

# **The Glen Canyon Dam Adaptive Management Program**

# The Doctrine & Formula of Adaptive Management

**Management actions conducted as experiments**  
*(versus trial & error)*

**Integrated ecosystem science**  
*(versus fragmented scientific investigations)*

**Formal experimental design & hypothesis testing**

**Monitoring of ecological and “social” effects**

**Policy-relevant analysis of experimental results**

**Explicit attention to scientific uncertainties**

**Close collaboration among stakeholders, “managers,” and “scientists”**  
*(versus “experts” holding exclusive authority)*

# The Doctrine & Formula of Adaptive Management

**Management actions conducted as experiments**

*(versus trial & error)*

Prescription, Invocation, Application

**Integrated ecosystem science**

*(versus fragmented scientific investigations)*

**Formal experimental design & hypothesis testing**

**Monitoring of ecological and “social” effects**

**Policy-relevant analysis of experimental results**

**Explicit attention to scientific uncertainties**

Intelligence  
&  
Appraisal

**Close collaboration among stakeholders, “managers,” and “scientists”**

*(versus “experts” holding exclusive authority)*

Promotion, Prescription, Termination

**Some orientation...**

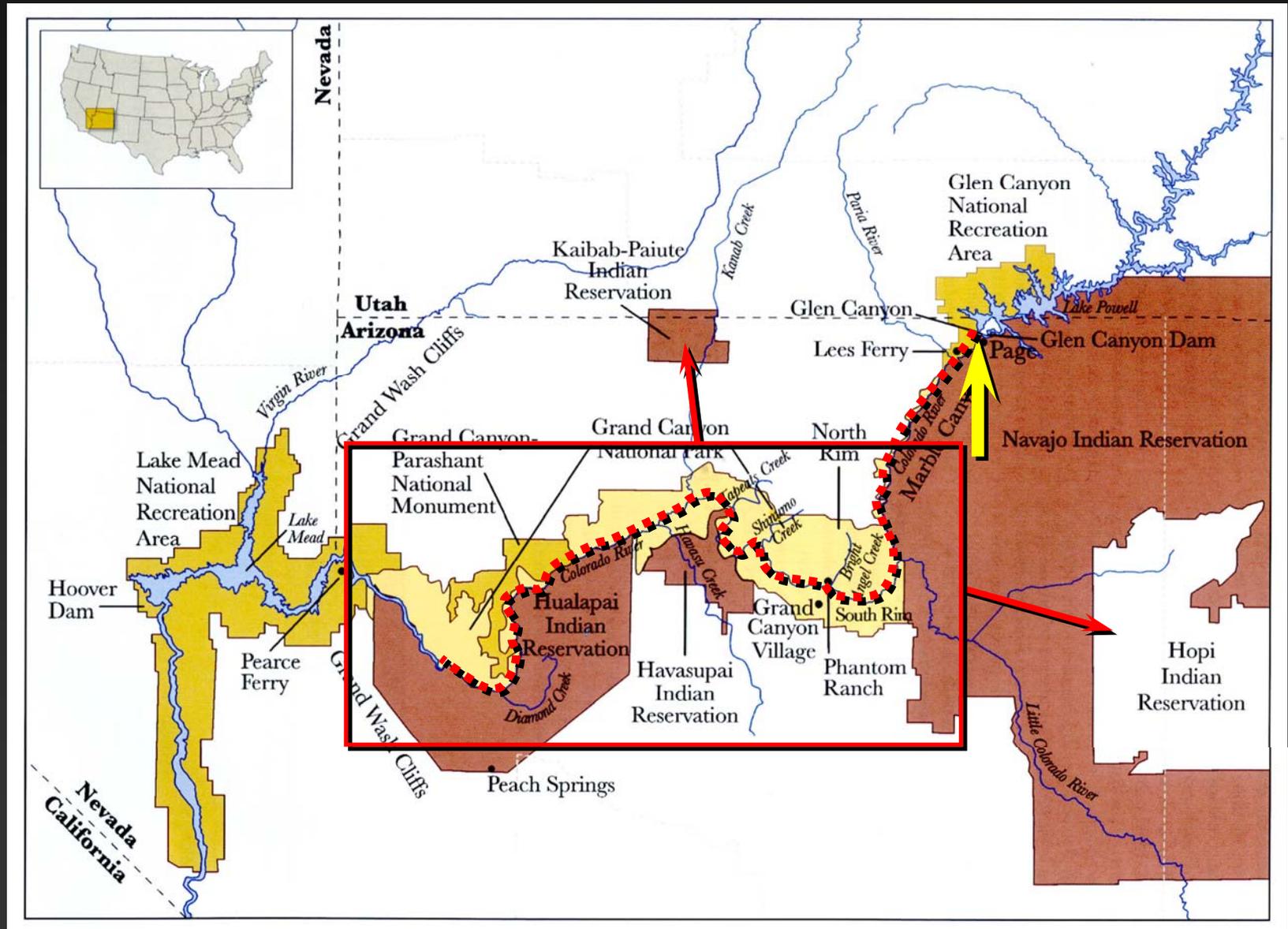
# Some orientation...



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Colorado River Basin Location Map

# Some orientation...



## Some orientation: Value stakes

*Aesthetic*

*Naturalistic*

*Ecologistic*

*Moralistic*

*Universalism*

*Hedonism*

*Stimulation*

*Achievement*

## Some orientation: Value stakes

*Moralistic*  
*Ecologistic*  
*Naturalistic*

*Respect*  
*Rectitude*  
*Tradition*  
*Power*

### Glen Canyon Dam

<i>Utilitarian</i>	<i>Wealth</i>
<i>Dominionistic</i>	<i>Achievement</i>
	<i>Power</i>

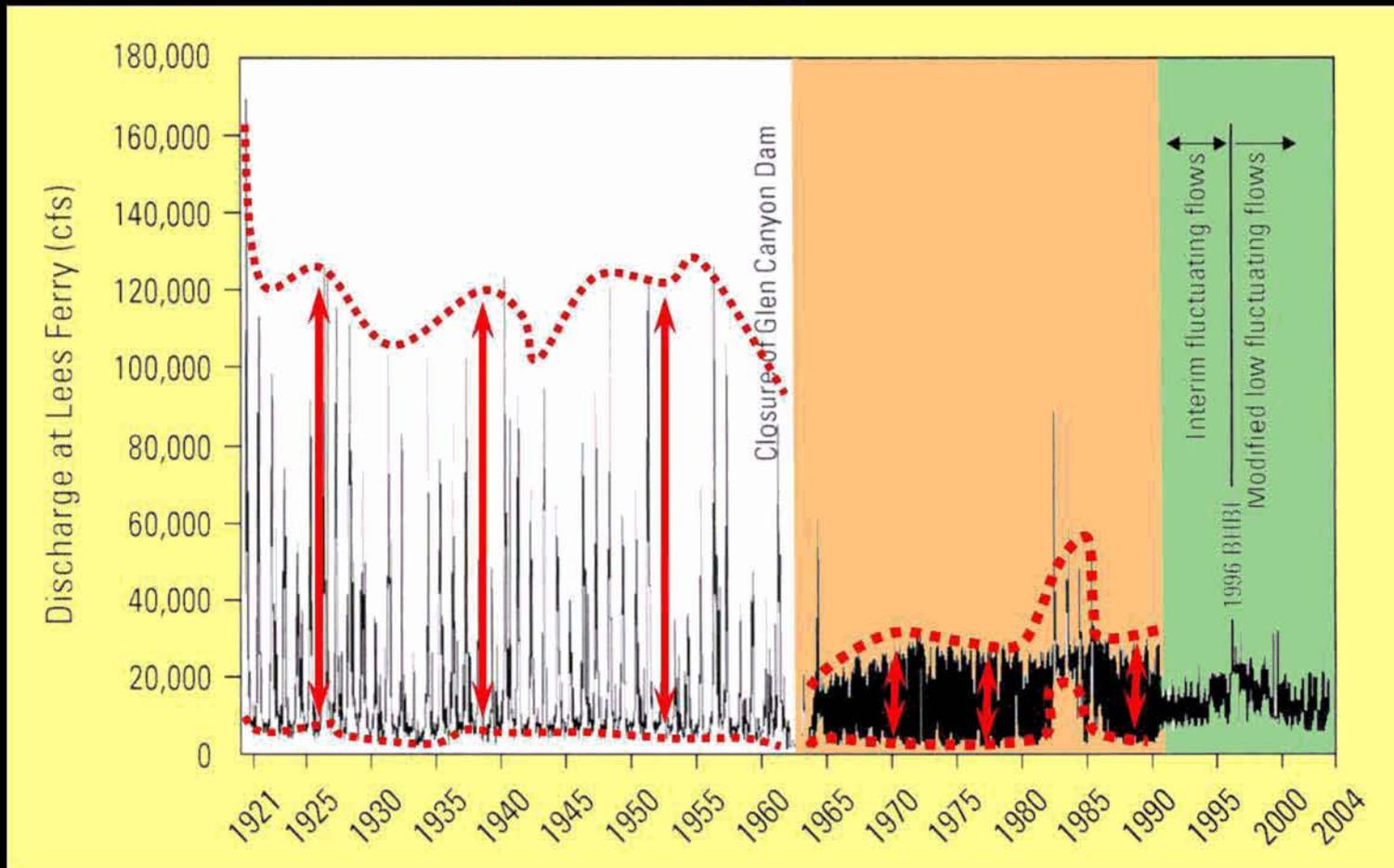
closure in 1963

- 1922 *Colorado River Compact*
- 1956 *Colorado River Storage Act*
- 1968 *Colorado River Basin Project Act*

**4 fish species extirpated**  
**4 fish species listed under ESA**

## Some orientation: Conditions

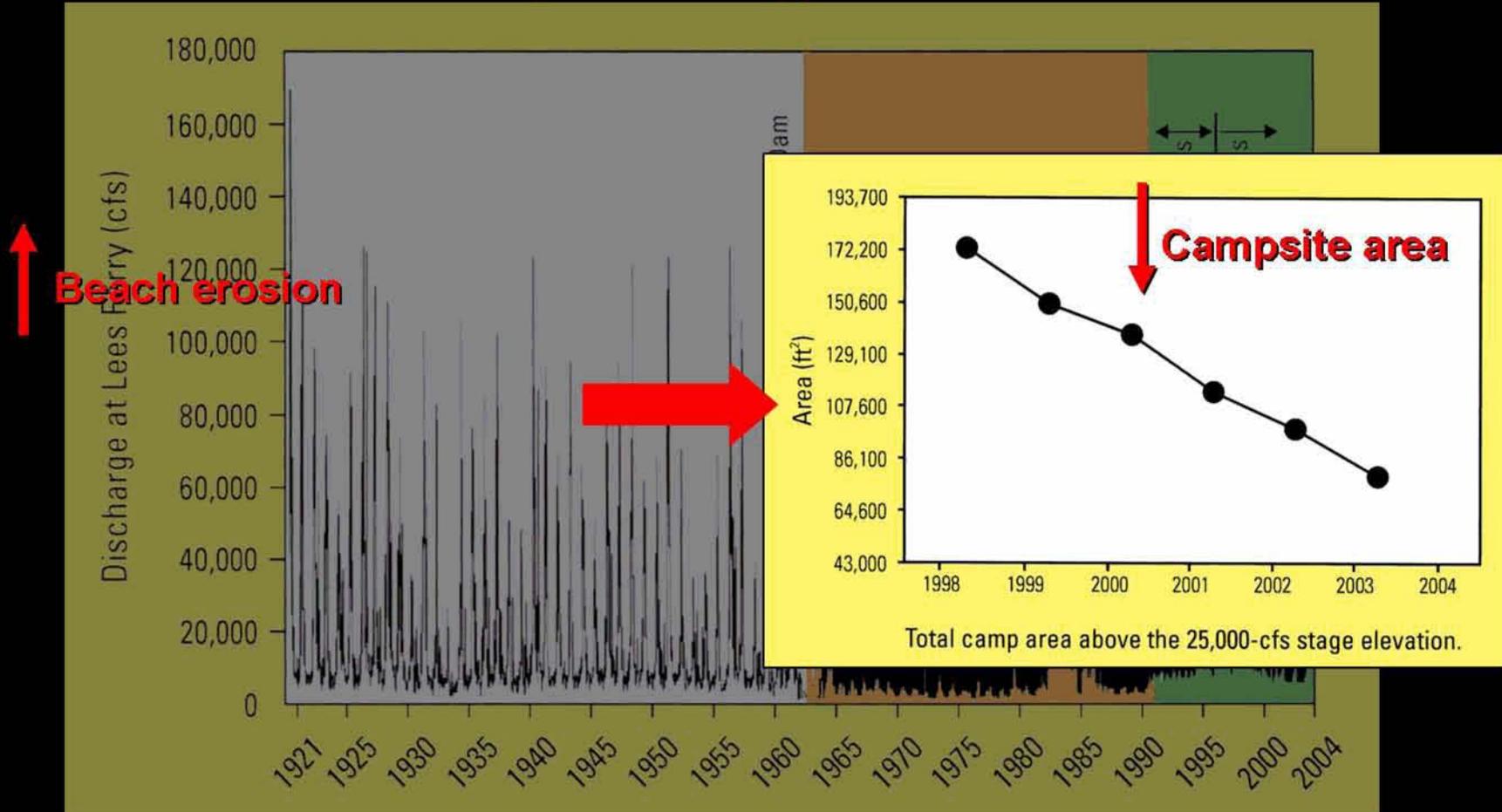
### Reduced sediment input & energy



**Dramatic reduction in seasonal amplitude of flows**  
**Increase in daily amplitude of flows**  
**Dramatic reduction in sediment input**

# Some orientation: Conditions

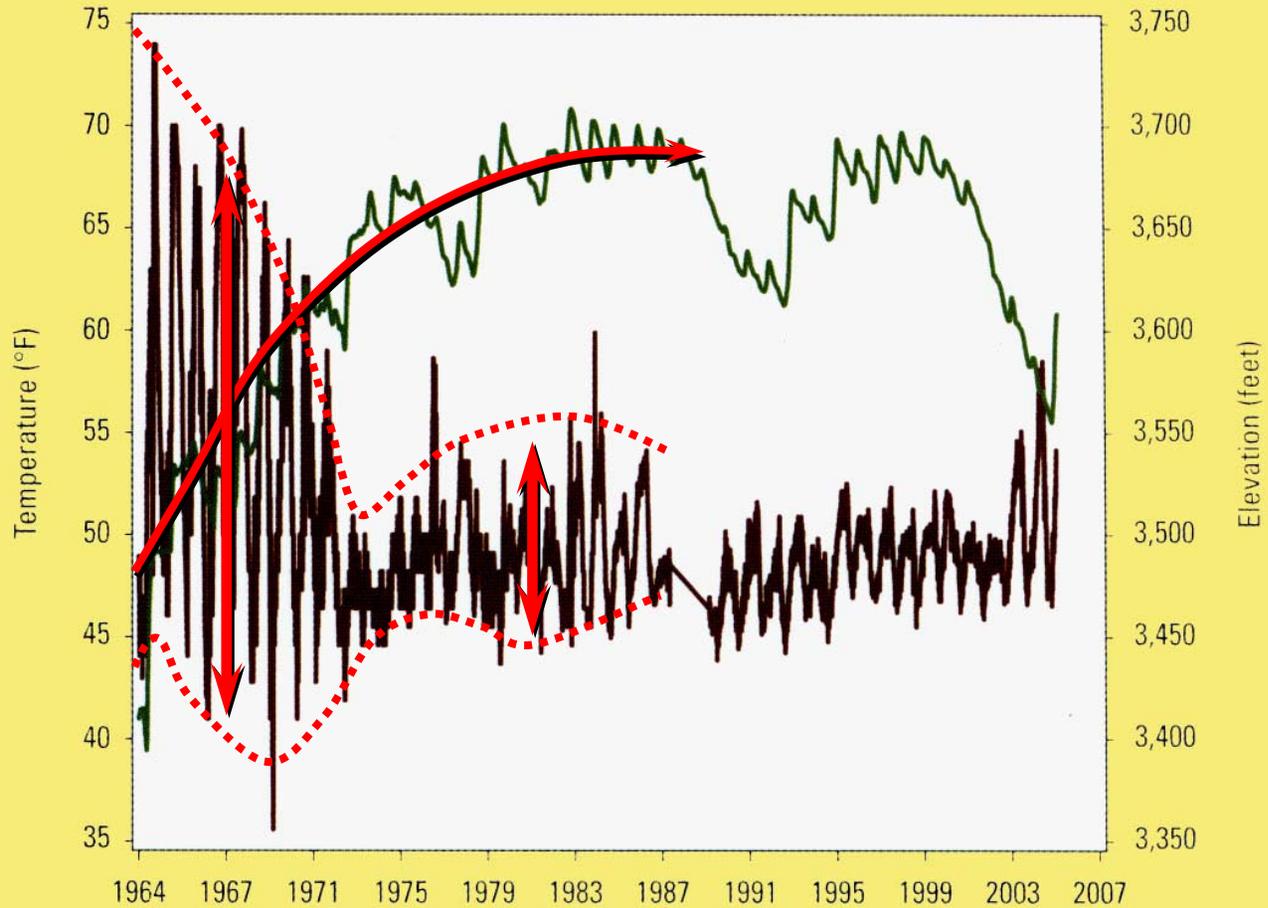
## Reduced sediment input & energy



***Dramatic reduction in seasonal amplitude of flows***  
***Increase in daily amplitude of flows***  
***Dramatic reduction in sediment input***

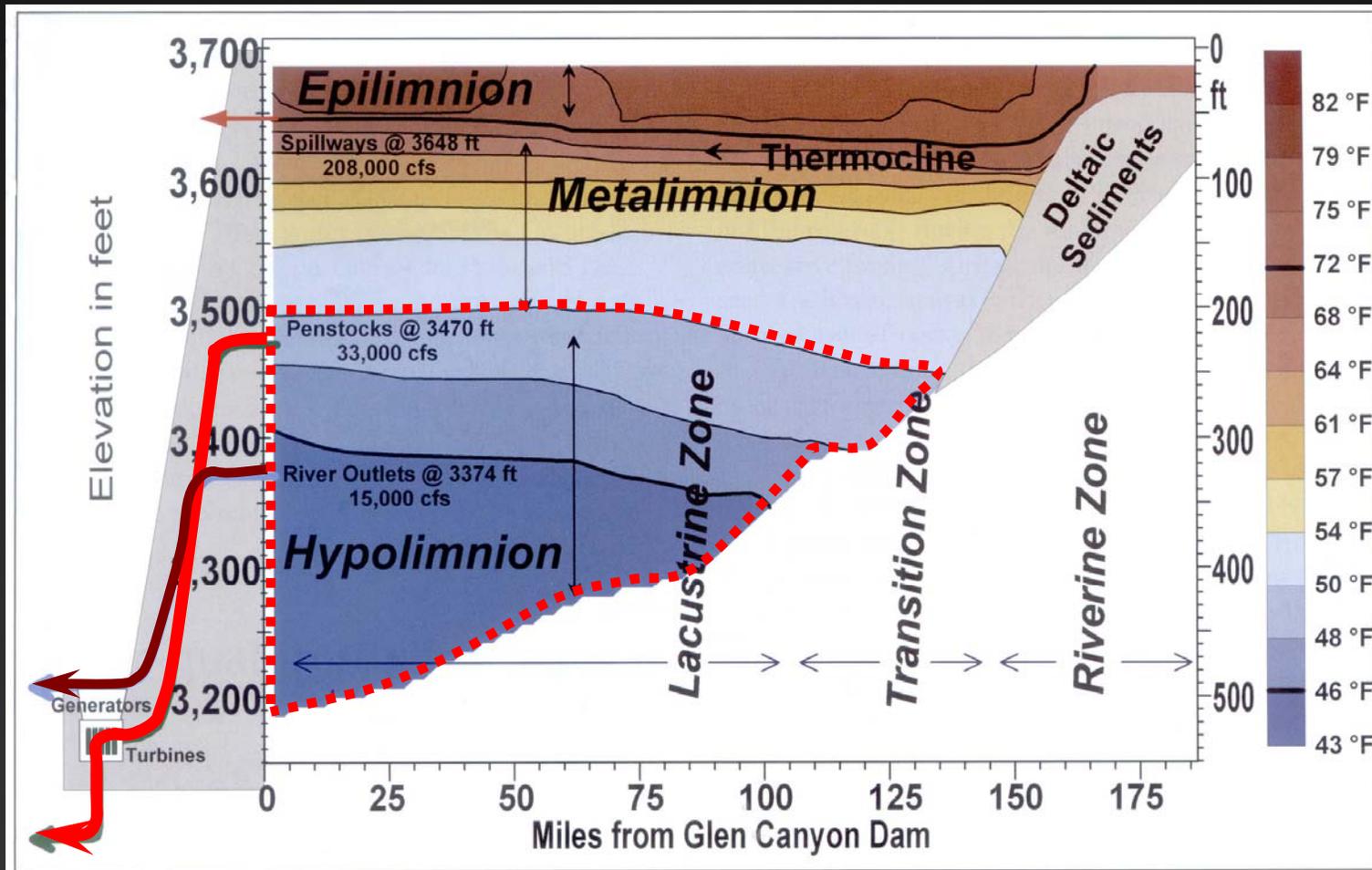
# Some orientation: Conditions

## More consistently cold water



# Some orientation: Conditions

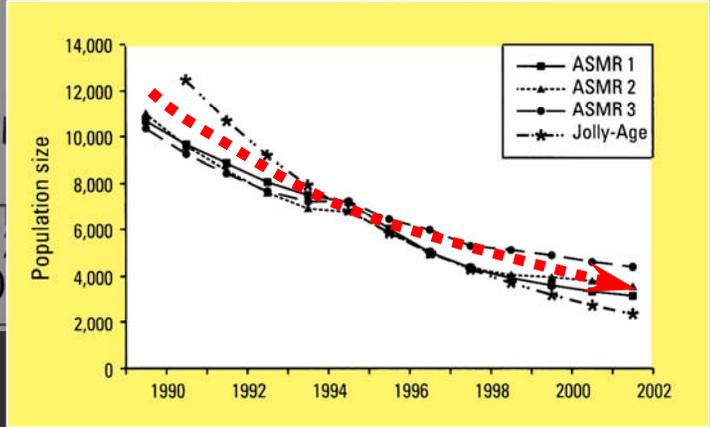
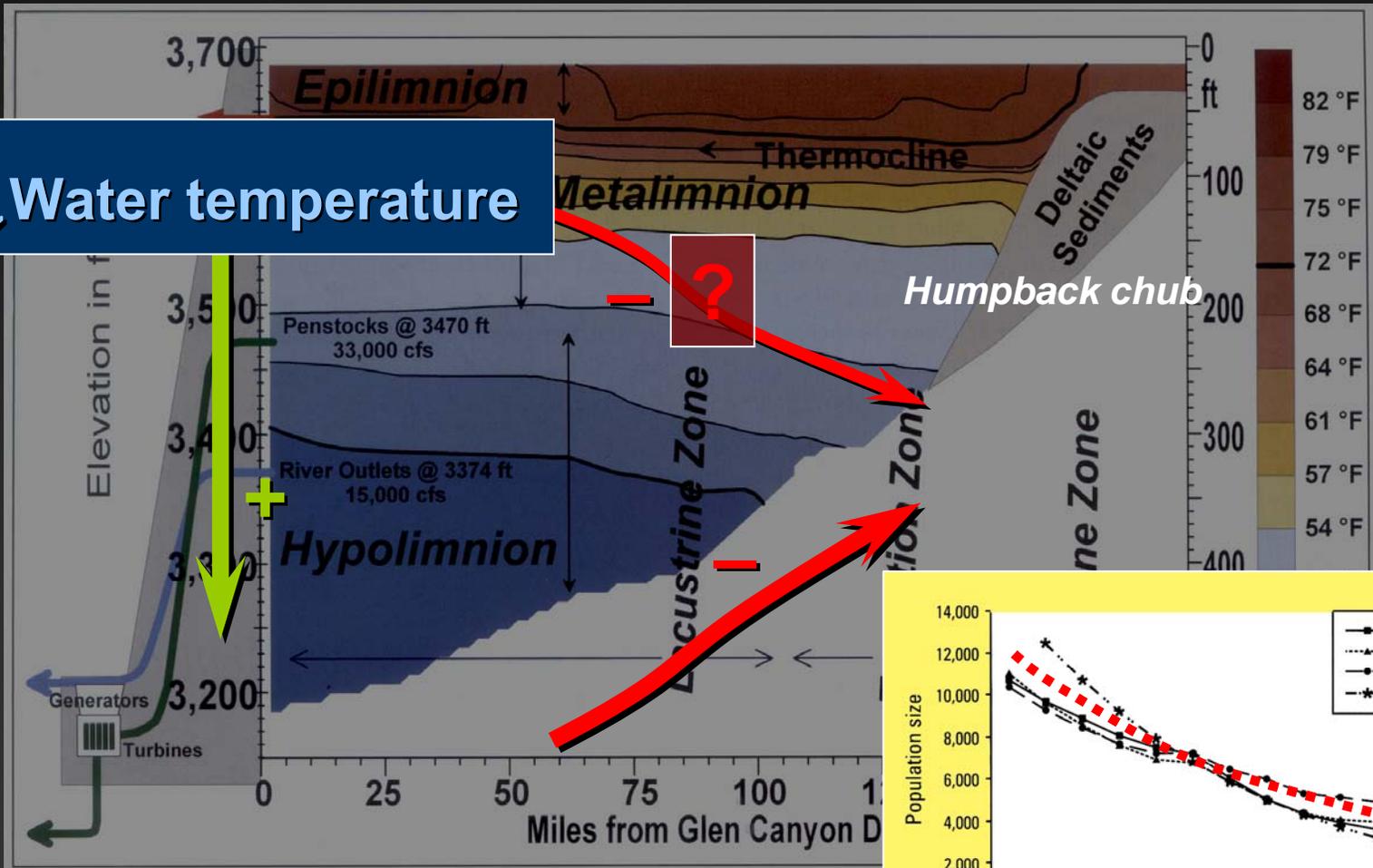
## More consistently cold water



# Some orientation: Conditions

More consistently cold water

↓ Water temperature



Rainbow trout (non-native)

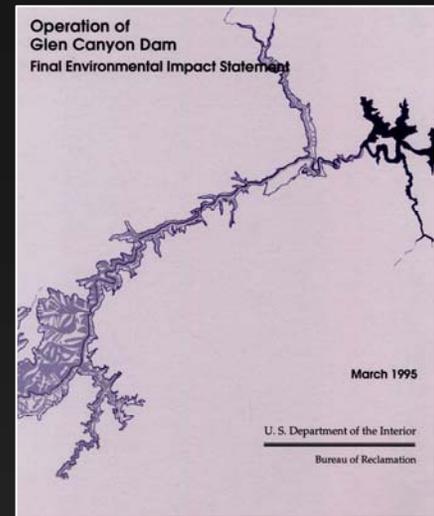
# Prescriptive Response

## 1992 Grand Canyon Protection Act

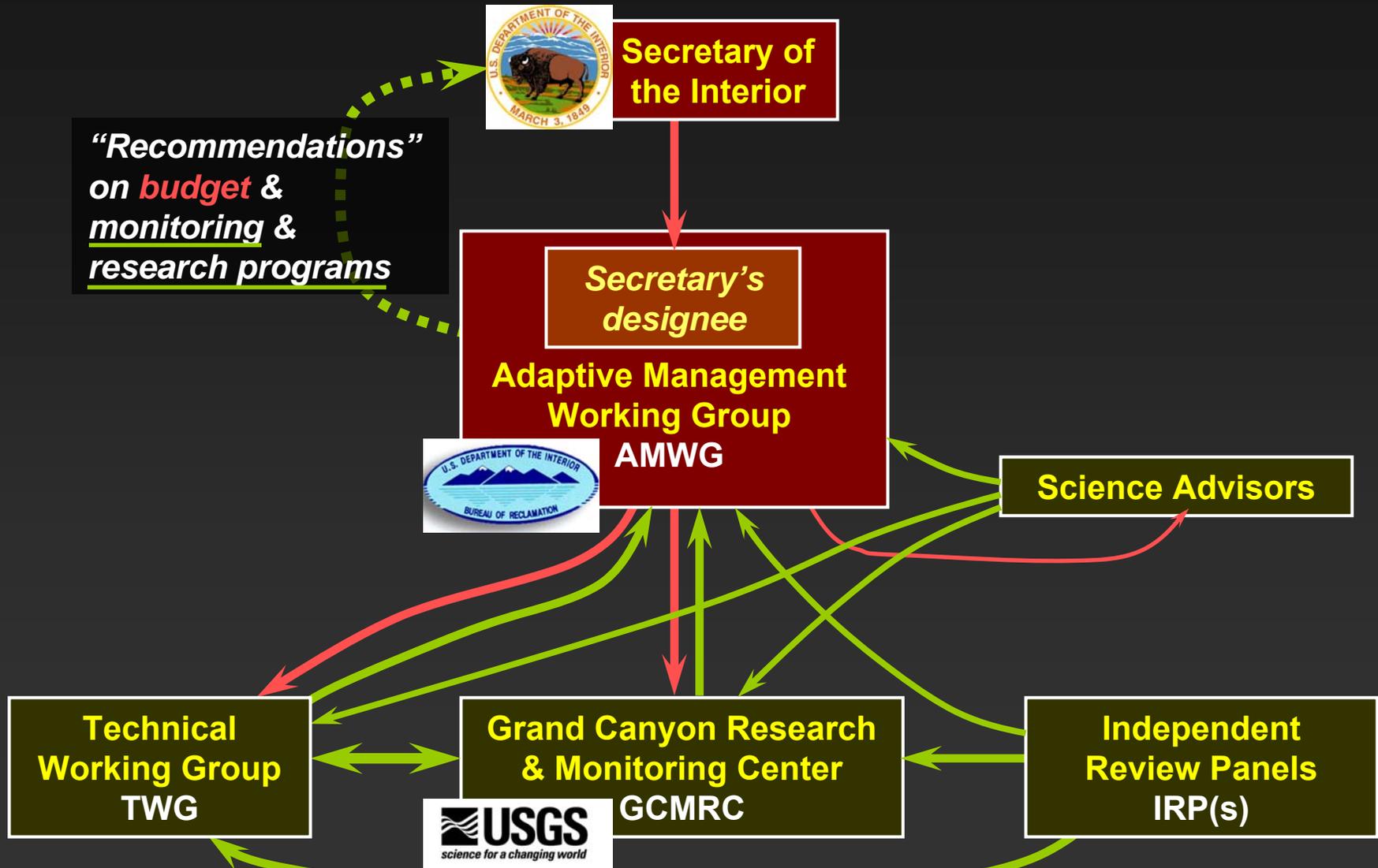
*Glen Canyon Dam Adaptive Management Program (APM)*

*1995 Final EIS for Operation of Glen Canyon Dam*

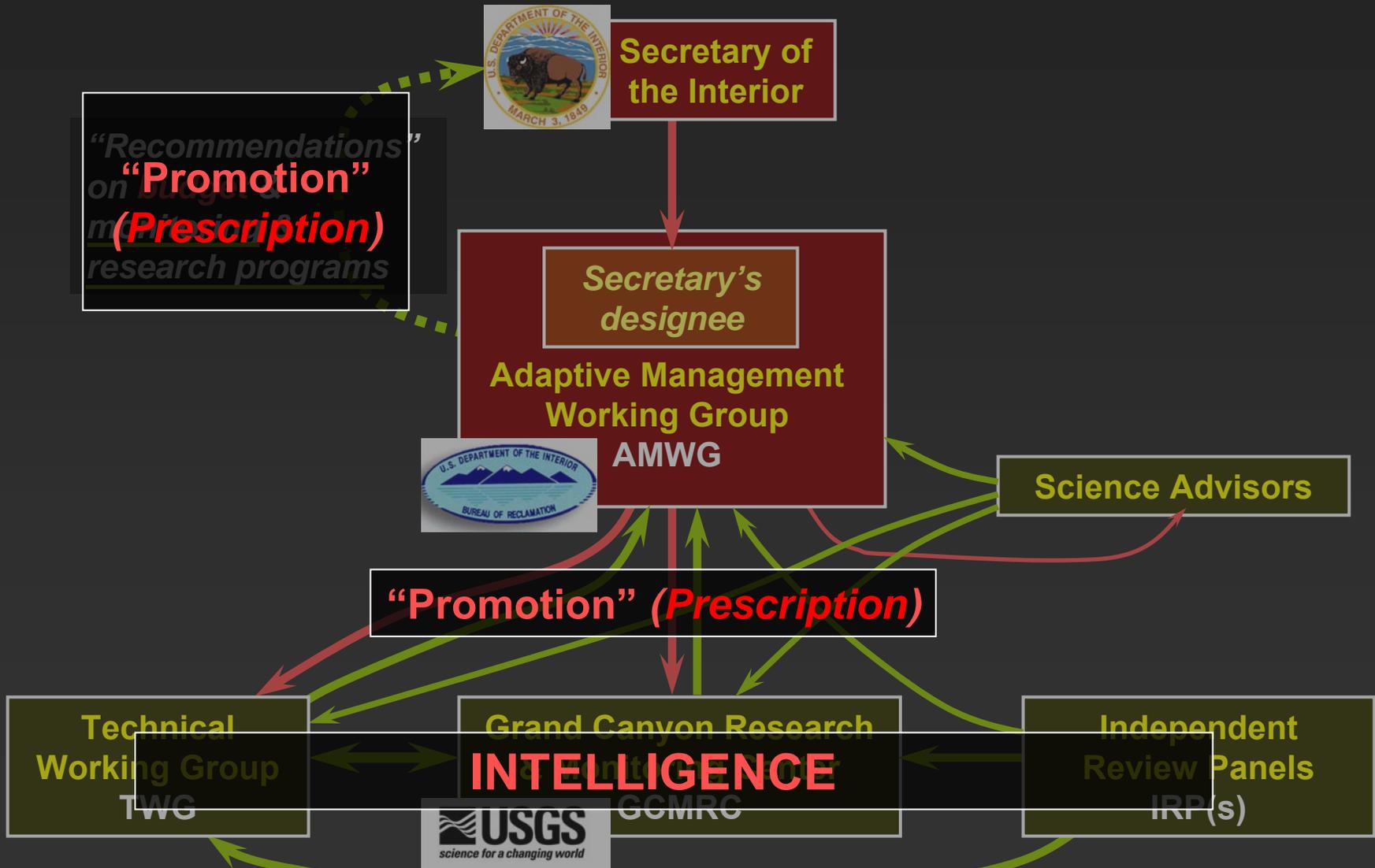
*1997 Adaptive Management Working Group (AMWG)*



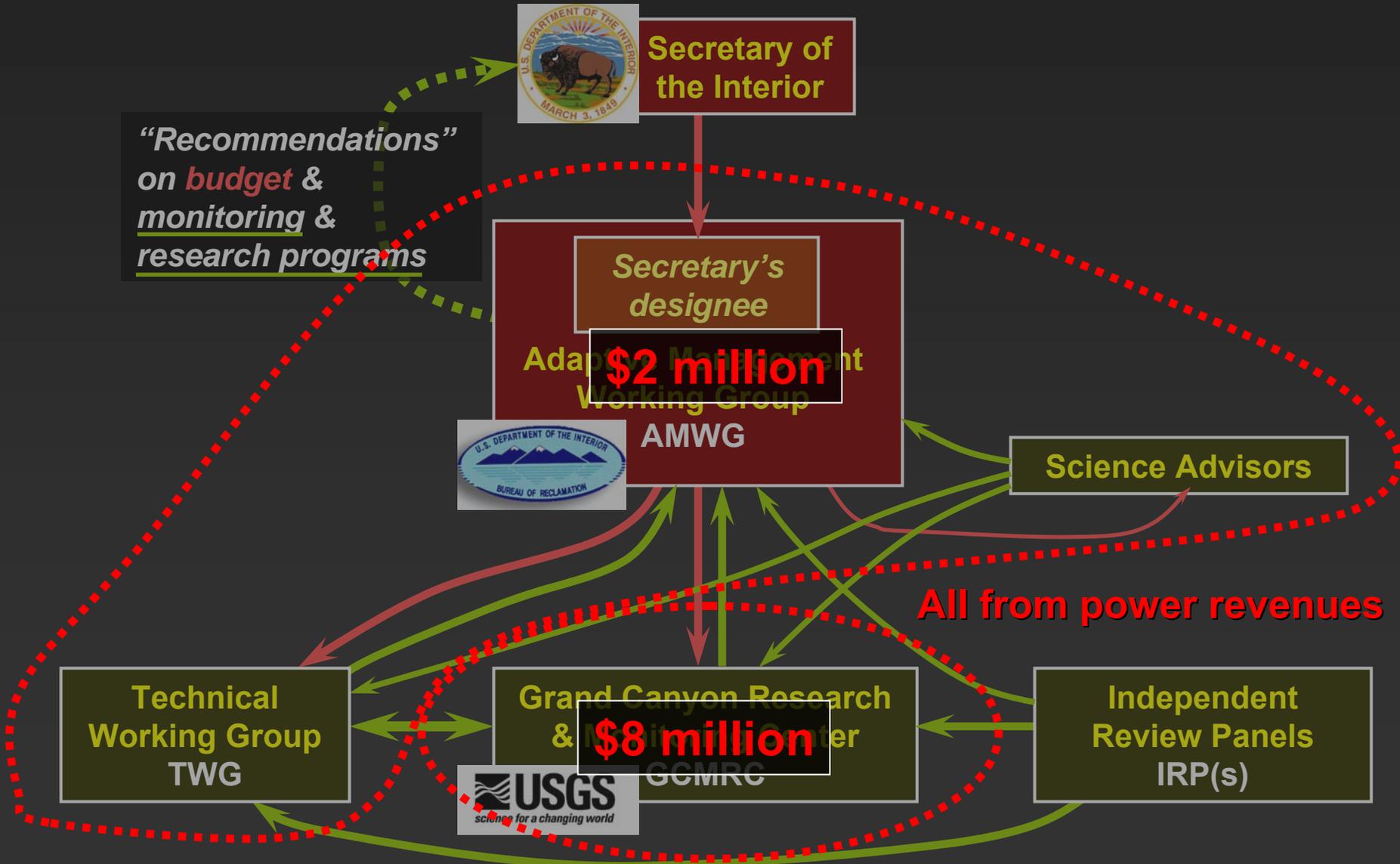
# Some orientation: The Adaptive Management Working Group



# Some orientation: The Adaptive Management Working Group



# Some orientation: The Adaptive Management Working Group



# Some orientation: The Adaptive Management Working Group

## "Stakeholders"

*Valued tangibles & intangibles as outcomes of decision process*



# Some orientation: The Adaptive Management Working Group

Secretary's  
designee

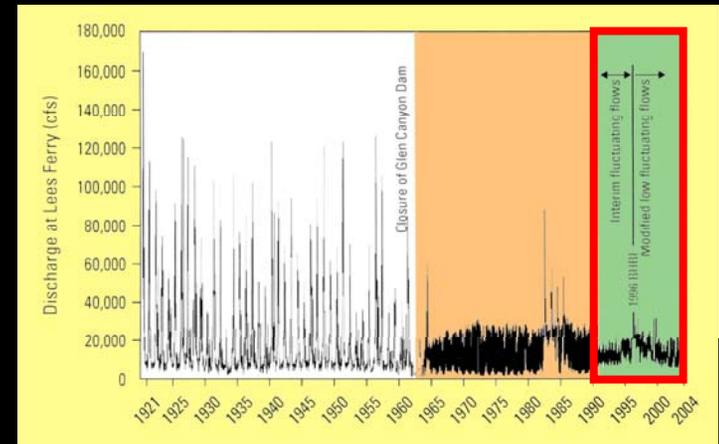
Adaptive Management  
Working Group  
AMWG



Overseen implementation & monitoring of EIS preferred alternative  
(which entailed **30 predictions** regarding outcomes)

**Primary EIS prescription**

**Modified Low Fluctuating Flows = MLFF**

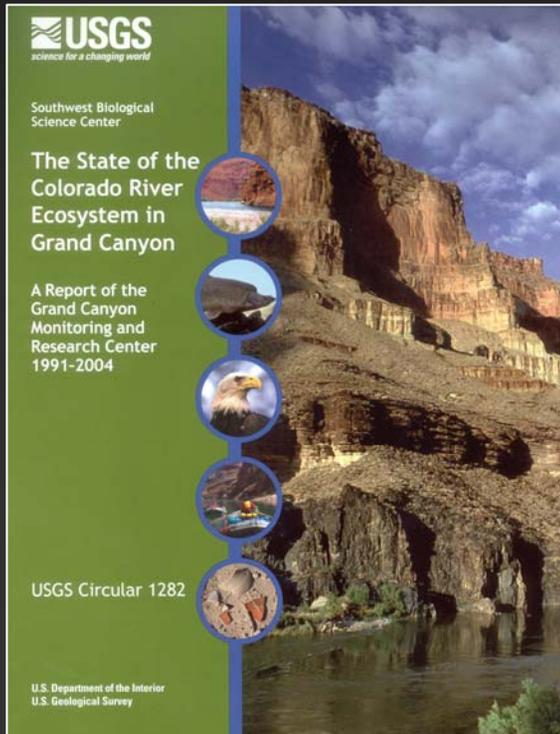


Overseen implementing **1 controlled flood**  
(Beach/Habitat-Building Flood = BHBF)

## Appraisal

Secretary's  
designee

Adaptive Management  
Working Group  
AMWG



No information to judge 14 predictions  
Information contravened 5 predictions  
Information ambiguous for 6 predictions  
Information consistent with 5 predictions

# Some orientation

## Appraisal



2005 Knowledge Assessment of the Effects of Glen Canyon Dam on the Colorado River Ecosystem: An Experimental Planning Support Document

A report of the USGS Grand Canyon Monitoring and Research Center

By Theodore S. Melis, Scott A. Wright, Barbara E. Ralston, Helen C. Fairley, Theodore A. Kennedy, Matthew E. Andersen, and Lewis G. Coggins, Jr.

In cooperation with Josh Korman, Ecometric Research, Inc.

Final Draft, August 30, 2006

Knowledge assessment  
c. \$76 million later...

**Secretary's  
designee**

**Adaptive Management  
Working Group**

**AMWG**



## Knowledge related to fish & their food

### Effects of physical factors      Effects of dam operations

Table 3.3. Knowledge assessment matrix for food base and fish sub models. '+', '-', and 'W' indicate positive, negative, and no effect (if color is green or yellow) or unknown (if color is red) responses. Dark green, light green, yellow, and red denote increasing uncertainty in the predicted response direction (see Table 2.1 for definitions). A positive response of a performance measure corresponds with the direction of AMP goals with the exception of performance measures for invasive fish species, disease, and rainbow trout abundance in Marble Canyon.

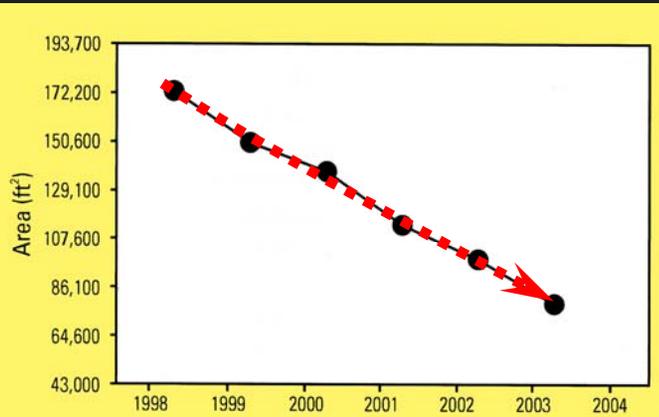
Performance Measure	Location and/or Species	Increase in GCD Release Water Temp	Overall Effect of Increased Fluctuations Relative to MLEF	Reduce Variation in Monthly Volume	RHBF with adequate sand supply	RHBF without adequate sand supply	HMF with adequate sand supply	HMF without adequate sand supply	Sustained Low Steady Flow (summer-fall)	High Sustained Flow (ponding-spring)	Mechanical Removal of Coldwater Exotics (Maintenance and Trib)	Mechanical Removal of Warmwater Exotics
Food base	Glen	+	+	+	+	+	+	+	+	+	+	+
	Grand	+	+	+	+	+	+	+	+	+	+	+
Mainstem spawning & incubation	HUMPBAC	+	+	+	+	+	+	+	+	+	+	+
	CHB	+	+	+	+	+	+	+	+	+	+	+
	FMS	+	+	+	+	+	+	+	+	+	+	+
	RBT-Glen	0	+	+	+	+	+	+	+	+	+	+
YOY/Juvenile rearing	HUMPBAC	+	+	+	+	+	+	+	+	+	+	+
	CHB	+	+	+	+	+	+	+	+	+	+	+
	FMS	+	+	+	+	+	+	+	+	+	+	+
	RBT-Glen	+	+	+	+	+	+	+	+	+	+	+
Invasive Fish Species	Coldwater	+	+	0	0	0	0	0	+	+	+	+
	Warmwater	+	+	+	+	+	+	+	+	+	+	+
Disease	Asian Fish Tapeworm	+	+	+	+	+	+	+	+	+	+	+
	Whirling Disease	+	+	+	+	+	+	+	+	+	+	+
Adult Population	HUMPBAC	+	+	+	+	+	+	+	+	+	+	+
	CHB	+	+	+	+	+	+	+	+	+	+	+
	FMS	+	+	+	+	+	+	+	+	+	+	+
	RBT #s - Glen	+	+	0	0	0	0	0	+	+	+	+
	RBT Size - Glen	+	+	0	0	0	0	0	+	+	+	+
Angling Opportunity and Quality	Glen	+	+	+	+	+	+	+	+	+	+	+

Table 3.4. Detail of food base and fish sub models KAW matrix describing elements of ROD flow constraints that contribute to the overall effect of increased fluctuations in daily flow. Also shown are responses to humpback chub translocation and hatchery supplementation options. '+', '-', and 'W' indicate positive, negative, and no effect (if color is green or yellow) or unknown (if color is red) responses. Dark green, light green, yellow, and red denote increasing uncertainty in the predicted response direction (see Table 2.1 for definitions). A positive response of a performance measure corresponds with the direction of AMP goals with the exception of performance measures for invasive fish species, disease, and rainbow trout abundance in Marble Canyon.

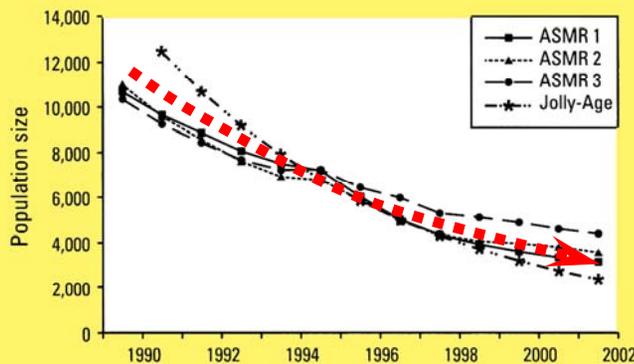
Performance Measure	Location or Species	Overall Effect of Increased Fluctuations Relative to MLEF	Increase Up-ramp Rate	Increase Down-ramp Rate	Increase and/or Lengthen Daily Flows	Increase Daily Variation in Flow	Decrease Minimum Daily Flow	Supplementation from Hatchery	Translocation of HBC
Food base	Glen	+	+	+	+	+	+	+	+
	Grand	+	+	+	+	+	+	+	+
Mainstem spawning & incubation	HUMPBAC	+	+	+	+	+	+	+	+
	CHB	+	+	+	+	+	+	+	+
	FMS	+	+	+	+	+	+	+	+
	RBT-Glen	0	+	+	+	+	+	+	+
YOY/Juvenile rearing	HUMPBAC	+	+	+	+	+	+	+	+
	CHB	+	+	+	+	+	+	+	+
	FMS	+	+	+	+	+	+	+	+
	RBT-Glen	+	+	+	+	+	+	+	+
Fish Species	Coldwater	+	+	+	+	+	+	+	+
	Warmwater	+	+	+	+	+	+	+	+
Disease	Asian Tapeworm	+	+	+	+	+	+	+	+
	Whirling Disease	+	+	+	+	+	+	+	+
Adult Population	HUMPBAC	+	+	+	+	+	+	+	+
	CHB	+	+	+	+	+	+	+	+
	FMS	+	+	+	+	+	+	+	+
	RBT #s - Glen	+	+	+	+	+	+	+	+
	RBT Size - Glen	+	+	+	+	+	+	+	+
Angling Opportunity and Quality	Glen	+	+	+	+	+	+	+	



# Some orientation: Outcomes & Effects



Total camp area above the 25,000-cfs stage elevation.



Beaches continued to erode

Humpback chub populations continued to decline

## Some orientation: Promotion & Prescription

**Prescriptive Response**

*Secretary's  
designee*

**Adaptive Management  
Working Group**

**AMWG**



*Mechanical removal  
of rainbow trout*

*Consideration  
of artificial sand  
augmentation &  
dam outlet  
modifications*

**\$600-800K per year**

# Some orientation: Outcomes & Effects

*(Invocation & Application)*

**Secretary's  
designee**

**Adaptive Management  
Working Group  
AMWG**



## ESA Litigation

Center for Biological Diversity  
Sierra Club  
Glen Canyon Institute  
Living Rivers  
Arizona Wildlife Federation

*None sit on the AMWG*

1 S. JAY GOVINDAN, Trial Attorney  
United States Department of Justice  
Environment & Natural Resources Division  
Wildlife & Marine Resources Section  
Ben Franklin Station, P. O. Box 7369  
Washington, D.C. 20044-7369

4 JAMES J. DUBOIS, Trial Attorney  
5 U.S. Department of Justice  
6 Environment and Natural Resources Division  
7 Natural Resources Section  
1961 Stout Street, 8<sup>th</sup> Floor  
Denver, CO 80294

8 Additional Counsel listed at end for space  
9 Attorneys for Federal Defendants

10 MATT KENNA, CO Bar #22159  
Western Environmental Law Center  
11 679 E. 2d Avenue, Suite 11B  
Durango, CO 81301

12 Attorney for Plaintiffs (*Admitted Pro Hac Vice*)

13 **IN THE UNITED STATES DISTRICT COURT FOR THE**  
14 **DISTRICT OF ARIZONA**

15 CENTER FOR BIOLOGICAL DIVERSITY;  
16 SIERRA CLUB; GLEN CANYON INSTITUTE;  
17 LIVING RIVERS; and ARIZONA WILDLIFE  
18 FEDERATION,

Case No:  
3:06-00494 DGC

STIPULATION OF  
DISMISSAL WITH  
PREJUDICE

19 Plaintiffs,

20 **Out of court settlement**

21 UNITED STATES BUREAU OF RECLAMATION;  
22 and DIRK KEMP THORNE, in his official  
23 capacity as Secretary of the Department of the Interior,

24 Defendants.  
25

# Some orientation: Outcomes & Effects

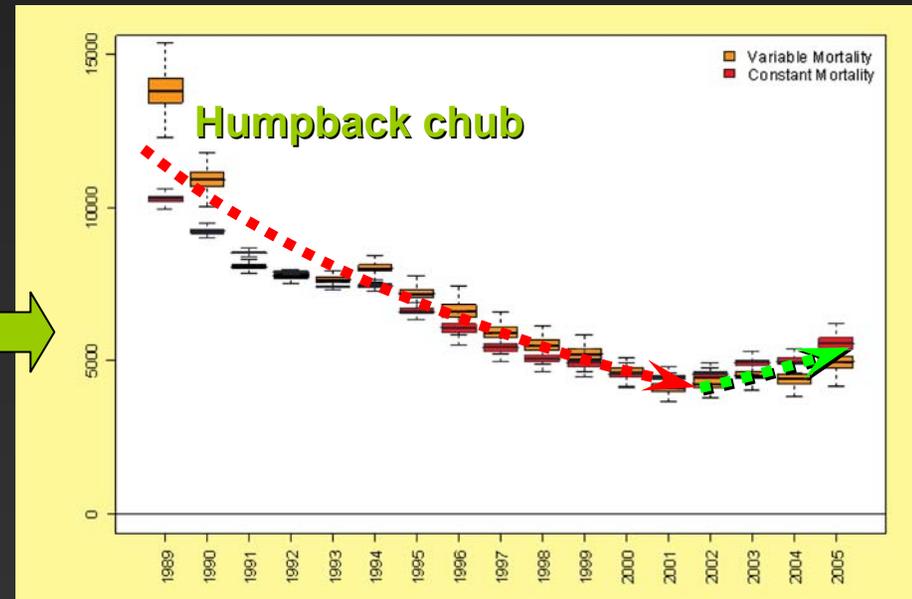
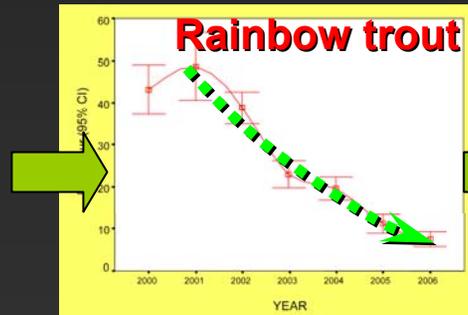
*Secretary's  
designee*

**Adaptive Management  
Working Group**

**AMWG**

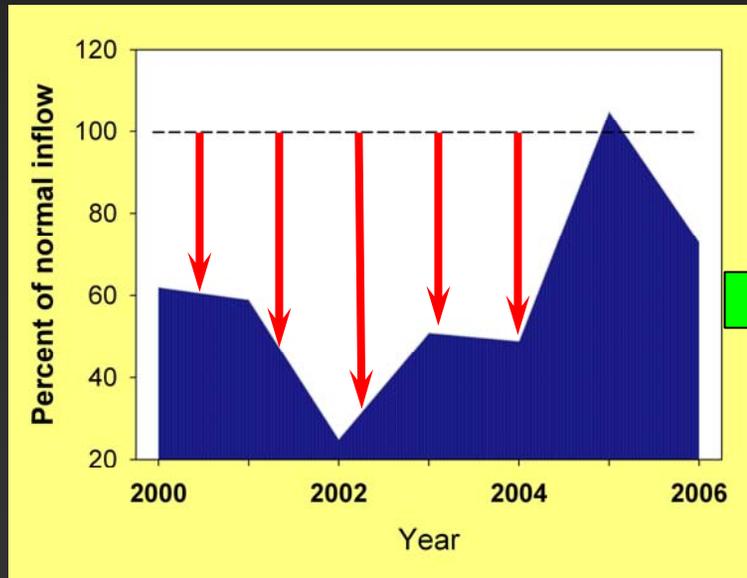


## Claims

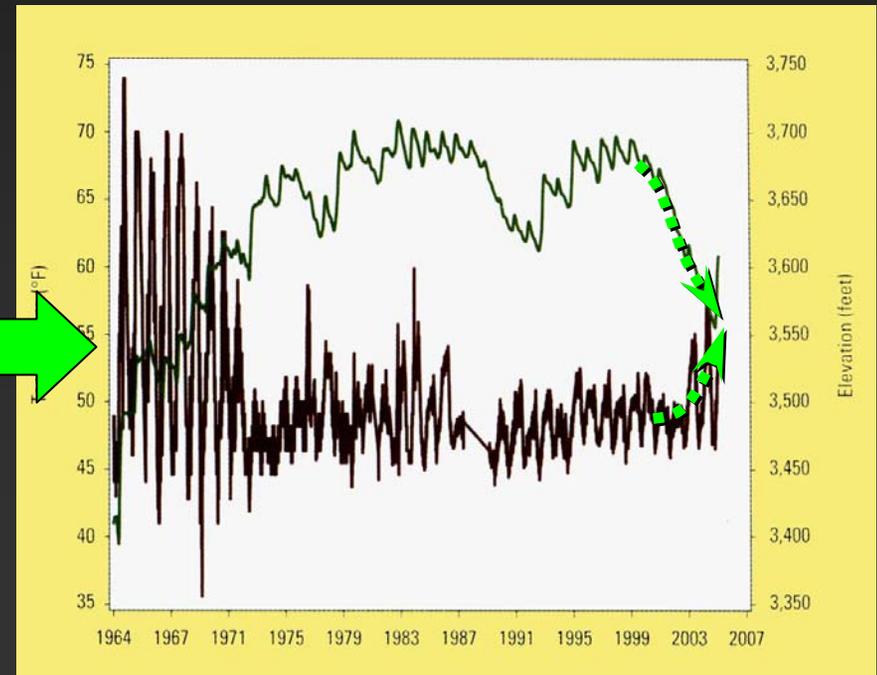


## Counter-claims

### Drought



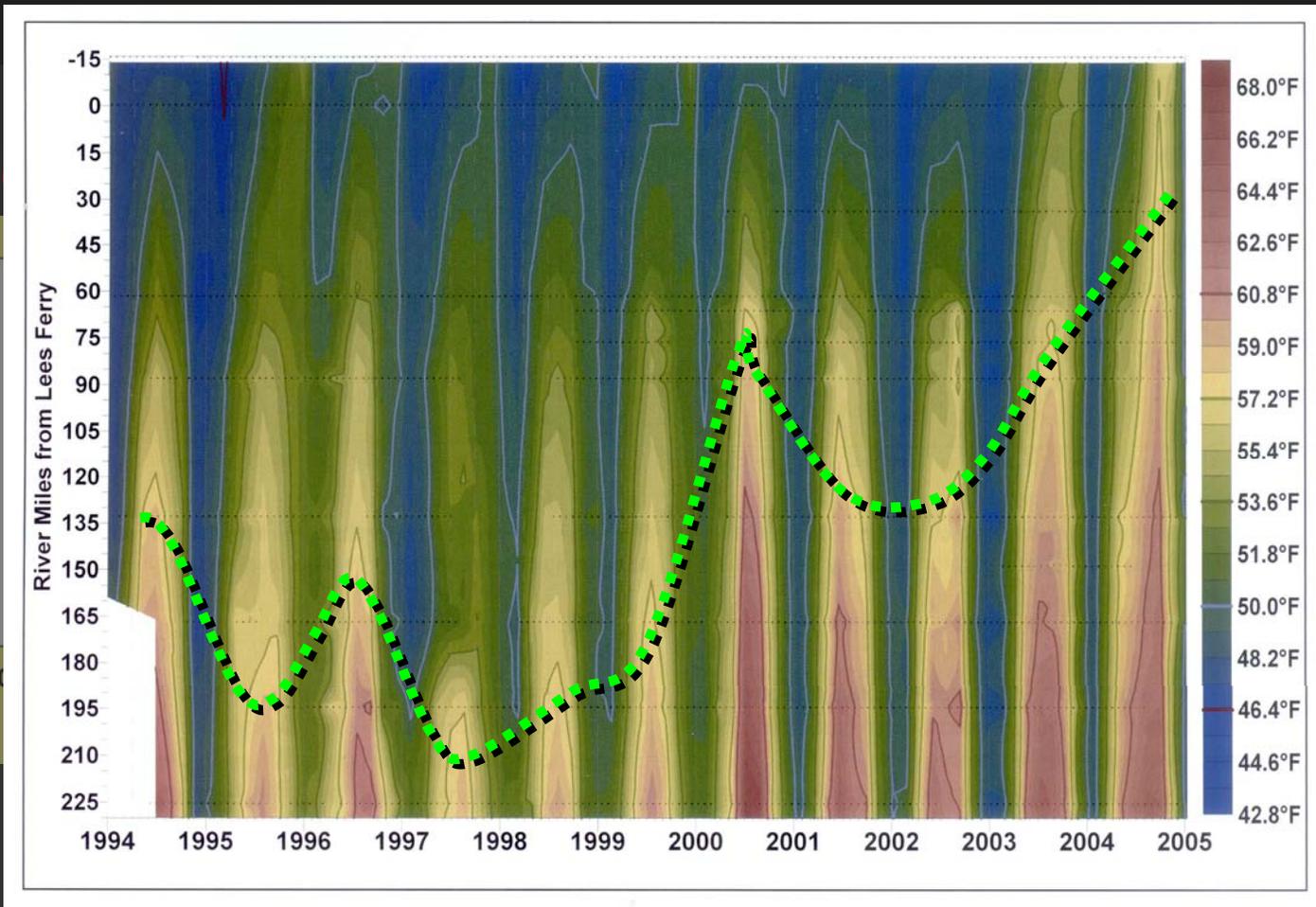
### Lake level & outflow temperature



# Some orientation: Outcomes & Effects

## Downstream water temperature plumes

Percent of normal inflow  
**MILES DOWNSTREAM**

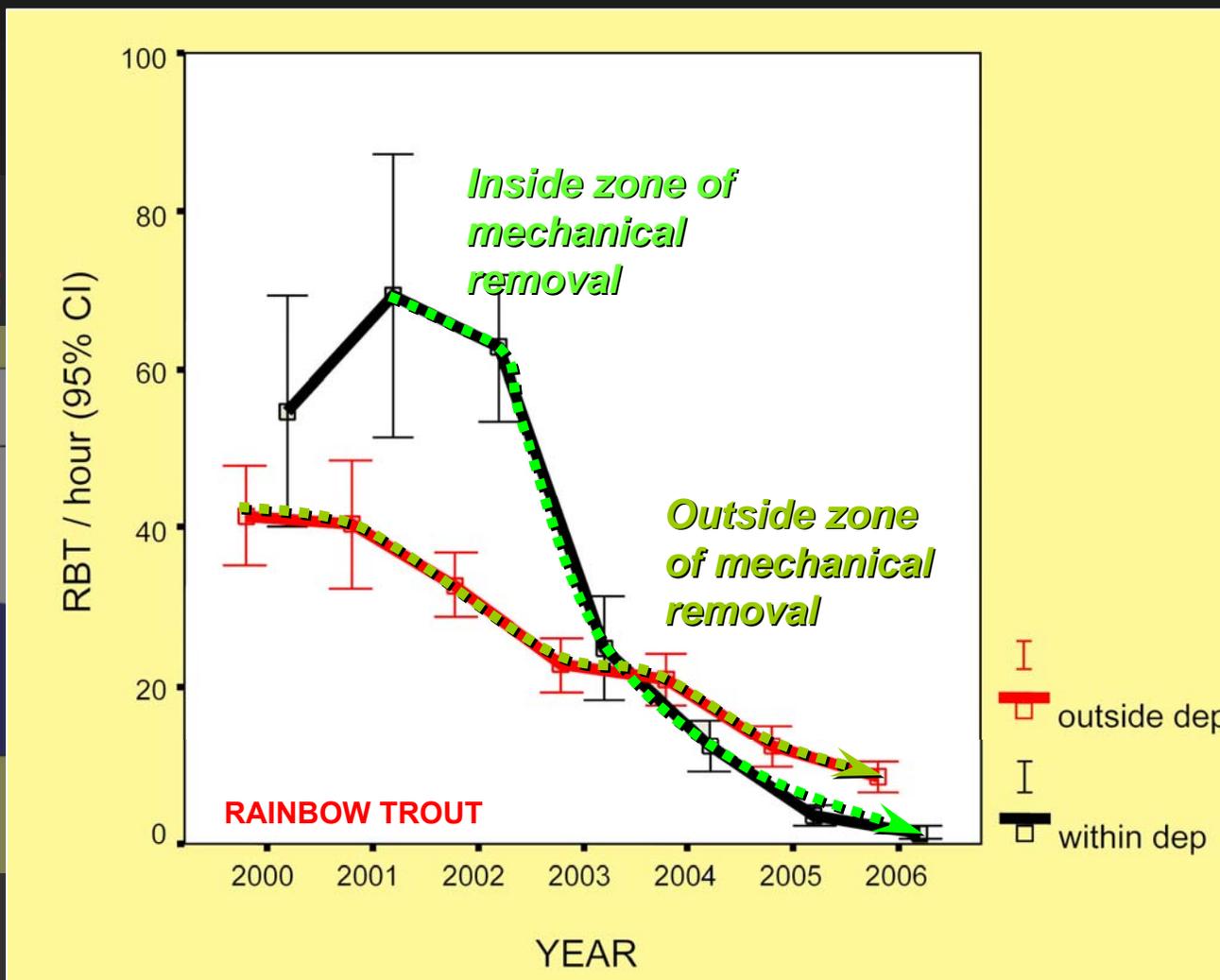
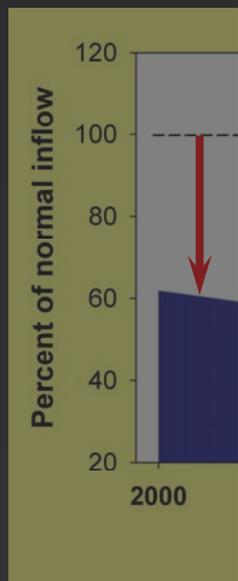


Temperature  
Elevation (feet)  
3,750  
3,700  
3,650  
3,600  
3,550  
3,500  
3,450  
3,400  
3,350  
03 2007

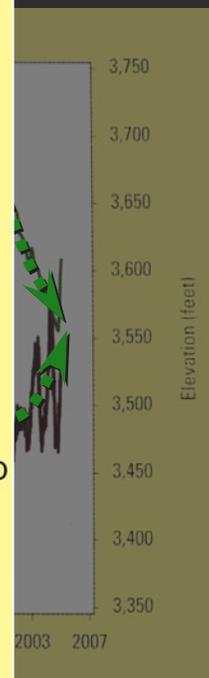
# Some orientation: Outcomes & Effects

## Stabilization of humpback chub populations a fortuitous result of prolonged drought?

Drought



Temperature



# Some orientation: Outcomes & Effects

AMWG  
TWG  
IRP  
SAG  
ROD  
GCPA  
MLFF  
BHBF

Secretary's  
designee

Adaptive Management  
Working Group  
AMWG



## Adaptive Management Work Group (AMWG)

Public Meeting: December 5-6, 2006  
Fiest Inn Resort  
2100 S. Priest Drive, Tempe, Arizona  
Encantada Ballroom

### Federal Register Notices(s):

Federal Register Notice Dated November 6, 2006

### Pre-Meeting Information:

- Pre-Meeting Materials and AIF (Agenda Information Forms)
- Draft Agenda and Proposed Motions
- Draft Minutes of March 6-7, 2006, Meeting and Sept. 6, 2006 Conference Call
- Action Item Tracking Report
- AIF-Science Planning Group Accomplishments, Executive Summary, PPT handout
- AIF-GCMRC Completed Science Projects, HBC Fact Sheet
- AIF-GCMRC Experimental Research Update
- AIF-Action on Science Plans: Strategic Planning for Science and CDAMP, Fiscal Years 2007-11
- Monitoring and Research Plan
- AIF-Beach/Habitat Efficacy Monitoring, PPT and PPT presentation
- AIF-FY 2007 GCMRC Budget Expenditures and Spreadsheets
- AIF-Action on Science Plans: Strategic Planning for Science and CDAMP, Fiscal Years 2007-11
- AIF-Action on Science Plans: Strategic Planning for Science and CDAMP, Fiscal Years 2007-11
- Assessment of the Estimated Effects of Four Experimental Options on Resources Below Glen Canyon Dam and PPT
- Assessment of the Estimated Effects of Four Experimental Options on Resources Below Glen Canyon Dam dated November 17, 2006
- AIF-Basin Hydrology
- AIF-Public Outreach Ad Hoc Group, proposed website maintenance and modification process, six Fact Sheets, PPT presentation
- AIF-Humpback Chub Recovery Consultation AHG
- AIF-Humpback Chub Comprehensive Plan Update
- AIF-Development of Humpback Chub Refuges for the Lower Colorado River
- AIF-Science Advisors' Annual Report, Annual Report, PPT presentation
- AIF-GCMRC FY 2007 Calendar, Calendar, AMP Effectiveness Workshop Plan
- Current AMWG Membership
- E-Mail Message, Subj: AMP Talking Points re: BHBF in WY07
- \*Not provided in meeting packets and the following to be included:
  - Knowledge Assessment
  - Monitoring and Research Plan

## Glen Canyon Dam Adaptive Management Program Adaptive Management Work Group Meeting, December 5-6, 2006 DRAFT AGENDA December 5, 2006

START TIME (Duration)	TOPIC, PRESENTER, and PURPOSE <sup>1</sup>	MATERIALS / TABS
9:30a (45)	<b>Welcome and Administrative:</b> Mark A. Limbaugh Information, discussion, and possible action	
	1. Introductions and Determination of Quorum (15 members) <ul style="list-style-type: none"> <li>• FY 07 TWG Chair: Kurt Dongoske</li> <li>• New GCMRC Deputy: Ted Meis</li> <li>• New Officially Appointed AMWG Alternates</li> </ul>	Agenda
	2. Approval of March Minutes dated Sept. 6, 2006, Meeting Minutes	Draft Minutes/ Action Items
	3. Action Item Tracking Report	
	4. Public Outreach	
	5. Recommendations to the Secretary	
	6. Re-establishment of Roles Ad Hoc Group Policy Group update Programmatic Agreement update	Old / New Business
10:15a (15)	Science	
10:30a (45)	GC Bur Inf	
11:55a (30)	FY Inf	
11:45a (1:00)	LU	

**GLEN CANYON DAM ADAPTIVE MANAGEMENT WORK GROUP  
ACTION ITEM TRACKING REPORT**

Note: Closed items will be removed from the next iteration of the report.

ITEM NO. - DATE	ACTION ITEM	ASSIGNED TO / DUE DATE	STATUS
Item 9 30-31 Aug 2005	Make the following budget format changes: <ul style="list-style-type: none"> <li>• Differentiate between obligated and expended.</li> <li>• Include projections through year-end.</li> <li>• Develop and utilize consistent reporting methodology for both BOR and GCMRC.</li> <li>• Show the financial report by project and line item, with budgeted amount and actual amount.</li> <li>• Show USGS burden @ 35%.</li> <li>• Show income and expense.</li> </ul>	BOR and GCMRC / Date of the next budget report (March 2006)	Open
Item 10 30-31 Aug 2005	Speak with Bruce Taubert regarding federal procurement issues.		
Item 11 7-8 March 2006	Consider Dr. Pete Whitley for a position on the Science Advisors.	Dave Garrett	Closed
Item 12 7-8 March 2006	AMWG members should provide additional comments/edits regarding any of the PDAMWG products to Andrei Porochnik or Amy Howden by Friday, March 31, 2006. (Andrei's e-mail address is amy4@infoamwg.net).	AMWG members	Closed (deadline passed)
7-Item 13 8 March 2006	AMWG members interested in participating and/or chairing the PDAMWG should submit their names to Linda Whetton by Friday, March 31, 2006. (lwhetton@ac.usbr.gov)	AMWG members	Closed (deadline passed)

AMWG Action Item Tracking Report Updated 13 November 2006  
Questions or Updates? Contact The Mary Orton Company, LLC at mary@maryorton.com

- |  |   |
|--|---|
| <h3>Law of the River</h3> <ul style="list-style-type: none"> <li>► Colorado River Compact</li> <li>► Boulder Canyon Project Act</li> <li>► California Seven Party Agreement</li> <li>► Mexican Water Treaty</li> <li>► Upper Colorado River Basin Compact</li> <li>► Colorado River Storage Project Act</li> <li>► Arizona v. California et al.</li> <li>► Colorado River Basin Project Act</li> <li>► Criteria For Coordinated Long-Range Operation of Colorado River Reservoirs</li> <li>► Minute 242 of the U.S. - Mexico International Boundary and Water Commission of 1973</li> <li>► Colorado River Basin Salinity Control Act</li> </ul> | <h3>Related Legislation</h3> <ul style="list-style-type: none"> <li>► Grand Canyon Protection Act</li> <li>► Endangered Species Act</li> <li>► National Environmental Policy Act</li> <li>► National Historic Preservation Act</li> </ul> |
|--|---|

**"Bureaucratic jungle"**

## Some orientation: Outcomes & Effects

*Secretary's  
designee*

**Adaptive Management  
Working Group**

**AMWG**



**Maintain *status quo***

**Unwilling to act**

**Threatened by research**

**Partisan**

**Uncivil**

**“Brutal”**

# Some orientation: Outcomes & Effects

*Secretary's  
designee*

**Adaptive Management  
Working Group  
AMWG**



**USGS**  
science for a changing world

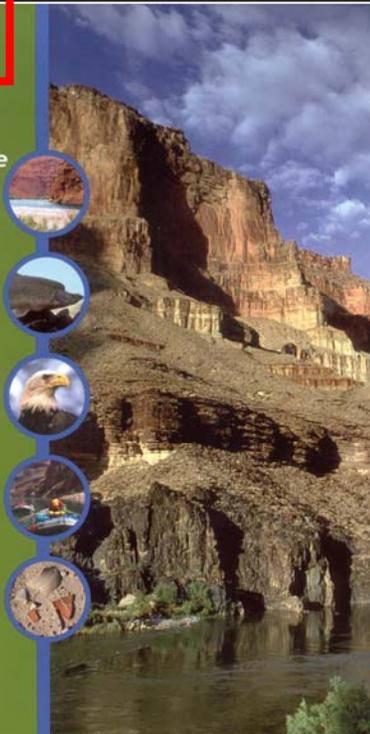
Southwest Biological  
Science Center

The State of the  
Colorado River  
Ecosystem in  
Grand Canyon

A Report of the  
Grand Canyon  
Monitoring and  
Research Center  
1991-2004

USGS Circular 1282

U.S. Department of the Interior  
U.S. Geological Survey



No information to judge 14 predictions  
Information contravened 5 predictions  
Information ambiguous for 6 predictions  
Information consistent with 5 predictions

*MLFF had been a negotiated rather than  
“science-driven” prescription **designed  
to minimize impacts on revenues***

*Report “**vigorously resisted by AMWG**”*

*“**A career limiting move**” for the USGS  
administrator who authorized the report*

***So...why did the adaptive management program end up so uncivil & conflicted?***

**↓ Human dignity**

**Glen Canyon Dam Adaptive Management Program**  
***Adaptive Management Working Group***

“Stakeholders”

*Valued tangibles & intangibles as **outcomes** of decision process*

2 Power User Groups

2 Fed. Power Admin. Agencies

7 River Basin States

1 Angler Group

1 State Game & Fish Agency

1 Raft Recreation Group

2 Fed. Environmental Agencies

2 Environmental Groups

First Nations Tribes

Hydropower & assoc. revenue **11**

Water quantity & quality (for irrigation & urban areas) **11**

Cold-water trout fishery **2**

Raft recreation **2**

Sediment (beaches for rafters, protection of cultural artifacts) **1**

Natural riparian vegetation **4**

Endangered warm-water species **5**

Non-use values **8**

Cultural “resources” **6**

“IN COMPARATIVE DISARRAY”

*Valued tangibles & intangibles as **outcomes** of decision process*

**VALUED TANGIBLES**

**Readily monetized**



**Readily measured**

**Hydropower & assoc. revenue**

**Water quantity & quality** (*for irrigation & urban areas*)

**Cold-water trout fishery**

**Raft recreation**

**Sediment** (*beaches for rafters, protection of cultural artifacts*)

**Natural riparian vegetation**

**Endangered warm-water species**

**Non-use values**

**Cultural "resources"**

**VALUED INTANGIBLES**

Valued tangibles & intangibles as **outcomes** of decision process

**VALUED TANGIBLES**

**PRIVILEGED INTERESTS**

**Dominionistic/Utilitarian**

**Power & Wealth**

**Stimulation**

Hydropower & assoc. revenue

Water quantity & quality (for irrigation & urban areas)

Cold-water trout fishery

Raft recreation

**UNDER-PRIVILEGED INTERESTS**

**Ecologistic/Scientistic**

**Well-being, Universalism**

**Enlightenment**

Sediment (beaches for rafters, protection of cultural artifacts)

Natural/primitive vegetation

Endangered warm-water species

**MARGINALIZED INTERESTS**

**Aesthetic/Moralistic/??**

**Universalism, Benevolence, Respect, Tradition**

Nature values

Cultural "resources"

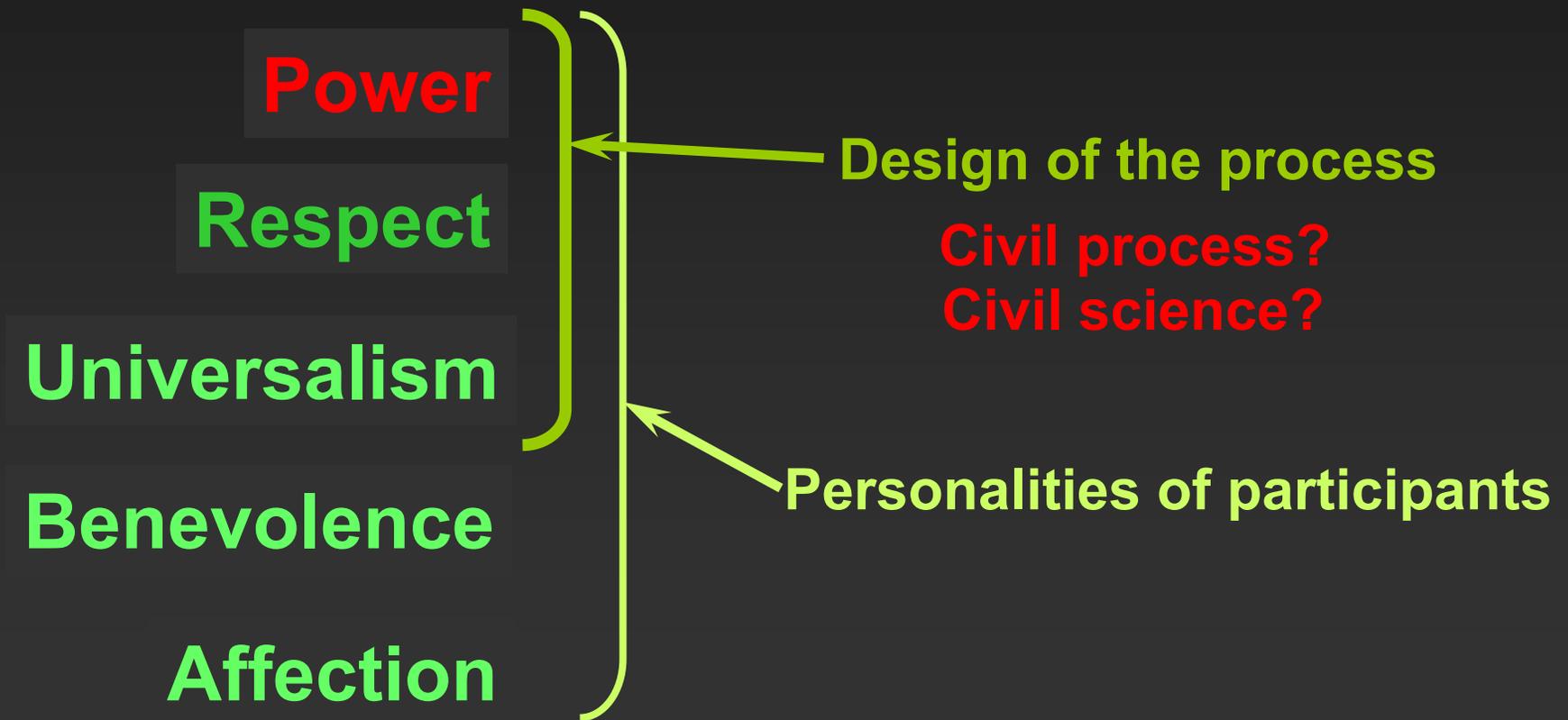
Readily monetized



VALUED INTANGIBLES

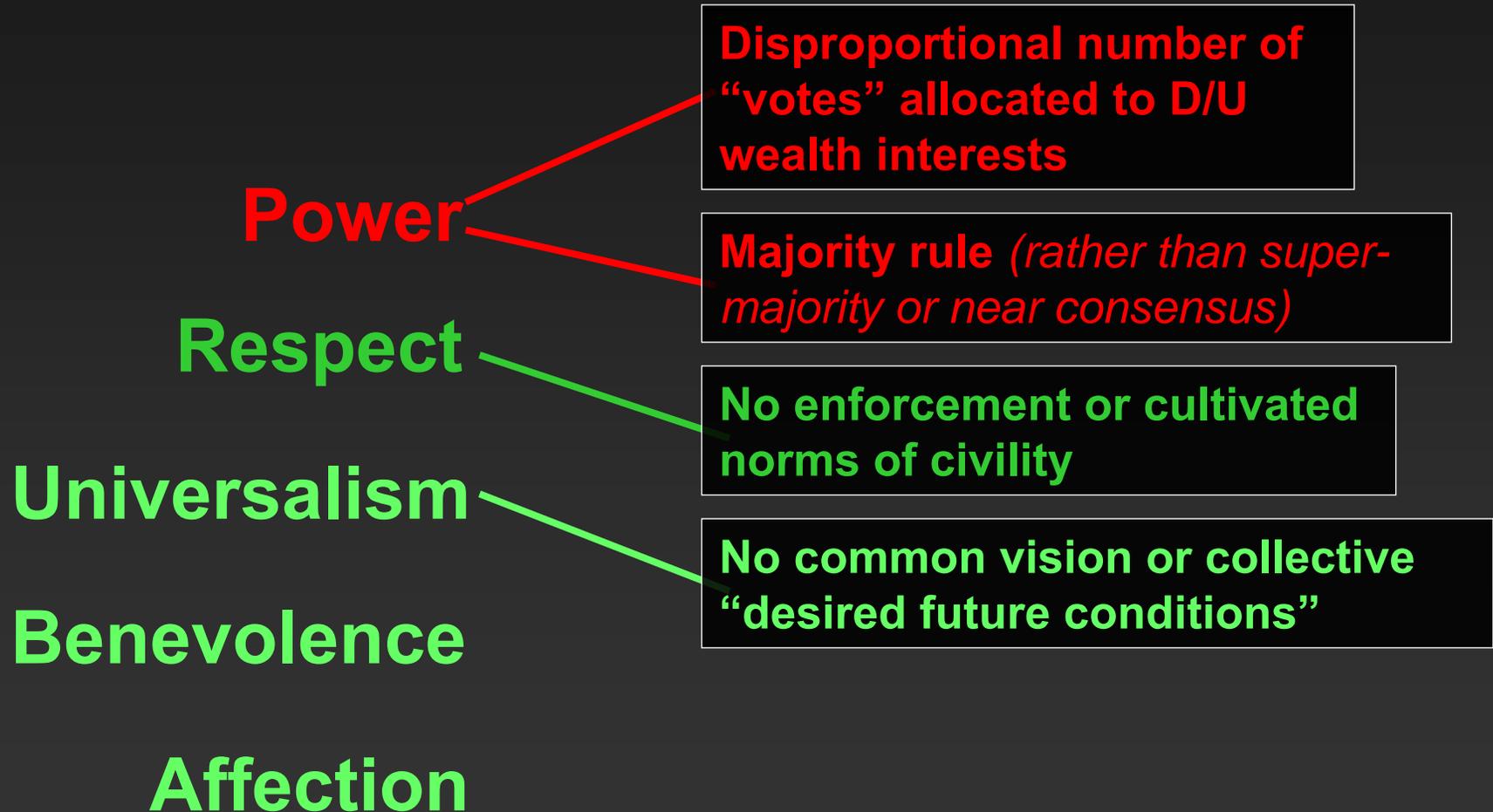
Glen Canyon Dam Adaptive Management Program  
*Values at Stake in the Decision Process*

# INTANGIBLES



# Glen Canyon Dam Adaptive Management Program

## *Values at Stake in the Decision Process*



# Glen Canyon Dam Adaptive Management Program

## *Personalities in the Decision Process*

### **Nascent psychoticism**

**Aggressive**

**Hostile**

**Cold**

**Egocentric**

**Unempathic**

**Tough-minded**

**Altruistic**

**Socialized**

**Empathic**

*Hans Eysenck*

**INFLUENTIAL NARCISSISTS**

**the problem of power-oriented charismatics**

# Glen Canyon Dam Adaptive Management Program

## *Personalities in the Decision Process*

### Chair

*Secretary's designee*

**“An ineffective  
spineless jellyfish”**

**“A bully who runs  
meetings... to  
protect the  
customer”**

Glen Canyon Dam Adaptive Management Program  
*Personalities in the Decision Process*

**“Brutalized”**

**INCIVILITY**

**“Compassion doesn’t serve people  
well in this environment”**

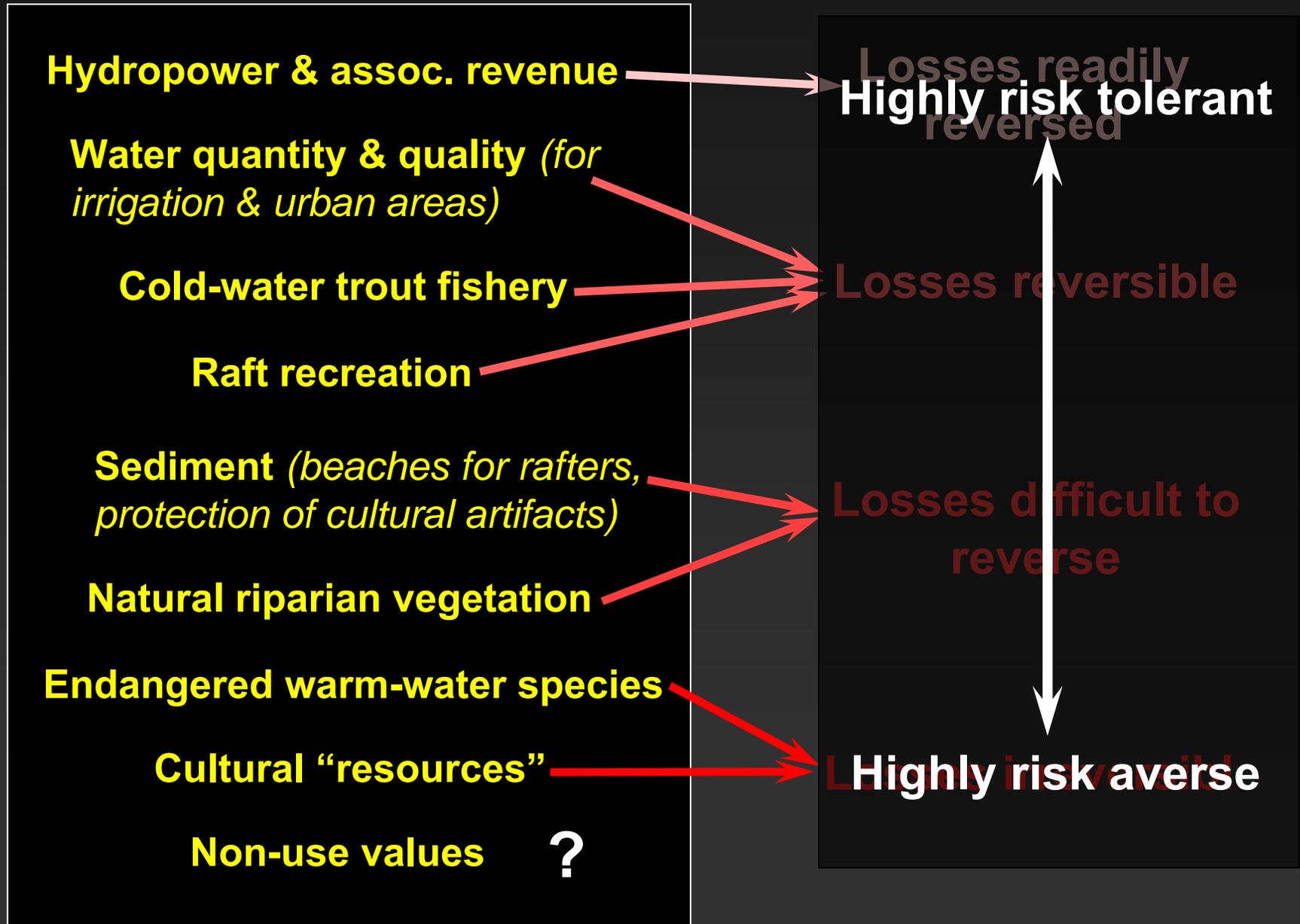
## Glen Canyon Dam Adaptive Management Program

***Outcome: Indulgence of Privileged Interests & Values***

**Glen Canyon Dam Adaptive Management Program**  
***“Science” as politicized allocation of risk***

*Valued tangibles & intangibles as  
outcomes of decision process*

*Nature of associated risk*



# Glen Canyon Dam Adaptive Management Program

## *Allocation of risk in practice?*

**Opaque**

**Implicit (rather than explicit) to the practice of science**

How burden of proof is allocated

How uncertainty is managed

Timeliness of reporting to stakeholders

**Largely uncivil**

**The order of risk aversion largely inverted**

# Glen Canyon Dam Adaptive Management Program

## *Politicized allocation of risk*

*Placement of a large burden of risk on  
valued things that are:*

*Difficult to monetize*

*Difficult to measure*

*At greatest risk of irreparable loss*

**Often legitimized by invoking  
“rigorous science”**

## Glen Canyon Dam Adaptive Management Program

### *Other indulgences of privileged interests & values*

*Gravitation toward “tech” fixes that do not challenge privileged interests & values*

**Mechanical removal of predators**

**Population augmentation**

**Artificial camping platforms**

**Sediment augmentation**

## Glen Canyon Dam Adaptive Management Program

### *Other indulgences of privileged interests & values*

Discussion of certain issues related to power generation & dam removal are not allowed.

Power revenue interests hold a monopoly on economic analyses, which are “privileged” information.

Independent economic analyses that consider “non-use” values are specifically not funded.

Cultural monitoring and information-gathering activities are under-funded (c. \$300K per year).

Information about intangibles valued by Tribes is given essentially no consideration.

**POLITICIZED “SCIENCE”**

**Glen Canyon Dam Adaptive Management Program**  
***Other indulgences of privileged interests & values***

**But...**

***“Science constrains the decision space...”***  
**available to power-wealth interests**

**So...**

**What are some lessons from the Glen Canyon Dam Adaptive Management experience?**

**Insure that all important valued tangibles  
& intangibles are identified**

**Provide a fair process for allocating resources  
to gather information on valued elements**

**Insure a fair process for making collective  
decisions about values in science**

*Questions asked*

*Standards applied*

*Allocating burden of proof*

*Allocating risk*

*Management of uncertainty*

**Edify or otherwise neutralize influential  
adherents of the myth of Scientific Management**

**Neutralize (to the extent possible!) the intrinsic advantages of wealth → power interests**

**Insure equitable representation of worldviews & values in stakeholder processes**

**Focus on creating a collective shared vision for process and outcomes**

**Establish decision protocols that encourage pursuit of common ground**

**Establish and enforce rules of civil conduct**

**Foster participant skills in collaboration & civility**

**Identify & manage the behaviors of destructive stakeholders**

***“Leadership is a big part of the problem and  
a big part of the solution”***

**Foster effective democratic leaders**

**Foster self-reflection and mindfulness**

**Foster respect & universalism**  
*(self-transcendence)*