



# GCMRC FY 2018-20 Triennial Workplan and Budget

**Adaptive Management Work Group Meeting  
September 20, 2017**

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Southwest Biological Science Center

Grand Canyon Monitoring and Research Center

# LTEMP Implementation

Resource Areas to be Evaluated and Considered Before Any Experiment	Objectives And Resource Goals Of The LTEMP
Water Quality and Water Delivery	Archaeological and Cultural Resources
Humpback Chub	Natural Processes
Sediment	Humpback Chub
Riparian Ecosystems	Hydropower and Energy
Historic Properties and Traditional Cultural Properties	Other Native Fish
Hydropower Production and WAPA's Assessment of the Status of the Basin Fund	Recreational Experience
Rainbow Trout Fishery	Sediment
Recreation	Tribal Resources
Other Resources	Rainbow Trout Fishery
	Nonnative Invasive Species
Tribal Concerns/Resources	Riparian Vegetation

# A. Streamflow, Water Quality, and Sediment Transport and Budgeting in the Colorado River Ecosystem

## Project Elements

1. Stream gaging
2. Water quality
3. Sediment transport and budgeting

## LTEMP Resource Areas:

- Water Quality and Water Delivery
- Sediment
- Natural Processes

FY18: \$1,230,000

FY19: \$1,251,000

FY20: \$1,318,000



A wide river with a large sandbar in a canyon. The river is brown and turbulent, flowing through a deep, rocky canyon. A large, light-colored sandbar is visible in the middle of the river, with several people standing on it. The canyon walls are steep and rocky, with some sparse vegetation. A suspension bridge is visible in the distance, spanning the canyon.

## B. Sandbar and Sediment Storage Monitoring and Research

FY18: \$1,039,000

FY19: \$1,111,000

FY20: \$1,044,000

### Project Elements

1. Sandbar monitoring using topographic surveys and remote cameras
2. Bathymetric and topographic mapping for monitoring long-term trends in sediment storage
3. Control network and survey support

### LTEMP Resource Areas:

- Sediment
- Natural Processes
- Recreational Experience





## C. Riparian Vegetation Monitoring and Research

### Project Elements

1. Ground-based riparian vegetation monitoring
2. Imagery-based riparian vegetation monitoring at the landscape scale
3. Vegetation responses to LTEMP flow scenarios
4. Vegetation management decision support

FY18: \$585,000

FY19: \$485,000

FY20: \$457,000

### LTEMP Resource Areas:

- Riparian Vegetation
- Natural Processes
- Recreational Experience

## D. Geomorphic Effects of Dam Operations and Vegetation Management for Archaeological Sites

FY18: \$262,000

FY19: \$294,000

FY20: \$298,000

### LTEMP Resource Areas:

- Sediment
- Riparian Vegetation
- Archaeological and Cultural Resources
- Natural Processes

### Project Elements

1. Geomorphic effects of dam operations and vegetation management
2. Cultural resources synthesis to inform Historic Preservation Plan



# E. Nutrients and temperature as ecosystem drivers: understanding patterns, establishing links and developing predictive tools for an uncertain future

## LTEMP Resource Areas:

- Water Quality and Water Delivery
- Other Resources (Food Base)
- Natural Processes

## Project Elements

1. Temperature and nutrients in the CRe – patterns, drivers, and improved predictions
2. Linking temperature and nutrients to metabolism and higher trophic levels

FY18: \$343,000\*

FY19: \$233,000\*

FY20: \$257,000

\* Up to \$200,000 in Lake Powell funding available for FY18-19

# F. Aquatic Invertebrate Ecology (Food Base)

## Project Elements

1. Influence of dam operations on the food base
2. Aquatic food base status at humpback chub monitoring locations
3. Terrestrial-aquatic linkages
4. Glen Canyon food base monitoring and research
5. Are undesirable shifts in the Glen Canyon prey base facilitating expansion of brown trout?

FY18: \$771,000

FY19: \$811,000

FY20: \$780,000

### LTEMP Resource Areas:

- Other Resources (Food Base)
- Natural Processes



# G. Humpback chub population dynamics throughout the Colorado River Ecosystem

## Project Elements

1. Humpback chub population modelling
2. Annual spring/fall humpback chub abundance estimates in the lower 13.6 km of the LCR
3. Juvenile chub monitoring near the LCR confluence
4. Remote PIT array monitoring in the LCR
5. Monitoring humpback chub aggregation relative abundance and distribution
6. Juvenile chub monitoring – West
7. Chute Falls translocations
8. Havasupai translocation feasibility
9. Backwater seining

FY18: \$1,506,000  
FY19: \$1,674,000  
FY20: \$1,682,000



## LTEMP Resource Areas:

- Humpback Chub
- Natural Processes



# H. Salmonid Research and Monitoring

## Project Elements

1. Experimental flow assessment of trout recruitment
2. Rainbow trout and brown trout recruitment and outmigration model
3. Using early life history and physiological growth data from otoliths to inform management of rainbow trout and brown trout populations in Glen Canyon
4. Rainbow trout monitoring in Glen Canyon

FY18: \$638,000

FY19: \$726,000

FY20: \$699,000

## LTEMP Resource Areas:

- Rainbow Trout Fishery
- Humpback Chub
- Other Native Fish
- Recreational Experience
- Natural Processes



# I. Warm-Water Native and Non-Native Fish Research and Monitoring

## LTEMP Resource Areas:

- Nonnative Invasive Species
- Recreational Experience
- Natural Processes

FY18: \$557,000

FY19: \$581,000

FY20: \$577,000

## Project Elements

1. System-wide native and invasive aquatic species monitoring
2. Improved early detection of warm-water invasive fish
3. Assess the risks warm-water nonnative fish pose to native fish



# J. Socioeconomic Monitoring and Research in the Colorado River Ecosystem

## Project Elements

1. Tribal perspectives for, and values of, resources downstream of Glen Canyon Dam: tribal member population survey
2. Applied decision and scenario analysis

### LTEMP Resource Areas:

- Recreational Experience
- Tribal Concerns/Resources
- Rainbow Trout Fishery
- Humpback Chub
- Hydropower and Energy

FY18: \$281,000

FY19: \$252,000

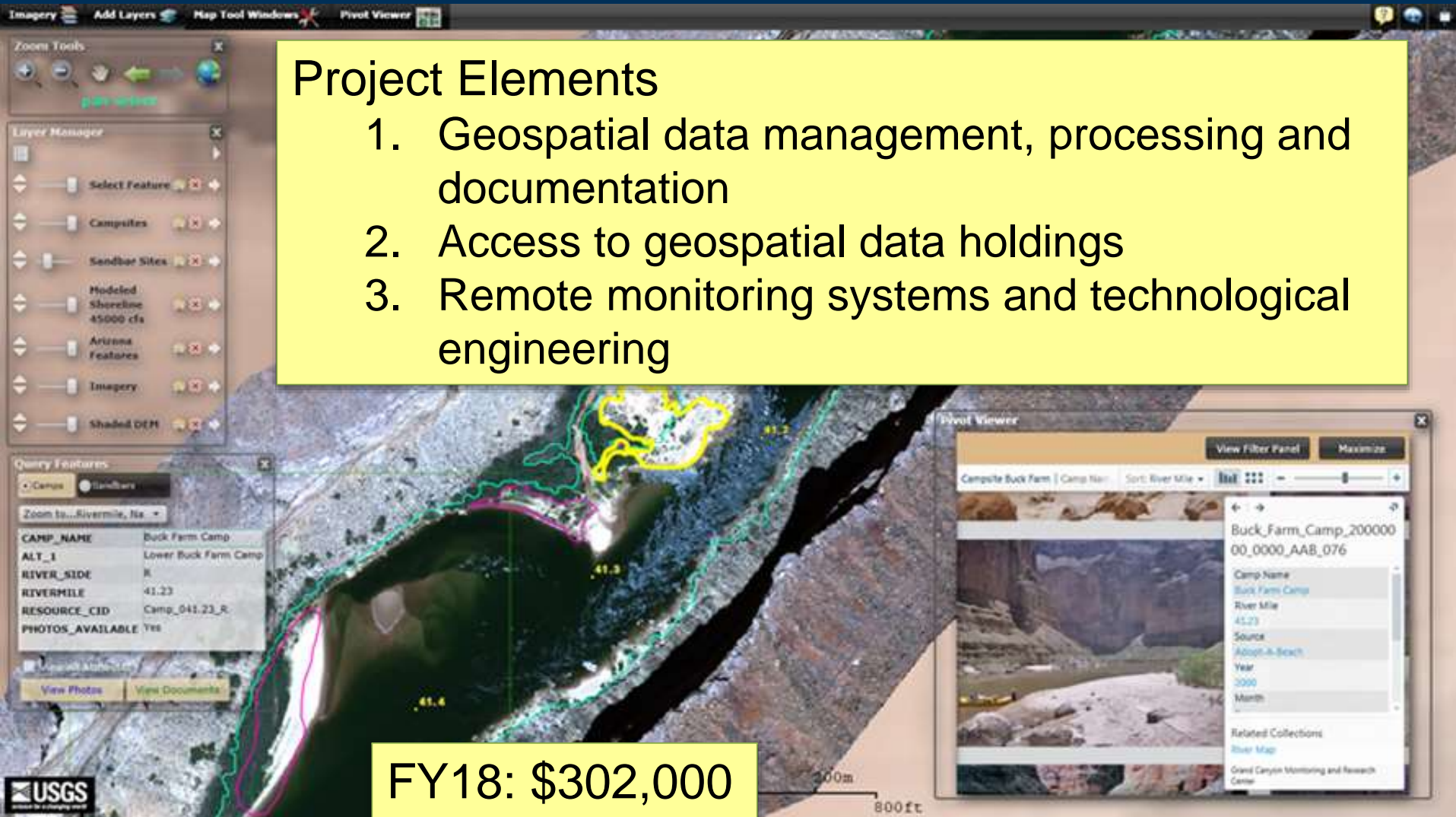
FY20: \$258,000



# K. Geospatial Science and Technology

## Project Elements

1. Geospatial data management, processing and documentation
2. Access to geospatial data holdings
3. Remote monitoring systems and technological engineering



FY18: \$302,000

FY19: \$231,000

FY20: \$273,000



# L. Remote Sensing Overflight in Support of Long Term Monitoring and LTEMP

## Project Elements

1. Remote sensing overflight in support of long term monitoring and LTEMP

FY18: \$75,000

FY19: \$75,000

FY20: \$75,000

### LTEMP Resource Areas:

- Riparian Vegetation
- Natural Processes
- Archeological and Cultural Resources





# M. Administration

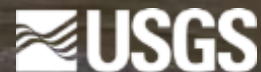
## Project Elements

1. Administration
2. Logistics
3. IT

FY18: \$1,375,000

FY19: \$1,478,000

FY20: \$1,573,000





# N. Hydropower Monitoring and Research

## Project Elements

### 1. Hydropower monitoring and research

FY18: \$12,000

FY19: \$13,000

FY20: \$14,000

LTEMP Resource Areas:

- Hydropower





# Potential FY2018 – 2020 Budget Summary

Project	Project Description	FY18 20 Summary		
		FY18	FY19	FY20
<b>A</b>	Streamflow, Water Quality, and Sediment Transport and Budgeting in the Colorado River Ecosystem	\$1,230,000	\$1,251,000	\$1,318,000
<b>B</b>	Sandbar and Sediment Storage Monitoring and Research	\$1,039,000	\$1,111,000	\$1,044,000
<b>C</b>	Riparian Vegetation Monitoring and Research	\$585,000	\$485,000	\$457,000
<b>D</b>	Geomorphic Effects of Dam Operations and Vegetation Management for Archaeological Sites	\$262,000	\$294,000	\$298,000
<b>E</b>	Nutrients and Temperature as Ecosystem Drivers: Understanding Patterns, Establishing Links and Developing Predictive Tools for an Uncertain Future	\$343,000	\$233,000	\$257,000
<b>F</b>	Aquatic Invertebrate Ecology	\$771,000	\$811,000	\$780,000
<b>G</b>	Humpback Chub Population Dynamics throughout the Colorado River Ecosystem	\$1,506,000	\$1,674,000	\$1,682,000
<b>H</b>	Salmonid Research and Monitoring	\$683,000	\$726,000	\$699,000
<b>I</b>	Warm-Water Native and Non-Native Fish Research and Monitoring	\$557,000	\$581,000	\$577,000
<b>J</b>	Socioeconomic Research in the Colorado River Ecosystem	\$281,000	\$252,000	\$258,000
<b>K</b>	Geospatial Science and Technology	\$302,000	\$231,000	\$273,000
<b>L</b>	Remote Sensing Overflight in Support of Long-term Monitoring and LTEMP	\$75,000	\$75,000	\$75,000
<b>M</b>	Administration	\$1,375,000	\$1,478,000	\$1,573,000
<b>N</b>	Hydropower Monitoring & Research	\$12,000	\$13,000	\$14,000
	<b>GCMRC AMP Total</b>	<b>\$9,021,000</b>	<b>\$9,215,000</b>	<b>\$9,304,000</b>

# Potential FY2018 – 2020 Budget Summary

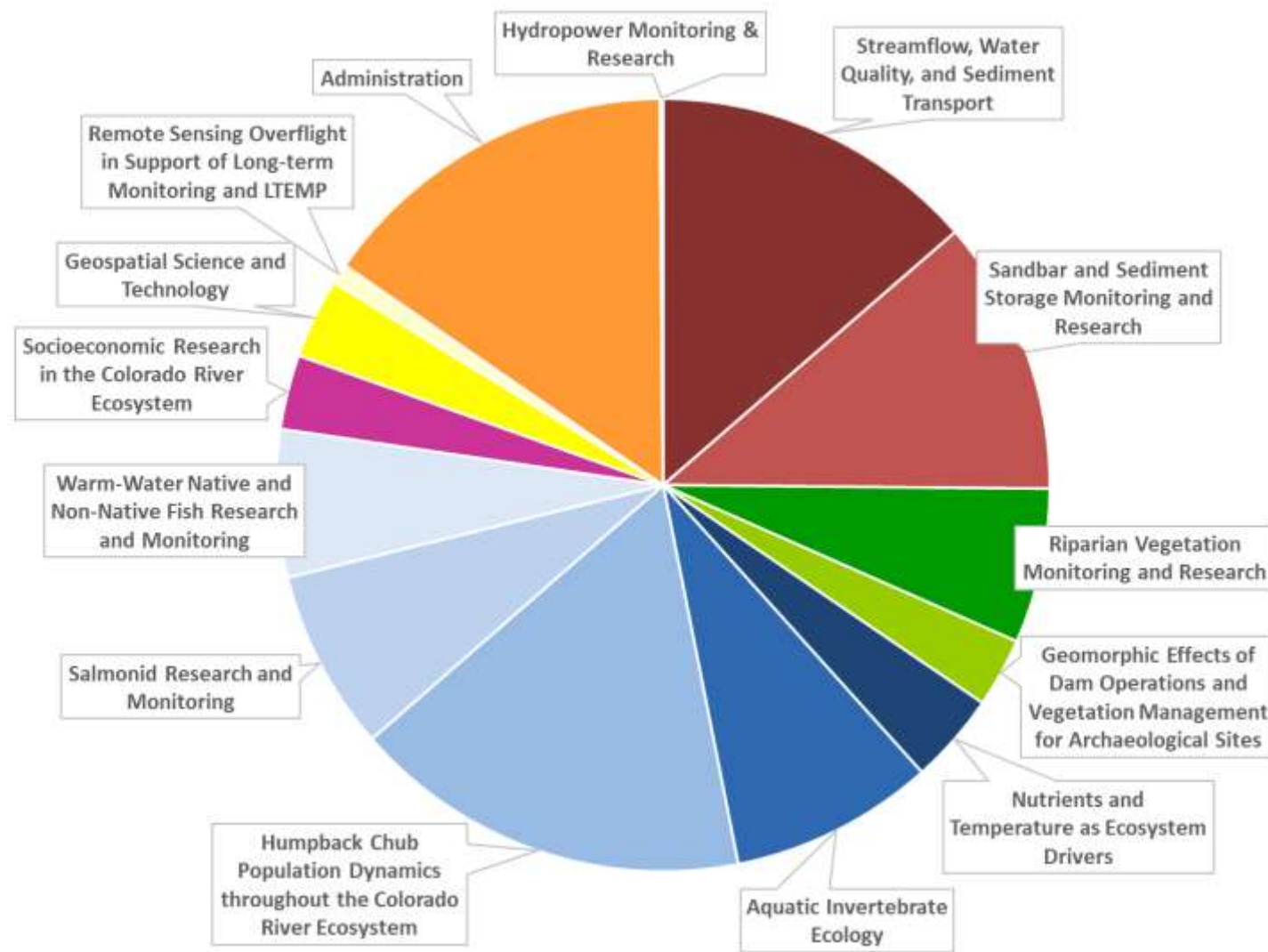
GCMRC AMP Total	\$9,021,000	\$9,215,000	\$9,304,000
Anticipated GCMRC AMP Funds (80%)	\$8,820,000	\$8,909,000	\$8,998,000
Over/Under Budget	(\$200,000)	(\$307,000)	(\$306,000)
Native Fish Conservation Contingency Fund	\$43,000	\$294,000	\$145,000
Anticipated Carryover (From Previous FY)	\$332,000	\$175,000	\$162,000
GCMRC AMP Total Over/Under Budget (w/Fish Funds & Carryover)	\$175,000	\$162,000	\$1,000
Lake Powell	\$150,000	\$71,000	\$0
<b>GCMRC Grand Total (w/ Lake Powell)</b>	<b>\$9,171,000</b>	<b>\$9,286,000</b>	<b>\$9,304,000</b>



(Amounts rounded to nearest \$1,000)

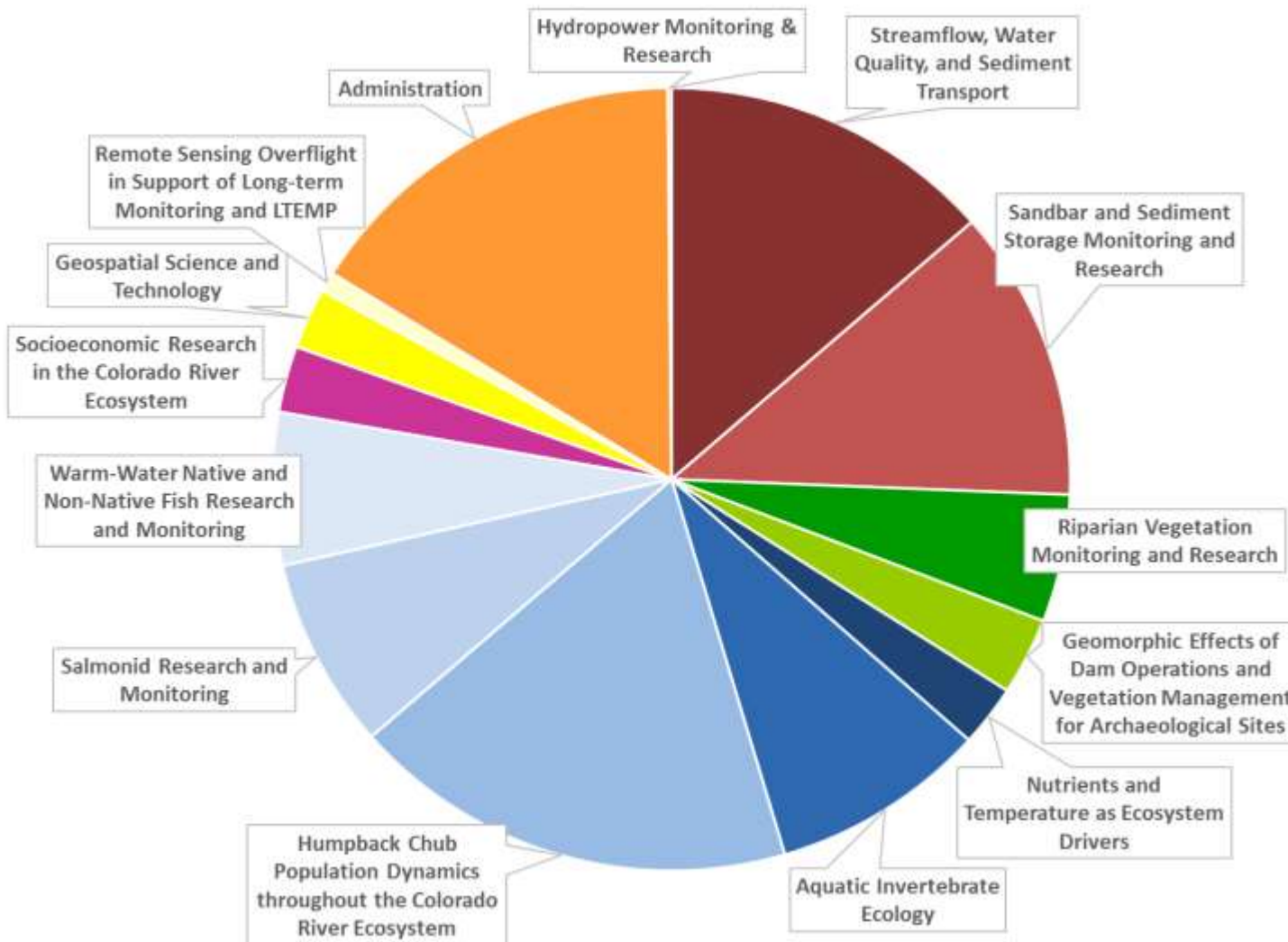


Potential allocation of FY2018 budget based on GCMRC/agency assessment of stakeholder interests, scientific issues, and monitoring mandates in support of LTEMP implementation



Geophysical sciences	26%
Vegetation & effects of management	9%
Aquatic and fish science	43%
Socioeconomics	3%
GIS	4%
Administration and support	15%

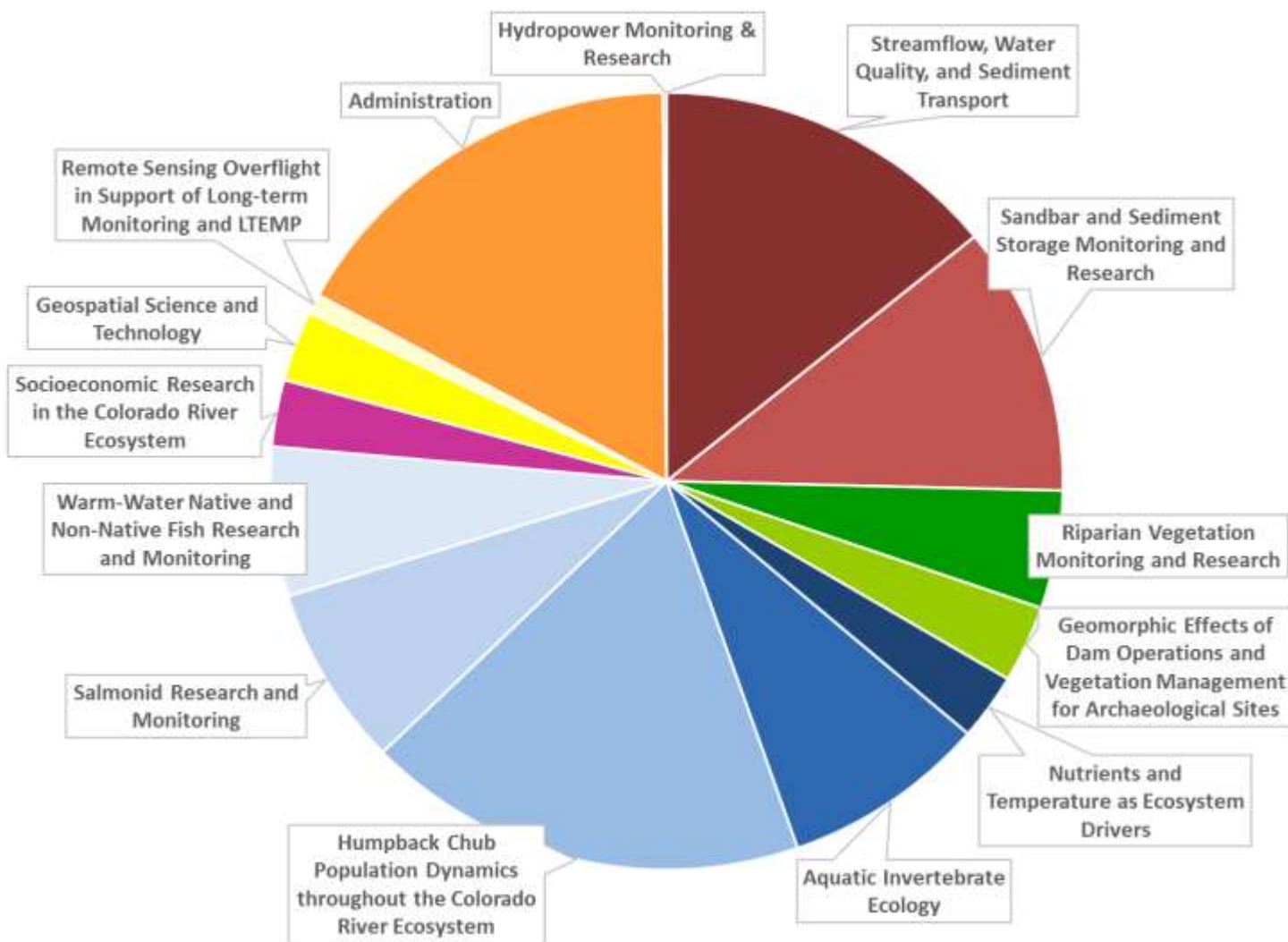
Potential allocation of FY2019 budget based on GCMRC/agency assessment of stakeholder interests, scientific issues, and monitoring mandates in support of LTEMP implementation



Geophysical sciences	26%
Vegetation & effects of management	8%
Aquatic and fish science	44%
Socioeconomics	3%
GIS	3%
Administration and support	16%



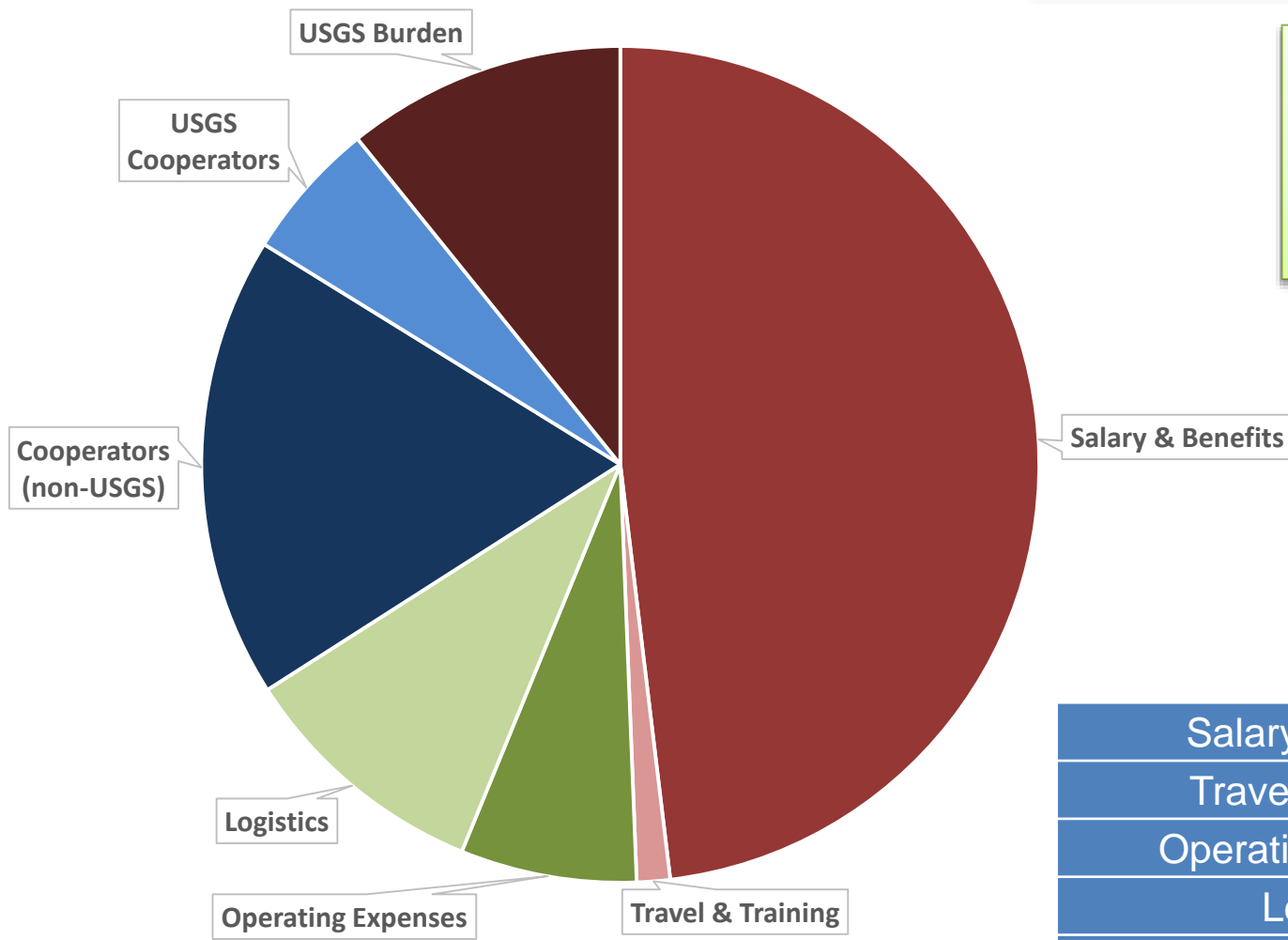
Potential allocation of FY2020 budget based on GCMRC/agency assessment of stakeholder interests, scientific issues, and monitoring mandates in support of LTEMP implementation



Geophysical sciences	25%
Vegetation & effects of management	8%
Aquatic and fish science	43%
Socioeconomics	3%
GIS	4%
Administration and support	17%

## Potential allocation of FY2018 budget by general categories

Overhead rates:  
USGS – 15.557%  
Pass through – 3%  
Sub-allocation – 0%

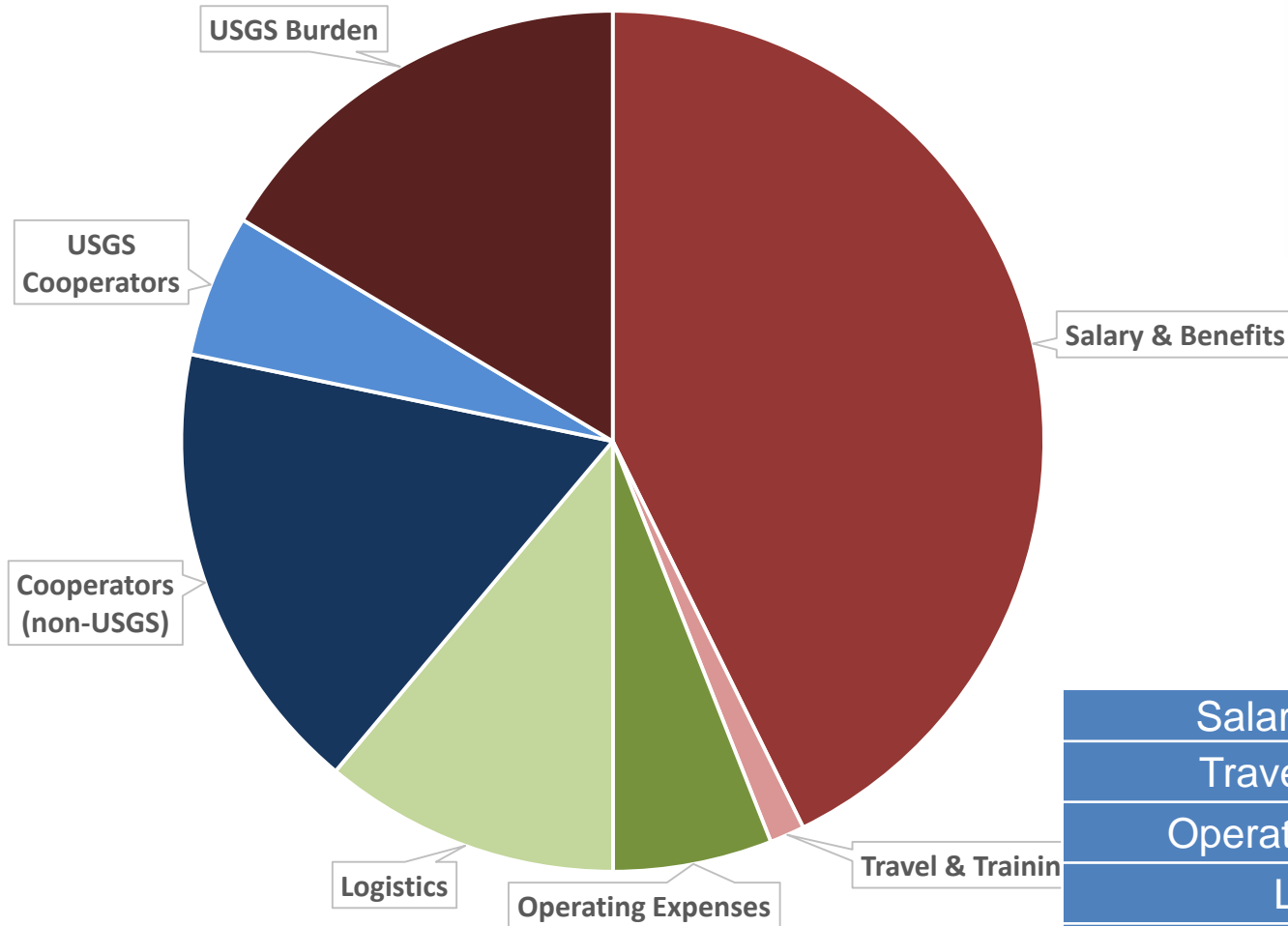


Salary & Benefits	48%
Travel & Training	1%
Operating Expenses	7%
Logistics	10%
Cooperators (non-USGS)	18%
USGS Cooperators	5%
USGS Burden	11%



# Potential allocation of FY2019 budget by general categories

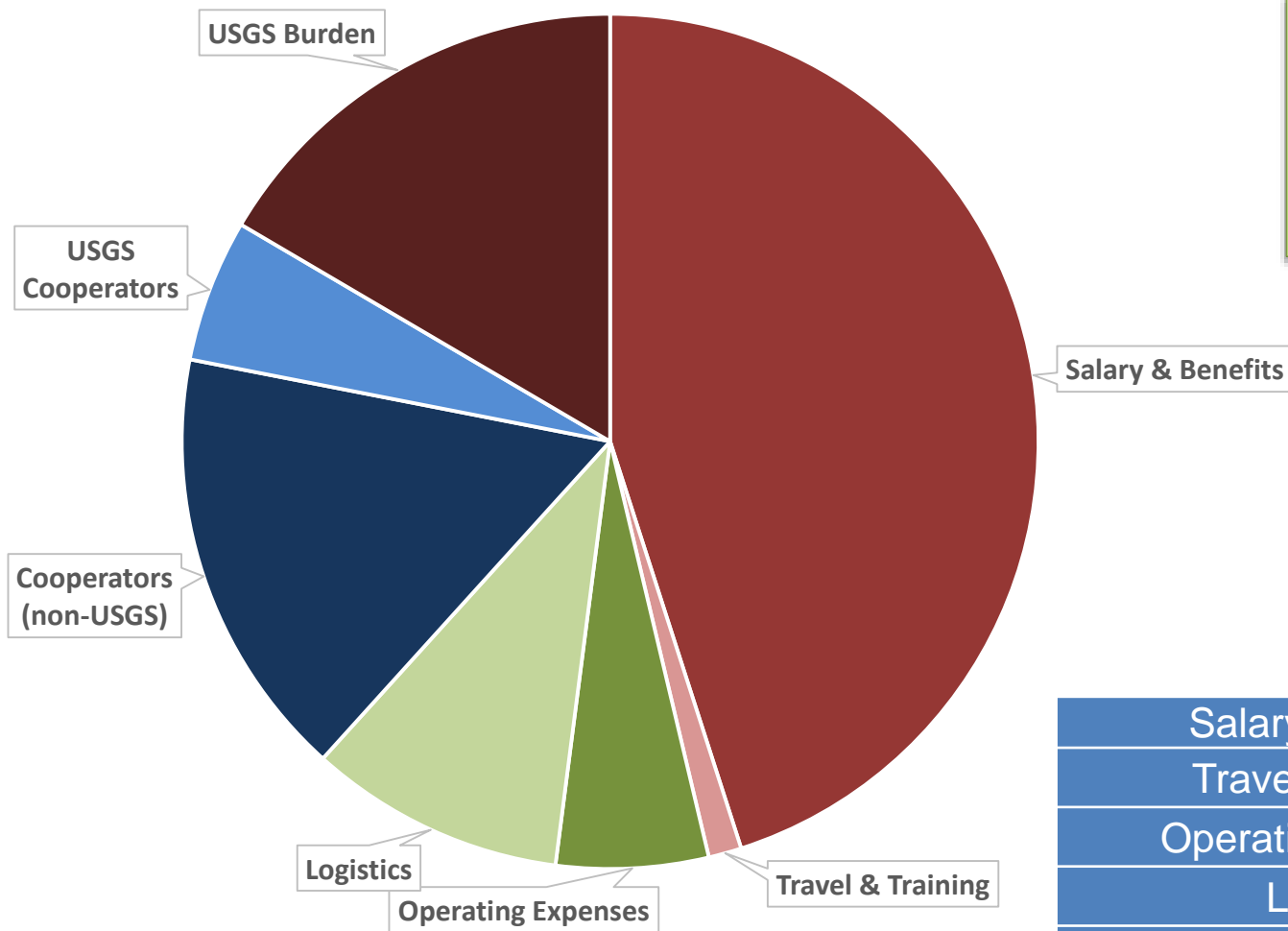
Overhead rates:  
USGS – est. ~26%  
Pass through – 3%  
Sub-allocation – 0%



Salary & Benefits	44%
Travel & Training	1%
Operating Expenses	6%
Logistics	11%
Cooperators (non-USGS)	17%
USGS Cooperators	5%
USGS Burden	16%

# Potential allocation of FY2020 budget by general categories

Overhead rates:  
USGS – est. ~26%  
Pass through – 3%  
Sub-allocation – 0%



Salary & Benefits	45%
Travel & Training	1%
Operating Expenses	6%
Logistics	10%
Cooperators (non-USGS)	16%
USGS Cooperators	5%
USGS Burden	17%



# Current Southwest Biological Science Center Facilities in Flagstaff

- SBSC leases space from the City of Flagstaff
- Current facilities are beyond design life
- City of Flagstaff will not enter into a new long-term lease



# Overhead will be Increasing Due to New Facilities – Planned for 2018

## SW Biological Science Center overhead:

- Bureau-level overhead (12%)
  - By policy, this charge is waived for GCDAMP funds
- Center-level overhead (26%)
  - By policy, this overhead rate is set at 7.5% for GCDAMP funds
  - Cost to SBSC offset by USGS appropriated funds (~\$1,000,000 in FY17)
- Facilities overhead
  - Currently 4.6%
  - Will increase to ~19%



# Questions?

