

INVASIVE SILVER CARP

*Destroying the Ecology, Fishery, and Economy
of the Tennessee River Ecosystem*

Can Anything Be Done?

Timothy Joseph, PhD.

--Fishery Biologist--

Chairman



WBEFC

WATTS BAR ECOLOGY AND FISHERY COUNCIL

WBEFC.ORG



BBC





INVASIVE SILVER CARP

Hypophthalmichthys nobilis

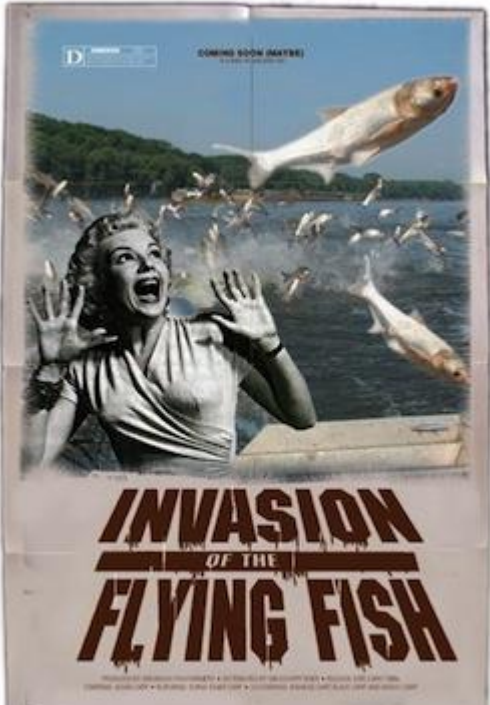


- ▶ Extremely rapid population explosion,
- ▶ Eggs released, fertilized, and mature in water column,
- ▶ Single female can lay 50,000 to 5,000,000 eggs, →
- ▶ Can grow to over 3-ft and weigh 50 lbs.
- ▶ **Quickly devastate entire ecosystem**



The silver carp – fractured skulls, broken jaws and arms -- knocked children out of boats – they are lethal

Destroys Recreation



Destroy The Ecology, Fishery, and Natural Ecosystem

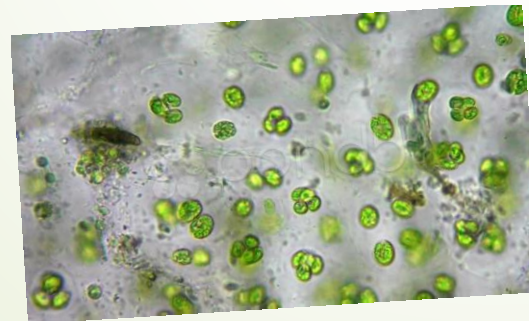
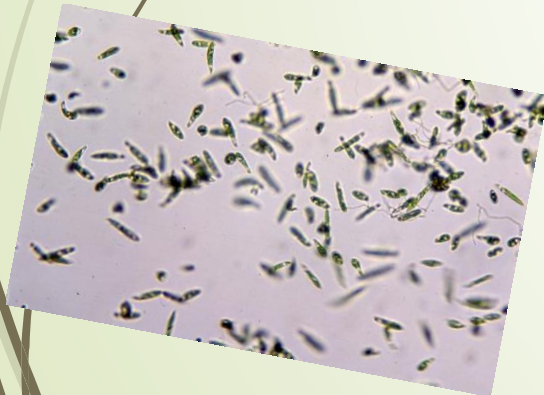


Will Shut Down the Economic Engines of Recreation, Tourism, Property Value, Local Gov. Tax Revenue, Etc.



-- Phytoplankton and Zooplankton --

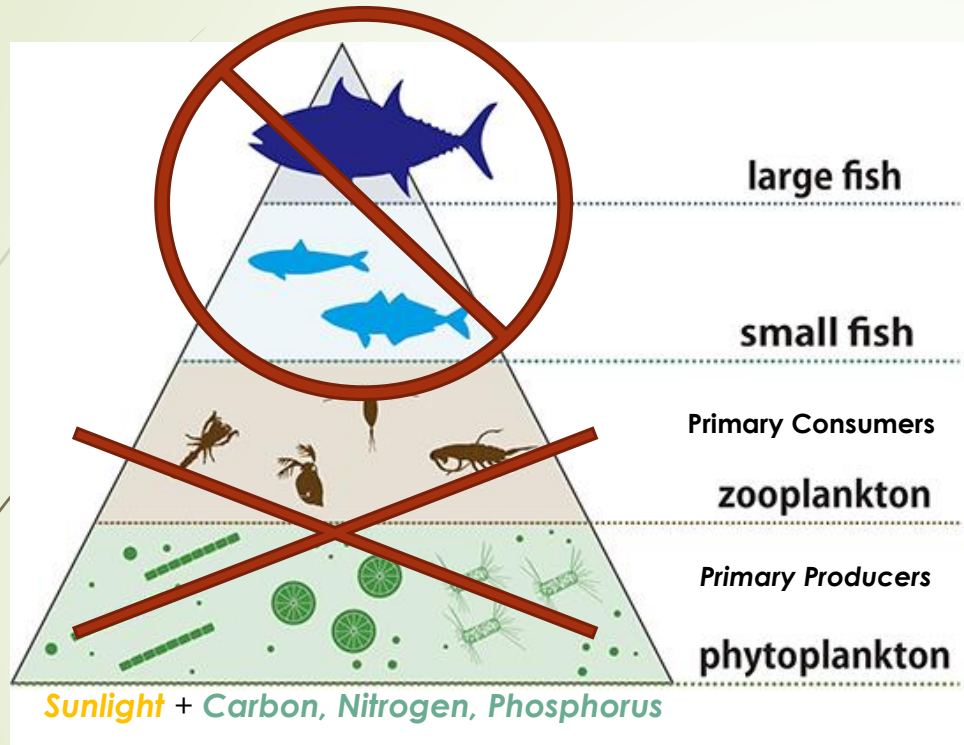
These are the Folks that Make **All** Life in a Lake Possible



➤ Primary Producers and Primary Consumers



Silver Carp Destroy the Bottom of the Food Pyramid



Plankton Feeder

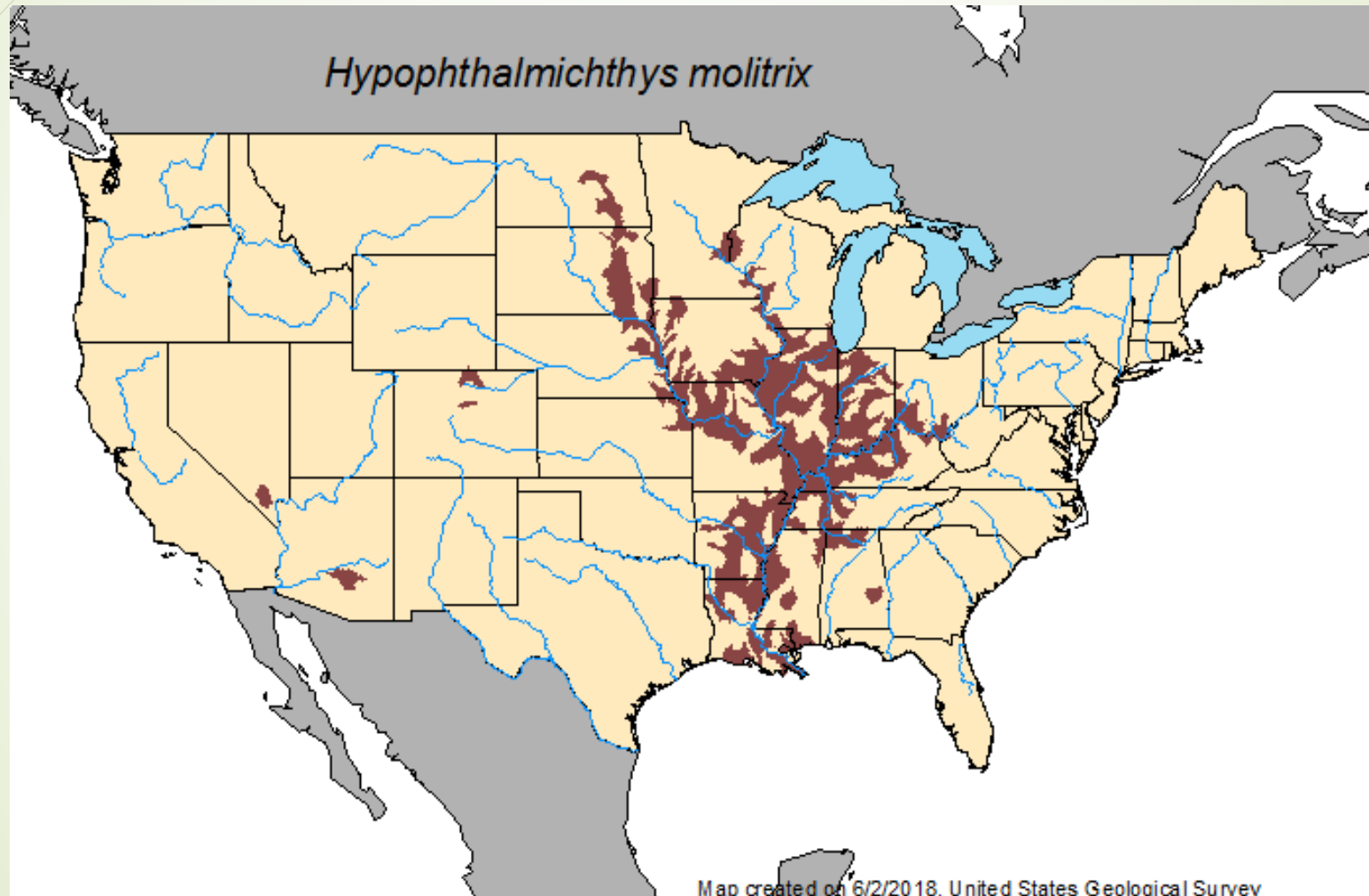


- Consume 40% of Their Body Weight Each Day
- This Removes Millions and Millions of Organisms
- As the Plankton Population is Decimated, Fish Populations are also Decimated



Silver Carp National Distribution

Ohio and Mississippi River Basins Overtaken



We Must Save the Upper TN River Basin



1,631 Miles of Shoreline

 Silver Carp Captured in Alabama



Land Between the Lakes

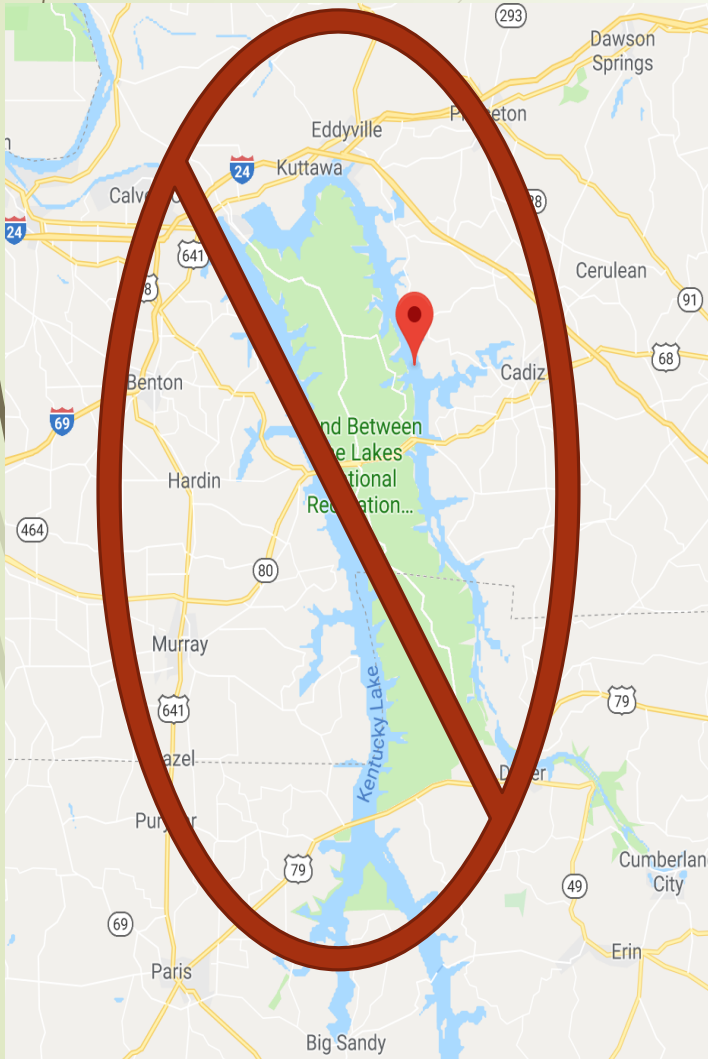
Kentucky Lake Barkley Lake

Allan Brown, U.S. Fish and Wildlife Service Assistant Regional Director Said:

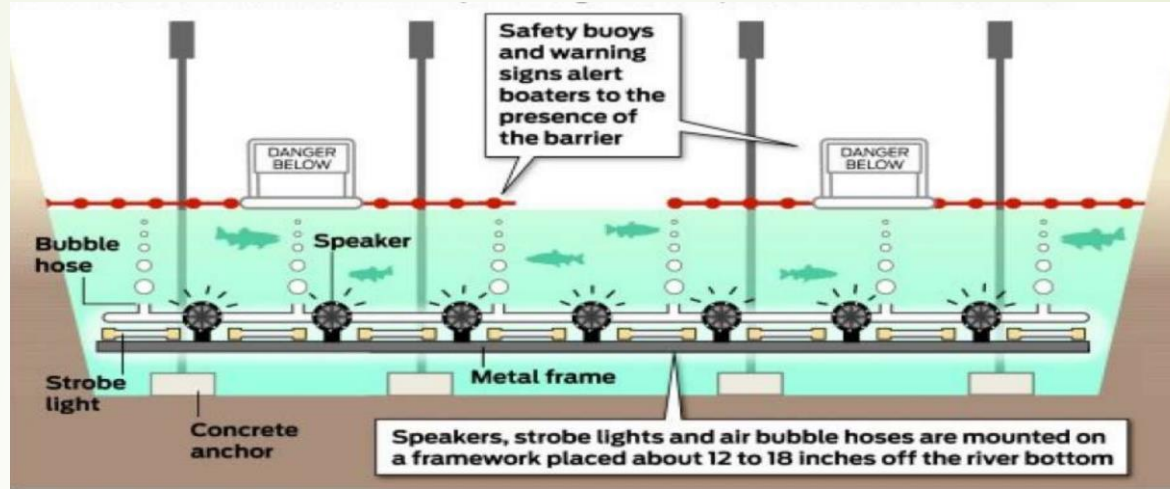
- ➔ “The silver carp population has ballooned to unmanageable numbers. Here in Kentucky, sport fishing is **gone**. The groups that historically flocked to the lakes for vacation have dwindled.”
- Millions of pounds of carp removed by subsidizing commercial fishing.
- Insignificant/no benefit to lake ecology or economic recovery.
- Repopulated quickly – one female lays 4-5 million eggs.
- **Subsidizing Commercial fishing will have to continue indefinitely at great cost.**

Senator Mitch McConnell said “the economic impact at Kentucky and Barkley lakes is estimated at \$1.2 billion”. There is no going back, recovery is impossible.

This clearly shows the fate of the Upper TN River Basin when the fish reach us. **This Must be Prevented.**

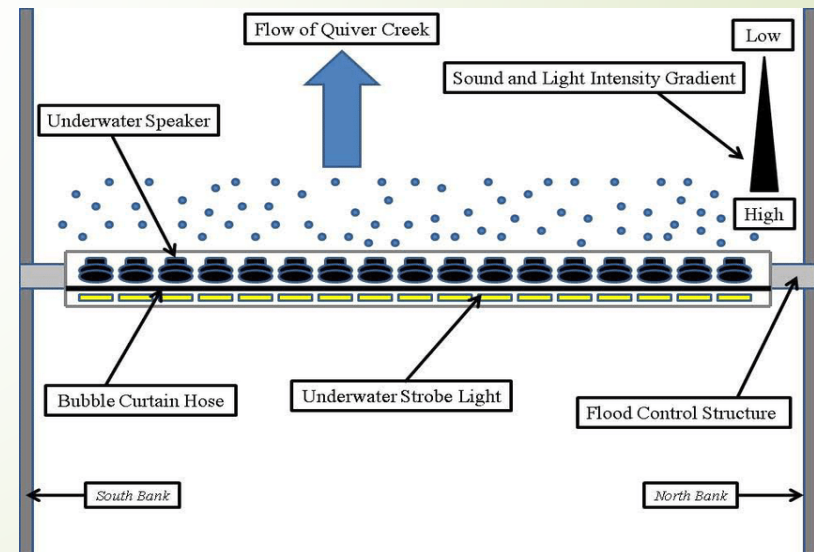
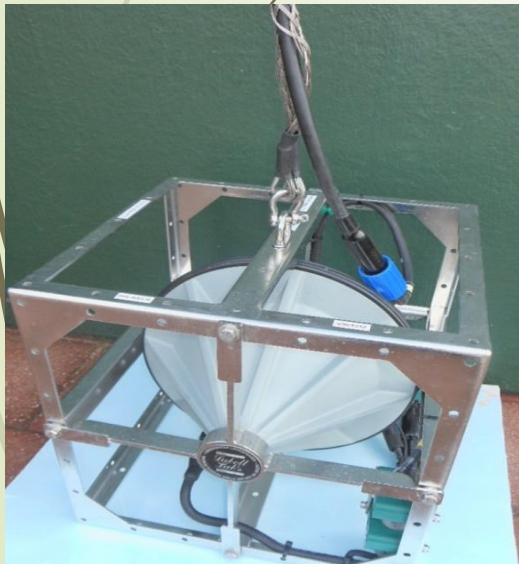


Bio-Acoustic Barrier: Sound, Bubble Curtain, Strobe Lights To Deter/Discourage movement past barrier



**90%
Effective**

**Cost
\$3-4 Million**



Electric Barriers Prevent Movement Upstream

Repelling the Invaders

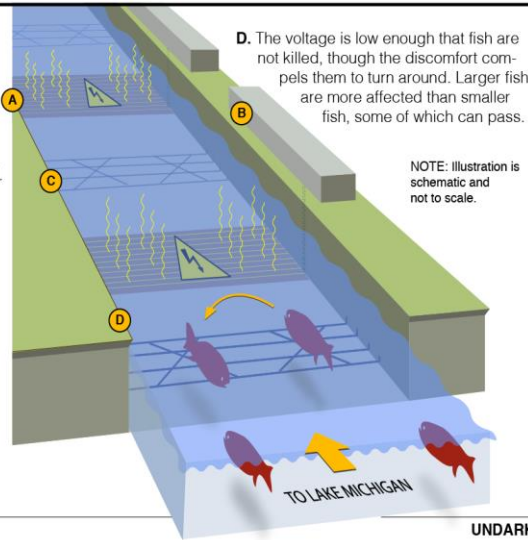
Electric barriers, placed on the bottom of a canal, act as a deterrent to Asian carp moving toward Lake Michigan.

A. Steel electrode arrays are mounted to the bottom of the canal.

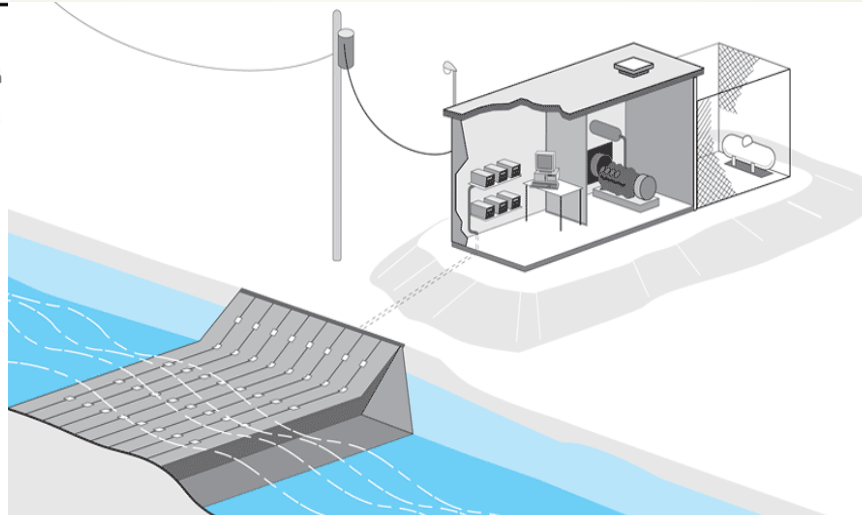
B. The electrodes are connected to a control building. Equipment in the control building generates a direct current pulse through the electrodes, creating an electric field in the water column.

C. Arrangements of woven cable wire, called "parasitic structures," prevent stray voltage from moving beyond the barrier zone.

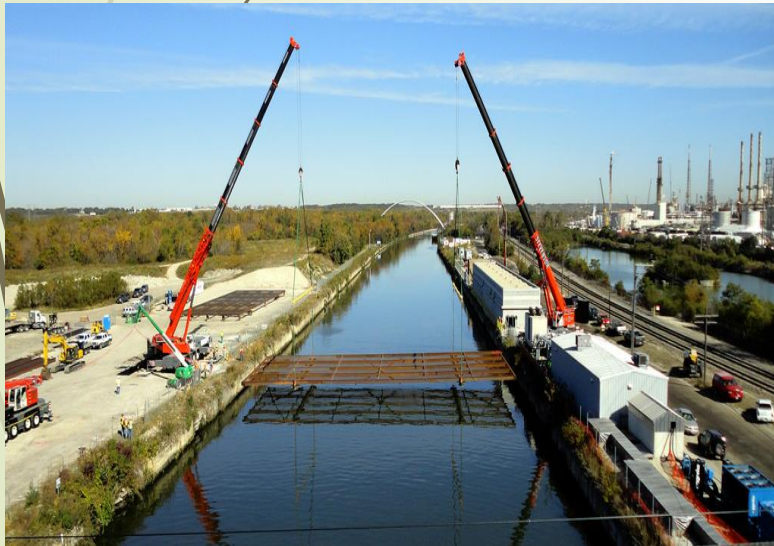
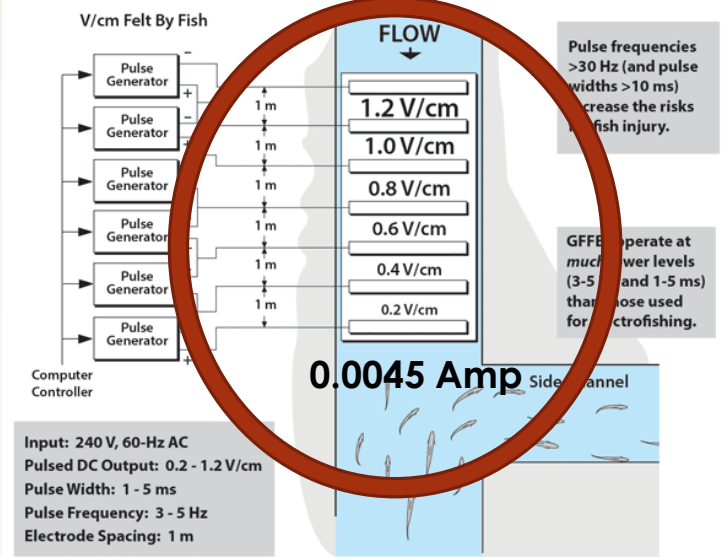
Source: Army Corps of Engineers



UNDARK



Graduated-Field Fish Barrier (GFFB)



Photos by Smith & Root



NO POSSIBILITY OF ELECTROCUTION:

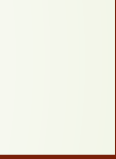
If a person fell into the water, the Volts (1.2 volts pulsed DC), and amps (0.0045 amp--less than 5/1000th of an amp) to a person's heart, is far below lethal.





The current a person would receive in the water is about **0.0045 Amp** ($5/1000^{\text{th}}$ of an Amp). People have swam through these electric barriers.

0.0045 Amp cannot electrocute a fish or a person

- 0.001 amp (1-mA) – just a faint tingle, barely perceptible.
 - Electric Barrier
 - 0.005 amp – strong tingle, very disturbing, but not painful.
 - 0.016 amps – an average person can still use muscles, painful but not lethal.
 - 0.02 amps - paralysis of muscles likely. Not **lethal** if person is removed.
 - 0.05-0.15 amps – extreme pain, respiratory and cardiac arrest, **lethal**.
- 

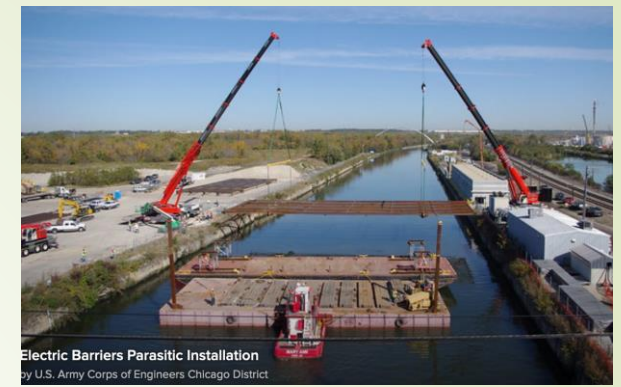




Blackfoot River



MENASHA, Wisconsin – being built



Chicago Corps of Engineers



Strawberry River



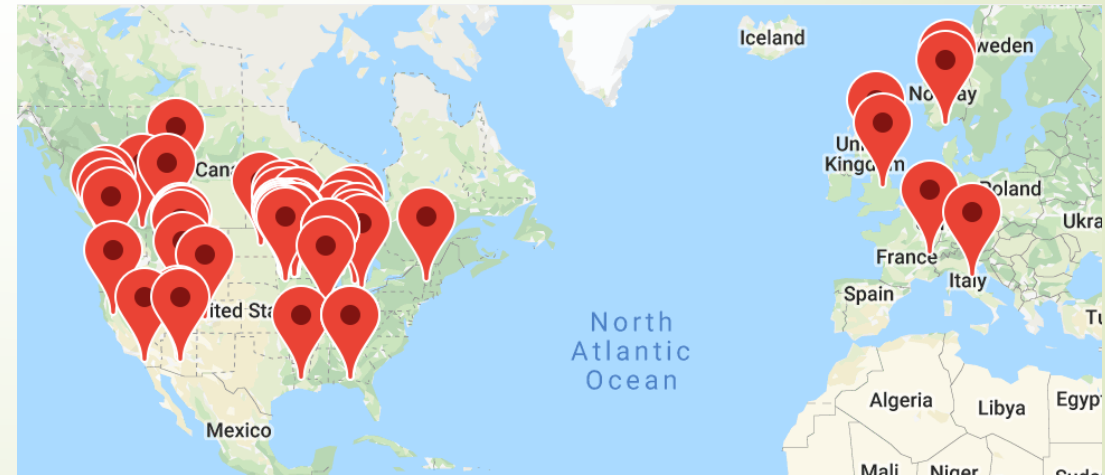
Vessy Switzerland



Okoboji Lake

Smith and Root Electric Barriers >50 Constructed

If “Electrocution” was possible,
None Would Exist



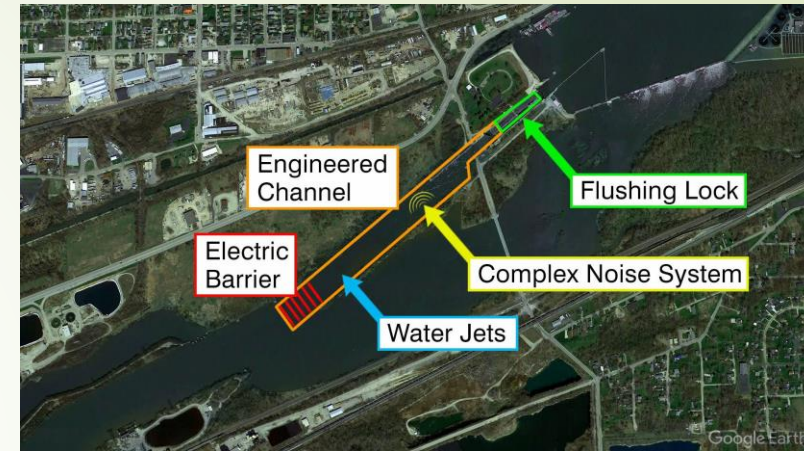
Michigan and Illinois Taking Action

Mich. Gov. Gretchen Whitmer said: “Our economy and way of life depends on the preservation of our water, but the **threat of invasive Asian Carp is putting the future of our economy, and Michiganders’ well-being at risk.** The threat has grown to the point where we cannot afford to delay action.”

A bipartisan coalition of governors, senators, representatives and agencies was formed to take action to stop the silver carp from reaching the Great Lakes.

Michigan Department of Natural Resources (DNR) and Corps of Engineers -- installing an **ELECTRIC AND A BIO-ACOUSTIC BARRIER** at the Brandon Road Lock and Dam in Joliet Ill.

Tennessee must follow Governor Whitmer’s Lead, and protect the Upper TN River Basin.



Michigan delegation members at the Brandon Road Lock and Dam in Joliet, Ill. Including U.S. Sen. Debbie Stabenow



Brings Millions \$\$ To Local Economy



Tennessee Valley Authority

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UTIA Study Finds \$1M-Per-Mile Economic Impact of TVA Reservoirs

May 01, 2017

Recreational/Property Opportunities Create \$11.9 Billion & 130K Jobs Annually

KNOXVILLE — A detailed study conducted by the University of Tennessee's Institute of Agriculture has concluded the combination of aquatic recreation and waterfront property along the Tennessee Valley Authority's managed river system creates \$11.9 billion of annual economic impact—the equivalent of \$1 million per shoreline mile.



Tennessee Valley Authority

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Valley Lakes Worth Billions

A new study from TVA and the University of Tennessee shows that the annual value of recreation on the Tennessee River reservoir system for the region is nearly \$12 billion.

MAY 1, 2017—Imagine the perfect May morning has dawned, a Saturday with 14 carefree hours of daylight sprawled before you and a weather forecast calling for clear skies and highs in the mid-80s. What to do?

#TVAfun

Recreation season is here, which means it's the prime time for fun on the Tennessee Valley's lands and waters! Not sure where to start? We have you covered! Check out some of the [best recreation activities on our reservoirs](#). While you're enjoying the lakes, trails, picnic areas and campgrounds, share your adventures using [#TVAfun](#) on social media.



Which Shoreline Is Worth \$1-Million/Mile?

With Invasive Silver-Carp



OR

Free of the silver-carp





TENNESSEE WILDLIFE FEDERATION

The Senate Appropriations Committee Approved a \$25-Million Asian Carp Management Budget.

-- How Will That Money Be Spent? --

Past budget allocation:

- ◆ subsidize commercial fisherman to reduce the numbers of carp (no environmental/economic benefit)
- ◆ population and distribution studies
- ◆ Testing the bio-acoustic barrier
- ◆ Finding markets for silver carp products

No use of decision analysis will be used to determine the most beneficial use of the budget.
This is unacceptable. Little if any funds will go to prevent the devastation of the Upper TN River Basin.

The TWF and Fed Agencies Needs To Understand that Preventing Devastation Must Always Take Precedence Over Insignificant Mitigation – But It Doesn't. Need to FIRST Prevent. Mitigate Second.



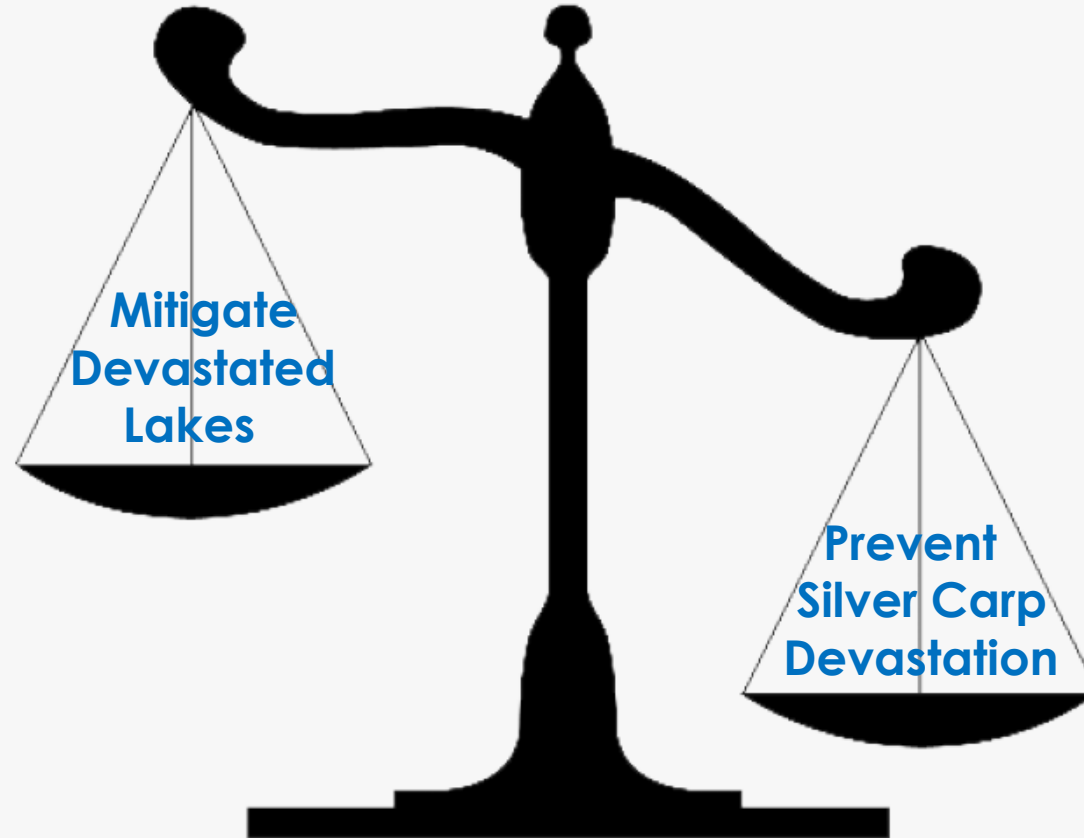
Decision Analysis To Prioritize Funding

Minor Short-Term Benefit ←



This ----- or ----- This →

Immense Long-Term Benefit



Protect the Ecosystems
& Economic Engines
of
Watts Bar
Melton Hill
Ft. Loudon
Tellico

Funding allocation **MUST** be based on the *greatest positive ecological and economic outcome*. Future funding decisions must include State & Federal Agencies, as well as fishery biologists outside of government agencies and TWF.



Tennessee State Budget Surplus

\$600 Million

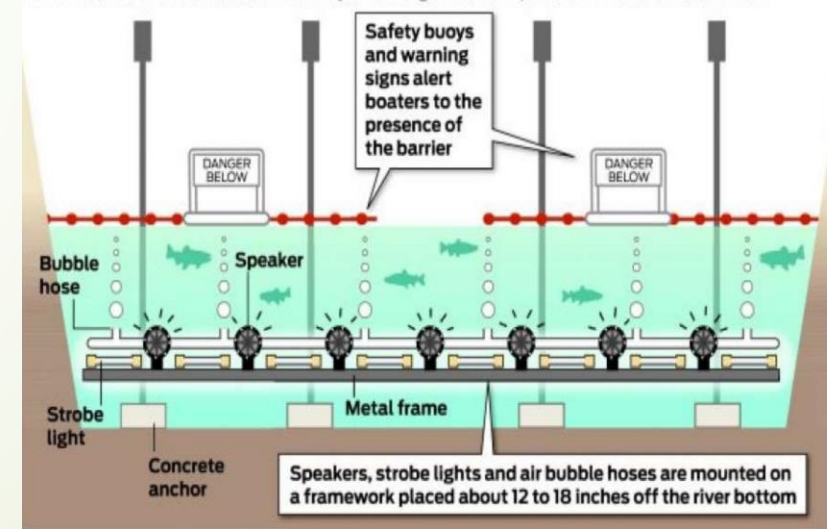
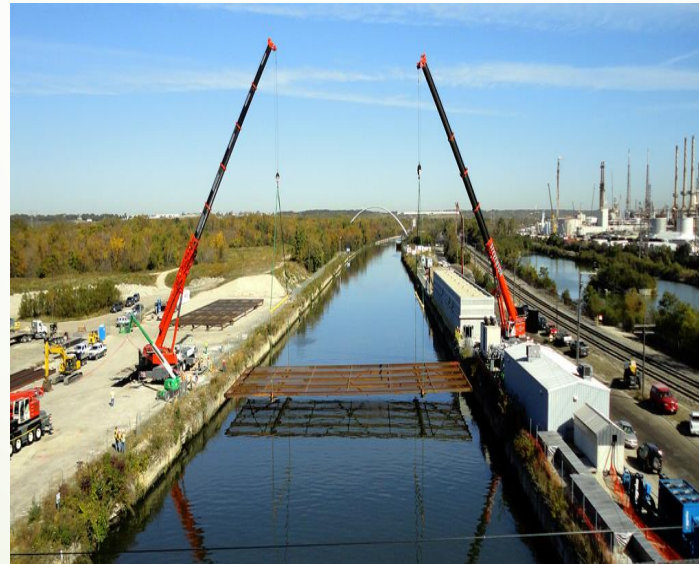
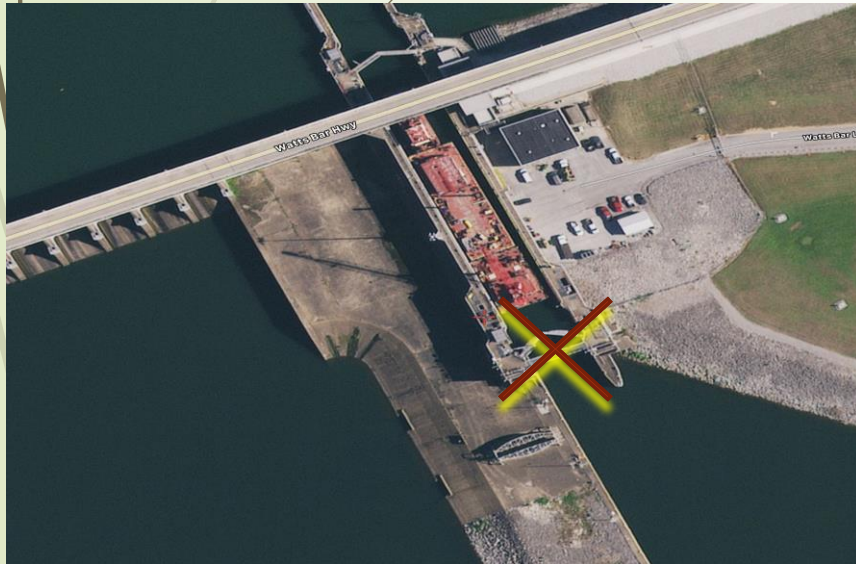
**\$30-50 Million Should Be Allocated to Protect the Upper TN River Basin
&
Prevent a >\$1-Billion Annual Economic Regional Loss**

**Protect the
Ecosystem,
Fishery,
Recreation,
of 4-TN River
Reservoirs**



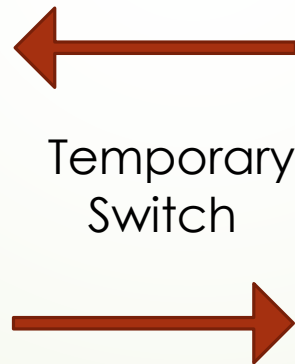
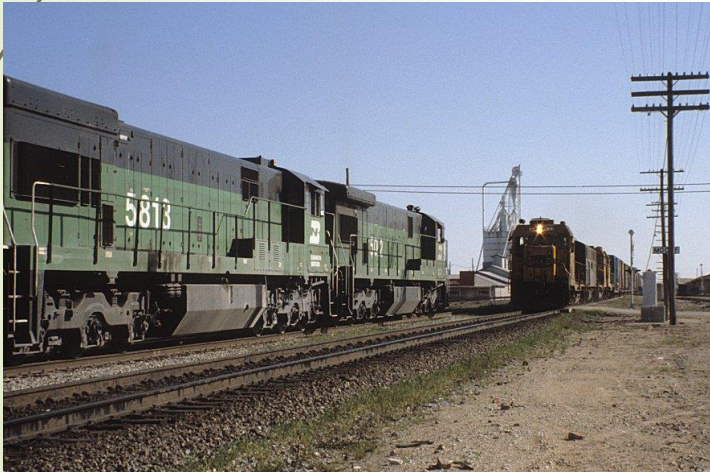
Only One Option Exists

- **Immediately** Close The Watts Bar Lock.
- Install An Electric And Bio-acoustic Barrier At Watts Bar Lock



The Negative Economic Impact on River Transportation Industry, Switches to Equally Positive Economic Impact on Rail and Truck Transportation Industry

- ▶ Only Temporary—the lock reopens when barrier is operational
- ▶ If construction expedited, time will be 2-3 years



Economic Loss by County

(Using the economic revenue data from the U.T. and TVA report of 2016)

\$1.6 Billion Annual Economy

Economic Income by Lake

Watts Bar	\$752		
		Roane	\$376
		Rhea	\$188
		Meigs	\$112
		Loudon	\$76
Melton Hill	\$199		
		Anderson	\$139
		Roane	\$10
		Loudon	\$10
		Knox	\$40
Fort Loudon	\$361		
		Loudon	\$54
		Knox	\$199
		Blount	\$108
Tellico	\$344		
		Loudon	\$172
		Monroe	\$172

When This Economy Is Hit With A **50% Downturn** like "The Land Between The Lakes"

Annual Loss @ 50% Downturn

Roane --	\$193 Million
Rhea --	\$94 Million
Meigs --	\$56 Million
Anderson --	\$70 Million
Knox --	\$120 Million
Loudon --	\$118 Million
Blount --	\$54 Million
Monroe --	\$86 Million

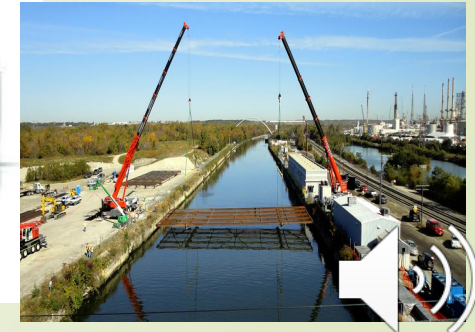
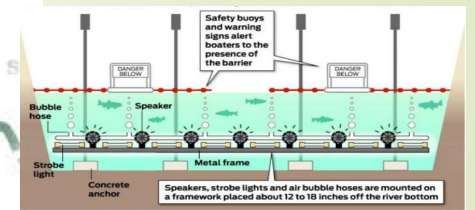


If We Do Not CLOSE Watts Bar Lock, This Region Will Follow the Fate of *The Land Between the Lakes*, and Suffer a Huge Economic Loss, a Destroyed Ecosystem, and the End of Sport-Fishing, Recreation and Tourism



~~Watts Bar
Melton Hill
Fort Loudoun
Tellico~~

 Silver Carp Captured in Alabama



It is **illegal** to transport silver carp: federal and state agencies are **required** to **prevent** movement of invasive species.

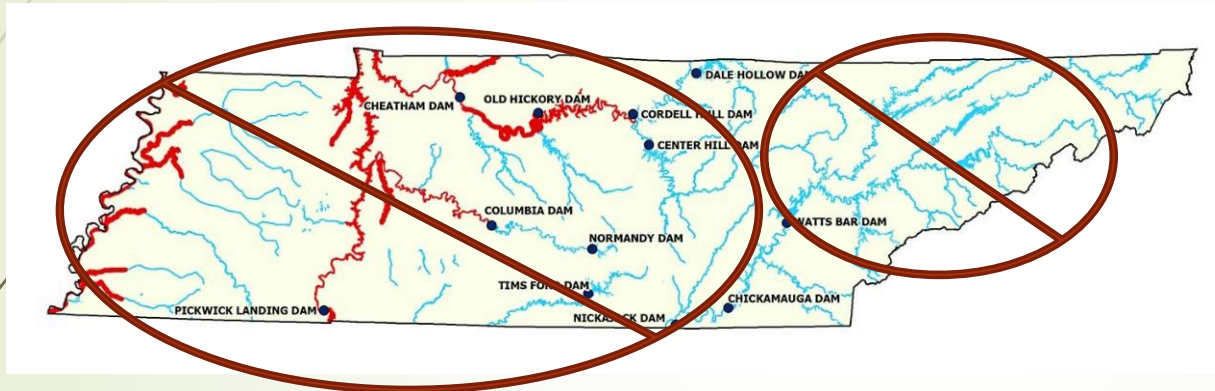
- **Executive Order 13112** says -- federal agencies must prevent the introduction of invasive species.
- **Executive Order 13751**, states -- "It is the policy of the United States to prevent the introduction, establishment, and spread of invasive species, as well as to eradicate and control populations of invasive species that are established."
- **50 CFR Part 16**, says -- transportation of silver carp by any means whatsoever is prohibited.
- **TWRA states**: "It is illegal to move live carp in Tennessee." They go on to say the carp will use the navigation locks on the Tennessee river to move upstream.
- **TWRA** acknowledges that it is illegal to move live carp, and they acknowledge that the locks are moving the Asian carp up the Tennessee River.
- **TWRA's** own policies require them to ask for the closure of the Watts Bar lock to prevent this invasive species from moving upstream through the lock.

WHY IS THE WATTS BAR LOCK STILL OPEN when the law states clearly that it must be closed since closure can prevent the spread of an invasive species?



Not only will the Upper TN River Basin face an annual Billion Dollar Economic Loss

Like the “*Land Between the Lakes*” it will need to continually subsidize commercial fishing -- which will never cease --



Protecting the entire Upper TN River Basin must be Your highest priority

We must STOP the silver carp by Closing Watts Bar Lock, and like Michigan and Illinois, install an electric and bio-acoustic barrier.

If our legislatures don't close the lock, their legacy will be the *devastation of four beautiful lakes*, If they do, their legacy will be profound: **Saving and entire river basin.**



Once In A Lake, There Is No Recovery

ENVIRONMENTAL ASSESSMENT

for Listing Silver Carp (*Hypophthalmichthys molitrix*) as Injurious Wildlife
under the Lacey Act Last Revised April 2007
USFWS/DEQ/BIS 4401 North Fairfax Drive, Rm. 322
Arlington, VA 22203

- If silver carp become established in additional large lakes or river systems as they have in the Mississippi River basin, eradication or control of silver carp is highly unlikely and they will be considered permanent members of the fish community
- Re-establishment of impacted populations, **if** biologically possible, would be labor and cost intensive and would depend on eradication of silver carp within the habitat. (*eradication in large ecosystems is impossible*)
- No effective and feasible tools are currently available to manage silver carp that are found in open river systems

Permanent →



If TVA had known the ash pond would breach the levee, they would have prevented it immediately

- ▶ Cost to TVA has been over \$1.2 Billion
- ▶ 63 lawsuits involving more than 850 plaintiffs asserting claims of negligence,
- ▶ \$27.8 million to settle claims from property owners who suffered damages

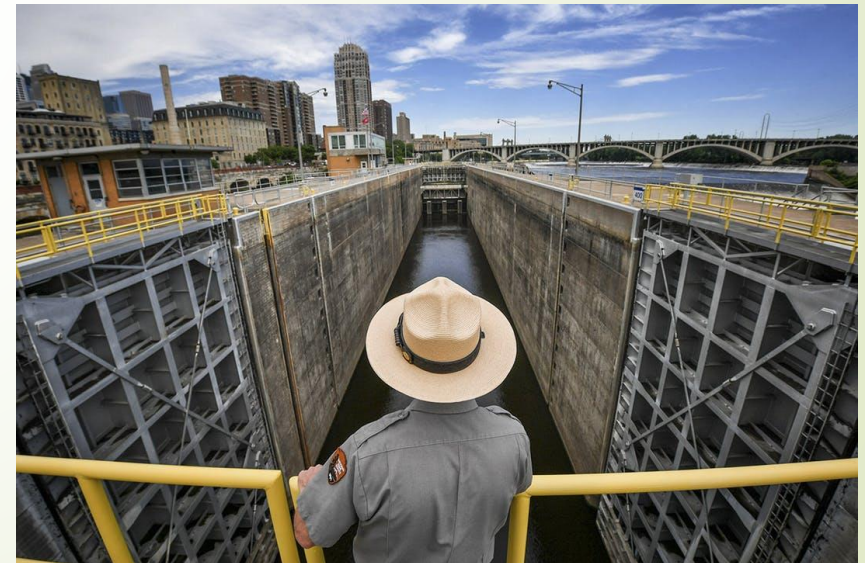
Pales in comparison to the \$Billion ANNUAL regional economic loss

Easily prevented--simply Close Watts Bar Lock until a Barrier is installed



Upper St. Anthony lock in Minnesota closed after half a century; blame the carp

- After more than 50 years of operation, the Upper St. Anthony Falls lock closed, June 8, 2015 5:00 a.m.
- To prevent the silver carp from moving upstream



To Delay Closing Watts Bar Lock

- Will allow the silver carp entry into the Upper TN River Basin (**Watts Bar, Melton Hill, Fort Loudon, and Tellico Lakes**)
- They will likely pass through the lock soon



This is NOT speculation:

The Upper TN River Basin will suffer the same fate as

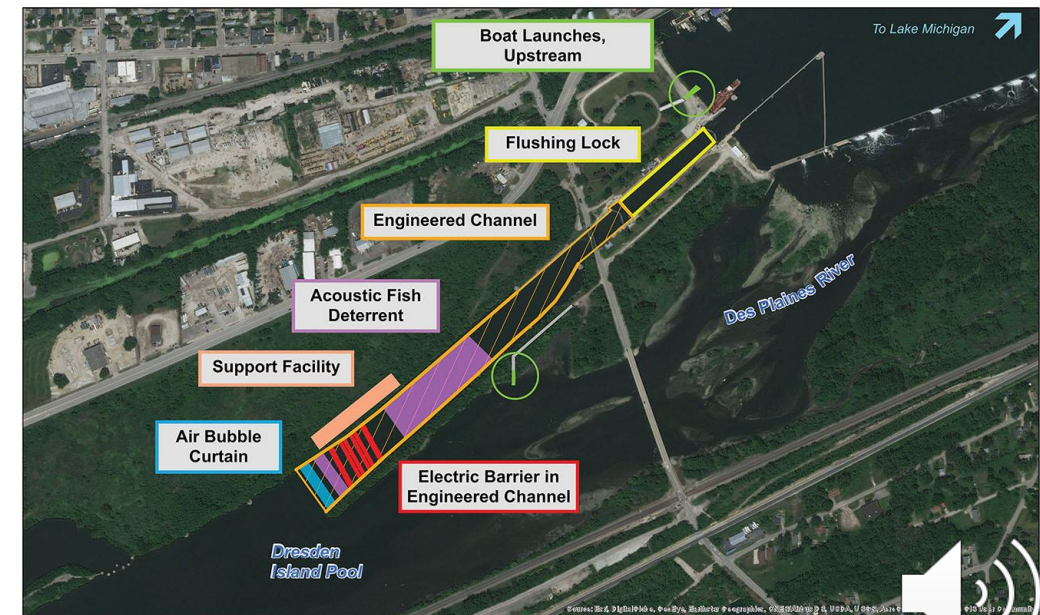
The Land Between the Lakes

We must NOT let that happen



Tennessee Governor Bill Lee, TWRA, TVA and the Corps of Engineers--Must:

- Declare an Environmental and Economic Emergency
- **Immediately Close Watts Bar Lock**
- Form a Coalition of TWRA, TVA, COE, and Non-Government Fishery Biologists (WBEFC)
- Begin an: ***Upper TN River Basin Silver-Carp Protection Project***
- Follow the Example of Michigan and Illinois
- Bring in Michigan Coalition Technical Lead
- Begin Engineering Design for Elec/Bio-Acoustic Barrier
- Label it an Emergency **Pilot Study** to Speed Process
- **Start This Project IMMEDIATELY**





PROTECTING THE ECONOMY AND ECOLOGY OF
THE TENNESSEE RIVER ECOSYSTEM IS THE
RESPONSIBILITY OF THE STATE AND FEDERAL
GOVERNMENTS

WATTS BAR LOCK MUST BE CLOSED IMMEDIATELY
TO STOP THE SILVER CARP RIVER
OR LOSE 4-MAGNIFICANT LAKES





FACT Not Speculation



Tennessee River Ecosystem > A Million \$\$\$\$\$ Per Mile

THE CHOICE IS OURS



- Amazing
- Serene
- Exuberant
- Stunning
- Joyful
- Relaxing
- Tranquil
- Fun
- Fantastic
- Peaceful



Watts Bar Ecology and Fishery Council

Please go to Website: WBEFC.ORG
and become a stakeholder in the ecological health of the Upper
Tennessee River Basin.

Click on “Contact” and fill out the short form. There is no cost.
You will receive only a few emails/year notifying you of important
information and upcoming meetings and events.

If you would like this presentation to be given to your organization
(over 25 people), please send us a message -- <http://wbefc.org/contact/>



WBEFC

WATTS BAR ECOLOGY AND FISHERY COUNCIL

WBEFC.ORG