

To: FY99 Program Planning Group, FY99 Pgm Plan Group cc's
From: Dave Garrett <dgarrett@flagmail.wr.usgs.gov>
Subject: FY99 Program Planning Group Meeting on December 3, 1997
Cc:
Bcc:

Please find *attached the documents requested for our Planning Group meeting on December 3 from 9:30 a.m. - 3 p.m. at the La Quinta Hotel, 2510 W. Greenway Rd., Phoenix, AZ. This communication will serve as your meeting notice to obtain authorization for travel.

As we discussed in our last meeting, it is difficult for us to make decisions when some of the parties have to leave around 3 p.m. As such, we will reach all of our decision points before our time of closure.

Our agenda is as follows:

AGENDA - FY99 PROGRAM PLANNING GROUP

- 9:30 a.m. Changes to Agenda (Garrett & Group)
- 9:45 a.m. Discussion of the Report to Congress (Garrett & Group)
- 10:15 a.m. Discussion of State of the Riverine Resources Report (Garrett/Group)
- 10:45 a.m. Overview of revisions to the FY99 Plan (Garrett & Group)
- 11:00 a.m. Break
- 11:15 a.m. Review of Physical Resources Program Elements (Melis)
- 12:00 p.m. Review of Information Technology Program (Liszewski)
- 12:30 p.m. Lunch
- 1:30 p.m. Review of Cultural Resources Program (Lambert)
- 2:15 p.m. Review of Biological Resources Program (Gold)
- 3:00 p.m. Adjourn

*Note from Serena: The budget page (last page of FY99 Annual Plan) still needs to be finalized. I will send the revised page to you by Monday, 12/1 at the latest. I have attached the documents with this message in case you have software to read them. I am also fed ex'ing them to you today.

GRAND CANYON MONITORING AND RESEARCH CENTER

FY98 and FY99

BIOLOGICAL RESOURCES PROGRAM

**Presentation to the TWG FY99 Working Group
December 3, 1997
Phoenix, AZ**

GCMRC - FY98 & FY99 BIOLOGICAL RESOURCES PROGRAM

Management Objective: Maintain and enhance the aquatic food base in Glen and Grand Canyons.

FY98 and FY99 Project: AQUATIC FOOD BASE RESEARCH AND MONITORING

Principal Investigator(s): Dean W. Blinn & Joe P. Shannon, Northern Arizona University

Project Cost: FY98: \$166,343; FY99: \$178,086 (proposed)

Project Duration: One Year, renewable for one additional year.

RFP Objectives:

- 1) Determine impacts alternative operating criteria have on the food base.
- 2) Monitor community structure, density, distribution, and composition of algae, macrophytes and macroinvertebrates along the mainstem and tributaries in a manner compatible with research and monitoring activities on fish.
- 3) Identify key parameters (i.e., nutrient levels, water quality, community structure) associated with the maintenance and enhancement of aquatic food base for long-term monitoring.
- 4) Data collections that enable distinction between the effects of dam operations and natural variation on the aquatic food base and previous monitoring efforts.
- 5) Linkages between nutrient levels, water quality and community structure (benthos, drift, etc.) in relation to dam operations, Lake Powell input and tributary influences.
- 6) Determine if and at what densities the standing aquatic food base in Glen Canyon is a limiting factor in higher trophic level productivity in association with different operating criteria.
- 7) Determine the effects of large fluctuations associated with dam releases on the aquatic food base in Glen and Grand Canyons and associated fish resources.

Proposed Activities:

1. Monitor the effects of modified low fluctuation flows from Glen Canyon Dam on the benthic algal and microinvertebrate community in the Colorado River between GCD and Diamond Creed (RM278).
2. Monitor the effects of modified low fluctuating flows from GCD on the organic drift in the Colorado River between GCD and Diamond Creek.

3. Inventory the phytobenthos, macroinvertebrates and drift in 11 major tributaries in Grand Canyon National Park.

4. Construct an aquatic/riparian foodweb using stable isotope analyses.

Potential new efforts for FY99:-

New efforts being considered for FY99 address the synthesis of previous research and monitoring efforts, and the initiation of research that addresses poorly understood, or unknown information associated with nutrient cycling, lower trophic level interactions, and the effect of temperature on these interactions. Specific questions pertaining to aquatic food base productivity include:

- How do lower level interactions such as nutrient cycling (phosphorous availability) in the mainstem affect primary productivity?**
- What is the microbial contributions to organic processing in this system?**
- What are the recruitment mechanisms associated with Cladophora (i.e., zoospore vs fragmentation), a keystone species in the aquatic food base?**
- How does temperature affect each of these subjects?**

GCMRC - FY98 & FY99 BIOLOGICAL RESOURCES PROGRAM

Management Objectives:

- Maintain or enhance existing population of HBC in lower 1,200 meters of the LCR.
- Maintain levels of recruitment of humpback chub in the mainstem and LCR.
- Verify the status of and management for healthy, self sustaining populations of: (1) flannelmouth sucker, bluehead sucker, and speckled dace in the mainstem Colorado River in Grand Canyon and its tributaries; and (2) native fish in Glen Canyon based upon the capability of the habitat to support those fishes.
- Minimize, to the extent possible, interactions between native and non-native fishes.
- Evaluate through monitoring and research the reasonable and prudent alternatives specified by the US Fish and Wildlife Service.

FY98 and FY99 Project: MONITOR NATIVE FISH

Principal Investigator(s): Owen Gorman, U.S. Fish and Wildlife Service¹

Project Cost: FY98: \$524,946; FY99: \$524,990 (proposed)
(\$441,160) (\$441,168)

Project Duration: One Year, renewable for one additional year.

RFP Objectives:

- 1) Establish linkages among dam operations and the resulting flow regimes and related abiotic (e.g., temperature, turbidity) and biotic (e.g., food base) parameters on spawning, reproductive success, larval transport, recruitment, habitat use, food availability and diet.
- 2) Monitoring to annually evaluate the status and trends of native fish populations, especially humpback chub and flannelmouth sucker, in the Colorado River ecosystem. Monitoring activities should consider parameters such as: abundance, age structure, growth rates, condition, year class strength, distribution (i.e., spatial patterns of abundance) reproductive success and overall recruitment in response to dam operations. Monitoring activities should utilize PIT tags to augment existing databases, as appropriate.

¹Pending review of potential conflict-of-interest.

- 3) **Competitive and predator-prey interactions with non-native fish and the influence of dam operation including potentially increased water temperatures, on these competitive and predatory interactions if any.**
- 4) **Assess the condition of adult humpback chub and other native fish. Utilize results of aquatic food base studies, as appropriate. Evaluate the effects of existing and potential parasites, diseases, and other factors on the condition of mature humpback chub and other native fish.**
- 5) **Examine the importance of the LCR, backwaters, and nearshore habitats to differing parts of the life cycles of native fish.**
- 6) **Temperature studies: Determine optimal, upper and lower water temperature limits on reproductive success, and growth and survival of larval, juvenile, and adult fish. Evaluate effects of increased water temperatures on various factors which may affect population survival (e.g., parasite distribution and abundance, swimming performance).**

Proposed Activities:

Not described until project is awarded.

Potential new efforts for FY99:

New efforts being considered for FY99 include:

- (1) **review of the feasibility of, and the development of a plan for the establishment of a second population of humpback chub,** *for location etc. synthesis of existing data to establish parameters*
- (2) **a study focused on quantifying and understanding the causes and significance of overwintering mortality of humpback chub, and**
- (3) **and effort focused on designing and developing a plan for the implementation of Endangered Fish Research Flows.**

GCMRC - FY98 & FY99 BIOLOGICAL RESOURCES PROGRAM

Management Objective(s):

-- ~~In the Colorado River~~ corridor below Glen Canyon Dam to the confluence with the ~~Paria River~~, natural reproduced fish should compose at least 50% of the Age III rainbow trout. Sufficient suitable spawning habitat should be maintained to reach this objective.

-- The total populations of rainbow trout (age II plus) in this reach should be maintained at approximately 100,000 fish as determined from population estimation.

-- Rainbow trout should achieve 18 inches in length by Age III with a mean relative weight (Wr) of at least 0.80.

FY98 and FY99 Project: MONITOR THE LEES FERRY TROUT FISHERY

Principal Investigator(s): Bill Persons, Arizona Game and Fish Department

Project Cost: FY98: \$125,000 FY99: \$125,000 (proposed)

Project Duration: One Year, renewable for one year.

RFP Objectives:

- 1) Synthesize existing information (published and unpublished data) on the Glen Canyon/Lees Ferry trout fishery and determine the fishery's likely response (growth, reproduction, recruitment population structure, size and distribution) to dam operations.
- 2) Monitoring activities for determining population size, structure, growth, distribution, reproductive success and overall recruitment in response to dam operations.
- 3) Develop methods for estimating the proportion of natural reproductive success in combination with stocking quantities and rates to determine desired levels of recruitment balanced against the carrying capacity for a range of dam operations.
- 4) Develop evaluation criteria for, and measure and assess the health and condition of the rainbow trout population.
- 5) Evaluate changing health and condition factors in relation to changes in the aquatic foodbase and nutrient levels as determined in the aquatic food base RFP.

Proposed Activities:

- 1) **Analyzing and summarizing existing data (lengths, weights, food habits, effort, catch location) from AGFD data collected from 1984-997 and integrating these data with a review of literature associated with other regulated river trout fisheries.**
- 2) **Determining the existing status of the trout fishery as it relates to dam operations and developing an evaluation criteria that measures and assesses the health and condition of the rainbow trout.**
- 3) **Integrating these data with data concerning the aquatic food base to develop methods to estimate the extent of spawning success, and stocking needed to reach healthy, sustainable population levels of trout relative to dam operations.**

Potential new efforts for FY98:

GCMRC is proposing to convene a Lees Ferry Trout Symposium in FY98. The goal of this symposium is to provide a scientific forum to present and discuss the effects of flow regulation and management activities on the Glen Canyon/Lees Ferry trout fishery. *Larry Crist*

The objectives of the symposium are to present and discuss the present state of knowledge on the Lees Ferry trout fishery, as well as the state of knowledge developed at other cold, tailwater trout fisheries in the western United States.

Topics that may be addressed in the symposium include:

- 1) **A perspective on the historical and present trout fishery (habitat use and availability, reproduction, growth, development and survival, stocking and genetic strains) in the context of flow releases and management activities.**
- 2) **An evaluation of the appropriate use and inherent risks associated with different sampling methods.**
- 3) **An evaluation of the spatial and trophic limitations to trout biomass and its distribution within the demographic structure of the population.**
- 4) **A discussion of the effects of flow regulation on fish response in their habitat use, availability and behavioral energetics.**

The symposium would result in a proceedings document that would represent the state of knowledge regarding cold, tailwater trout fisheries in the western United States.

GCMRC - FY98 & FY99 BIOLOGICAL RESOURCES PROGRAM

Management Objective(s):

-- Preserve or restore (where possible) natural species composition and abundance within riparian and upland communities affected by dam operations.

-- Emphasize the preservation of unique plant communities and any special status species (Federal, Tribal, and State designations) to ensure their perpetuation within the system.

FY98 and FY99 Project: MONITOR WETLAND AND RIPARIAN VEGETATION

Principal Investigator(s): Tina Ayers and Mike Kearsley, NAU

Project Cost: FY98: \$78,060 FY99: \$79,980 (proposed)

Project Duration: One Year, renewable for one-year.

RFP Objectives:

- 1) Monitor the community response (i.e., community structure, diversity, density, distribution, and extent of riparian and marsh vegetation) to dam releases along the Colorado River ecosystem.
- 2) Compare 1998 riparian and marsh vegetation data with historical monitoring data to evaluate change over time (i.e., the spread and contraction of communities, change in species composition, etc.), in relation to dam operations.
- 3) Monitor non-native/invasive vegetation with respect to recruitment, spread and survivorship.
- 4) Examine habitat integrity and composition as it is related to threatened and endangered species (e.g., Southwestern Willow Flycatcher, Kanab Ambersnail), and linkages between vegetation, aquatic food base, fish habitat, and sediment-related resources.

Proposed Activities:

The proposed work will address the following questions:

- (1) Are riparian plant assemblages in the new high water zone changing through time in response to the hydrologic regime imposed by Glen Canyon Dam?
- (2) Are there important changes in the physical structure of vegetation in the study sites which affect the suitability of habitats for avifauna from one year to the next?

(3) How do previous measurements of vegetation structure in the 11 study sites relate to more widely used measures of bird habitat structure?

(4) Are the distributions of species of special concern changing in long-term study sites?

(5) Can significant interactions between riparian vegetation and sediment and riparian vegetation and aquatic resources be measured?

Potential new efforts for FY99:

New efforts being considered for FY99 will be directed toward evaluating the current monitoring sites and determining if the present sites are sufficient to characterize the status riparian vegetation (i.e., do more sites that coincide with fish, aquatic food base and terrestrial vertebrate study need to be added?).

Additionally, the interactions between decomposition, nutrient availability, and nutrient cycling between terrestrial and aquatic interfaces need to begin to be examined. Efforts such at these will strengthen ties between aquatic and terrestrial primary productivity.

center would like to mod the N&A contract

GCMRC - FY98 & FY99 BIOLOGICAL RESOURCES PROGRAM

Management Objective(s):

- Protect, restore, and enhance survival of native and special status species (Federal, Tribal, and State designations). Ensure that the required habitat for these species is preserved. Maintain native faunal components of the ecosystems for the benefit of threatened and endangered species.
- Maintain a natural age-class distribution through out the majority of their natural range in Glen and Grand Canyons, emphasizing the need to recruit into breeding age classes.
- Evaluate the viability of food chain(s) for native fauna, including the Peregrine Falcon, Southwestern Willow Flycatcher, and other special status species.
- In as much as such management is not deleterious to naturally occurring ecosystem components, consider and mitigate impacts to special status species that may use the river corridor opportunistically (Bald Eagle). Maintain self-sustaining fish populations as forage to provide opportunities for bald eagles. Monitor for nesting.

FY98 & FY99 Project: MONITOR RIPARIAN AVIFAUNA, WITH PARTICULAR EMPHASIS ON THE ENDANGERED SOUTHWESTERN WILLOW FLYCATCHER

Principal Investigator(s): John Spence, NPS/GLCA

Project Cost: FY98: \$75,800 FY99: \$80,900 (proposed)

Project Duration: One Year, renewable for one year.

RFP Objectives:

- 1) Collect and interpret data on the current and historic distribution and population densities of wintering and spring and summer avifauna, and their relation to habitat patches, within the Colorado River ecosystem (River Miles -15 to 278).
- 2) Relate habitat structure/composition of survey areas to dam discharges and river flows during the study period, to breeding bird distribution and density.
- 3) Collect detailed monitoring data of southwestern willow flycatcher habitat condition, habitat use and nesting success, and nesting fidelity, including the dynamic nature of its colonizing behavior through the study period and in comparison with previous data and other SWWF monitoring programs.

- 4) **Relate current SWWF distribution to past data to provide a comprehensive analysis of population change through time.**
- 5) **Evaluate the effect of brown-headed cowbird (Molothrus ater) on the abundance and/or distribution of SWWF and what management alternatives should be considered to counteract this effect, if it is negative, in a fashion that does not interfere with SWWF territory occupation or nesting success.**

Proposed Activities:

This project involves:

- **monitoring SWWF and other riparian avifauna population trends in the river corridor,**
 - **synthesizing existing information concerning SWWF biology and distribution in the corridor, and**
 - **collecting data associated with life history and the effects of dam operations on life history traits and habitat requirements.**
- **Additionally, this project will census overwintering avifauna.**

Spence intends to address these objectives by using fixed-radius point counts and walking surveys to determine habitat use, home range size, and nest placement characteristics. He will use power analysis to determine which species are effectively monitored in this manner.

Spence will also make efforts to correlate species composition and abundance with habitat to determine which variables are most closely linked to birds and are most useful for long-term monitoring.

Lastly he will compare current data with previous data to determine trends associated with changes in the riparian avifauna community.

Potential new efforts for FY99:

None.

GCMRC - FY98 & FY99 BIOLOGICAL RESOURCES PROGRAM

Management Objectives(s):

- Protect, restore, and enhance survival of native and special status species (Federal, Tribal, and State designations). Ensure that the required habitat for these species is preserved. Maintain native faunal components of the ecosystems for the benefit of threatened and endangered species.
- Maintain a natural age-class distribution through out the majority of their natural range in Glen and Grand Canyons, emphasizing the need to recruit into breeding age classes.
- The population of Kanab Ambersnail should be inventoried and maintained near current levels. Efforts to establish additional population center should be guided by the recovery plan for the species.

FY98 and FY99 Project: MONITOR KANAB AMBERSNAIL AT VASEYS PARADISE

Principal Investigators(s): Vicky Meretsky and Dave Wegner, SWCA Inc.

Project Cost: FY98: \$43,511 FY99: \$43,511 (proposed)

Project Duration: One Year, renewable for one year.

RFP Objectives:

- 1) Relate food availability, habitat patch composition, area of cover, and condition at Vaseys Paradise to the historic and recent condition of those patches, and population requirements for sustainability.
- 2) Determine and statistically compare the historic (1995-97) and current population distribution, abundance, age-class/size distribution, population density, and condition (i.e., occurrence of Kanab ambersnail trematode parasite) of Oxyloma haydeni kanabensis at Vaseys Paradise as it relates to natural variation and to the local stage-discharge relationship.
- 3) Monitor abundance and food habits of Peromyscus predator at Vaseys Paradise.

Proposed Activities:

This project involves conducting monitoring and research activities to determine how the KAS population at Vaseys Paradise may be affected by alternative dam operations and to distinguish natural population variation from the effects of dam operations.

Potential new efforts for FY99:

None.

GCMRC - FY98 & FY99 BIOLOGICAL RESOURCES PROGRAM

SWCA Data Integration Project

As a result of the independent external peer-review conducted by GCMRC on the Draft Data Integration Report, and in order to provide a product that will be of the greatest value to the GCMRC conceptual modeling and native-fish activities, GCMRC has decided to provide additional funds (\$20,000 in FY98) to SWCA in support of a substantial revision of this report.

The deadline for receipt of the final report has been extended to February 15, 1998.

Item 7 model for 70,000

GCMRC - FY98 & FY99 BIOLOGICAL RESOURCES PROGRAM

GCMRC In-house Studies: FY98: \$128,000 FY99: \$100,000 (proposed)

GCMRC staff have proposed studies for FY98 related to specific stakeholder objectives and information needs. These studies are currently undergoing independent, external peer review and are listed below:

-- Factors Influencing Benthic Standing *Mass* in the Colorado River

Benthic growth rate

-- Monitoring and Synthesis of Mainstem and Tributary Temperatures

-- Effects of GCD on Shoreline Habitat Suitability and Use by Native Fish

-- Determine Genetic Relatedness of Ambersnail Populations and Review the Morphological Taxonomy of Ambersnail Species and Subspecies in the United States and Canada.

-- ~~Synthesis of Backwater Information~~

Support for these in-house studies will account for less than 10% of the budget of the GCMRC biological resources program and is in keeping with the recommendation of the National Research Council (NRC, 1996) that the majority of research funding go to support external activities. In addition to taking advantage of the scientific expertise of GCMRC staff, these studies will help ensure that GCMRC staff retain their scientific expertise with respect to biological resources in the Colorado River ecosystem.

need justification of why these items were kept inhouse

GCMRC - FY98 & FY99 BIOLOGICAL RESOURCES PROGRAM

Protocol Evaluation:

needs to be done this spring

GCMRC biological resources program staff propose to initiate protocol evaluation in FY98 and continue this in FY99 through the use of visiting committees of three scientists with relevant expertise in the field of study, as funding permits.

The strategy would be to identify a lead reviewer with relevant expertise in the field of study and work with that reviewer to identify two additional reviewers.

These reviewers would be provided with the past two to three years of reports from a given project as well as the currently funded proposal to review.

They would be invited to meet with the current PI(s) for a series of project briefings immediately before a scheduled river trip.

They would accompany the PI(s) on a river trip to evaluate their field methodology and gain familiarity with the ecosystem.

The reviewers would be expected to provide a rigorous review of the protocols currently in use and commendations for changes in protocols, as appropriate.

This information would be used in designing the FY 2000 monitoring program.

quality assurance & quality control

FY98 & FY99 Biological Sciences Program Budget

FY98 & FY99 Program Activities	<u>FY98</u>	<u>FY99</u>
1) Proposal to Monitor the Aquatic Food Base Dean W. Blinn & Joe P. Shannon Northern Arizona University	\$166,343	\$178,086
2) Proposal to Monitor the Native Fish Owen Gorman et al. U.S. Fish and Wildlife Service	\$524,946 (\$441,160) ²	\$524,990 (\$441,168)
Additional Activities:		
--Second Population of HBC	\$ -0-	\$TBD ³
--Overwintering Mortality of HBC	\$ -?-	\$TBD
--Endangered Fish Research Flows	\$ -0-	\$TBD
3) Proposal to Monitor the Rainbow Trout Fishery William R. Persons et al. Arizona Game and Fish Department	\$125,000	\$125,000
Additional Activities:		
--Lees ferry Trout Symposium	\$TBD	\$ -0-
4) Proposal to Monitor Wetland and Riparian Vegetation Tina Ayers and Mike Kearsley Northern Arizona University	\$ 78,060	\$ 79,980
5) Proposal to Monitor Avifauna and the Southwest Willow Flycatcher John Spence Glen Canyon National Recreation Area	\$ 75,800	\$ 80,900
6) Proposal to Monitor the Kanab Ambersnail at Vaseys Paradise Vicky J. Meretsky & Dave Wegner SWCA, Inc.	\$ 43,511	\$ 43,511

(continued)

²Reflects costs assuming waiver of overhead.

³TBD = Cost to be determined as scope of activity is developed.

FY98 & FY99 Program Activities	<u>FY98</u>	<u>FY99</u>
7) Proposal to Develop an AEAM Model (\$209,700) for the Colorado River Ecosystem Josh Korman Ecometric Research Inc.	\$ 70,000 ⁴ ...	\$ 50,000
8) Data Integration Report Ron Borkin SWCA, Inc.	\$ 20,000	\$ -0-
9) GCMRC In-house Studies⁵		
a) Factors Influencing Benthic Standing	\$ 40,000	\$ 40,000
Mass in the Colorado River Mike Yard, GCMRC		
b) Mainstem and Tributary Temperature Monitoring ..	\$ 3,000	\$ -0-
Jeanne Korn, GCMRC		
c) Effects of GCD on Shoreline Habitat Suitability ...	\$ 5,000	\$ -0-
and Use by Native Fish Barbara Ralston, GCMRC		
d) Genetic Relatedness between Ambersnail	\$ 34,000	\$ -0-
Populations Larry Stevens, GCMRC		
e) Synthesis of Backwater Information	\$ 46,000	\$ -0-
Larry Stevens, GCMRC		
f) Protocol Evaluation	\$ - 0 -	\$ 40,000
g) Data Integration	\$ - 0 -	\$ 20,000
10) Contingency Funds / Unsolicited Proposals	\$ -0-	\$ -0-
11) Program Operations / Logistics	\$200,000	\$200,000
TOTAL⁶	\$1,431,660	\$1,382,467
.....	(\$1,347,874) ...	(\$1,298,645)

*workshops
river
helicopter*

⁴This program is also funded through contributions from the Physical and Cultural Resource programs.

⁵Proposals all related to stated Stakeholder Objectives and Information Needs and are currently undergoing independent, external peer review.

⁶It is assumed that some level of overhead reduction will be negotiated with FWS which will prevent over spending of budget. In addition, two of the projects will provide their own logistics resulting in a savings from the funds budgeted for logistics (\$200,000) of approximately \$20,000.