Development of a New GCMRC Work Plan and Budget

Jack Schmidt
Grand Canyon Monitoring and Research Center
Southwest Biological Science Center
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The Big Questions

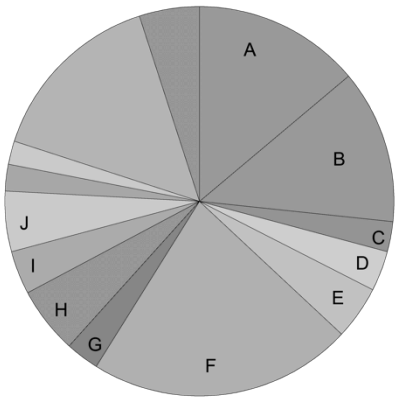
What is an appropriate rehabilitation goal for the physical habitat of the Colorado River, given the limited supply of fine sediment and the characteristics of the large-scale flow regime?

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

FY 13: $10,441,000 total budget

GCDAMP funds = $8,546,000 (other sources GCDAMP carryover, BoR carryover, GCMRC carryover

FY 2013



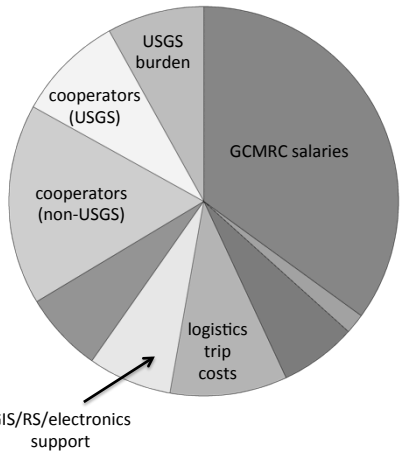
A. Sandbars and sediment storage ....
B. Streamflow, water quality, sediment
C. Lake Powell
D. Mainstem humpback chub aggregations
E. Humpback chub early life history
F. Monitoring native and nonnative fishes
G. Interactions between trout and native fish
H. Factors limiting growth of Rainbow Trout
I.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

Earth sciences (29%)
Aquatic and fish science (39%)
Riparian ecology (4%)
Cultural resources (5%)
Economist (2%)
Independent review (2%)
GCMRC administration (15%)
Overflight (5%)

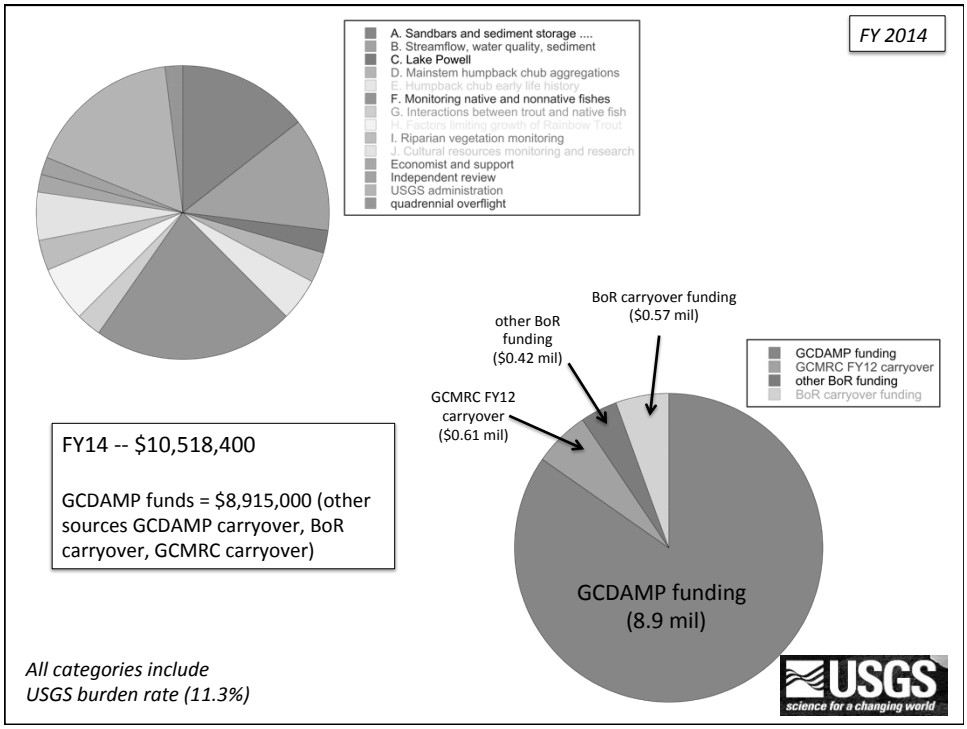
All categories include USGS burden rate (11.3%)

FY 2013

FY13: general budget categories



salaries
travel/training
operating expenses
logistics
GIS/RS/electronics support
contractors
non-USGS cooperators
USGS cooperators
USGS burden


FY 2014
A. Sandbars and sediment storage ....
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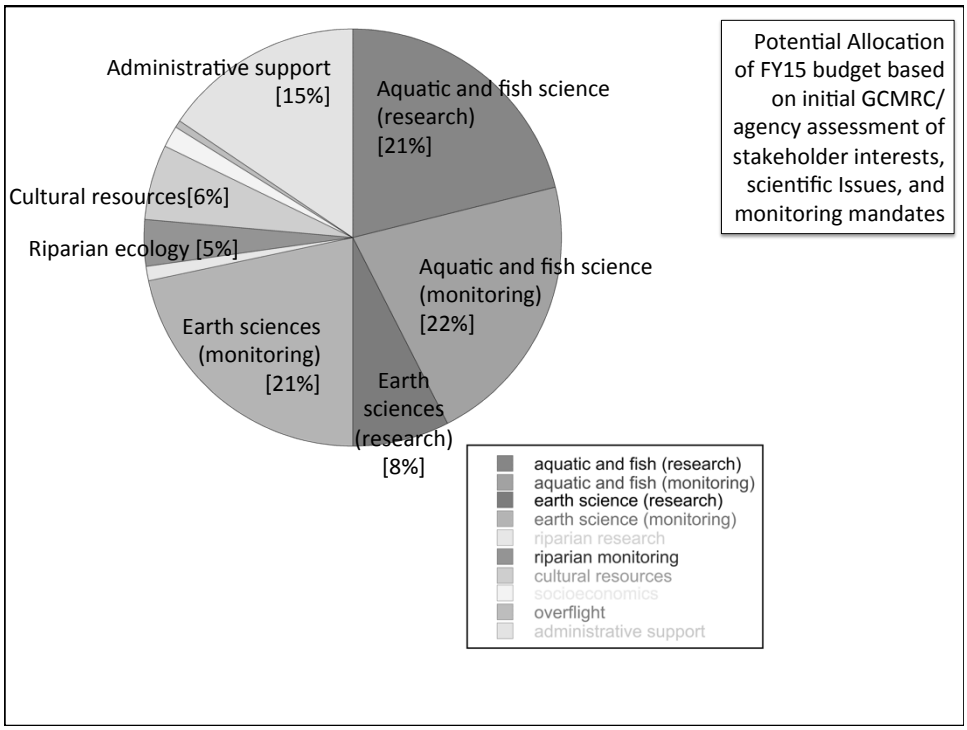
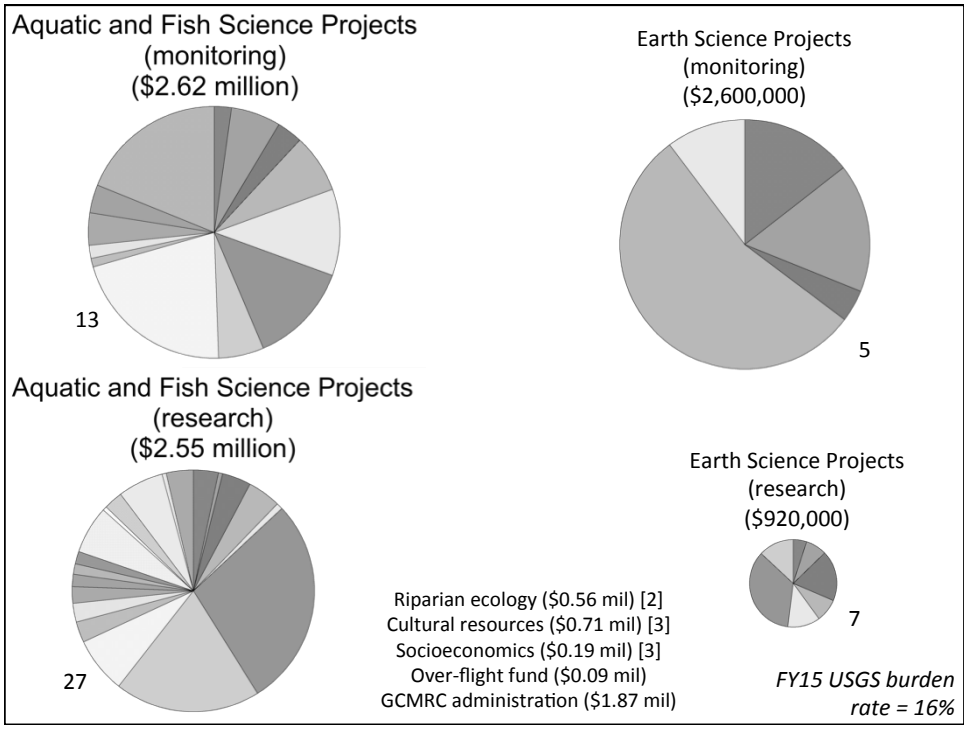
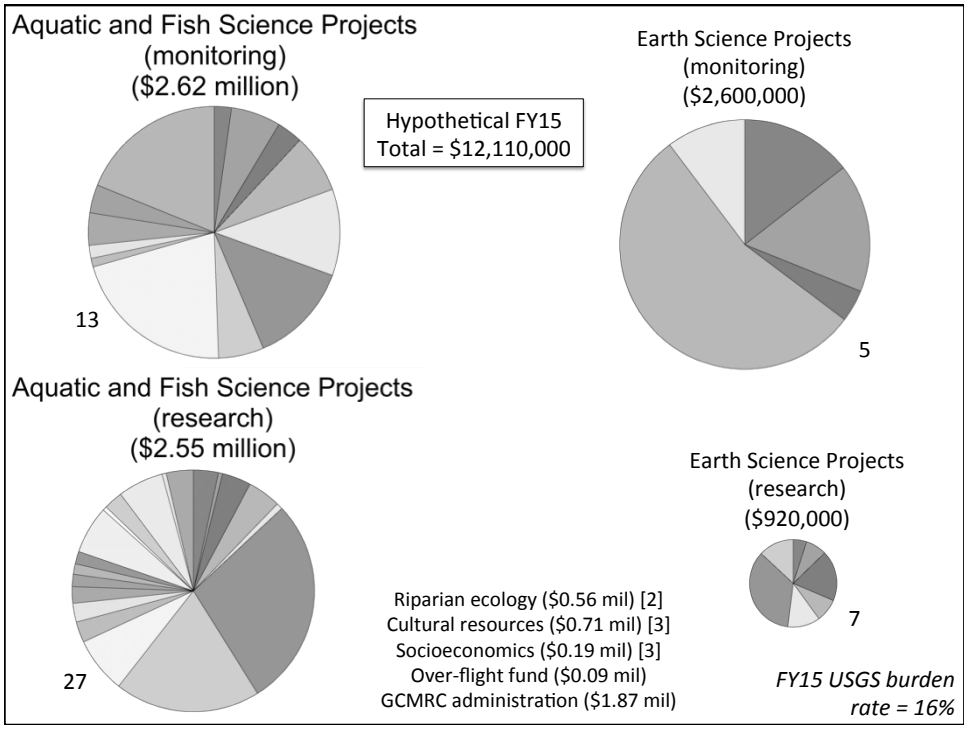
Economist and support
Independent review
USGS administration
quadrennial overflight
BoR carryover funding ($0.57 mil)
other BoR funding ($0.42 mil)
GCMRC FY12 carryover ($0.61 mil)
GCDAMP funding
GCMRC FY12 carryover
other BoR funding
BoR carryover funding
FY14 -- $10,518,400
GCDAMP funds = $8,915,000 (other sources GCDAMP carryover, BoR carryover, GCMRC carryover)
GCDAMP funding (8.9 mil)
All categories include USGS burden rate (11.3%)
USGS
science for a changing world


Potential Allocation of FY15 budget based on initial GCMRC/ agency assessment of stakeholder interests, scientific Issues, and monitoring mandates
Administrative support [15%]
Aquatic and fish science (research) [21%]
Cultural resources[6%]
Riparian ecology [5%]
Aquatic and fish science (monitoring) [22%]
Earth sciences (monitoring) [21%]
Earth sciences (research) [8%]
aquatic and fish (research)
aquatic and fish (monitoring)
earth science (research)
earth science (monitoring)
riparian research
riparian monitoring
cultural resources
socioeconomics
overflight
administrative support


Aquatic and Fish Science Projects
(monitoring)
($2.62 million)
13
Earth Science Projects
(monitoring)
($2,600,000)
5
Aquatic and Fish Science Projects
(research)
($2.55 million)
27
Earth Science Projects
(research)
($920,000)
7
Riparian ecology ($0.56 mil) [2]
Cultural resources ($0.71 mil) [3]
Socioeconomics ($0.19 mil) [3]
Over-flight fund ($0.09 mil)
GCMRC administration ($1.87 mil)
FY15 USGS burden rate = 16%


Aquatic and Fish Science Projects
(monitoring)
($2.62 million)
13
Hypothetical FY15
Total = $12,110,000
Earth Science Projects
(monitoring)
($2,600,000)
5
Aquatic and Fish Science Projects
(research)
($2.55 million)
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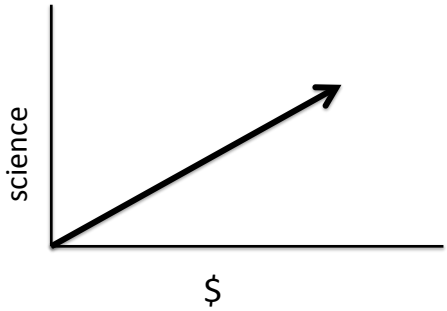
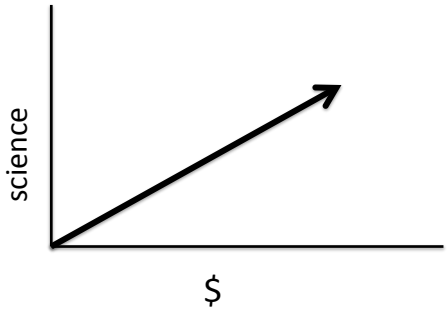
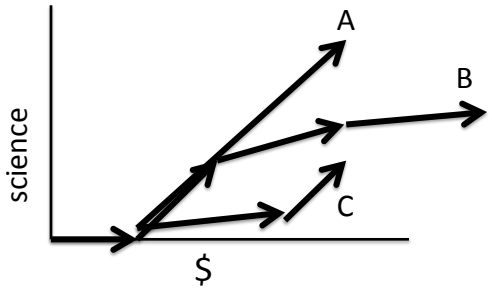


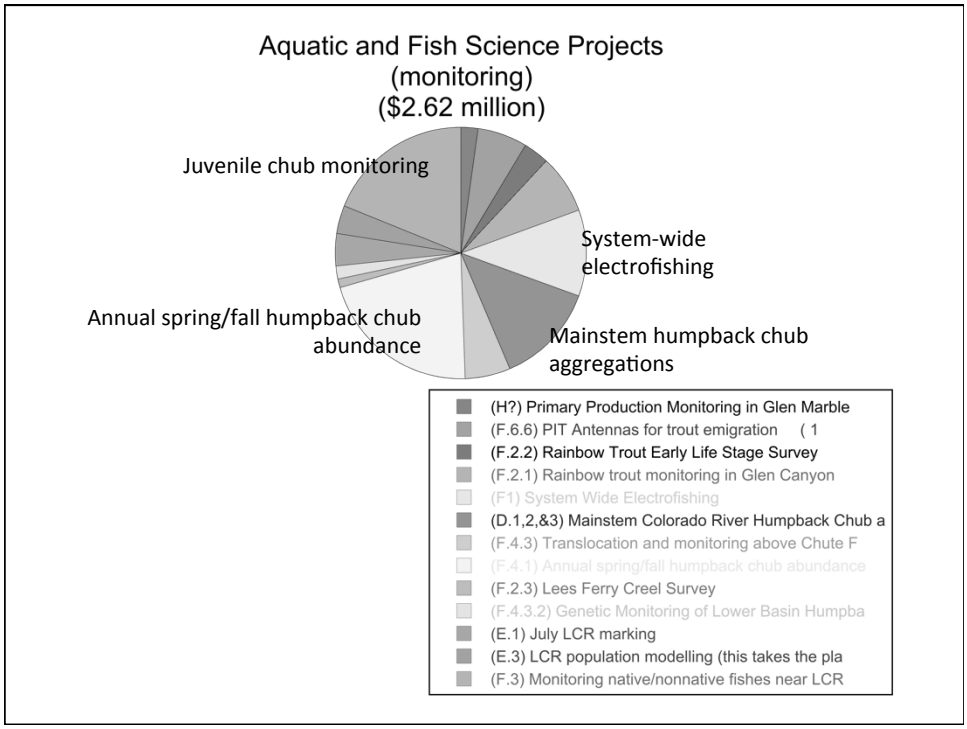
Principles in Budget Development

Although we might assume that more money results in more, better, and relevant monitoring and research …



The relationship between money spent and the amount and relevance of monitoring and research is imperfectly known. The challenge in developing this budget is anticipating these relationship for different disciplines and different researchers.





Proposed Aquatic and Fish Science (research)

(F,7) Invertebrate diversity and productivity recruitment limited? [$520,000]

(F.7?) Drift Glen Canyon and other tailwaters [$355,000]

(F.6) Detection of RBT movement from upper Colorado River below GCD [$324,000]

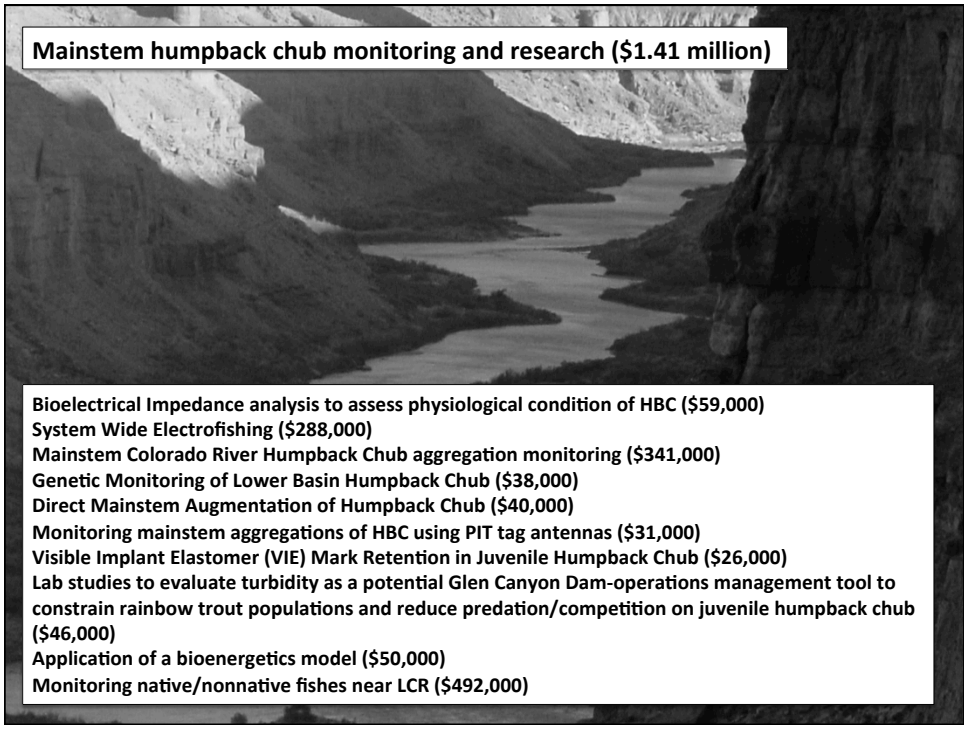
(E.2) LCR characterizing invertebrate production [$141,000]

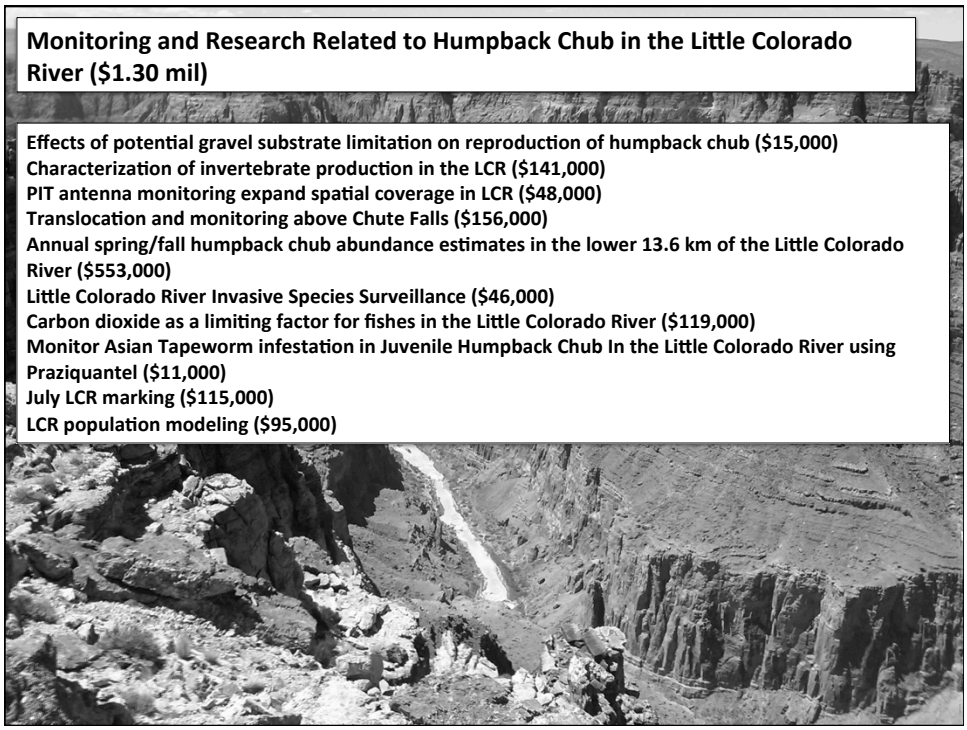
(G.1, G.1.2) Carbon dioxide as a limiting factor for fishes in the Little Colorado River [119,000]

(H.2) Prey size limitations on feeding efficiencies of drift feeding fish [$115,000]

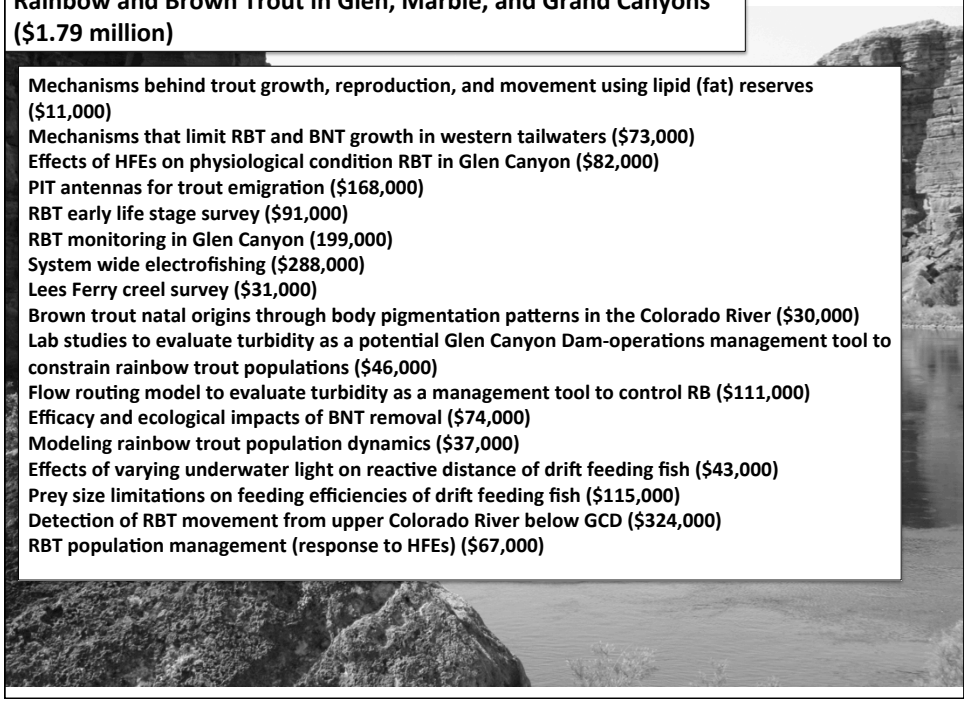
(E.1) July LCR marking [$115,000]

(H.10) Flow routing model to evaluate turbidity as a management tool to control RBT [$111,000]


Mainstem humpback chub monitoring and research ($1.41 million)
Bioelectrical Impedance analysis to assess physiological condition of HBC ($59,000)
System Wide Electrofishing ($288,000)
Mainstem Colorado River Humpback Chub aggregation monitoring ($341,000)
Genetic Monitoring of Lower Basin Humpback Chub ($38,000)
Direct Mainstem Augmentation of Humpback Chub ($40,000)
Monitoring mainstem aggregations of HBC using PIT tag antennas ($31,000)
Visible Implant Elastomer (VIE) Mark Retention in Juvenile Humpback Chub ($26,000)
Lab studies to evaluate turbidity as a potential Glen Canyon Dam-operations management tool to constrain rainbow trout populations and reduce predation/competition on juvenile humpback chub ($46,000)
Application of a bioenergetics model ($50,000)
Monitoring native/nonnative fishes near LCR ($492,000)

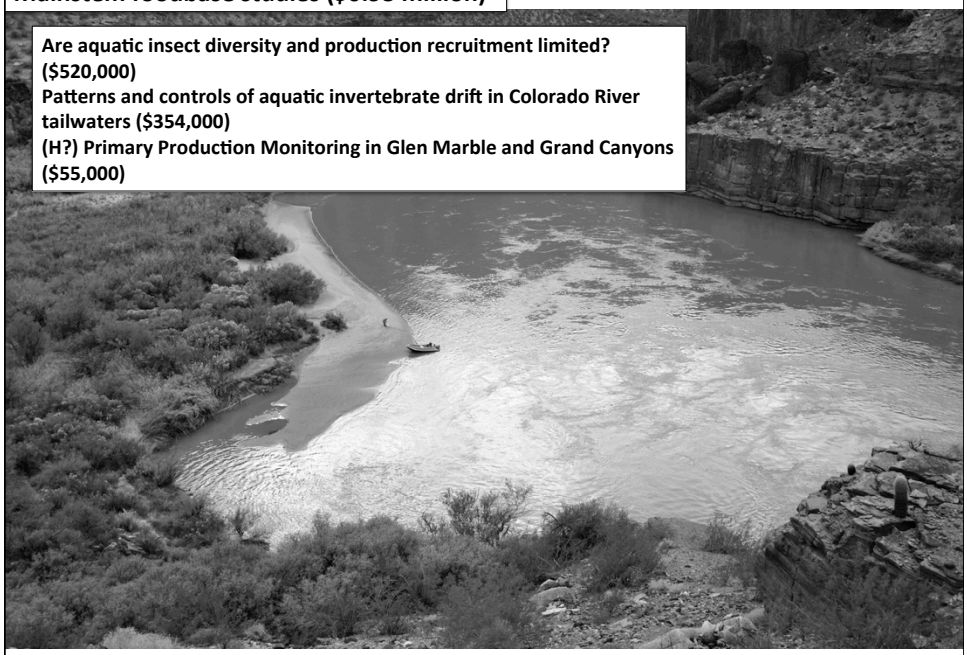

Monitoring and Research Related to Humpback Chub in the Little Colorado River ($1.30 mil)
Effects of potential gravel substrate limitation on reproduction of humpback chub ($15,000)
Characterization of invertebrate production in the LCR ($141,000)
PIT antenna monitoring expand spatial coverage in LCR ($48,000)
Translocation and monitoring above Chute Falls ($156,000)
Annual spring/fall humpback chub abundance estimates in the lower 13.6 km of the Little Colorado River ($553,000)
Little Colorado River Invasive Species Surveillance ($46,000)
Carbon dioxide as a limiting factor for fishes in the Little Colorado River ($119,000)
Monitor Asian Tapeworm infestation in Juvenile Humpback Chub In the Little Colorado River using Praziquantel ($11,000)
July LCR marking ($115,000)
LCR population modeling ($95,000)

Rainbow and Brown Trout in Glen, Marble, and Grand Canyons ($1.79 million)



Mechanisms behind trout growth, reproduction, and movement using lipid (fat) reserves ($11,000)
Mechanisms that limit RBT and BNT growth in western tailwaters ($73,000)
Effects of HFEs on physiological condition RBT in Glen Canyon ($82,000)
PIT antennas for trout emigration ($168,000)
RBT early life stage survey ($91,000)
RBT monitoring in Glen Canyon (199,000)
System wide electrofishing ($288,000)
Lees Ferry creel survey ($31,000)
Brown trout natal origins through body pigmentation patterns in the Colorado River ($30,000)
Lab studies to evaluate turbidity as a potential Glen Canyon Dam-operations management tool to constrain rainbow trout populations ($46,000)
Flow routing model to evaluate turbidity as a management tool to control RB ($111,000)
Efficacy and ecological impacts of BNT removal ($74,000)
Modeling rainbow trout population dynamics ($37,000)
Effects of varying underwater light on reactive distance of drift feeding fish ($43,000)
Prey size limitations on feeding efficiencies of drift feeding fish ($115,000)
Detection of RBT movement from upper Colorado River below GCD ($324,000)
RBT population management (response to HFEs) ($67,000)

Mainstem foodbase studies ($0.93 million)

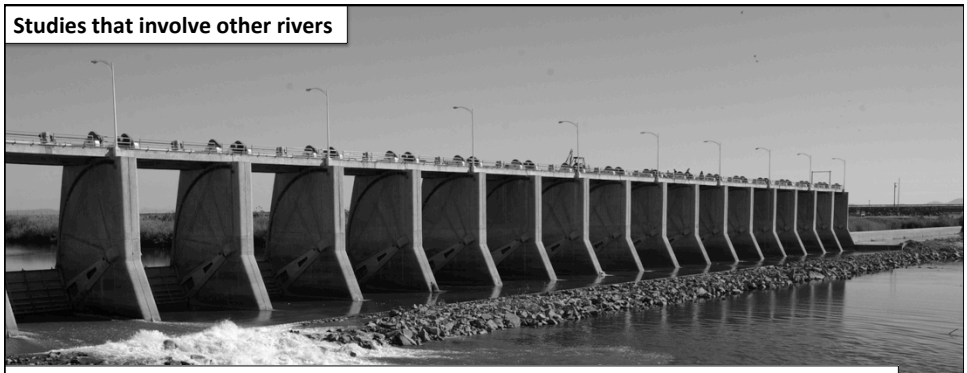


Are aquatic insect diversity and production recruitment limited? ($520,000)
Patterns and controls of aquatic invertebrate drift in Colorado River tailwaters ($354,000)
(H?) Primary Production Monitoring in Glen Marble and Grand Canyons ($55,000)

Evaluate new methods for removal of invasive fishes (in locations other than the Colorado River) ($11,000)

Is hybridization between razorback sucker and flannelmouth sucker likely to become a problem for management of razorback sucker at the Lake Mead inflow? ($68,000)

Studies that involve other rivers



Mechanisms that limit RBT and BNT growth in western tailwaters ($73,000)

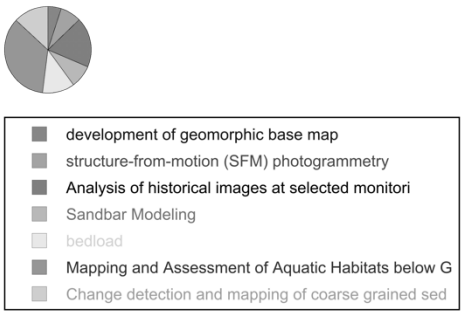
Are aquatic insect diversity and production recruitment limited? ($520,000)

Patterns and controls of aquatic invertebrate drift in Colorado River tailwaters ($354,000)

Evaluate new methods for removal of invasive fishes ($11,000)

Lab studies to evaluate turbidity (in terms of TSS) as a potential Glen Canyon Dam-operations management tool to constrain rainbow trout populations and reduce ($46,000)

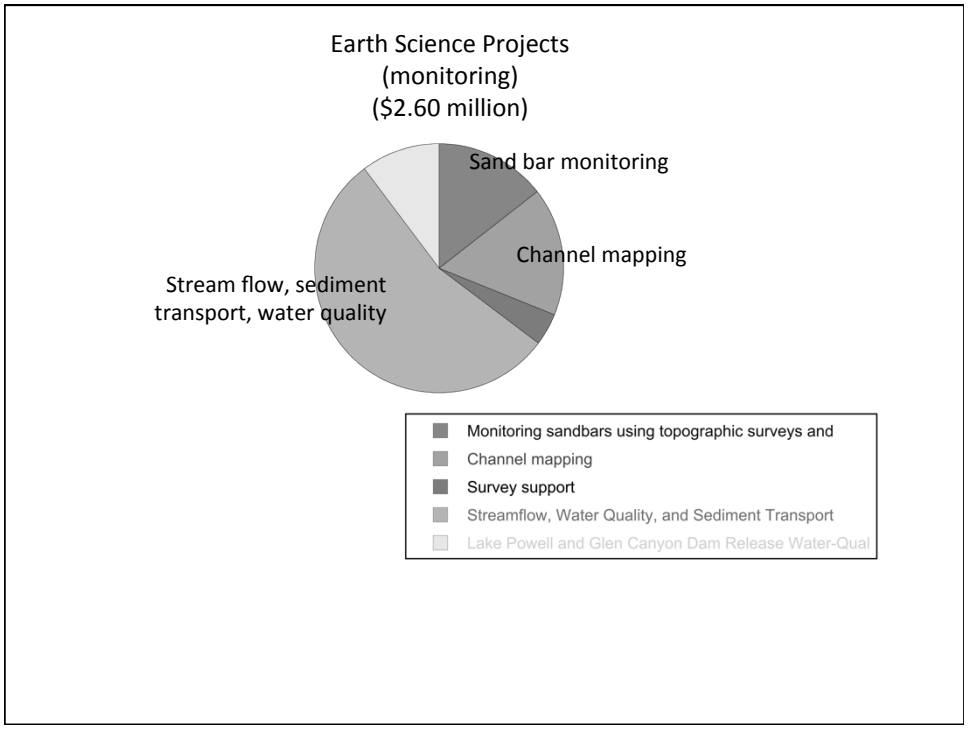
Earth Science Projects
(research)
($0.92 million)

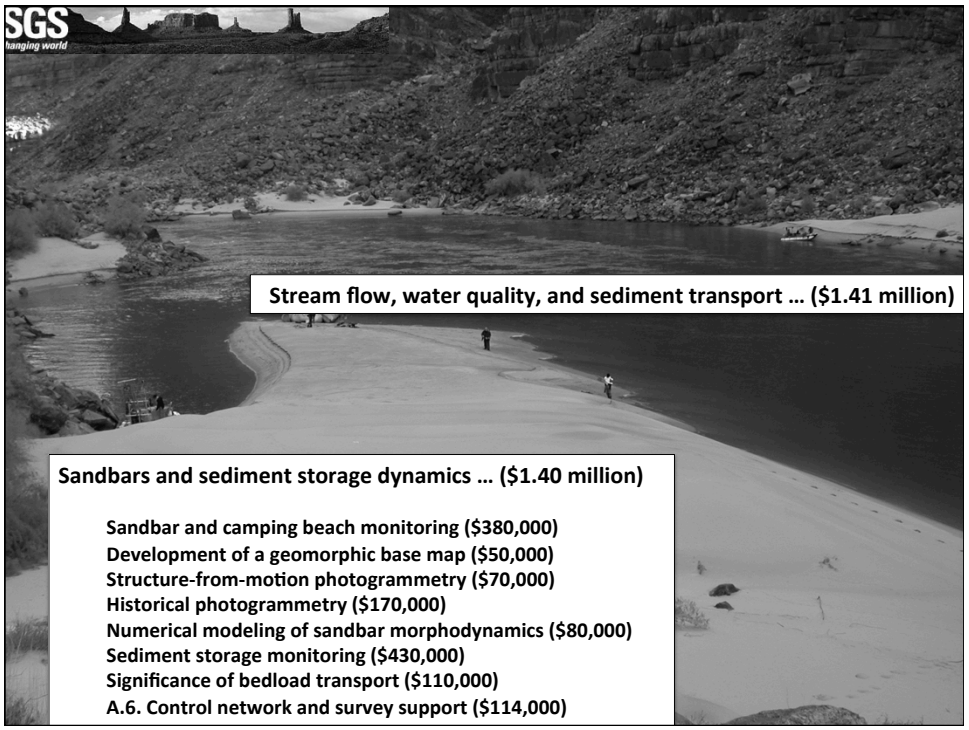


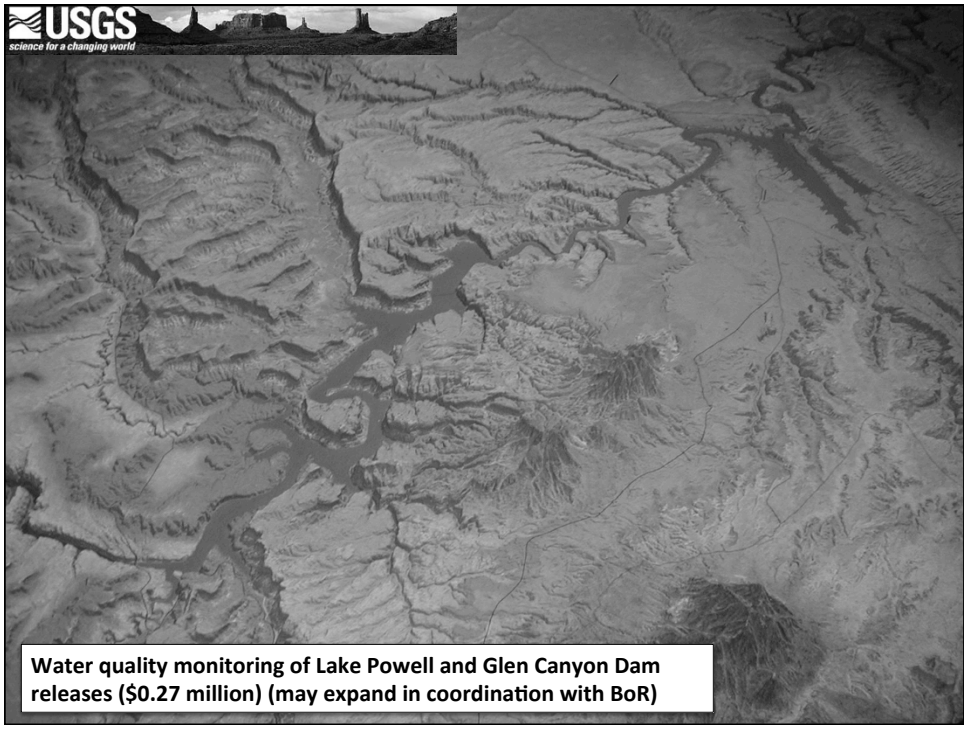
Geomorphic foundation of fish habitat

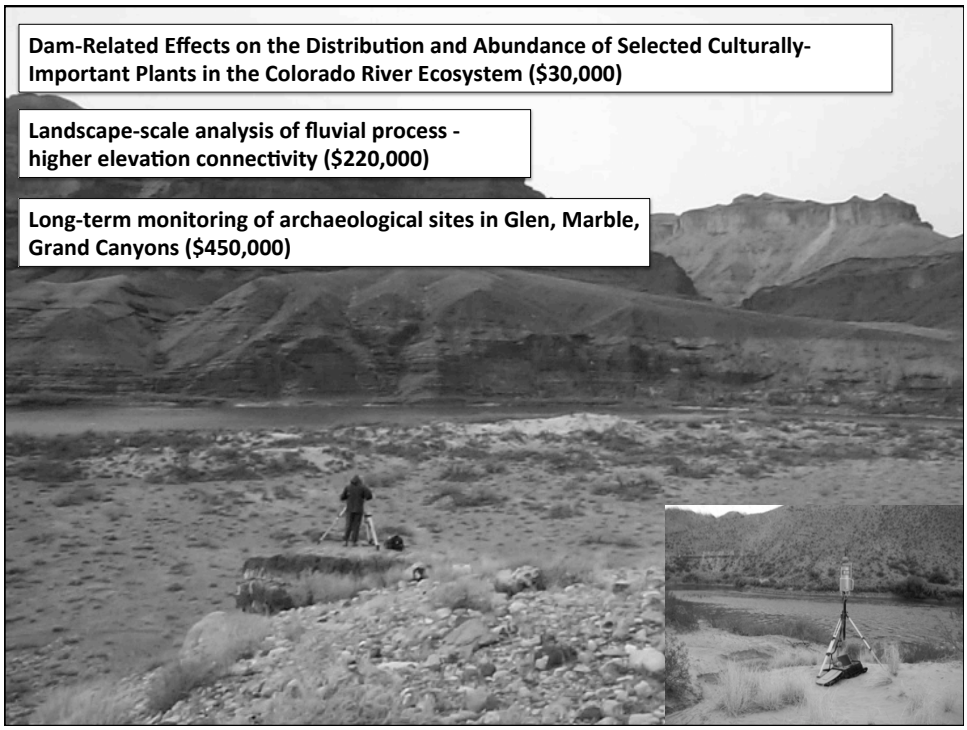
Mapping and Assessment of Aquatic Habitats below Glen Canyon Dam ($320,000)

Change detection and mapping of coarse grained sediment throughout Glen, Marble and Eastern Grand Canyons and the Lower Little Colorado River ($120,000)

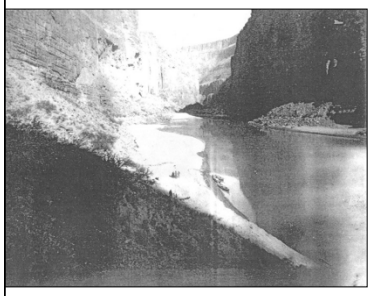

Earth Science Projects
(monitoring)
($2.60 million)
Sand bar monitoring
Channel mapping
Stream flow, sediment transport, water quality
Monitoring sandbars using topographic surveys and
Channel mapping
Survey support
Streamflow, Water Quality, and Sediment Transport
Lake Powell and Glen Canyon Dam Release Water-Qual


SGS
hanging world
Stream flow, water quality, and sediment transport … ($1.41 million)
Sandbars and sediment storage dynamics … ($1.40 million)
Sandbar and camping beach monitoring ($380,000)
Development of a geomorphic base map ($50,000)
Structure-from-motion photogrammetry ($70,000)
Historical photogrammetry ($170,000)
Numerical modeling of sandbar morphodynamics ($80,000)
Sediment storage monitoring ($430,000)
Significance of bedload transport ($110,000)
A.6. Control network and survey support ($114,000)


USGS
science for a changing world
Water quality monitoring of Lake Powell and Glen Canyon Dam releases ($0.27 million) (may expand in coordination with BoR)


Dam-Related Effects on the Distribution and Abundance of Selected Culturally-Important Plants in the Colorado River Ecosystem ($30,000)
Landscape-scale analysis of fluvial process - higher elevation connectivity ($220,000)
Long-term monitoring of archaeological sites in Glen, Marble, Grand Canyons ($450,000)

Terrestrial ecosystem studies ($0.56 million)



Riparian Vegetation Studies: Ground-based and Landscape-scale Riparian Vegetation Monitoring and Plant Response-Guild Research ($450,000)

What can birds, bats and spiders tell us about the state of the Colorado River ecosystem? ($120,000)

Economic Issues ($187,000)

Tribal Values and Perspectives of Resources Downstream of Glen Canyon Dam ($0; FY16/17)

Economic Values of Recreational Resources Along the Colorado River – Grand Canyon Whitewater Floater and Lees Ferry Angler Values ($70,000)

Applied Decision Methods for the Glen Canyon Adaptive Management Plan ($117,000)

Long-term Implications of Increased USGS Burden Rates on Funding for Monitoring and Research

	Total GCDAMP funds available to GCMRC	**USGS burden rate**	**GCDAMP funds available for scientific work led by GCMRC, including GCMRC administrative costs**
FY13	$8.4 million	11.3% (actual)	$7.4 million
FY14	$8.5 million	~11.3%	~$7.5 million
FY15	~8.8 million	~16%	~$7.5 million
FY16	~$9.0 million	~22%	~$7.4 million
FY17	~9.3 million	~28%	~$7.3 million

SEC. 204. (a) IN GENERAL.—For fiscal year 2001 and each fiscal year thereafter, the Secretary of the Interior shall continue funding, from power revenues, the activities of the Glen Canyon Dam Adaptive Management Program as authorized by section 1807 of the Grand Canyon Protection Act of 1992 (106 Stat. 4672), at not more than $7,850,000 (October 2000 price level), adjusted in subsequent years to reflect changes in the Consumer Price Index for All Urban Consumers published by the Bureau of Labor Statistics of the Department of Labor.