

**ADAPTIVE MANAGEMENT PROGRAM  
GRAND CANYON MONITORING AND RESEARCH CENTER  
PROJECT BUDGET - FY 2002**

**SUMMARY BY PROGRAM**

<b>AMP Funds</b>		<b>FY-2000</b>	<b>FY-2001</b>	<b>FY-2002</b>
A.	Bureau Support Services	123,000	125,000	128,000
B.	Administrative Operations, Personnel	2,023,000	1,969,000 <sup>(1)</sup>	2,011,000
C.	Physical Resources Science	700,000	950,000	971,000
D.	Biological Resources Science	1,500,000	1,280,000 <sup>(2)</sup>	1,319,000
E.	Socio-Cultural Resources Science	355,000	365,000 <sup>(3)</sup>	373,000
F.	Information Technologies Program	320,000	320,000	327,000
G.	Remote Monitoring Technology	400,000	400,000	400,000
H.	Independent Review Panels	155,000	175,000	179,000
I.	Unsolicited Proposals		120,000 <sup>(4)</sup>	123,000
J.	AMWG/TWG Requests		60,000 <sup>(4)</sup>	61,000
K.	In-house Research		20,000 <sup>(4)</sup>	20,000
L.	Logistics	653,000	650,000	664,000
<b>TOTAL</b>		<b>6,229,000</b>	<b>6,434,000</b>	<b>6,576,000</b>

<b>O&amp;M Funds</b>		<b>FY-2000</b>	<b>FY-2001</b>	<b>FY-2002</b>
Integrated Water Quality Program - Lake Powell		300,000	300,000	307,000

<b>Appropriated Funding Request</b>		<b>FY-2000</b>	<b>FY-2001</b>	<b>FY-2002</b>
A.	Administrative Operations, Personnel	0	0	250,000
D.	Biological Resources Science	0	0	525,000
F.	Information Technologies Program	0	0	185,000
H.	Independent Review Panels	0	0	50,000
<b>TOTAL</b>		<b>0</b>	<b>0</b>	<b>1,010,000</b>

**FUNDING SOURCES**

	<b>FY-2000</b>	<b>FY-2001</b>	<b>FY-2002</b>
AMP - ADAPTIVE MANAGEMENT PROGRAM	6,229,000	6,434,000	6,576,000
O&M - IWQP LAKE POWELL STUDIES	300,000	300,000	307,000
APPROPRIATED FUNDS	0	0	1,010,000
<b>TOTAL</b>	<b>6,529,000</b>	<b>6,734,000</b>	<b>7,893,000</b>

- Notes: FY-2000 and 2001 budget figures are from the respective Annual Monitoring and Research Plans  
FY-2002 figures were derived by increasing the FY-2001 budget by the Consumer Price Index (CPI) rate of 2.2%
- (1) 70% of the salary cost for GCMRC staff working on Lake Powell was transferred to the O&M IWQP account
  - (2) \$120,000 was set aside for Unsolicited Proposals (see "I"); \$20,000 was set-aside for In-House Research (see "K"); \$10,000 was set aside to address AMWG/TWG requests (see "J")
  - (3) \$10,000 was set aside to address AMWG/TWG requests (see "J")
  - (4) New categories established in FY-01. Funds were transferred from the Biology and Cultural Programs.

ADAPTIVE MANAGEMENT PROGRAM  
**GRAND CANYON MONITORING AND RESEARCH CENTER**  
 PROJECT BUDGET - FY 2002

SUMMARY BY PROJECT	AMP and O&M		Appropriations Request
	Funding		
<b>I. SCIENTIFIC OPERATIONS</b>			
<b>A. TERRESTRIAL ECOSYSTEM ACTIVITIES</b>		660,025	
1. Monitoring avifauna	129,900		
2. Monitoring terrestrial habitat	200,500		
3. Monitoring Kanab Ambersnail	71,625		
4. Ongoing trophic interactions research	55,900		
5. Cultural resource monitoring & mitigation strategies	132,000		
6. Development of historic contexts	70,100		
7. Terrestrial mapping and inventory**	0		200,000
<b>B. AQUATIC ECOSYSTEM ACTIVITIES</b>		1,129,070	
1. Ongoing monitoring phyto-benthic community	261,840		
2. Ongoing monitoring of downstream fish**	587,740		200,000
3. Monitoring of Lees Ferry trout fishery	149,840		
4. Ongoing population genetics of humpback chub	65,550		
5. New research - native and non-native fish species**	64,100		125,000
<b>C. INTEGRATED WATER QUALITY MONITORING</b>		396,565	
1. IWQP downstream activities	89,565		
2. IWQP Lake Powell (O&M funding)	307,000		
<b>D. INTEGRATED TERRESTRIAL &amp; AQUATIC ECOSYSTEM ACTIVITIES</b>		1,471,420	
1. Long-term monitoring of fine-grained sediment storage	435,740		
2. Long-term monitoring of streamflow and fine-sed. transport	549,140		
3. Long-term monitoring of coarse-graining sediment	113,140		
4. Modeling reach-averaged sand bar evolution	149,400		
5. Develop of a one-dimensional fine sediment-routing model	124,500		
6. Advanced conceptual modeling of coarse-grained sediment	99,500		
<b>E. PROTOCOL EVALUATION PROGRAM ACTIVITIES</b>		179,000	
1. Biological Resources and IWQP PEP	88,000		
2. Socio-Cultural Resources PEP	91,000		
<b>F. REMOTE SENSING ACTIVITIES*</b>		423,800	
1. Evaluating ground-based and airborne remote sensing tech.	423,800		
<b>II. MANAGEMENT AND BUDGET</b>			
<b>G. ADMINISTRATIVE OPERATIONS AND SUPPORT**</b>	1,130,670	1,130,670	250,000
<b>H. INFORMATION TECHNOLOGIES PROGRAM SUPPORT**</b>	783,700	783,700	185,000
<b>I. CULTURAL RESOURCES INFORMATION TRANSFER ACTIVITIES</b>	60,000	60,000	
<b>J. INDEPENDENT REVIEW PANELS**</b>	179,000	179,000	50,000
<b>K. UNSOLICITED PROPOSALS</b>	123,000	123,000	
<b>L. AMWG/TWG REQUESTS</b>	61,000	61,000	
<b>M. IN-HOUSE RESEARCH</b>	20,000	20,000	
<b>N. LOGISTICS (Costs not assigned to projects)</b>	265,750	265,750	
<b>TOTAL</b>	<b>6,883,000</b>	<b>6,883,000</b>	<b>1,010,000</b>

\* Remote Monitoring Technology funding has not been increased and remains at \$400,000. Projected salary cost is \$23,800.

\*\* Appropriated funding requested.

FUNDING SOURCES	
ADAPTIVE MANAGEMENT PROGRAM	6,576,000
O&M - IWQP LAKE POWELL STUDIES	307,000
APPROPRIATED FUNDING REQUEST	1,010,000
<b>TOTAL</b>	<b>7,893,000</b>

ADAPTIVE MANAGEMENT PROGRAM  
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SUMMARY BY EXPENSE CATEGORY			Total Expense
11.0	Salary (includes benefits)		1,705,000
	AMP Funded	1,569,000 <sup>[a]</sup>	
	IWQP - Lake Powell	136,000 <sup>[b]</sup>	
21.0	Travel		79,000
	Administrative Operations Support	61,000 <sup>[a]</sup>	
	Information Technologies Support	10,000 <sup>[c]</sup>	
	IWQP - Lake Powell	8,000 <sup>[b]</sup>	
23.0	GSA Space, Phones, Vehicles	216,000 <sup>[a]</sup>	216,000
25.0	Contracts - Scientific		3,008,000
	Biological Resources	1,319,000	
	Socio-Cultural Resources	373,000	
	Physical Resources	971,000	
	IWQP - Lake Powell	141,000 <sup>[b]</sup>	
	Unsolicited Proposals	123,000	
	AMWG/TWG Requests	61,000	
	In-House Research	20,000	
25.0	Services - Project Support		1,084,000
	Logistics	664,000	
	Remote Sensing	400,000	
	IWQP - Lake Powell	20,000 <sup>[b]</sup>	
25.0	Services - Other		375,000
	Administrative Operations	32,000 <sup>[a]</sup>	
	Information Technologies Support	164,000 <sup>[c]</sup>	
	Independent Review Panels	179,000	
26.0	Supplies and Materials		203,000
	Administrative Operations	48,000 <sup>[a]</sup>	
	Information Technologies Support	153,000 <sup>[c]</sup>	
	IWQP - Lake Powell	2,000 <sup>[b]</sup>	
31.0	Equipment		20,000
	Administrative Operations	20,000 <sup>[a]</sup>	
81.0	Intra-Office/Inter-Bureau		193,000
	Administrative & Network Support - Flagstaff Center	65,000 <sup>[a]</sup>	
	Administrative Support - USGS Regional Office	128,000	
TOTAL		6,883,000	6,883,000

[a]	Administrative Operations and Support total costs (regional support not included)	2,011,000
[b]	IWQP Lake Powell (O&M) total costs:	307,000
[c]	Information Technologies Program Support total costs:	327,000

## **FY 2002 Brief Project Descriptions**

**TWG**

**May 10 -11, 2000**

### **I. SCIENTIFIC OPERATIONS**

#### **A. Terrestrial Ecosystem Activities**

##### **1. Monitoring avifauna**

Overwintering waterfowl and bird counts of riparian breeding birds. Methods using point counts with emphasis on common “indicator” breeding birds. Surveys will be expanded to include marginal habitat as well as “good” habitat.

##### **2. Monitoring terrestrial habitat**

Survey and census (transect sampling) along the river to determine vegetation representation and change. Included in this effort will be inventory efforts as funding permits. Monitoring methodologies will be developed with Native American participants to address traditional and ethnobotanical resources.

##### **3. Monitoring Kanab ambersnail**

Continued monitoring of habitat at Vasey’s Paradise. Will likely have fewer monitoring trips (2/year) and less intrusive methods (photogrammetry) to document habitat availability. Will be done internally with volunteer/cooperation from KAWG. Money is for the KAWG participation.

##### **4. Bird - Insect trophic interactions research funding**

Will be reprogrammed into another terrestrial research project likely associated with nesting success of riparian birds. The money in 2001 is being used for a 2<sup>nd</sup> year of support for the trophic linkage research being done by SWCA.

##### **5. Cultural Resources Monitoring and Mitigation Strategies**

Evaluate the effectiveness of cultural resource monitoring and mitigation strategies at selected locations along the river corridor using remote sensing technologies. Project will be developed to address recommendations from PEP assessment.

##### **6. Development of Historic Contexts and Other Documents and Plans**

Development of historic contexts to evaluate and interpret the significance of identified cultural resources within the river corridor. Additional documents and plans will be developed to implement the HPP as recommended in the PEP panel report.

## **7. Terrestrial mapping and inventory activities**

The draft PEP report for terrestrial resources indicates that an inadequate framework exists for conducting long-term monitoring of the terrestrial ecosystem. They have recommended an initial mapping and inventory effort that this project is intended to address.

### **B. Aquatic Ecosystem Activities**

#### **1. Ongoing monitoring of the phyto-benthic community**

Will be the 1st year for long-term monitoring. At this time this represents current funding levels.

#### **2. Ongoing monitoring of the status and trends of the downstream fish community**

Will be the 1<sup>st</sup> year for long-term monitoring following the 2001 PEP. Intent for the program will be to assess population change in the mainstem and to determine potential cohort contribution in the LCR.

#### **3. Ongoing monitoring of the status and trends of the Lees Ferry trout fishery**

Will be in the 2<sup>nd</sup> year of long-term monitoring. The budget number represent the current funding level for this program. The program determines the population trends of the trout in the Glen Canyon reach.

#### **4. Ongoing population genetics research of HBC**

This will be reprogrammed into native fish research. At this time it is uncertain as to the avenue of study, possibly predator population estimates.

#### **5. New research associated with native and non-native fish**

These funds were reprogrammed in the 2001 budget to cover native fish monitoring and may be absorbed by that effort. If not, they would be combined with the project funding under the HBC genetics header.

### **C. Integrated Water Quality Monitoring**

#### **1. IWQP downstream activities**

Includes temperature and conductivity measurements under the IWQP program. The PEP for water quality will take place in 2001. the values for the monitoring may change.

## **2. IWQP Lake Powell (O&M) Activities**

### **D. Integrated Terrestrial and Aquatic Ecosystem Activities**

#### **1. Long-term Monitoring of Fine-Grained Sediment Storage throughout the Main Channel.**

This project is designed to annually assess the spatial distribution of sand- and finer-sized material stored within the main channel of the Colorado River ecosystem; specifically related to storage in eddy complexes and main-channel pools. Monitoring data shall reflect the relative changes in total volume of sediment and grain-size distribution within a subset of representative reaches throughout the ecosystem, with emphasis on the first 100 miles below the dam. These data support information needs on the state of the available fine-sediment supply in the system subject to influence of dam operations.

Related elements of this project include documenting changes in high-elevation sand storage (above 25,000 cfs) related to available campable areas, evolution of sand bar grain-size distribution, changes in the spatial distribution of channel-bed substrates, changes in the number and size of return-current channels within eddy complexes (backwater habitats) and changes in the size of pre-dam river terraces.

#### **2. Long-term Monitoring of Streamflow and Fine-Sediment Transport in the Main Channel Colorado, Paria and Little Colorado Rivers.**

This project provides data on streamflow and suspended-sediment transport on the gaged tributaries that provide fine-sediment to the ecosystem (influx), and on suspended-sediment transport through critical reaches of the main channel of the Colorado River ecosystem (efflux). It has one research component related to advancing development of a protocol for tracking the fine-sediment budget in real time through a variety of integrated and remotely sensed input data.

#### **3. Long-term Monitoring of Coarse-Grained Sediment Inputs, Storage and Impacts to Physical Habitats of the Main Channel.**

This project provides data on tributary inputs of coarse sediment introduced by debris flows annually, and information about how these inputs change the geomorphology of the main channel settings where sand storage, recreational, food base and fisheries resources exist.

#### **4. Modeling Reach-Averaged Sand Bar Evolution over a Range of Discharge and Sediment Conditions Along the Main Channel.**

This project provides numerical model simulations for sand bar responses to a range of dam operations under historical sediment-supply conditions within all representative geomorphic reaches in the ecosystem.

## **5. Development of a One-Dimensional Sand-Routing Model Along the Main Channel.**

This project results in a numerical simulation for routing sand inputs from the Paria and Little Colorado Rivers, downstream through main channel storage settings below Glen Canyon Dam, including eddy complexes and main channel pools. The simulation uses modeled information on sand inputs, in combination with predictions of travel time and historical and model-derived local conditions of sand bar deposition and erosion.

## **6. Advanced Conceptual Modeling of Coarse-Grained Sediment Inputs Related to Evolving Physical Habitats and Aquatic Processes.**

This project relates ongoing impacts of coarse-sediment inputs to the evolution of the geomorphic framework of the Colorado River ecosystem, under current dam operations, over periods ranging from decadal to centennial time scales. The project specifically examines simulations related to local and system-wide changes to the main channel thought to influence fine-sediment storage, related physical habitats and food base dynamics.

### **E. Protocol Evaluation Program Activities**

- 1. Biological Resources and IWQP PEP**
- 2. Socio-Cultural Resources PEP**

There should not be any PEP activities in the FY2002. These funds can be reprogrammed into research or monitoring money.

### **F. Remote Sensing Activities**

- 1. Evaluating ground-based and airborne remote sensing technologies.**

In FY2002 we will complete our evaluation of remote sensing technologies. A report recommending operational technologies will be provided.