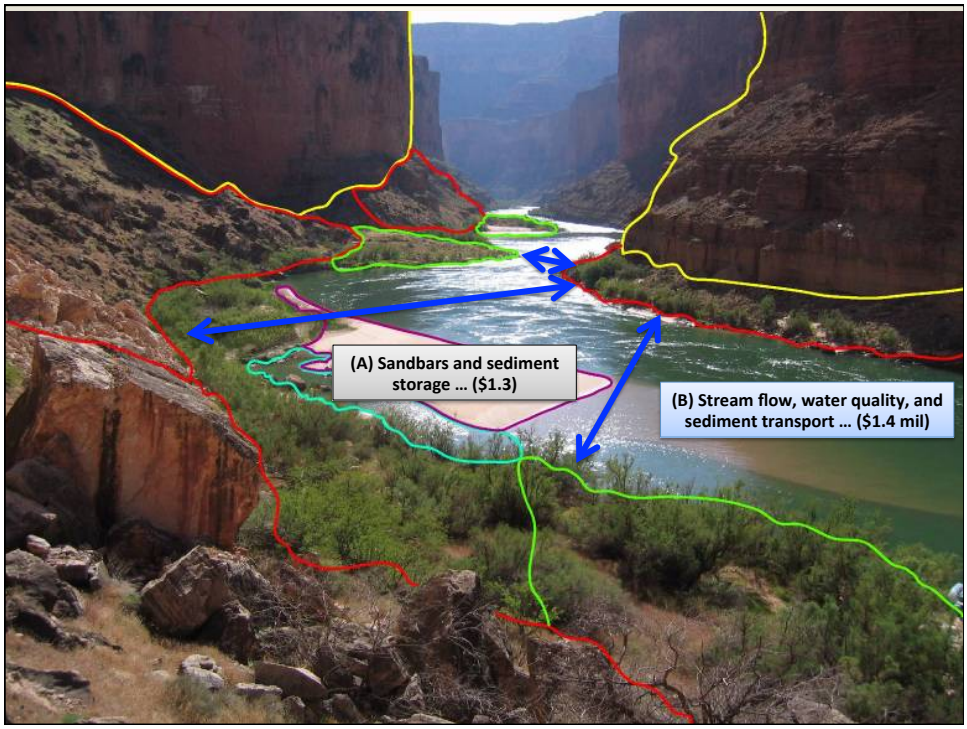
Guiding Principles in Budget Development

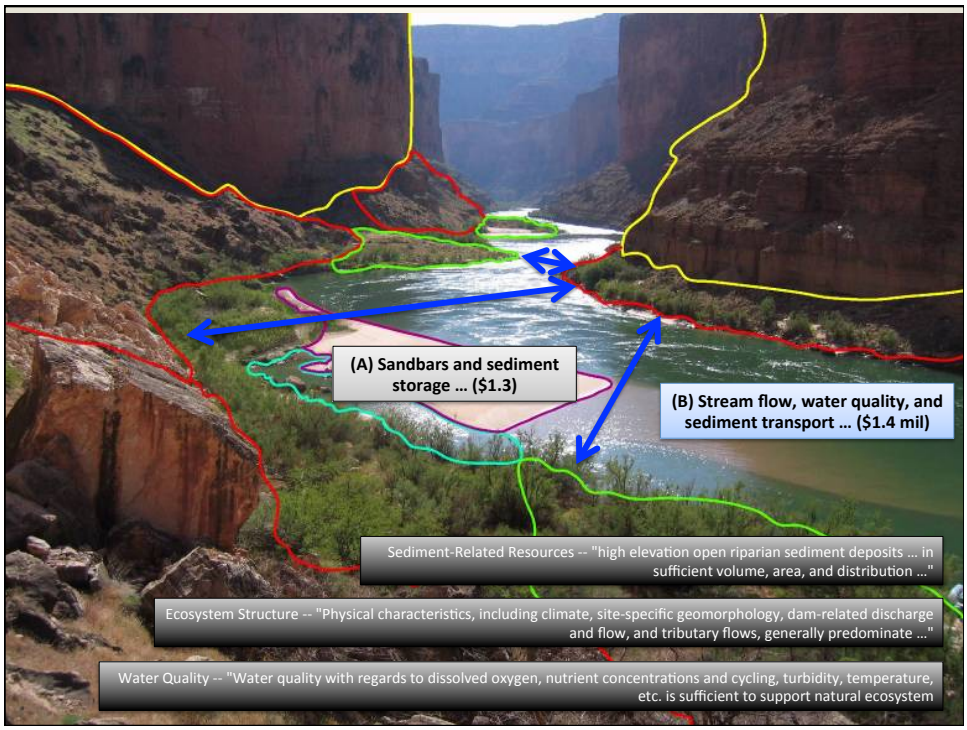
1) Integrate projects, resulting in fewer projects
2) Collaborate across disciplines
3) Focus each project on key monitoring activities and resolving key management uncertainties; identify the big questions and big issues; be mindful of SSQs, AMP Goals, DFCs, stated research and information needs
4) Consider the knowledge to be gained from field scale experiments, laboratory experiments, literature reviews, innovative data analysis, comparisons with other rivers
5) Determine full cost of each project (i.e., incorporate logistical and remote sensing/GIS costs in the associated science activity)
6) Seek agency collaboration but let science lead program development, not agency or staff commitments
7) Collaborate with land, species, and water management agencies where appropriate/ required (ensure projects are administratively possible)
8) Reveal full administrative and overhead costs

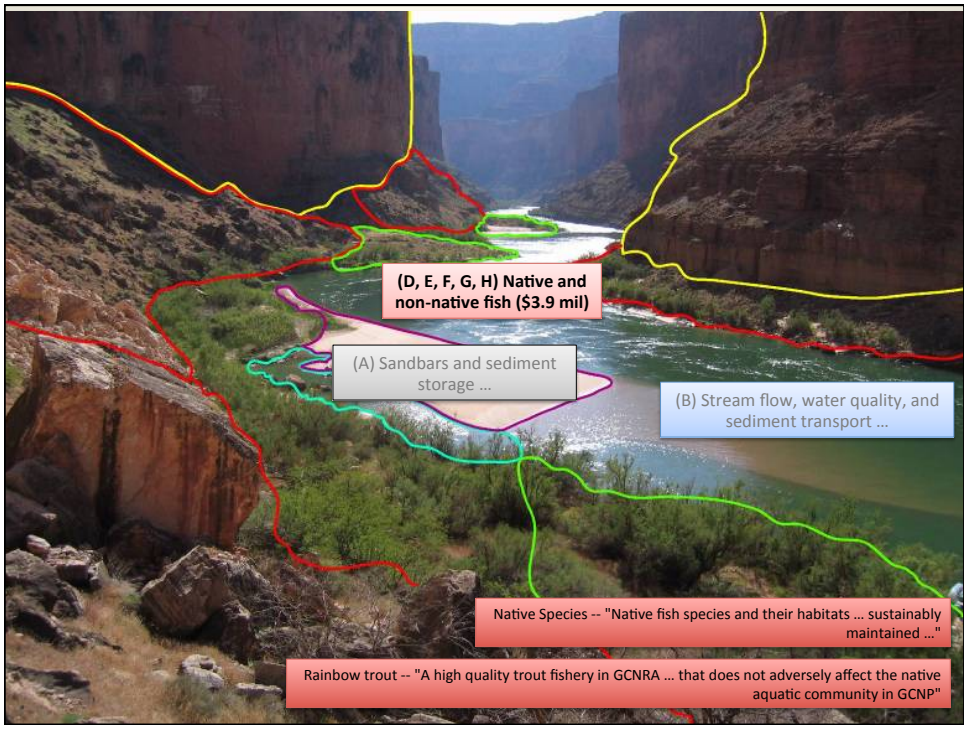
The Big Questions

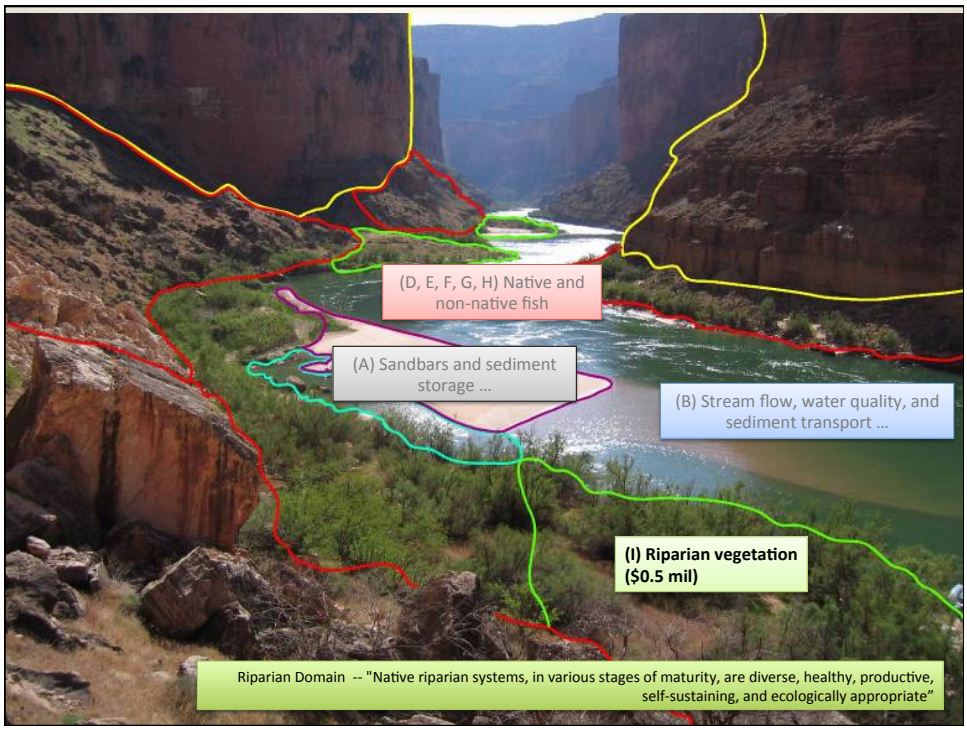
What is an appropriate rehabilitation goal for the physical habitat of the Colorado River – for the available sediment supply and the large-scale flow regime?

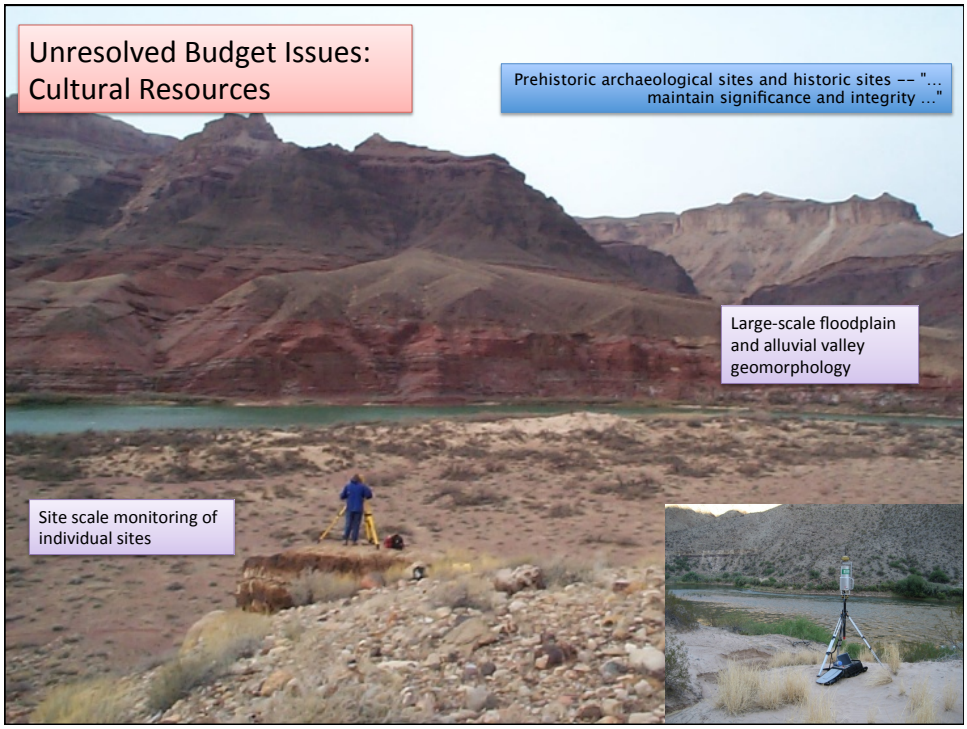
How can a non-native trout sport fishery in Glen Canyon coexist with an endangered humpback chub population in Marble and Grand Canyons?

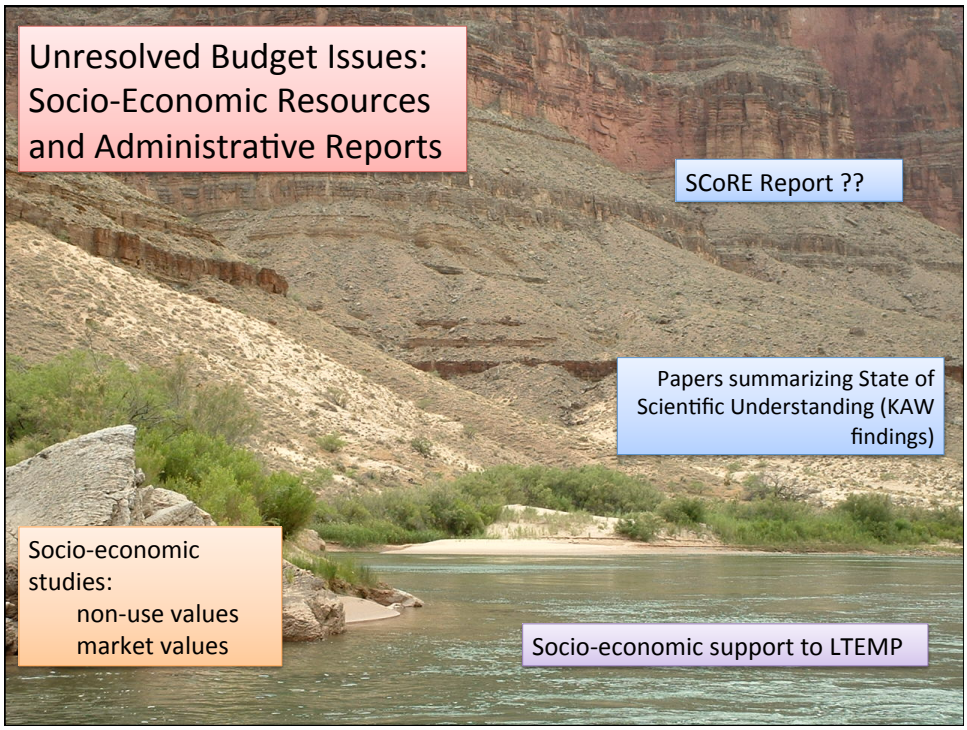

(A) Sandbars and sediment storage … ($1.3)
(B) Stream flow, water quality, and sediment transport … ($1.4 mil)

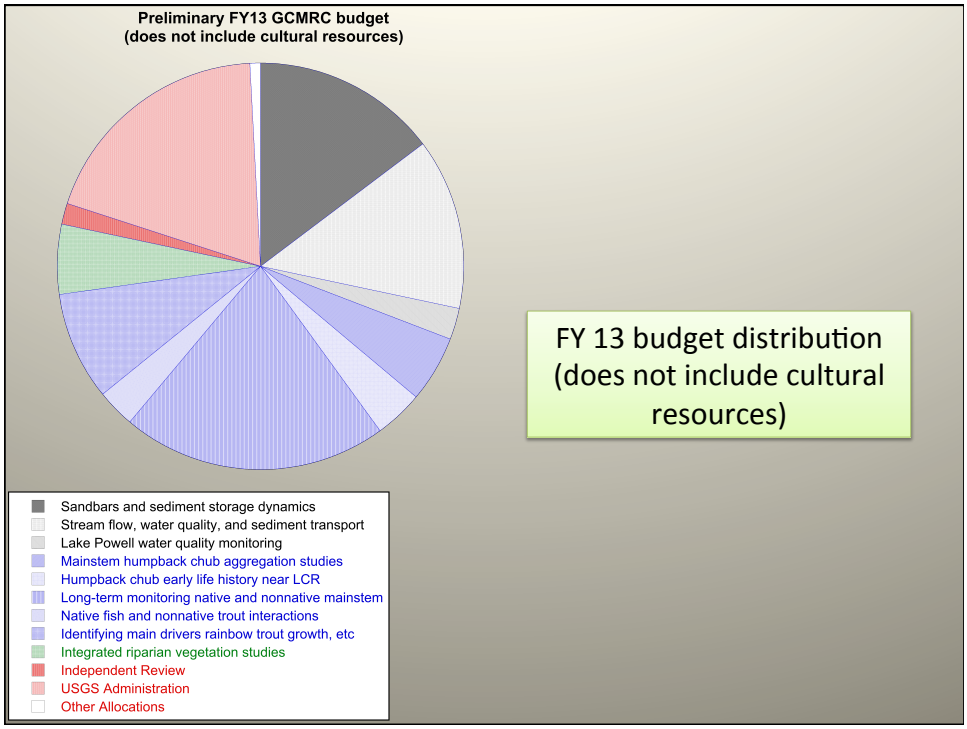

(A) Sandbars and sediment storage … ($1.3)
(B) Stream flow, water quality, and sediment transport … ($1.4 mil)
Sediment-Related Resources -- "high elevation open riparian sediment deposits … in sufficient volume, area, and distribution …"
Ecosystem Structure -- "Physical characteristics, including climate, site-specific geomorphology, dam-related discharge and flow, and tributary flows, generally predominate …"
Water Quality -- "Water quality with regards to dissolved oxygen, nutrient concentrations and cycling, turbidity, temperature, etc. is sufficient to support natural ecosystem

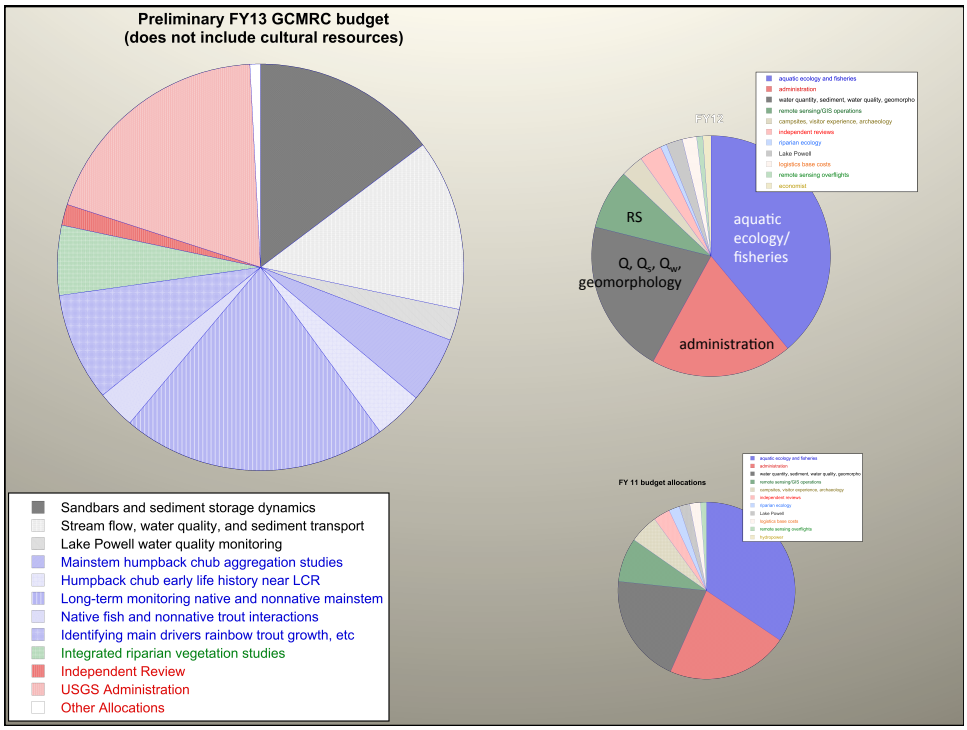

(D, E, F, G, H) Native and non-native fish ($3.9 mil)
(A) Sandbars and sediment storage …
(B) Stream flow, water quality, and sediment transport …
Native Species -- "Native fish species and their habitats … sustainably maintained …"
Rainbow trout -- "A high quality trout fishery in GCNRA … that does not adversely affect the native aquatic community in GCNP"


(D, E, F, G, H) Native and non-native fish
(A) Sandbars and sediment storage …
(B) Stream flow, water quality, and sediment transport …
(I) Riparian vegetation ($0.5 mil)
Riparian Domain -- "Native riparian systems, in various stages of maturity, are diverse, healthy, productive, self-sustaining, and ecologically appropriate"


Unresolved Budget Issues:
Cultural Resources
Prehistoric archaeological sites and historic sites -- "... maintain significance and integrity ..."
Large-scale floodplain and alluvial valley geomorphology
Site scale monitoring of individual sites


Unresolved Budget Issues:
Socio-Economic Resources and Administrative Reports
SCoRE Report ??
Papers summarizing State of Scientific Understanding (KAW findings)
Socio-economic studies:
non-use values
market values
Socio-economic support to LTEMP


Preliminary FY13 GCMRC budget
(does not include cultural resources)
FY 13 budget distribution (does not include cultural resources)
Sandbars and sediment storage dynamics
Stream flow, water quality, and sediment transport
Lake Powell water quality monitoring
Mainstem humpback chub aggregation studies
Humpback chub early life history near LCR
Long-term monitoring native and nonnative mainstem
Native fish and nonnative trout interactions
Identifying main drivers rainbow trout growth, etc
Integrated riparian vegetation studies
Independent Review
USGS Administration
Other Allocations


Preliminary FY13 GCMRC budget
(does not include cultural resources)
FY12
aquatic ecology and fisheries
administration
water quantity, sediment, water quality, geomorpho
remote sensing/GIS operations
computes, visitor experience, archaeology
independent reviews
riparian ecology
Lake Powell
logistics base costs
remote sensing overflights
economist
RS
aquatic ecology/ fisheries
Q, Qs, Qw, geomorphology
administration
FY 11 budget allocations
Sandbars and sediment storage dynamics
Stream flow, water quality, and sediment transport
Lake Powell water quality monitoring
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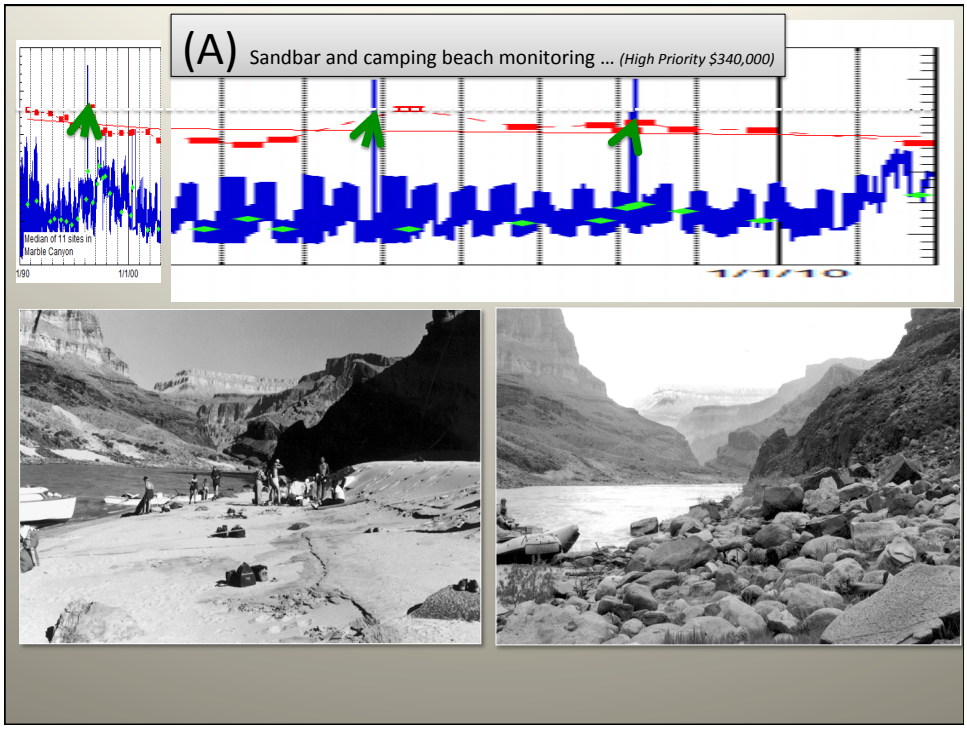
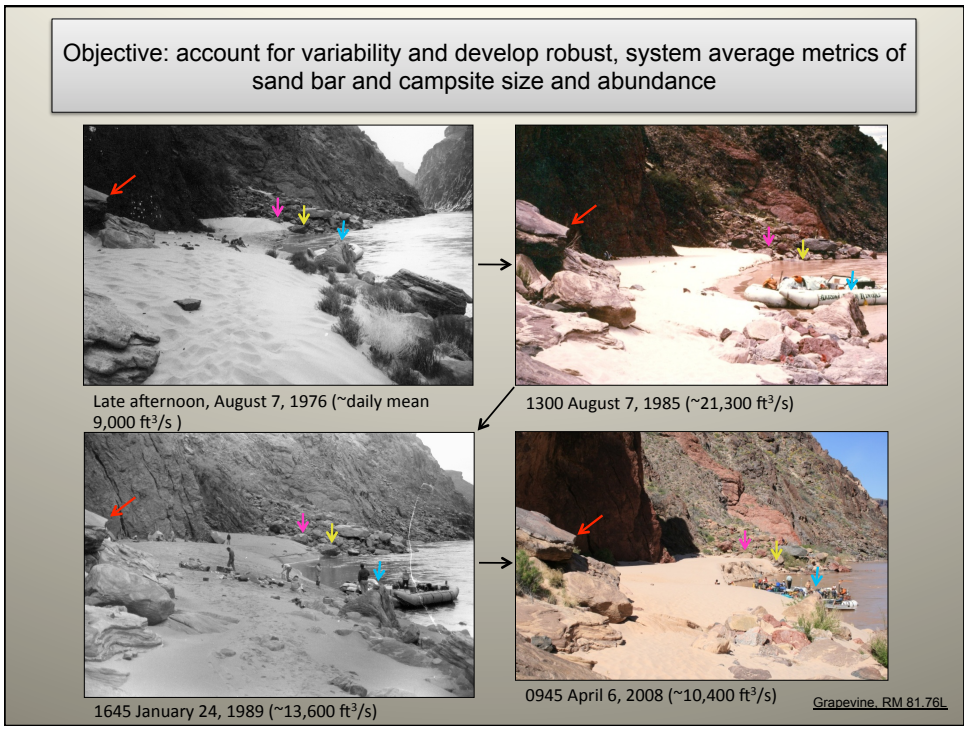
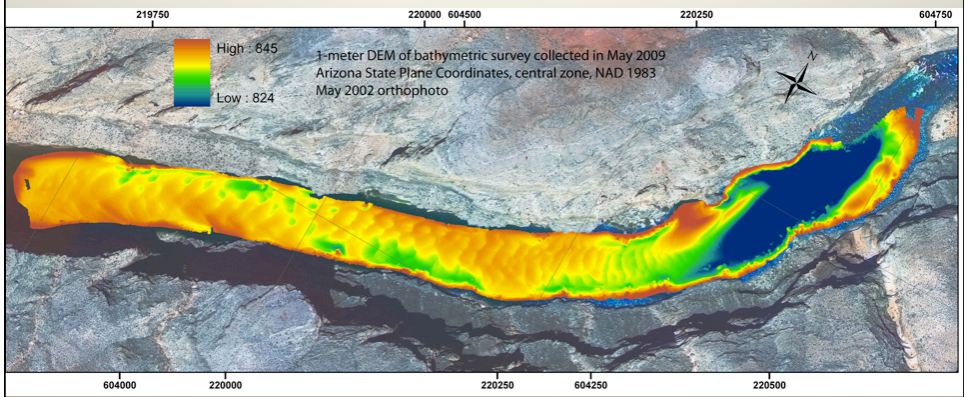
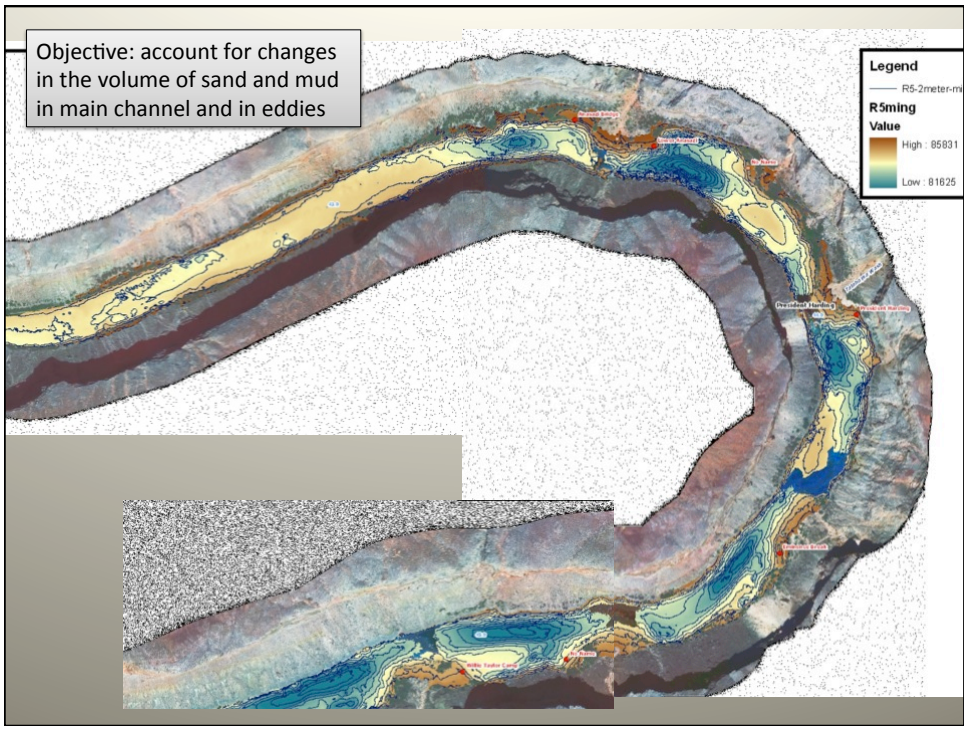

(A) Sandbar and camping beach monitoring … (High Priority $340,000)
Median of 11 sites in Marble Canyon
1/90
1/1/00


Objective: account for variability and develop robust, system average metrics of sand bar and campsite size and abundance
Late afternoon, August 7, 1976 (~daily mean 9,000 ft³/s)
1300 August 7, 1985 (~21,300 ft³/s)
1645 January 24, 1989 (~13,600 ft³/s)
0945 April 6, 2008 (~10,400 ft³/s)
Grapevine, RM 81.76L

Sediment storage monitoring and research *(High Priority $691,000)*

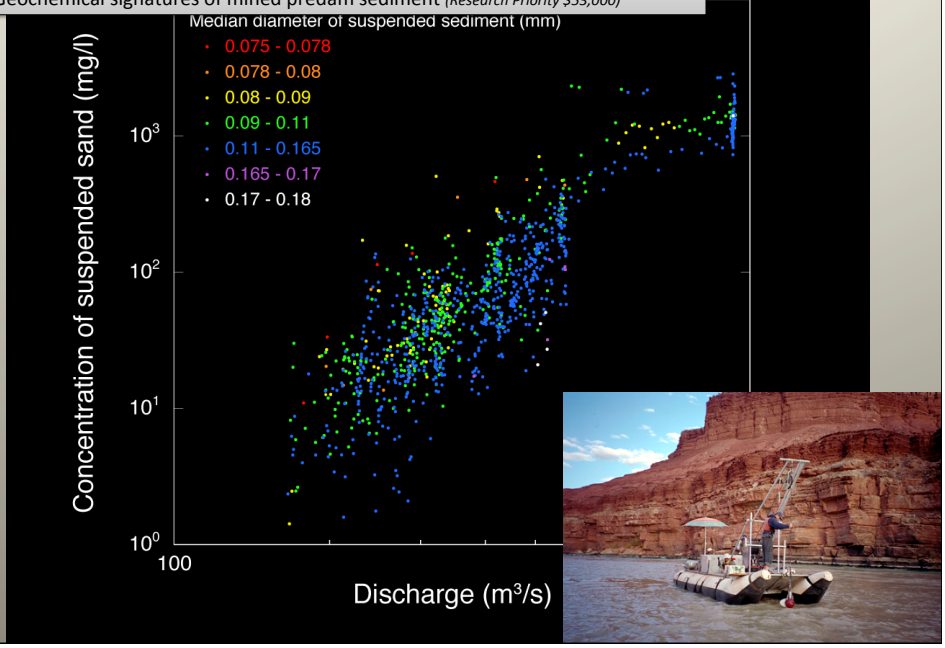


Objective: account for changes in the volume of sand and mud in main channel and in eddies

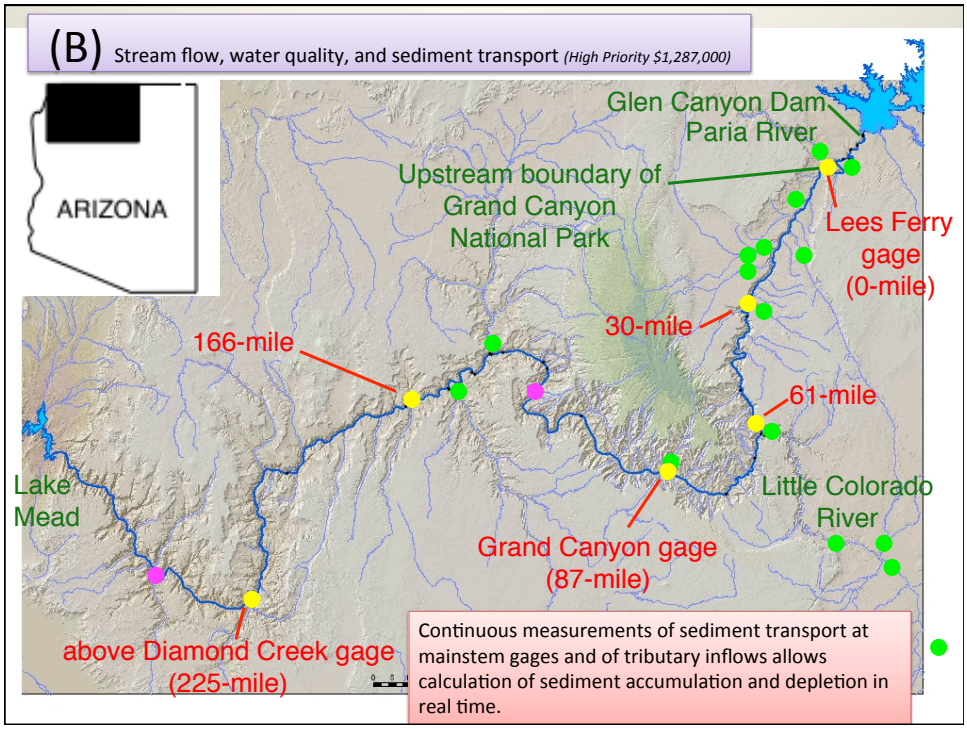


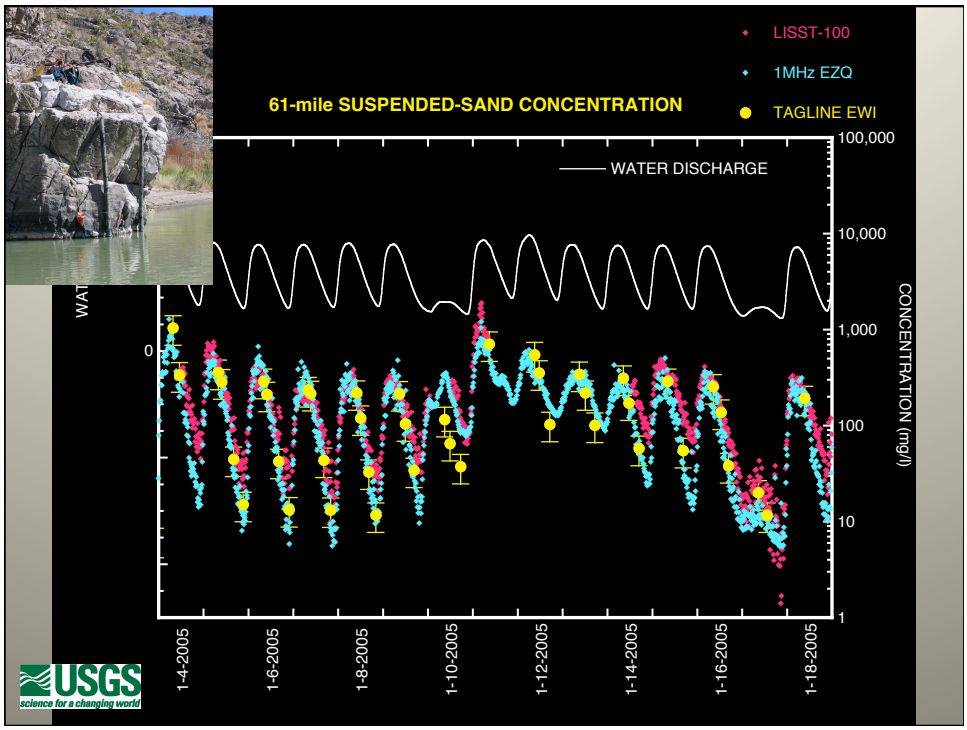
Bed sediment influences on suspended sediment *(Research Priority $267,000)*

Geochemical signatures of mined predam sediment *(Research Priority $53,000)*

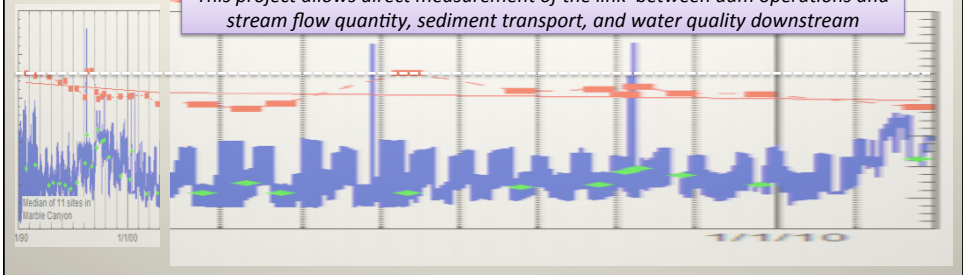


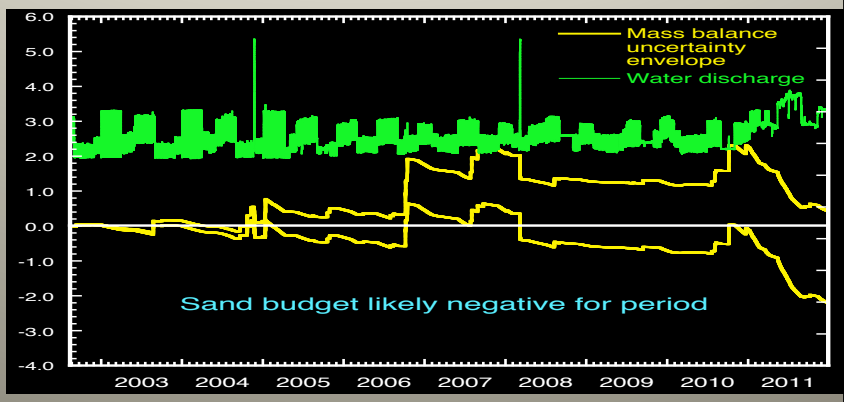
General surveying support *(High Priority $36,000)*


(B) Stream flow, water quality, and sediment transport (High Priority $1,287,000)
ARIZONA
Glen Canyon Dam
Paria River
Upstream boundary of
Grand Canyon
National Park
Lees Ferry
gage
(0-mile)
30-mile
166-mile
61-mile
Lake
Mead
Little Colorado
River
Grand Canyon gage
(87-mile)
above Diamond Creek gage
(225-mile)
Continuous measurements of sediment transport at mainstem gages and of tributary inflows allows calculation of sediment accumulation and depletion in real time.


LISST-100
1MHz EZQ
TAGLINE EWI
61-mile SUSPENDED-SAND CONCENTRATION
WATER DISCHARGE
100,000
10,000
1,000
100
10
1
CONCENTRATION (mg/l)
0
1-4-2005
1-6-2005
1-8-2005
1-10-2005
1-12-2005
1-14-2005
1-16-2005
1-18-2005
USGS
science for a changing world

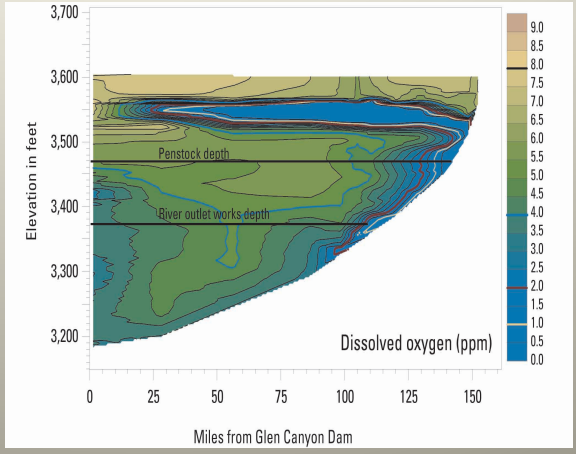
This project allows direct measurement of the link between dam operations and stream flow quantity, sediment transport, and water quality downstream





(C) Lake Powell Water Quality Monitoring *(High Priority $236,000)*

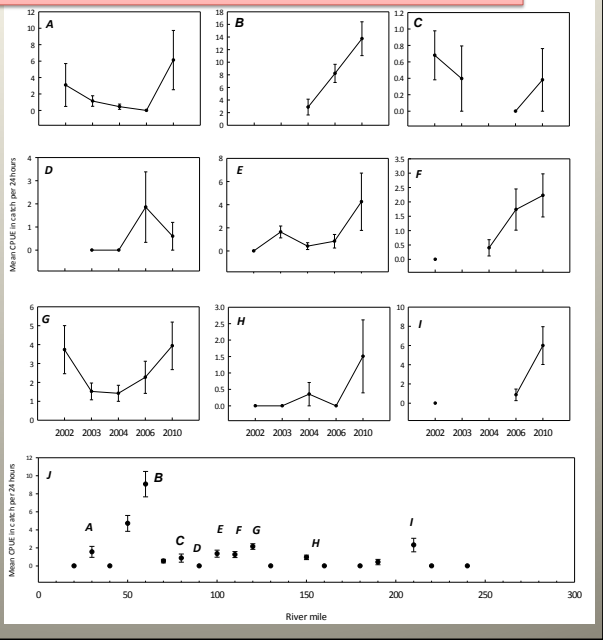
- Monitors quality of water that enters the Colorado River ecosystem



Lake Powell Dissolved Oxygen – September 2003

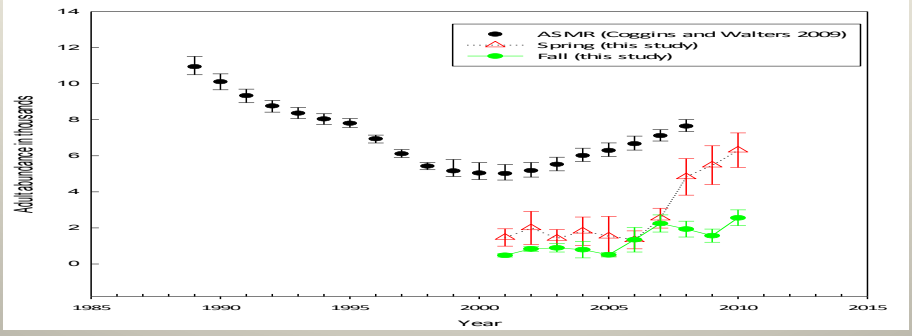
(D) Mainstem Humpback chub aggregation studies *(High Priority $412,000; Research Priority $92,000)*

Aggregation sampling *($250,000 High Priority)*
Aggregation ecology *(124,000 High Priority)*
Adult condition and reproductive potential *($92,000 Research Priority)*
Humpback chub natal origins *($38,000 High Priority)*

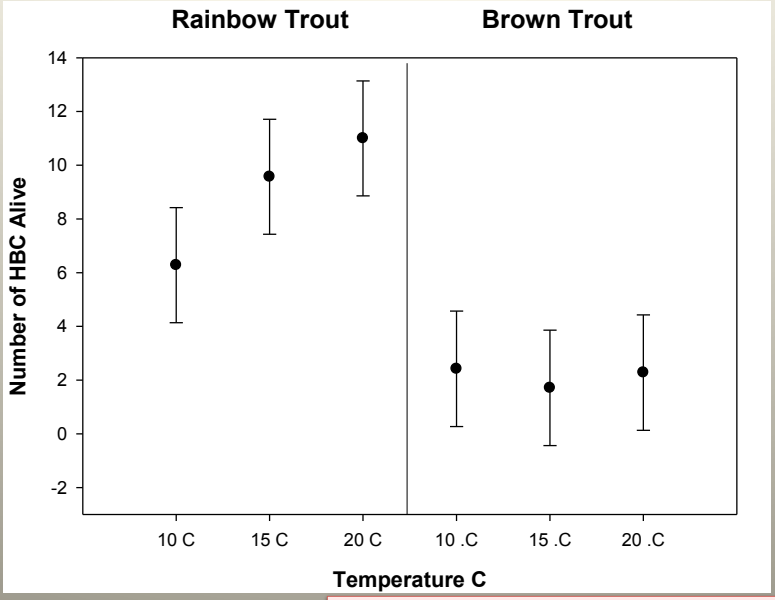


(E) Humpback chub early life history near the Little Colorado River *(Research Priority $358,000)*

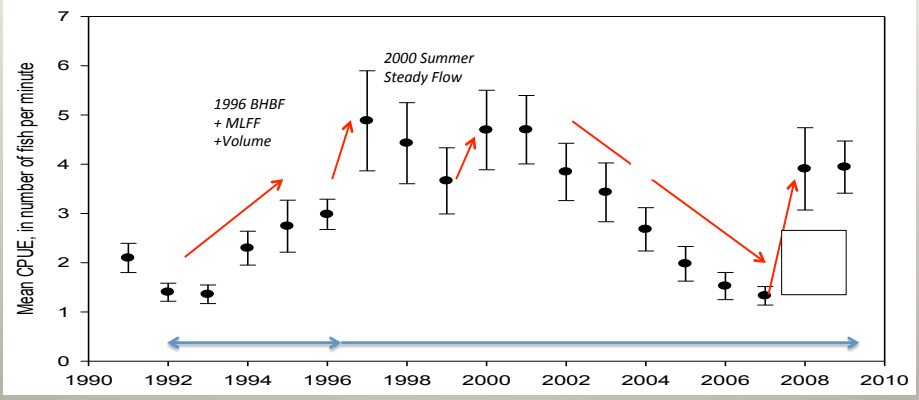
July LCR marking *($93,000 Research Priority)*
Describing trophic ecology of humpback chub in the LCR *($119,000 Research Priority)*
Fall otolith sampling in the NSE reach *($32,000 Research Priority)*
Linkages and modeling *($114,000 Research Priority)*



(F) Long-term monitoring of native and nonnative fishes in the mainstem Colorado River in in the Little Colorado River *(High Priority $1,910,000; Research Priority $80,000)*



(G) Interactions between native fish and nonnative trout *($277,000 Research Priority)*

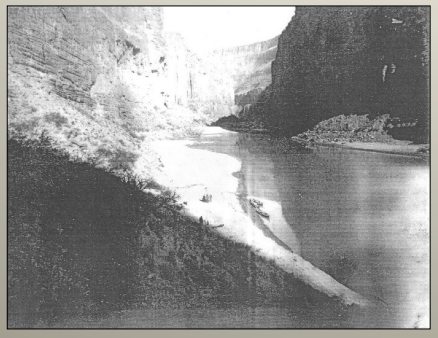


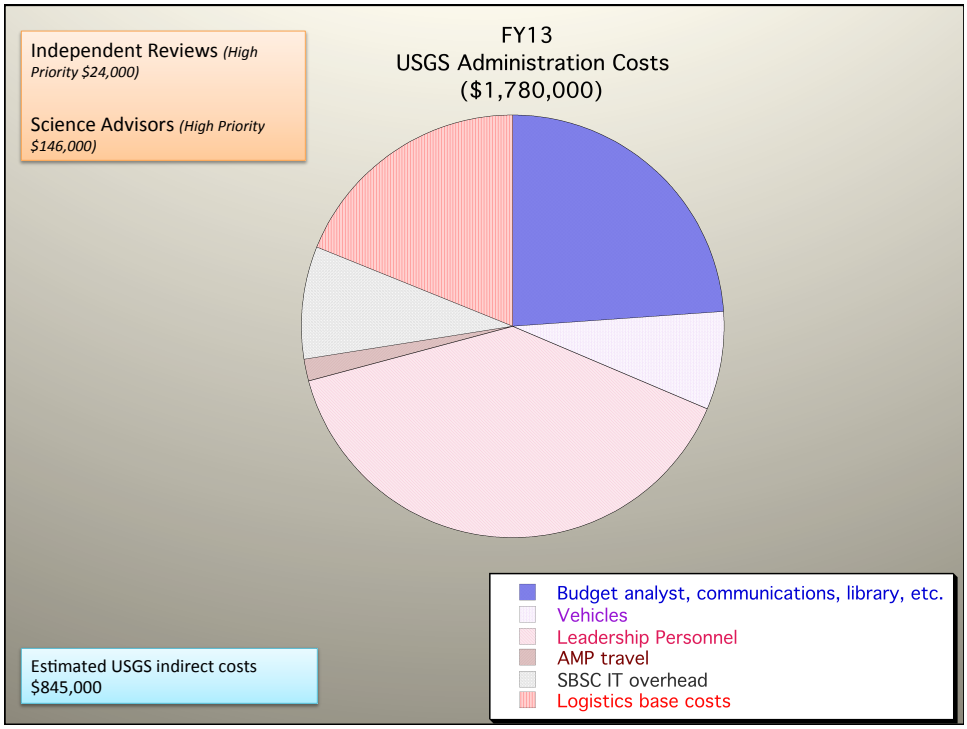
(H) Identifying main drivers rainbow trout growth, population size, demographics, distribution ($660,000 *High Priority*) ($154,000 *Research Priority)*

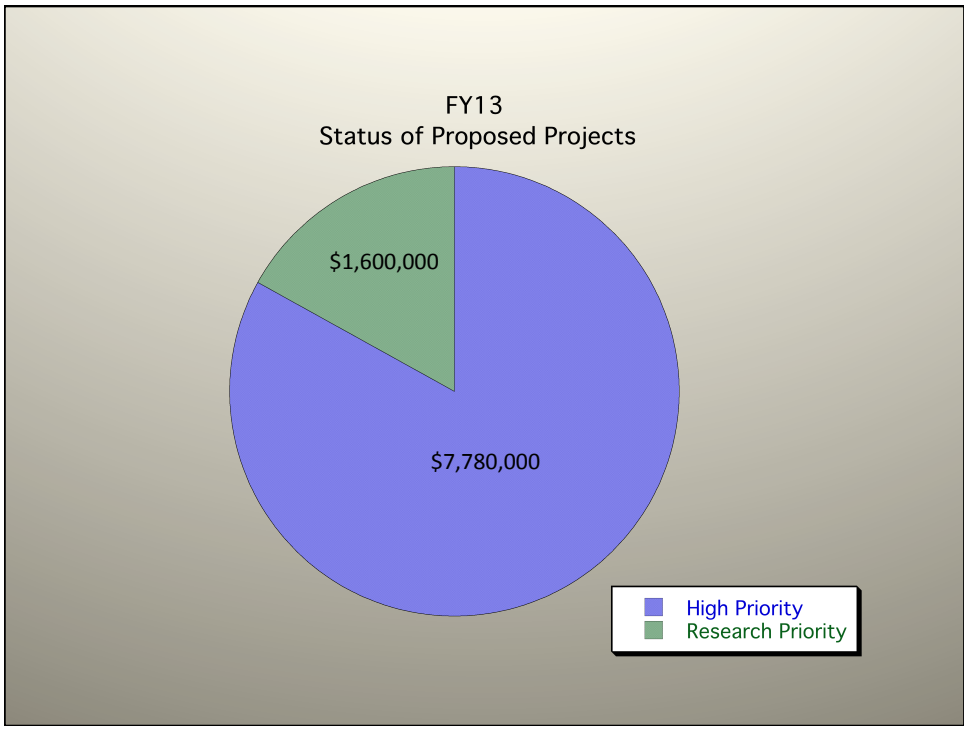
Establishing current conditions *($113,000 High Priority)*
Laboratory feeding studies (*$36,000 Research Priority)*
Monitoring and modeling food base *($327,000 High Priority)*
Factors limiting rainbow trout growth *($111,000 High Priority)*
Tailwater synthesis *($118,000 Research Priority)*
Rainbow trout population management *($109,000 High Priority)*

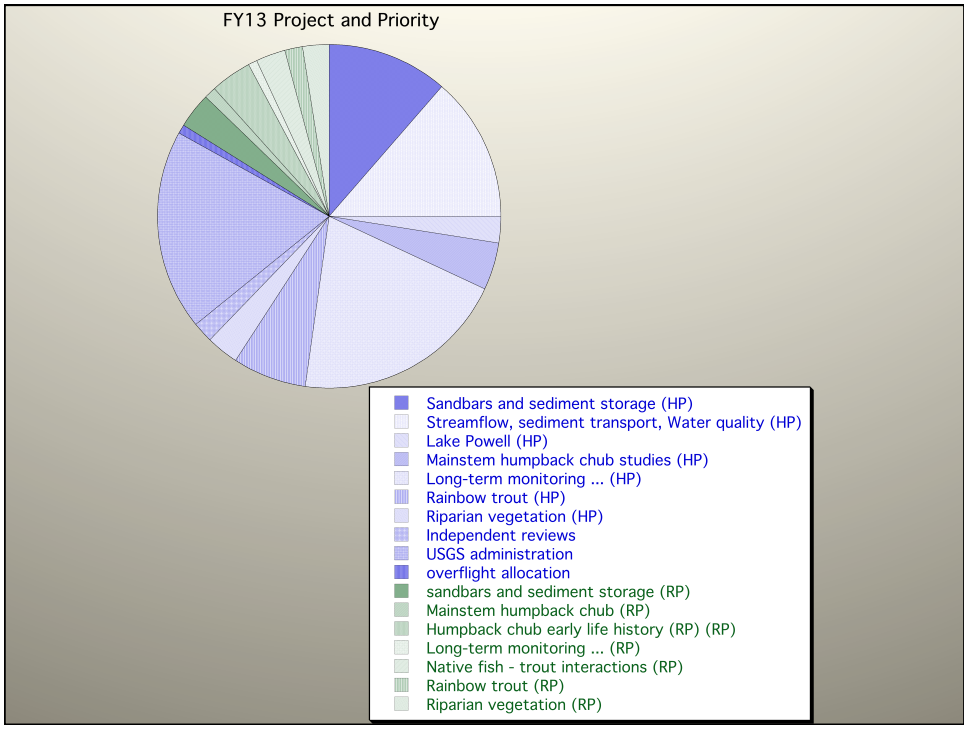
(I) Integrated Riparian Vegetation Studies *($276,000 High Priority; $233,000 Research Priority)*

Integrated vegetation monitoring *($276,000 High Priority)*
Vegetation – sediment modeling *($189,000 Research Priority)*
Riparian dynamics and trophic level linkages *($44,000 Research Priority)*




Independent Reviews (High Priority $24,000)
Science Advisors (High Priority $146,000)
FY13
USGS Administration Costs
($1,780,000)
Estimated USGS indirect costs
$845,000
Budget analyst, communications, library, etc.
Vehicles
Leadership Personnel
AMP travel
SBSC IT overhead
Logistics base costs


FY13
Status of Proposed Projects
$1,600,000
$7,780,000
High Priority
Research Priority


FY13 Project and Priority
Sandbars and sediment storage (HP)
Streamflow, sediment transport, Water quality (HP)
Lake Powell (HP)
Mainstem humpback chub studies (HP)
Long-term monitoring ... (HP)
Rainbow trout (HP)
Riparian vegetation (HP)
Independent reviews
USGS administration
overflight allocation
sandbars and sediment storage (RP)
Mainstem humpback chub (RP)
Humpback chub early life history (RP) (RP)
Long-term monitoring ... (RP)
Native fish - trout interactions (RP)
Rainbow trout (RP)
Riparian vegetation (RP)