Update on U.S. Geological Survey, Grand Canyon Monitoring and Research Center activities: 2004

Jeff Lovich
Chief GCMRC

Updates

- Changes at GCMRC
- Mechanical removal
- Sediment update
- Remote sensing
- River warming
- GCMRC resources online

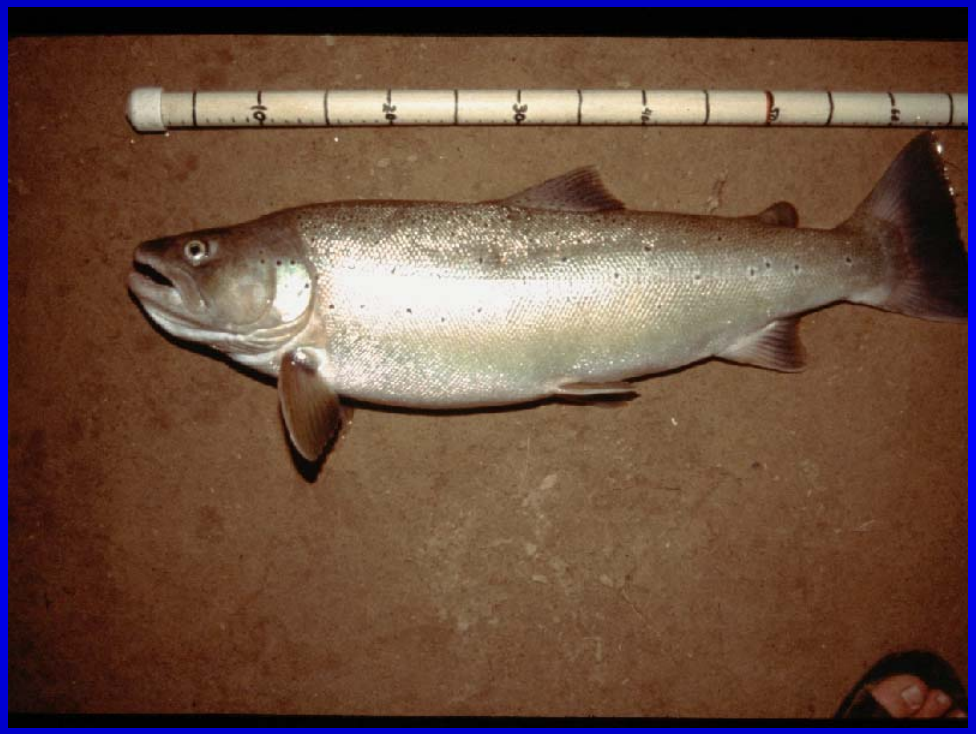
Recent changes at GCMRC

- Reorganized October 9, 2003
- Smaller federal staff
- Increased emphasis on contracting
- Development of a newsletter
  - to sign up email *jeffrey_lovich@usgs.gov*
- Renewed emphasis on productivity (SCORE report forthcoming)

- GCMRC Chief Lovich
  - Information Liszewski
    - IT Spec. Blank
    - Tech. Info. Spec. Wyse
  - Logistics Fritzinger
    - Env. St. Asst. Stephenson
    - Survey. Tech. Brown
    - Survey. Tech. Kohl
  - IESP* Melis
    - DASA Coordinator (DETAIL)
      - GIS Coord. VACANT
        - Geographer Breedlove
        - Surveying tech. Gonzales
        - Geographer Gushue
    - Biology Coordinator VACANT
      - Fishery Biol. Coggins
      - Hydrologist Vernieu
      - Biologist Yard
      - Biologist Ralston
    - Hydrologist Wright
      - Student Trainee Fuller
      - Hydrologist Hueftle
        - Hydro. Tech. Voichick
  - Sociocultural Fairley

*** Integrated Ecosystem Science Program**

Mechanical Removal of Non-Native Fishes in the Colorado River



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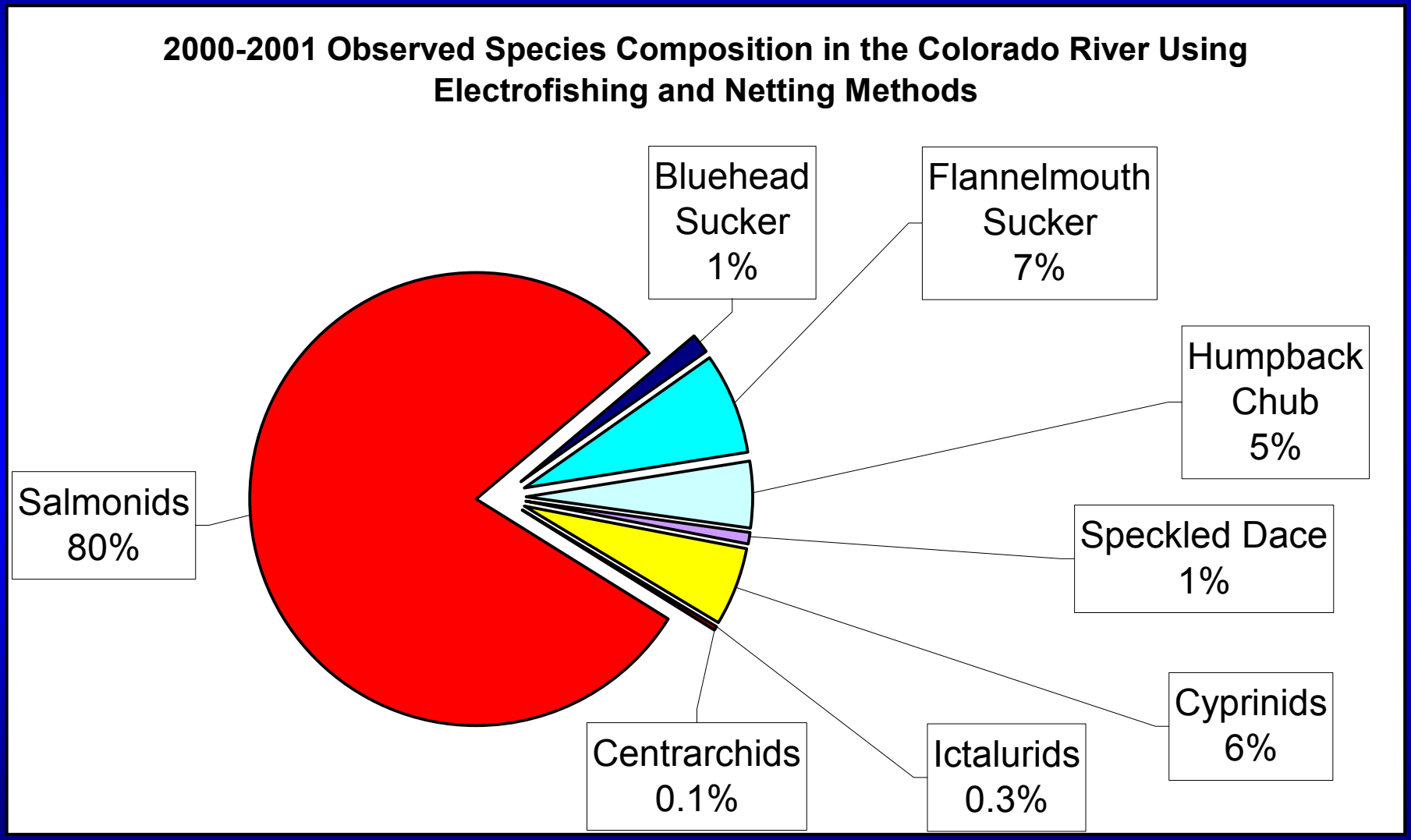
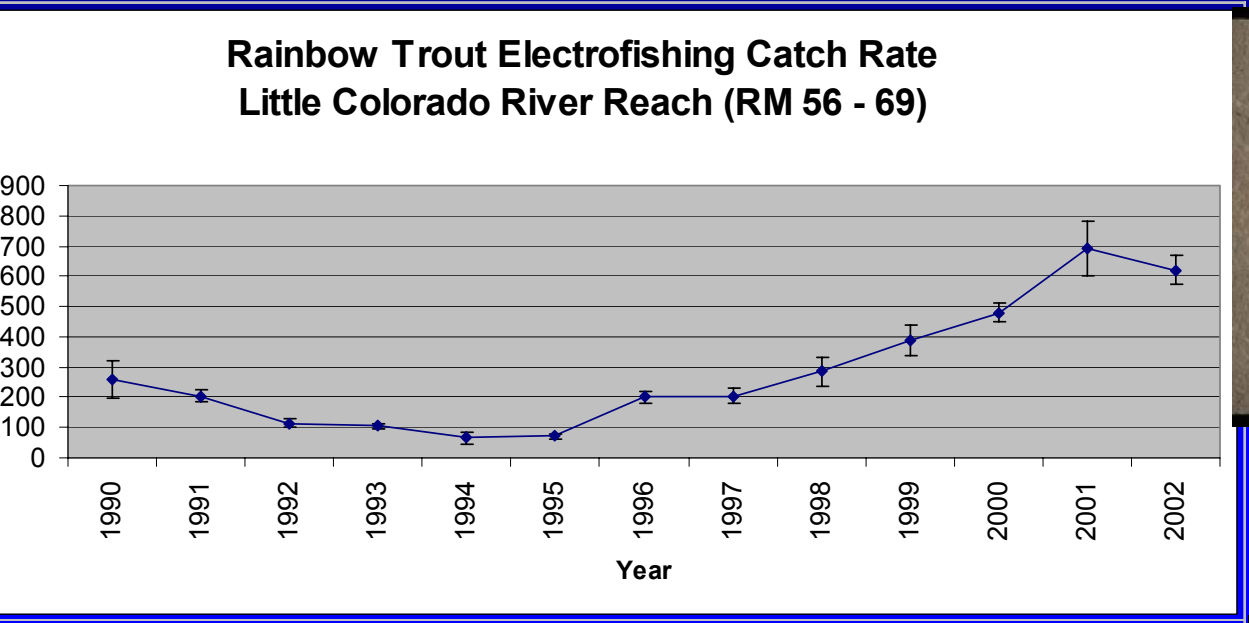
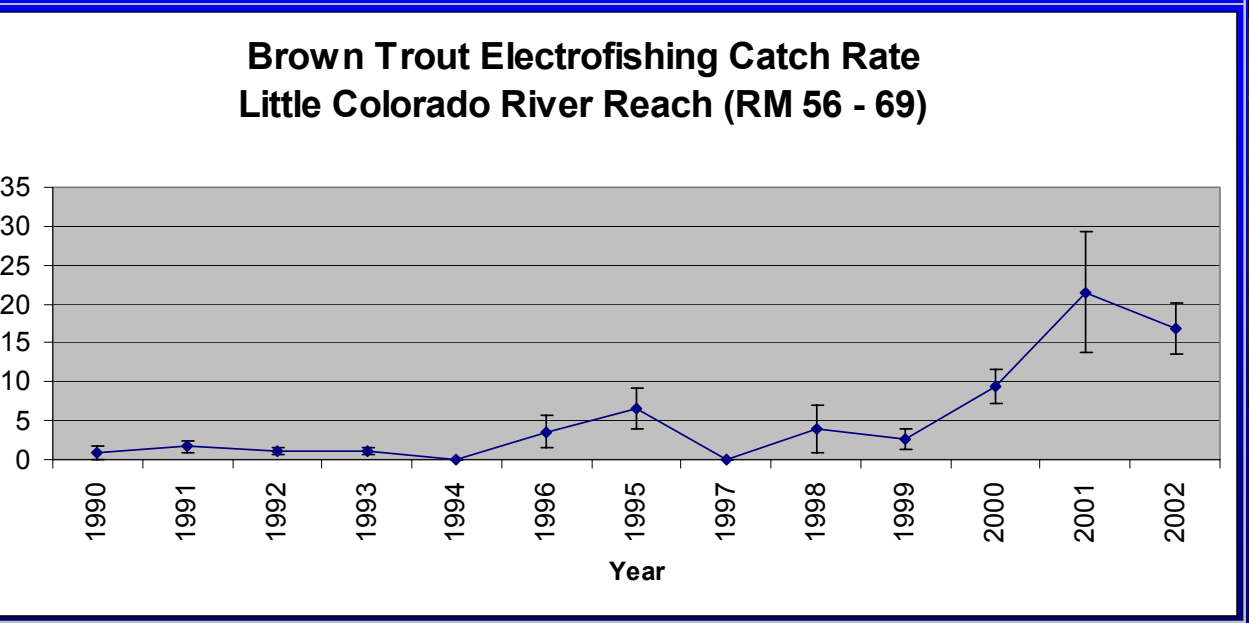
The Present Fish Community in Grand Canyon

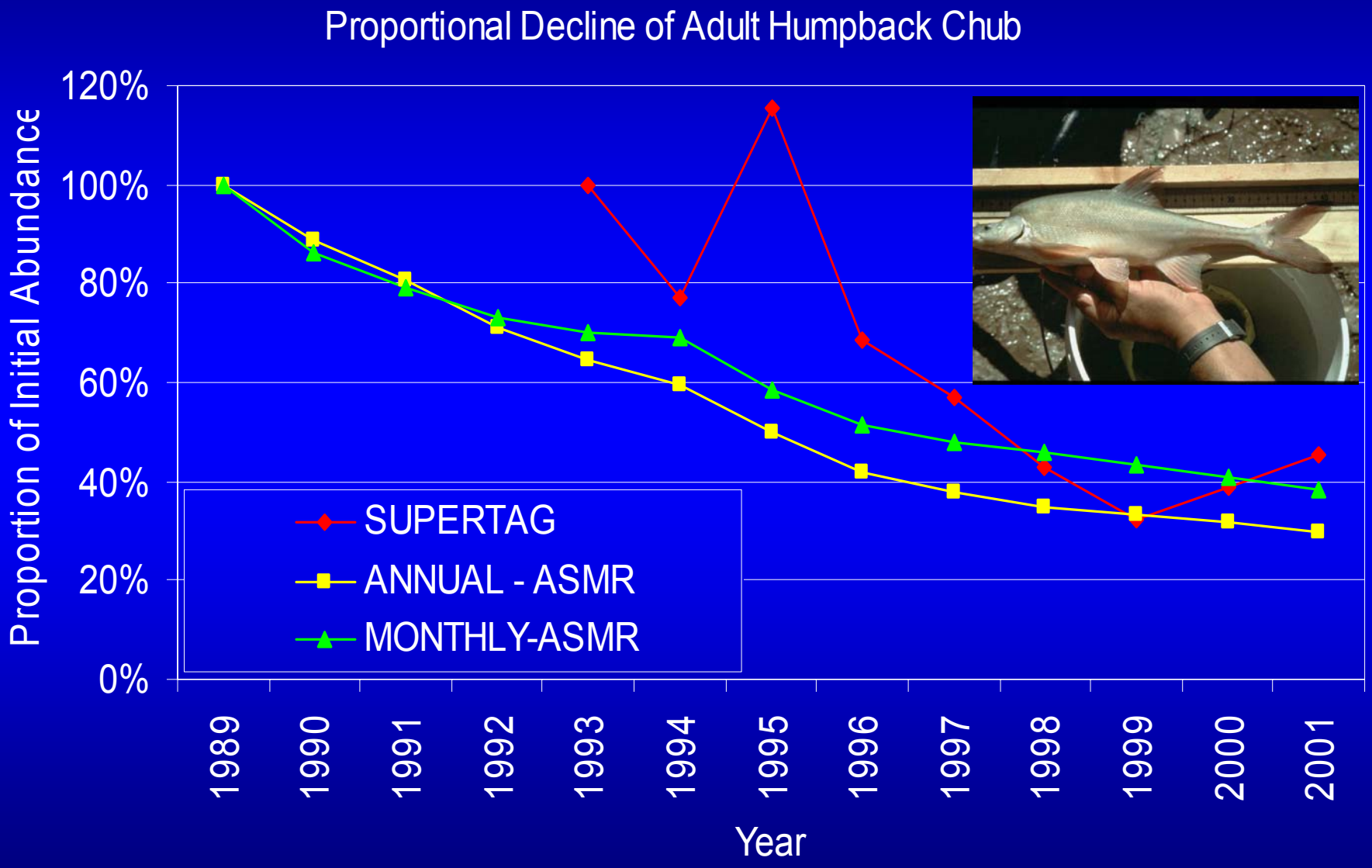


Recent Trends in Salmonid Abundance



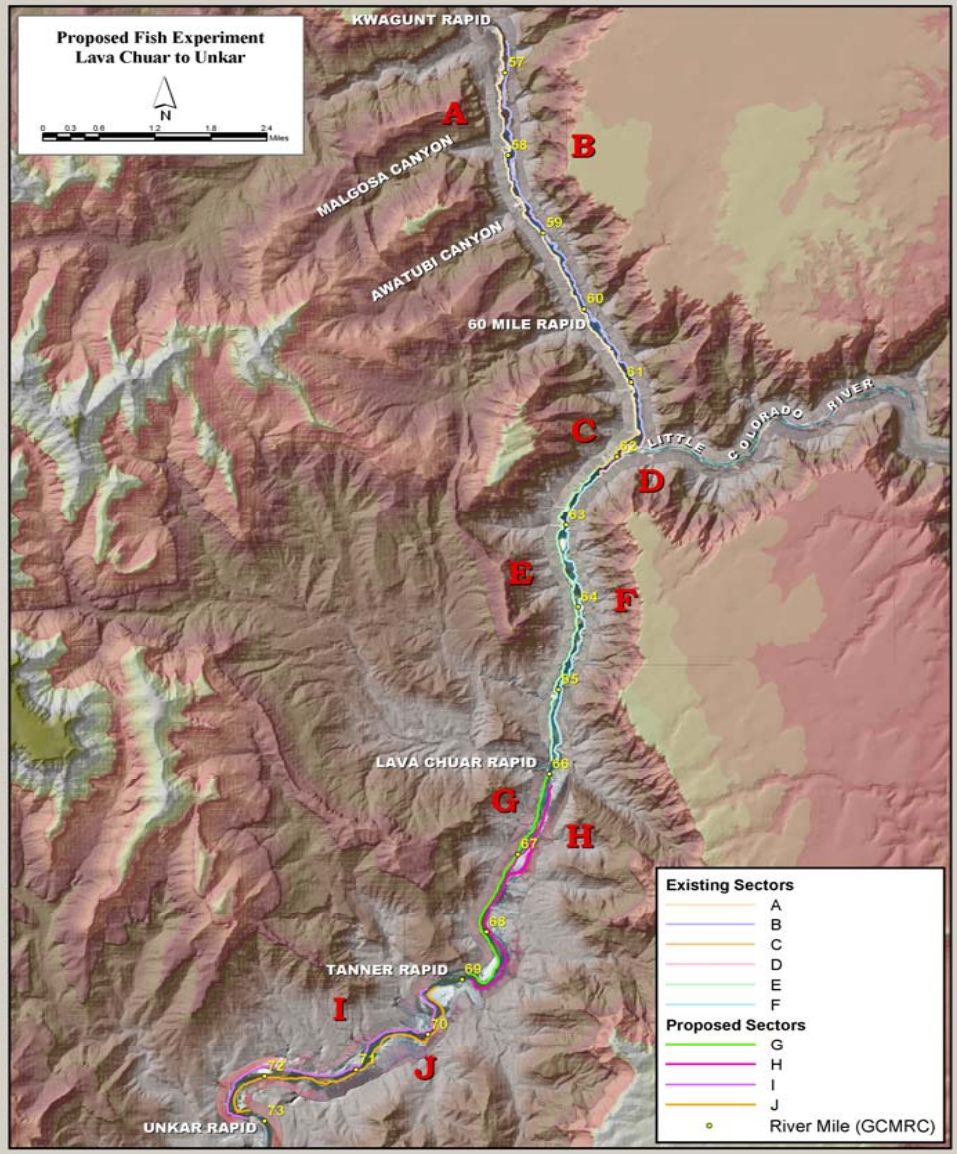


Humpback Chub Abundance Trend

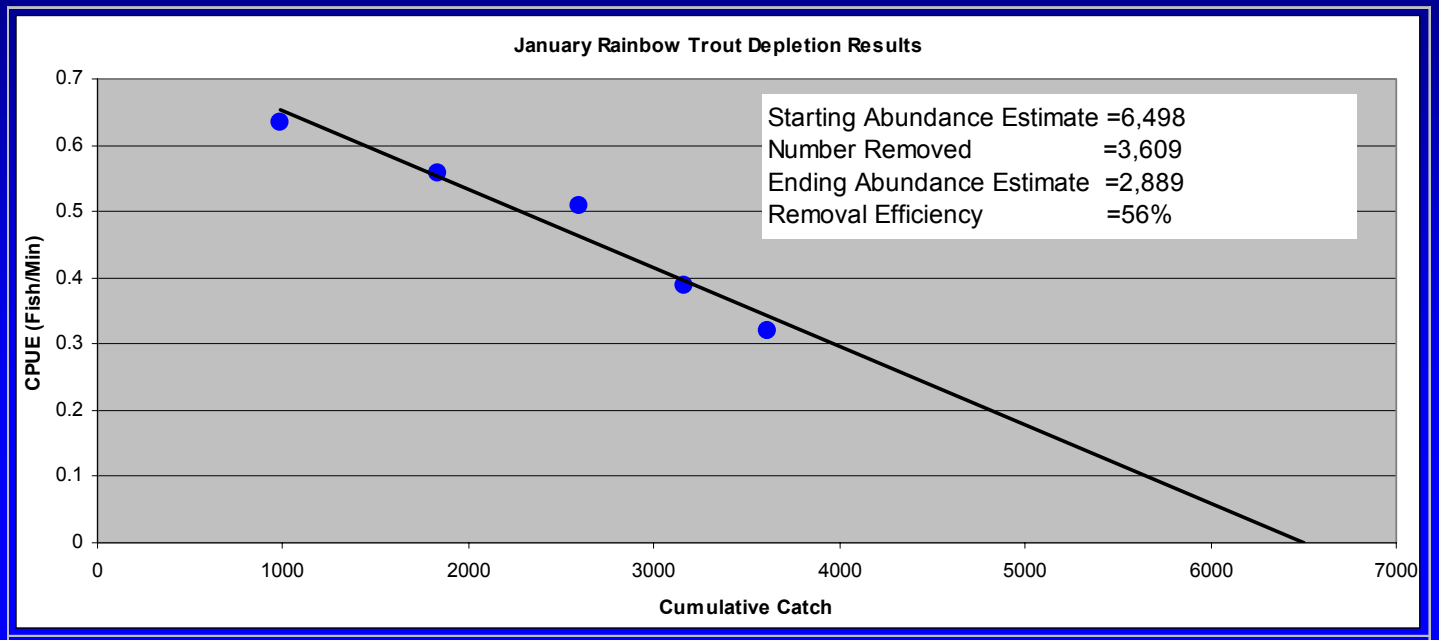


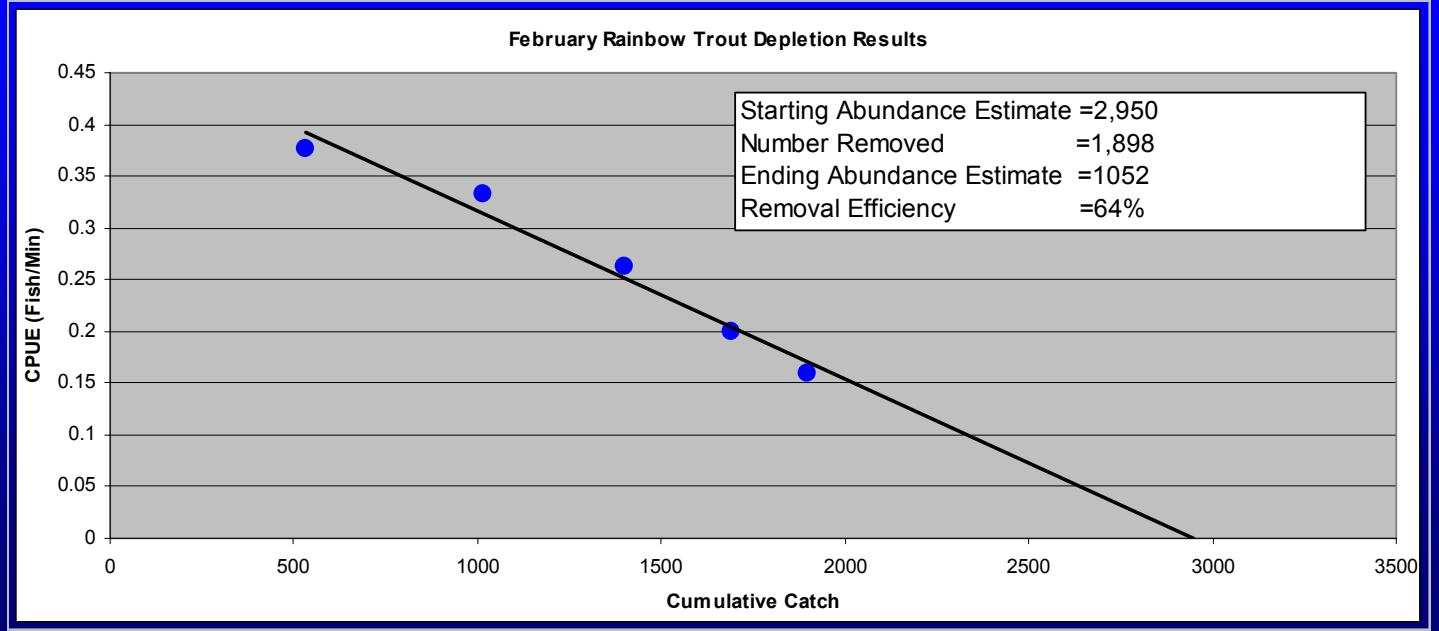
Mechanical Removal Field Operations

- Camp within the removal reach for 11 days
- Sample depletion areas systematically in order to produce abundance estimates before and after removal efforts



Preliminary Results – Removal Reach RBT Abundance Estimates





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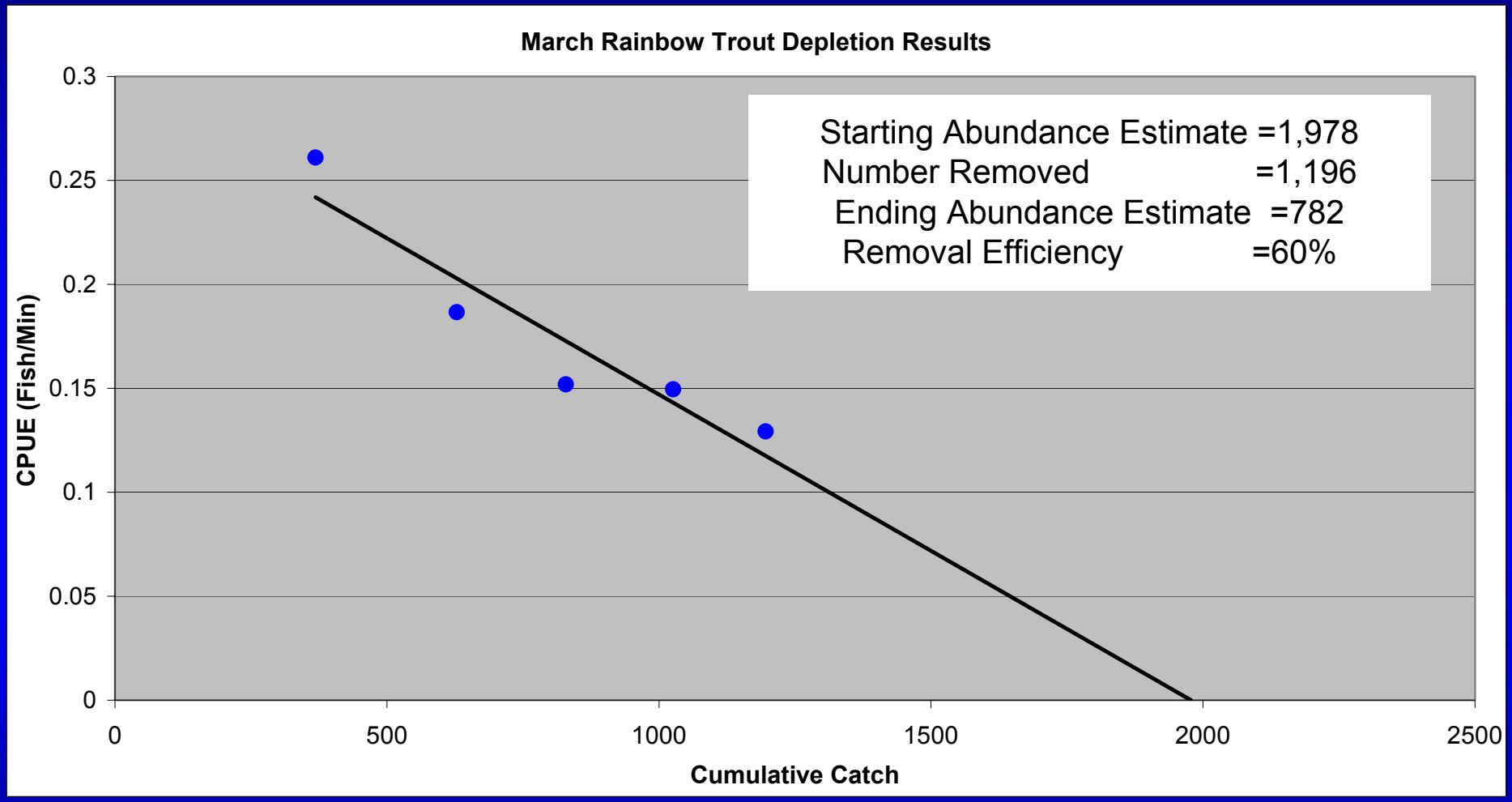

Ending abundance estimate in March is 12% of starting abundance estimate in January.

Upcoming mechanical removal trip dates

- July 15-Aug 2
- Aug 12-30
- Sept 9-27

Grand Canyon Monitoring and Research Center

Status of & Management Options for Sand Bars of the Colorado River in Grand Canyon below Glen Canyon Dam

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Sand Bars are Important Elements in the River Restoration Program Because...

- **Geomorphic Framework** – fundamental part of the pre-dam river
- **Terrestrial Habitat** – substrate for riparian vegetation & assoc. fauna
- **Aquatic Habitats** – nursery habitats that may support native fish
- **In-Situ Preservation** – most archeological sites buried in sand/silt
- **Recreational Campsites** - for boaters and backpackers

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EXAMPLE OF BEACH LOSS
The Camping Beach Downstream From Tapeats Creek (River Mile 133)

1952 (Kent Frost). Everyone would want to camp here now.

1995. The beach reappeared briefly after the 1996 flood.

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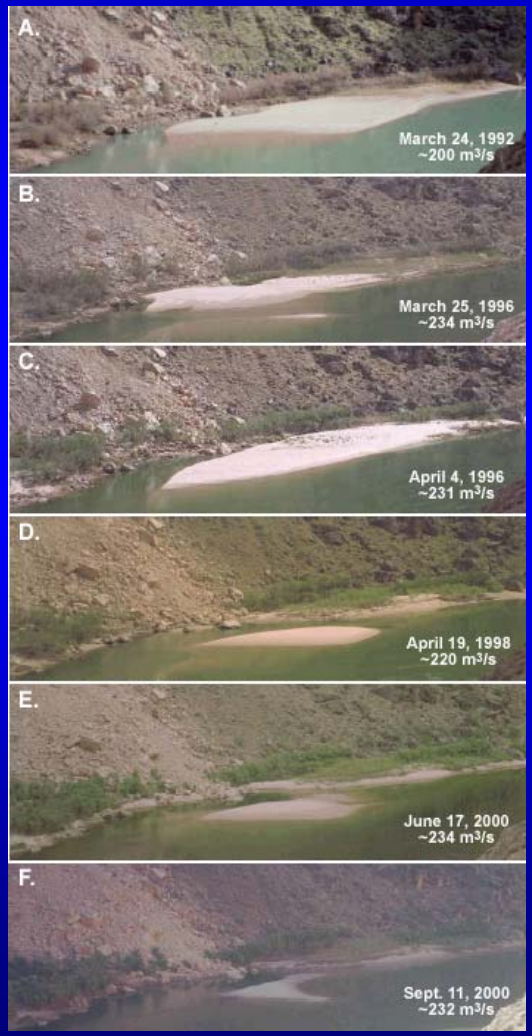
Our Renewable Sand Supply

- Significant Paria River Inputs, 1990-2001
  - *About 14 Million Tons (long-term average ~ 1.5)*
- Paria Sand Loads vs. Little Colorado River
  - *Paria Inputs Dominate Supply Since 1993*
- Characteristics of Tributary Sand Inputs
  - *Arrive as Discrete Packets in Summer/Fall*
  - *Fine Grain-Size of Sand = Rapid Transport*
  - *High Variability in Loads Year-to-Year*
  - *Annual Inputs are ~ 10% of Pre-Dam Supplies*

Grand Canyon Monitoring and Research Center

Latest Estimates of Reach-Scale Sand Export for 9/01/02 through 07/31/03

Preliminary Results – Subject to Review and Revision 08/13/03



SAND MASS-BALANCE "Efflux"

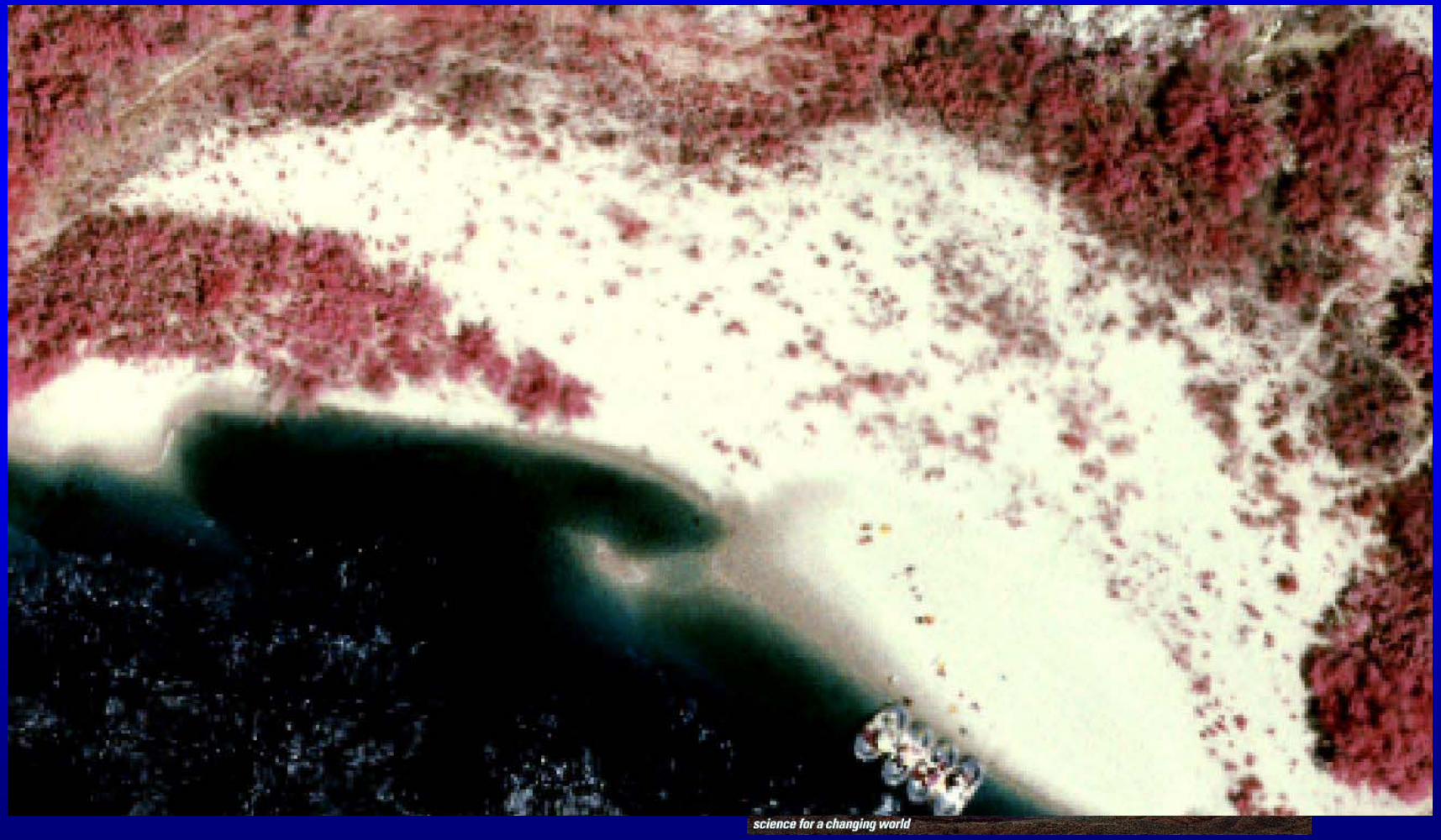
Lees Ferry to Phantom Ranch: rm 0-87

Total Sand Export = -1,000,000 (± 100,000) metric tons past Phantom Ranch through July '03

Estimate that ~ 130,000 tons came from Marble Canyon's antecedent storage, Jan.-Apr. 03, and that total export from Marble Canyon through July was about 300,000 (± 60,000) tons.

***** Export of Sand Inputs Occurs Quickly, Despite Dam Operations Reflecting Upper Basin Drought**

GCMRC's Remote Sensing Proposal for Spring 2004



Remote Sensing Initiative 2000 - 2003

Remote Sensing Initiative – final report completed in 2003

Discontinue Analog Imagery – if possible, fly sensors that provide digital data

Multi-Spectral Sensors - the ISTAR sensor flown in 2002, met needs of ecosystem monitoring, except for projects needing high-resolution topography (sand storage)

LiDAR – although several options exist, "Very High Resolution" LiDAR tested in May 2003, provided the best topography in most areas for sand-storage monitoring – Also, has potential for cultural resources monitoring (arroyos)

Remote Sensing Mission 2004
(Overflight Requirements)

Conventional Analog CIR – flown system-wide on "fixed-wing" aircraft at an altitude of 8,500 ft such that constant 8,000 cfs stage is captured from the Dam to Phantom Ranch (requires 5 days of stable flows from Glen Canyon Dam)

Very High Resolution LiDAR – flown from "helicopter" between Lees Ferry and Phantom at an altitude of 300 ft above ground, flight windows each day may be only 2-3 hours over each of the 5 days in which flows are held constant (change-detection protocol tied to constant, low flows)

Test "CHARTS" – flown from helicopter at 900 ft between Lees Ferry and Phantom Ranch during one of the constant-flow days (test conditions are optimized by having constant, low flows that promote settling of sediment)

Remote Sensing Mission 2004
(Requested Timeframe)

Last Week of May – These three flights are intended to be flown simultaneously within a 5-day, constant, low-flow window during the last half of May

*****timing is tied to minimal shadowing, historically clear flight conditions, lower monthly release volume in May versus June & potential for minimal sediment inputs from tributaries**

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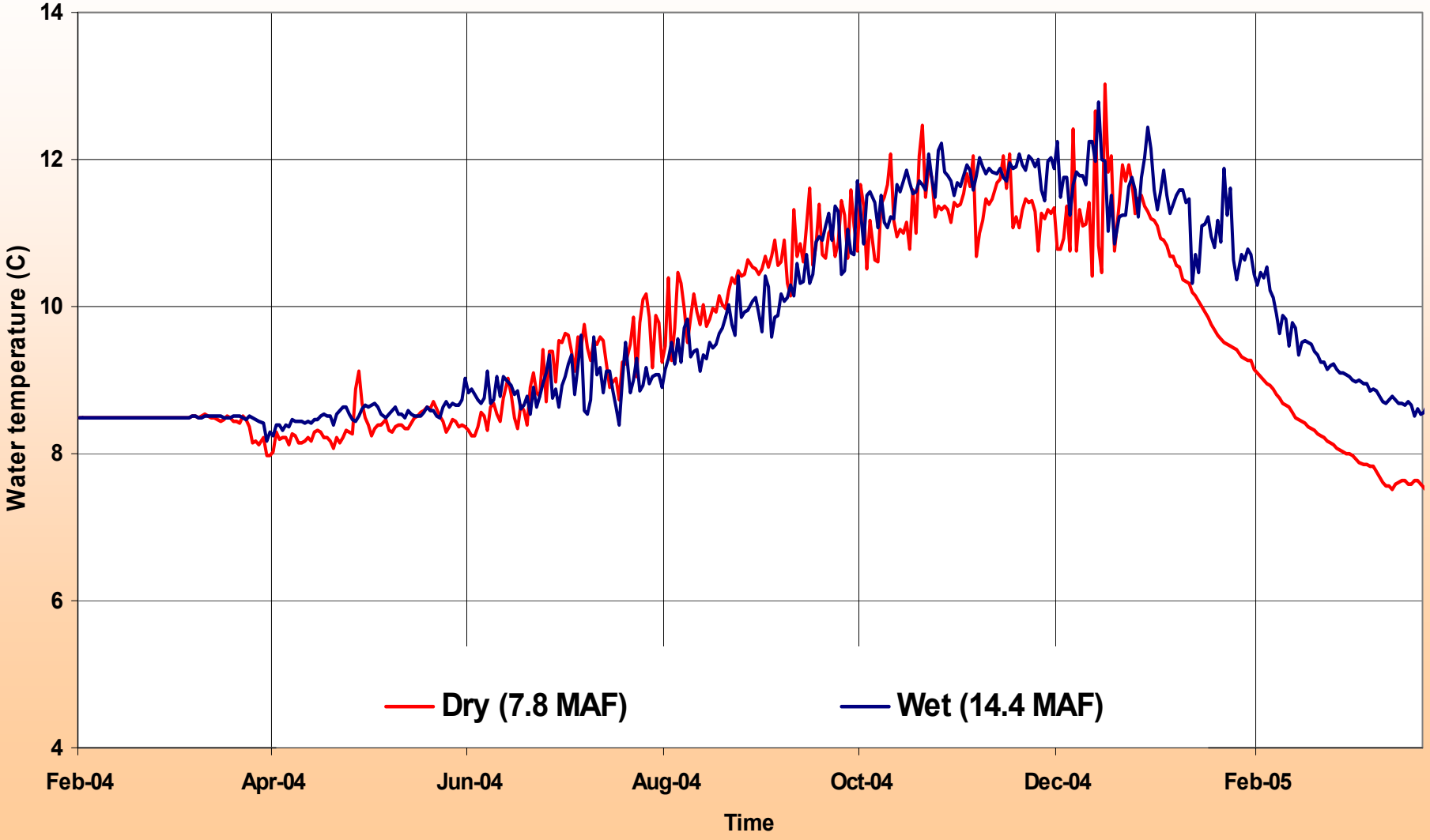
W2 Projected '04 Lake Powell Release Temperature



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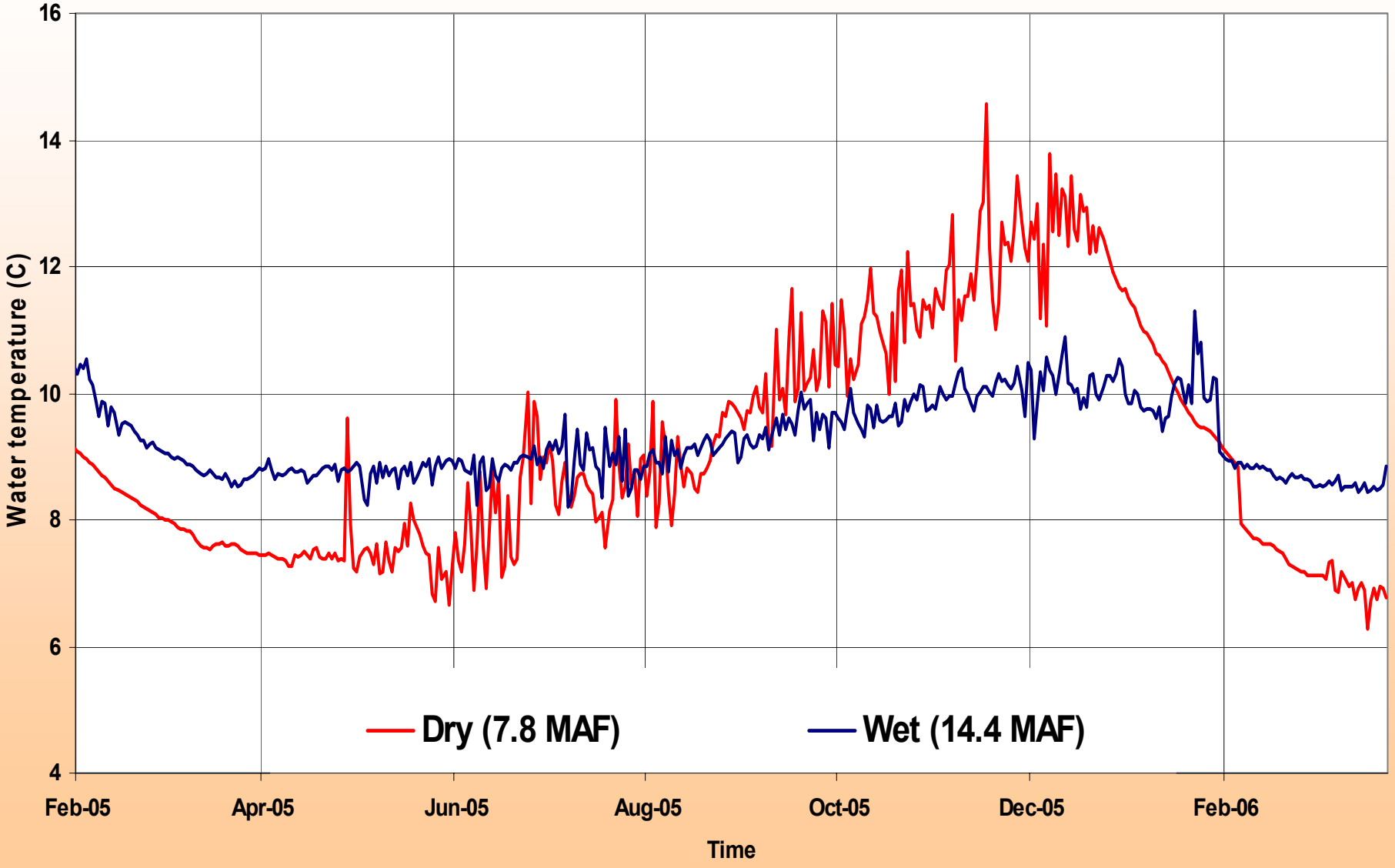

Grand Canyon Monitoring and Research Center

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Welcome to the Grand Canyon Monitoring and Research Center

The Grand Canyon Monitoring and Research Center (GCMRC), the cornerstone of the Glen Canyon Dam Adaptive Management Program (AMP), was formally established in October of 1996. Located in Flagstaff, Arizona, the GCMRC measures effects of Glen Canyon Dam operations on the resources along the Colorado River from Glen Canyon Dam to Lake Mead. The GCMRC's scientific activities contribute to meeting the statutory requirements placed on the Secretary of the Interior by Congress via the 1992 Grand Canyon Protection Act, the 1995 Glen Canyon Dam Environmental Impact Statement, and the 1996 Record of Decision.

The GCMRC operates within the Adaptive Management Program to define research objectives and develop monitoring programs to meet information needs of the AMP.


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Temporal and Spatial Distribution and Abundance of Juvenile Humpback Chub and Adult Rainbow Trout in Gorman, Owen T. 2000
Effects of a Test Flood on Fishes of the Colorado River in Grand Canyon, Arizona. Valdez, Richard A. 2001 120.01 ENV-2.00 C719 IN
Aquatic ecology studies of twin lakes, Colorado 1971-86 effects of a pumped-storage hydoelectric pro United States. Bureau of Reclamation. 1993 452.00 RES-3.20 T973 IN
Evaluation of factors influencing population characteristics and habitat utilization of trout in the Young, Douglas A. 1989 564 F579 19161 IN
Flaming Gorge tailwater fisheries investigations : trout growth, harvest, survival, and microhabitat Johnson, James E. 1987 564 F579 19166 IN
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Impacts of fluctuating water levels on eggs and fry of rainbow trout in the Colorado River below Gle Montgomery, W. Linn. 1993 564 G558 19710 IN
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Microhabitat of trout in tailwaters below western dams. Gosse, Jeffrey C. 1985 564 M626 19933 IN
Rainbow trout in the Lee's Ferry recreational fishery below Glen Canyon McKinney, Ted 1999 564 M155r c.1 IN
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