

Fishes of Grand Canyon

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Main Conclusions Regarding Fishes

- 1. Continuing Decline* in Endangered Humpback Chub Began in 1980s and Continued in 1990s through 2004**
- 2. MLFF Had Either a Negative Effect or No Effect on Humpback Chub**
- 3. Population Not Projected to Attain FWS Recovery Goals Under Present Conditions**

Main Conclusions Regarding Fishes - continued

- 4. Large Increase in Rainbow Trout in Lees Ferry Reach due to Natural Reproduction**
- 5. Proliferation of Rainbow Trout Below Paria River to at least River Mile 75**
- 6. Brown Trout Increase Centered around Bright Angel Creek but Extending Upstream to Little Colorado River**

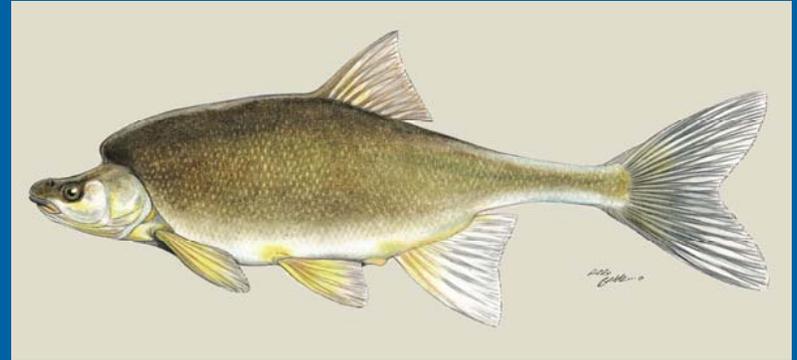


Main Conclusions Regarding Fishes - continued

7. Effects of Recent Experimental Management Actions on Native Fishes is Not Known

Fishes of Grand Canyon

- Historical Perspectives
- Adaptive Management Goals
- Lees Ferry Trout Fishery



Fishes of Grand Canyon

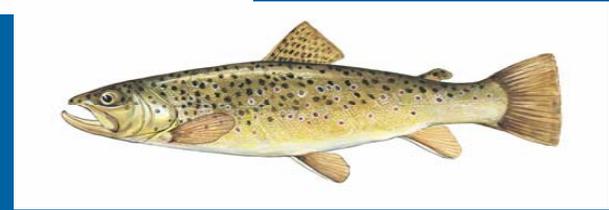
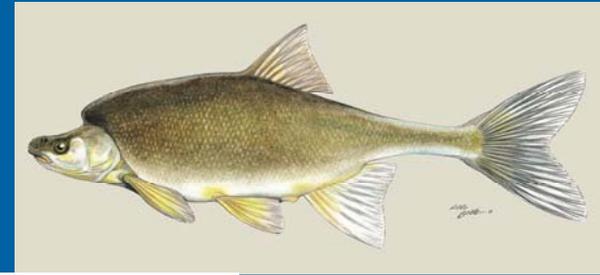
- Mainstem Fishes Below Paria River

- Native Fishes

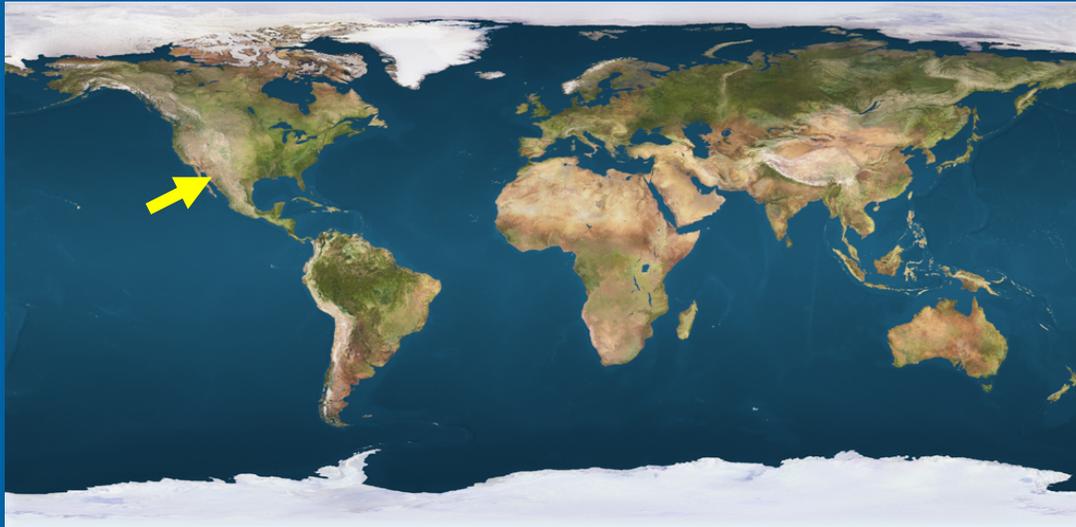
 - Humpback Chub

- Recent Management

 - Dam Operations
 - Mechanical Removal
 - Future Research

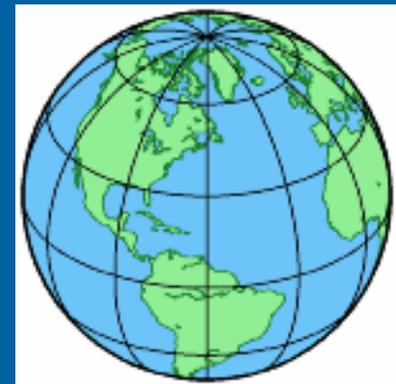


Native Fishes Highly Endemic on a Global Scale



Most Distinctive Group of Fishes in the United States

- Colorado River Basin 22 of 32, 69%
- Mainstem Species 20 of 23, 87%
- Grand Canyon Reach 6 of 8, 75%



What Happened??



Introduced Fish Species in Grand Canyon Area of Colorado River Drainage (partial list)

Smallmouth bass

Black crappie

Bluegill

Black bullhead

Brook trout

Brown trout

Channel catfish

Coho salmon

Carp

Golden shiner

Green sunfish

June sucker

Kokanee salmon

Largemouth bass

Mosquito fish

Plains killifish

Rainbow trout

Red shiner

Utah sucker

White sucker

Yellow perch

Yellow bullhead

Walleye

Cutthroat trout

Striped bass

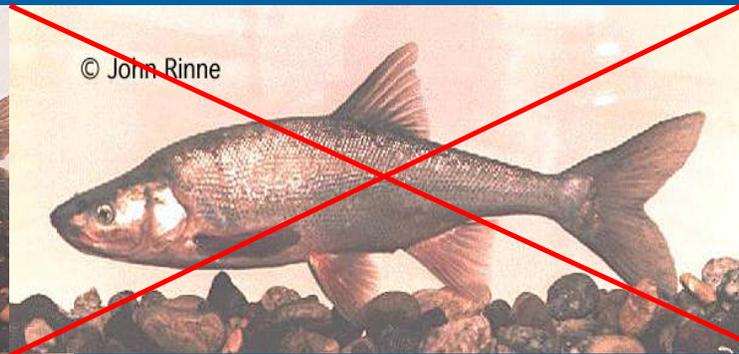
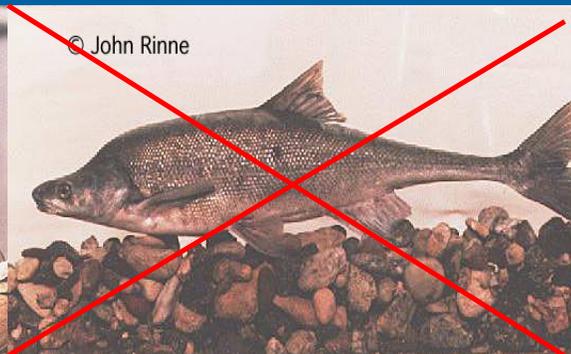
Threadfin shad

Fathead minnow

Glen Canyon Dam and Water Development



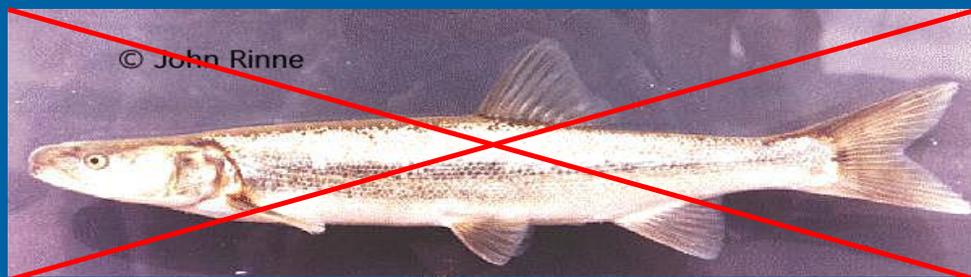
The Present Native Fish Community



Humpback Chub (*Gila cypha*)

Bonytail Chub (*Gila elegans*)

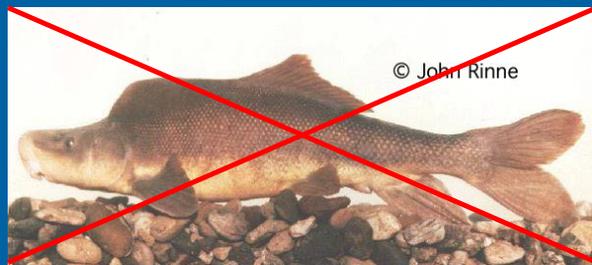
Roundtail Chub (*Gila robusta*)



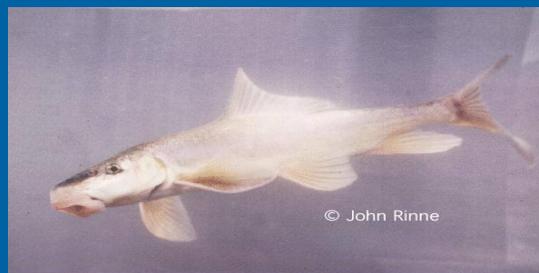
Colorado Pikeminnow (*Ptychocheilus lucius*)



Speckled Dace (*Rhinichthys osculus*)



Razorback Sucker (*Xyrauchen texanus*)



Flannelmouth Sucker
(*Catastomus latipinnis*)



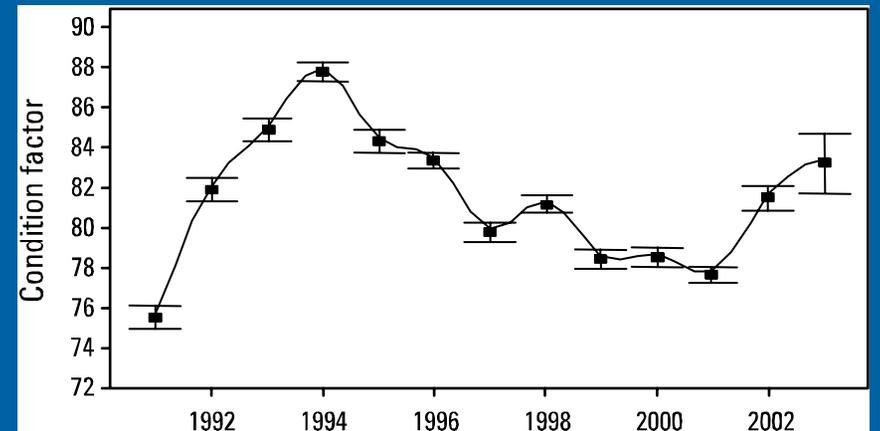
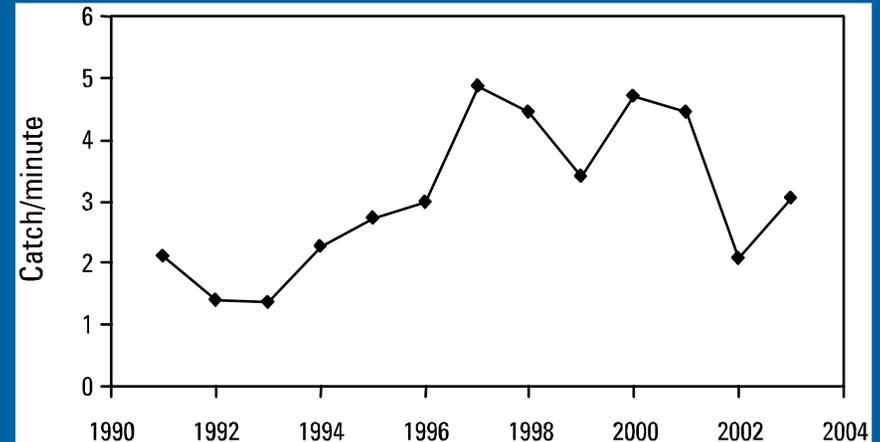
Bluehead Sucker
(*Catastomus discobulus*)

Glen Canyon Dam Adaptive Management Program Goals-Fishes

- **Maintain or attain viable populations of existing native fish, remove jeopardy from humpback chub and razorback sucker, and prevent adverse modification to their critical habitat.**
- **Maintain a naturally reproducing population of rainbow trout above the Paria River, to the extent practicable and consistent with the maintenance of viable populations of native fish.**

Lees Ferry Rainbow Trout

- Increase in population size in early 1990s
- Concomitant decrease in the average condition of individual fish
- Conservation of Biomass-Carrying Capacity

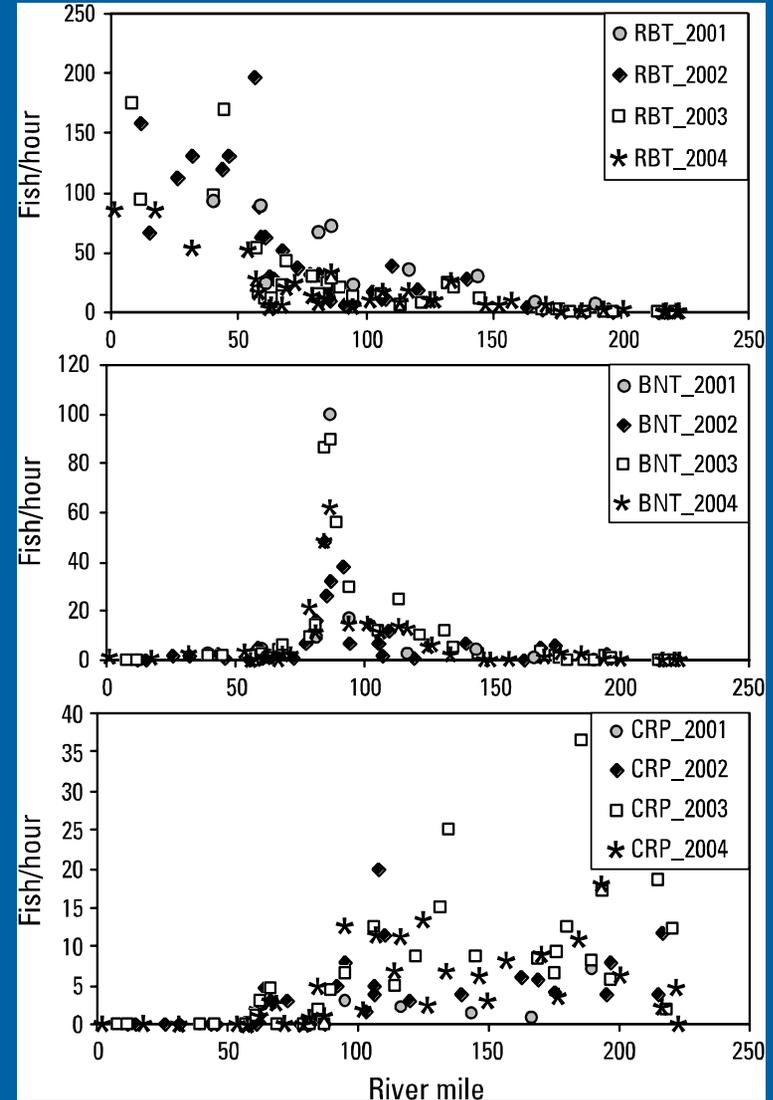


Mainstem Fish Abundance

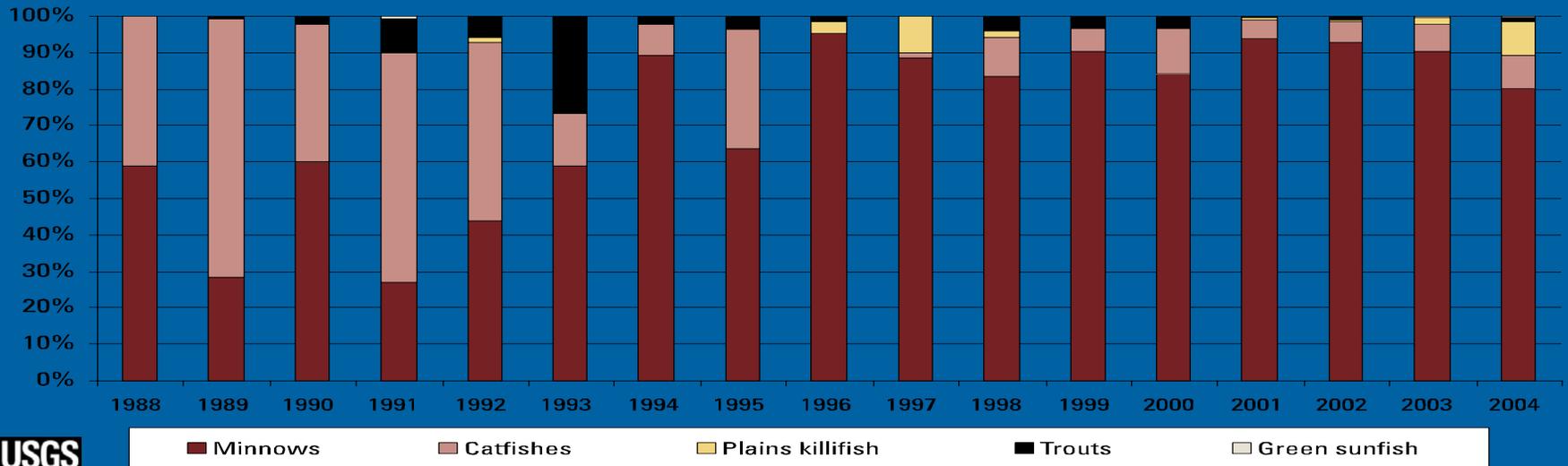
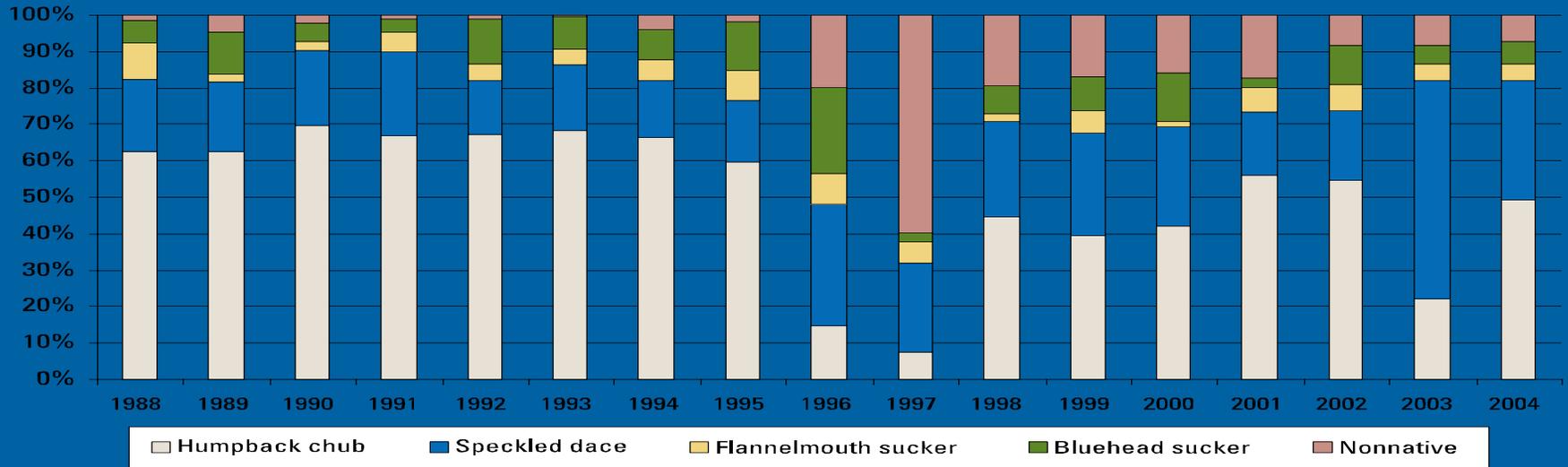
- Rainbow Trout

- Brown Trout

- Common Carp

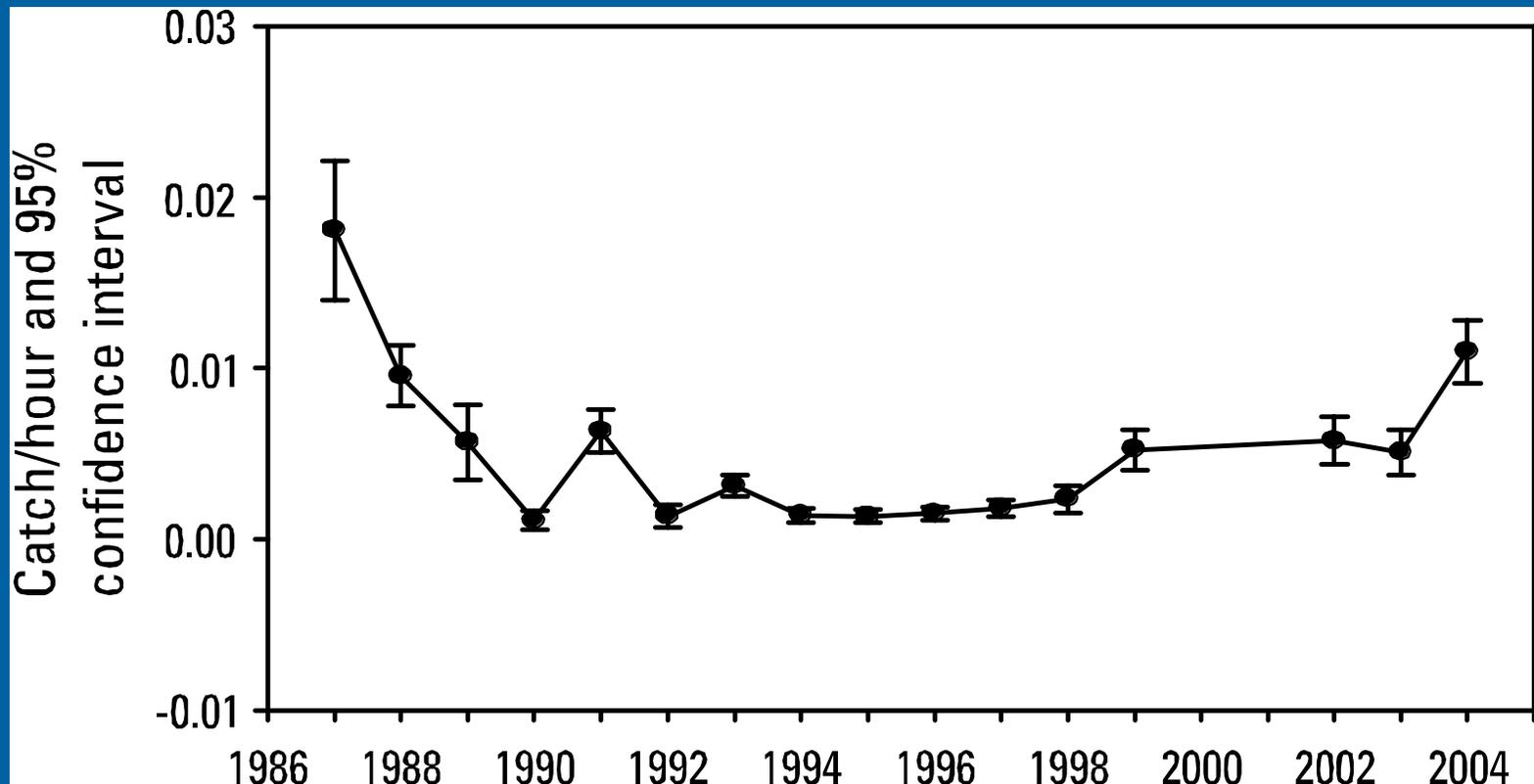


LCR Hoop Net Catch Proportions for Native (top) and Nonnative(below)



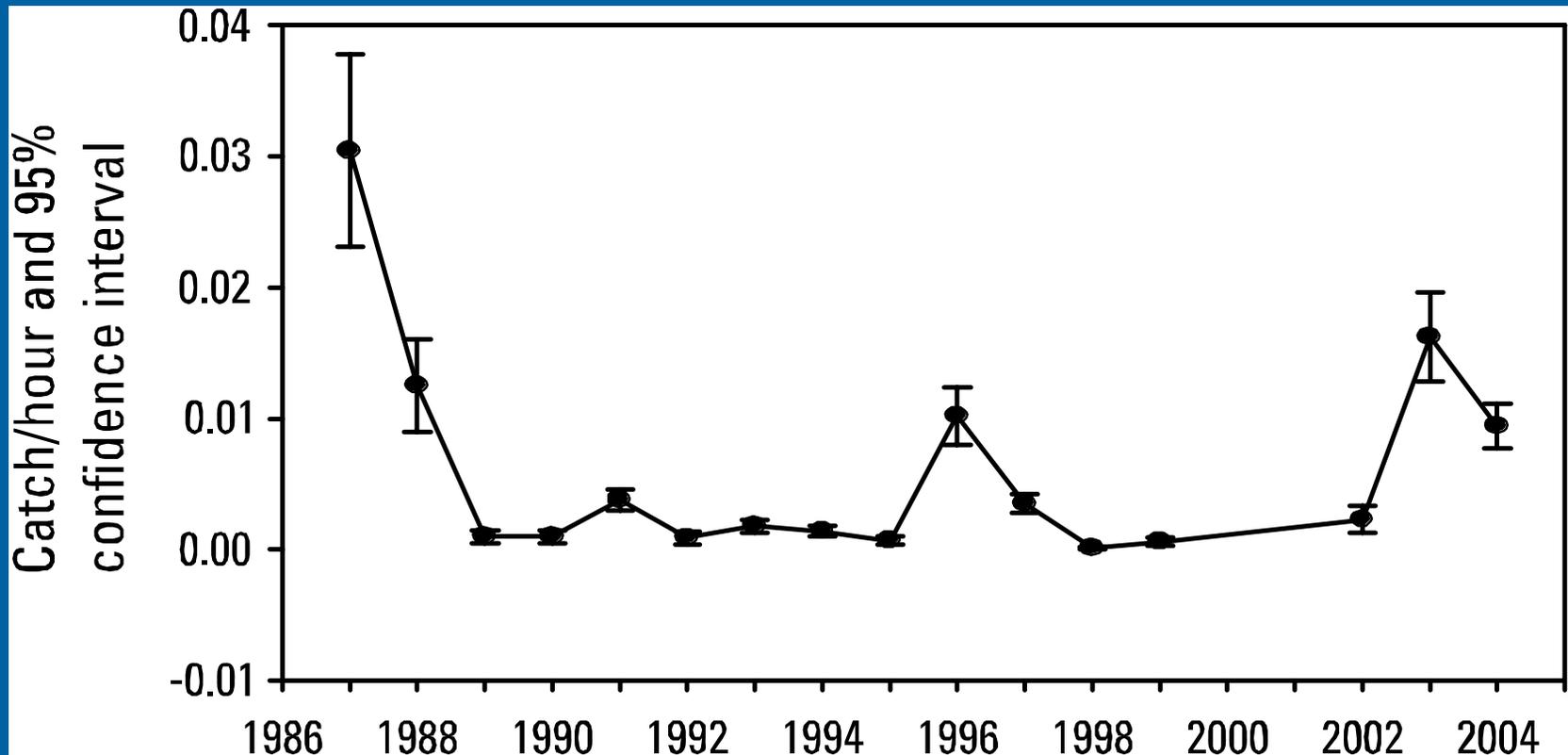
Bluehead Sucker

- Hoop Net Catch Rates for adult Bluehead sucker in the lower 1200 meters of the Little Colorado River



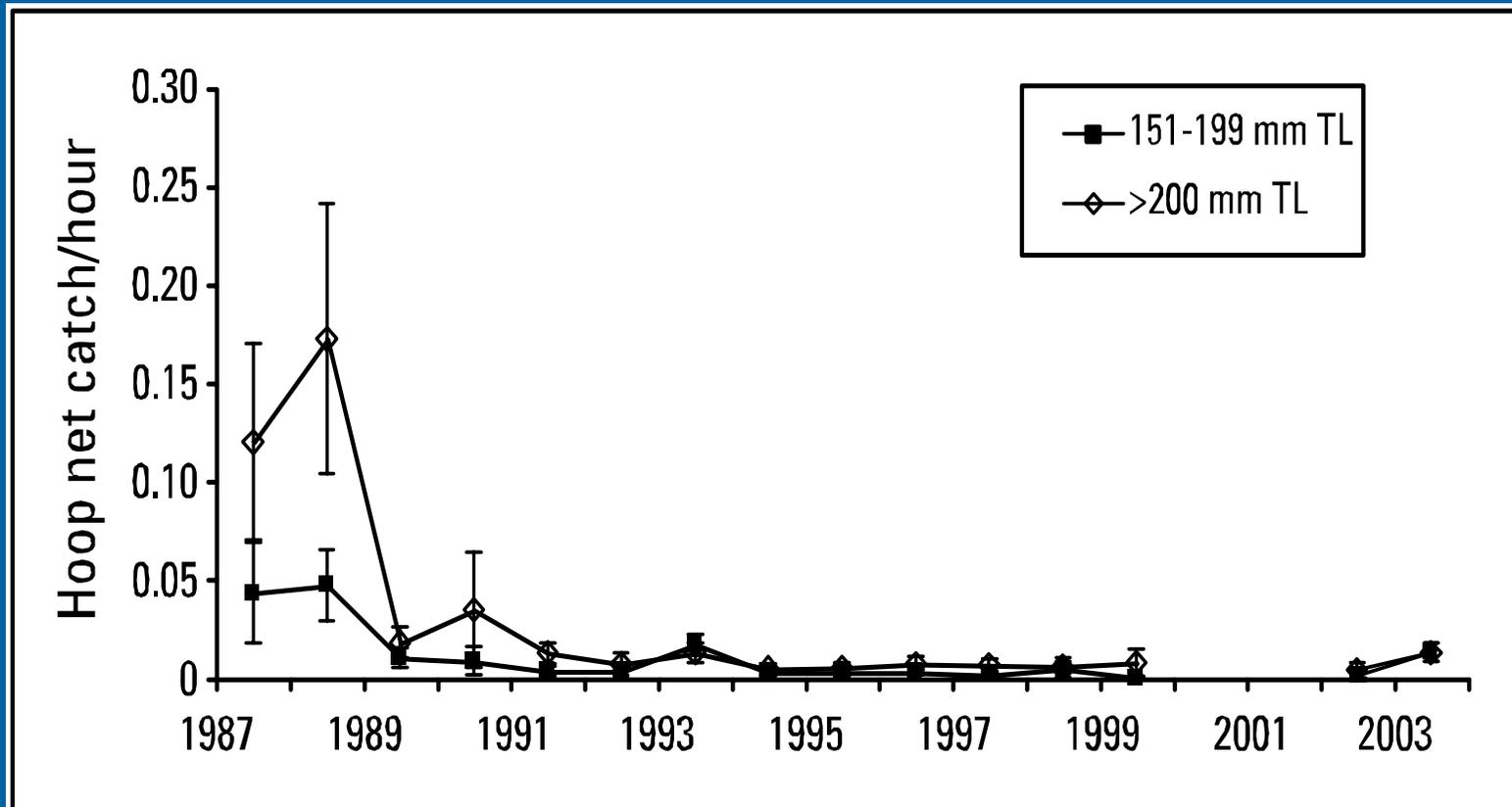
Flannemouth Sucker

- Hoop Net Catch Rates for adult Flannemouth sucker in the lower 1200 meters of the Little Colorado River

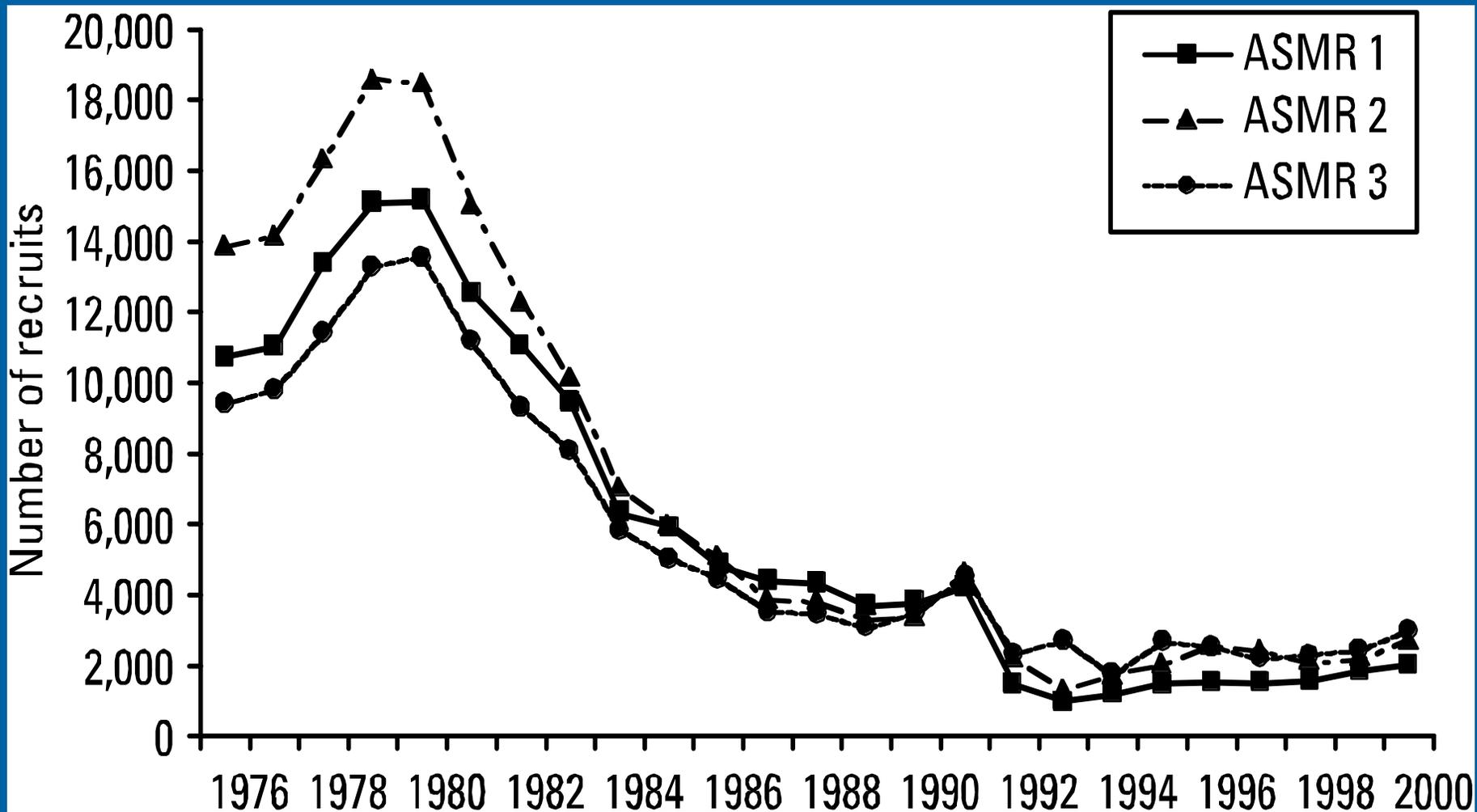


Humpback Chub

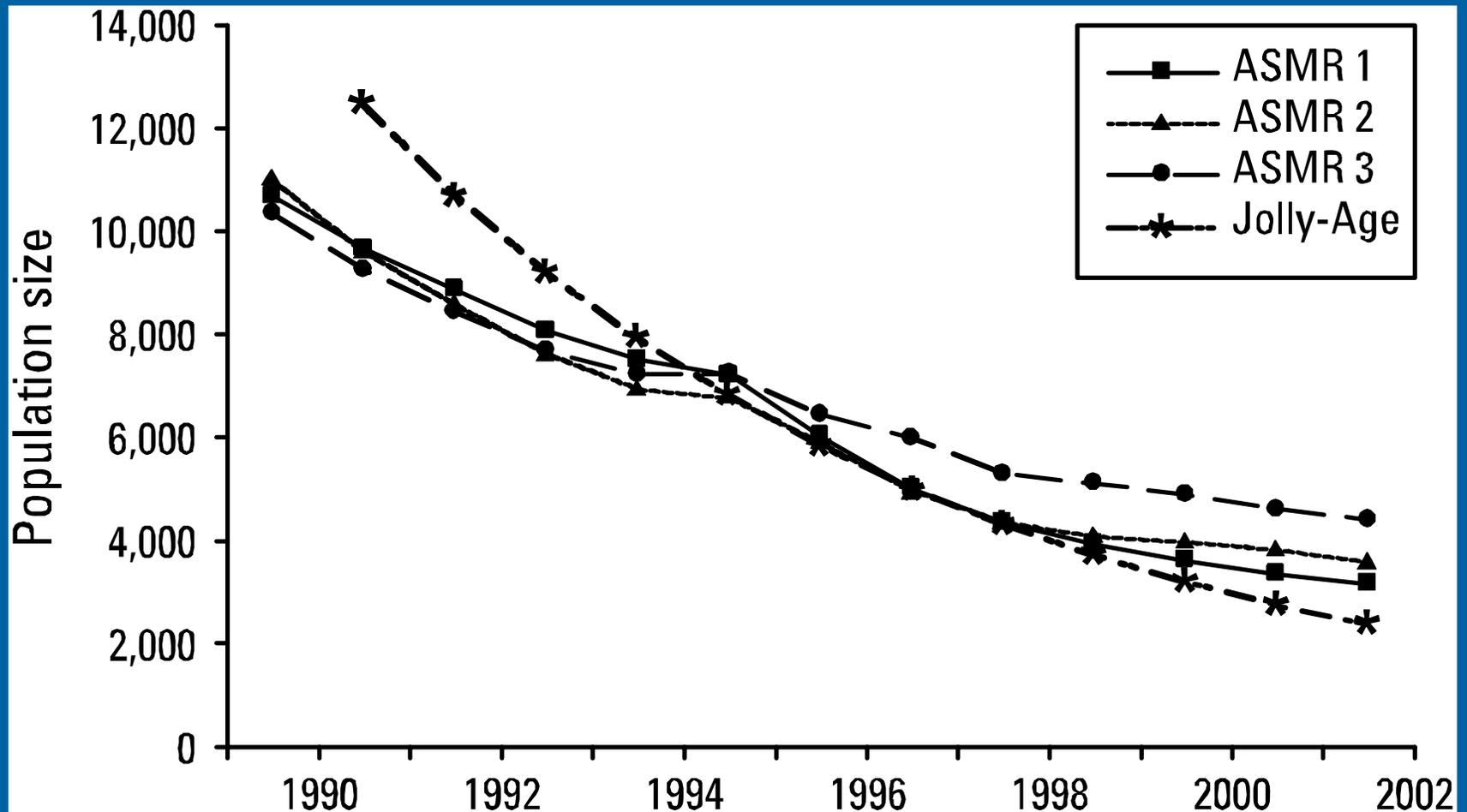
- Hoop Net Catch Rates for 2 sizes of Humpback Chub in the lower 1200 meters of the Little Colorado River



Estimated Recruitment of Age 2 HBC



Estimated Adult Population Size of HBC





Response of Fish to Management Actions

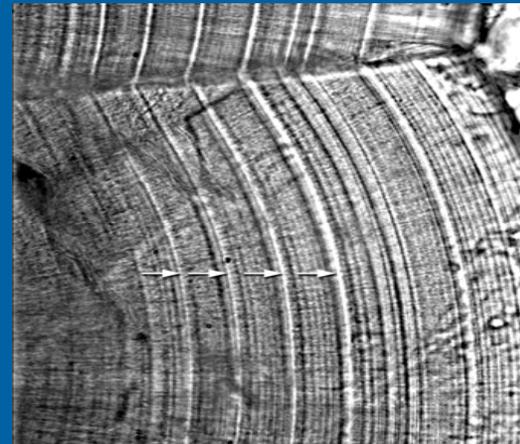
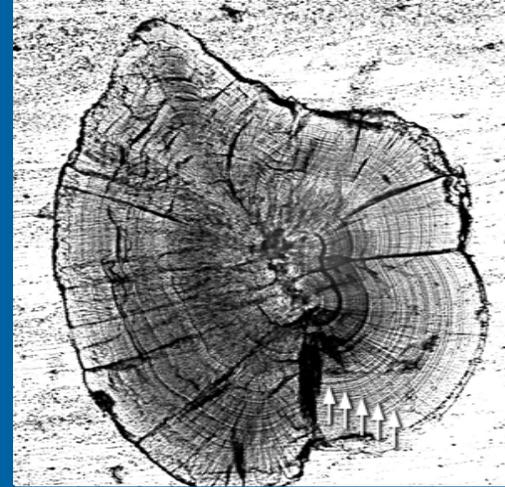
**Modified Low Fluctuating Flows (MLFF)
Experimental Flows to Reduce Trout
Mechanical Removal of Nonnative Fishes**

Modified Low Fluctuating Flows (MLFF) 1996-2004

- **Humpback Chub Decline Continued During MLFF-not possible to ascribe recent decline to dam operations and other factors may contribute to decline.**
- **MLFF Have Not Improved Population Status of Humpback Chub in Grand Canyon**
- **Nonnative Trout Have Increased Substantially During MLFF-possibly to the detriment of Native Fishes**

Fluctuating Flows to Reduce Rainbow Trout Numbers

- Otoliths are small boney structures in fish's inner ear
- Detect daily changes in growth rate of individual fish
- Saw changes due to fluctuating flows in growth of young trout and egg survival

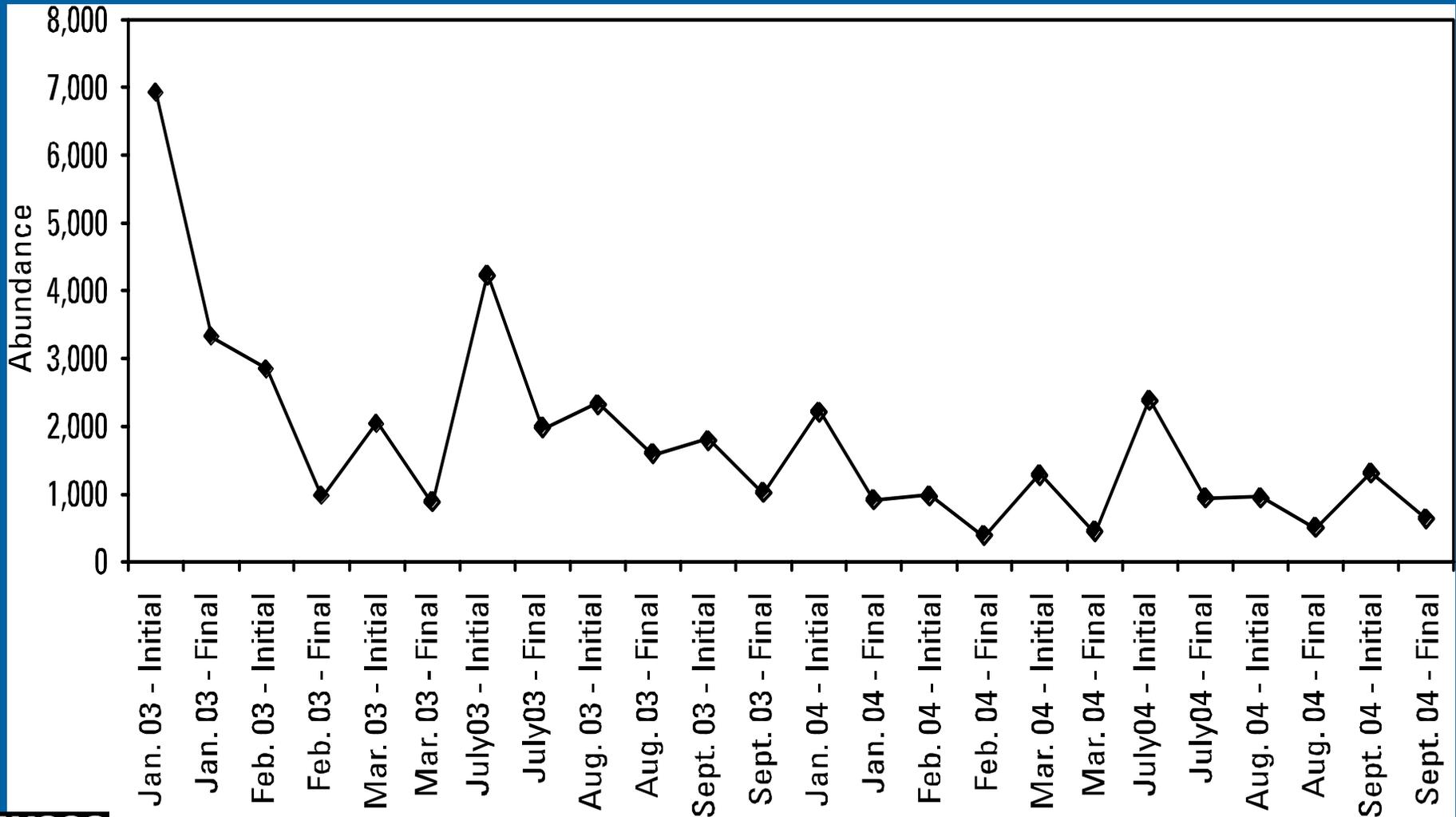


Korman and others, 2005

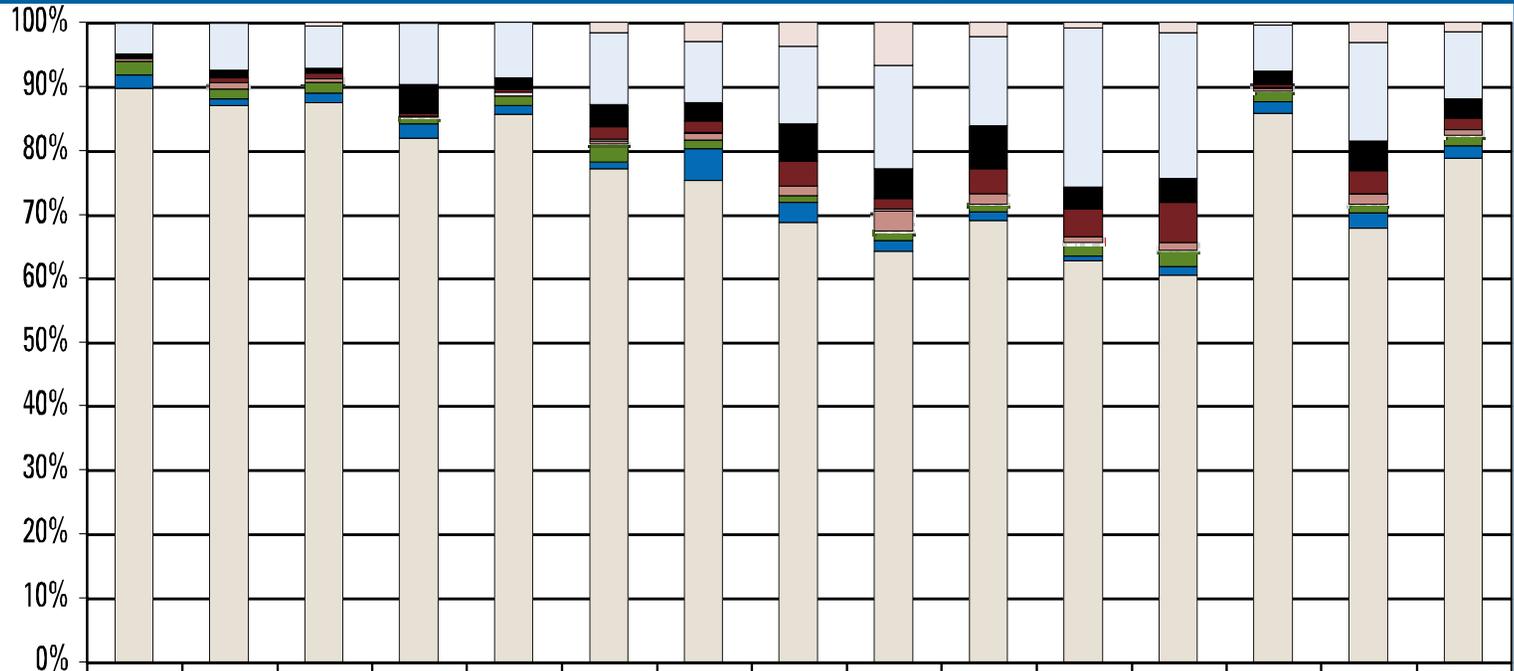
Experimental Fluctuating Flows Winter/Spring of 2003-2004

- No discernable direct impact on native fishes
- Reduced growth and survival of young rainbow trout at Lees Ferry
- Reduced adult numbers of rainbow trout with increased individual fish size and angler catch rate-coincident with experimental flows but cause and effect cannot be implied

Estimated Change in Rainbow Trout Numbers During Mechanical Removal Efforts



Cumulative Fish Removed by Electrofishing



	Jan. 03	Feb. 03	Mar. 03	July 03	Aug. 03	Sept. 03	Jan. 04	Feb. 04	Mar. 04	July 04	Aug. 04	Sept. 04	Total 03	Total 04	Total 03-04
Speckled dace	7	2	8	6		18	53	34	92	47	7	19	41	252	293
Flannelmouth sucker	188	161	89	266	79	119	169	110	218	296	190	258	902	1,241	2,143
Humpback chub	26	26	13	126	17	37	51	52	61	142	27	43	245	376	621
Bluehead sucker	8	18	11	12	4	19	32	37	24	84	33	72	72	282	354
Unidentified sucker	2	0	0	3	5	4	3	0	3	0	0	0	14	6	20
Fathead minnow	17	21	8	4	0	4	18	13	44	32	6	13	54	126	180
Common carp	80	33	22	29	14	31	23	9	18	26	16	29	209	121	330
Brown trout	87	24	21	63	12	11	88	29	22	29	7	17	218	192	410
Rainbow trout	3,605	1,900	1,195	2,298	779	818	1,330	622	867	1,464	480	687	10,595	5,450	16,045

Research Needs

- **Develop More Effective Monitoring Programs for Many Native & Non-Native Fishes in the Mainstem Colorado Below Paria River**
- **Research to Understand Causative Factors for Decline in Humpback Chub Recruitment**

ATTENTION!!!!



Post SCORE Report Info and More Detail On Status and Trends of Fishes.....

- Lew Coggins- 10:30am on Wednesday
- Bill Pine- 8:00am on Thursday
- Scott Rogers- 3:40pm on Thursday
- David Ward-4:00pm on Thursday



