

# Controlling Bighead and Silver Carps



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# Destructive Bighead and Silver Carps



Threatens \$7 B rec. fishing & \$16 B boating industries in Great Lakes

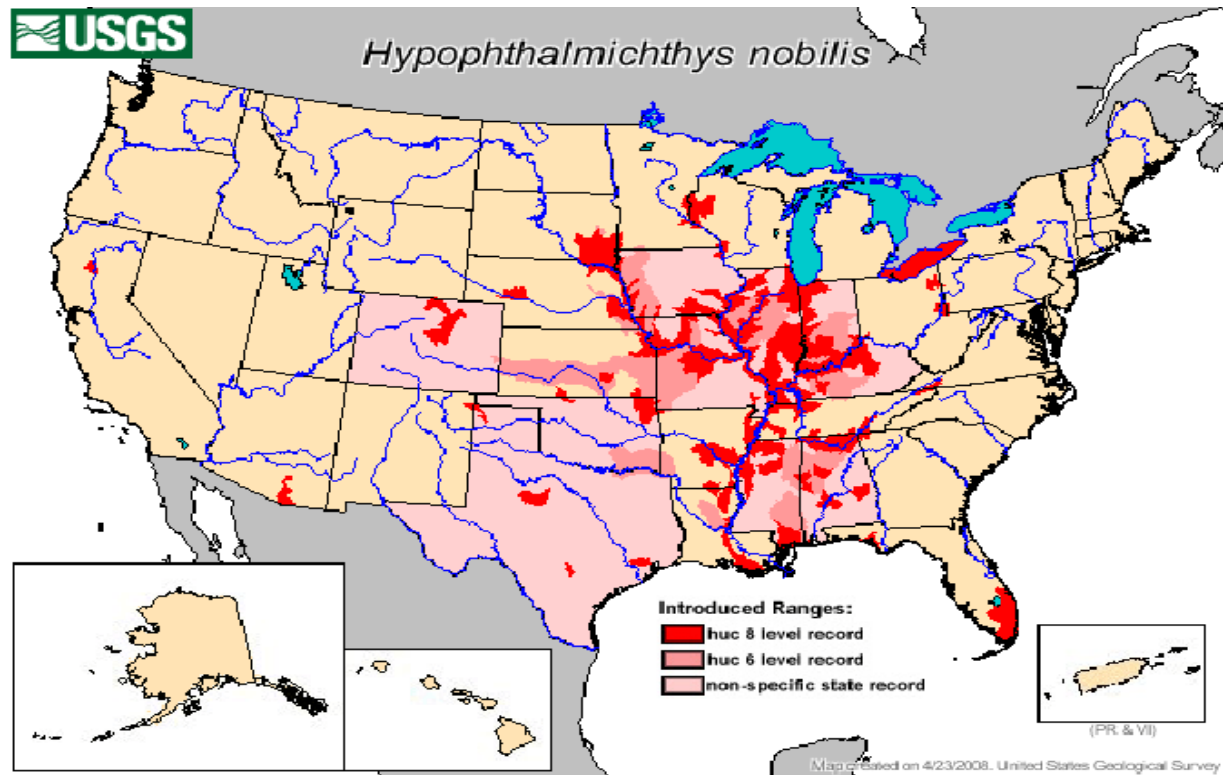


United States Geological Survey



# 2012 Bighead Carp US habitat

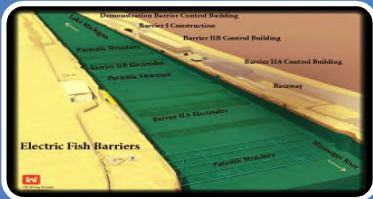
Escaped from Arkansas fish ponds to wild estimated early 1980's



Where the bighead carp are the silver carp will most likely follow



# Federal Government Solutions for Controlling Asian Carp



## Barriers

- Electric water fences, dams, water falls, other
- Flood barriers (Eagle Marsh)



Date	Amount/Species	Where	Details
Feb. 28, 2012	14,000 lbs. bighead carp	Windsor/Detroit border crossing	April 25 court date
Jan. 25, 2012	8,600 lbs. grass carp, 8,500 lbs. bighead carp	Windsor/Detroit border crossing	April 25 court date
Jan. 9, 2012	700 lbs. bighead, 1,000 lbs. grass carp	Windsor/Detroit border crossing	Case currently in court system
Feb. 18, 2011	6,000 lbs. bighead carp	Windsor/Detroit border crossing	Sweetwater Springs Fish Farm, Penn., Ind., paid \$20,000 fine for possessing live invasive fish
Jan. 20, 2011	3,200 lbs. bighead carp	Sarnia/Fort Huron border crossing	Trial July 18, 2012, in Sarnia
Nov. 4, 2010	2,500 lbs. bighead, 1,600 lbs. grass carp	Windsor/Detroit border crossing	Feng Yang of Wind Fishery, Maryland, Ind., paid \$10,000 fine for possessing live invasive fish, second conviction

## Early Detection, Education and Enforcement

- Informing public of their responsibility
- Consequences for being an active vector



## Population Reduction

- Commercial fishing (adult population)
- Piscicide, selective harvesting



# Product Requirements



## Selective

- Destruction of all fish is not an option
- Protection of endangered Species

## Safe

- 18 million get water from Mississippi River
- Water recreation
- Application

## Low Cost

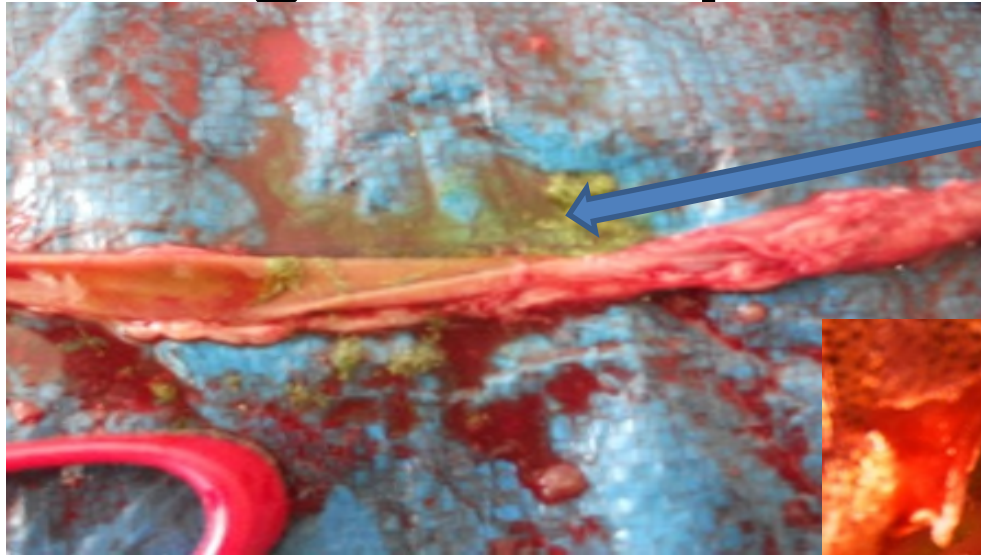
- Mississippi Basin 3<sup>rd</sup>/4<sup>th</sup> largest in world
- Government funds are limited
- Development, Registration, Raw Materials, Processing and Use costs



# Competitive Analysis

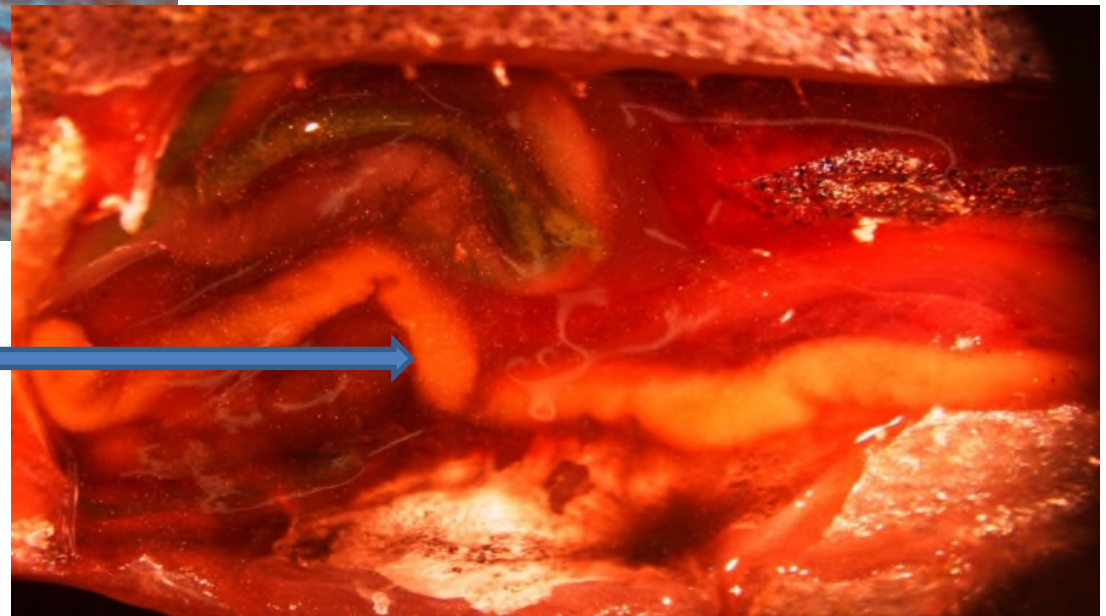
	Selective	EPA Approval	Safety	Efficacy	Cost
MJSTI Carpe Diem, bio-bullet, concept	✓	✓	✓	✓	\$
Rotenone, commercial piscicide	X	☠	☠	✓	\$\$\$\$\$\$
Antimycin A, bio-bullet, USGS	✓	☠	☠	✓	\$\$\$
USGS, 30 compounds identified, 6 screening	?	☠	?	?	?
Carp virus, U of MN	?	X	?	✓	?
YY Males, testing brown trout, U of ID	✓	?	✓	X	?
Barriers	X		✓	✓	\$\$\$\$\$\$\$\$
Commercial Fishing, mass fishing	✓		✓		\$\$\$

# Bighead Carp Ate Model Pesticides



Adult bighead carp ate fat beads.  
White material consistent with  
test material

Juvenile bighead carp ate fat  
encapsulated salts,  
intestines are full





# MJSTI Laboratory Procedures



## Spray Wax Beads

- Active insoluble in wax
- Under 100 microns

## Pellet Formation

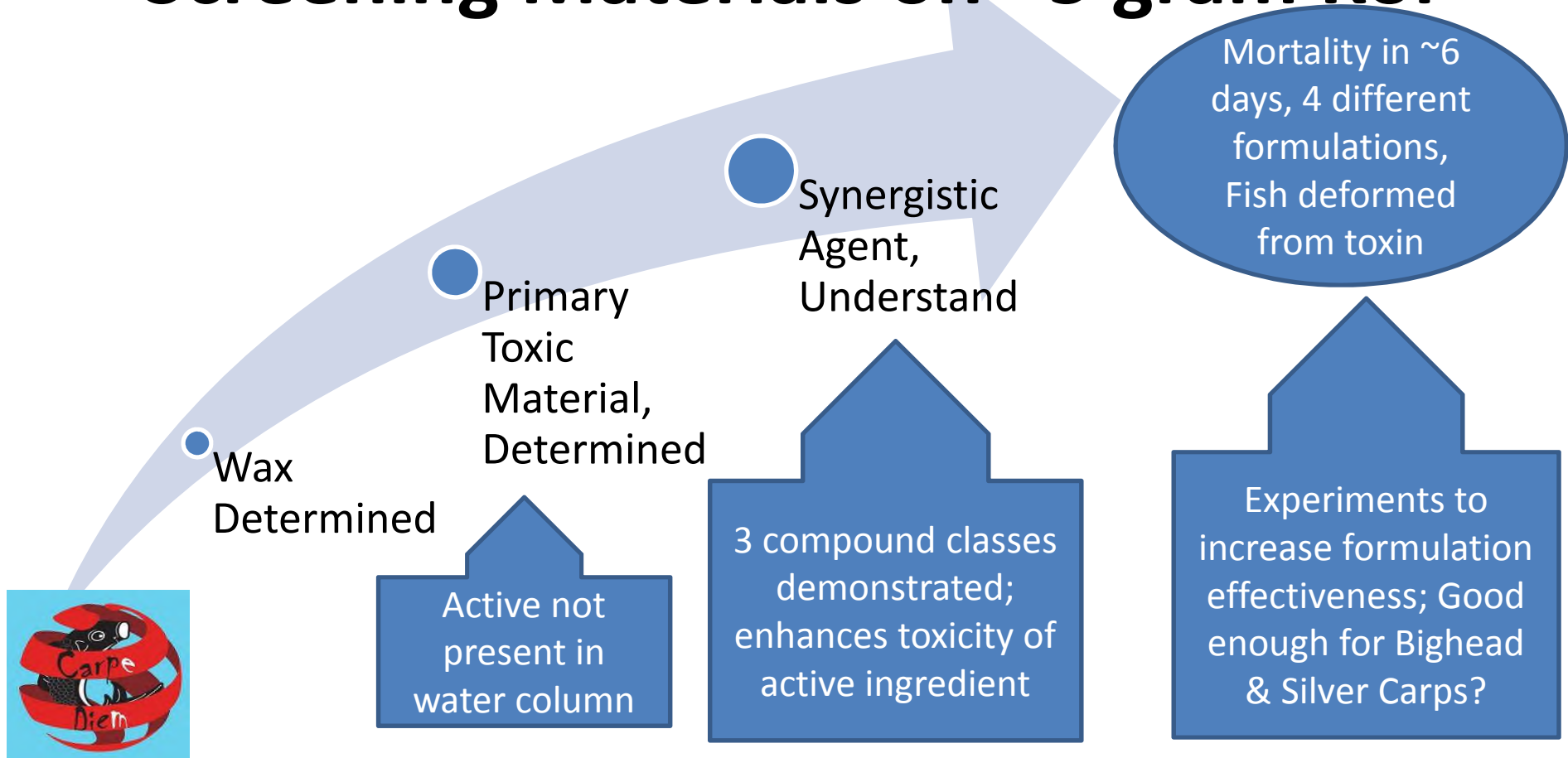
- Na Alginate gel

## Koi Testing

- Will they eat?
- Will they die?
- How long and how many?



# Screening Materials on ~5 gram Koi



# Only Formulation meeting Requirements

Selective

- Toxicity demonstrated
- Fish habitat and behavior
- Particle size

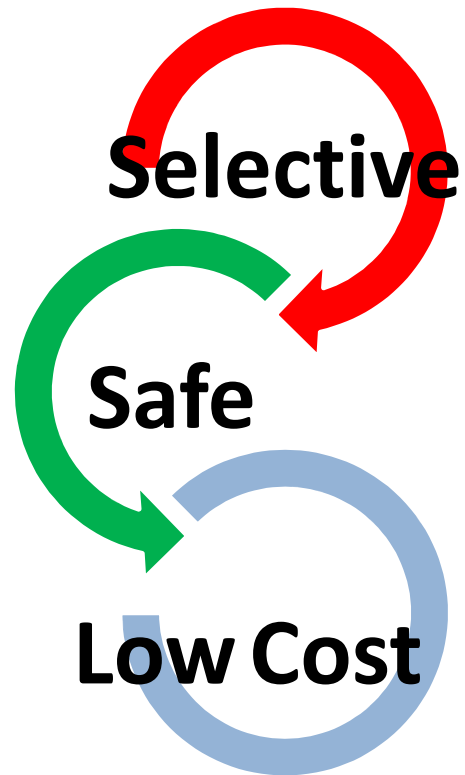
Safe

- Approved FDA food or animal feed ingredients
- Decomposition to safe materials in rivers and lakes
- Chronic not acute poison

Low Cost

- Commodity chemicals
- Practiced process with US excess capacity
- EPA registered aquatic pesticides or inert ingredients





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