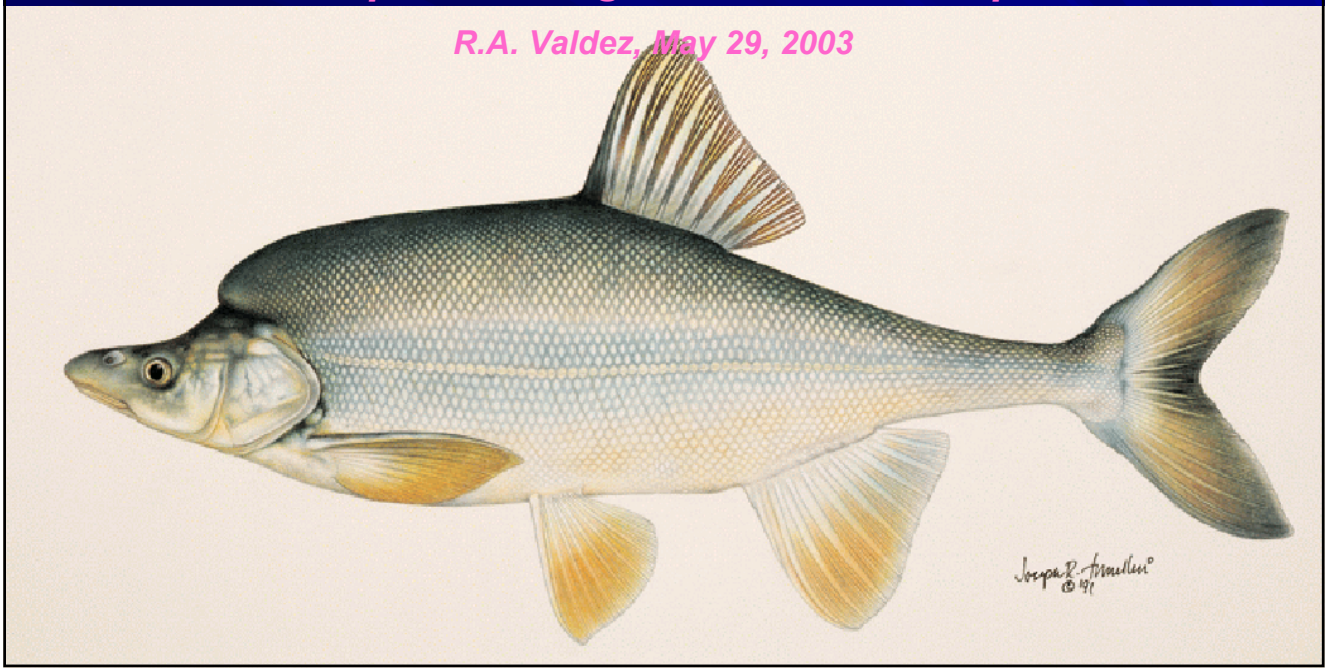
STATUS OF THE HUMPBACK CHUB In The Colorado River Basin

Presentation To The

Adaptive Management Work Group

R.A. Valdez, May 29, 2003



Outline Of This Presentation

- Historic and Present Distribution
- Status of the Six Populations
- Threats to Upper and Lower Basin Recovery Units
- Recovery Goals

HISTORIC AND PRESENT DISTRIBUTION

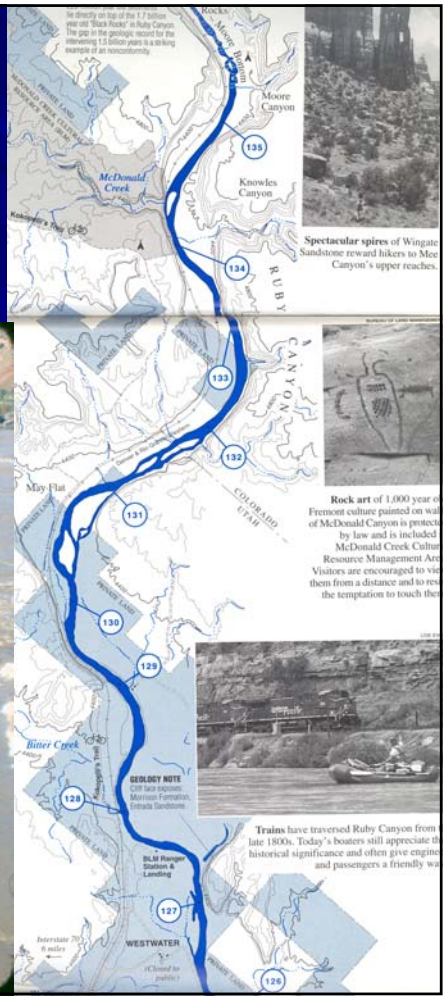
Population	Historic	Present (miles)
1. Black Rocks	1	1
2. Westwater Canyon	9	9
3. Yampa Canyon	30	30
4. Deso/Gray Canyons	70	70
5a Cataract Canyon	36	13
5b. Narrow Canyon	7	0
6a. Grand Canyon	214	159
6b. Marble Canyon	61	32
6c. Little Colorado River	90	9
7. Flaming Gorge	20	0
8. Lodore Canyon	14	0
9. Whirlpool Canyon	10	1
10. Split Mtn. Canyon	7	1
Summary:	569 (100%)	325 (57%)

Status of the Six Populations

1. Black Rocks
2. Westwater Canyon
3. Yampa Canyon
4. Deso/Gray Canyon
5. Cataract Canyon
6. Grand Canyon

1. Black Rocks

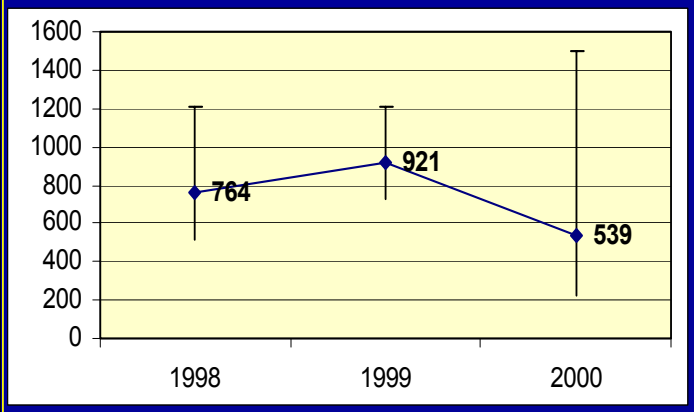
- First Report: 1976 (Kidd 1977)
- 1-mile of exposed Proterozoic gneiss
- 10 miles upstream of Westwater Canyon
- Movement of HBC to/from Westwater Canyon



1. Black Rocks

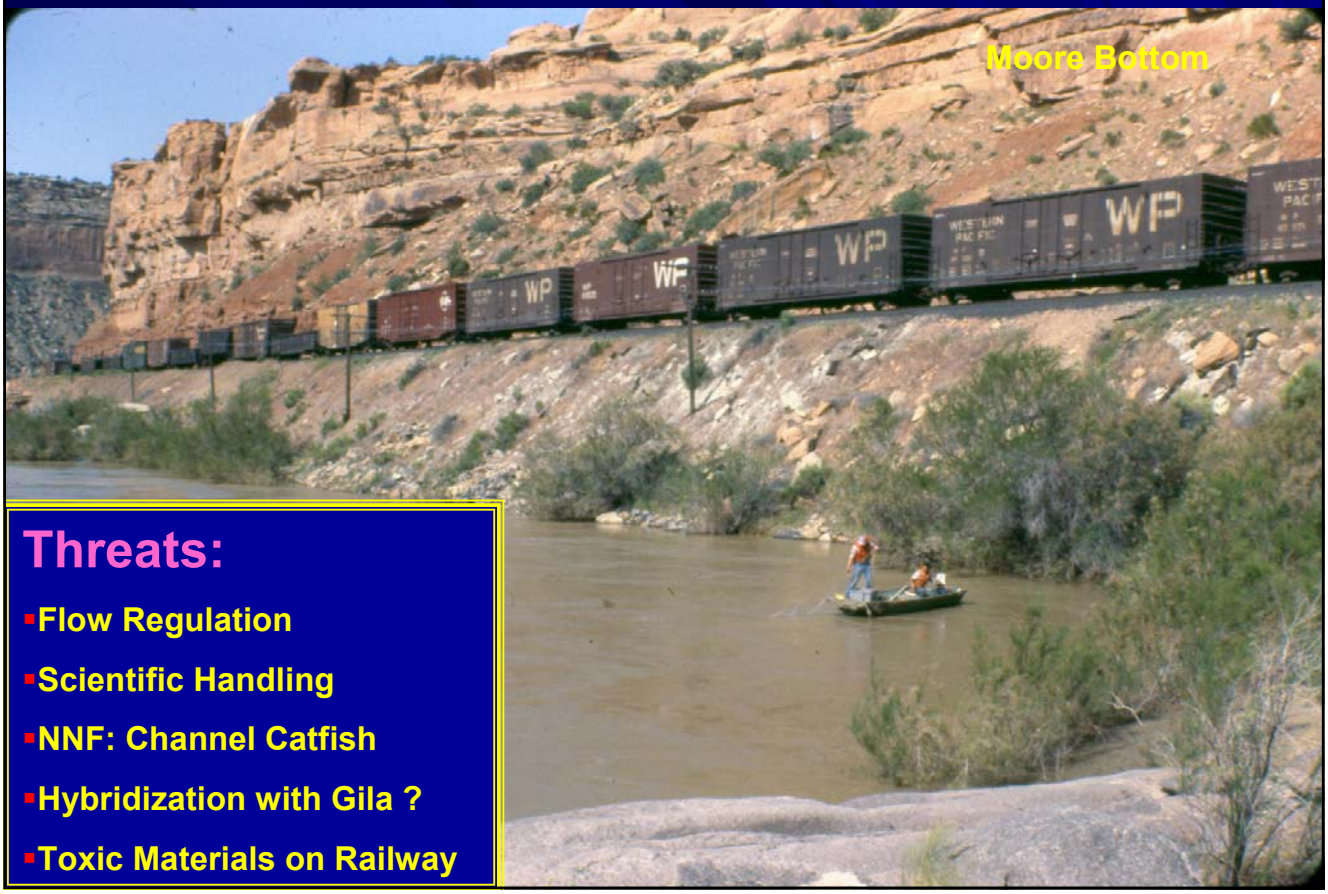
1. Black Rocks

Adult Pop. Est. (McAda 2002):



Moore Bottom

1. Black Rocks

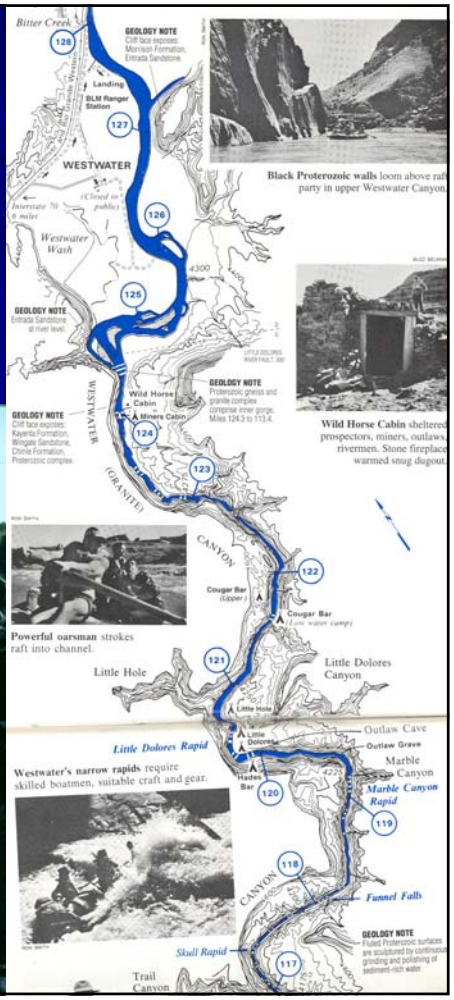


Threats:

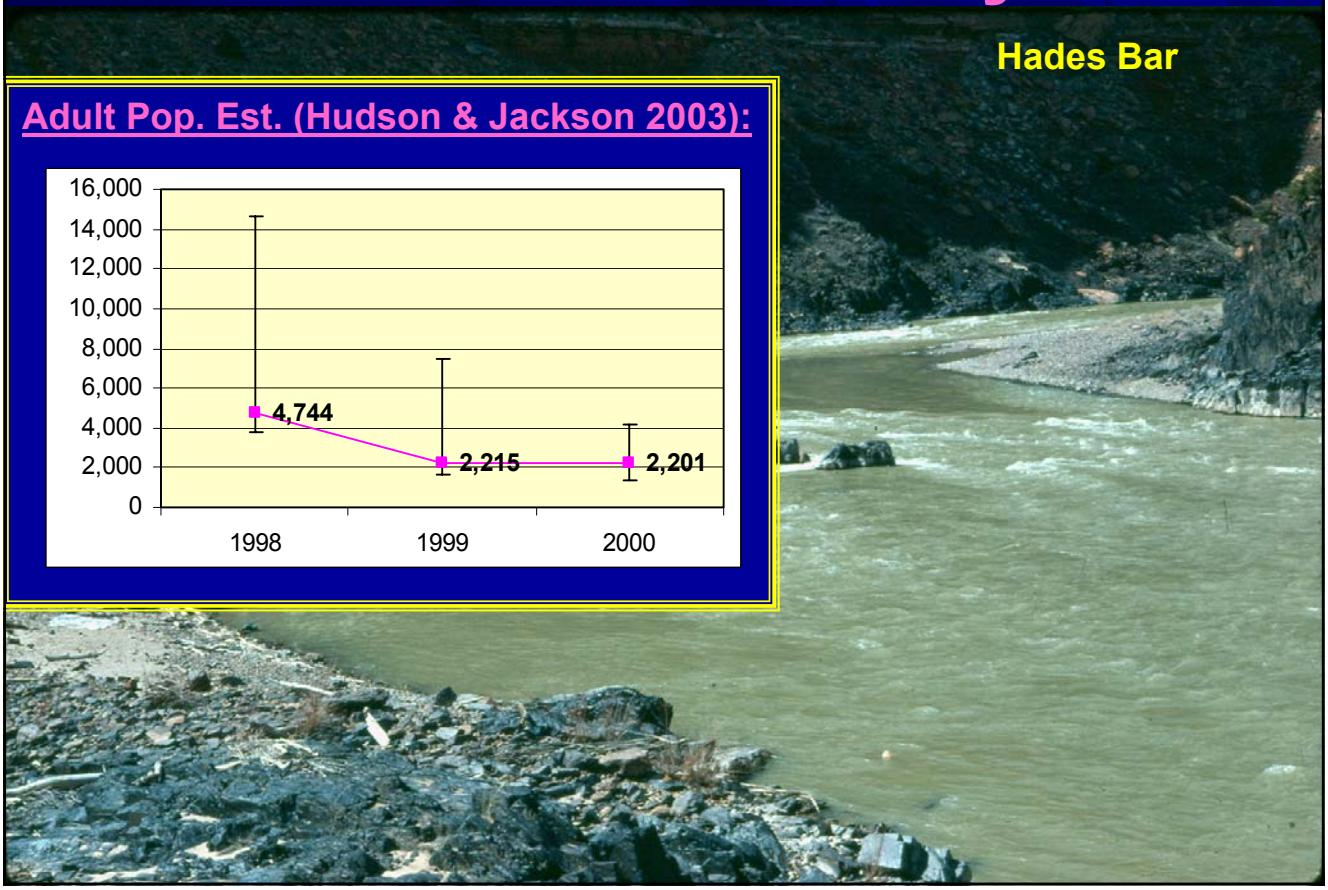
- Flow Regulation
- Scientific Handling
- NNF: Channel Catfish
- Hybridization with Gila ?
- Toxic Materials on Railway

2. Westwater Canyon

- First Report: 1979 (Valdez et al. 1982)
- 9-miles of exposed Proterozoic gneiss
- 10 miles downstream of Black Rocks
- Movement of HBC to/from Black Rocks

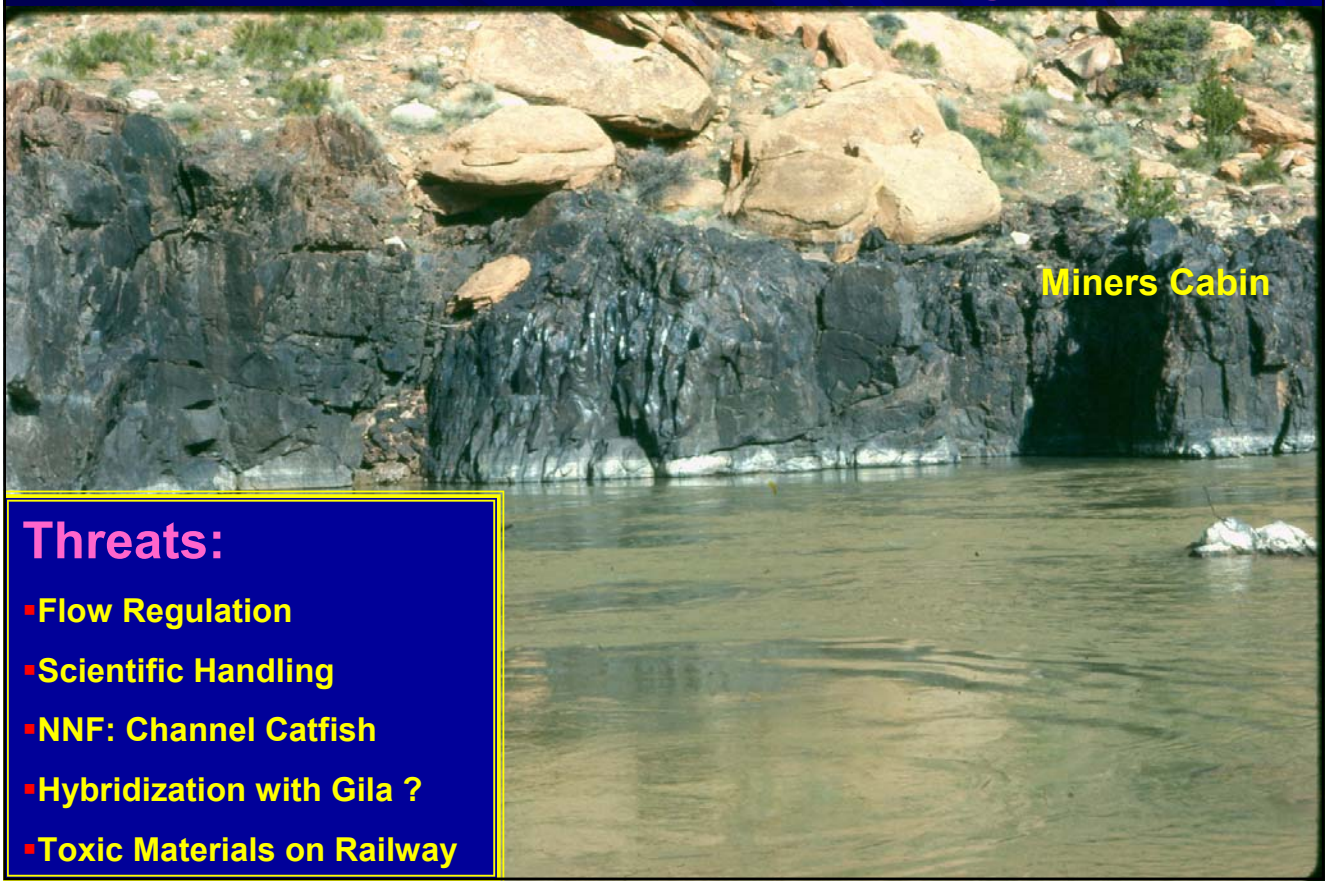


2. Westwater Canyon



Adult Pop. Est. (Hudson & Jackson 2003):

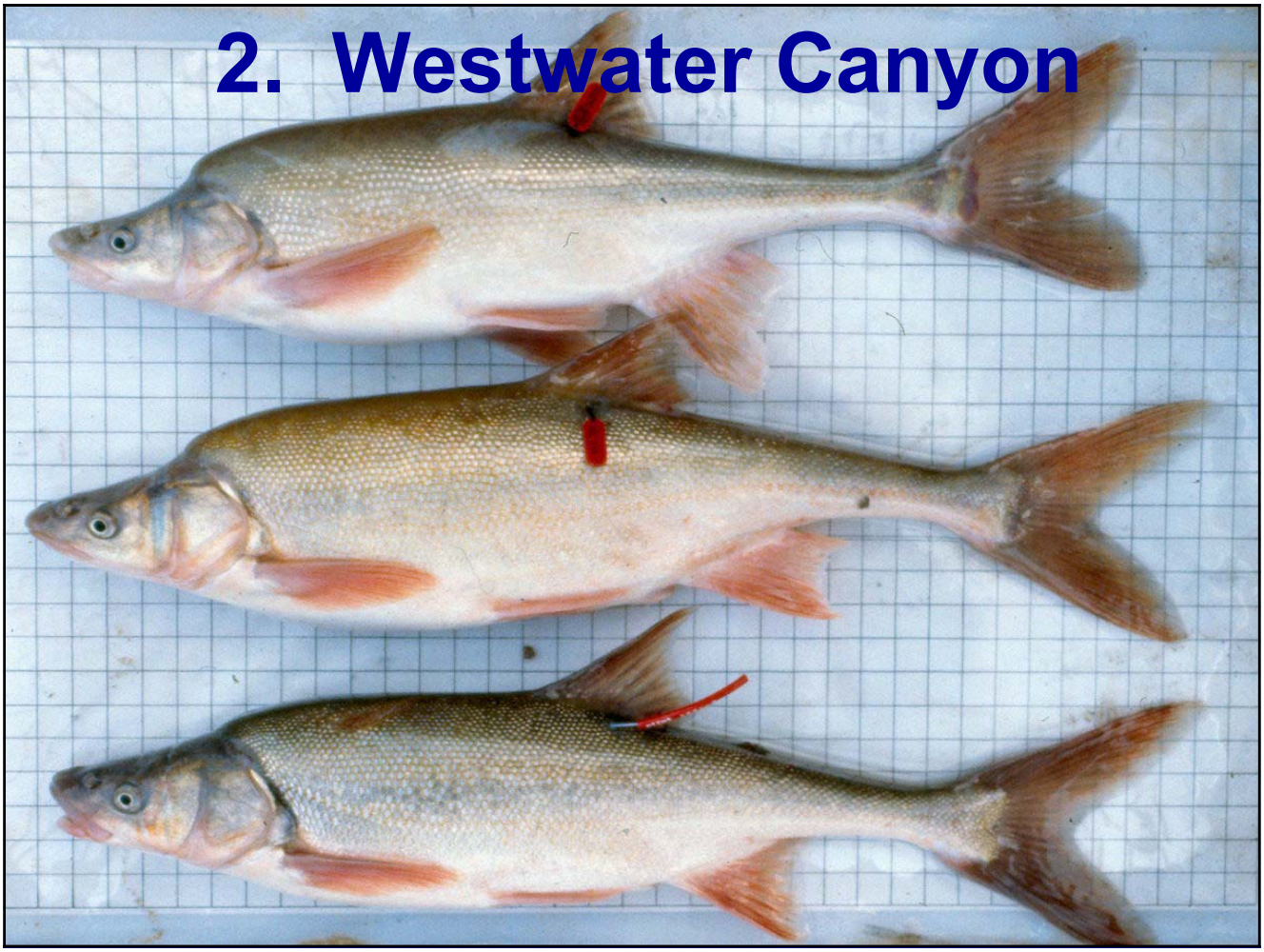
2. Westwater Canyon



Threats:

- Flow Regulation
- Scientific Handling
- NNF: Channel Catfish
- Hybridization with Gila ?
- Toxic Materials on Railway

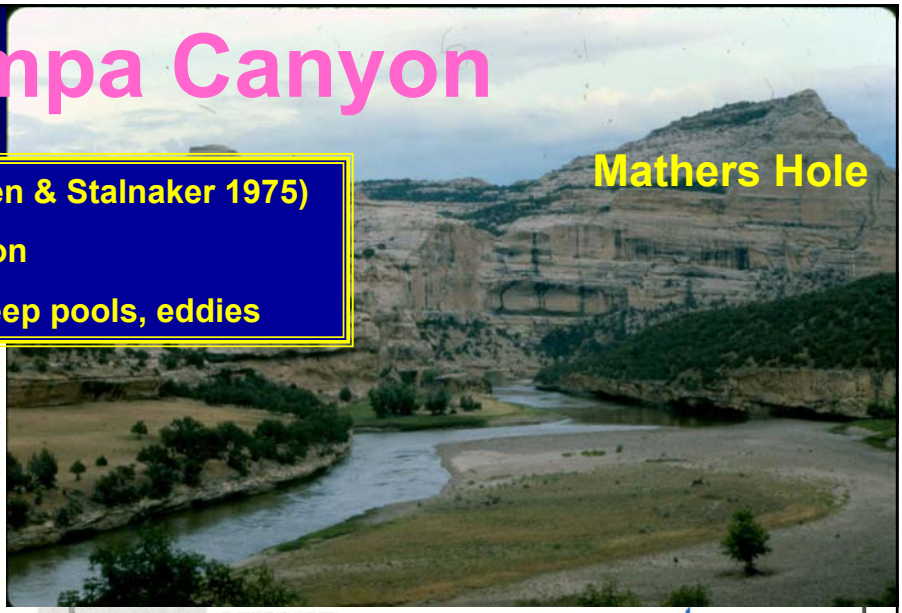
2. Westwater Canyon

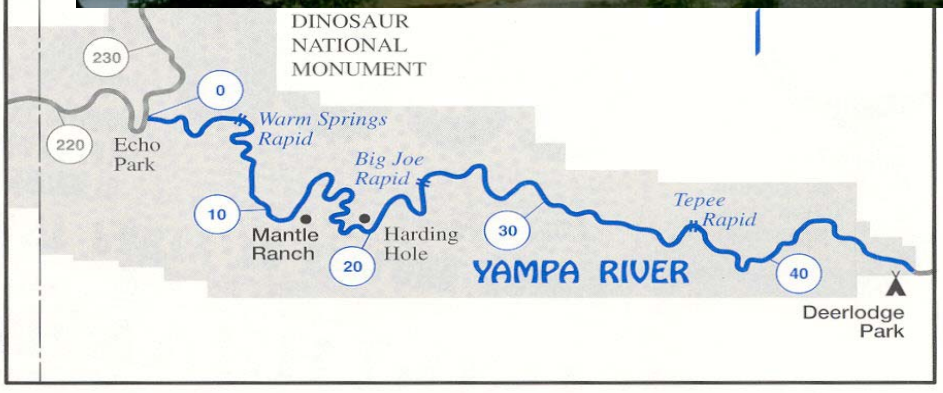


2. Westwater Canyon

3. Yampa Canyon

- First Report: 1970 (Holden & Stalnaker 1975)
- 30 miles in Yampa Canyon
- Clumped distribution: deep pools, eddies





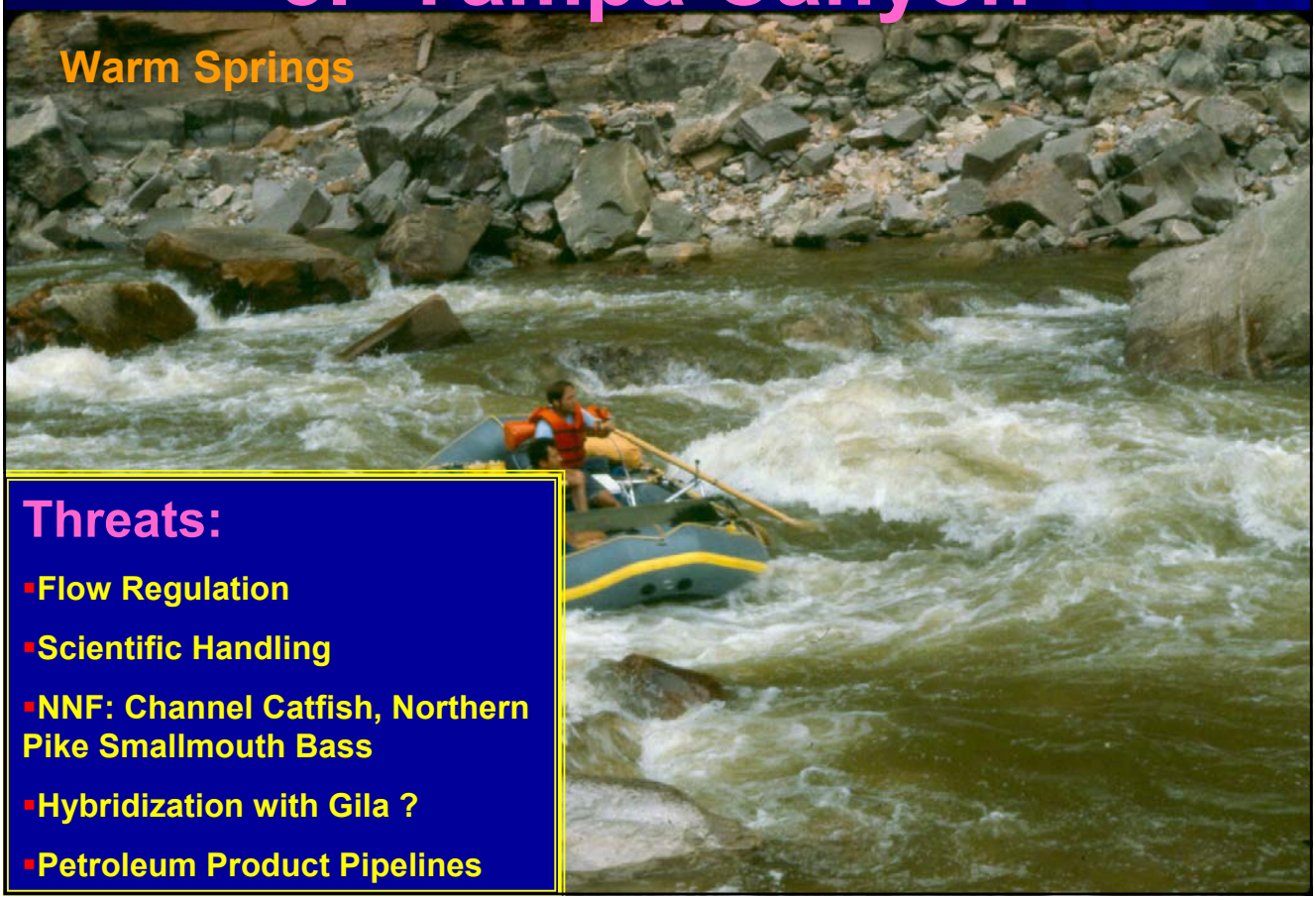
3. Yampa Canyon

Adult Pop. Est. (Haines & Modde 2002):

200	SE = 66
500	SE = 162
1,000	SE = 276

Little Joe

3. Yampa Canyon

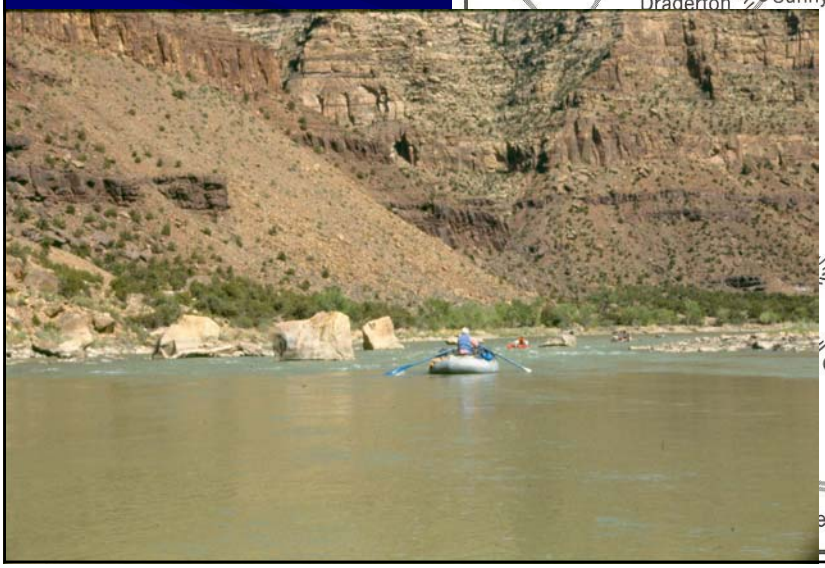


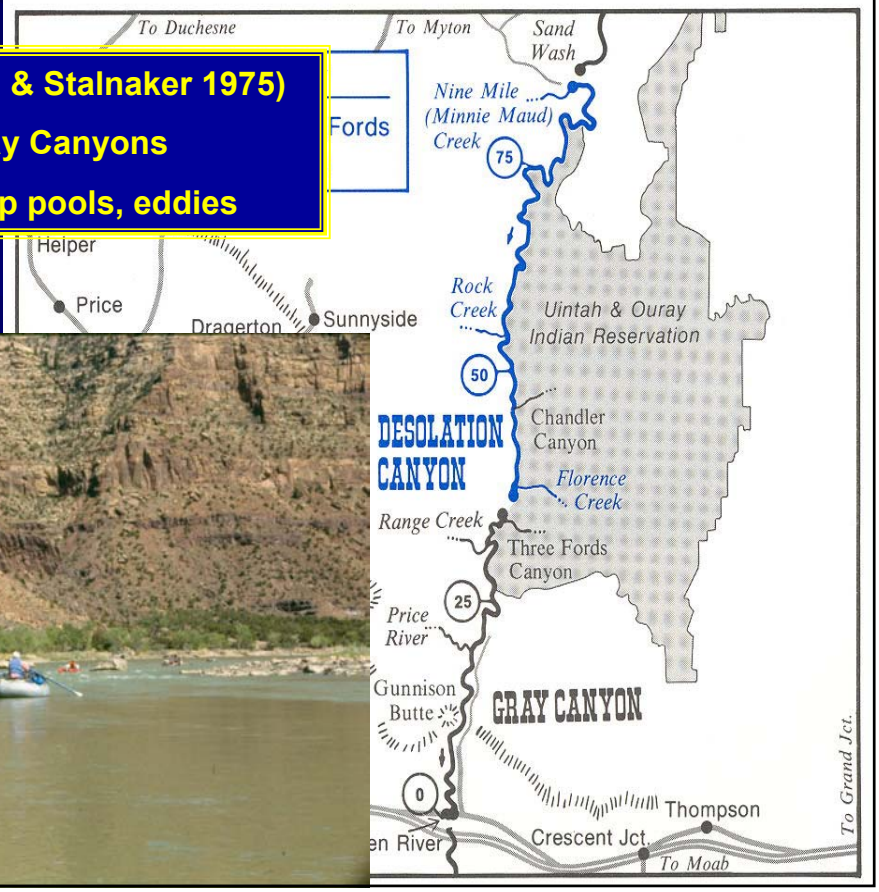
Threats:

- Flow Regulation
- Scientific Handling
- NNF: Channel Catfish, Northern Pike Smallmouth Bass
- Hybridization with Gila ?
- Petroleum Product Pipelines

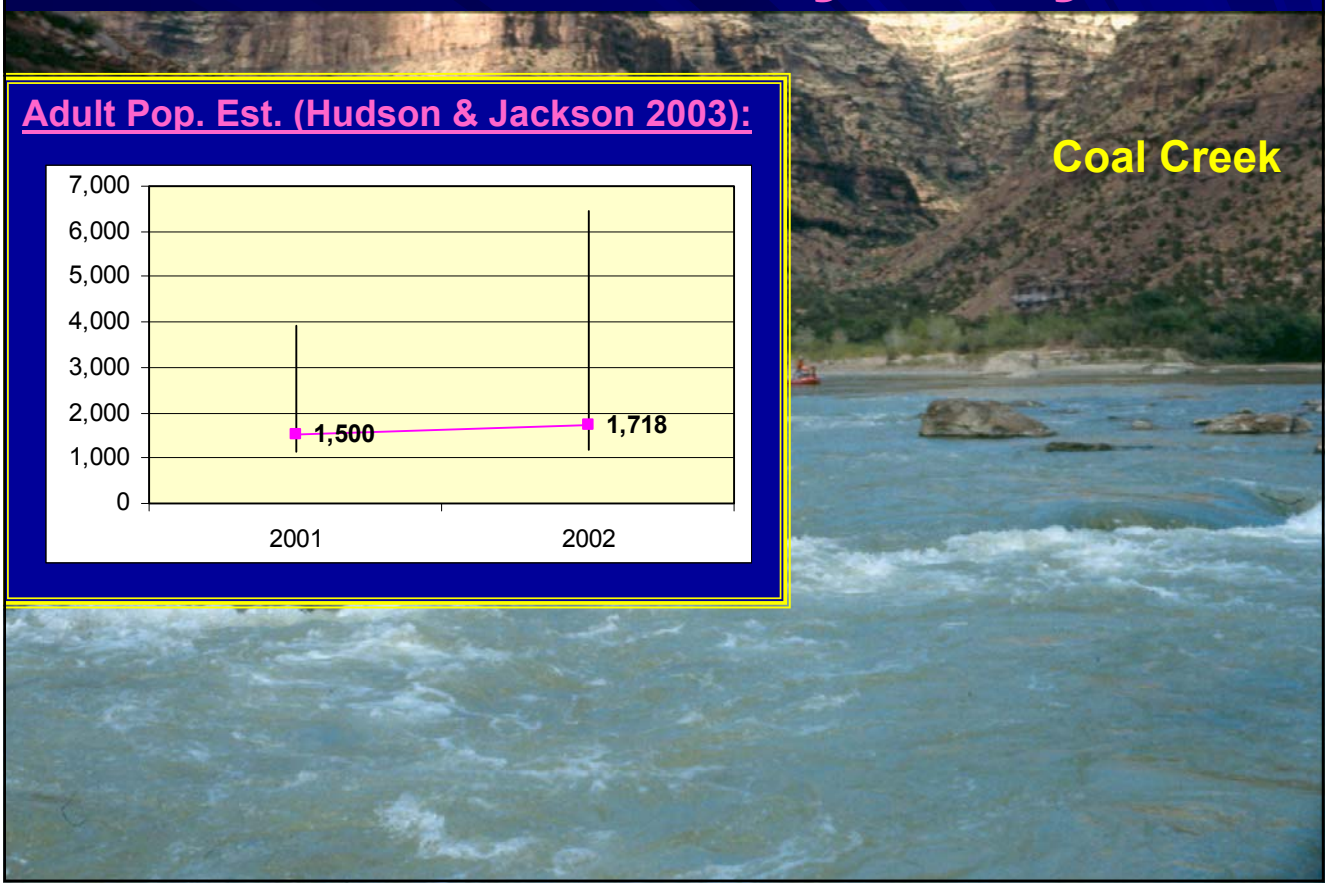
4. Desolation/Gray Canyons

- First Report: 1970 (Holden & Stalnaker 1975)
- 70 miles in Desolation/Gray Canyons
- Clumped distribution: deep pools, eddies





4. Desolation/Gray Canyons



Adult Pop. Est. (Hudson & Jackson 2003):

4. Desolation/Gray Canyons

Threats:

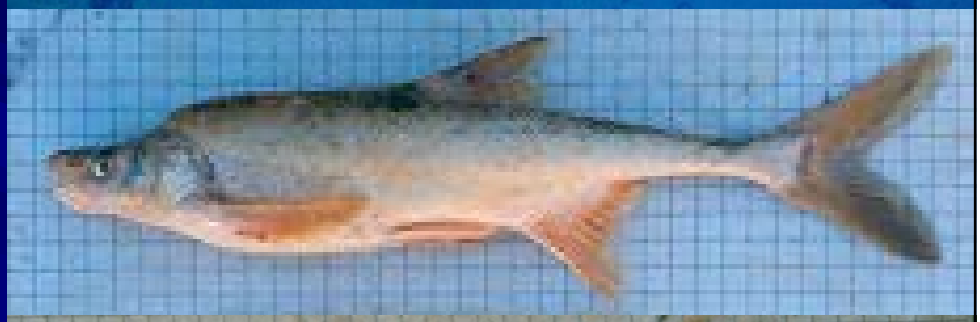
- Flow Regulation
- Scientific Handling
- NNF: Channel Catfish, Carp
- Hybridization with Gila ?

4. Desolation/Gray Canyons

4. Desolation/Gray Canyons

Roundtail Chub
(*Gila robusta*)

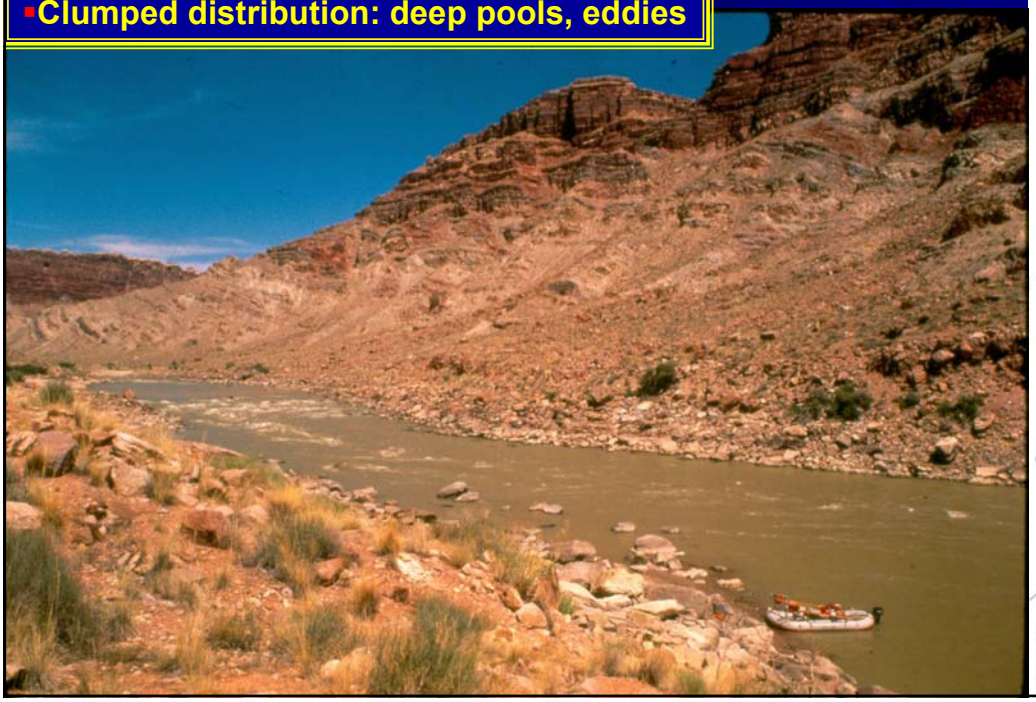
Humpback Chub
(*Gila cypha*)

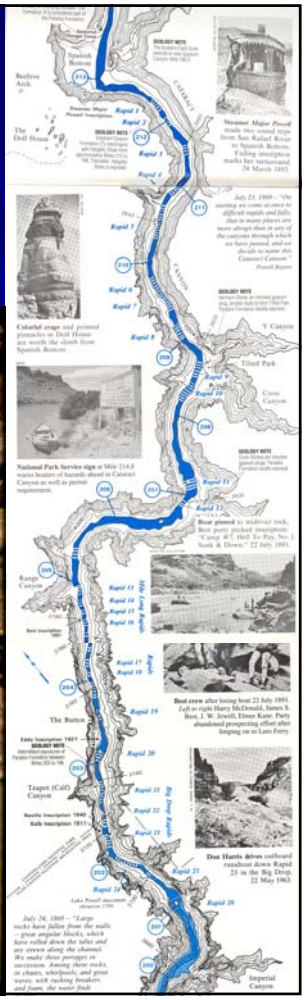


Bonytail
(*Gila elegans*)

5. Cataract Canyon

- First Report: 1979 (Valdez et al. 1982)
- 13 miles in Cataract Canyon
- Clumped distribution: deep pools, eddies



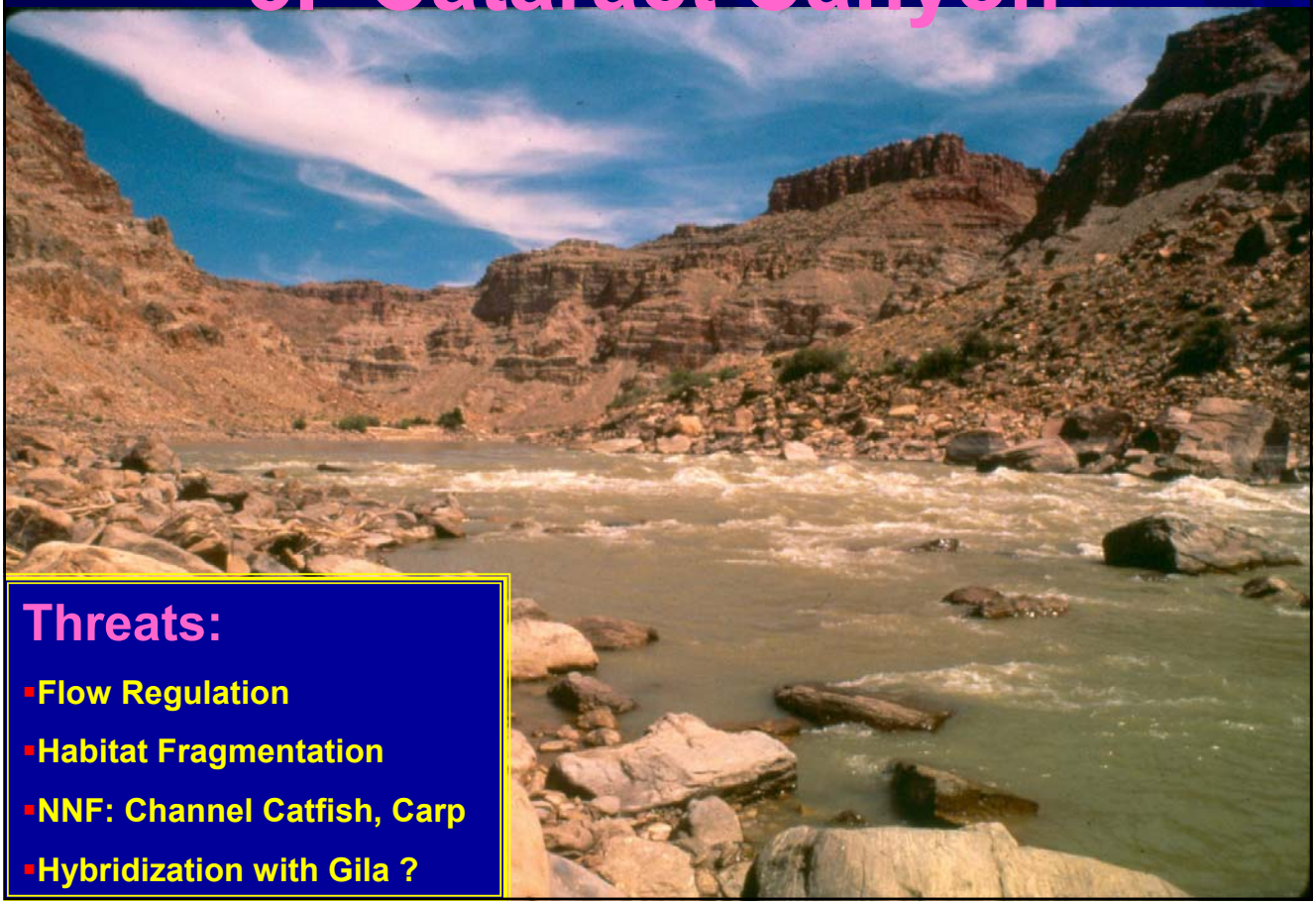


5. Cataract Canyon

Adult Pop. Est. (Valdez 2002):

Peterson ~500

5. Cataract Canyon



Threats:

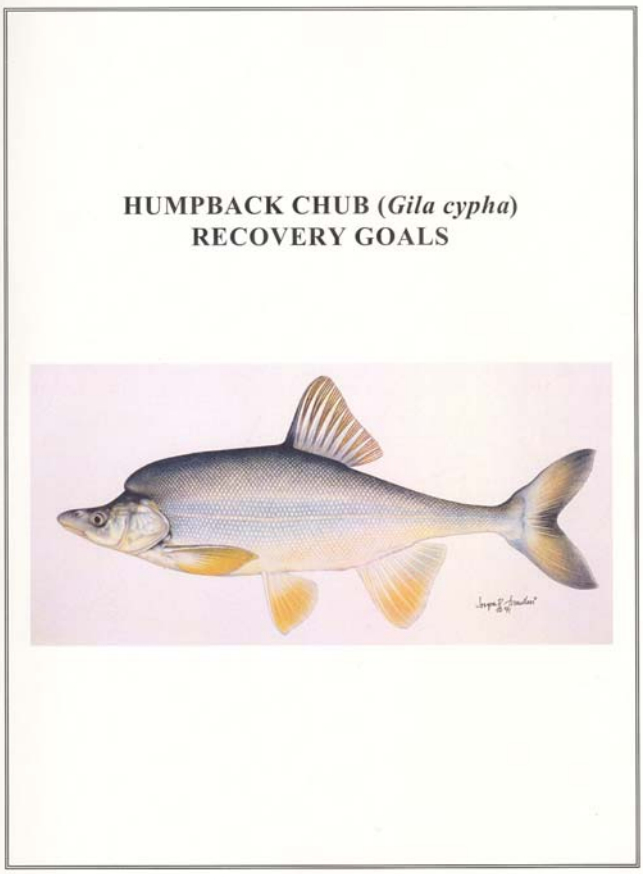
- Flow Regulation
- Habitat Fragmentation
- NNF: Channel Catfish, Carp
- Hybridization with Gila ?

5. Cataract Canyon

HUMPBACK CHUB RECOVERY GOALS

ESA Section 4(f)(1)(B)

- **Site-Specific Management Actions**
- **Objective, Measurable Criteria**
- **Estimates of Time and Costs**



Five Listing Factors

ESA Section 4(c)(2)(B)

(A) "The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) overutilization for commercial, recreational, scientific, or educational purposes;

(C) disease or predation;

(D) the inadequacy of existing regulatory mechanisms; and

(E) other natural or manmade factors affecting its continued existence."

SITE-SPECIFIC MANAGEMENT ACTIONS

Recovery Factor Criteria For Downlisting
Upper Basin Recovery Unit

RECOVERY FACTOR A: Adequate Habitat and Range for Recovered Populations

1. Flow regimes identified, implemented, evaluated, revised

RECOVERY FACTOR B: Protection From Overutilization

2. Overutilization for commercial, recreational, scientific, or educational purposes re-evaluated and actions identified to ensure adequate protection

RECOVERY FACTOR C: Adequate Protection From Diseases and Predators

3. Effects of diseases and parasites re-evaluated and actions identified to ensure adequate protection
4. Procedures for stocking nonnative fish species developed, implemented, evaluated to minimize negative interactions
5. Channel catfish control in Yampa Canyon and Deso/Gray canyons

RECOVERY FACTOR D: Adequate Existing Regulatory Mechanisms

6. Mechanisms determined for legal protection of adequate habitat
7. Conservation Plans for long-term management and protection

RECOVERY FACTOR E: Other Natural Or Manmade Factors-Protection Is Provided

8. State and Federal spills emergency-response plans reviewed, modified
9. Measures identified to minimize risk of hazardous-materials spills in Black Rocks and Westwater
10. Petroleum-product pipelines within 100-year floodplain located and need for emergency shut-off valves determined

OBJECTIVE, MEASURABLE CRITERIA

Demographic Criteria

DOWNLIST

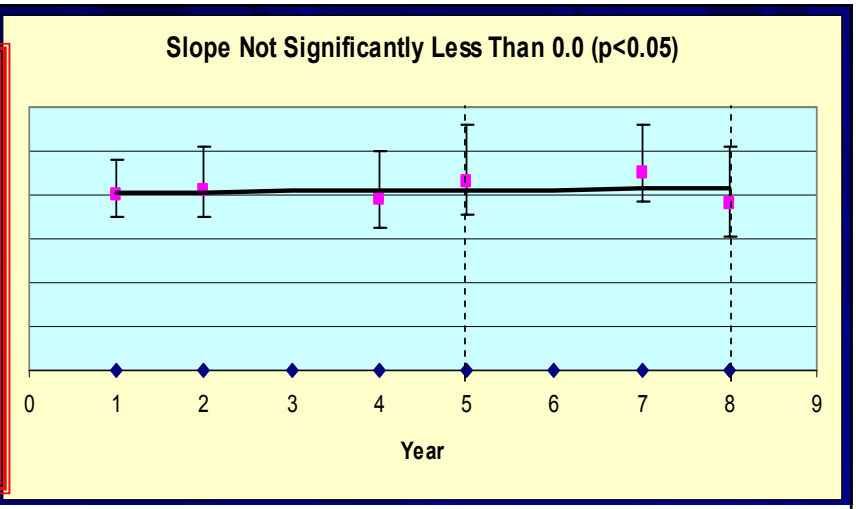
1. Each of the 5 populations maintained over a 5-year period, such that:
   a. The trend in adult (age-4+) point estimates does not decline significantly
   b. Mean estimated recruitment of age 3 equals or exceeds mean annual adult mortality
2. One of 5 pops maintained as a core, such that each point estimate exceeds 2,100 adults

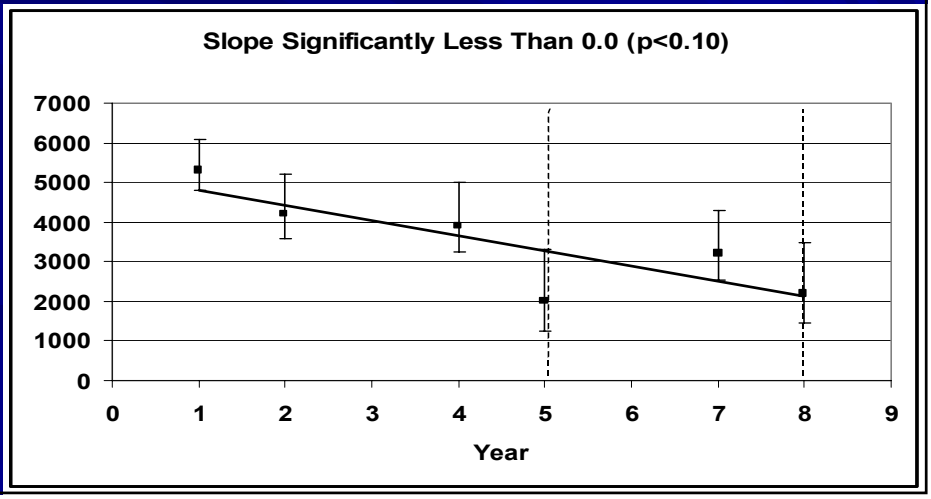
DELIST

1. Each of the 5 populations maintained over a 3-year period beyond downlist, such that:
   a. The trend in adult (age-4+) point estimates does not decline significantly
   b. Mean estimated recruitment of age 3 equals or exceeds mean annual adult mortality
2. Two of 5 pops maintained as a core, such that each point estimate exceeds 2,100 adults

Demographic Criteria

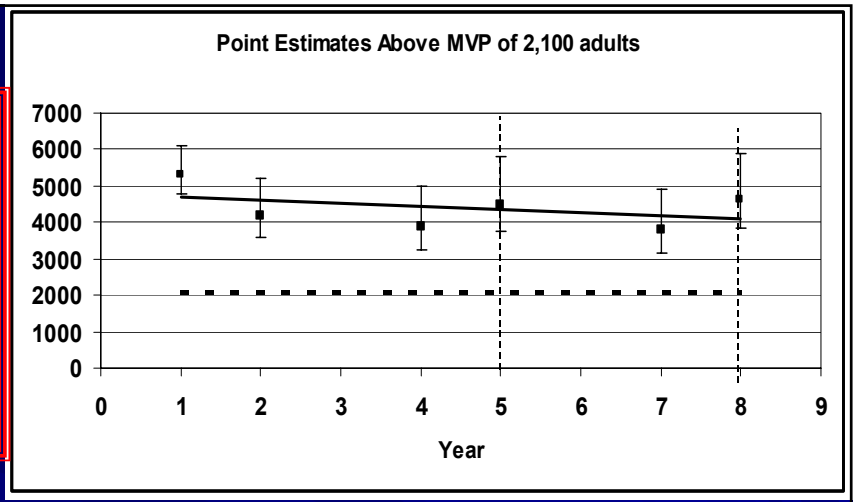
1. Each of the 5 populations maintained over a 5-year period, such that:
   a. The trend in adult (age-4+) point estimates does not decline significantly

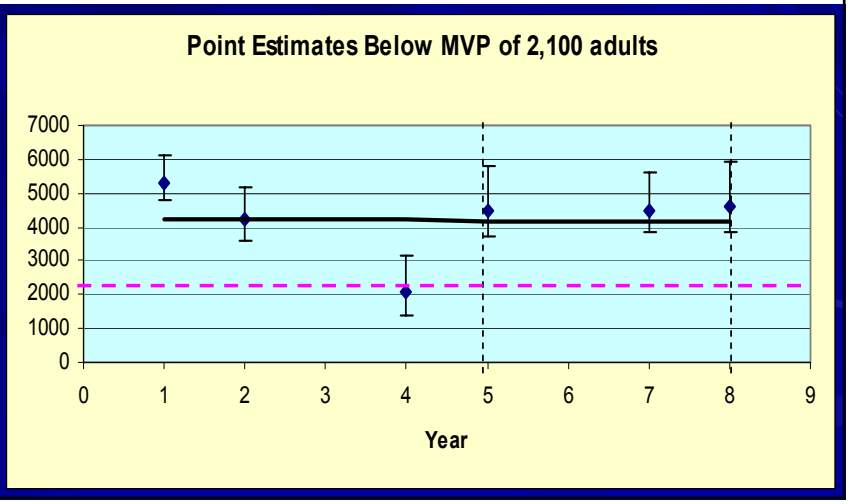




Demographic Criteria

2. One of 5 pops maintained as a core, such that each point estimate exceeds 2,100 adults





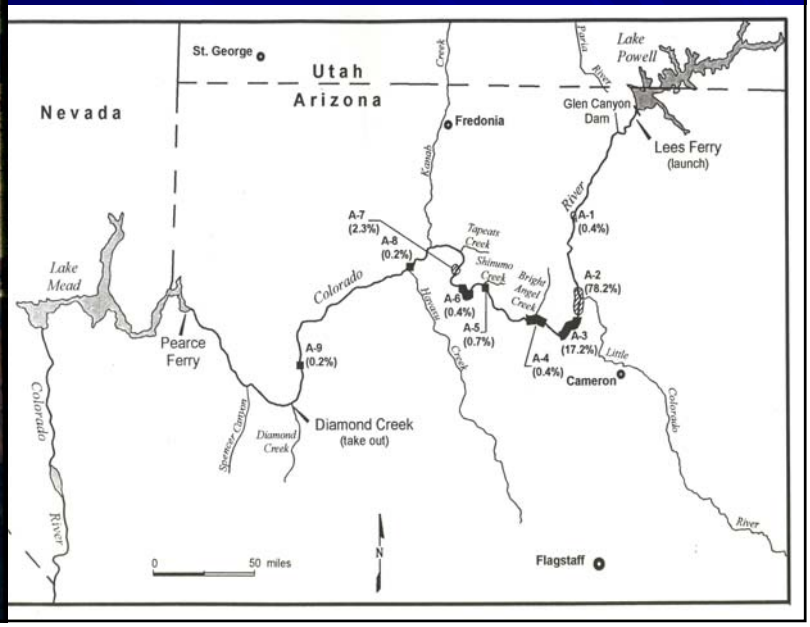
CURRENT POPULATION ESTIMATES

YEAR	N	95% CI	C.V.	P-HAT
Black Rocks				
1998	764	512-1,206	0.23	0.08
1999	921	723-1,208	0.13	0.09
2000	539	223-1,497	0.54	0.04
Westwater Canyon				
1998	4,744	3,760-14,665	0.23	0.035
1999	2,215	1,608-7,508	0.28	0.041
2000	2,201	1,335-4,124	0.28	0.041
Yampa Canyon				
2000	200	SE = 66	0.48	0.043
	500	SE = 162	0.36	0.043
	1,000	SE = 276	0.31	0.043
Desolation/Gray Canyons				
2001	1,500	1,154-3,925	0.23	0.06
2002	1,718	1,169-6,462	0.32	0.07
Cataract Canyon				
1999	~500			

C.V = Coefficient of Variation (standard deviation/estimate); Target is >= 0.10
P-HAT = Probability of Capture for an Individual Fish; Target is <=0.15 (0.10-0.20)

6. Grand Canyon

- First Report: 1945 (Miller 1946)
- 275 miles in Marble/Grand Canyon
- Currently as 9 aggregations



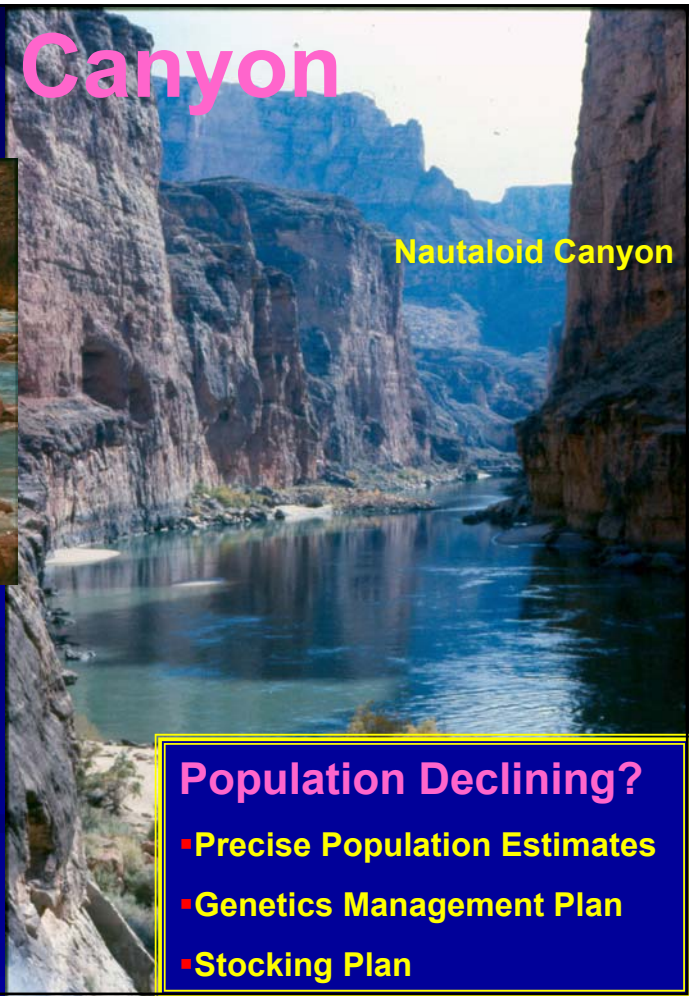
6. Grand Canyon

Adult Pop. Est. (GCMRC):

Provided by S. Gloss

6. Grand Canyon


Little Colorado River


Nautaloid Canyon

Threats:

- Flow Regulation
- Water Temperature, Clarity
- Scientific, Recreational Use
- NNF: Rainbow Trout, Brown Trout, Channel Catfish, Carp
- Lernaea, Asian Tapeworm
- Toxic Spills in LCR

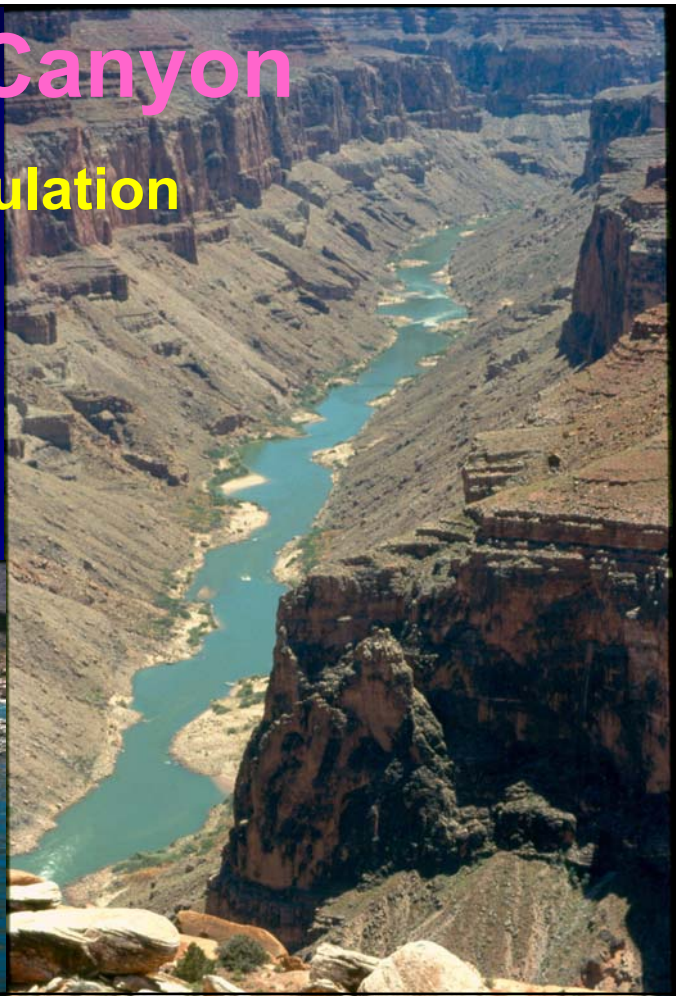
Population Declining?

- Precise Population Estimates
- Genetics Management Plan
- Stocking Plan

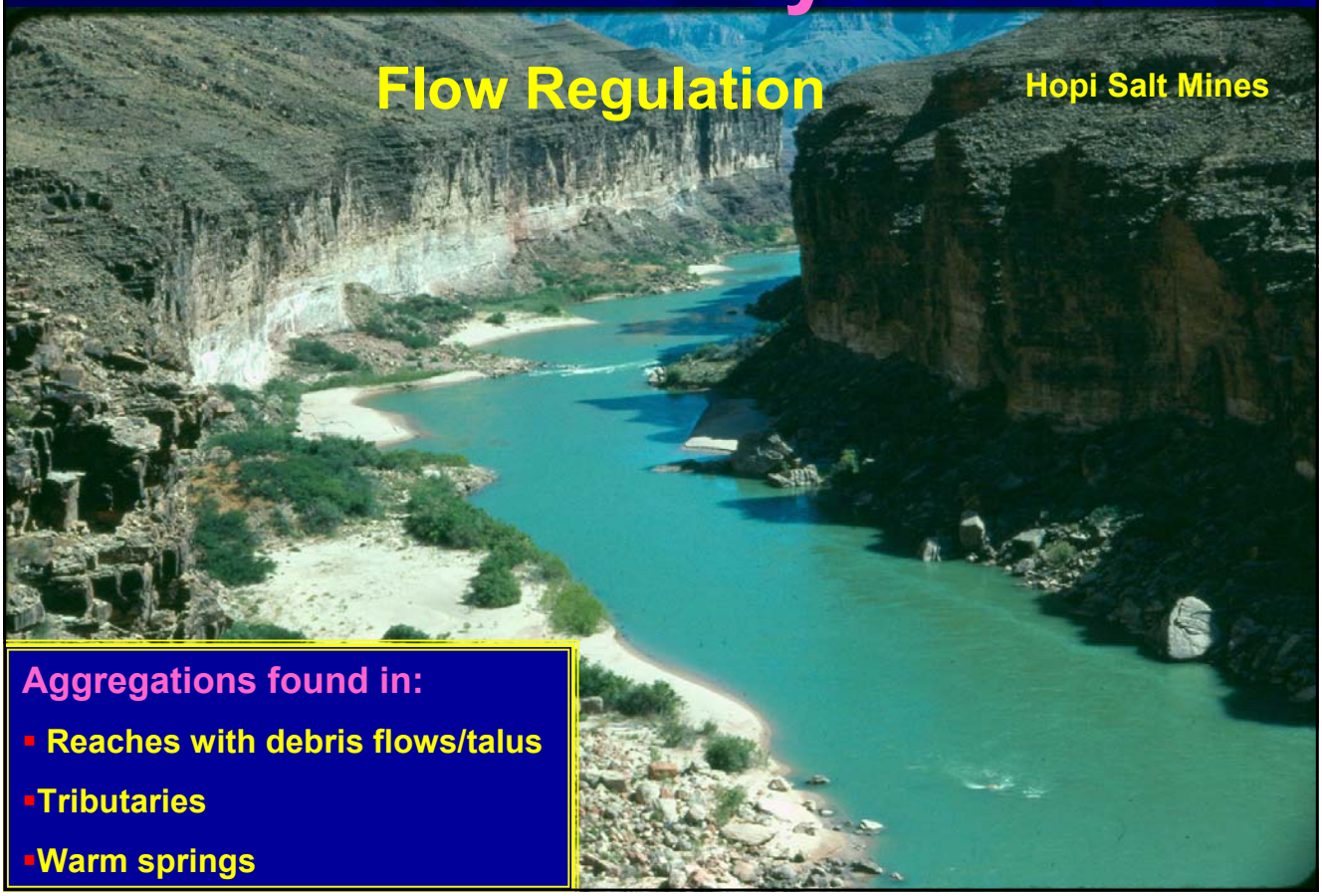
6.Grand Canyon

Flow Regulation

- Habitat availability adjusts with flow in reaches with debris flows and talus
- YOY, Juvenile use shorelines
- Adults use large eddies



6.Grand Canyon



Aggregations found in:

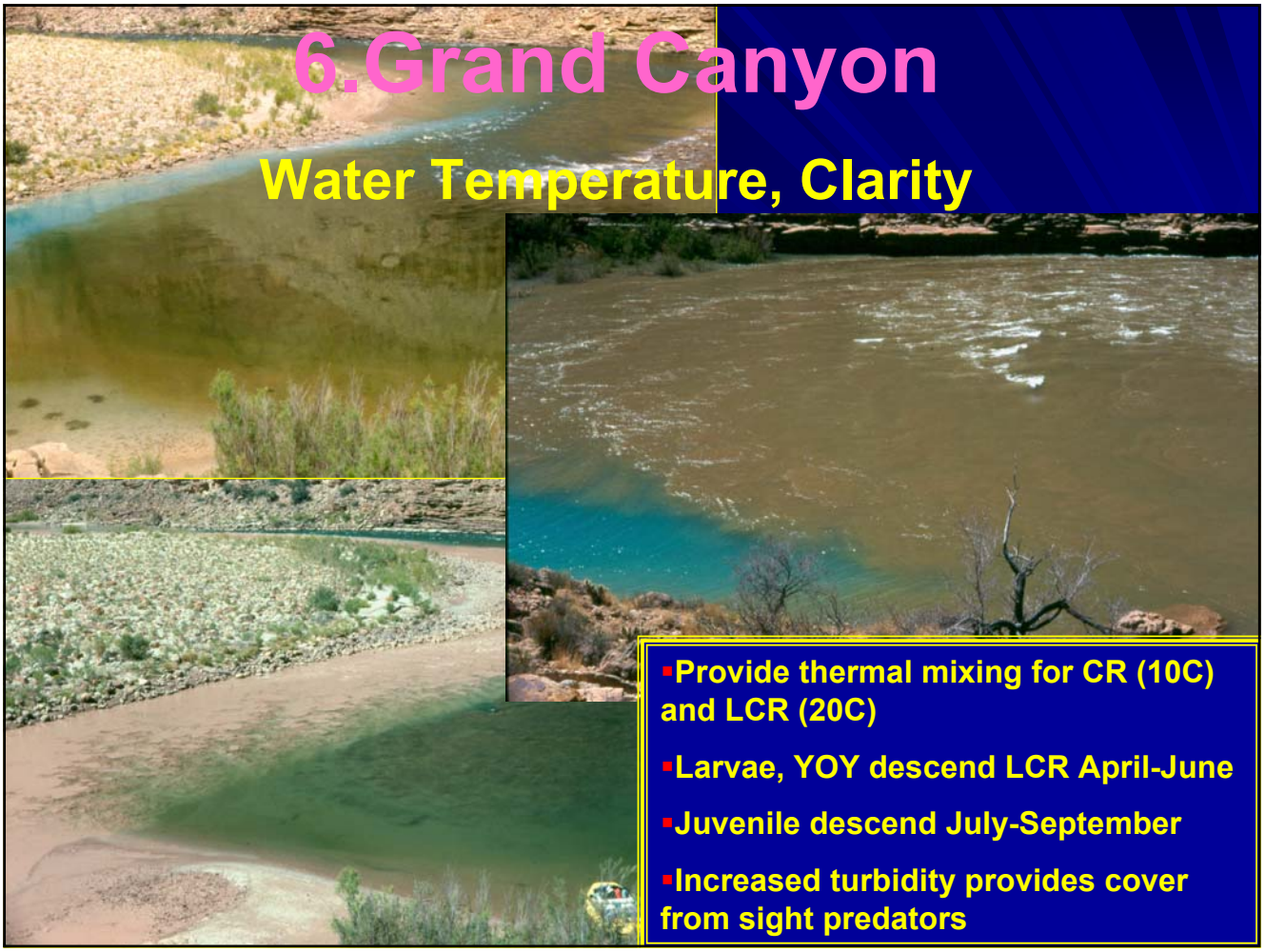
- Reaches with debris flows/talus
- Tributaries
- Warm springs

6.Grand Canyon

Water Temperature, Clarity

6.Grand Canyon

Water Temperature, Clarity



- Provide thermal mixing for CR (10C) and LCR (20C)
- Larvae, YOY descend LCR April-June
- Juvenile descend July-September
- Increased turbidity provides cover from sight predators

6.Grand Canyon

Scientific, Recreational Use

Scientific Handling:

- Sampling events per year (overlap)
- Effects of gear type (efficiency)
- Effects of handling; PIT, sonic tags

Recreational Use:

- High visitation during April-June; spawning peak for HBC in LCR
- Possibly implement closure to visitation in LCR during April-June

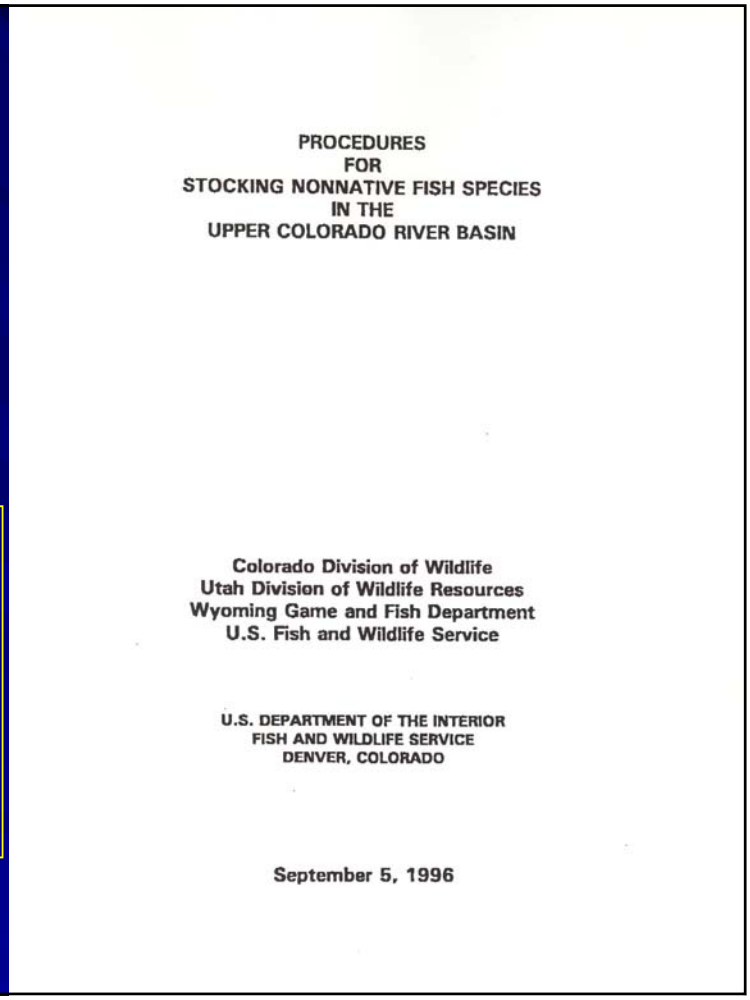
6.Grand Canyon

Non-Native Fish

- Brown Trout at Bright Angel Creek
- Rainbow Trout near LCR inflow
- Channel catfish, brown bullhead, carp in LCR
- Increased turbidity provides cover from sight predators
- Non-Native Fish Stocking Plan

Procedures For Stocking Non-Native Fishes

- Identifies state and federal NNF stocking plans
- Identifies sensitive areas (e.g., critical habitat, nurseries, spawning)
- Implements agreements (e.g., no stocking in 100-yr floodplain)



PROCEDURES
FOR
STOCKING NONNATIVE FISH SPECIES
IN THE
UPPER COLORADO RIVER BASIN

Colorado Division of Wildlife
Utah Division of Wildlife Resources
Wyoming Game and Fish Department
U.S. Fish and Wildlife Service

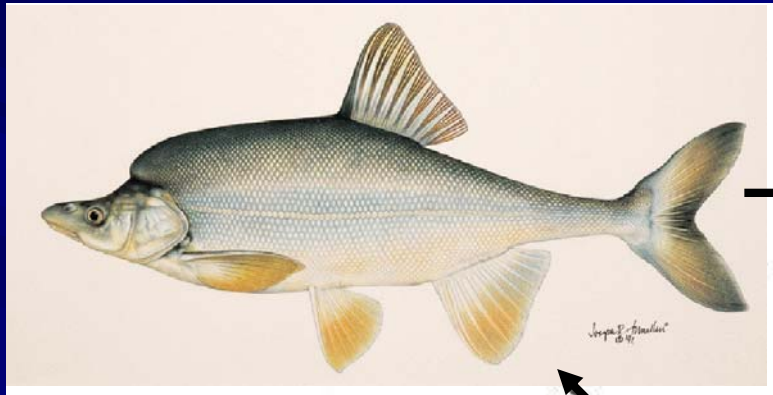
U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
DENVER, COLORADO

September 5, 1996

Life Cycle of *Lernaea cyprinacea*

Unable to Complete Life Cycle <15 C

(<1% of HBC in Mainstem)



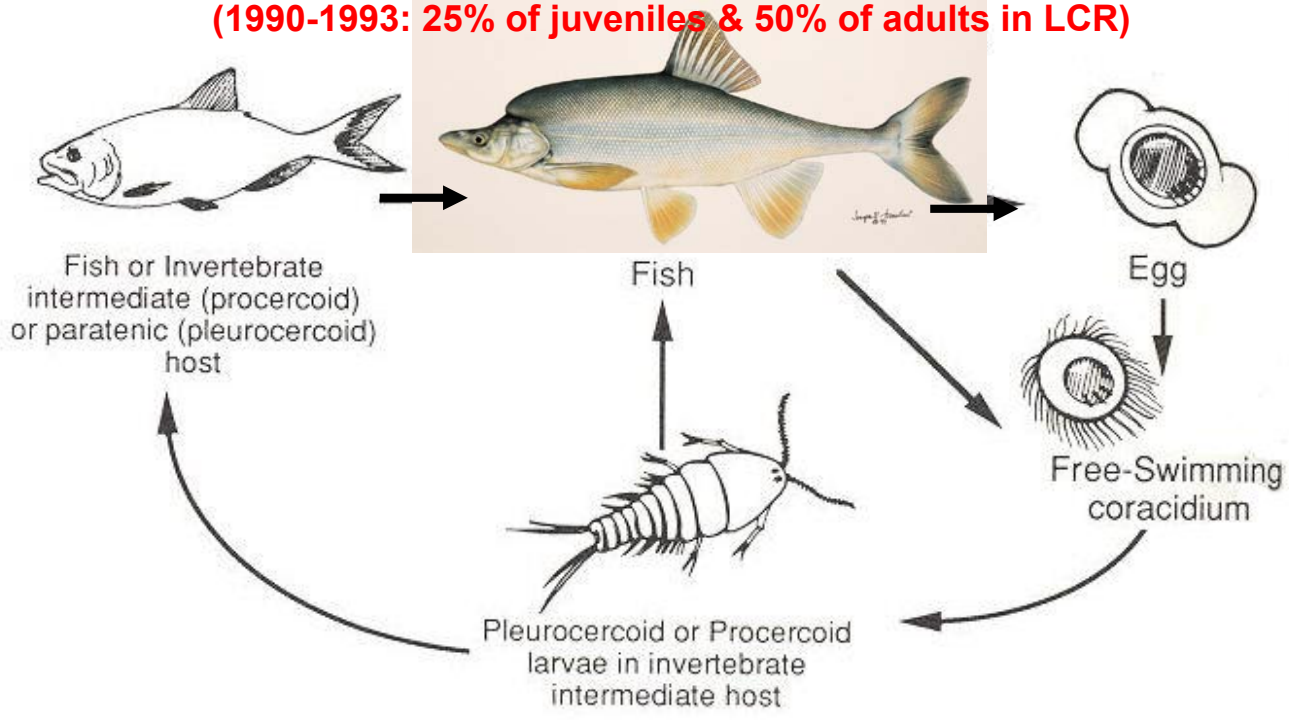
Egg

Free-Swimming coracidium

Life Cycle of Asian Tapeworm (*Bothriocephalus acheilognathi*)

Requires >20 C For Maturation of Eggs

(1990-1993: 25% of juveniles & 50% of adults in LCR)



6.Grand Canyon

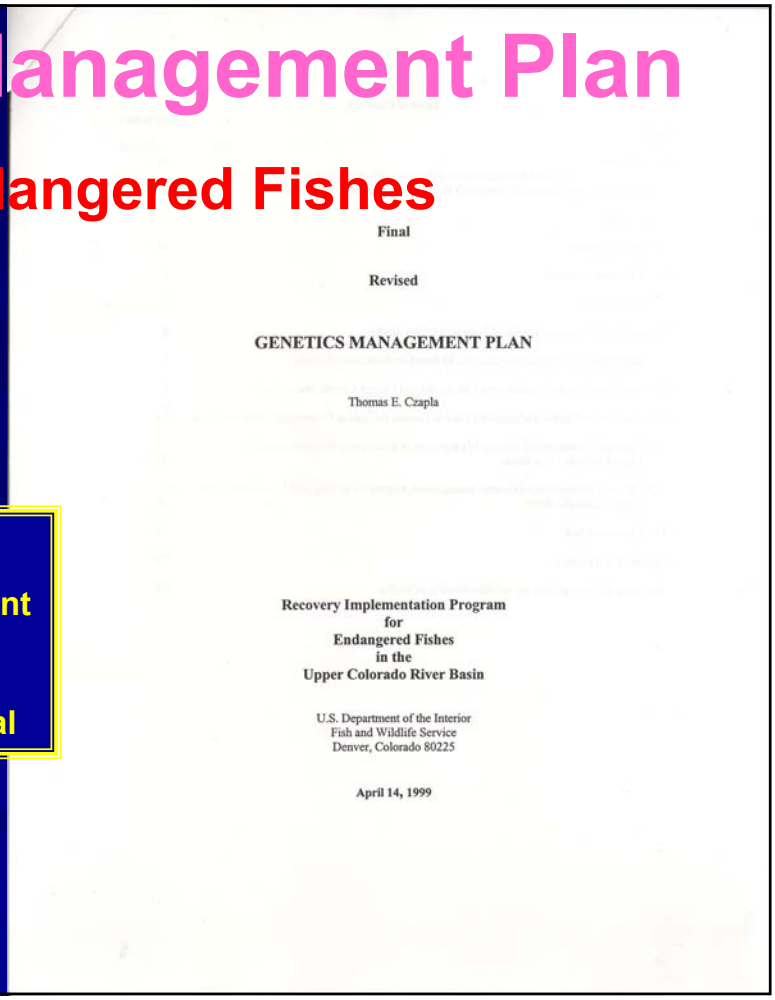
Toxic Spills in the LCR

- Identify state and federal Toxic Spill Response Plans
- Develop local plan for cleanup at Cameron Bridges, and others on LCR
- Develop and Implement LCR Watershed Management Plan

Genetics Management Plan

For Endangered Fishes

- Evaluates genetics
- Identifies broodstock development
- Identifies best culture strategies
- Insures against parasite dispersal



Final

Revised

GENETICS MANAGEMENT PLAN

Thomas E. Czapla

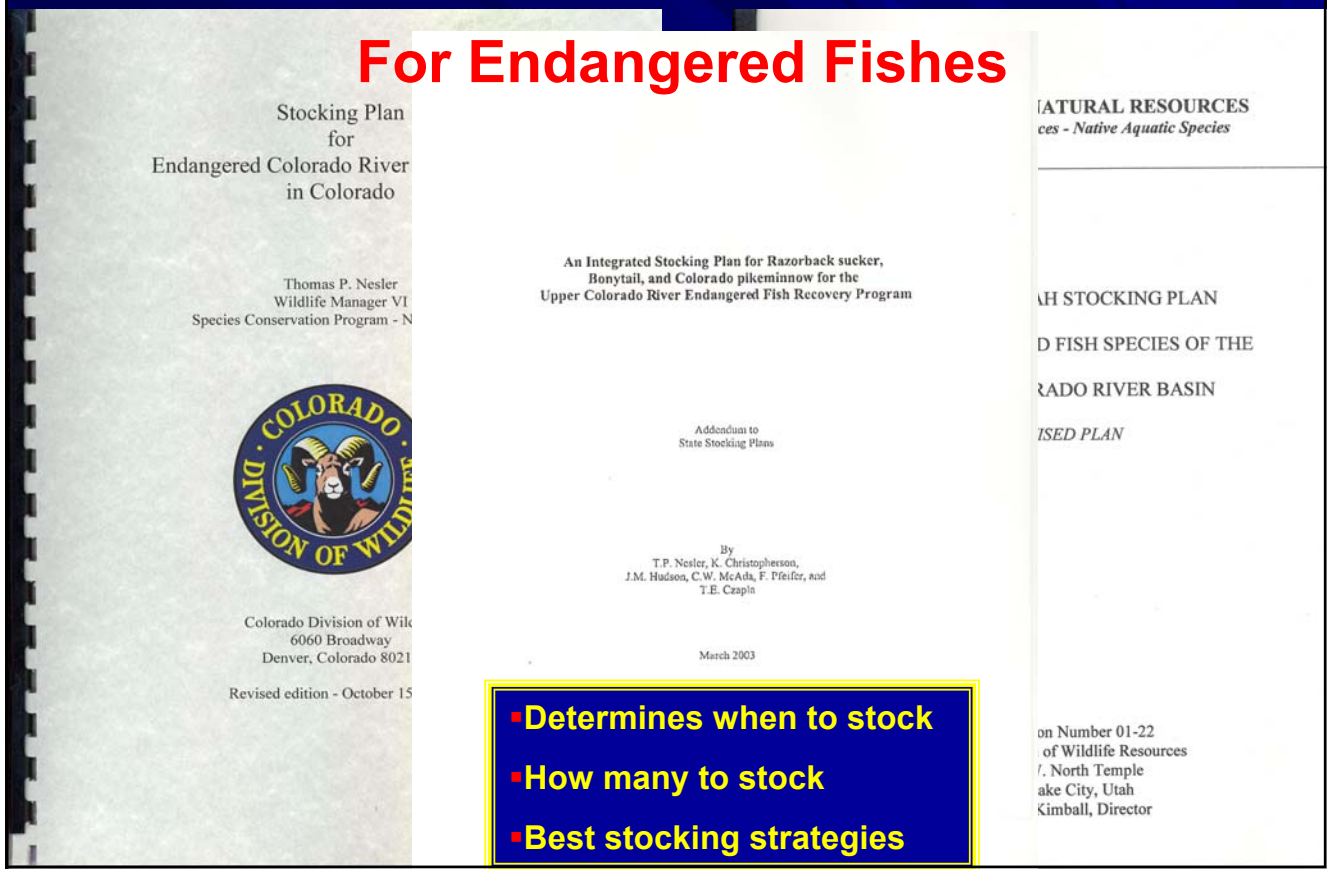
Recovery Implementation Program
for
Endangered Fishes
in the
Upper Colorado River Basin

U.S. Department of the Interior
Fish and Wildlife Service
Denver, Colorado 80225

April 14, 1999

Stocking Plans

For Endangered Fishes



- Determines when to stock
- How many to stock
- Best stocking strategies

SITE-SPECIFIC MANAGEMENT ACTIONS

Recovery Factor Criteria For Downlisting

Lower Basin Recovery Unit

RECOVERY FACTOR A: Adequate Habitat and Range for Recovered Populations

1. Relationship of mainstem CR to LCR identified
2. Operations of Glen Canyon Dam and flow regime identified to benefit HBC
3. Effects and feasibility of TCD determined

RECOVERY FACTOR B: Protection From Overutilization

4. Overutilization for commercial, recreational, scientific, or educational purposes re-evaluated and actions identified to ensure adequate protection

RECOVERY FACTOR C: Adequate Protection From Diseases and Predators

5. Asian tapeworm program developed and implemented to minimize negative effects
6. Procedures for stocking nonnative fish species developed, implemented, evaluated to minimize negative interactions
7. Rainbow trout, channel catfish, black bullhead, carp control programs developed and implemented in LCR to minimize negative interactions
8. Brown trout, rainbow trout control programs developed and implemented in Grand Canyon to minimize negative interactions

RECOVERY FACTOR D: Adequate Existing Regulatory Mechanisms

9. Mechanisms determined for legal protection of adequate habitat
10. Conservation Plans for long-term management and protection

RECOVERY FACTOR E: Other Natural Or Manmade Factors-Protection Is Provided

11. State and Federal spills emergency-response plans reviewed, modified
12. Measures identified to minimize risk of toxic spills along US Hwy 89 and Cameron bridges