

Overview of History and Status of Asian Carps in North America





Bighead carp
(Plankton – mostly animal)

Silver carp
(Plankton – mostly algal)



Grass carp
(Vegetation)

Black carp
(Clams, snails and other invertebrates)



> 1000 Years of Chinese aquaculture
based on wild-caught fry

First Artificial Spawn in China

1950

1960

1970

1980

1990

2000

2010

> 1000 Years of Chinese aquaculture
based on wild-caught fry

First Artificial Spawn in China

Worldwide
expansion of
carp
polyculture

1950

1960

1970

1980

1990

2000

2010

> 1000 Years of Chinese aquaculture
based on wild-caught fry

First Artificial Spawn in China

Grass carp Imported to USA

At least three GC importations,
probably several – many others

1950

1960

1970

1980

1990

2000

2010

> 1000 Years of Chinese aquaculture
based on wild-caught fry

First Artificial Spawn in China

Grass carp Imported to USA

Bigheads and Silvers (first) Imported

Bigheads imported many times,
Silvers one or few times

1950

1960

1970

1980

1990

2000

2010

> 1000 Years of Chinese aquaculture
based on wild-caught fry

First Artificial Spawn in China

Grass carp Imported to USA

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Black Carp Imported

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Early English Language Publications on Grass Carp

“Grass carp for Weed Control” (+)

“Observations on Grass Carp in AR” (+)

Grass carp for Mosquito Control (+)

“Studies on
Weed Control w
GC” (+)

“Aquatic Weed Control w GC” (+)

“Exotic Fishes Introduced to NA” (-)

1950

1960

1970

1980

1990

2000

2010

Pro (Bailey and Boyd 1970)

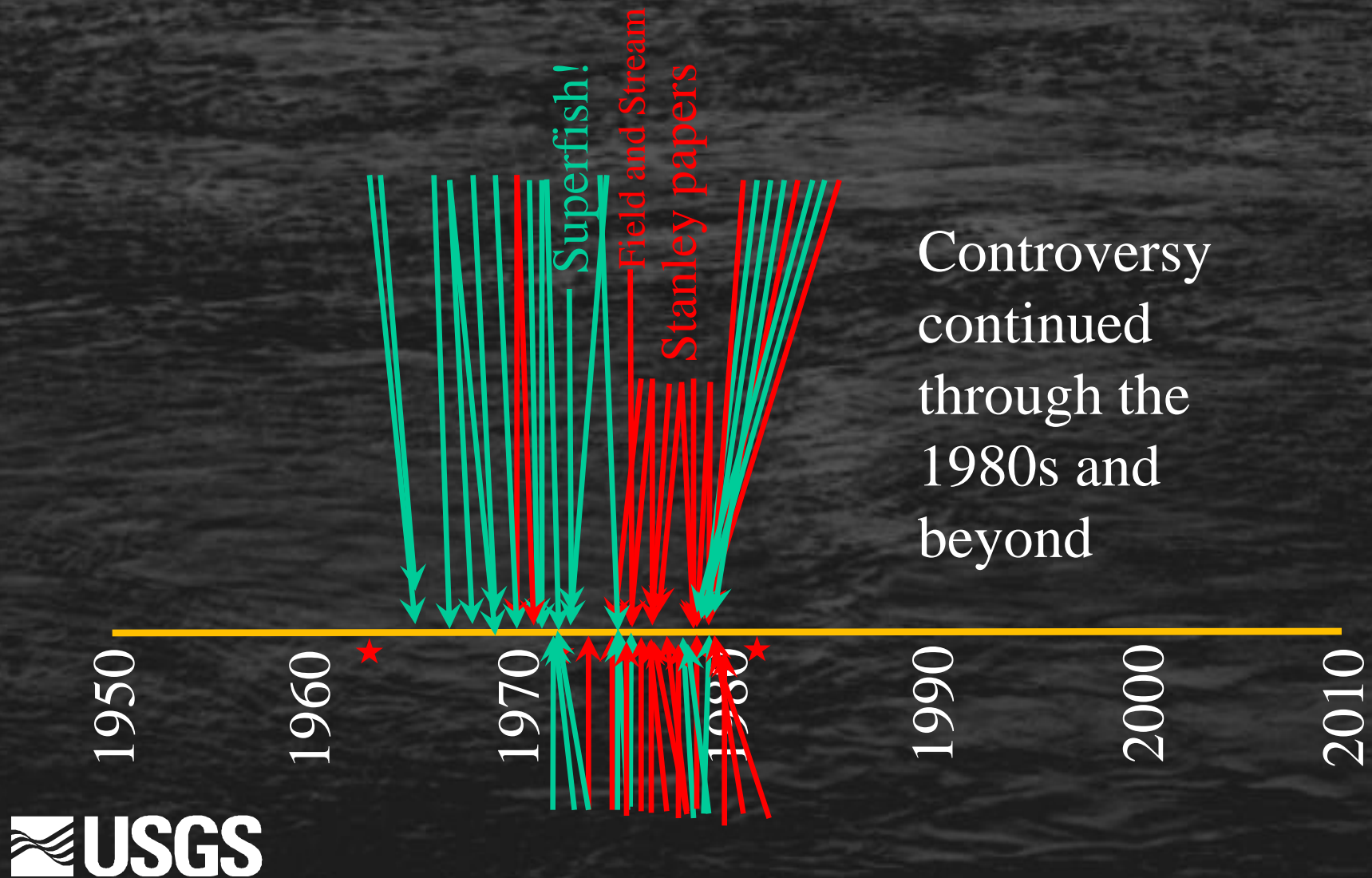
- The grass carp does not create a muddy condition or produce increased plankton blooms.... its feeding habits ...control many of our common, problematic submerged weeds and filamentous algae. The rapid growth rate....jumping ability, and size.....**make the grass carp desirable**, not only as a biological agent for vegetation control, but also as a sport fish which anglers should seek with greatenthusiasm.

Cautionary (Lachner et al. 1970)

- **The real danger inherent with the grass carp** is not its life in ponds and reservoirs, but the great possibility of its release....(to) large river systems of America. There are many habitats in our rivers suitablefor juvenile grass carp adequate breeding beds....for the larvae and young.

North American Publications on Grass Carp

Pro and Cautionary 1965 - 1978



Grass Carp
successfully spawned
in USA

Grass carp liberally stocked to
control vegetation in many
states, first fish are caught in
rivers, including Great Lakes
Basin



Grass Carp
successfully spawned
in USA

Other States object,
Ban Grass Carp

1950

1960

1970

1980

1990

2000

2010

First Known Wild Reproduction of Asian Major Carps In North America

Jon Stanley Risk Assessments

In 1976, predicts reproduction
by 1978 or 79



First Known Wild Reproduction of any Asian Major Carp In North America

Jon Stanley Risk Assessments

In 1976, predicts grass carp
reproduction by 1978 or 79

Conner et al. 1980 MS River!

Identifies large numbers of advanced grass
carp larvae in 1975 samples



Grass Carp
successfully spawned
in USA

Surgical sterilization,
sterile hybrids, monosex
attempted

1983
Sterile Triploid
Grass Carp First
Produced!

Many states move
to “triploid only”

1950

1960

1970

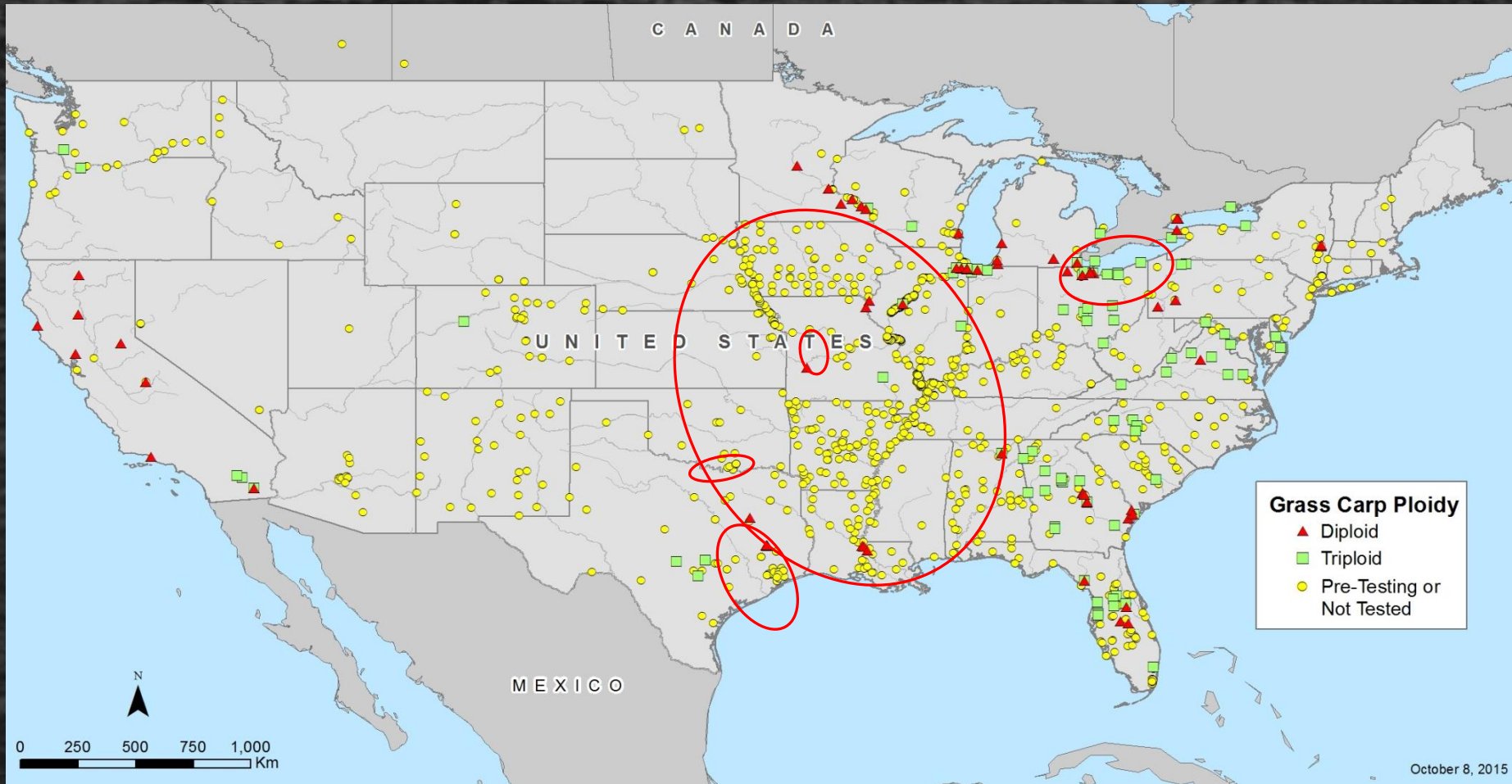
1980

1990

2000

2010

Grass Carp Captures (very incomplete records)



Grass Carp Effects

- Effects in lakes well-documented, based on stocked populations
 - Reduction in macrophyte biomass
 - Excess stocking has undesirable effects
 - ZERO research on effects of self-sustaining populations in reservoirs

Grass Carp Effects

- Few documented effects of grass carp *in rivers*
 - but little researched
 - Most midwestern rivers have few aquatic plants
 - Grass carp abundant
 - Feed terrestrially
 - Riparian damage?
 - In impounded zones, do grass carp influence vegetation abundance or types?

Silver carp **never**
substantially used in
aquaculture in the
USA, other than to
produce fish to stock
(usually with
Bighead Carp) for
water quality control
in sewage treatment
in mid 70s

Silver Carp Imported



Reported Captures of Silver Carp 1974-89

Silver Carp Caught From River in Arkansas near importation location

Silver Carp Imported

Flooding of aquaculture ponds is not a likely reason for the escape of silver carp



Reported Captures of Silver Carp 1974-89



Silver Carp Imported

Silver Carp Caught From River in Arkansas near importation location

1950

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Reported Captures of Silver Carp 1974-89



Silver Carp Imported

Silver Carp Caught From Rivers in Arkansas

1950

1960

1970

1980

1990

2000

2010

Reported Captures of Silver Carp 1974-89



Silver Carp Imported

Silver Carp Caught
From River in AR

LA and MO (MS River)

KY (Ohio River)

IA (MS River)

13 total silvers
reported in 16 years
after first capture

1950

1960

1970

1980

1990

2000

2010

Reported Captures of Silver Carp 1974-89



Silver Carp Imported

Silver Carp Caught
From River in AR

LA and MO (MS River)

KY (Ohio River)

IA (MS River)

1950

1960

1970

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2000

2010

35 silvers caught in AR LA, and MS 1988-89

Silver Carp Caught
From River in AR

Bigheads and Silvers
(first) Imported

Aquaculture of
Bighead Carp with
Catfish begins

1950

1960

1970

1980

1990

2000

2010



Bigheads and Silvers
(first) Imported

Aquaculture of
Bighead Carp with
Catfish begins

Bighead Carp Caught
From OH River in KY

1950

1960

1970

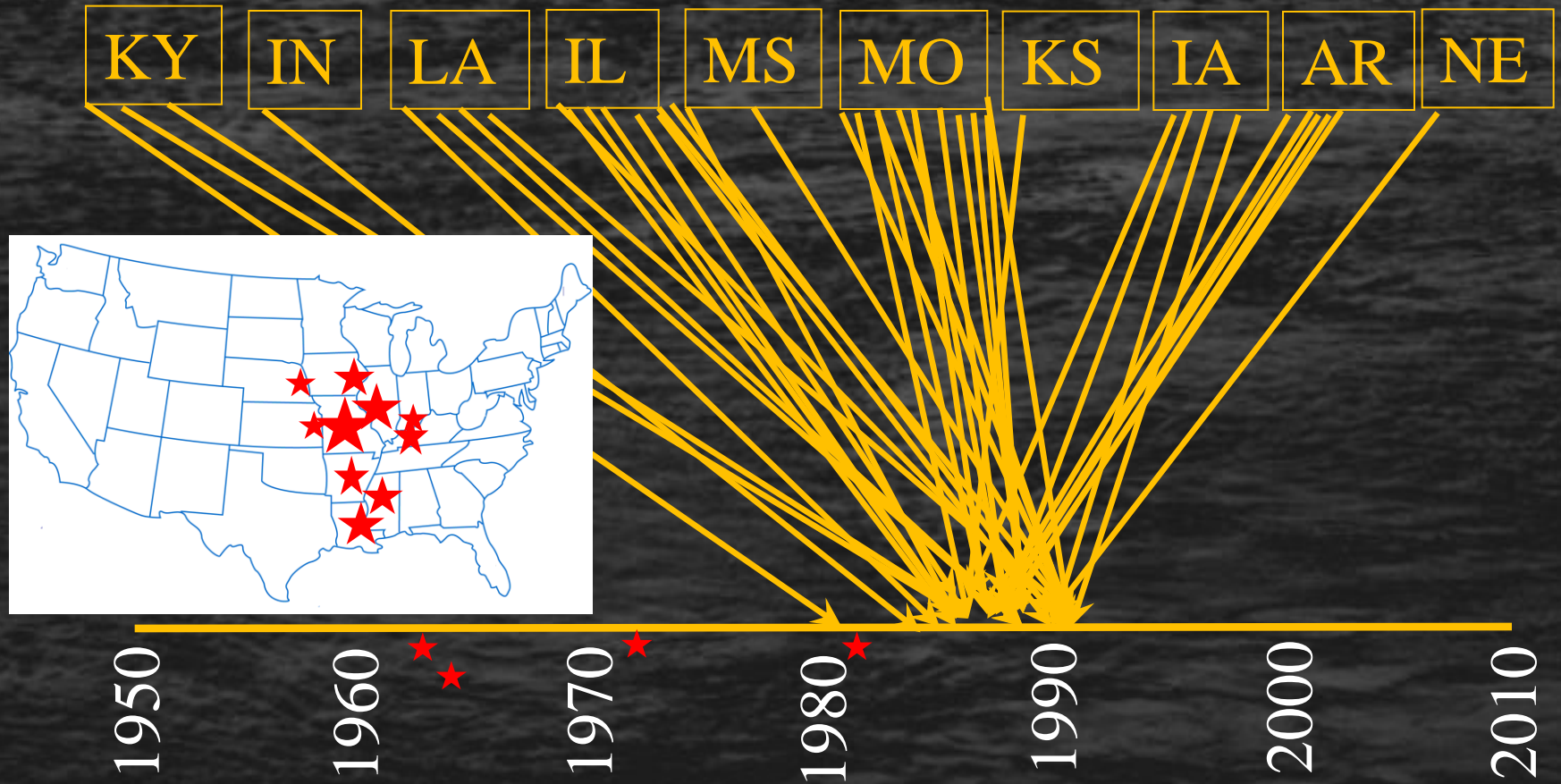
1980

1990

2000

2010

Reported Captures of Bighead Carp 1981-91



Silver Carp- Very gradual increase, rare to uncommon until late 90s

1950

1960



1970



1980



1990

2000

2010

Bighead Carp- rapid
increase, widespread,
common in some areas
by 1993

Silver Carp- Very
gradual increase,
rare to uncommon
until late 90s



Bighead Carp- rapid
increase, widespread,
common in some areas
by 1993

BHC
Exponential
Growth
(approximate)

Silver Carp- Very
gradual increase,
rare to uncommon
until late 90s

1950 1960 1970 1980 1990 2000 2010

Bighead Carp- rapid increase, widespread, common in some areas by 1993

Silver Carp Exp. Growth (approx.)

Silver Carp- Very gradual increase, rare to uncommon until late 90s

BHC Exp. Gr.

1950 1960 1970 1980 1990 2000 2010

Cautionary Journal
Publications on Bighead,
Silver, and Black Carps
Prior to 1992



Cautionary Journal
Publications on Bighead,
Silver, and Black Carps
Prior to 1992

Twenty years of silence



First Cautionary Journal Publications on Silver and Bighead Carp in North America

Costa-Pierce review of silver carp

Courtenay et al.
exotic species
paper mentions
bigheads and
silvers



Publications of Captures of Wild Bighead Carp in North America

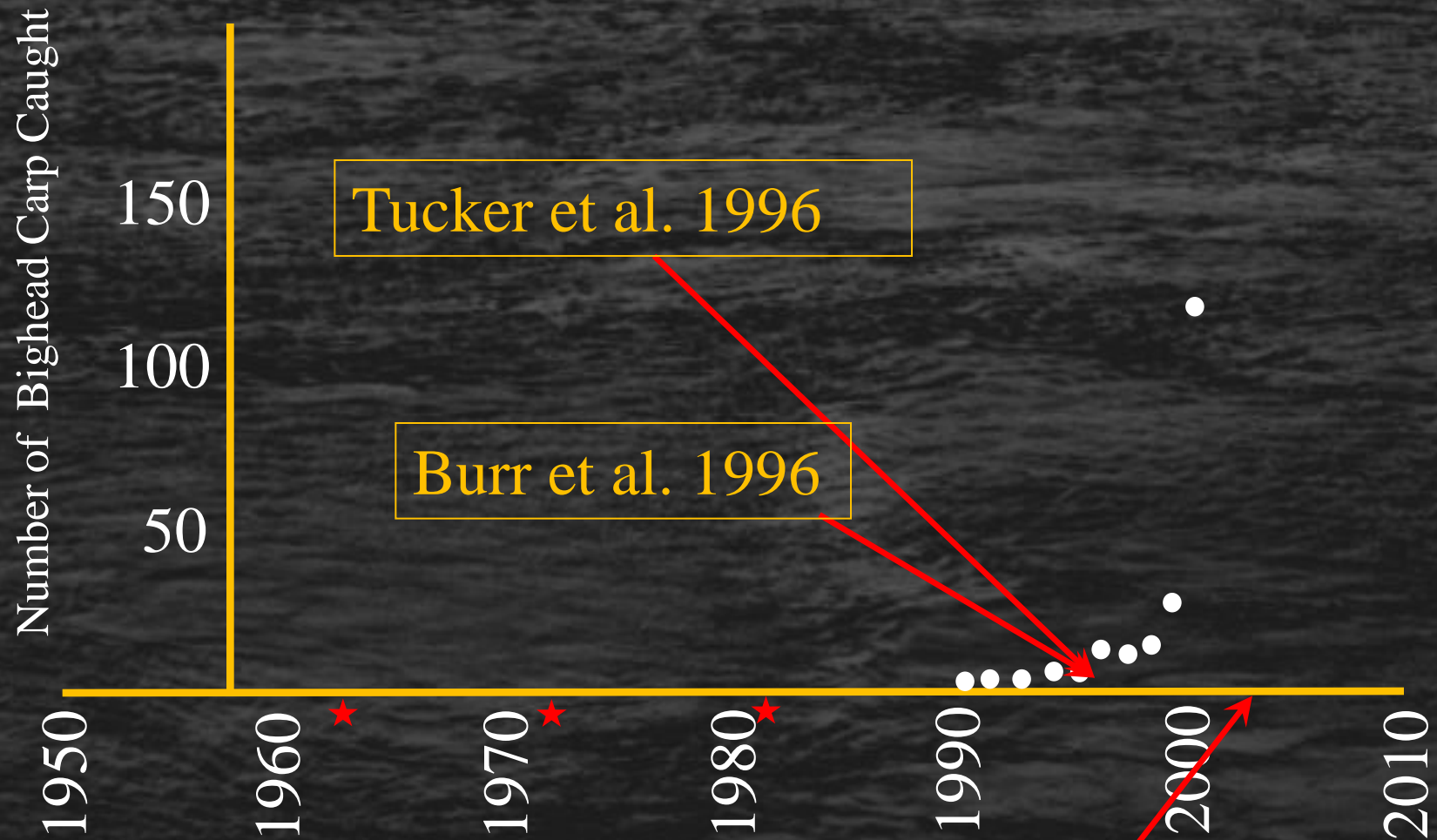
Tucker et al. 1996

24 years after original importation
(Nobody mentions silver carp)

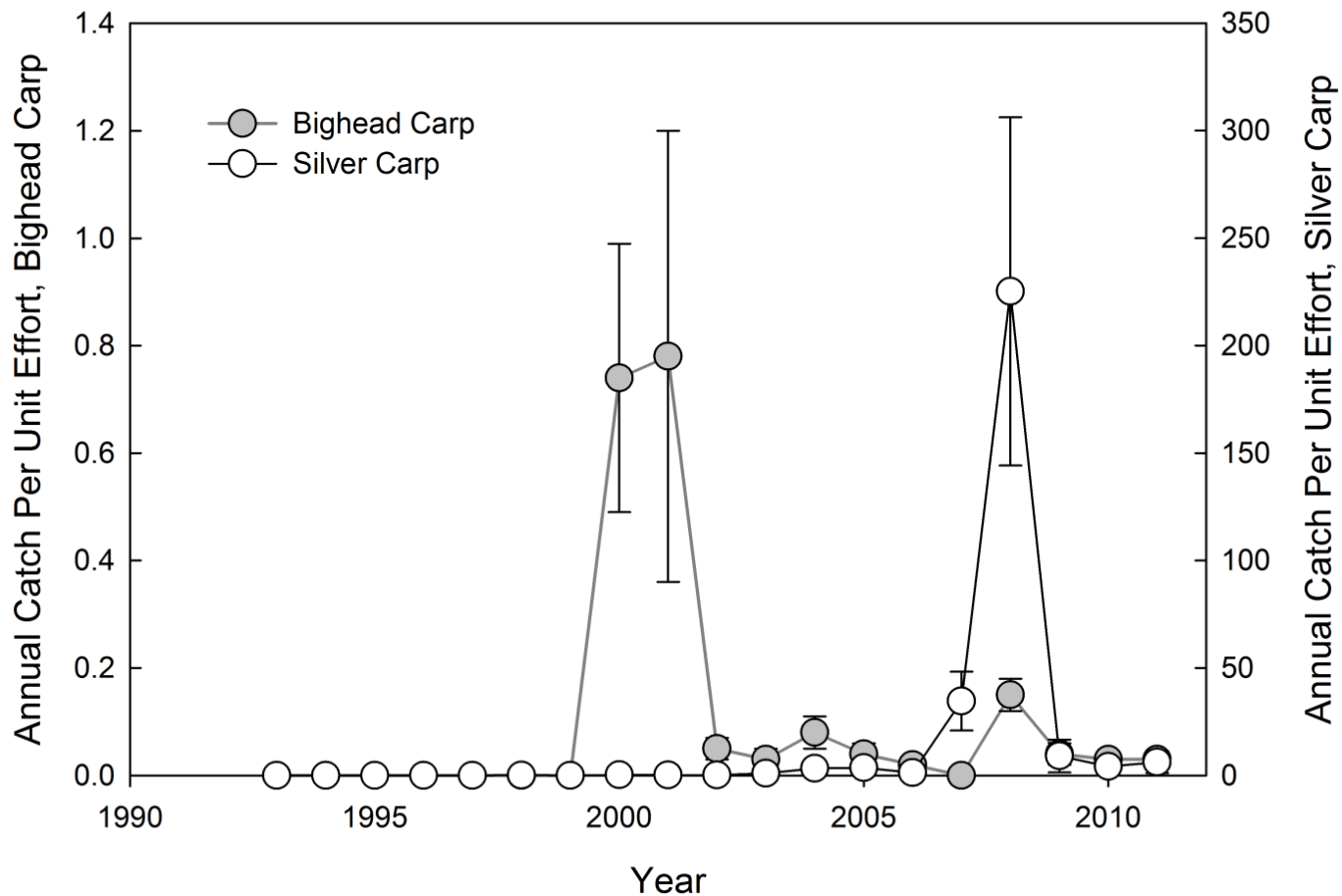
Burr et al. 1996



Bighead Carp Captures in Pool 26 of MSRIV



Daytime Electrofishing CPUE, La Grange Reach Illinois River



Waterski, anyone?



Chicago Waterways



Sanitary and Ship Canal

Barrier Reach

Cal-Sag Channel

Des Plaines River

North Shore Channel

Chicago River

Lake Michigan

\$ focused on protecting Great Lakes

Illinois

Indiana

Credit for slide: Phil Moy

To Illinois and Mississippi Rivers

Chicago Sanitary And Ship Canal Dispersal Barrier

Dispersal Barrier Advisory Panel Created

Carp were
not primary
reason for
AIS Barrier



Chicago Sanitary And Ship Canal Dispersal Barrier

Dispersal Barrier Advisory Panel Created

Demonstration
Barrier
operational

Carp
become
focus

Barrier II

1950

1960

1970

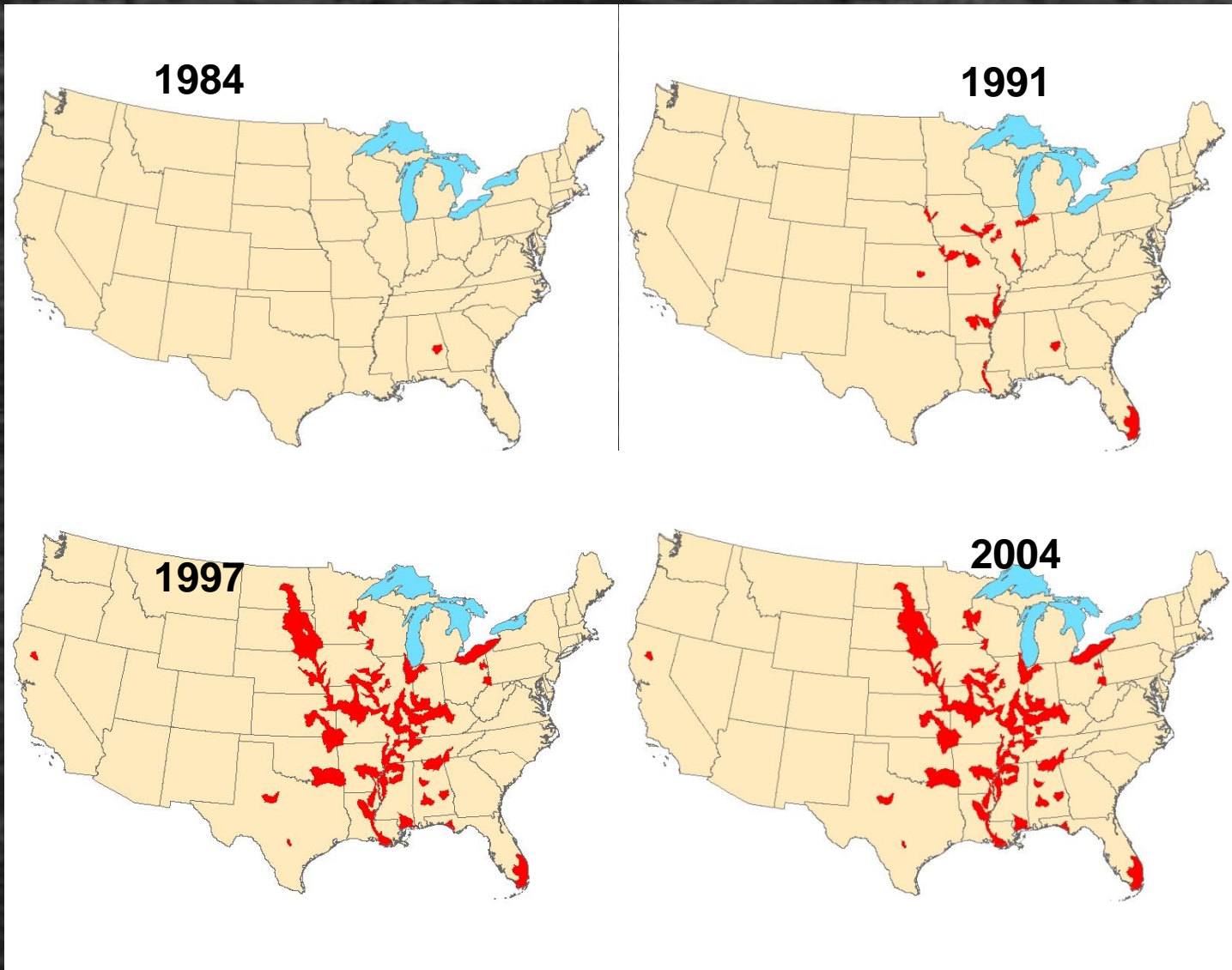
1980

1990

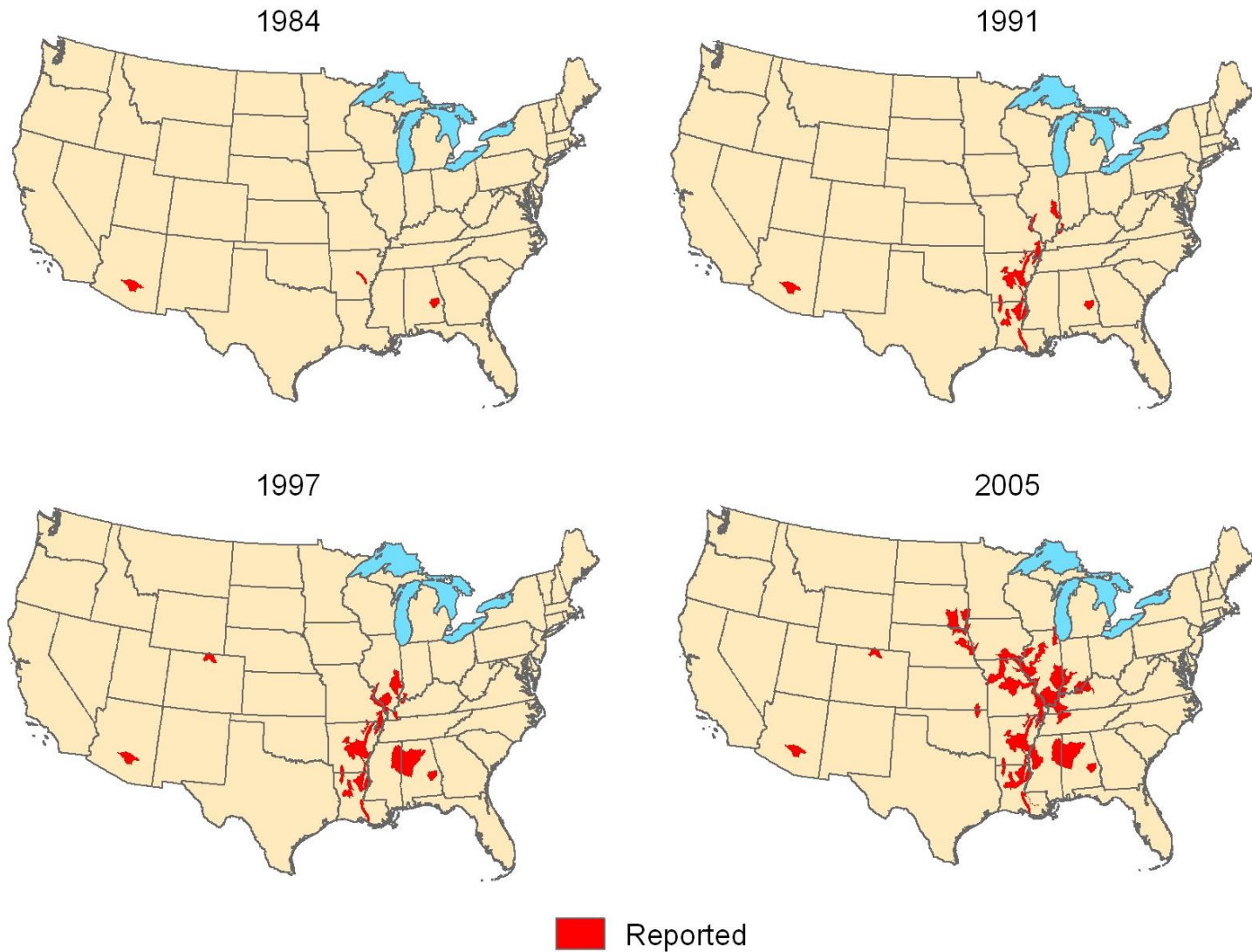
2000

2010

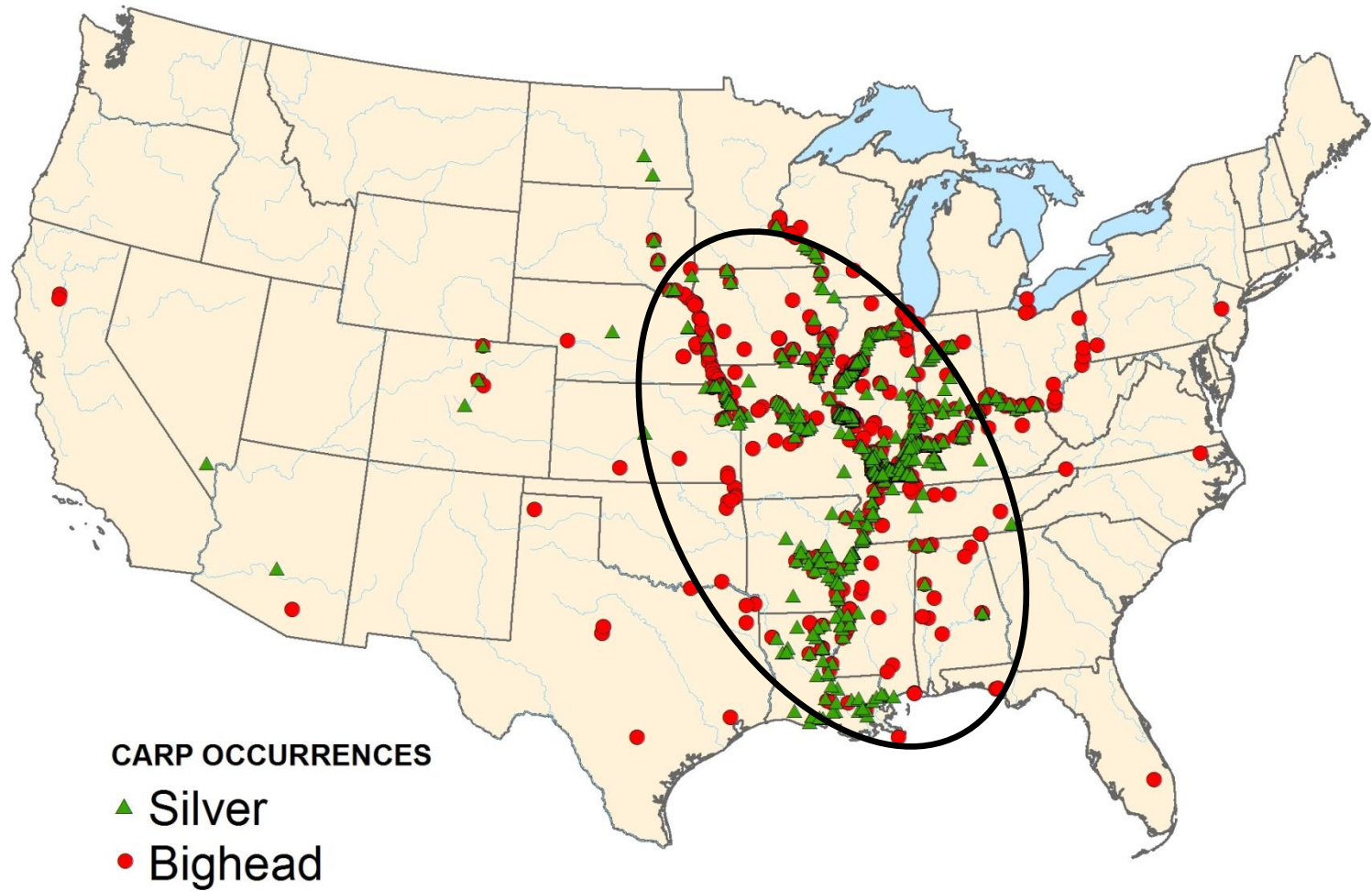
Bighead Carp Range Expansion



Silver Carp Range Expansion



Bighead Carp + Silver Carp 2015



U.S. GEOLOGICAL SURVEY AUGUST 2015

Bighead and Silver Carp Effects

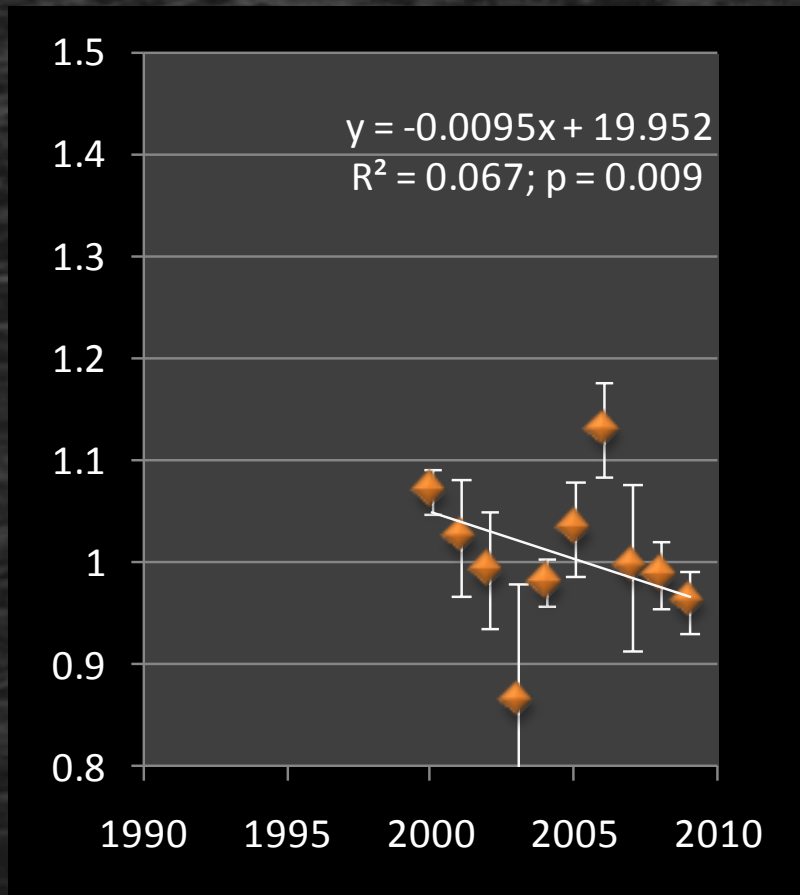
- Large reductions in crustacean zooplankton
- Reductions in size of phytoplankton
- Variable effects on rotifers
- Reduced condition/growth of planktivorous fishes
- Reduced survival of pelagic fish larvae
- Reduced Omega-3 fatty acids in pelagic fishes

Silver Carp Injuries / Property Damage

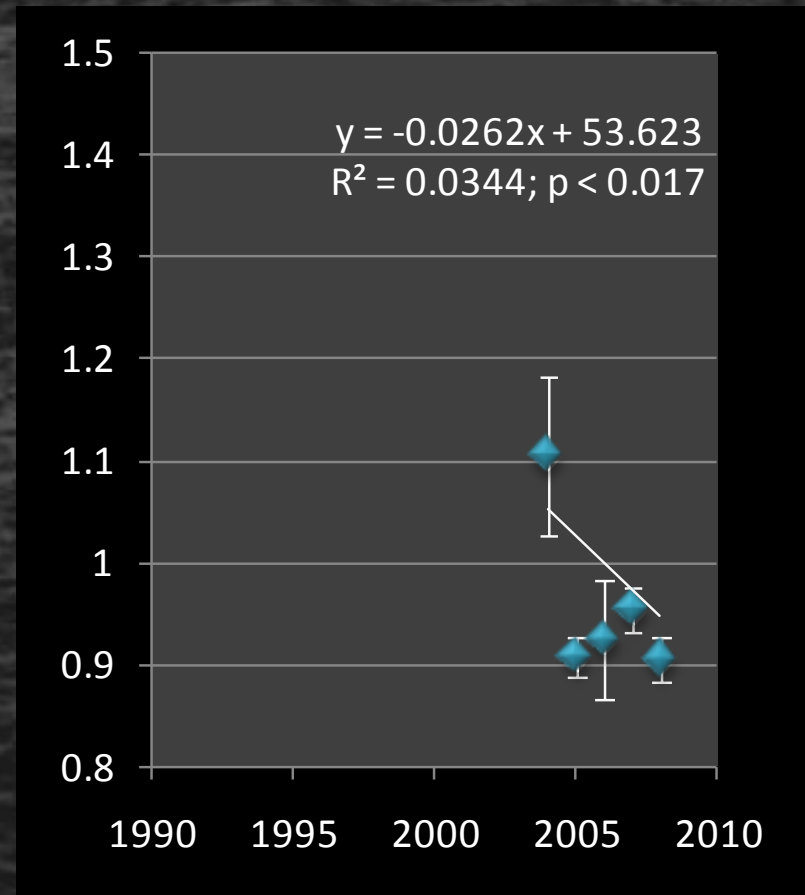


Bighead Carp Condition Factor

Mississippi River



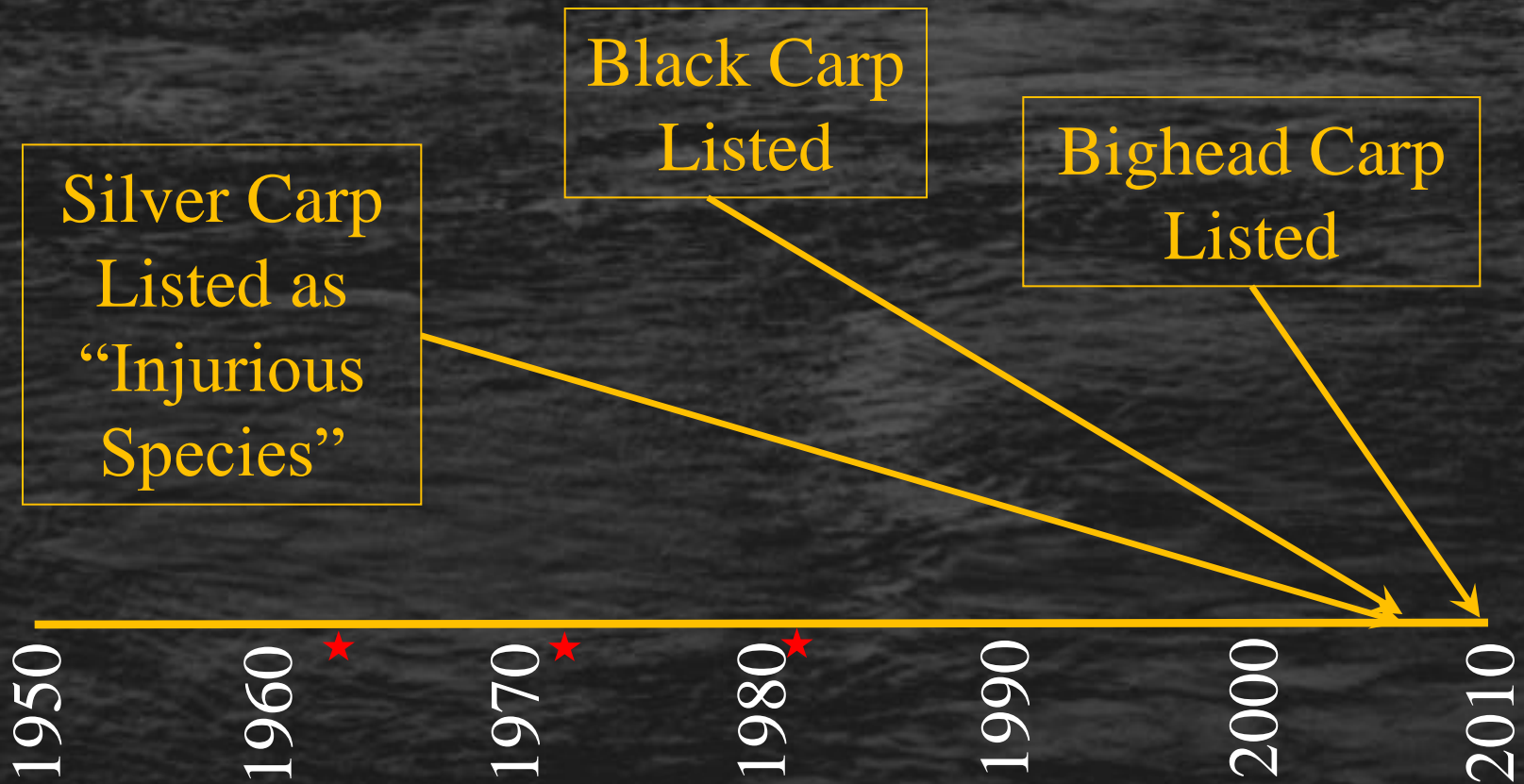
Missouri River



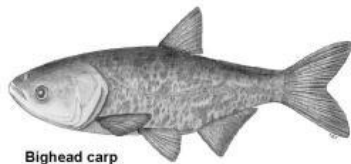


Emaciated Bighead Carp — photo by Ben Stahlschmidt

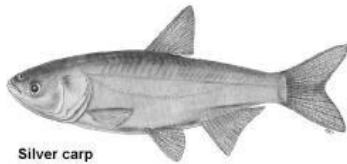
Lacey Act



The Management Plan (2007)



Bighead carp

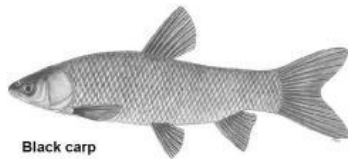


Silver carp

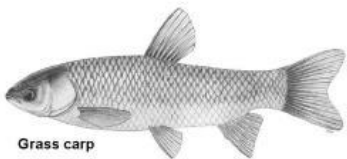
Management and Control Plan for Bighead, Black, Grass, and Silver Carps in the United States

*Submitted to the Aquatic Nuisance Species Task Force
Prepared by the Asian Carp Working Group*

October 2007



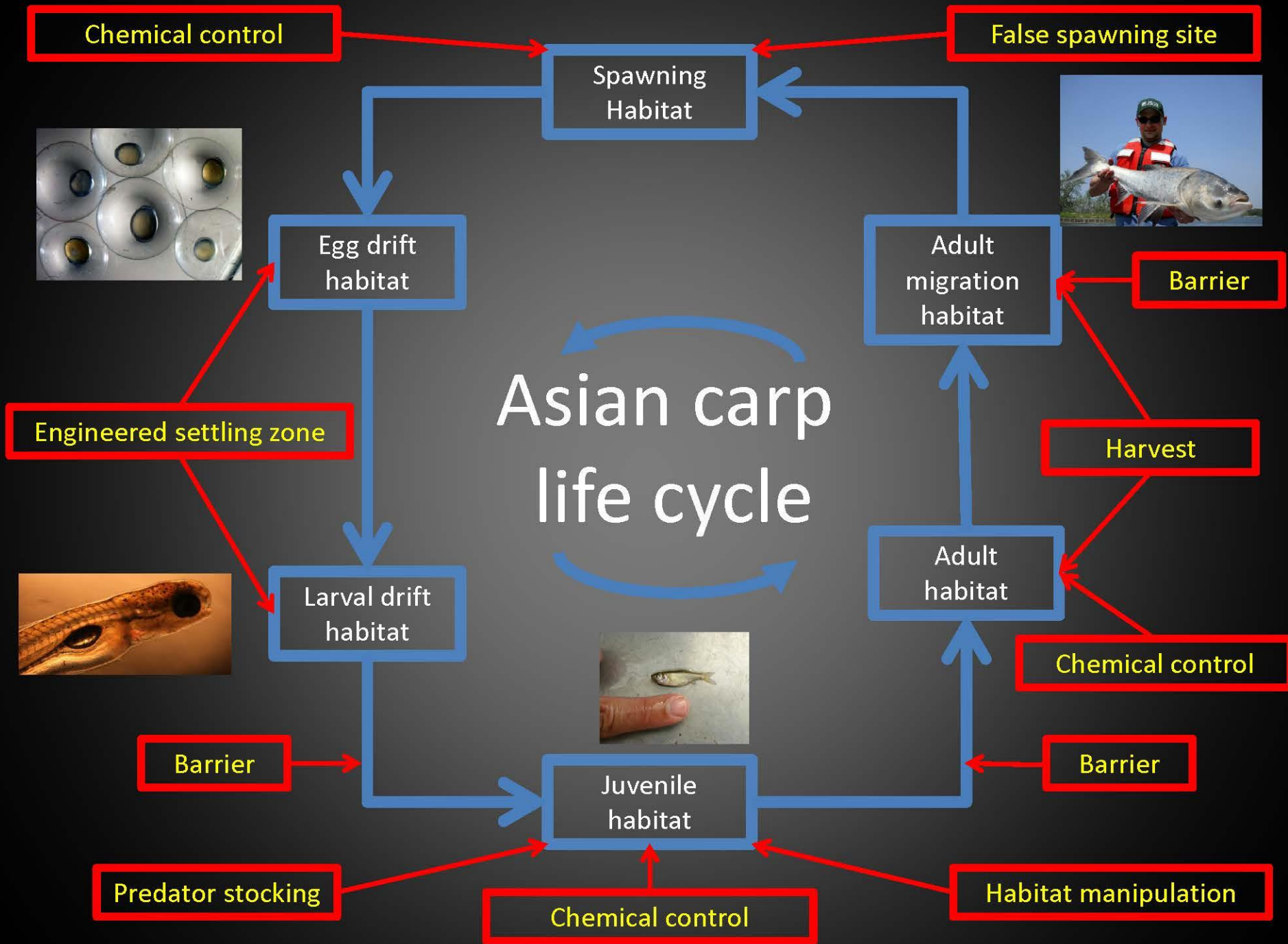
Black carp

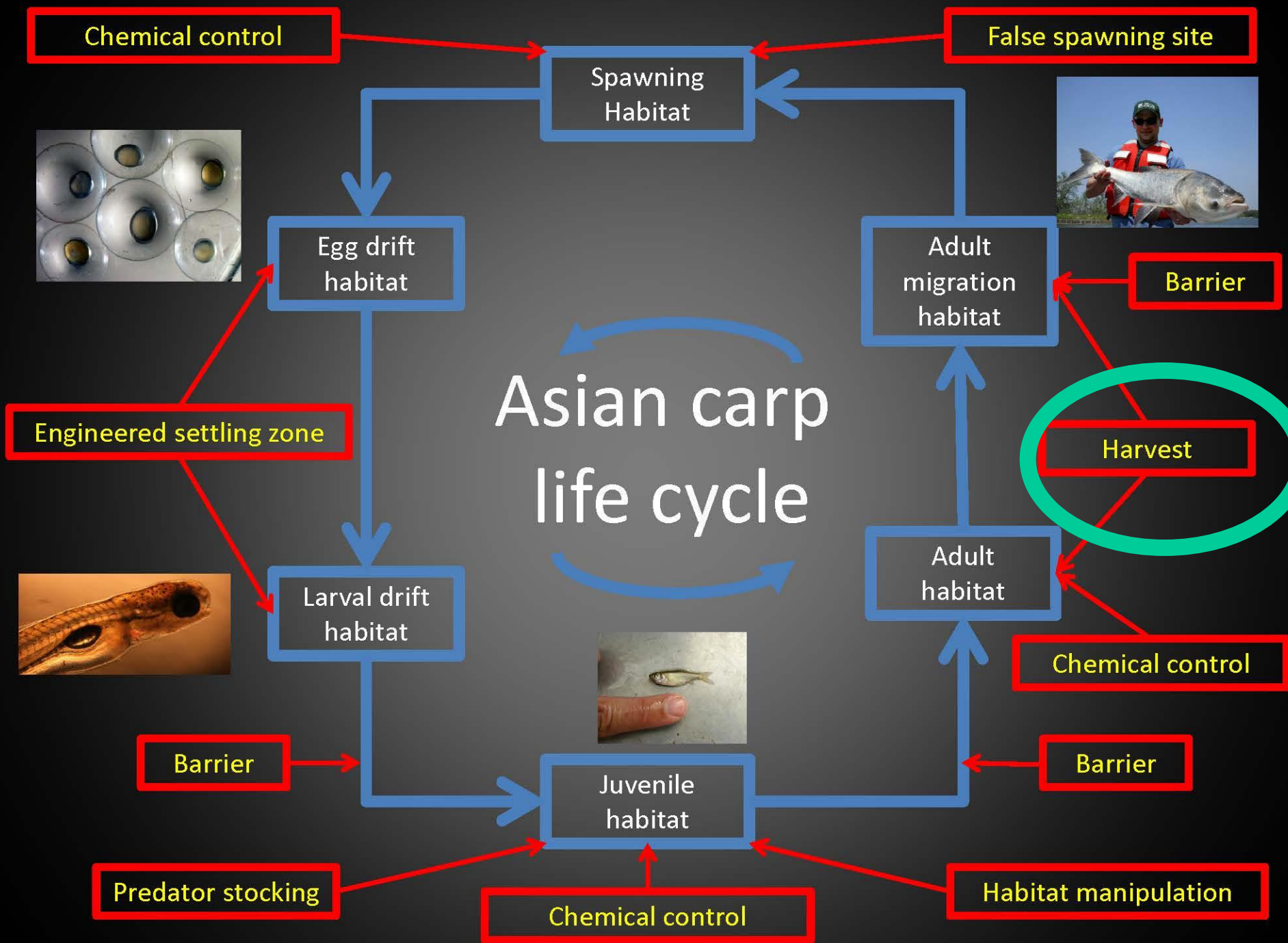


Grass carp

- 48 strategies
- 131 recommendations
- some unresolved issues
- >\$16 million/year for 20 years to do all recommendations
- Unfunded, but...

Asian carp life cycle





Summary

- Importations with best of intentions
- Decades passed between first captures and exponential growth phase
- Potential for problems recognized before problems existed, but after it was too late.
- Wheels of change are slow--- but I'm optimistic that we can manage Asian carps if we are committed to do so.

Recorded Black Carp Catches

(Not including Louisiana)

