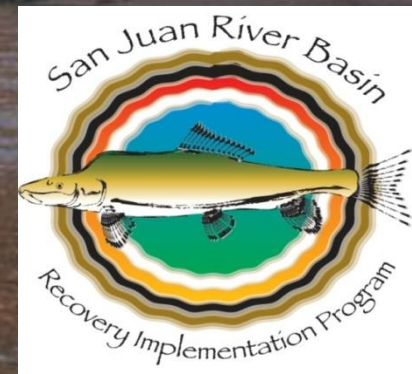


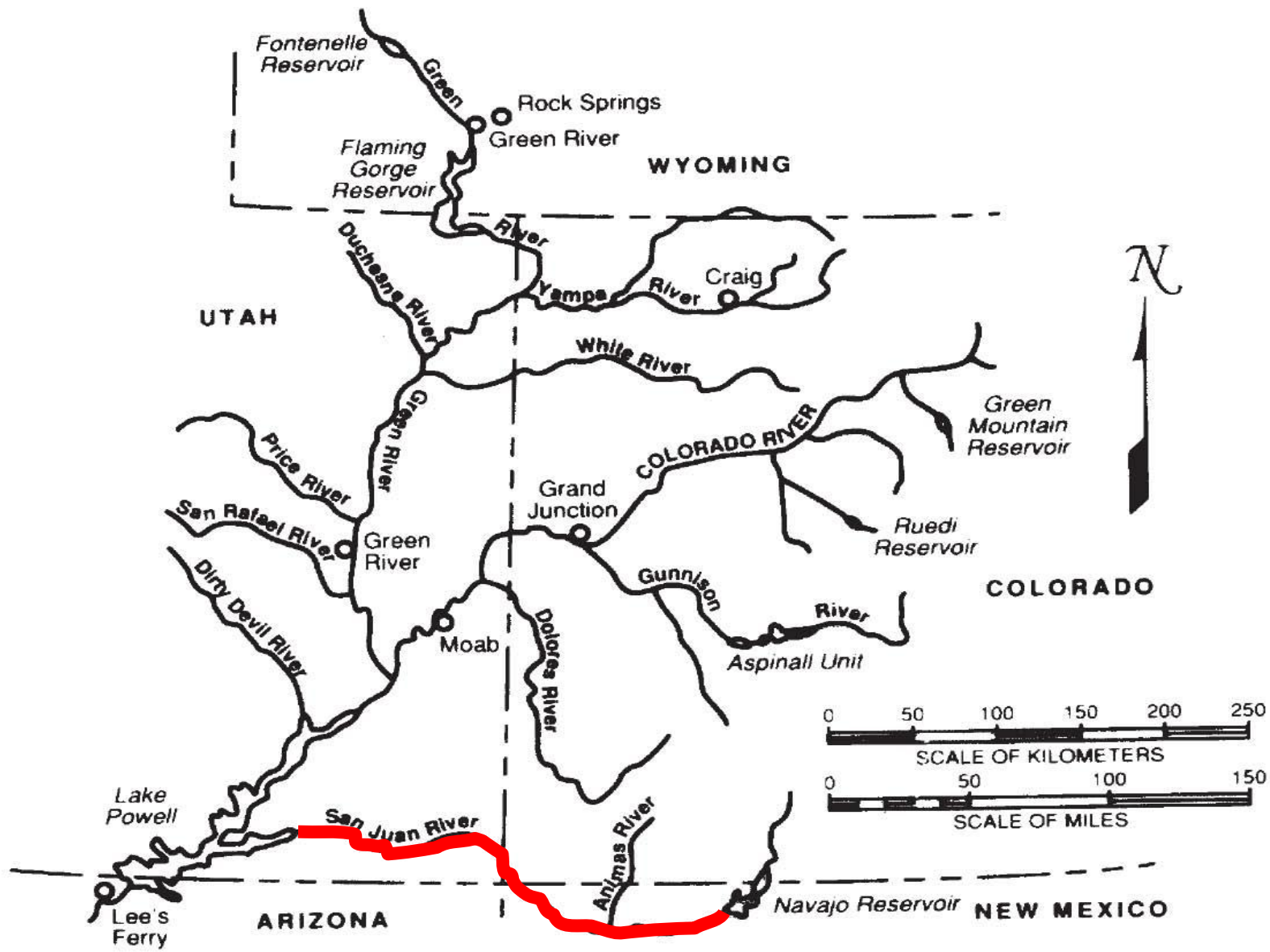
Recovering Endangered Fish in the San Juan River— Snatching Success From the Jaws of Nonnative Fish

Mark McKinstry, Ph.D.
U.S. Bureau of Reclamation
Salt Lake City, UT

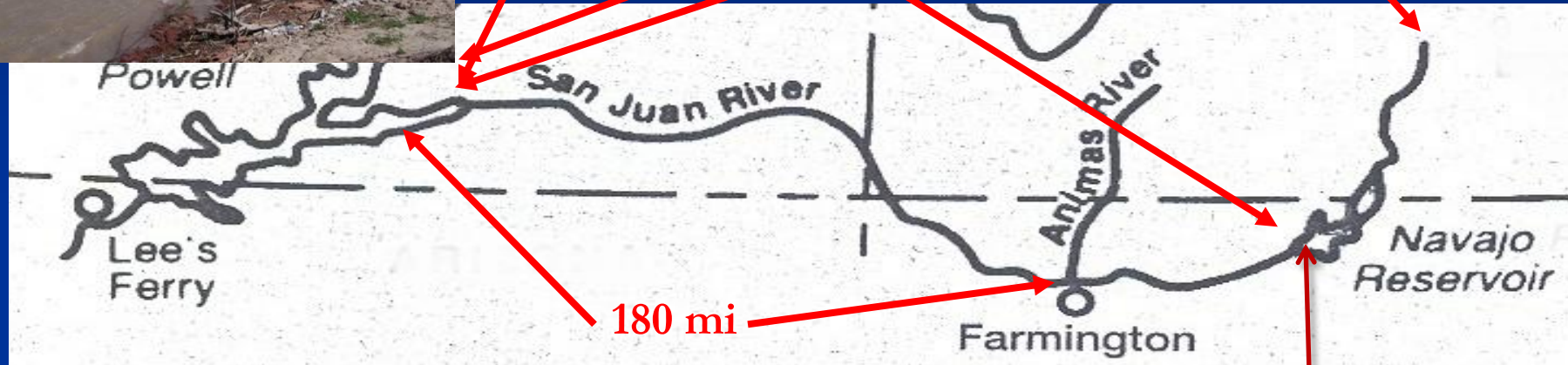
National Conference on Ecosystem Restoration

August 1, 2011





Upper Colorado River Basin



- Constructed 1962--CRSP
- Industrial, municipal, and agricultural
- 1.7 maf average yield, 400,000 af active depletions
- Complex water rights
- Hypolimnetic release
- World-class trout fishery



Colorado River “Big River” Endangered Fish



Colorado pikeminnow



© John Rinne

Humpback chub



© John Rinne

Bonytail



Razorback sucker

Major Restoration Programs Colorado River Basin

Lower Colorado
River Multi-
Species
Conservation
Program (2005-
2055)

\$626 mil. 2003
dollars (50 yrs)

Upper Colorado River
Endangered Fish Recovery
Program (1988-2023)

[\$190 mil. 1989-2011' ~\$6
mil./yr;]

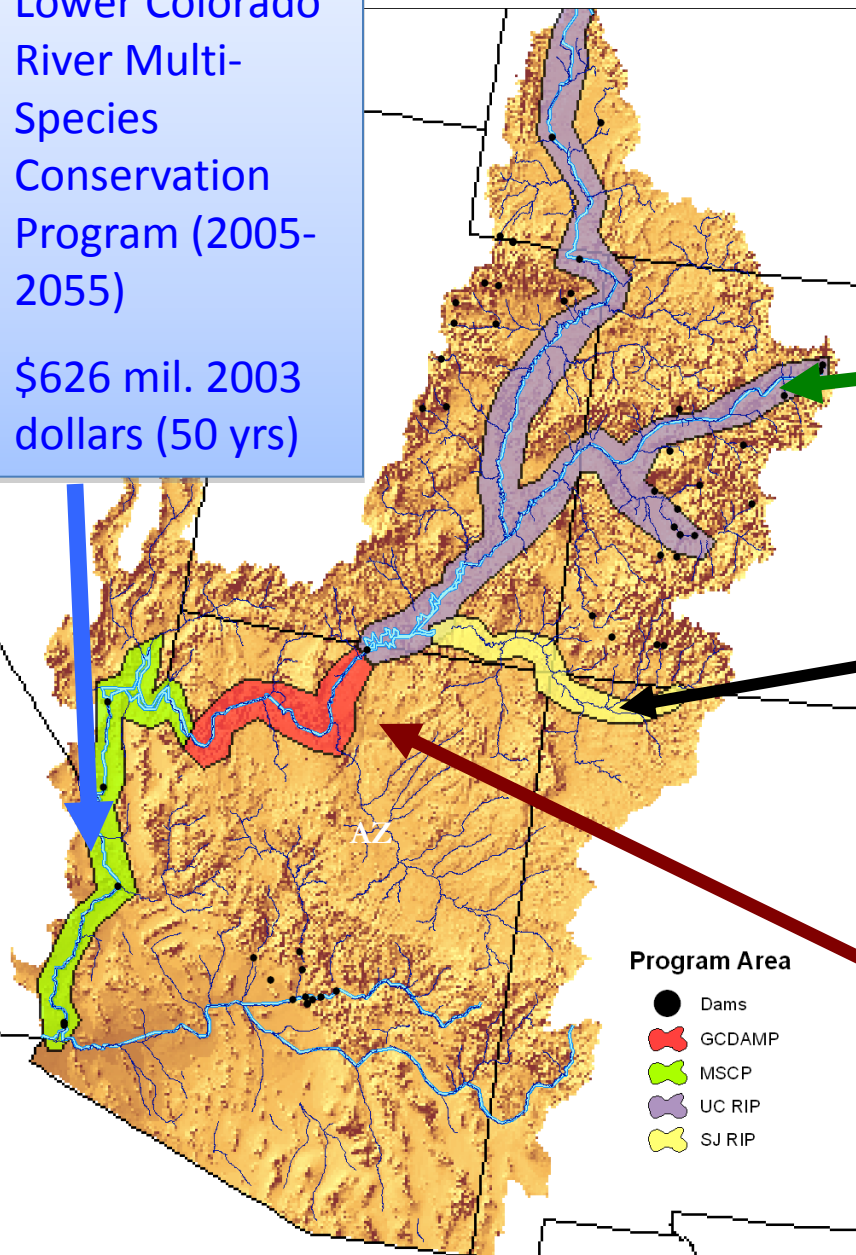
San Juan River Basin
Recovery Implementation
Program (1992-2023)
[\$42.0 mil 1992-2006;
\$2.5 mil FY11]

Glen Canyon Dam Adaptive
Management Program (1997-?)

\$11 mil./yr operating
~\$40 mil./yr lost revenue

Program Area

- Dams
- 🔴 GCDAMP
- 🟢 MSCP
- 🟡 UC RIP
- 🟠 SJ RIP



Downlisting and Delisting San Juan River Basin

- **Colorado pikeminnow**
 - A target number of 1,000 age 5+ fish (>300 mm)
- **Razorback sucker**
 - A target number of 5,800 age 4+ fish (>400 mm)
- Other demographic parameters are met,
- AND “when certain site-specific management tasks to minimize or remove threats have been identified, developed and implemented”

SJRRIP Goals

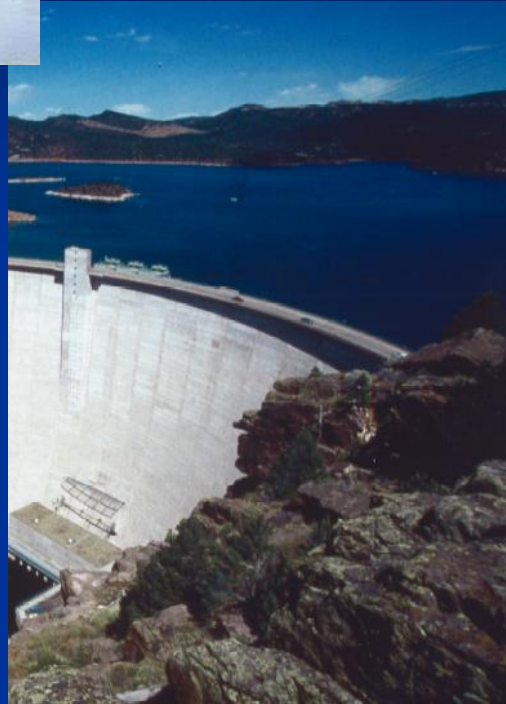


- SJRIP established in 1988 to:**
- 1) To recover populations of Colorado pikeminnow and razorback sucker in the San Juan River Basin
 - 2) To proceed with water development in the Basin

Reasons for Declines



- Dams
- Diversions
- Agriculture
- Habitat alteration
- Development
- Nonnative fish introductions



Recovery Actions



- Flow Protection/Management
- Capital Projects/Habitat Expansion
- Stocking/Augmentation
- Non-Native Fish Removal
- Monitoring/Research



NonNative Fish

Red Shiner, Fathead Minnow, Bullhead, Green Sunfish, Brown Trout, Smallmouth Bass, Common Carp, Channel Catfish

- Predation
- Competition
 - Food, space, resources



Catfish with Endangered Pikeminnow In Stomach



Colorado Pikeminnow Eating Small Catfish



Adaptive Management

■ Development of conceptual models

- Endangered fish population and habitat model (Miller and Lamarra 2006)
 - Stocking, community structure, habitat
- Flow Recommendations (Holden 1999)

■ Working hypotheses

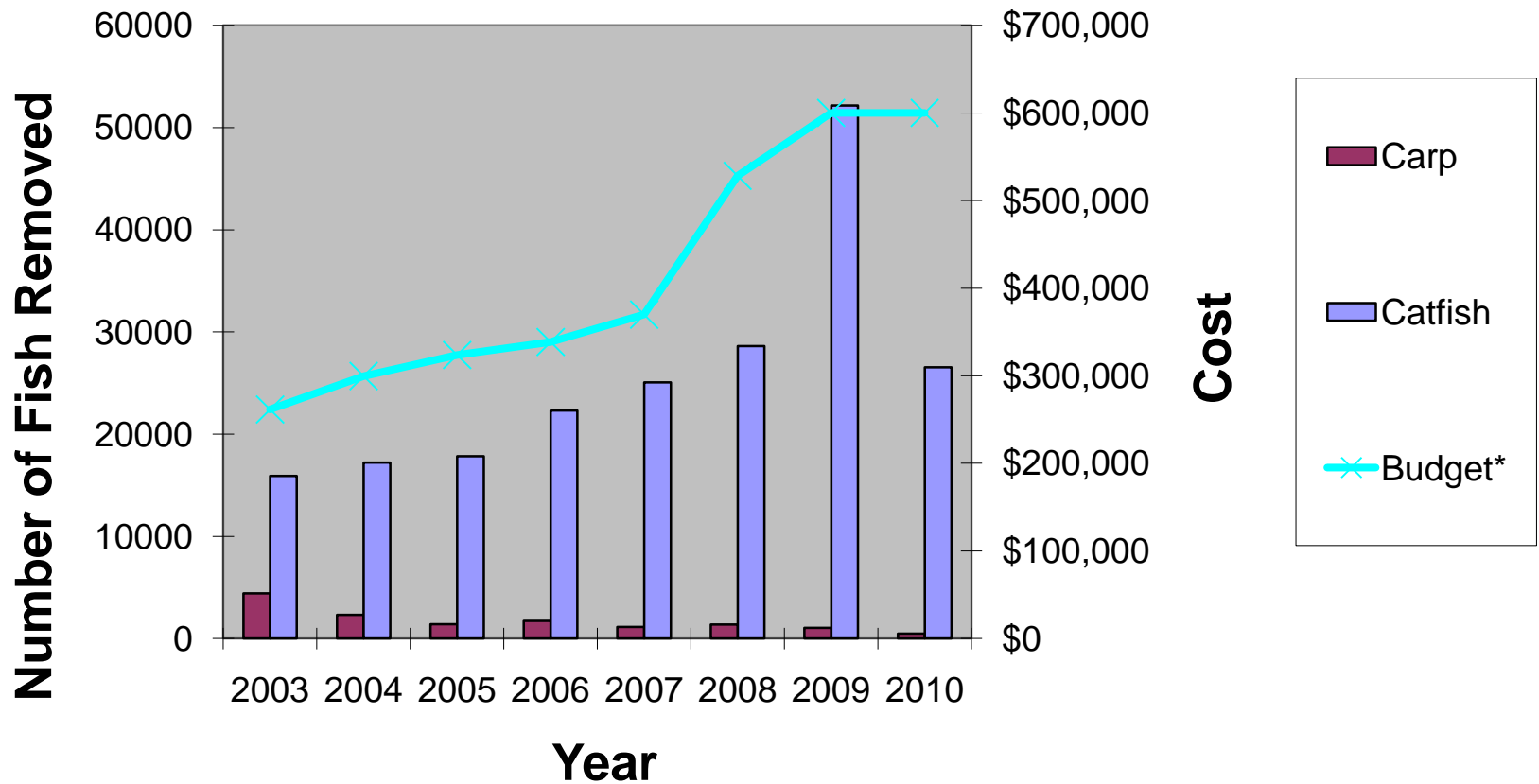
- Endangered fish stocking recommendations
- Natural flow mimicry
 - Base flows, spring peak releases to match Animas River
 - Create and maintain habitat—backwaters, secondary channels
- Nonnative fish removal
 - >50-70% removal of carp and channel catfish
 - Reduce predation and competition

Remove Nonnative Fish

Raft-mounted Electrofishing

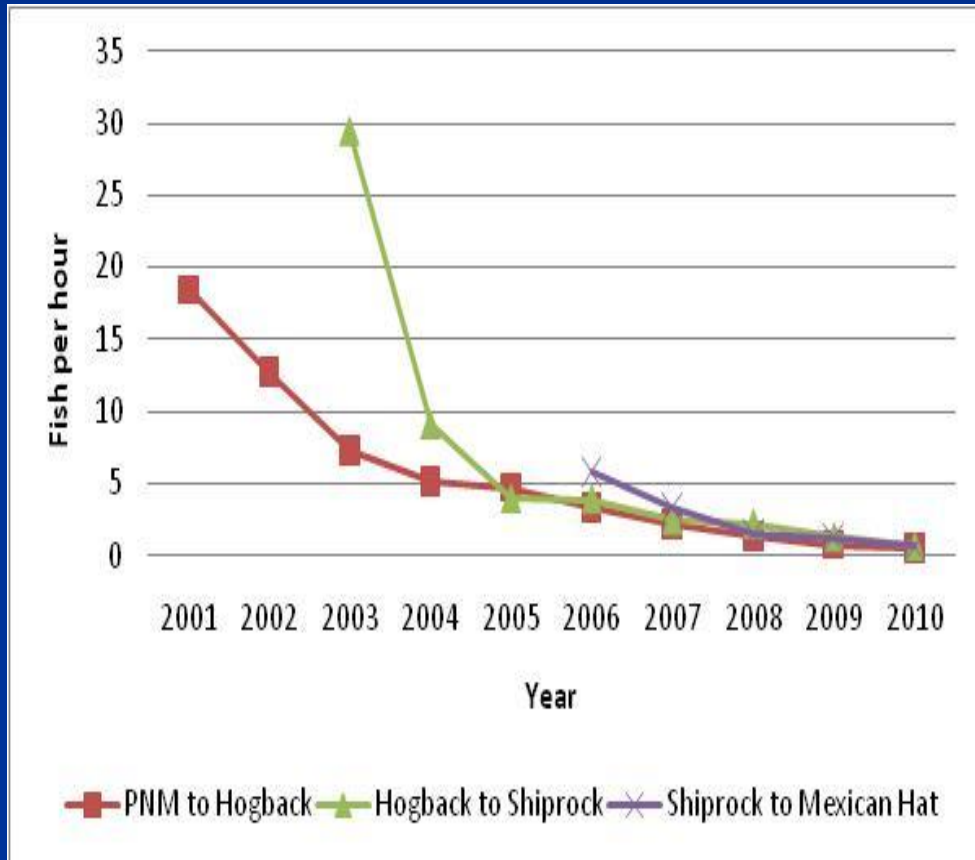


Nonnative Fish Removal Results and Cost



SUMMARY

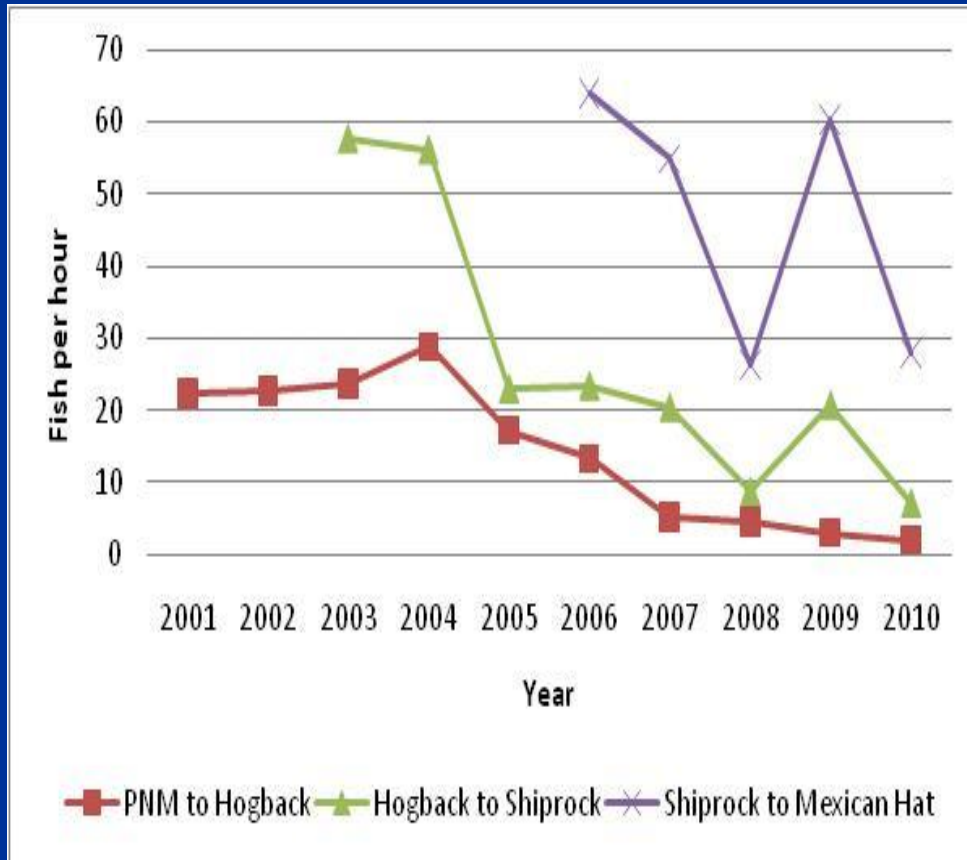
Common Carp



- PNM to Hogback
 - 99% reduction from 2001-2010
- Hogback to Shiprock
 - 98% reduction from 2003-2010
- Shiprock to Mexican Hat
 - 89% reduction from 2006-2010

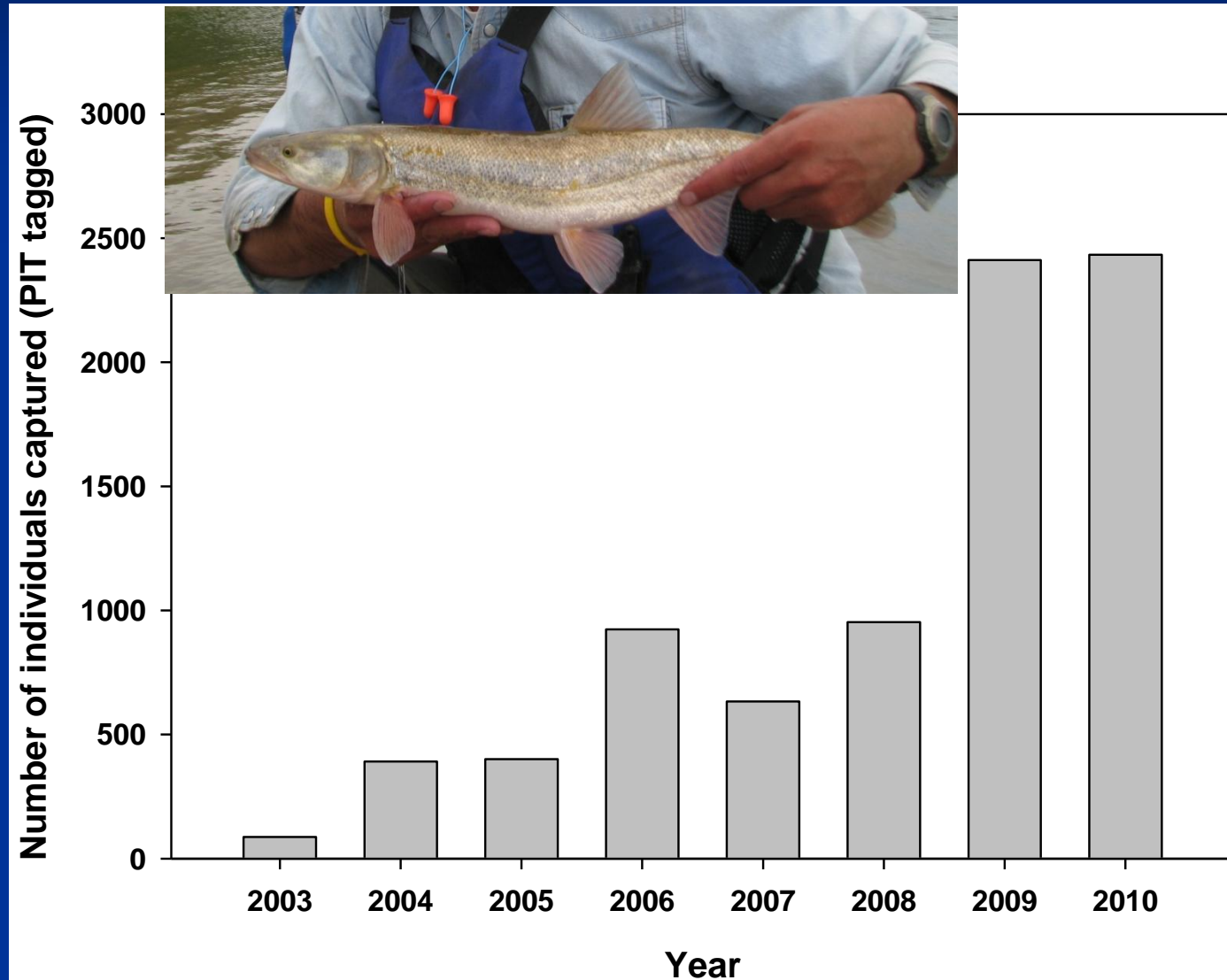
SUMMARY

Channel Catfish

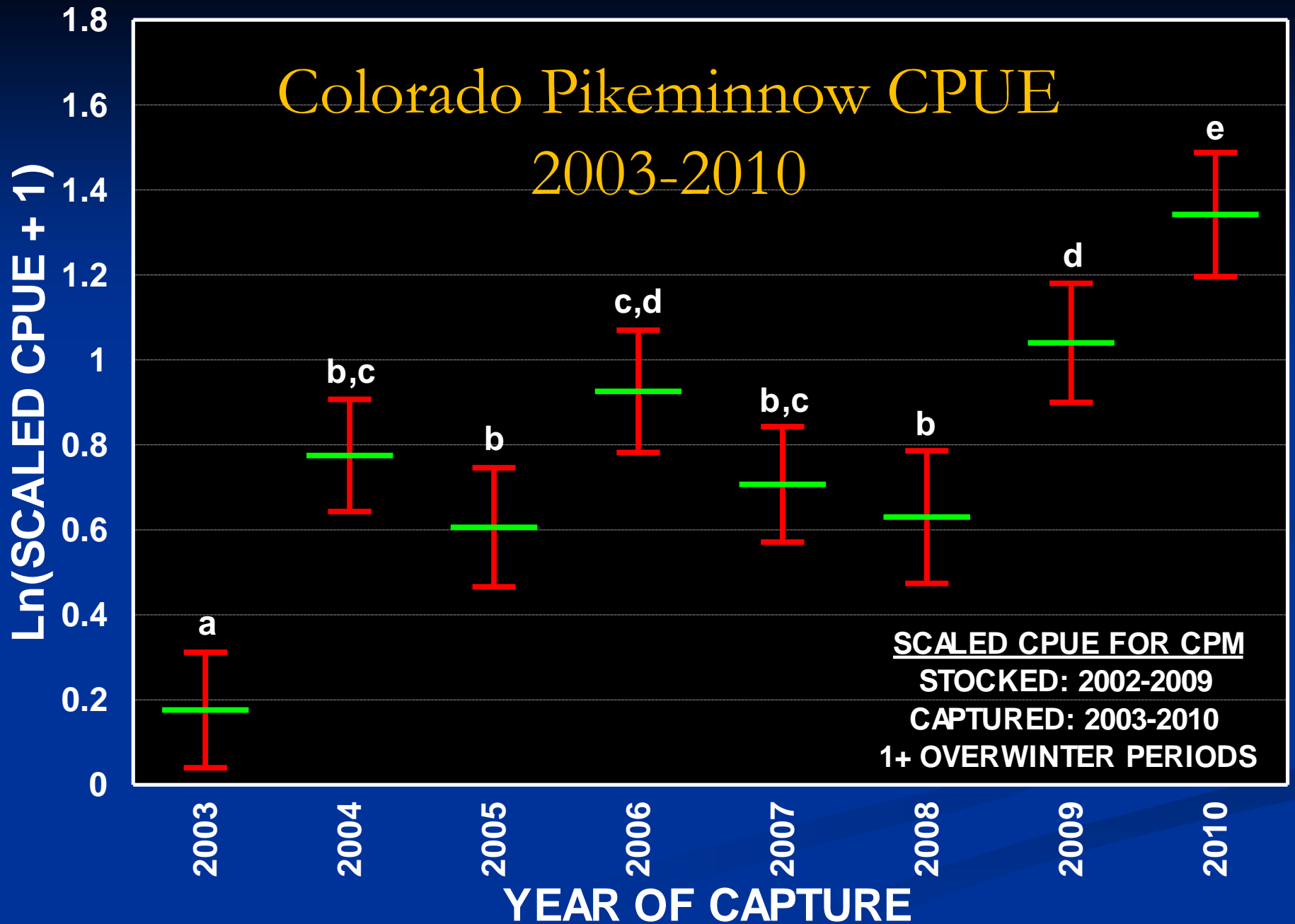


- PNM to Hogback
 - 91% reduction from 2001-2010
- Hogback to Shiprock
 - 88% reduction from 2003-2010
- Shiprock to Mexican Hat
 - 56% reduction from 2006-2010

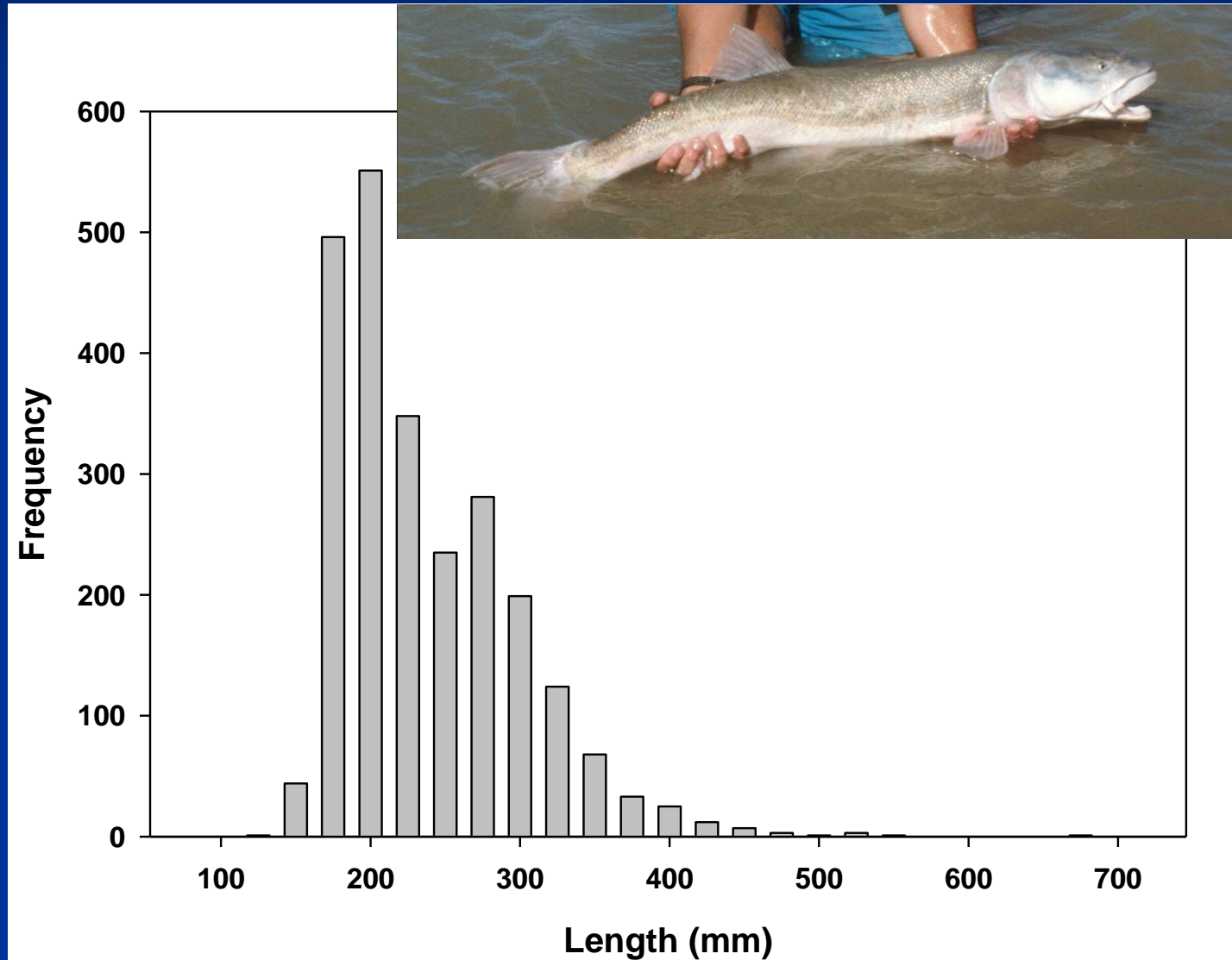
Colorado pikeminnow detected over time



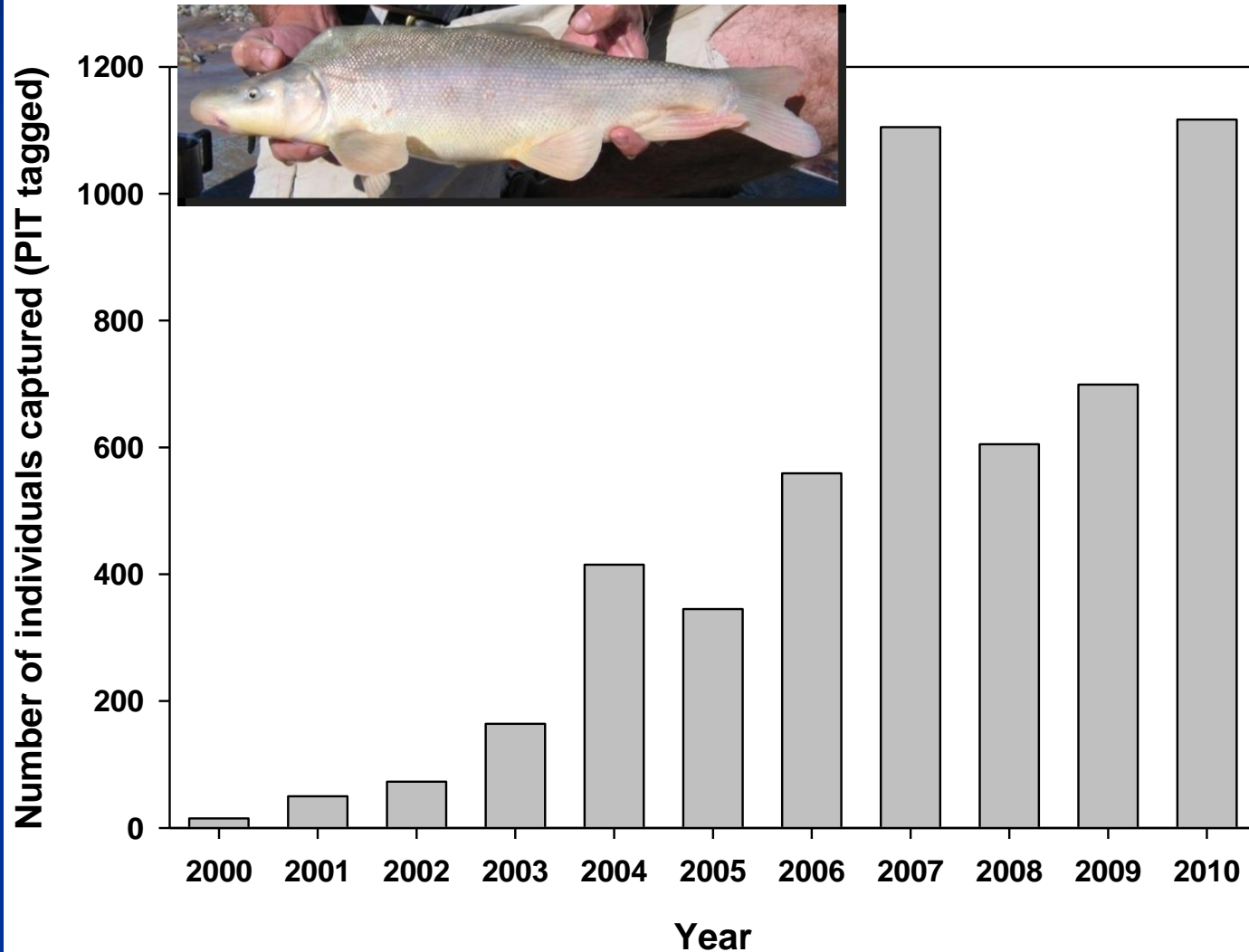
Colorado Pikeminnow CPUE 2003-2010



Colorado pikeminnow 2010 size structure



Razorback sucker detected over time



Razorback Sucker CPUE

2003-2010

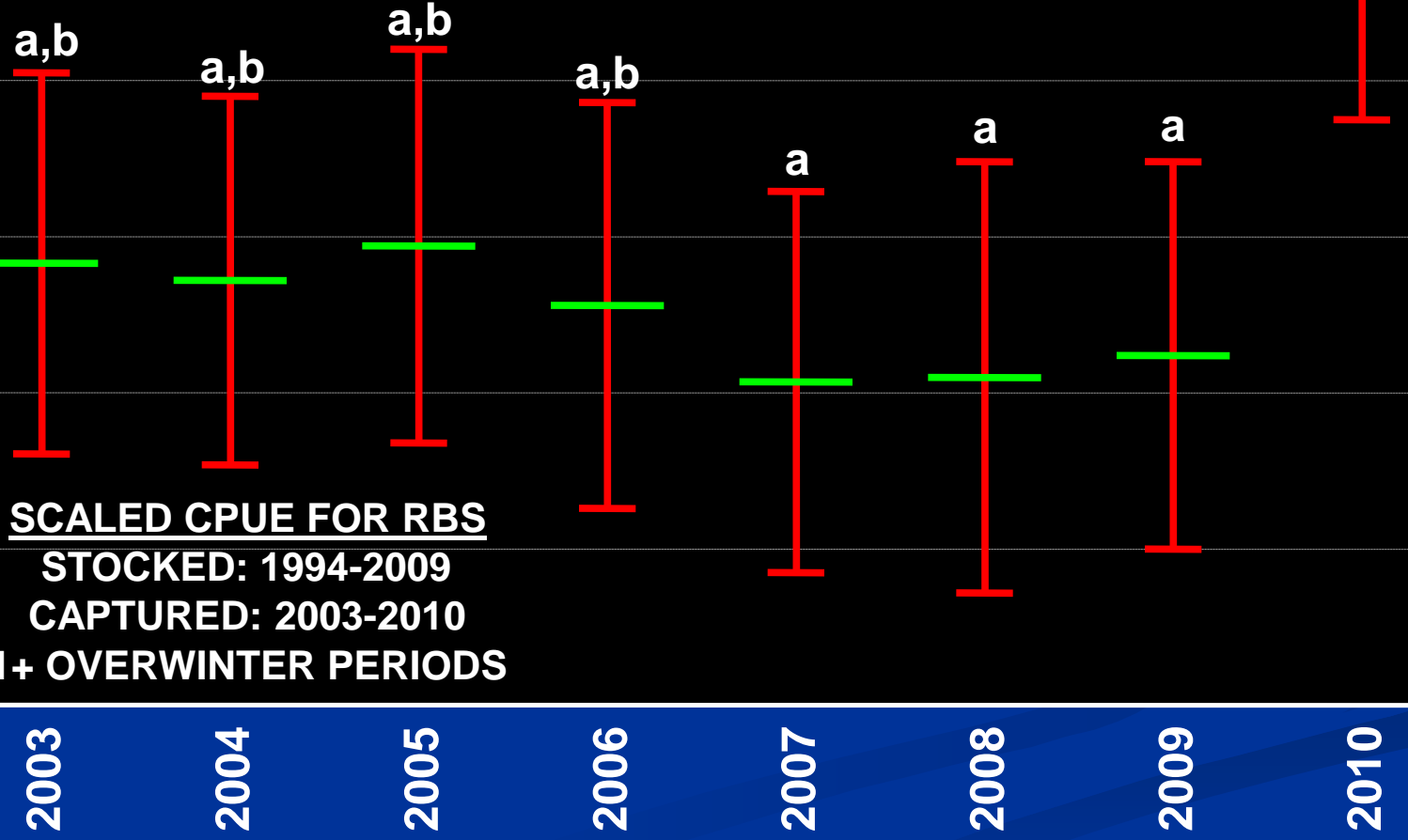
Ln(SCALED CPUE + 1)

0.6
0.5
0.4
0.3
0.2
0.1
0

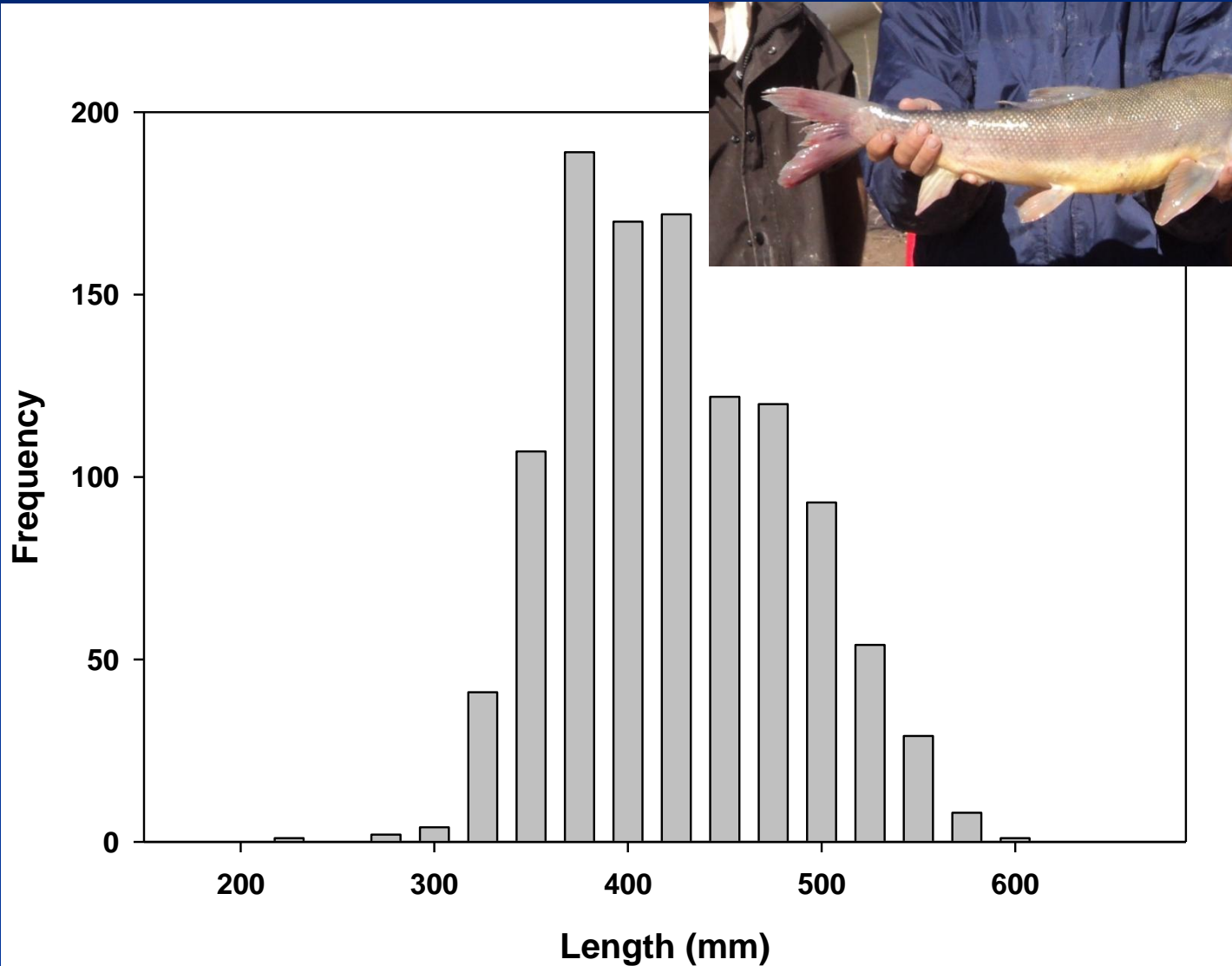
SCALED CPUE FOR RBS
STOCKED: 1994-2009
CAPTURED: 2003-2010
1+ OVERWINTER PERIODS

2003 2004 2005 2006 2007 2008 2009 2010

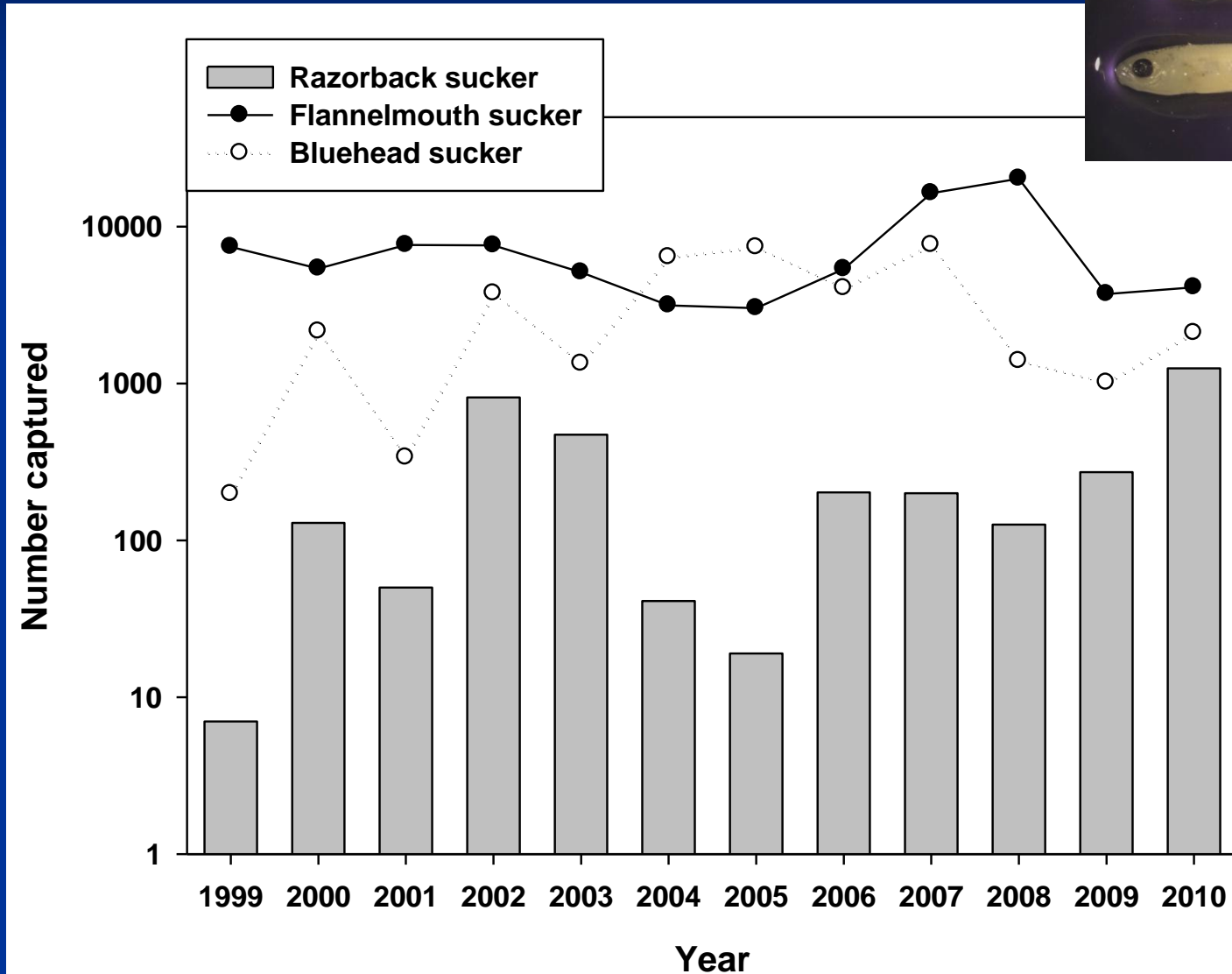
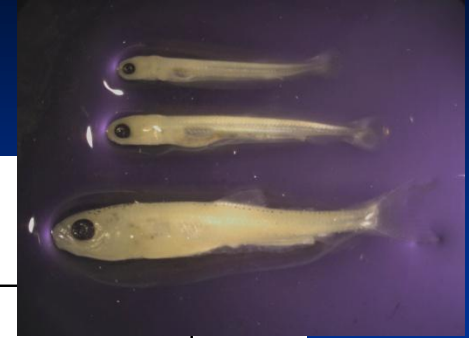
YEAR OF CAPTURE



Razorback sucker 2010 size structure



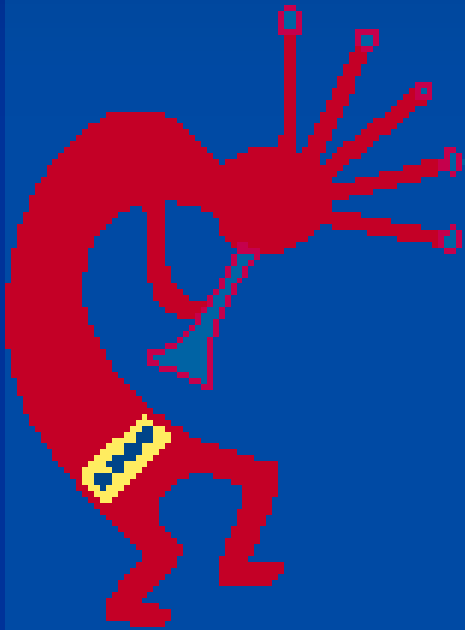
Native sucker larvae detected



Future Actions

- Stocking protocols
 - Numbers
 - Season of release
 - Size
 - Location
 - Acclimation
- Monitoring plan
- Habitat manipulations
- Revise flow recommendations

Program Partners



- State of Colorado
- State of New Mexico
- Jicarilla Apache Nation
- Navajo Nation
- Southern Ute Indian Tribe
- Ute Mountain Ute Indian Tribe
- U.S. Bureau of Indian Affairs
- U.S. Bureau of Land Management
- U.S. Bureau of Reclamation
- U.S. Fish and Wildlife Service
- Water Development Interests
- Conservation Interests (TNC)

The End

