

Development of a New GCMRC Work Plan and Budget

Jack Schmidt

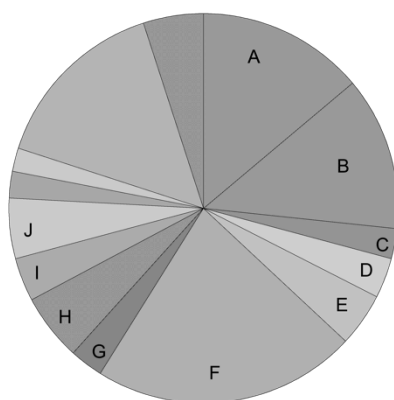
Grand Canyon Monitoring and Research Center
Southwest Biological Science Center
May 2014



FY 13: \$10,441,000 total budget

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

FY 2013

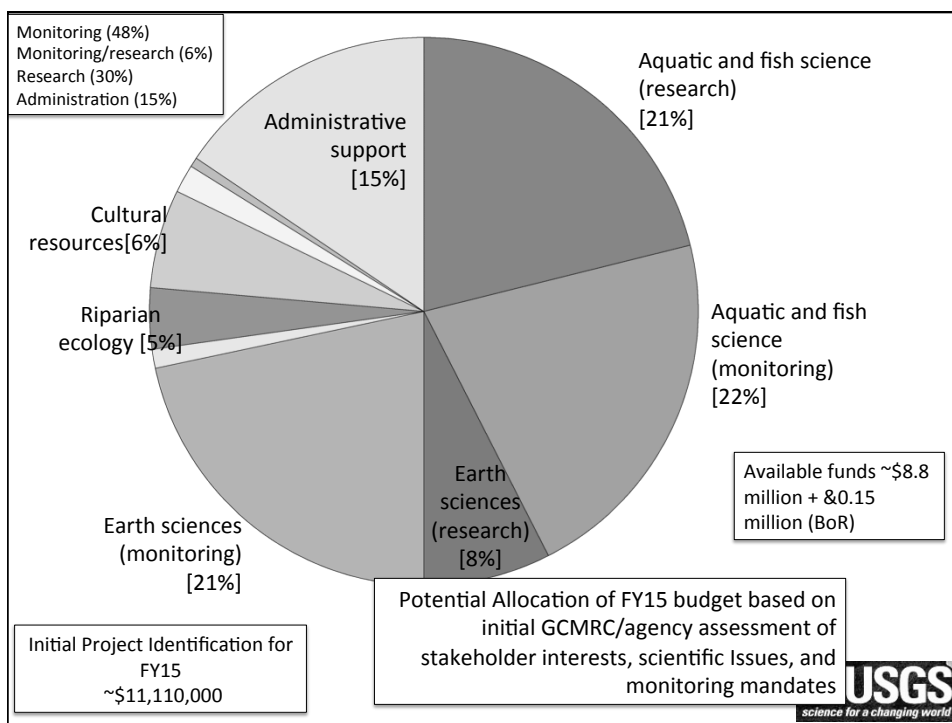
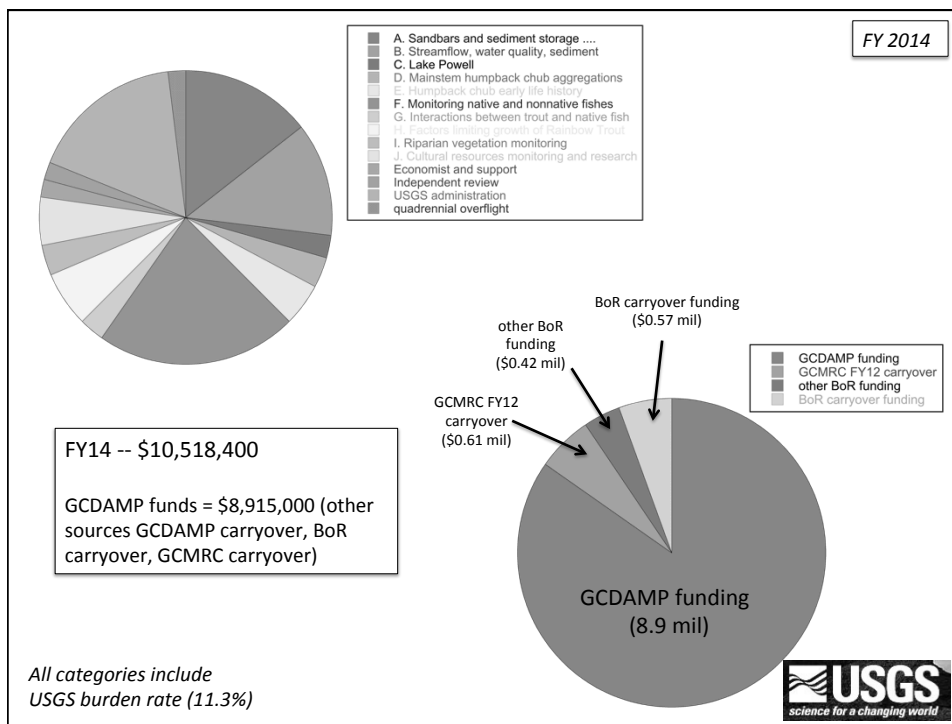


- A. Sandbars and sediment storage
- B. Streamflow, water quality, sediment
- C. Lake Powell
- D. Mainstem humpback chub aggregations
- E. Humpback chub early life history
- F. Monitoring native and nonnative fishes
- G. Interactions between trout and native fish
- H. Factors limiting growth of Rainbow 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%)

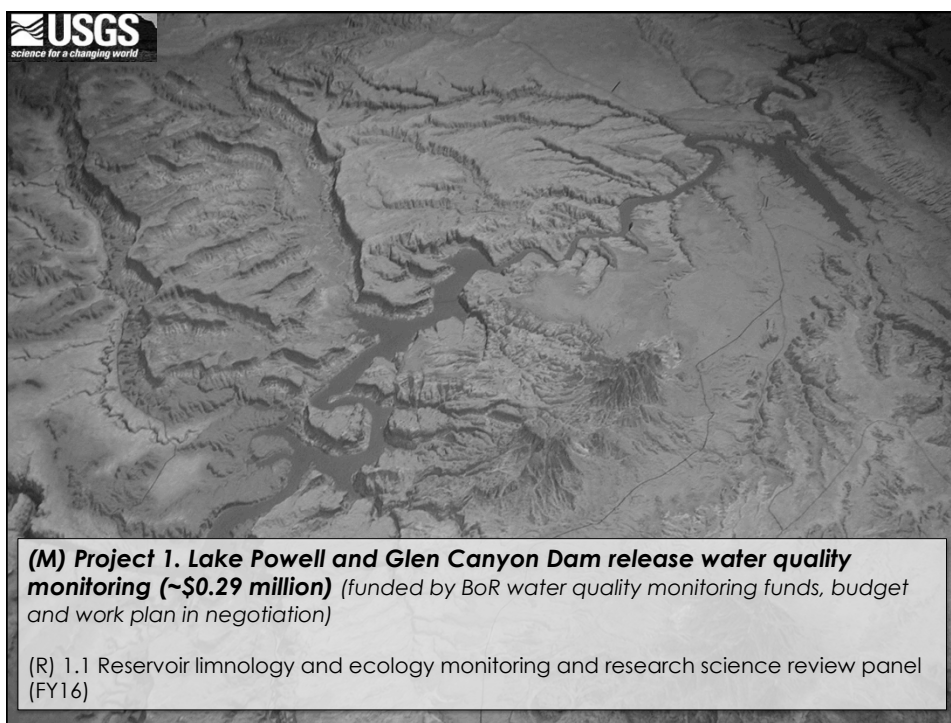
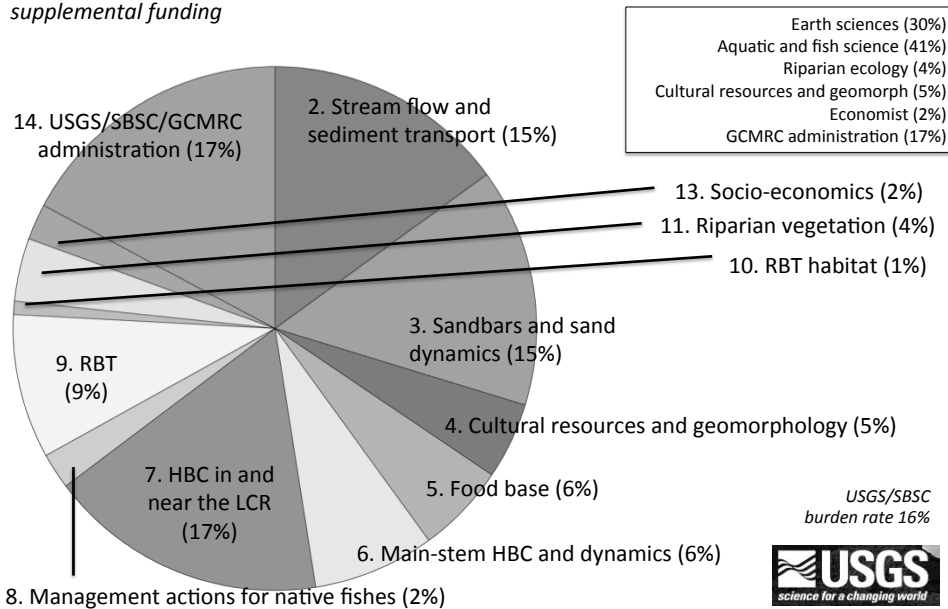
All categories include
USGS burden rate (11.3%)





Potential Allocation of GCDAMP Funds for FY15

Assumed available resources -- \$8.8 million + \$0.15 million BoR supplemental funding





(M) Project 2. Stream flow, water quality, and sediment transport ... (\$1.35 million)

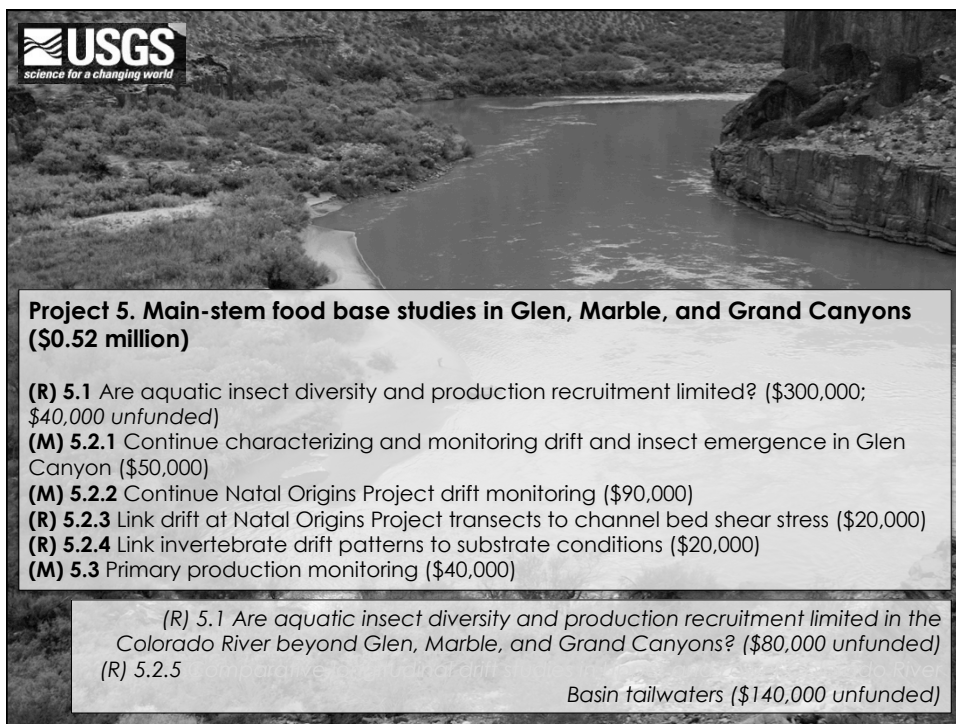
Project 3. Sandbars and sediment storage dynamics ... (\$1.33 million)

- (M) 3.1.1** Monitoring sandbars using topographic surveys and remote cameras (\$370,000)
- (M) 3.1.2** Monitoring sand bars and shorelines above 8000 ft³/s by remote sensing (\$120,000)
- (R) 3.1.3** Rapid topographic surveys with digital images technology development (\$40,000)
- (M/R) 3.1.4** Analysis of historical images at selected monitoring sites (\$90,000)
- (M/R) 3.2** Sediment storage monitoring (\$460,000)
- (R) 3.3** Characterizing, and predictive modeling of, sand bar response at local and reach scales (\$100,000)
- (R) 3.4** Connecting bed material transport, bed morphodynamics, and sand budgets in Grand Canyon (\$40,000)
- (M) 3.5** Control network and survey support (\$110,000)



Project 4. Quantifying the relative importance of river-related factors that influence upland geomorphology and archaeological site stability (\$0.41 million, including \$0.15 million from BoR)

- (R) 4.1** Quantifying connectivity along the fluvial-aeolian-hillslope continuum at landscape scales (\$220,000, including \$80,000 BoR)
- (M) 4.2** Monitoring of cultural sites in Grand and Glen Canyons (\$200,000, including \$70,000 BoR; \$180,000 unfunded)

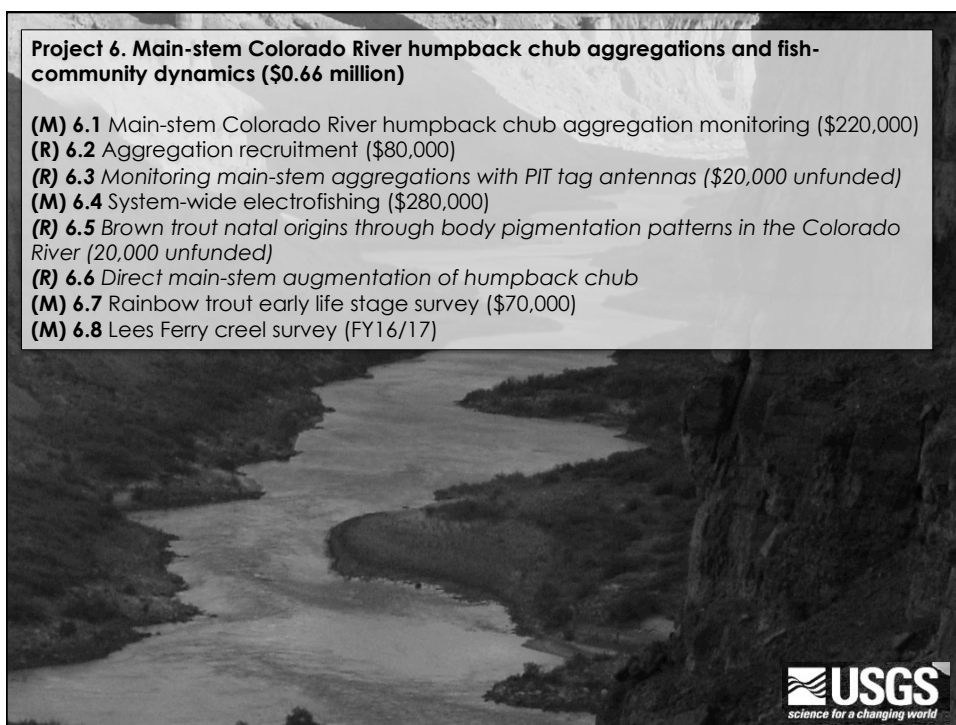



Project 5. Main-stem food base studies in Glen, Marble, and Grand Canyons (\$0.52 million)

- (R) 5.1 Are aquatic insect diversity and production recruitment limited? (\$300,000; \$40,000 unfunded)
- (M) 5.2.1 Continue characterizing and monitoring drift and insect emergence in Glen Canyon (\$50,000)
- (M) 5.2.2 Continue Natal Origins Project drift monitoring (\$90,000)
- (R) 5.2.3 Link drift at Natal Origins Project transects to channel bed shear stress (\$20,000)
- (R) 5.2.4 Link invertebrate drift patterns to substrate conditions (\$20,000)
- (M) 5.3 Primary production monitoring (\$40,000)

(R) 5.1 Are aquatic insect diversity and production recruitment limited in the Colorado River beyond Glen, Marble, and Grand Canyons? (\$80,000 unfunded)

(R) 5.2.5 Basin tailwaters (\$140,000 unfunded)

Project 6. Main-stem Colorado River humpback chub aggregations and fish-community dynamics (\$0.66 million)

- (M) 6.1 Main-stem Colorado River humpback chub aggregation monitoring (\$220,000)
- (R) 6.2 Aggregation recruitment (\$80,000)
- (R) 6.3 Monitoring main-stem aggregations with PIT tag antennas (\$20,000 unfunded)
- (M) 6.4 System-wide electrofishing (\$280,000)
- (R) 6.5 Brown trout natal origins through body pigmentation patterns in the Colorado River (20,000 unfunded)
- (R) 6.6 Direct main-stem augmentation of humpback chub
- (M) 6.7 Rainbow trout early life stage survey (\$70,000)
- (M) 6.8 Lees Ferry creel survey (FY16/17)

Project 7. Population ecology of humpback chub in and around the Little Colorado River (\$1.56 million)

- (M) 7.1 Annual spring/fall humpback chub abundance estimates in the lower 13.6 km of the Little Colorado River (\$30,000)
- (M) 7.2 Juvenile chub monitoring in the main stem near the Little Colorado River confluence (\$520,000)
- (R) 7.3 July Little Colorado River juvenile humpback chub marking to estimate production and outmigration (\$110,000)
- (M) 7.4 Remote PIT tag array monitoring in the LCR (\$50,000)
- (R) 7.5 Food web monitoring in the Little Colorado River (\$140,000)
- (R) 7.6 Potential for gravel substrate limitation for humpback chub reproduction in the LCR (\$10,000)
- (R) 7.7 Evaluate CO₂ as a limiting factor early life history stages of humpback chub in the Little Colorado River (\$90,000)
- (M) 7.8 Evaluate effects of Asian tapeworm infestation on Juvenile humpback chub (\$20,000)
- (R) 7.9 Development of a non-lethal tool to assess the physiological condition of humpback chub in the Colorado and Little Colorado Rivers (\$40,000 unfunded)
- (R) 7.10 Humpback chub population modeling (\$90,000)



Project 8. Management actions to increase abundance and distribution of native fishes in Grand Canyon (\$0.19 million)

- (R) 8.1 Efficacy and ecological impacts of brown trout removal (\$100,000)
- (M) 8.2 Translocation and monitoring above Chute Falls (\$90,000)
- (M) 8.3 Fisheries Protocol Evaluation Panel [FY16]
- (M) 8.4 Invasive species surveillance and response [FY17]
- (R) 8.5 Genetic monitoring of Lower Basin humpback chub [FY17]



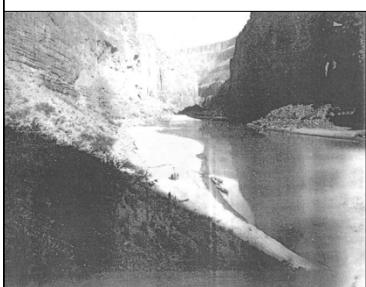
Project 9. Understanding the factors limiting the growth of rainbow trout in Glen and Marble Canyons (\$0.81 million)

- 9.1 Lees Ferry rainbow trout monitoring, analysis, and study design (\$40,000)
 9.2 Detection of rainbow trout movement from Glen Canyon (Natal Origins Project) (\$440,000)
 9.3 Exploring the mechanisms behind trout growth, reproduction, and movement in Glen and Marble Canyons using lipid (fat) reserves as an indicator of physiological condition (\$100,000)
 9.4 Comparative study on the feeding morphology of drift feeding fish (\$40,000; \$50,000 unfunded)
 9.5 Meta-analysis and the development of reactive distance relationships for encounter rate models (\$50,000 unfunded)
 9.6 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 (\$40,000)
 9.7 Application of a bioenergetics model in a seasonally turbid river (\$70,000 unfunded)
 9.8 Mechanisms that limit rainbow trout and brown trout growth in other western tailwater systems (\$70,000)
 9.9 Contingency planning for High Flow Experiments and subsequent rainbow trout population management (\$70,000)
 9.10 Examining the effects of High Flow Experiments on the physiological condition of age-0 and adult rainbow trout in Glen Canyon (\$50,000 unfunded)

Project 10. Mapping and assessment of aquatic habitats in Glen and Marble Canyons (\$0.70 million; \$0.80 million unfunded)

Project 11. Riparian vegetation studies (\$0.35 million)

- 11.1 Ground-based vegetation monitoring (\$160,000)
 11.2 Periodic landscape scale vegetation mapping and analysis using remotely sensed data (\$150,000)
 11.3 Influence of sediment and vegetation feedbacks on the evolution of sandbars since 1991 (\$130,000 unfunded)
 11.4 Linking dam operations to changes in terrestrial fauna (\$40,000; \$110,000 unfunded)
 11.5 Riparian vegetation management and monitoring science review panel (FY16)



Project 12. Dam-related effects on the distribution and abundance of selected culturally-important plants in the Colorado River ecosystem (\$0.05 million unfunded)

Project 13. Socio-economic monitoring and research (\$0.19 million)

13.1 Economic values of recreational resources along the Colorado River – Grand Canyon whitewater floater and Glen Canyon angler values (\$70,000)

13.2 Tribal values and perspectives of resources [FY16/17] (\$0)

13.3 Applied decision methods for the Glen Canyon Adaptive Management Program (\$120,000)



Project 14. USGS/SBSC/GCMRC administration and support (\$1.56 million)

14.1 GIS/database/engineering support (\$210,000)

14.2 GCMRC leadership and budget personnel (\$550,000)

14.3 GCMRC leadership travel-training (\$30,000)

14.4 GCMRC operations/supply/equipment (\$230,000)

14.5 working capital (\$20,000)

14.6 GCMRC logistical support staff salaries (\$270,000)

14.7 GCMRC support staff through NAU (\$70,000)

14.8 USGS/SBSC burden rate on Project 14 (\$180,000)



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.

