

Challenges of Nonnative Fishes in the Illinois River



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Cool looking Shovelnose sturgeon.....



Paddlefish.....





Shorthead redhorse





Aquatic Nuisance Species

are nonindigenous species that threaten the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural or recreational activities dependent on such waters. ANS include nonindigenous species that may occur in inland, estuarine and marine waters and that presently or potentially threaten ecological processes and natural

Can include very small things
such as virus:
Fish = VHS

In addition to adversely affecting
pendant on waters of the United
adversely affect individuals,
including health effects.

In the United States, the States currently designated as VHS-regulated areas by APHIS under the VHS interim rule are:

Indiana

Illinois

Michigan

Minnesota

New York

Ohio

Pennsylvania

Wisconsin

Black crappie

Bluegill

Bluntnose minnow

Brown bullhead

Brown trout

Burbot

Channel catfish

Chinook salmon

Emerald shiner

Freshwater drum

Gizzard shad

Lake whitefish

Largemouth bass

Muskellunge

Shorthead redhorse

Northern Pike

Pumpkinseed

Rainbow trout

Rock bass

Round goby

Silver redhorse

Smallmouth bass

Spottail shiner

Trout-Perch

Walleye

White bass

White perch

Yellow perch

Pomoxis nigromaculatus

Lepomis macrochirus

Pimephales notatus

Amieurus nebulosus

Salmo trutta

Lota lota

Ictalurus punctatus

Oncorhynchus tshawytscha

Notropis atherinoides

Aplodinotus grunniens

Dorosoma cepedianum

Coregonus clupeaformis

Micropterus salmoides

Esox masquinongy

Moxostoma macrolepidotum

Esox lucius

Lepomis gibbosus

Oncorhynchus mykiss

Ambloplites rupestris

Neogobius melanostomus

Moxostoma anisurum

Micropterus dolomieu

Notropis hudsonius

Percopsis omiscomaycus

Sander vitreus

Morone chrysops

Morone americana

Perca flavescens

One report indicates that the economic cost of invasive species to Americans is an estimated \$137 billion every year (Pimentel *et al.* 2000).

Up to 46% of the plants and animals Federally listed as endangered species have been negatively impacted by invasive species (Wilcove *et al.* 1998).

MANAGEMENT PLAN

MEETING THE INVASIVE SPECIES CHALLENGE

National Invasive Species Council - January 18, 2001

An Action Plan for the Nation

- A. Leadership and Coordination
- B. Prevention
- C. Early Detection and Rapid Response
- D. Control and Management
- E. Restoration
- F. International Cooperation
- G. Research
- H. Information Management
- I. Education and Public Awareness

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National Invasive Species Council - January 18, 2001

Challenges:

- understand the non-native species that are/were present in the Illinois River
- how did non-native species use to get to the Illinois River
- how does general trend data inform us
- ongoing efforts within Illinois to manage ANS



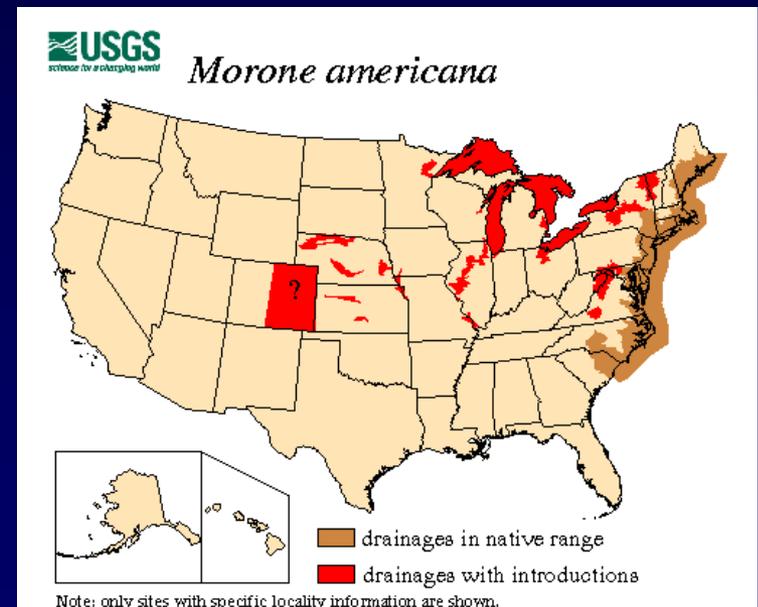
-Many species have entered the Illinois River drainage by routes that were not historically present.

White perch *Morone americana*

Invaded Great Lakes with construction of the Erie and Welland Canals

Current distribution: Length of Illinois Waterway and into Mississippi

Potential negative impacts on native white bass stocks and other native fishes used as forage.

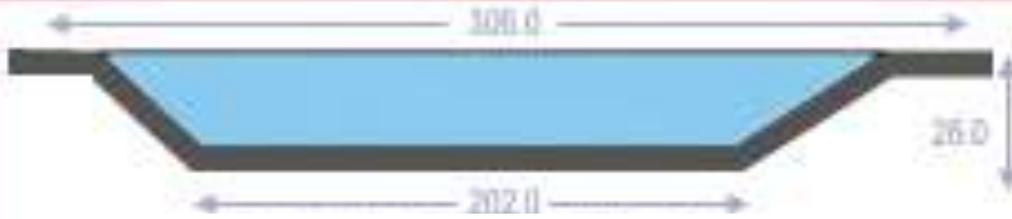


I&M Canal National Heritage Corridor (Eastern Section)

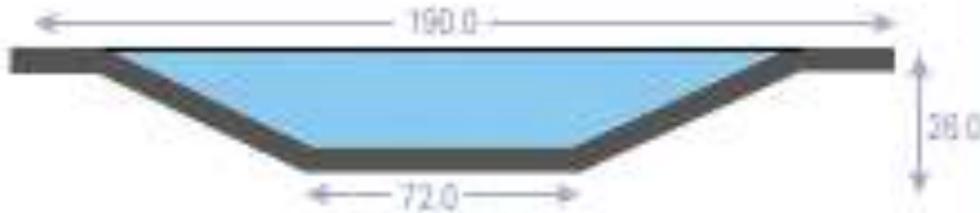


**New York canal system
linking East Coast to
Great Lakes**

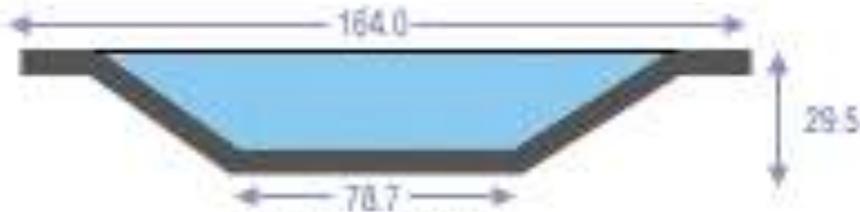
Famous canals



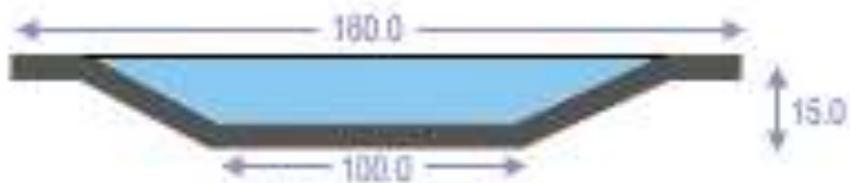
Chicago Sanitary and Ship Canal



Suez Canal



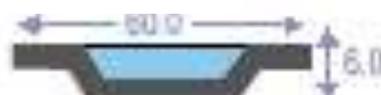
Panama Canal



Welland Canal



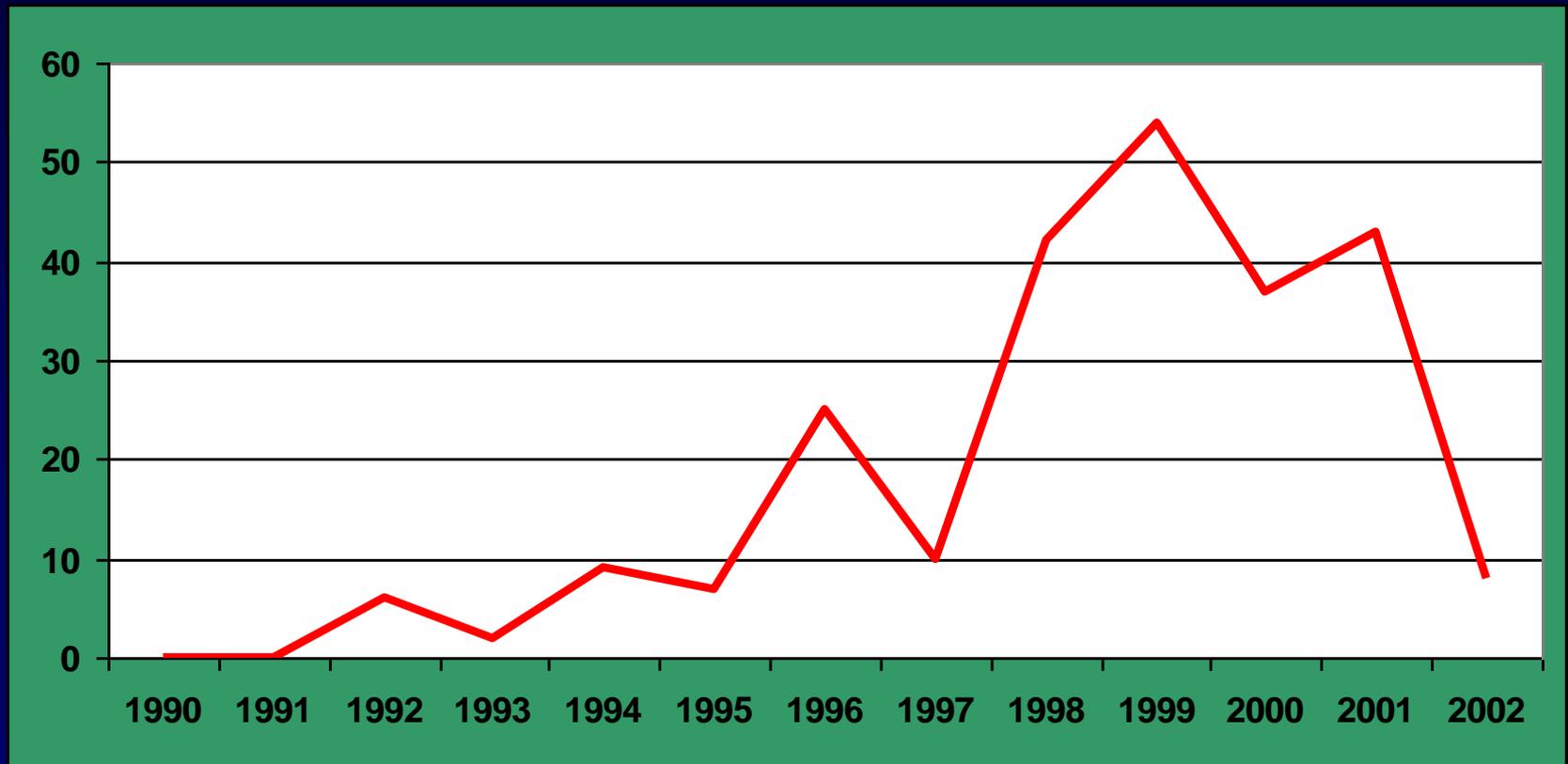
Erie Canal



Illinois and Michigan Canal

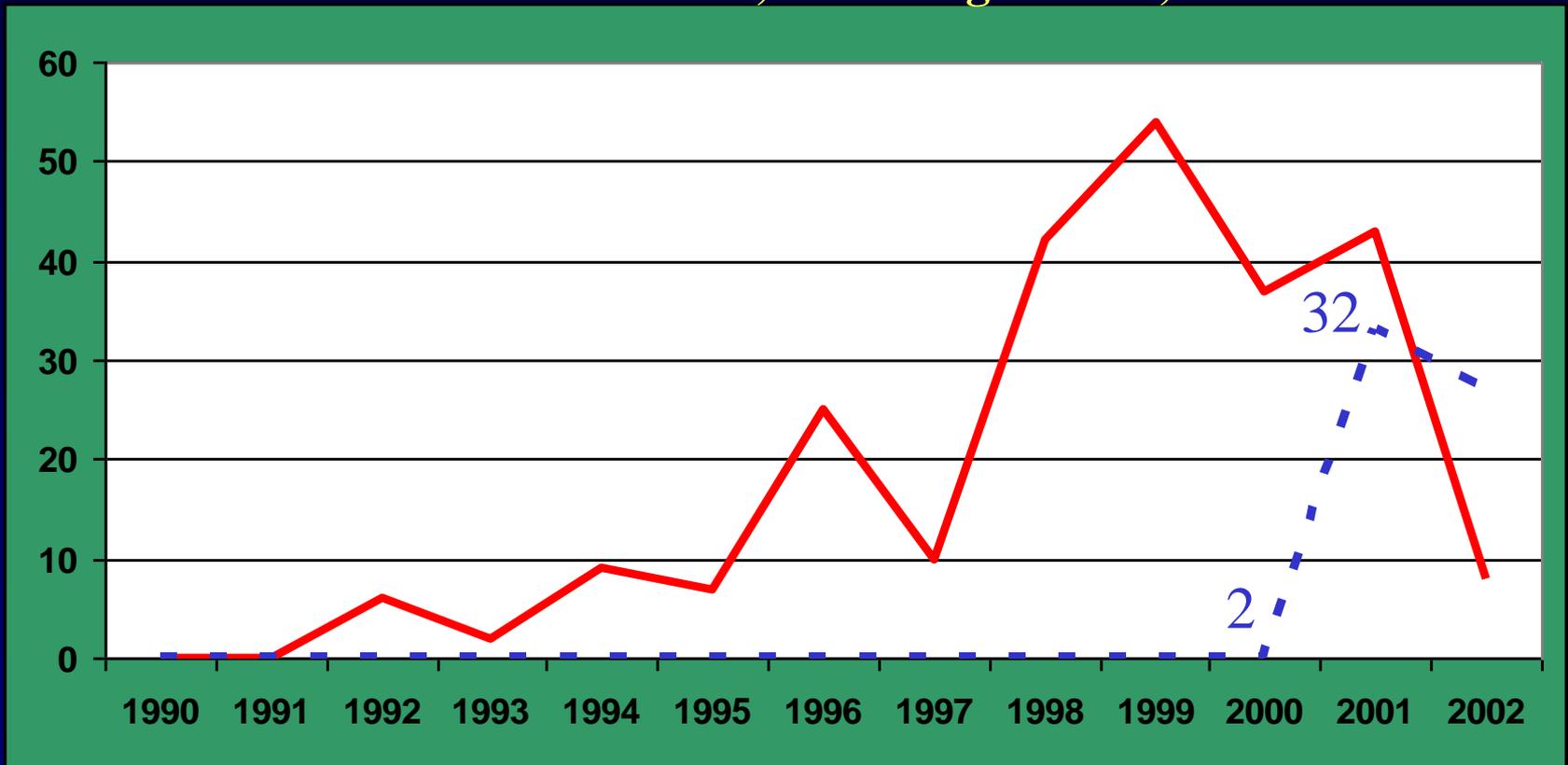


White perch abundance in LTRMP catches, La Grange Reach, Illinois River



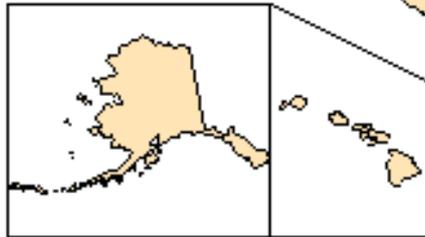
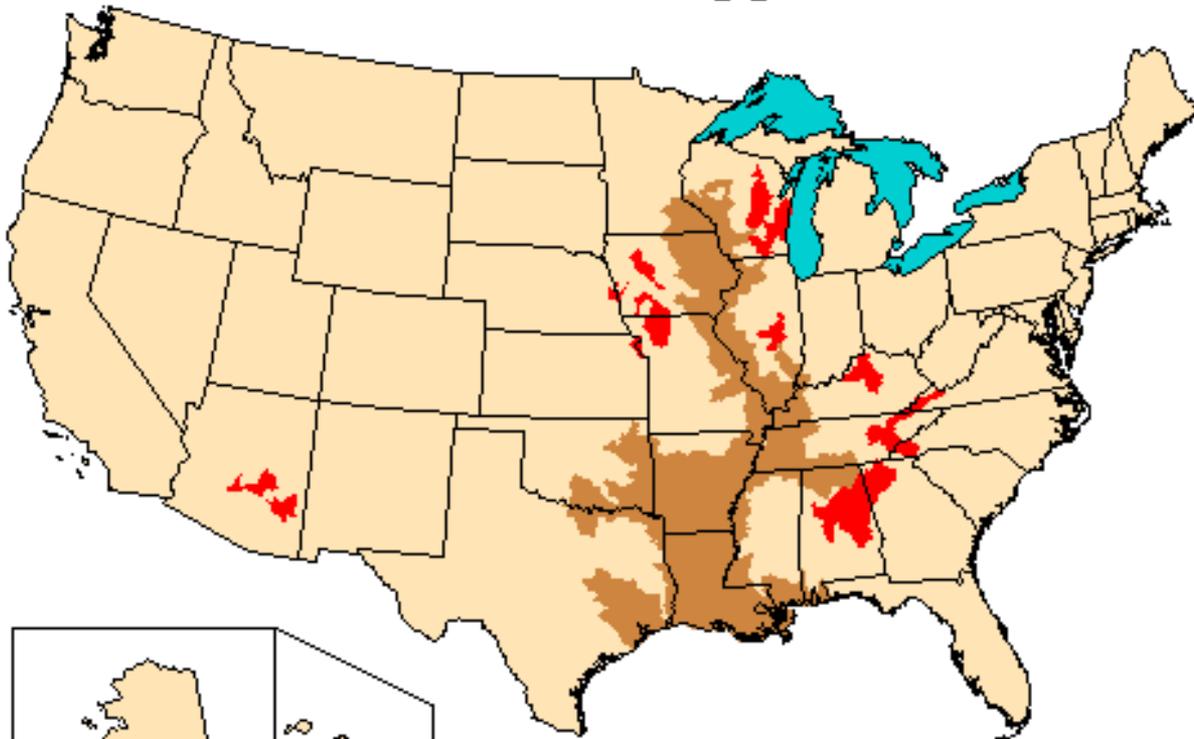


White perch and White perch x Yellow bass hybrid abundance in LTRMP catches, La Grange Reach, Illinois River



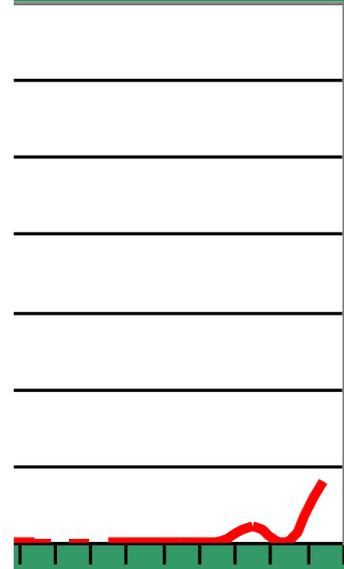


Morone mississippiensis



- drainages in native range
- drainages with introductions

ch
ng (LTEF),



1999

Illinois River

◆ denotes non-native species in Lake Michigan

Sea lamprey ◆

Three spine stickleback ◆

Ninespine stickleback

Alewife ◆

Oriental weatherfish ◆

Cisco

Round goby ◆

Occasional occurrence in Upper drainage, stray from Lake Michigan.



-Management activities have promoted non-native species within the Illinois River
(not considered nuisance species)

Striped bass *Morone saxatilis*

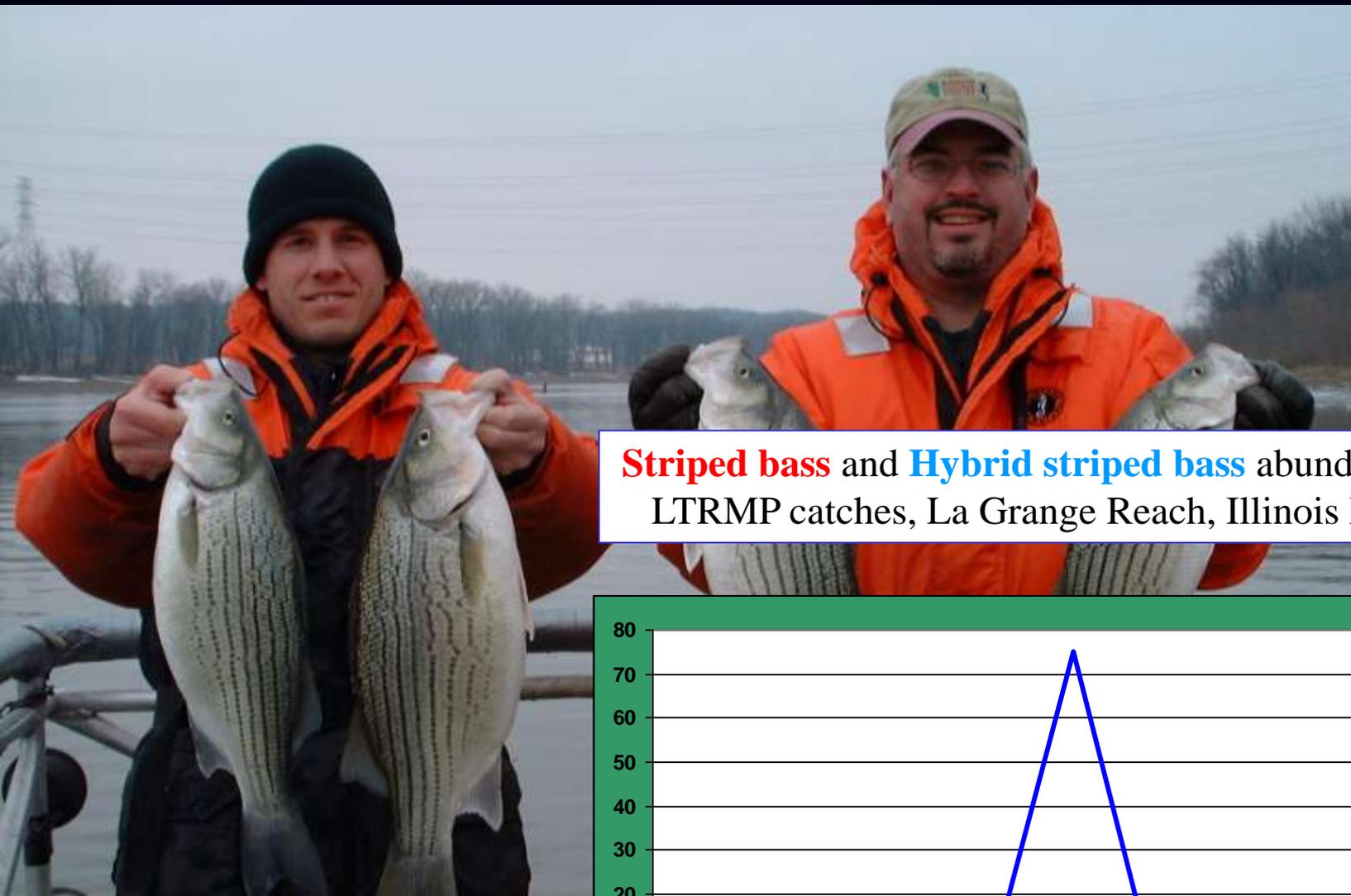
Hybrid striped bass

Morone saxatilis x chrysops

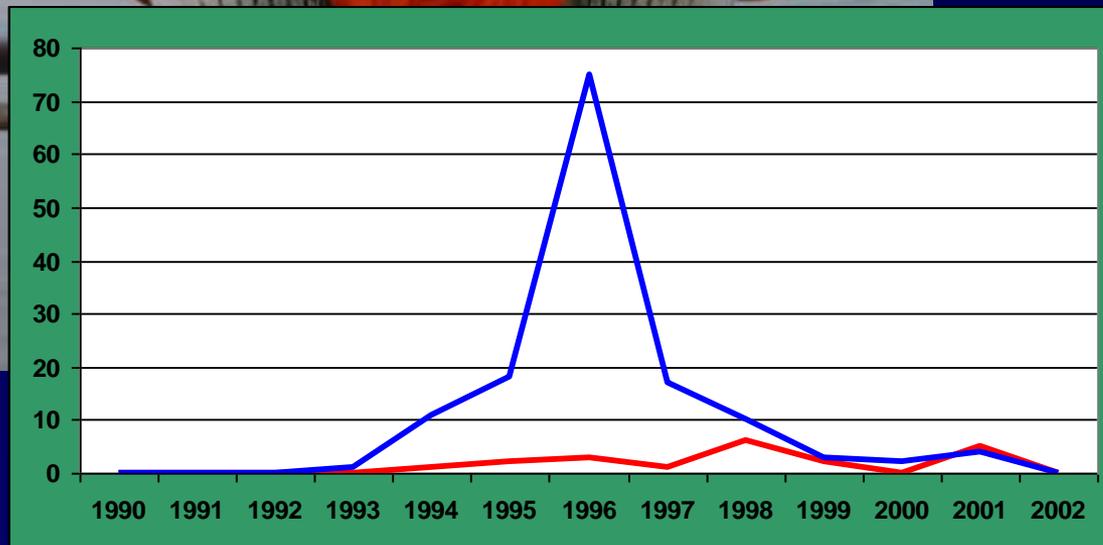
Escapee from W. Kentucky reservoirs 1974 into Illinois waters (Smith 1979)

Potential to become established in large rivers statewide (Laird and Page 1996), Potential for both to hybridize with native white bass and even white perch.





Striped bass and **Hybrid striped bass** abundance in LTRMP catches, La Grange Reach, Illinois River



Illinois River

Salmonidae *various species*

Commonly used as sportfish and management tool in Great Lakes in response to crash of Lake Trout due to sea lamprey and alewife explosion.

Certainly effects are great in the Great Lakes, current risks are few in Illinois River.



Hybrid tiger musky

Esox lucius x

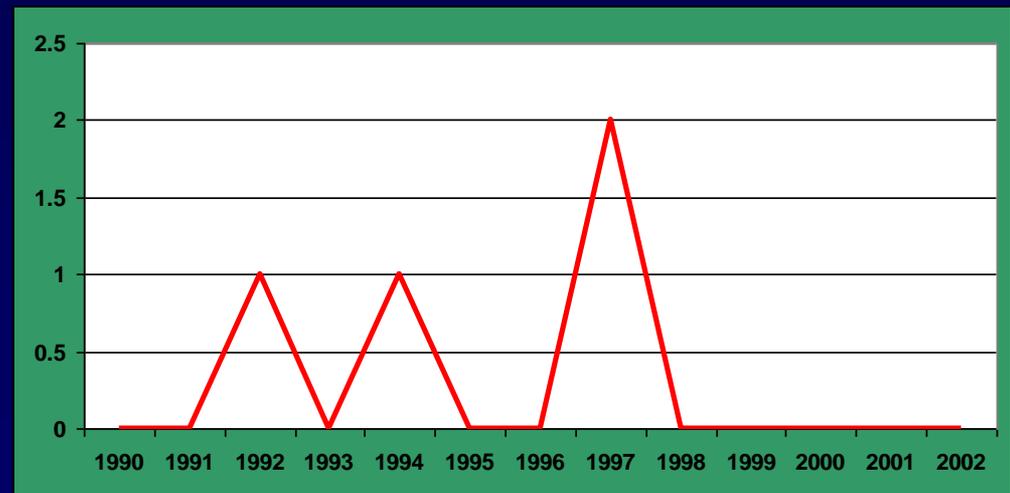
Esox masquinongy

Commonly stocked as sportfish and management tool in lakes and reservoirs statewide.

Low abundance and sporadic occurrence due to escapement from stocked locations, sterile.



Hybrid tiger musky abundance in LTRMP catches, La Grange Reach, Illinois River



Illinois River

White catfish - Stocked into Canton Lake, Fulton county, escaped reservoir into Illinois River, Mason, Fulton, and Peoria counties, 1965 to 1999.

Rainbow smelt - Stocked into Crystal Lake, MI in 1912, found in Mississippi River and collected in Illinois River around Pekin, IL in 1976.



Threadfin shad

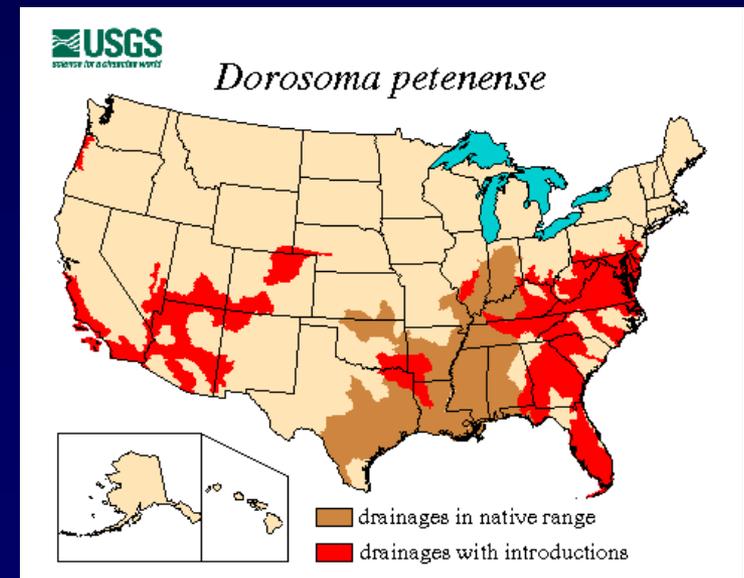
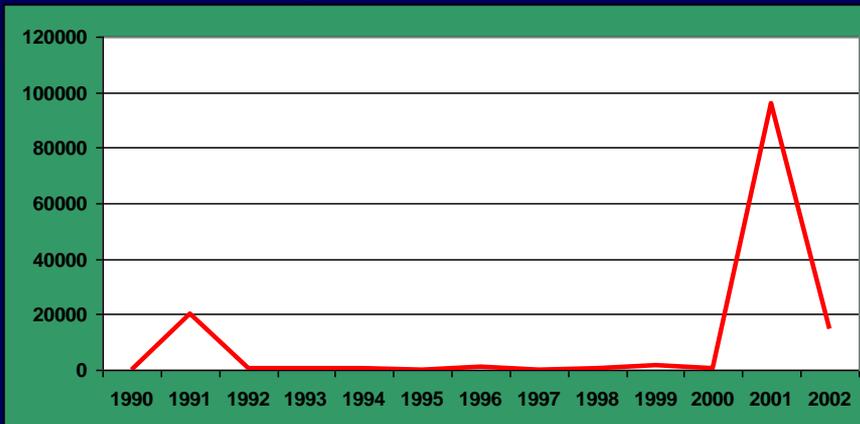
Dorosoma petenense

Commonly used as forage sportfish and management tool in lakes and reservoirs.

Naturalized within river and found throughout state. Potential interactions with other planktivores and larval fish. (>10,000 threadfin shad occurred in one minnow fyke, 1991 and >80,000 threadfin shad in 2001.)



Threadfin shad abundance in LTRMP catches, La Grange Reach, Illinois River



Illinois River

Tench - Stocked as forage in late 1800's, last record 1947 (Chicago canals and ditches, USGS).

Inland silverside - Stocked as forage, more common in southern Illinois, established in Ohio River.



Illinois River

-Public activities have promoted non-native species within the Illinois River –bait buckets and aquaria



Rudd - sold as bait, collected in wild in Upper Illinois drainage. Collected as part of LTRMP Pool 13, Mississippi River 2002.

Rio Grande Cichlid - found in Powerton Lake, Pekin Illinois, result of fish tank stocking (isolated, still present?).





Common Carp *Cyprinus carpio*

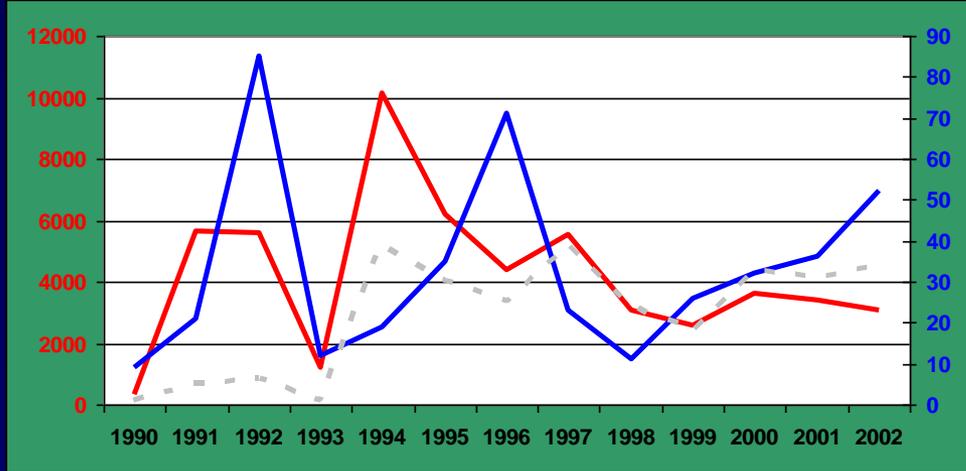
First Illinois occurrence: mid to late 1880's. Stocked from rail nationwide.

Current distribution: River- and State-wide.

Detrimental to water quality and found to uproot vegetation.



Common carp, Goldfish, and Carp x Goldfish hybrid abundance in LTRMP catches, La Grange Reach, Illinois River



Goldfish *Carassius auratus*

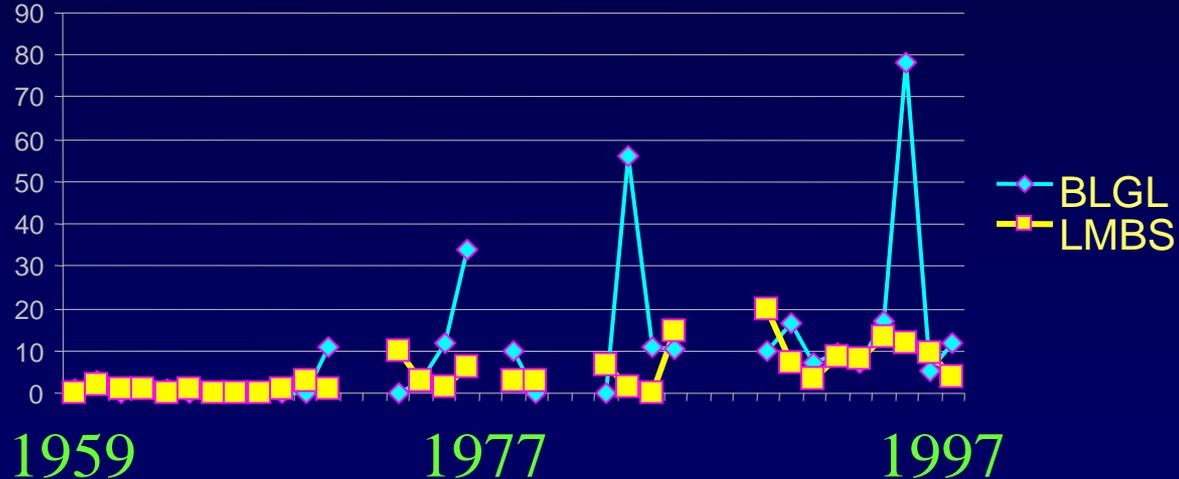
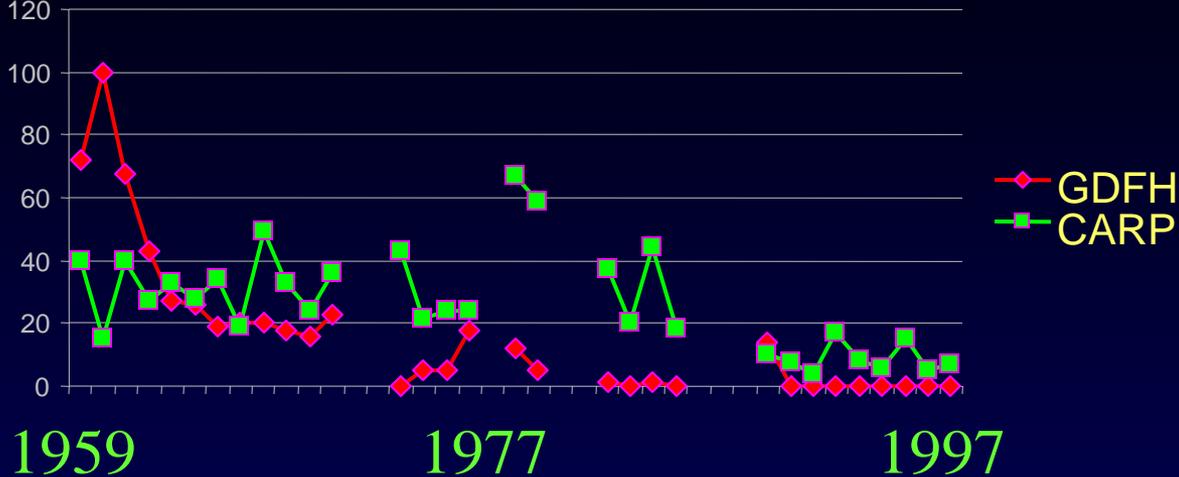
First Illinois occurrence: ~ 1876 (Smith 1979)

Current distribution: State-wide, but most common in Illinois River.

Will thrive in polluted streams due to ability to out compete other species in areas of poor water quality.

Improvements in the watershed

Ballards Island
Marseilles, Illinois



Long Term Illinois River Fish Population
Monitoring (LTEF), Project 101-R

Grass carp

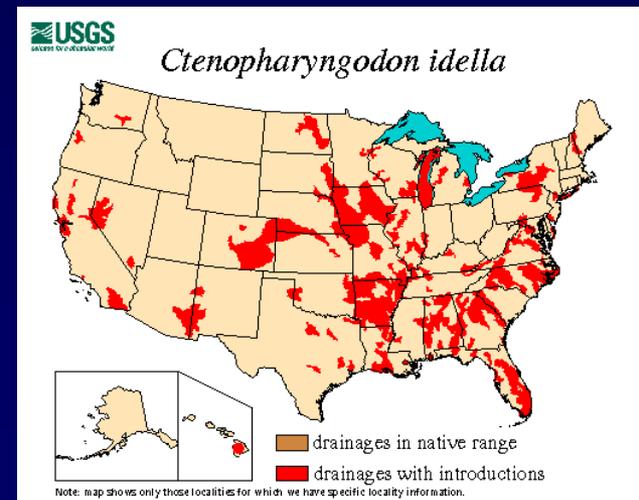
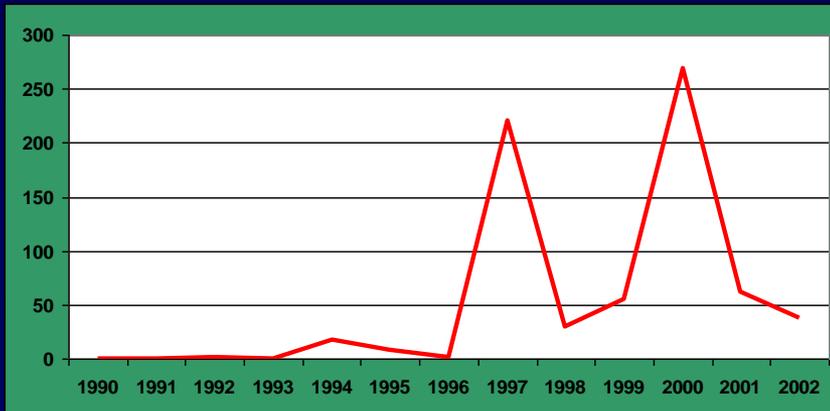
Ctenopharyngodon idella

First introduced in Arkansas in 1960's. First collected in Illinois in Mississippi River, 1971.

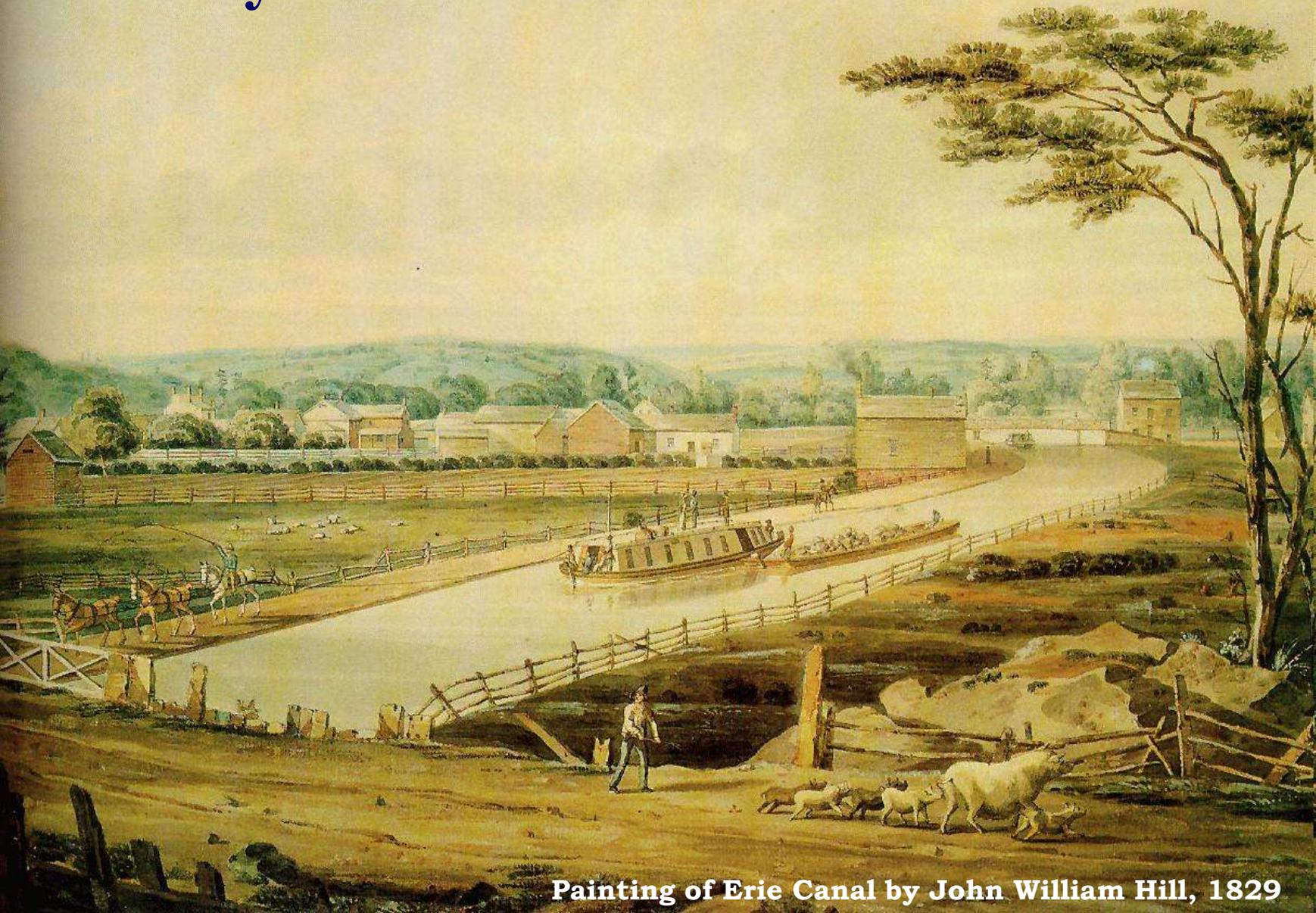
Current distribution: Stocked in ponds for weed control state-wide. Found throughout Illinois waters of the Mississippi River, Lake Michigan, and the Illinois River.

May inhibit or control aquatic vegetation in Illinois rivers.

Grass carp abundance in LTRMP catches, La Grange Reach, Illinois River



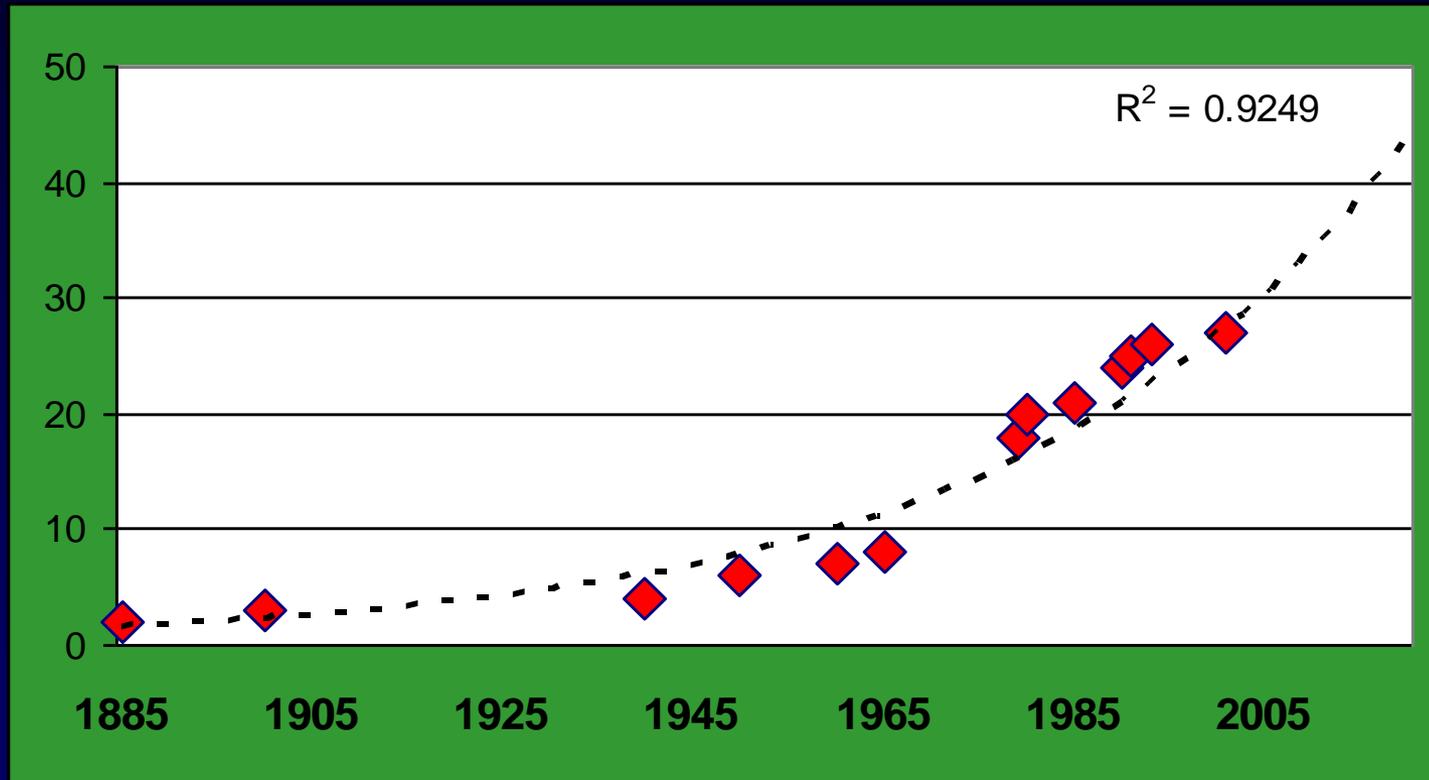
Pathways to Illinois River



Painting of Erie Canal by John William Hill, 1829

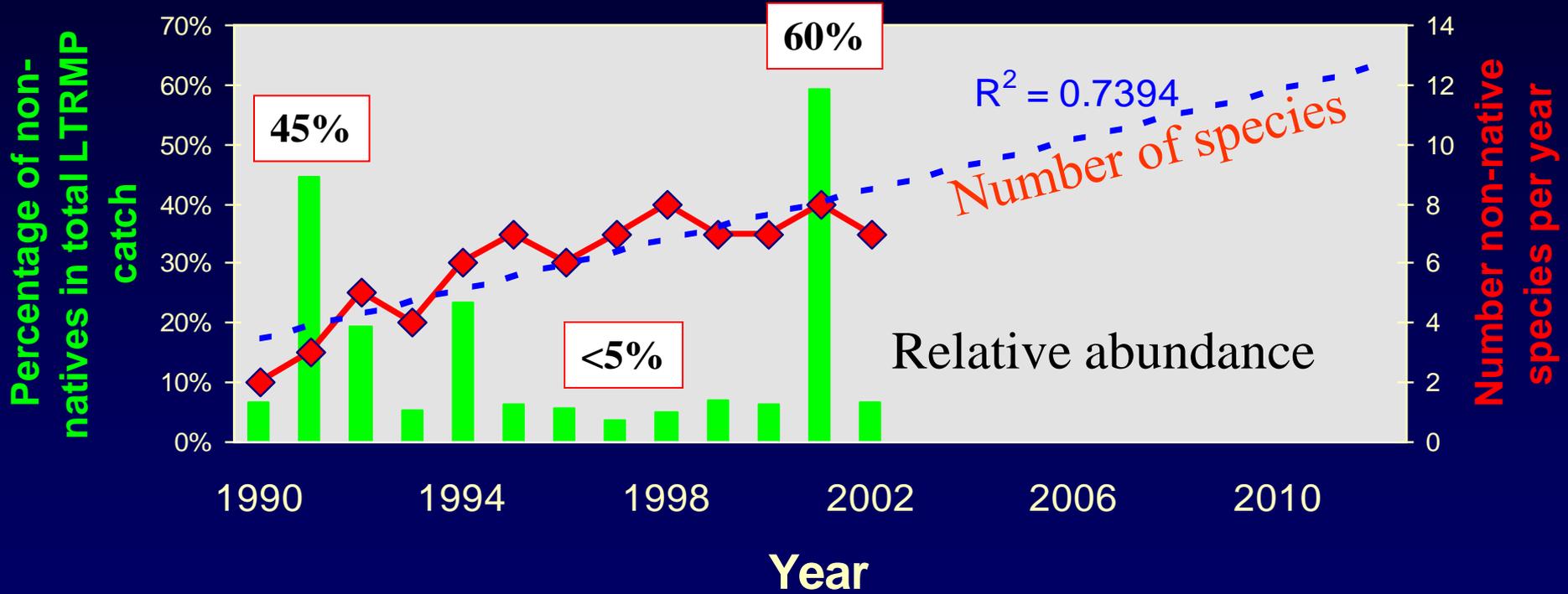
Accumulated non-native species historically in Illinois Waterway

Number of non-native species



Years

Non-native species in LTRMP collections of La Grange Reach (1990 - 2002)



Bighead carp

Hypophthalmichthys nobilis

Introduced in Arkansas for aquaculture in 1970's. Spread into Mississippi and Illinois drainage.

Current distribution: Illinois and Mississippi River drainage including Kankakee River.

Efficient filter feeding behavior could conflict with young and native fish species.



Silver carp

Hypophthalmichthys molitrix

Introduced in Arkansas for aquaculture in 1973. Spread into Mississippi and Illinois drainage.

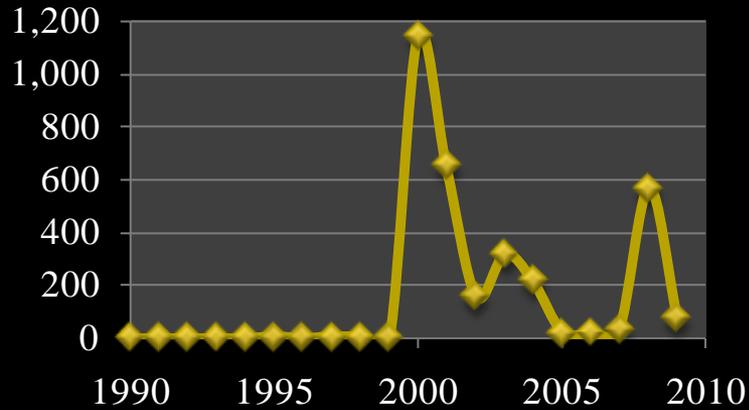
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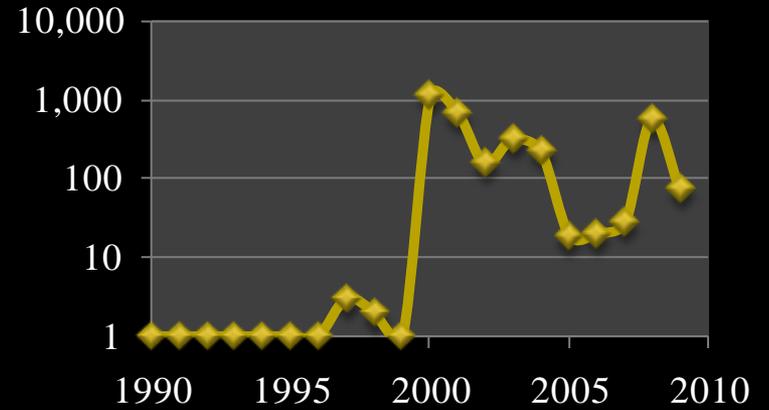


Abundance in LTRMP catches (numbers)

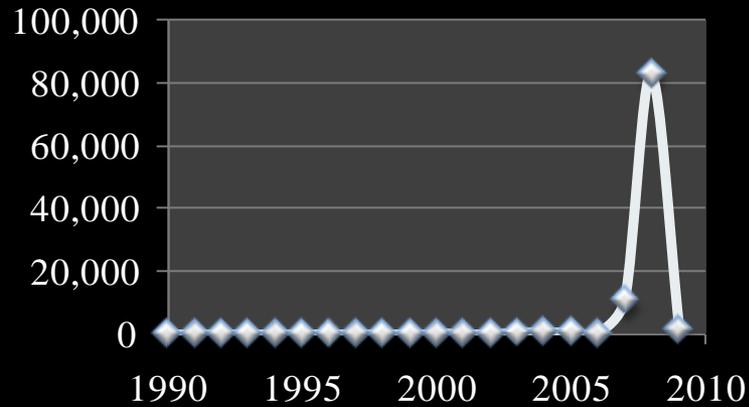
Bighead carp



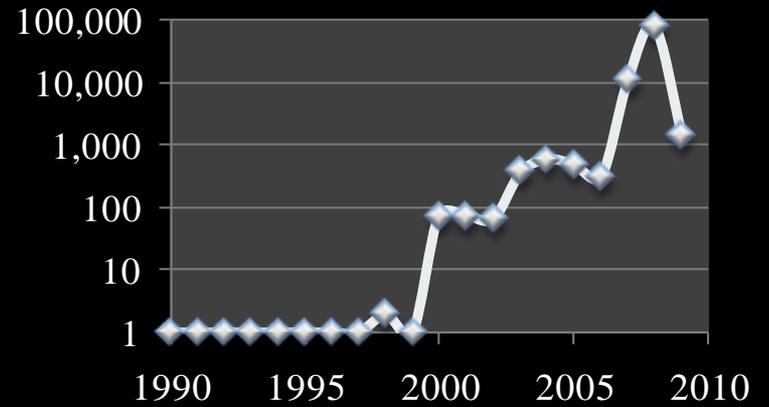
Bighead carp



Silver carp



Silver carp







Asian Carp Regional Coordinating Committee
Monitoring and Rapid Response Workgroup

Monitoring and Rapid Response Plan for Asian Carp in the Upper Illinois River and Chicago Area Waterway System

April 2011



Approach and Target Areas

Illinois River

- Commercial Harvest
- Market Development



CAWS & Upper Des Plaines

- Physical Barriers
- Monitoring
- Rapid Response

Upper Illinois and Lower Des Plaines

- Population Front Monitoring
- Barrier Defense

Fixed Sites Upstream of Barrier

March-August 2011

DC Electrofishing

- 11 sampling trips
- 1,330 person-hours
- 127 hours of electrofishing
- 29,614 fish
- 7,277 shad <6 inches
- 55 species

Contract Netting

- 11 sampling trips
- 1,070 person-hours
- 212 sets
- 36.2 miles of net
- 4,079 fish
- 15 species

No bighead or silver carp

Fixed Sites Downstream of Barrier

March-August 2011

DC Electrofishing

- 6 sampling trips
- 470 person-hours
- 24 hours of electrofishing
- 6,581 fish
- 3,127 shad <6 inches
- 60 species

Contract Netting

- 6 sampling trips
- 360 person-hours
- 90 sets
- 12 miles of net
- 993 fish
- 19 species

**No bighead or silver carp in
Lockport or Brandon Road pools**

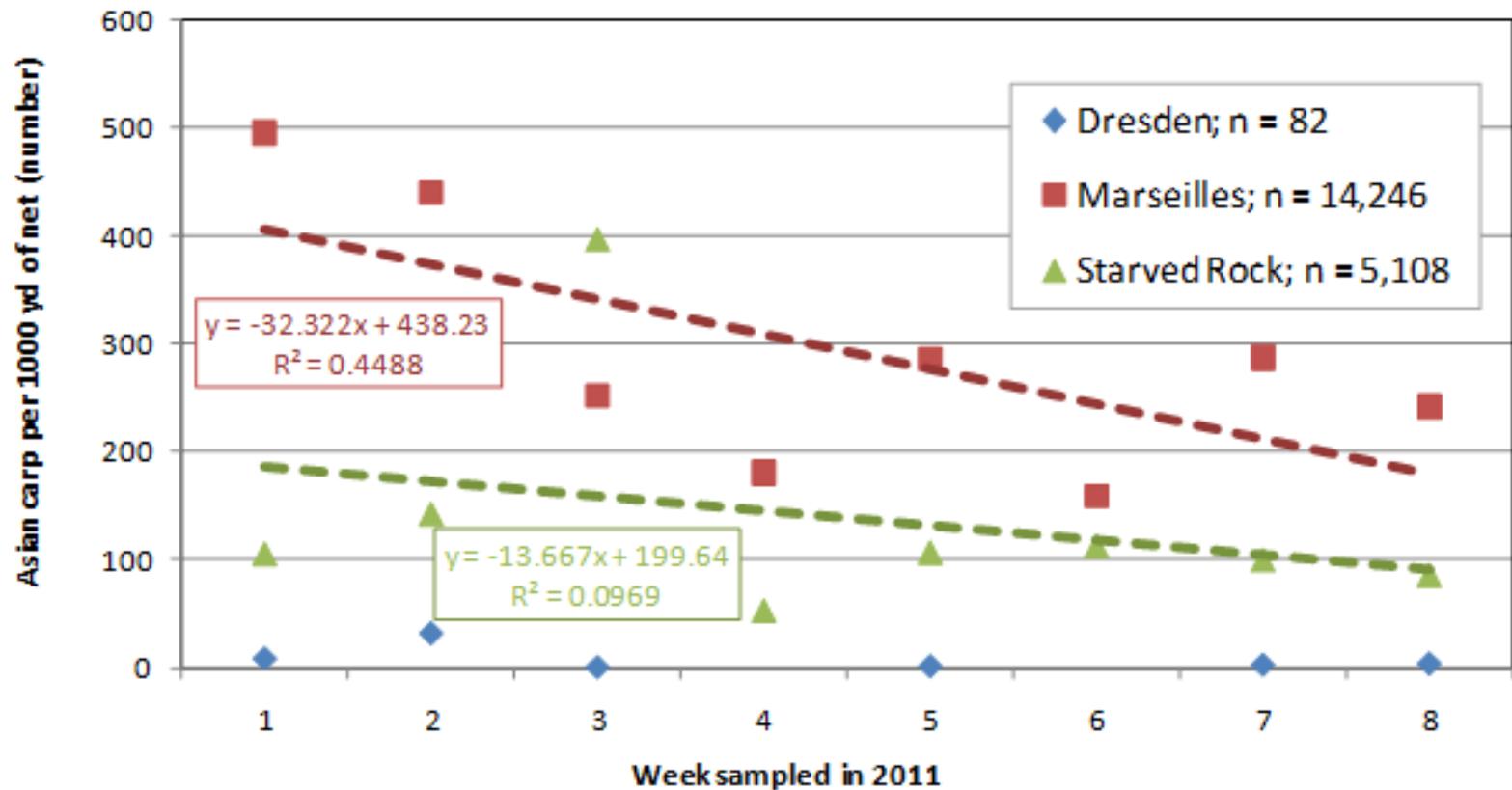
Lake Calumet Rapid Response August 1-4, 2011







2011 Barrier defense: number per thousand yards of net fished (April 12 - Aug 6)



Potential threats in the near future:

Black carp

European ruffe

Tubenose goby

? Without changes in policy ?



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Illinois is active in all these areas, strongly leading Asian carp efforts in these areas, but evaluating and updating ANS Statewide management plans (10 years old currently) with forecasting and modeling efforts and working with others for education of the public.

Conclusions:

- Many challenges, multiple areas of work, involving collaborators, researchers for both Asian carp and statewide ANS management
- IDNR has committed to this challenge by assembling an ANS team with tremendous administrative support
- Novel management efforts: new gears?, multiple agencies, including IL Department of Agriculture (pet trade)
 - Target Hunger Now! (Feeding Illinois),
 - Contracted commercial fishers,
 - Department of Commerce and Economic Opportunity,
 - Even economists are helping in these efforts!

<http://nas.er.usgs.gov/>

