

**Draft**

**Warm Water Nonnative  
Species Research  
Program**

25 January 2006

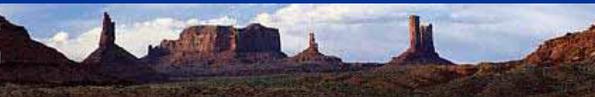
Matthew E. Andersen

SBSC - GCMRC



# Guidance to GCMRC

- Glen Canyon Dam releases are warming; potential risks from nonnatives increase
- AMWG and TWG direct development of a research program to address immediate threats from warm water nonnative species
- AMWG and TWG direct conduct of a workshop
- GCMRC translates workshop results into draft research program



# Presentation Objectives

- Present Research Areas
- Present Research Projects Overview
  - Highlight projects and associated budgets proposed for 2006
- Propose TWG motions for AMWG consideration



# December '05 Workshop Results

- Recommendations
  - Summarized in handout
- Research Areas
  - Risk
  - Water Quality Monitoring
  - Fish Monitoring
  - Control



# Research Areas Format

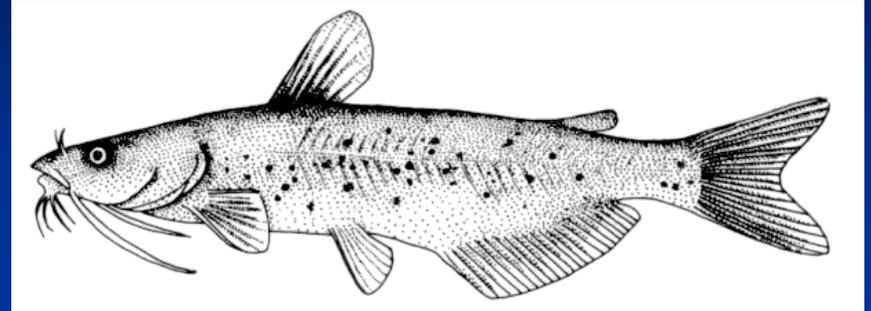
- Problem Statement
- Research Questions
- Research
- Projects
  - Most projects intended for 2007 and beyond
  - All proposed projects included
  - Projects recommended for initiation in 2006 are highlighted



# Risk Problem Statement

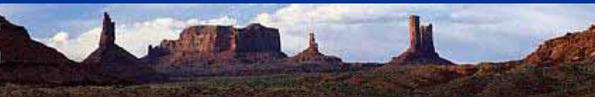
- The nonnative warm water species that pose the greatest risk to native fishes in the Grand Canyon are not known with certainty

(Illustrations: AFS)



# Risk Projects

- **2006**: Risk of invasion based on life histories (BOR)
- **2006**: Monitor nonnative species sources; initiate policies and control as necessary; **LCR, LCR confluence, and lower GC**
- Risk analysis – incorporate life history info, environmental data, species interactions
- Nonnative species control policies review (AZGF & GCMRC)



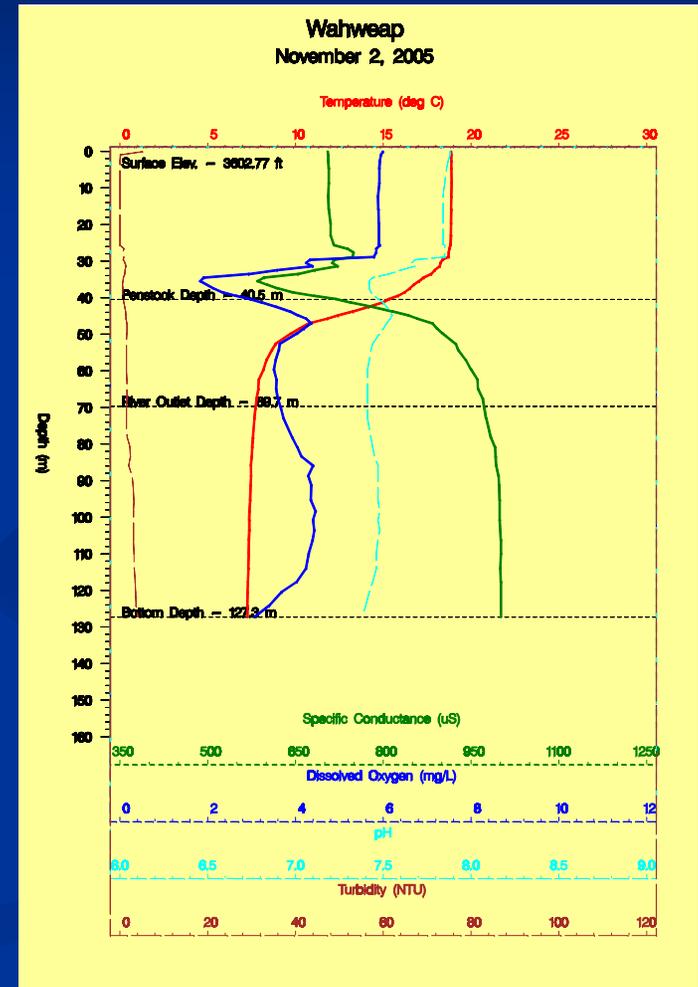
# Risk Projects (cont'd)

- Conduct *ex situ* and *in situ* experiments distinguishing and determining competition and predation
- Develop rapid response plan



# Water Quality Monitoring Problem Statement

- Fall 2005 Glen Canyon Dam releases were warmer than historic; dissolved oxygen was low. A better understanding of how native and nonnative fishes will respond to warmer temperatures is needed.



# Water Quality Monitoring Projects

- In Lake Powell and Colorado River in Grand Canyon, conduct
  - Monitoring
  - Modeling



# Fish Monitoring Problem Statement

- Need to improve characterization of distribution and abundance of native and nonnative fishes and crayfish in GC. Methods need to minimize impacts to native fishes.



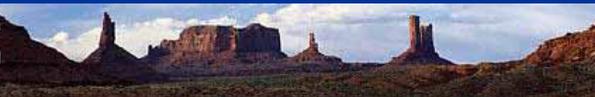
# Fish Monitoring Projects

- **2006**: Investigate acoustic technologies
  - DIDSON camera (fish assemblages)
  - Acoustic tags (fish movements)
- Nonnative fishes movement studies
  - **2006**: LCR
  - **2006**: Diamond Creek and below
  - Inner gorge and tributaries



# Fish Monitoring Projects (cont'd)

- Increased, more effective, mainstem monitoring
- Use remote PIT tag monitoring to document movement of tagged fishes, especially natives
- Study effects of trammel nets, especially on native fishes



# Control Problem Statement

- How do we control nonnative warm water species in Grand Canyon?

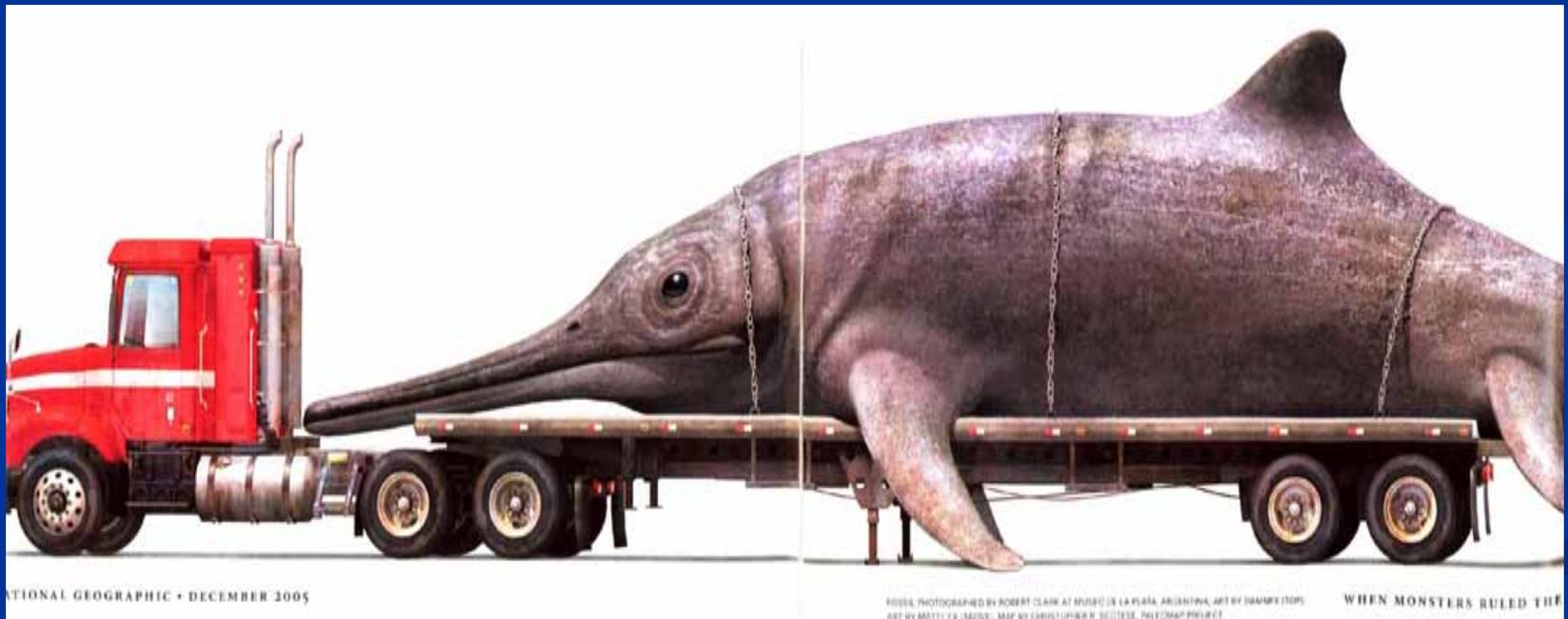


Illustration: NGS

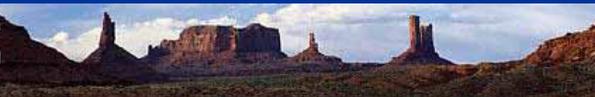
# Control Projects

- Investigate control methods and gear effectiveness
- Monitor nonnative species sources and modify applicable policies and controls as necessary
  - Channel catfish, smallmouth bass, and common carp in LCR and mainstem
  - Brown trout in inner gorge tributaries
  - Small-bodied fishes



# Control Projects

- Investigate proportion of nonnatives vulnerable to gear; use sonic technologies
- Determine distribution and relative abundance of crayfish in GC
- Support research into genetic/molecular control of crayfish
- Investigate safety, effectiveness, and authorities for using praziquantel to treat individuals for Asian tapeworm



# Proposed **2006 Projects** Summary

- **2006:** Risk of invasion based on life histories (BOR)
- **2006:** Monitor nonnative species sources; initiate policies and control as necessary; **LCR, LCR confluence, and lower GC**
- **2006:** Investigate acoustic technologies
  - DIDSON camera (fish assemblages) (**\$50K**)
  - Acoustic tags (fish movements) (**\$50K**)
- Nonnative fishes movement studies
  - **2006:** LCR (**\$30K**)
  - **2006:** Diamond Creek and below (**\$80K**)
- Add warm water species biologist at GCMRC (\$40K in 2006)
- Estimated additional 2006 funds needed: **\$210K**



# Proposed TWG Motions

- GCMRC will prepare work plans for all approved 2006 warm water nonnative species projects. Plans delivered not later than 24 February 2006.
- Funds estimated for 2006 (\$210K) are approved subject to review of work plans.
- GCMRC enters into cooperative agreement to add a warm water species biologist, who, in turn, should proceed with complete development of the warm water species research program for TWG review.
- Implementation of full program initiated in 2007.