



# Regional Resource Stewardship Council

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April 3-4, 2019  
Kentucky Dam Village State Park





Mark Iverson

# Term 10 RRSC Members

**RaeLynn Butler**

Muscogee (Creek) Nation

**Keith Carnahan**

Meriwether Lewis Electric Cooperative

**Robert Englert, Jr**

Crounse Corporation

**Ray Hardin**

Decatur Utilities

**Brock Hill**

TN Dept. of Environment & Conservation

**Richard Holland**

Packaging Corporation of America

**Donny Holland**

KY Parks

**Mark Iverson\***

Bowling Green Municipal Utilities

**Avis Kennedy**

State of Tennessee

**Kim Klinker**

Klinker Management

**Brad Kreps**

Nature Conservancy

**Tom Littlepage**

Ala Dept. of Economic & Community Affairs

**Gary Myers**

State of Tennessee

**Will Nelson**

Nelson Tractor Co.

**Sen. Clay Scofield**

Alabama Senate, District 9

**Danette Scudder**

TN Valley Public Power Association

**Patricia Thomasson**

Thomasson Company

**Catherine Via**

TN Farm Bureau Federation

**Randy Wiggins**

Cherokee County, NC

\*RRSC Chair

# Safety First



## Building Emergency Plan



# Introductions



- Name
- Organization
- Favorite Water-based Activity



# Today's Meeting

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# Meeting Goals

- Navigation reliability in the region
- February flood control efforts
- Erosion study
- Invasive species management – Asian Carp
- Advice from Council
- Update on TVA Natural Resources Stewardship and River Management activities

# Agenda – April 3, 2019

<b>8:30</b>	<b>Welcome</b>	Mark Iverson, Chair and GM Bowling Green Municipal Utilities
<b>8:40</b>	<b>Introductions and Agenda Review</b>	Liz Upchurch, Facilitator
<b>8:55</b>	<b>FACA Briefing</b>	Kendra Mansur – Office of the General Counsel
<b>9:00</b>	<b>DFO Briefing</b>	Amy Henry, Enterprise Relations and Innovation and Designated Federal Officer
<b>9:20</b>	<b>Break</b>	
<b>9:35</b>	<b>River Management &amp; Feb 2019 Flood Control</b>	James Everett
<b>10:00</b>	<b>Navigation and KY Lock project</b>	Don Getty, Army Corps of Engineers
<b>10:20</b>	<b>Break</b>	
<b>10:35</b>	<b>Invasive Species – Asian Carp</b>	Dennis Baxter
<b>11:05</b>	<b>Fish Fence at Lake Barkley</b>	Don
<b>11:20</b>	<b>Erosion Control Study</b>	Shannon O'Quinn
<b>11:45</b>	<b>Announcements</b>	Liz
<b>12:00</b>	<b>Wrap up and adjourn</b>	



# Agenda – April 4, 2019

<b>8:30</b>	<b>Welcome and Recap</b>	Liz, Facilitator
<b>8:45</b>	<b>Announcements</b>	Amy
<b>9:00</b>	<b>Council Discussion</b>	Liz and Council
<b>9:25</b>	<b>Prepare for Public Comment Period</b>	
<b>9:30</b>	<b>Public Comment Session</b>	Liz
<b>10:30</b>	<b>Break</b>	
<b>10:45</b>	<b>Natural Resources Update</b>	Bucky Edmondson
<b>11:15</b>	<b>Finalize Advice Statement</b>	Council
<b>11:45</b>	<b>Wrap Up</b>	Amy/Liz
<b>12:00</b>	<b>Adjourn</b>	

# RRSC Meeting Facilitation

- The facilitator will ensure good order during all open discussions
- Only one person is permitted to comment at a time
- Please turn your name card on its side in order to be recognized by the Chair or facilitator when wanting to provide comment.





# The Federal Advisory Committee Act and The Regional Resource Stewardship Council

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Kendra Mansur, Office of the General Counsel  
FACA Briefing—10th Term  
Third Meeting

# RRSC FACA Meeting Protocols – 10<sup>th</sup> Term

## **Agenda**

- Joe Hoagland, Vice President, Enterprise Relations & Innovation is the Designated Federal Officer (DFO); Amy Henry, Senior Manager, Enterprise Relations & Innovation is the alternate DFO
- Agenda prepared and approved by the DFO in consultation with Council Chair, Mark Iverson
- Agenda distributed to Council and an outline is published in the Federal Register prior to each meeting
- Topics may be submitted to the DFO by any member of the Council, or non-members, including members of the public

## **Meeting Minutes**

- DFO will ensure that minutes are prepared for each meeting, approved by the Chair, and made available to Council members and the public

## **Voting**

- Any member of the Council may make a motion for a vote
- Quorum is 11 members
- Advice requires an affirmative vote of majority of Council members present
- Advice may include minority or dissenting views

## **Membership**

- Balanced Membership
- Professional or personal qualifications to achieve the mission of regional resource stewardship
- Broad range of diverse views and interests, including recreational, environmental, industrial, business, consumer, educational and community leadership





# DFO Briefing

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Amy Henry, Senior Manager, Enterprise Relations and Innovation  
Designated Federal Officer Alternate

# TVA Update

## Board of Director Announcements

Approved the retirement of Paradise Unit 3 in 2020 and Bull Run in 2022

Jeff Lyash named new President and CEO to replace retiring CEO Bill Johnson

James “Skip” Thompson was elected the new Board Chair to a two-year term

Discontinuing the existing Green Power Providers (GPP) program at the end of 2019 and will develop new programs in partnership with LPCs



Bill Johnson



Jeff Lyash

# New Biz in the Valley

- SmileDirectClub, a market leader in doctor-directed, remote invisible aligner therapy, announced plans to expand operations in Nashville, Tennessee. Plans for the project include the creation of more than 2,000 new jobs and \$217 million in investment to expand the company's Middle Tennessee presence.
- Toyota Motor Manufacturing announced plans to expand its Huntsville, Alabama, engine plant. Plans for the OEM expansion project include the addition of 450 new jobs and \$288 million in capital investment.
- Expansion of Volkswagen in Chattanooga
- New Amazon facilities in Nashville and Marshall County, Miss.

# IRP 2019 Preliminary Observations

- New capacity is needed in all scenarios, even in the lower load futures, to replace expiring or retiring capacity
- Solar expansion plays a substantial role across all portfolios
- Gas, storage and demand response additions provide reliability and/or flexibility
- No wind or hydro resources are added, indicating that solar backed up by gas and/or storage is the more optimal choice
- No baseload resources, designed to operate around the clock, are added except in one case where Small Modular Reactors are promoted for resiliency
- Additional coal retirements occur in lower load and carbon-constrained futures
- Energy Efficiency (EE) levels are relatively similar across the portfolios





# Questions?



# February 2019 Flood & River Management Overview

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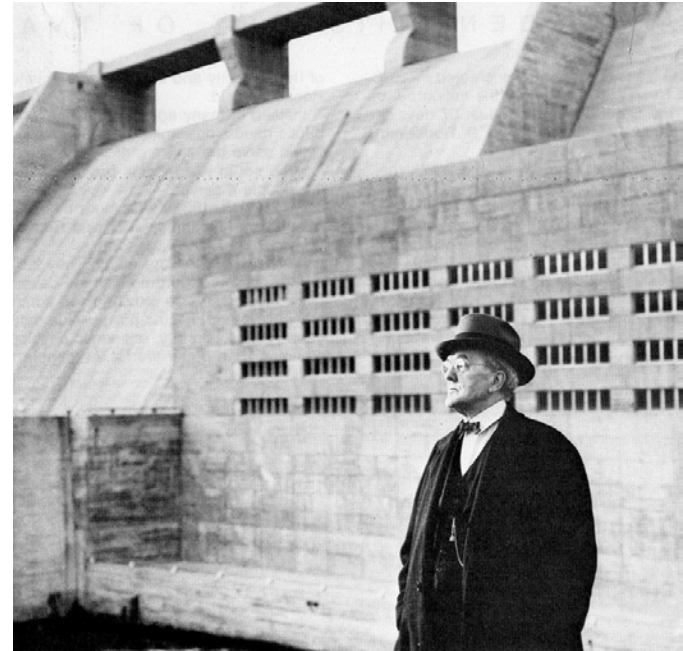
**James H. Everett, PE**

**April 3, 2019**

# Integrated Resource Management

River system assigned multipurpose role through TVA Act in 1933

(section 9a) ...to regulate the stream flow primarily for the purposes of promoting navigation and controlling floods. So far as may be consistent with such purposes, ...for the generation of electric energy...



“Father of TVA,” Senator George Norris



# Integrated River Management

## Provides Multiple Benefits



Navigation



Water Supply



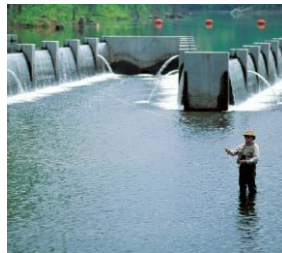
Flood -Damage  
Reduction



Recreation

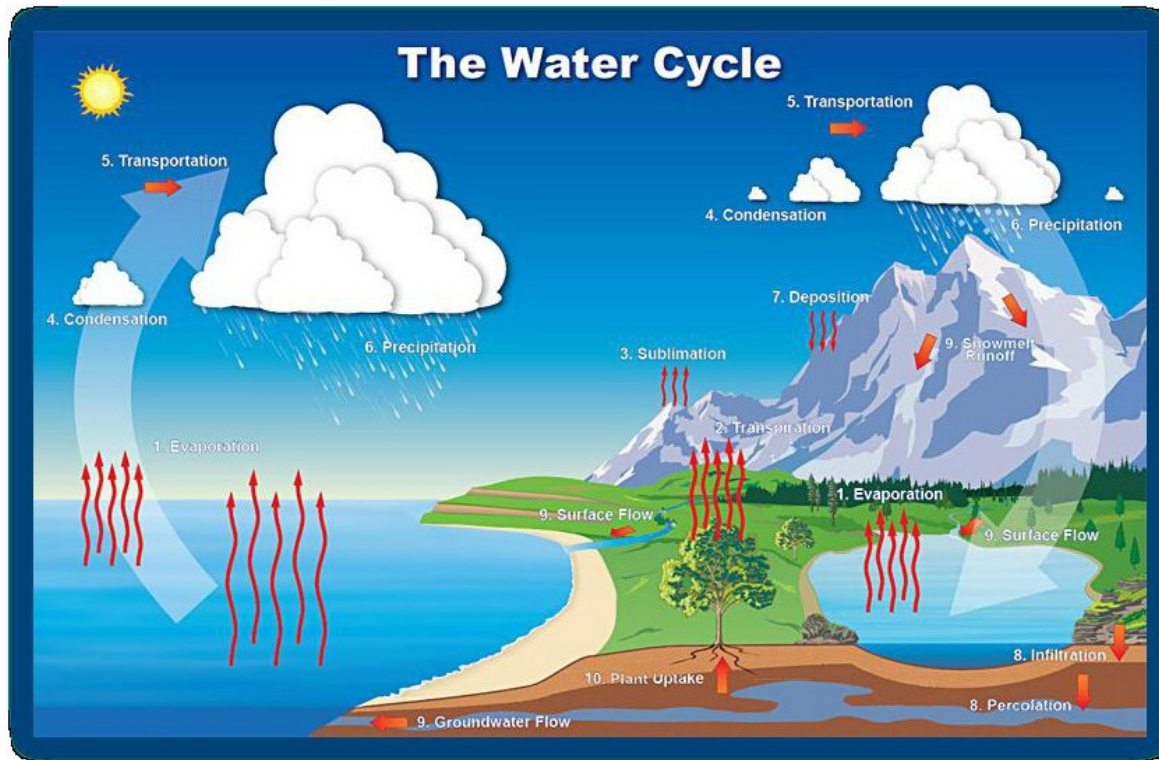


Power  
Generation

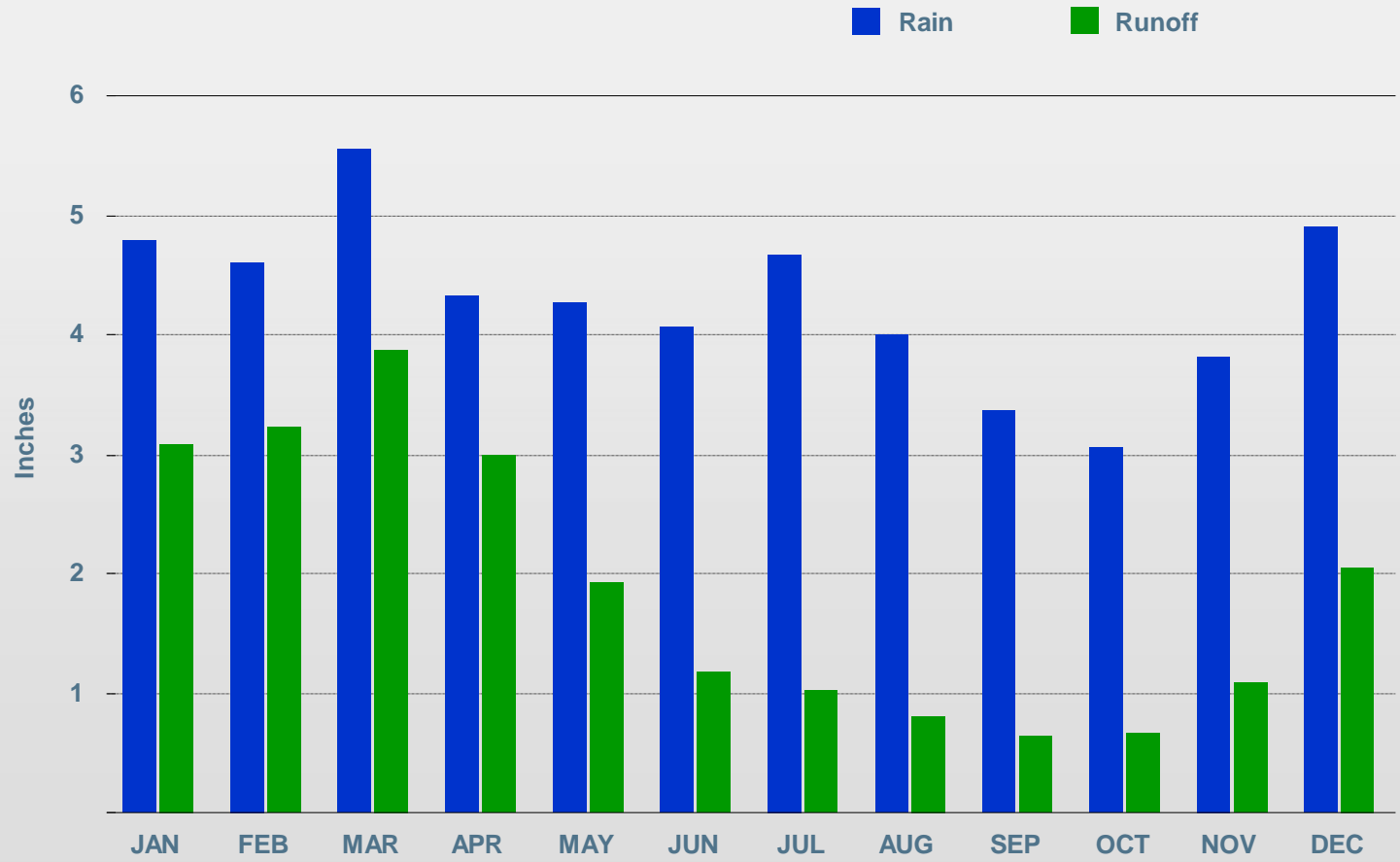


Water Quality

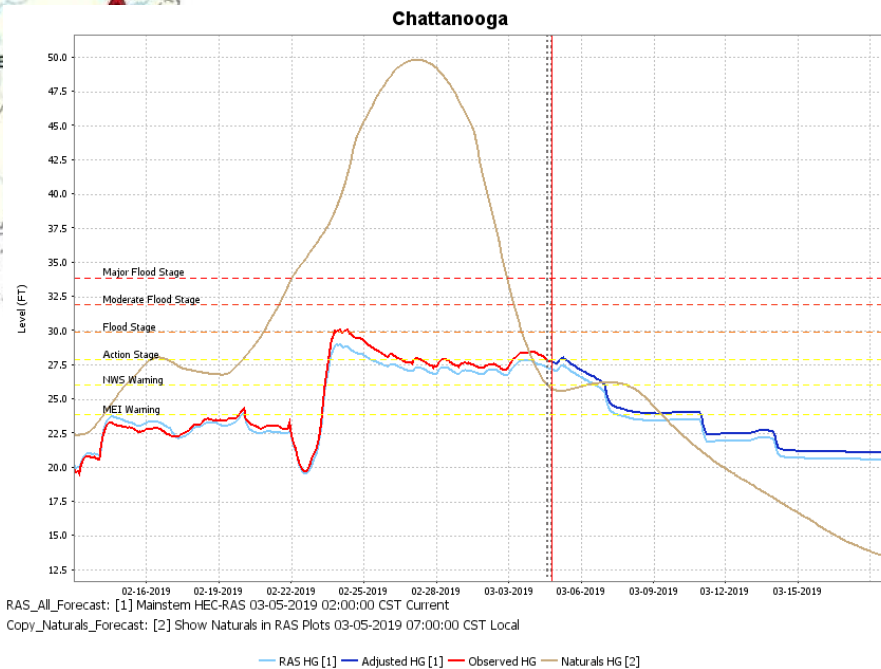
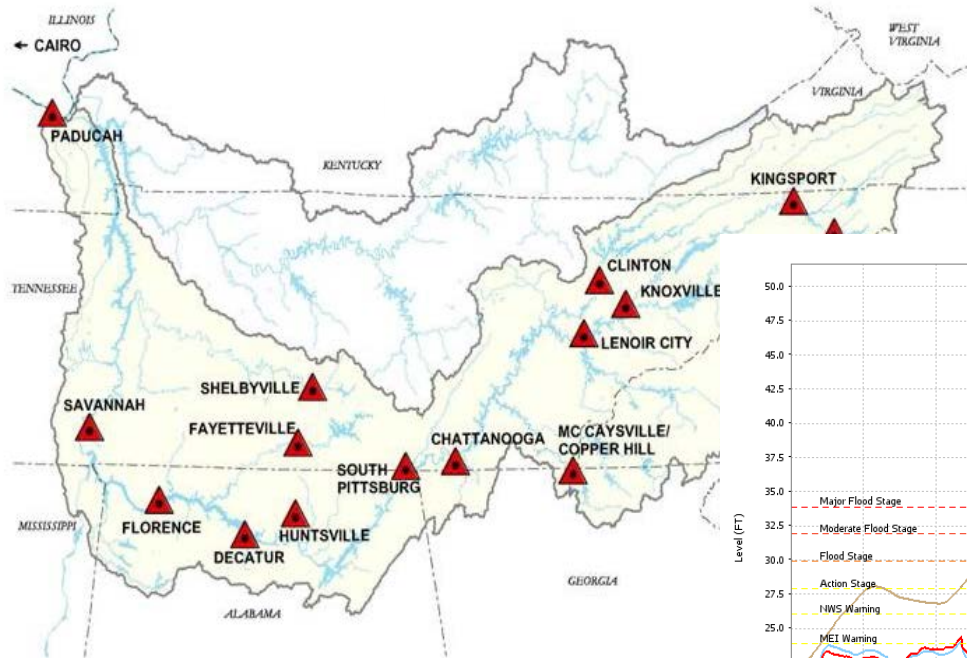




- Average annual rainfall is about 51 inches
- Average annual runoff is about 22 inches
- About 60% of the average runoff - Jan. through April



# Flood Control



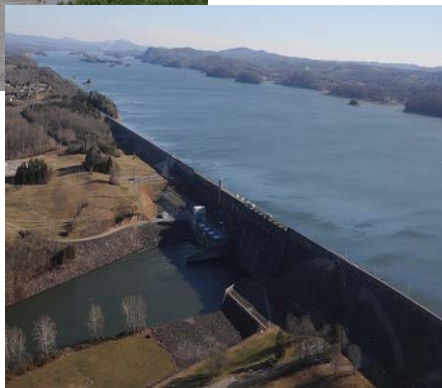


- 1867 Flood
- 58 foot stage



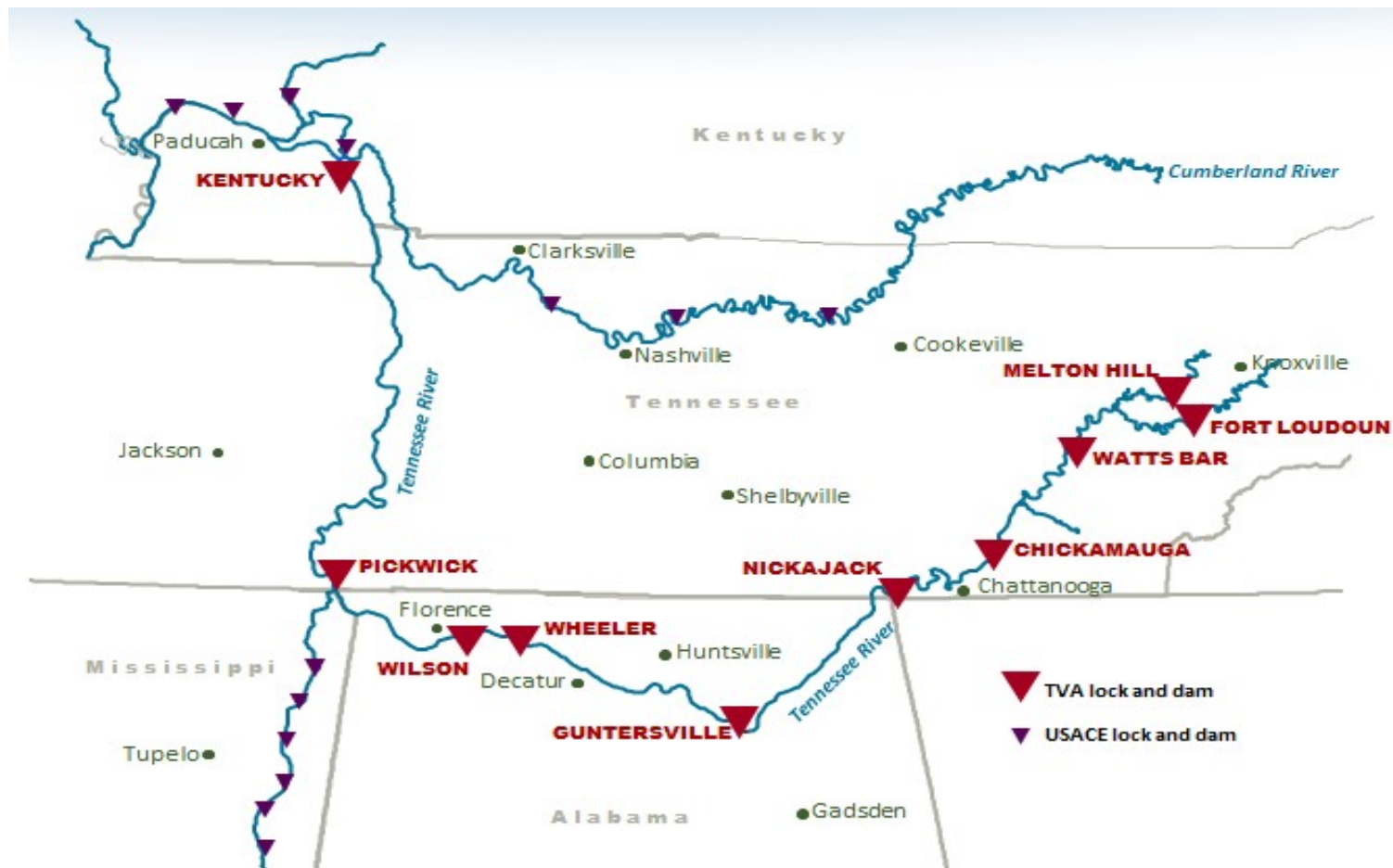


# Flood Control



- Use tributary dams to store water to reduce downstream flooding
- TVA issues flood forecasts for major areas along the Tennessee River through partnerships with the National Weather Service
- Release water at non-flood rate once levels below dams have receded
- Annual average flood damages averted are \$280 million (\$8.6 billion to date)
- Add'l \$17M averted on the Ohio and Mississippi Rivers

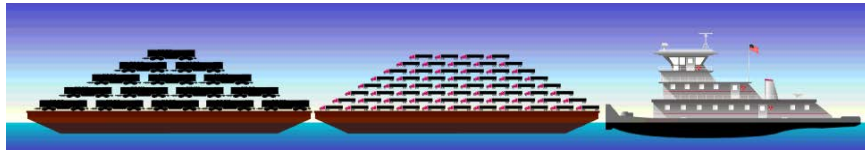
# Navigation





# Navigation

- Cost-effective transportation
- Raw materials, coal, grains, aggregates, iron, steel, petroleum
- ~ \$1B/year in shipper savings
- 800 miles of commercially navigable waterways
- Partners with the U.S. Army Corps of Engineers and U.S. Coast Guard, and towing industry

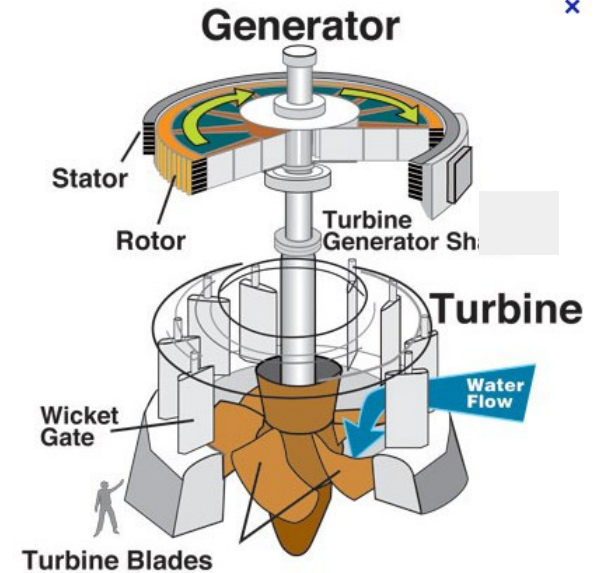


1 barge = 15 railcars = 60 trucks



# Hydropower

- 3,538 MW Conv. generating capacity (109 Units)
- 1,653 MW Pump-storage capacity (4 units)
- Peaking power demand
- Rapid dispatch and flexibility
- ~ 10% of TVA's energy portfolio
- Low O&M Costs
- Displaces more expensive fuels
- Water temperature support at thermal generating plants



# Water Supply and Quality



- Temperature and Dissolved Oxygen monitoring
- Adaptive Management for T&E species
- Minimum flow for downstream habitat
- Thermal compliance at TVA fossil and nuclear sites

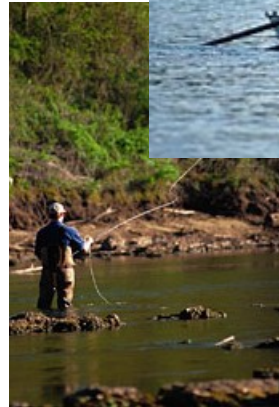
- 700 Water Intakes
- Process water for industry, thermal-electric cooling, municipal, irrigation
- Drinking water for nearly 5 million people
- Provide minimum depths for intakes
- Manage inter-basin transfers





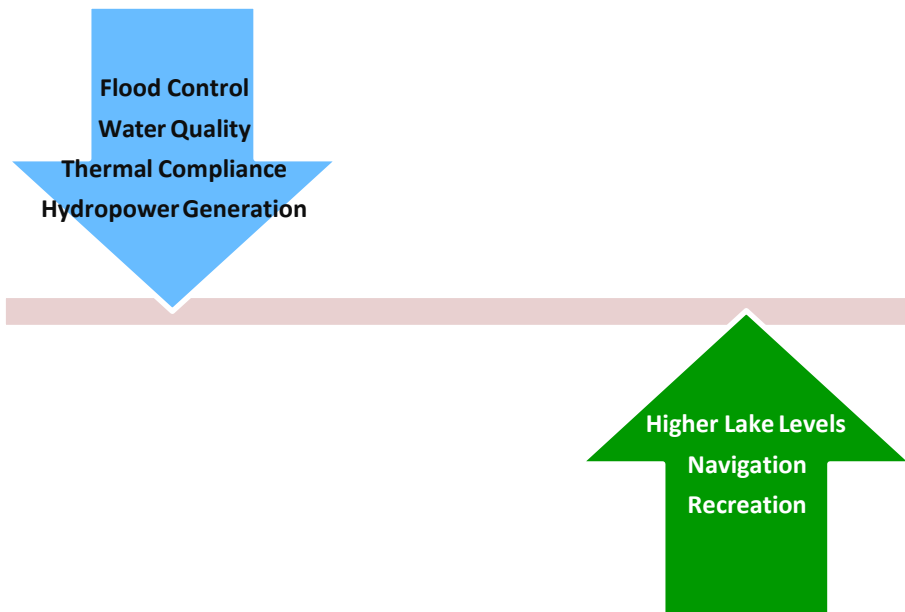
# Recreation

- 230 Commercial Marinas
- 260 Campgrounds
- Drawdown restricted June 1 – Labor Day to provide higher summer lake levels
- Numerous tailwater releases to support trout fishing, whitewater rafting and drift-boating
- Economic boost
- Stakeholder involvement
- Special flows and elevations to support community events



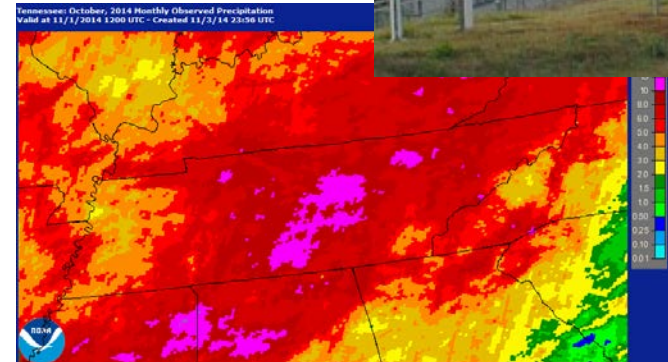
# Challenges

- Balancing the competing demands on the system and the overall value to the public
- Understanding of the trade-offs associated with various scenarios
- Example: Can you keep my reservoir higher, longer?



# Forecasting & Decision Support

- 200 Rain Gages
- 60 Stream Gages
- Data Management (FEWS)
- Inflow and Runoff Modeling (SAC-SMA)
- Reservoir Storage Routing and Simulation (Riverware)
- Hydraulic Modeling (HEC-RAS)
- Hydropower Optimization (Riverware)
- Information Dissemination (Varies)





# The River Forecast Center

- Staffed 24/7/365
- Teams issue 2-4 forecasts per day
- Data validation
- Modeling
- System monitoring
- Emergency response
- Hydropower scheduling
- Interaction with stakeholders

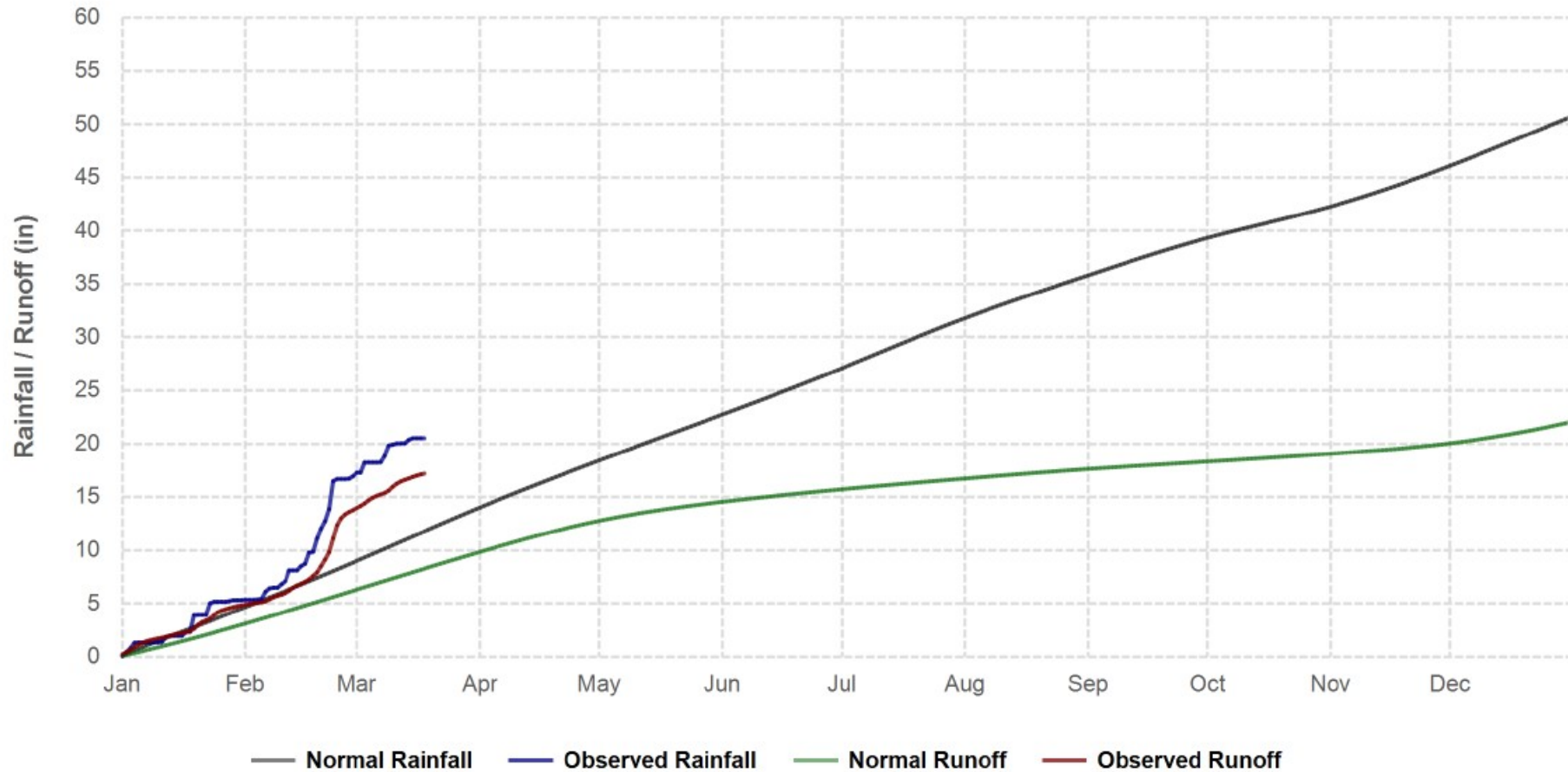


3-4, 2019



# February 2019 Flood



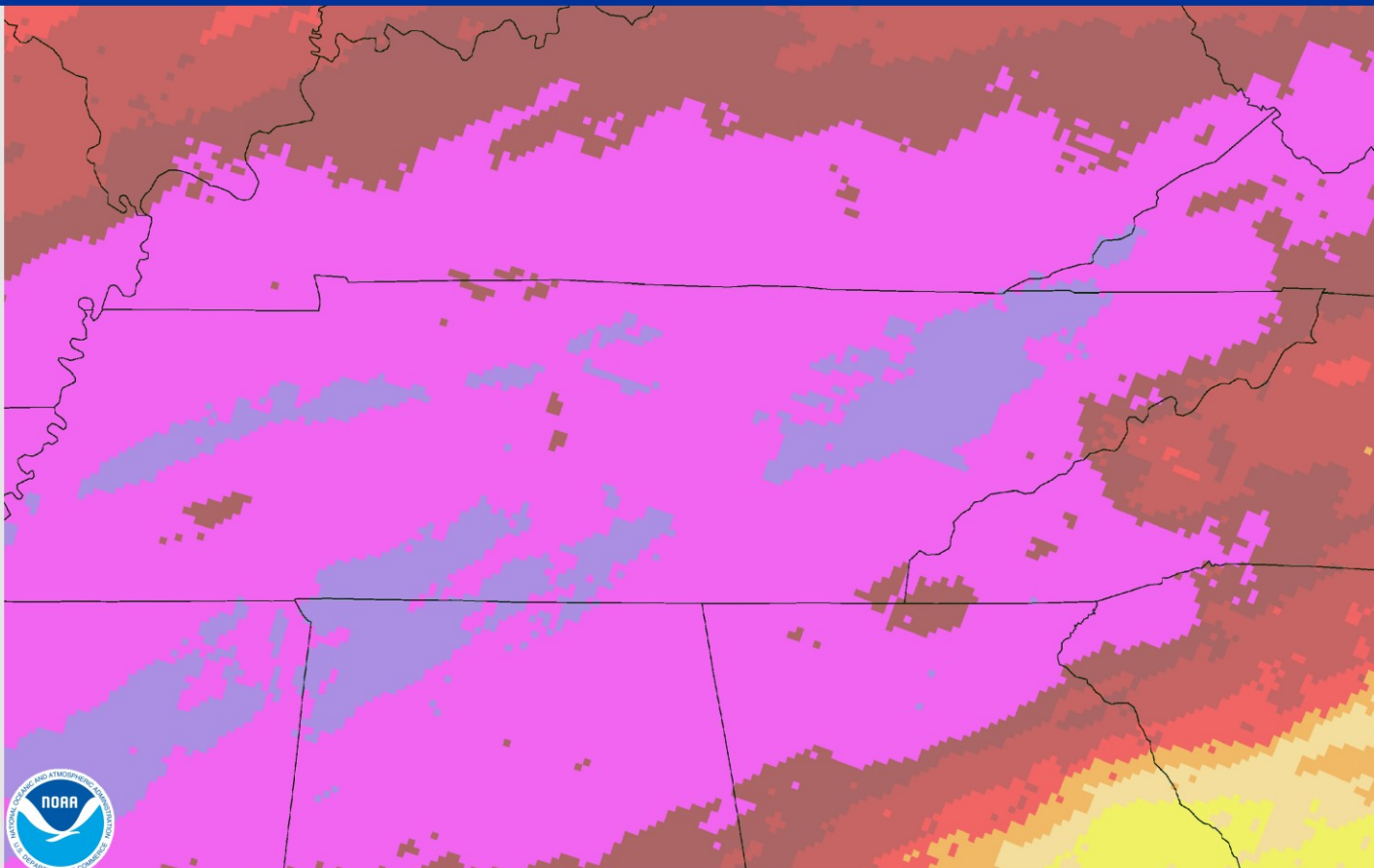




## March 04, 2019 30-Day Observed Precipitation

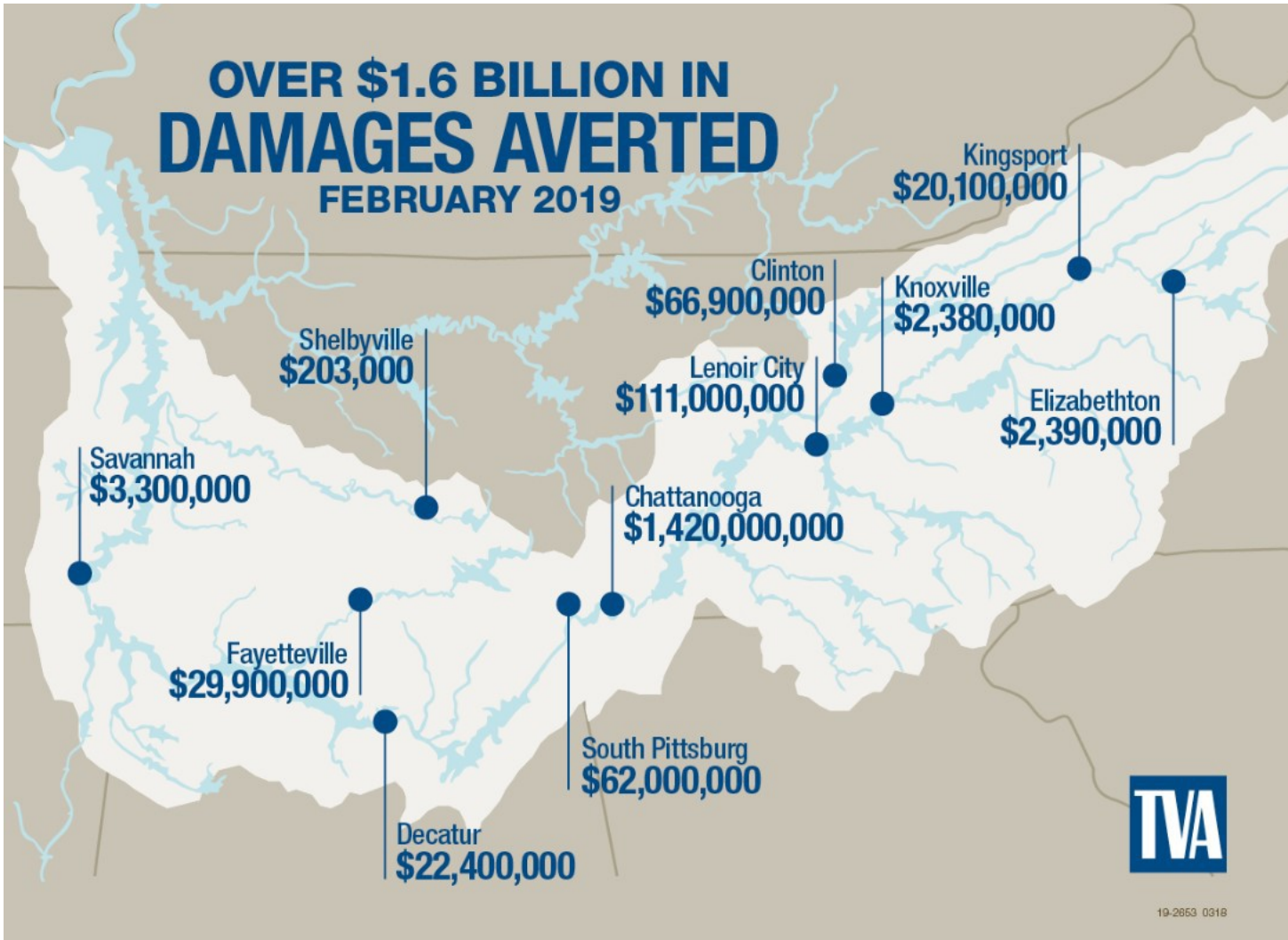
Created on: March 05, 2019 - 13:22 UTC

Valid on: March 04, 2019 12:00 UTC

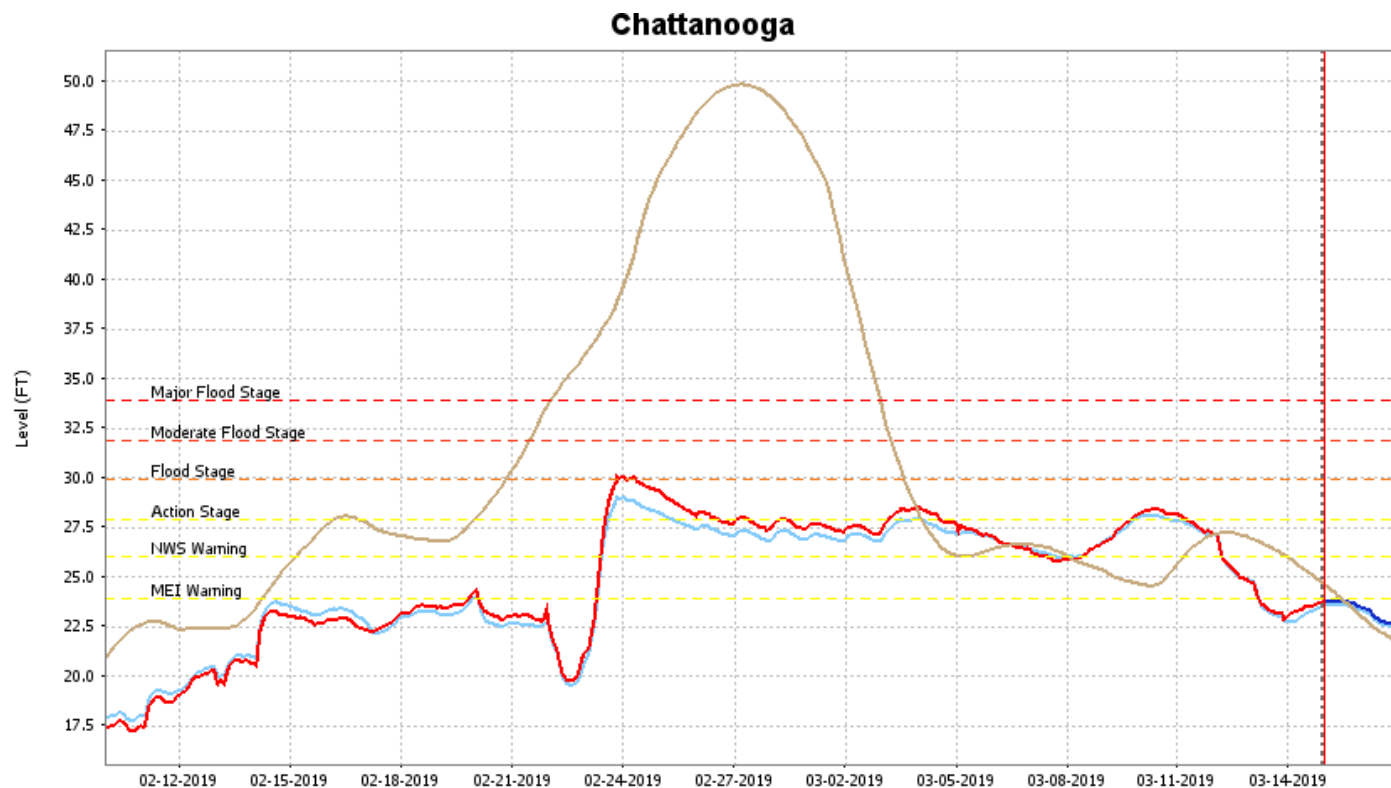


# OVER \$1.6 BILLION IN DAMAGES AVERTED

FEBRUARY 2019



## River Stages



RAS\_All\_Forecast: [1] Mainstem HEC-RAS 03-15-2019 11:00:00 CDT Current

Copy\_Naturals\_Forecast: [2] Show Naturals in RAS Plots 03-15-2019 11:00:00 CDT Local

— RAS HG [1] — Adjusted HG [1] — Observed HG — Naturals HG [2]



# Stakeholder Outreach

- Directly to County Emergency Management Authorities
- Conference calls with State Emergency Management
- Conference calls with Navigation Industry
- Updating National Weather Service routinely
- Updates to recreational interests, marinas, rowing venues, campgrounds, etc.
- Updates to major industries near the Tennessee River
- Updates to industries in the lower Tennessee and Ohio Rivers
- Updates daily to Redstone Arsenal

**Tennessee Valley Authority** @TVANews · Mar 1

Management of the Tenn. River system using our integrated system of 49 dams across the region averted \$1.6 billion in flood damages. After the wettest February and fourth wettest month on record, we continue to manage high river and lake conditions to minimize flood impacts.



1:03 3,199 views

7 37 127

Show this thread

**Tennessee Valley Authority** @TVANews · Feb 26

River Forecast Center Manager James Everett on the @weatherchannel discussing how we're managing the Tennessee River to reduce downstream impacts all across the Valley after a record-breaking month of rainfall.



TVA SCRAMBLES TO CONTROL FLOODWATERS

1 7 28

**Tennessee Valley Authority** @TVANews · Feb 27

River Update: We are increasing releases out of tributary dams to recover flood storage in preparation for the next rain event, so you can expect to see above normal river flows below those dams. (1-3)



0:16 4,329 views

4 16 52

**Tennessee Valley Authority** @TVANews · Feb 20

Incredible site! Wilson Dam near Florence AL, is releasing 2 million gallons per second. Heavy rainfall has resulted in high river conditions along the Tennessee River. We are storing water at tributary and main stem reservoirs to help reduce downstream flood levels. #ALWX #TNWX



1:21 12.6K views

9 134 276

# Social Media Impact

## Facebook:

Number of Posts: 35

Number of Impressions: **7,610,058**

Number of Users Reached: 2,755,040

Number of Link Clicks: 17,700

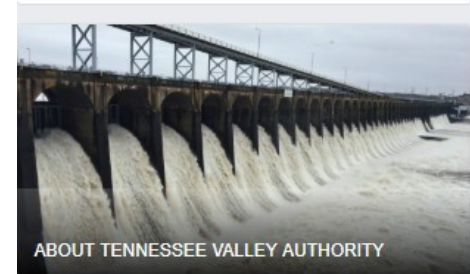
Number of Video Views: 2,210,756

Avg. Reach Per Post: **141,286.63** < Very impressive

Engagement Rate: **9.76%** (Compared to the national average of 0.17%)

**Tennessee Valley Authority**  
Public Utility Company in Knoxville,  
Tennessee

4.3 ★★★★★



[facebook.com/TVA](https://facebook.com/TVA)

We gained 9,387 Facebook followers over the 18 days a 9.85% growth. We now have 104,718 followers Facebook.

## Twitter:

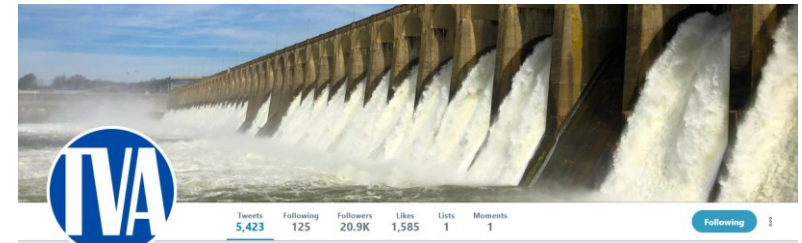
Number of Tweets: 88

Impressions: 996,400

Overall Reach **1,684,800**

Retweets 1,896

Engagement Rate: **4.1%** (National average is 0.05%)



[@TVAnews](https://twitter.com/TVAnews)

We gained 1,200 new Twitter follower over the period, a 6.26% growth. We now have 20,800 Twitter followers.



## February rainfall breaks Tennessee River Valley records

Posted: Feb 25, 2019 04:15 PM EST  
Updated: Feb 26, 2019 06:03 AM EST



(Photo: WATE)

### Near Historic River Levels

Site	Current Level	Forecast	Record	Most Recent Crest of this Magnitude
TN River at Florence	28.78ft	Steady/Falling	32.50ft (1897)	30.03ft (1973)
TN River at Decatur	9.77ft	11.26ft	14.80ft (1867)	10.29ft (2003)
TN River at Whitesburg	21.80ft	24.20ft	26.10ft (1973)	24.67ft (2003)
TN River at Guntersville	36.04ft	40.11ft	38.18ft (2015)	38.18ft (2015)

Some of these records were before the dams were built along the river (Florence & Decatur)!

Forecasts Could Change as TVA adjusts water levels at various dams along the river.

Credit: @ NWSHuntsville



## FLOODING FORCES UNION COUNTY FAMILIES TO BOAT IN AND OUT OF THEIR NEIGHBORHOOD

NEWS

3-4, 2019

# Lingering Impacts



## Rains bring flooding, lock closures on Tennessee River

By Kirk Moore on FEBRUARY 26, 2019

SHARE [f](#) [t](#) [in](#) [✉](#)



The Tennessee Valley Authority is managing water levels at the Kentucky Dam and other structures to control flooding and river levels across the region. TVA photo.



# Summary

- TVA continues it's river management mission – dating back to the TVA Act
- Operations are driven by rainfall and runoff as guided by Reservoir Operations Policy
- Integrated operation allows TVA to balance river system benefits:
  - Navigation
  - Flood-damage reduction
  - Affordable and reliable electricity
  - Improved water quality and aquatic habitat
  - Dependable water supply
  - Recreation



www.tva.com

- Release schedules
- Current reservoir elevations
- Operating guides
- Tailwater improvements
- Monitoring results

TVA Lake Info App





# Questions?



# Kentucky Lock Addition & Lake Barkley Fish Fence Research Project

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**Don Getty, Project Manager**  
**US Army Corps of Engineers**  
**April 3, 2019**



# KENTUCKY LOCK ADDITION



*"The views, opinions and findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."*



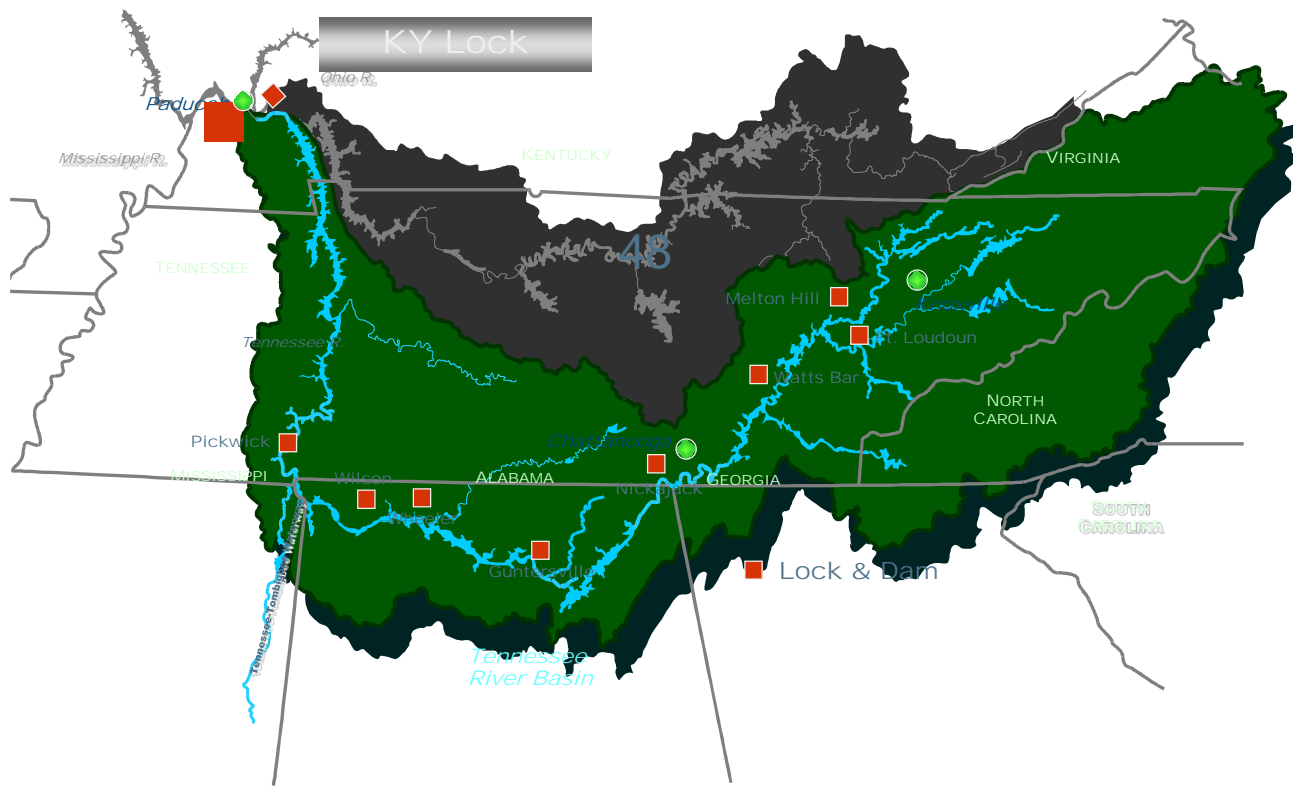
**US Army Corps  
of Engineers**







# KY Lock Location



# KY/Barkley System Vicinity Map



KY Lock - Ft. Campbell Unit  
traveling to Louisiana  
February 2018





# Delta Mariner

7/15/04





## Delta Mariner - April 2010 Wheeler Lock



## Delta Mariner - Rocket Loading in Decatur 2010







# Sand Mining on Ohio

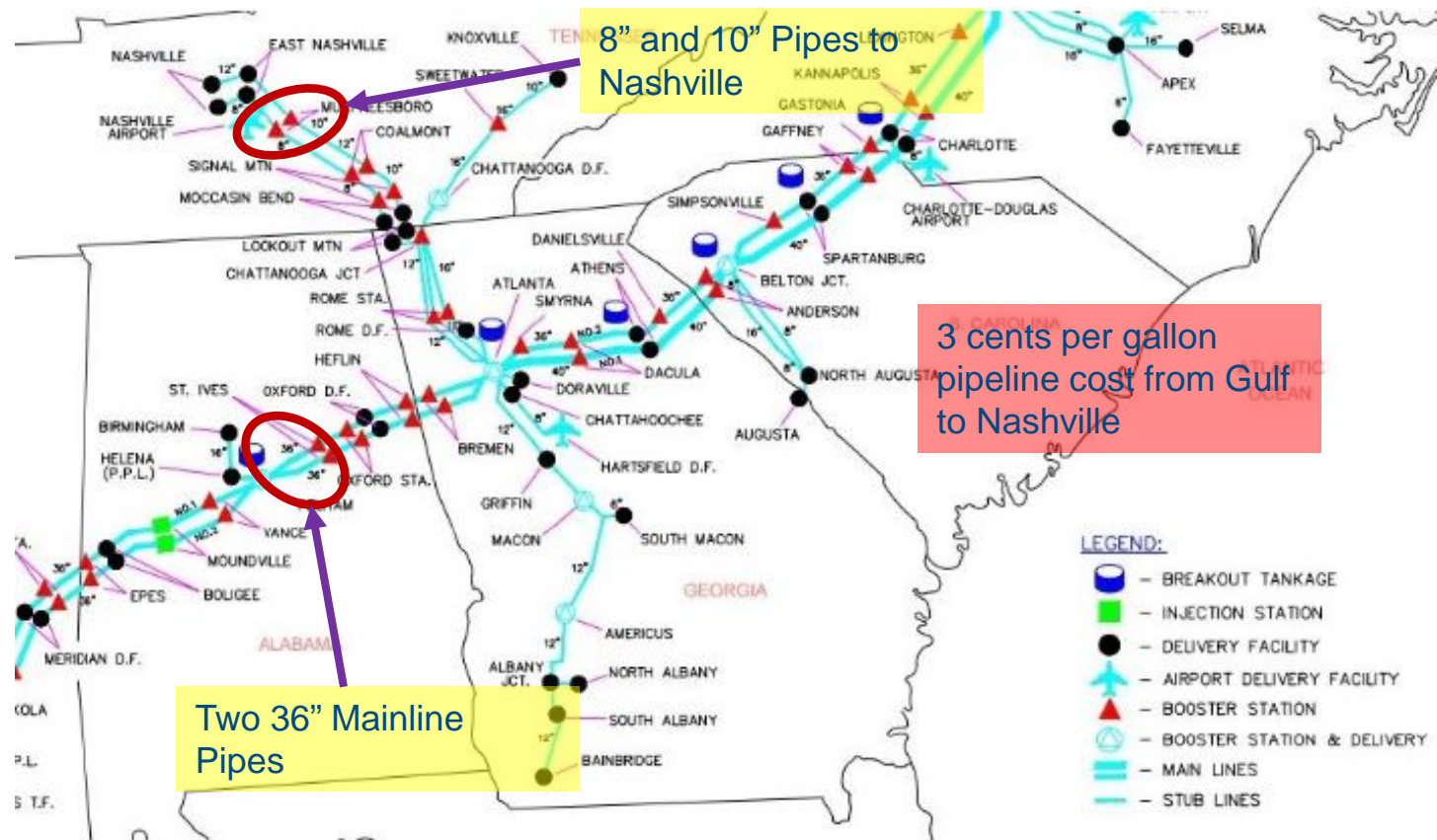




Vulcan Materials –  
Grand Rivers



# Changes in Refined



# Nashville petroleum Trend

## Gasoline and Ethanol

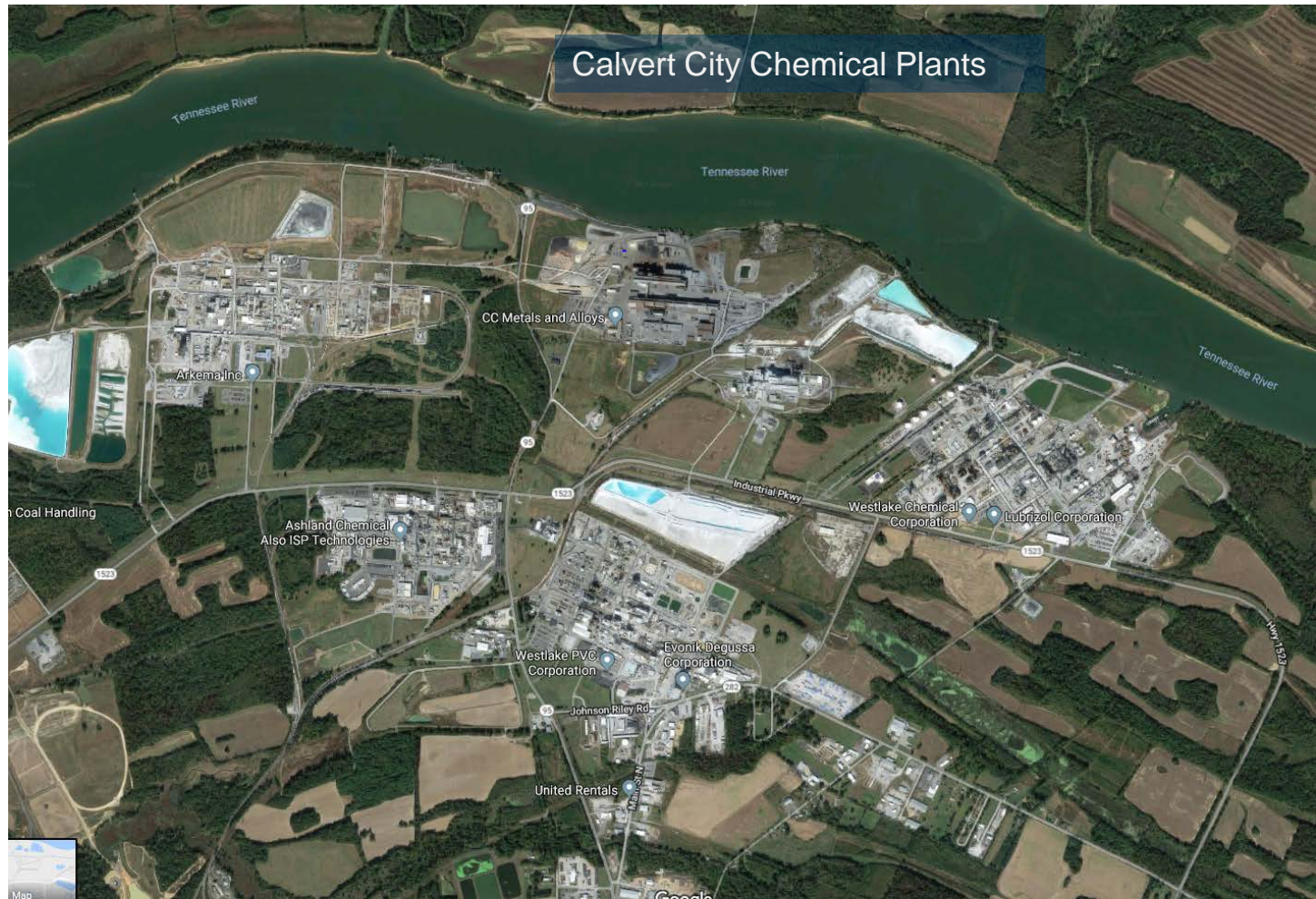
	CY 2014	CY 2015	CY 2016	CY 2017	CY 2018
Middle TN Market Share by Barge	<2%	2-10%	10-20%	>25%	>40%

## Diesel

	CY 2014	CY 2015	CY 2016	CY 2017	CY 2018
Middle TN Tons by Barge	<150K tons	<150K tons	>250K tons	>450K tons	>600K tons



## Calvert City Chemical Plants

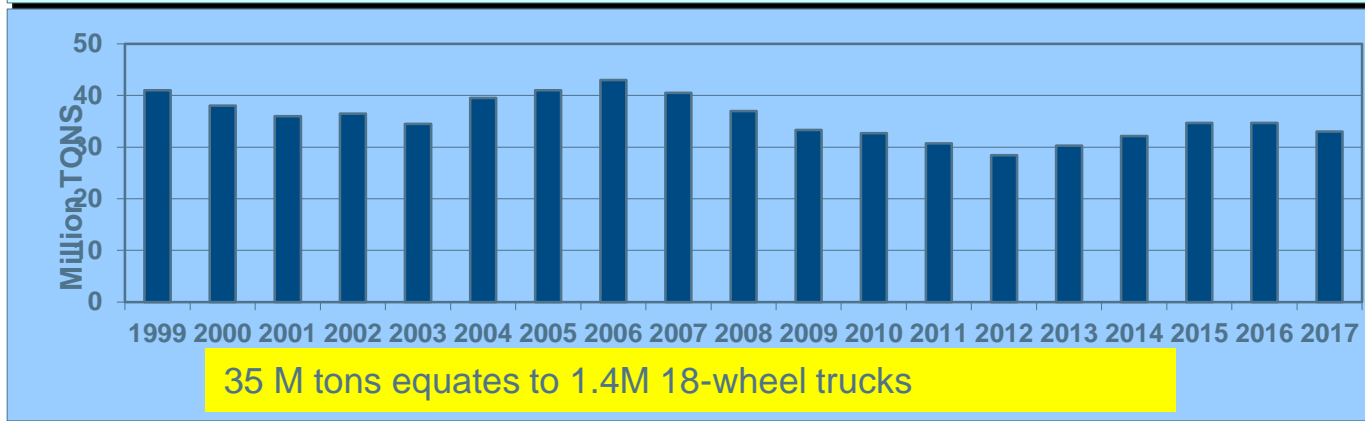
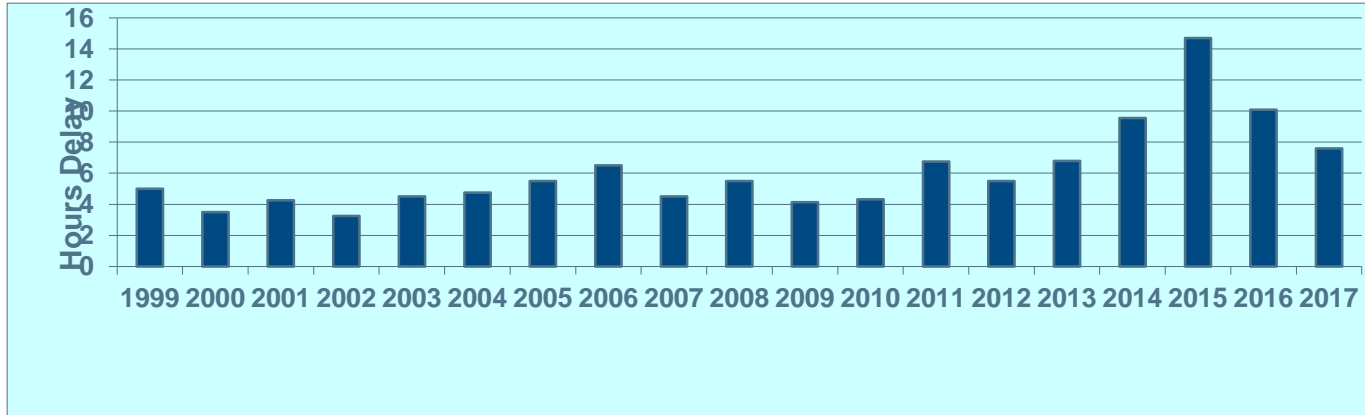




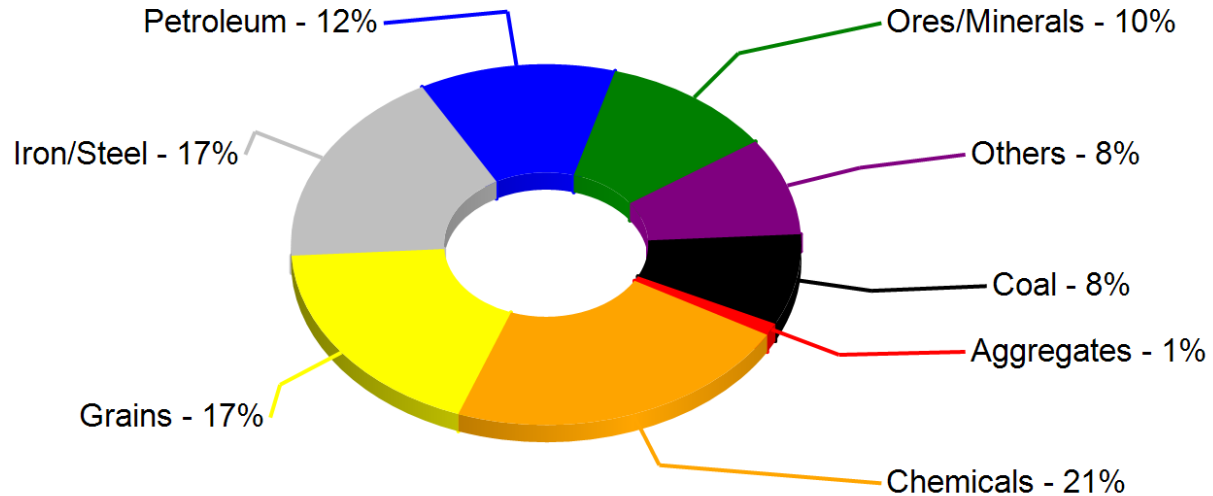
## Eddyville Riverport



# Kentucky Lock System - Delays and Tonnage

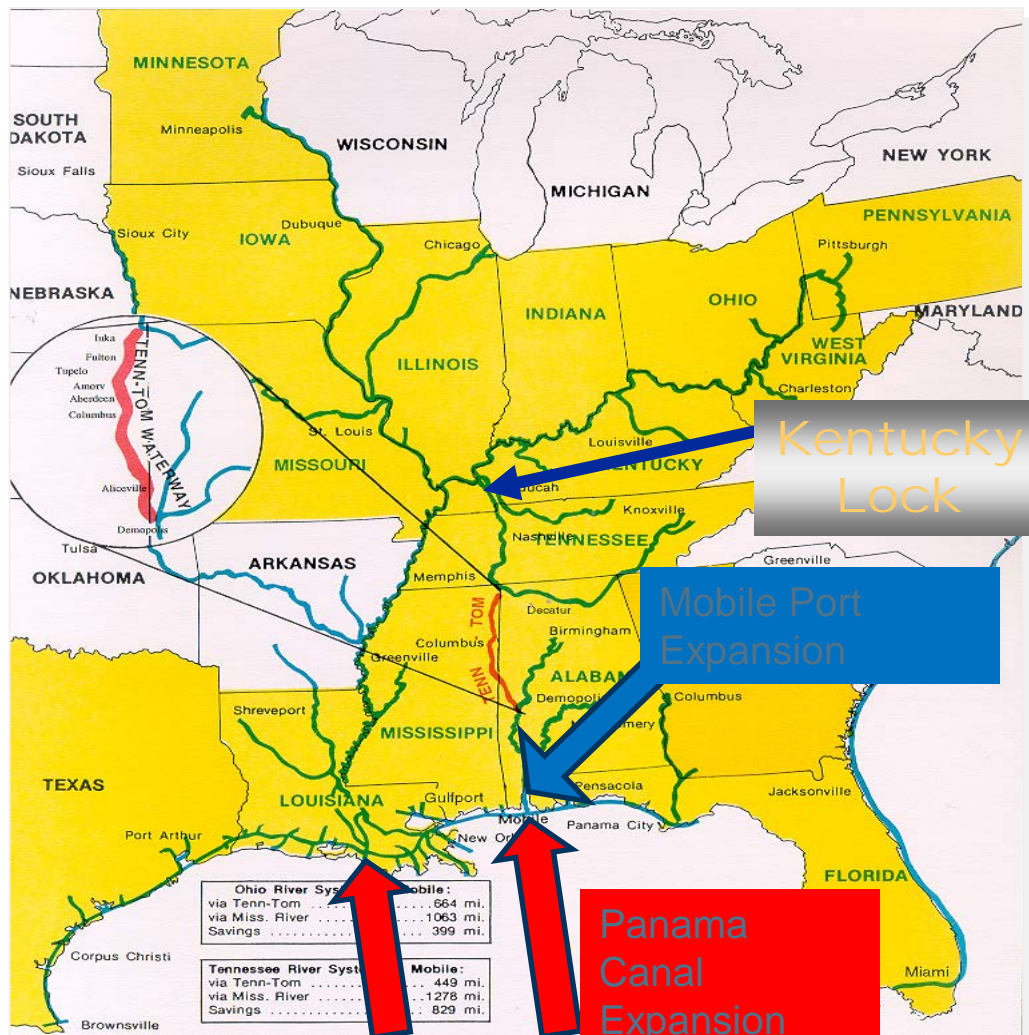


## 2015 Commodity Value Distribution



*Source: WCSC and 2012 NDSU Commodity Value Study*

# Near Term Changes to Inland Waterways

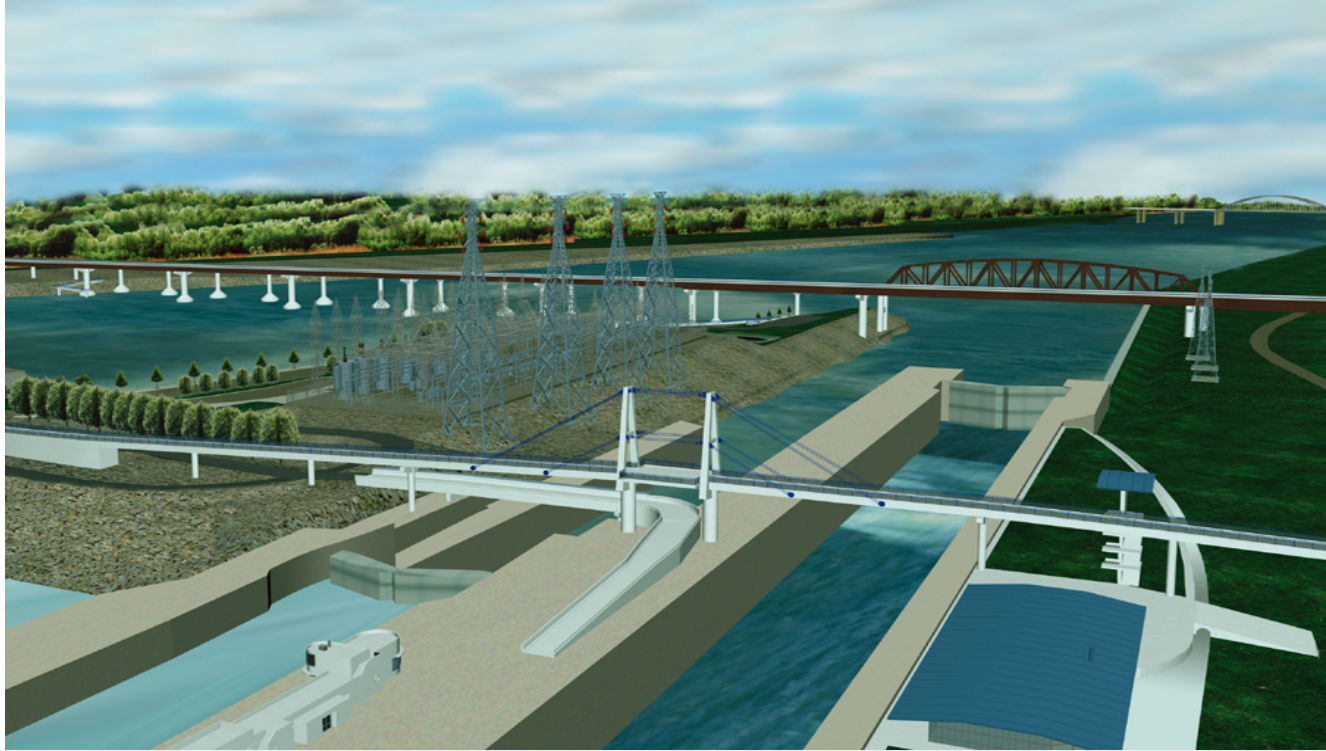




# Kentucky Lock Addition Artist Rendering



# KY Lock Computer Rendering





## Proposed Visitors Center







New Hwy and RR Bridges

New Transmission Towers

Upstream Lock Monoliths

Upstream Cofferdam

Kentucky Lock Addition Completed Features

## Total Project Cost Estimate (Fully Funded, Oct 2017 \$'s)

• Lock & Associated Facilities	\$1,044M
• TVA Transmission Towers	13M
• P & L Railroad	97M
• Hwy 62 and other roadways	100M

Total	\$1,254M*
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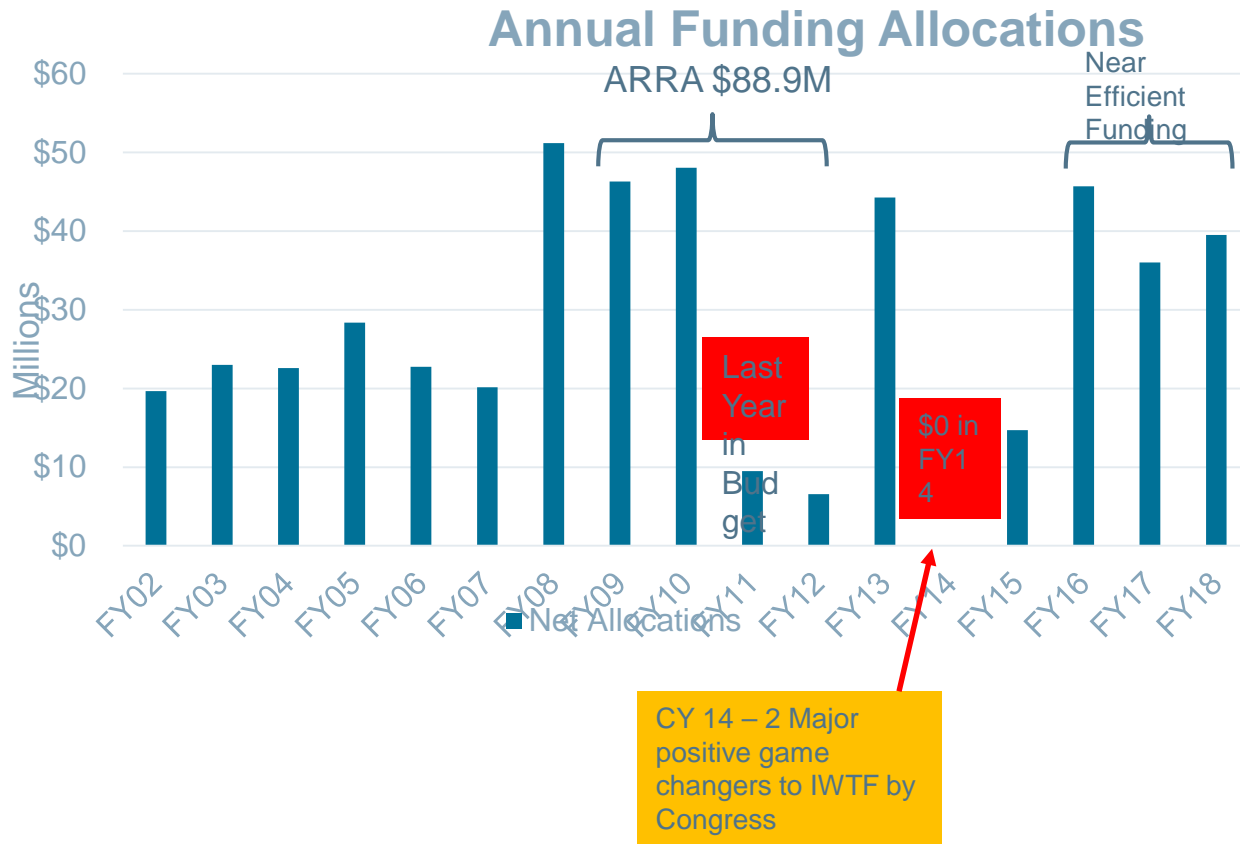
\*Based on 2028 completion date

\$455M Expended to date = 36% complete

**BCR = 1.3 & RBRCR = 2.3 (both @ 7%)**

BCR = 2.8 & RBRCR = 5.3 (both @ 2.75%)

# KY Lock Funding history



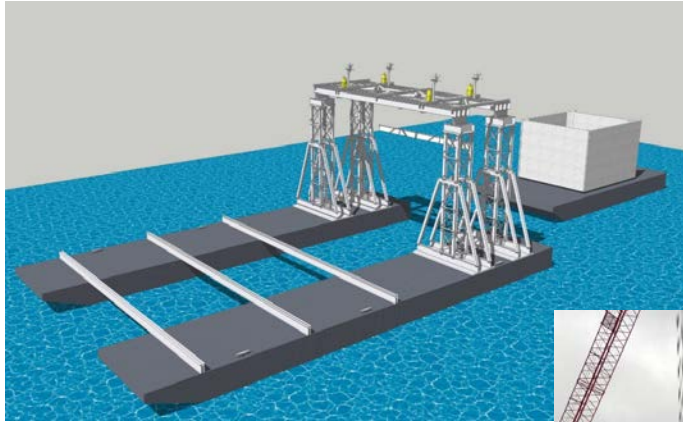


### Downstream Cofferdam

- Low Bid: \$67.1M
- Contractor: Johnson Bros.
- Award: September 2016
- Complete: February 2020

### Downstream Cofferdam





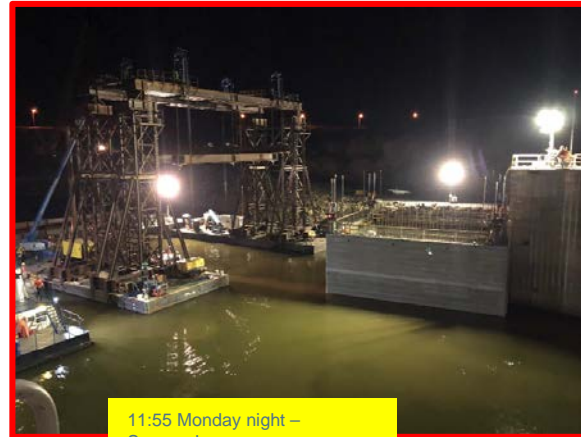
Lift-in Arrangement  
3D Model

2 Feb 2018 – Gantry  
barge system being  
assembled





## Kentucky Lock First Downstream Cofferdam Shell Set-Down (Aug 2018)







**Downstream Lock Excavation  
Award: September 2018**

## TVA Towers Crown of last 375' Tower





## TVA Towers - Crew on last Crown

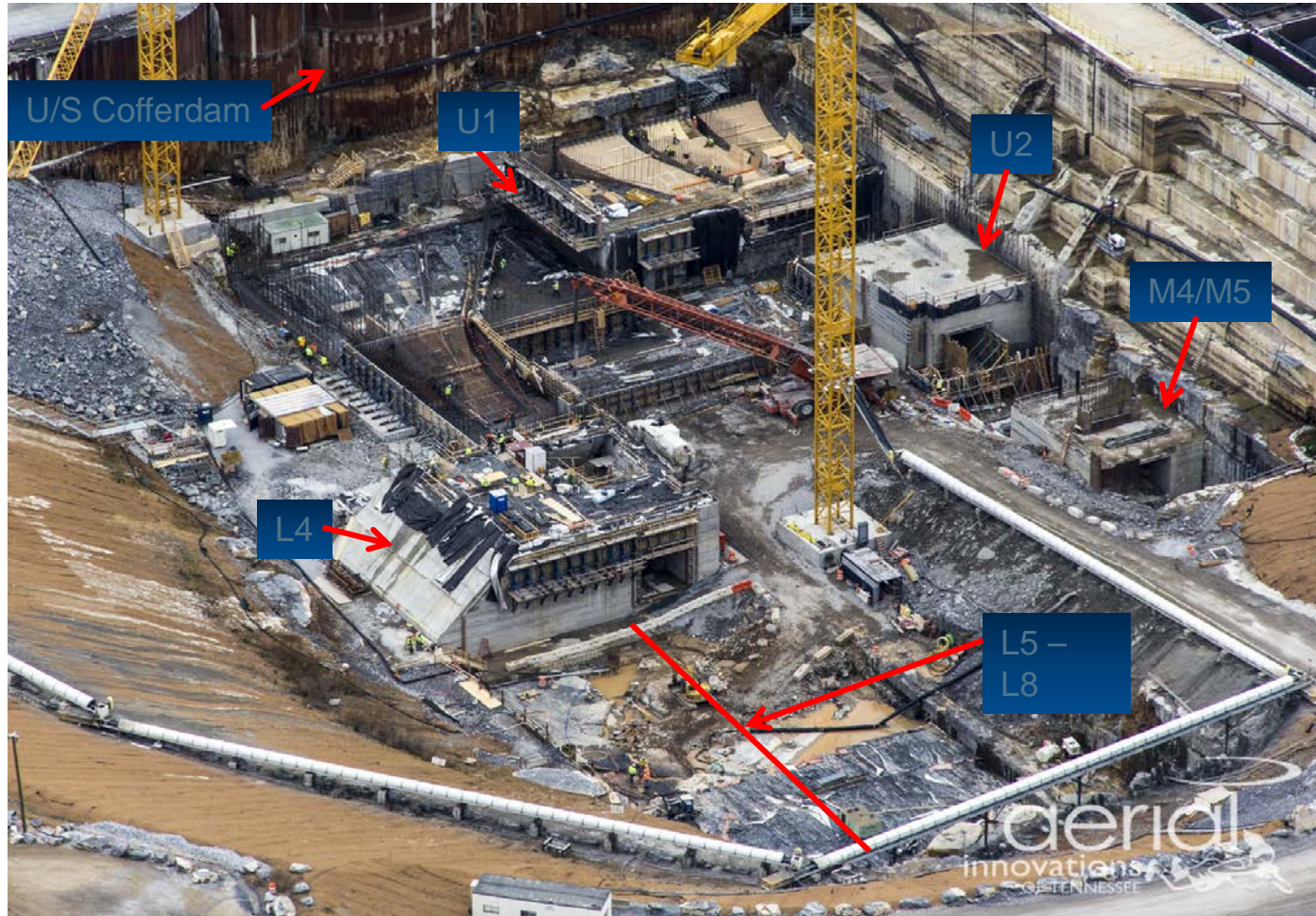




## TVA Towers View from Top of Tower



26 March 2013







7 June  
2016





13 July 2016

Last Gate  
Segment

## Kentucky Lock – June



# KY Lock - Summary and Challenges

- Future Funding
- Structural funding issues are trending positive
- Impact to costs and ultimate project completion date
- Funding flexibility is still being designed in next large construction contract – Downstream Lock Monoliths
- Impacts to Existing Lock during construction of Downstream Cofferdam
- Ongoing Economic Analysis and Traffic Forecast
  - New Economic Metrics (e.g.. BCR's)
    - Downward trend in coal
    - Upward trend in liquid shipments and aggregates





# Status of Asian Carp in the Valley

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Dennis S. Baxter

April 3, 2019

# Asian Carp in the Valley



Bighead carp



Grass carp



Black carp



Silver carp

**Non-native and invasive in North America**

**There are four Asian carp species in the Tennessee River Watershed:**

Silver

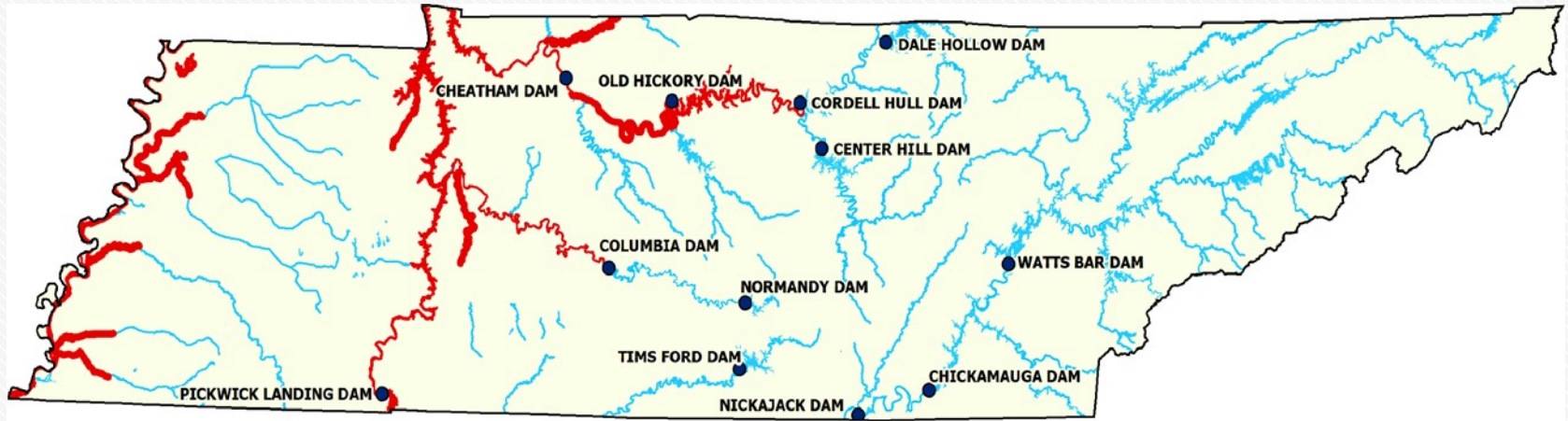
Bighead

Grass

Black

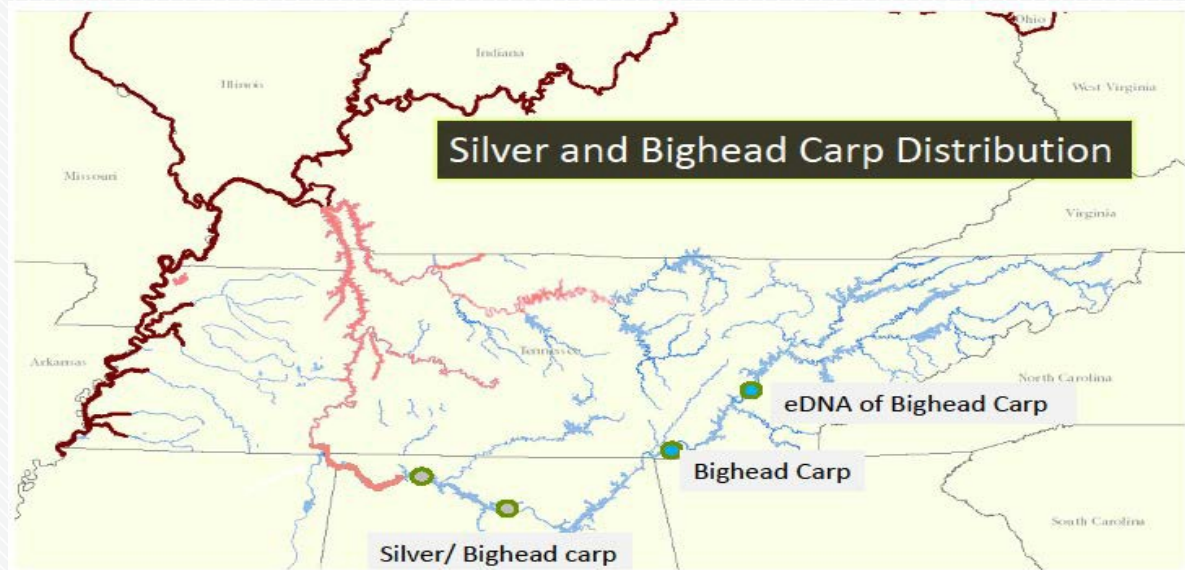


# Asian Carp Distribution in Tennessee





# Asian Carp Distribution & eDNA



# Mistaken Identity





# Gizzard Shad, Silver Carp, Blueback Herring and Alewife Comparisons





# MICRA (Mississippi Interstate Cooperative Resource Association)

- MICRA functions as an umbrella organization
  - Organizes multi-state partnerships
  - Address inter-jurisdictional fishery management issues
  - Within six Mississippi River sub-basins
  - MICRA is a partnership of
    - > 28 state agencies with fisheries management jurisdiction
    - > 4 Federal Partners in the Mississippi River Basin
    - > TVA participates in the Tennessee/Cumberland sub-basin

# MICRA Objectives

- Conduct Targeted Sampling Surveillance
- Early Detection
- Population Characteristics
- Evaluate Lock & Dam Passage



# National Strategies for Asian Carp

- Contain and control the expansion of populations of Bighead, Black, grass, and Silver carps in the United States
- Extirpate, or reduce to levels of insignificant effect
- Conduct research to provide accurate and scientifically valid information necessary for the effective management and control
- Effectively plan, implement, and evaluate management and control efforts



# Who is Responsible

- The states (KY, MS, AL, TN) **fisheries management**
- The USFWS obtains **funding** then **facilitates program** The USACE **operates locks**
- The TVA manages water/**operates dams** Tennessee River

# Can These Fish Be Stopped?



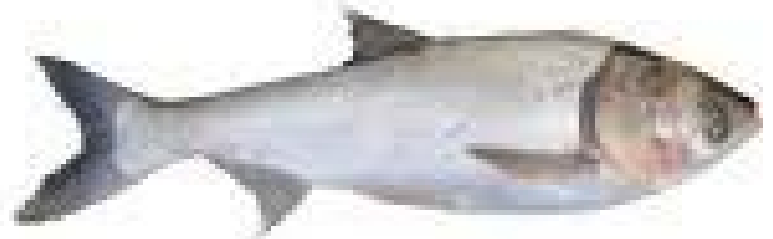
**Bighead carp**



**Grass carp**



**Black carp**



**Silver carp**

# Understanding Population Dynamics

## First Actions



- Silver and Bighead carp form tight schools. Individuals will be tagged so the schools of Asian carp can be tracked. This is called the “**Judas fish technique.**”
- The fish can be affectively netted to ensure re-capture and removal of other invasive carp found in the school.
- Commercial fishermen will be able to remove fish in the school at the state’s request.



# First Actions (cont.)

## Collaboration of Sub-basin agencies and universities

- Implanting acoustic transmitters and receivers
- Monitor movements through locks and dams
- Provide information for lock management and deterrent barriers
- Surveying relative densities
- Determine if natural recruitment is occurring in the reservoirs



# Fill Knowledge Gaps

Understand distributions and habitat use in the Ohio River sub-basin and determine:

- **Spawning** occurring within the systems,
- **Movement** within the systems, and will provide
- **Life history** and **population dynamics** data for informing Tennessee River specific-models
- Estimating **control needs** and **invasion impacts**



# Will Asian Carp Affect the Fisheries?

- Unknown at this Time
- Long Term Monitoring Programs & Historical Fisheries Data will help Determine Changes in Fish Populations





# Silver Carp Monitoring



# Silver Carp



# Silver Carp Larvae



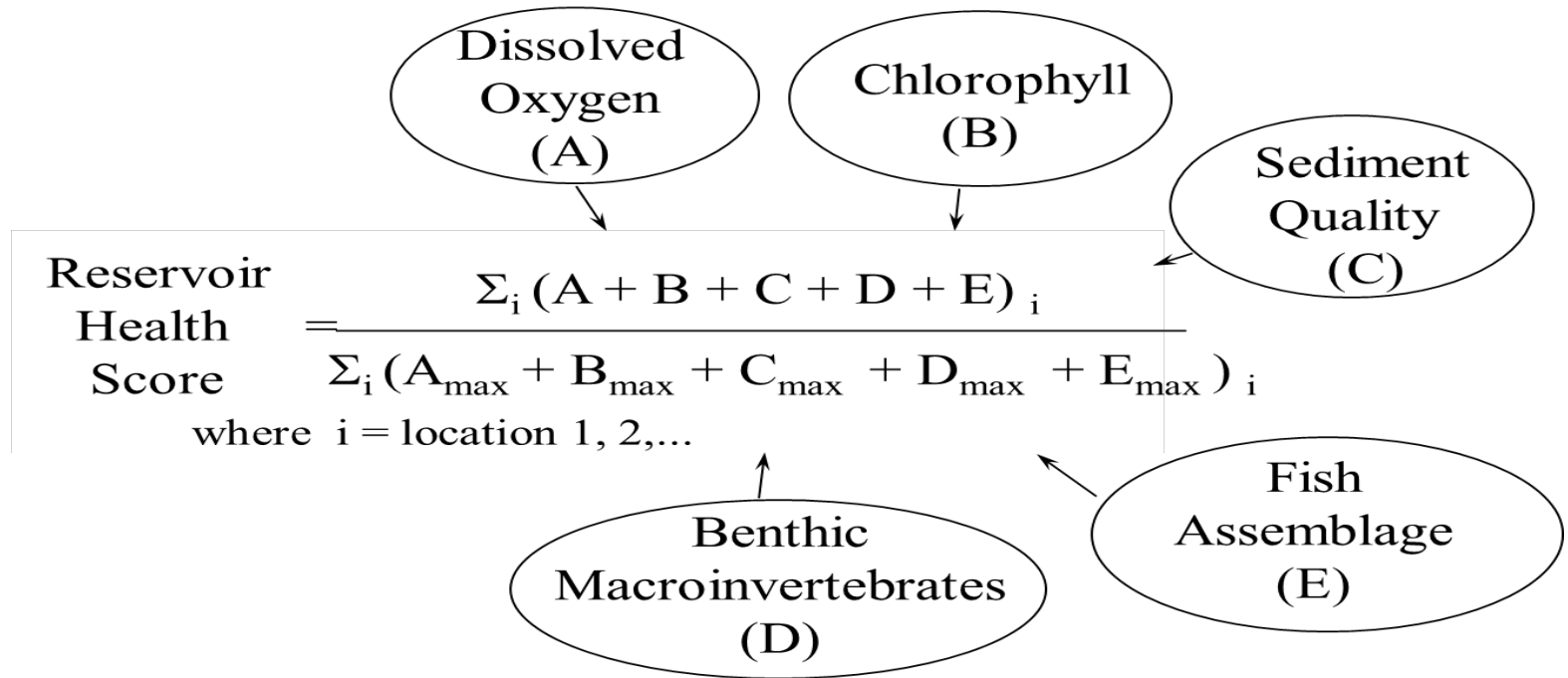
**TVA Vital Sign Locations**  
August 18, 2003

- Vital Sign Location
- TN Watershed
- Cities
- Nuclear Plants
- Steam Plants
- Watershed Boundaries
- State Boundaries
- Rivers
- Lakes

Scale: 0 5 10 20 30 40 60 Miles



# Ecological Health Score Calculation Utilizing Five Key Indicators



# Strategies to Stop Upstream Migration

- Communication
- Barriers
- Commercial Fishing
- Contract Fishing
- Bow Fishing  
Tournaments
- Large Scale Netting at  
Pinch Points



# Communication



Websites

TV Interviews

Tennessee Uncharted

Public Meetings

Sportsman Events



# Barriers

- Electric and Acoustic
  - Positioned at the downstream lock entrances
  - Current research will determine if barriers are successful

# Acoustic Barrier System at Lake Barkley Lock

- Sound Barrier-Installed by the USGS
- Install in March
- Test in May
- Verify if barrier works by tagging and tracking movement
- Successful spawning has only occurred once in 2015 and not has been seen in KY or Barkley Lakes.
- 100% effectiveness is not necessarily needed to reduce population
- Recruitment reduction to upstream waters will keep populations from exploding.



# Commercial Fishing





# Bow Fishing for Asian Carp



# Asian Carp Roundup

- Removal at Pinch Points
- Multi-Agency Event





# Cooperative Tagging and Removal





# Uses for Asian Carp

- Table Fare
- Bait
- Animal Feed
- Compost
- Recreation?



# Asian Carp are Great Table fare!







# Kentucky Fish Center, LLC

- Opened the Kentucky Fish House
  - Public-Private Partnership to harvest and sell Asian Carp
- Harvest goal by 2024 is 20-million-pound production goal
- Teaches Commercial Fishers – Use nets and how to fish for Asian Carp
- Ice Machine



# Turning an invasive problem into a bait solution

- Lowering numbers of silver carp moving upstream by using them for bait
  - Harvest, freeze it, cut it into pieces
  - Sell it as a cheap bait to East Coast lobster fishermen
  - Lobster Fisherman want live bait and are willing to pay 50 cents per pound
    - > 50,000 lbs. needed



# Lacey Act

- It's legal to transport invasive species across state lines
  - if the fish are **dead and eviscerated**
- Significant regulations must be amended to make this work





# Silver Carp on Kentucky and Barkley Lakes



# Health and Safety Issues



# Flying Carp are a Hazard to Boaters



Benjamin Lowy via Getty Images



# State of the Valley



All State and Federal Agencies are working together through MICRA

# State of the Valley

- All State and Federal Agencies are working together through MICRA-Ohio Sub-Basin
- We Established the Leading Edge of Invasion
  - Deployed Receivers & Tagged Fish
  - Identified Pinch Points



# State of the Valley

- All State and Federal Agencies are working together through MICRA-Ohio Sub-Basin
- We Established the Leading Edge of Invasion
  - Deployed Receivers & Tagged Fish
  - Identified Pinch Points
- We are Testing Acoustic Barrier
- KY developed fish house & bought Ice Machine
- Contract with commercial fishing programs







Questions









# Invasive Fish Deterrent

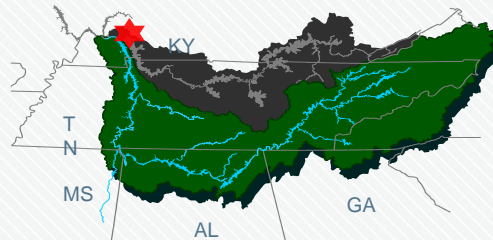
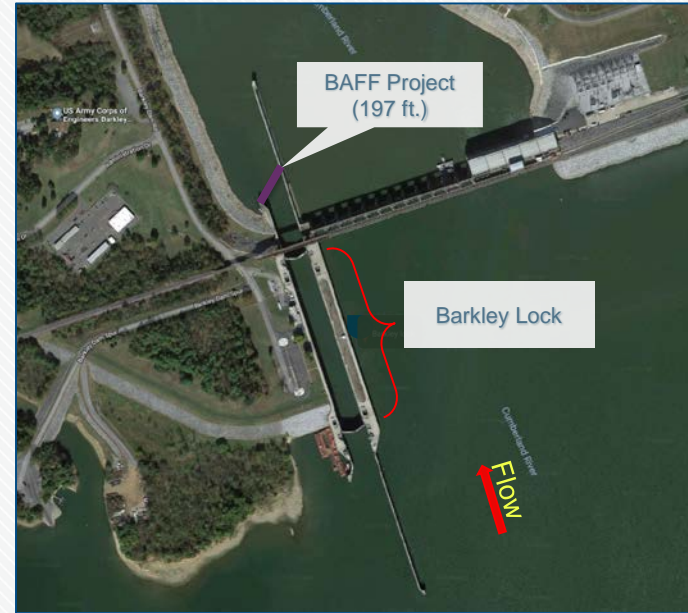
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Don Gibbs



### Critical Lake Barkley Information

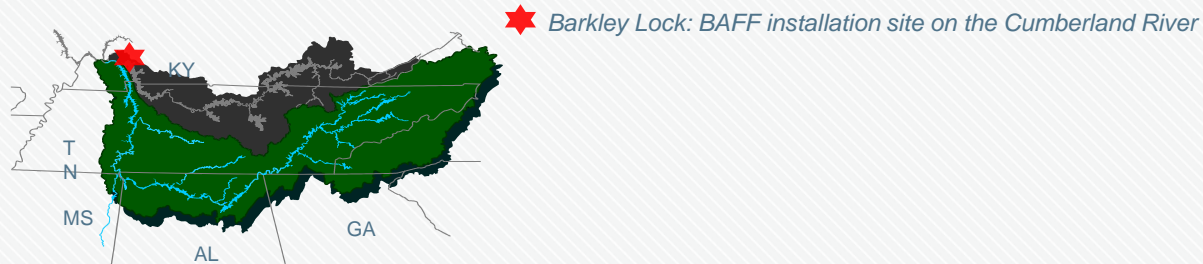
- Major part of the largest reservoir system east of the Mississippi River.
- In conjunction with nearby Kentucky Lake, supports an annual \$1.2B sport fish and recreation boating industry.
- Movement through lock systems is the primary means of migration of invasive fish.
- Asian carp are entering the Tennessee and Cumberland Rivers from the Ohio River through Kentucky and Barkley Locks.



★ Barkley Lock: BAFF installation site on the Cumberland River

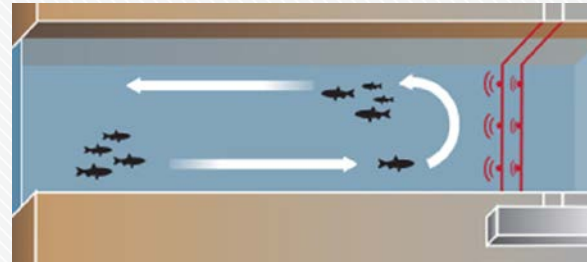
## Research Project Information

- Three year research effort led by USFWS, with USACE, USGS and Kentucky DFWR support
- Involves testing of a proprietary alternative deterrence method consisting of sound, light and air bubbles – BAFF (Bio-Acoustic Fish Fence)
- USACE is reviewing design documents to
  - ensure integrity of the navigation structure
  - minimize impact to navigation industry
- **Construction start June 2019 and** project operational August 2019



## Introduction

- Fish Guidance Systems Ltd (FGS) has been awarded the design build contract by USFWS to install a Bio Acoustic Fish Fence system at Barkley Lock & Dam.
- Project is currently in 100% design phase.
- Research design is being developed through the partnership.
- Construction of the BAFF System is planned for spring/summer 2019.





# THE BIOACOUSTIC FISH FENCE - BAFF™

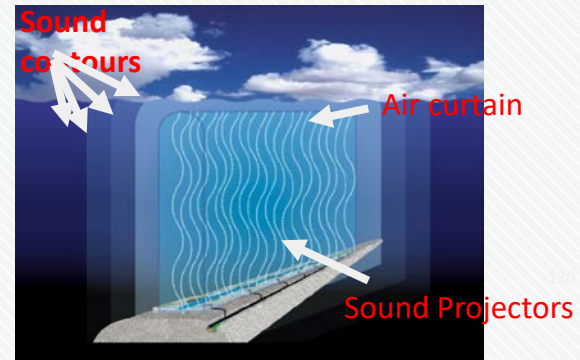
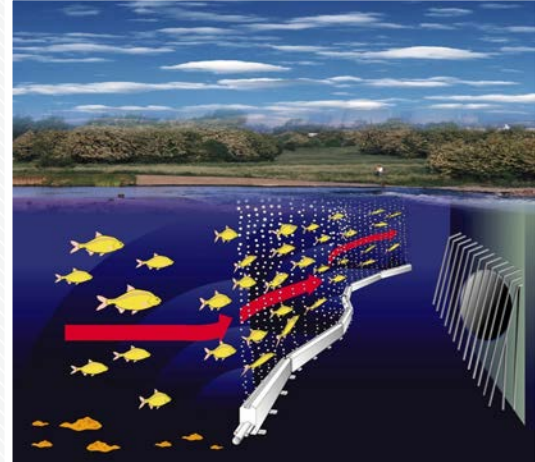
BAFF developed by FGS

System evaluated by University of Minnesota

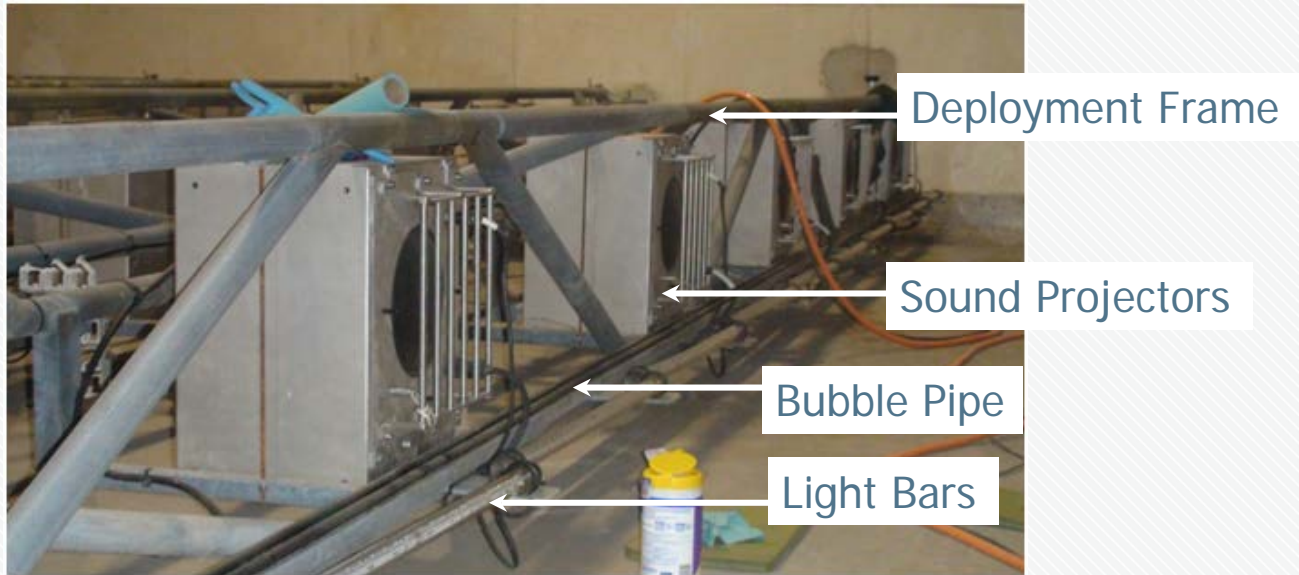
Uses proprietary sound signal that is introduced into water in a bubble curtain

Produces a confined 'wall of sound' enabling fish to be *guided* to a bypass or trap

Utilizes sound projectors, compressed air, and lights



## PROPOSED BAFF SYSTEM AT BARKLEY LOCK & DAM







# Questions?



# Savannah, TN Erosion Study

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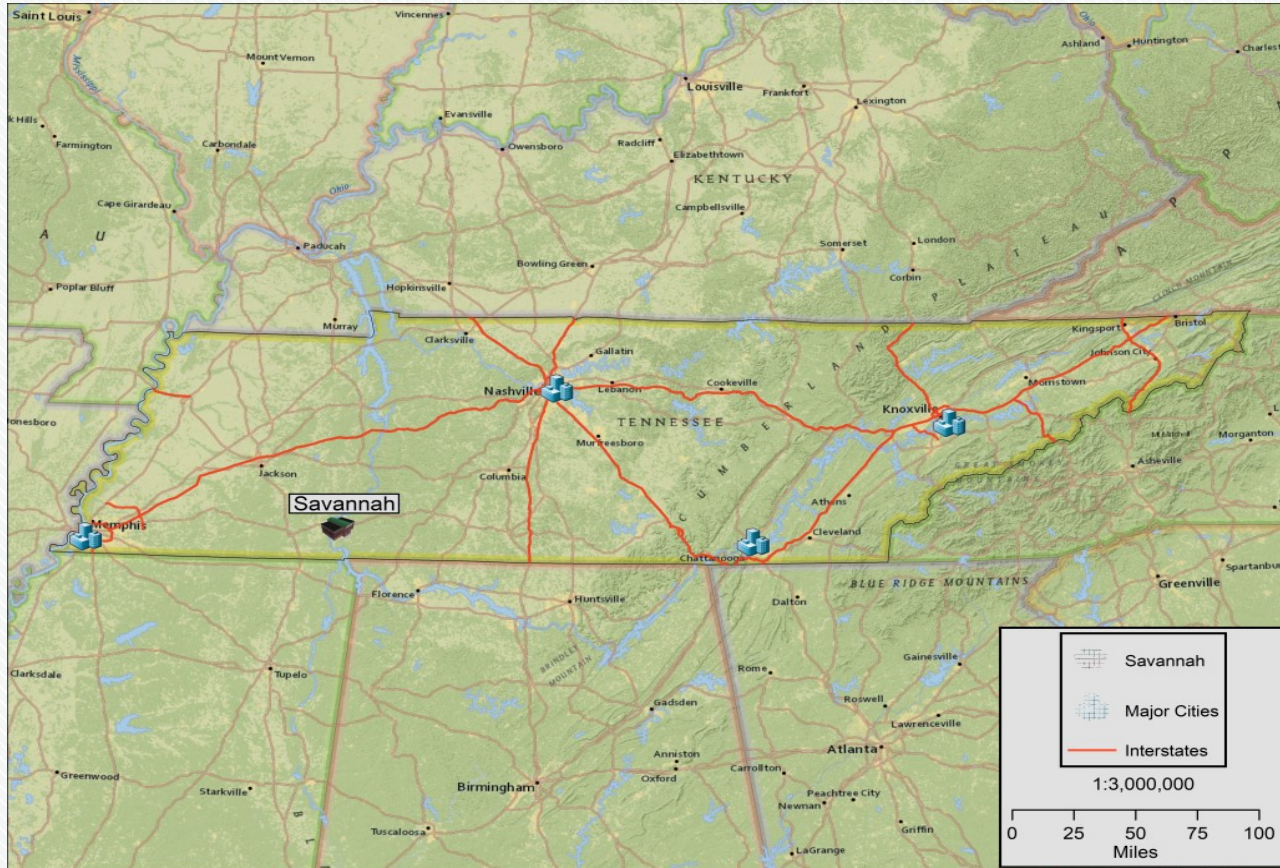
April 3, 2019

RRSC

Shannon O'Quinn

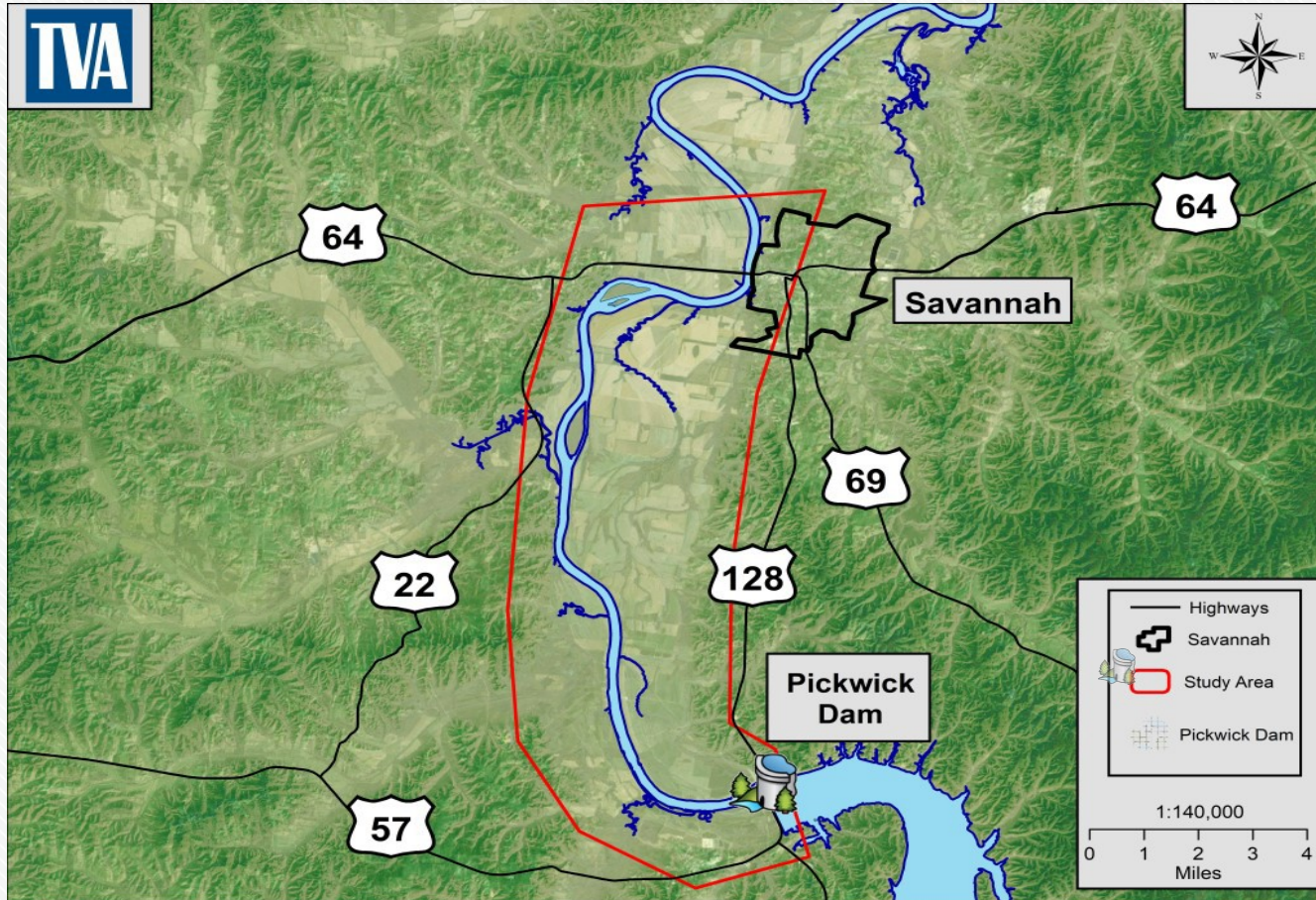


# Project Location





# Project Study Area





# Tennessee Valley Farmers





# Shoreline Erosion on Tennessee River





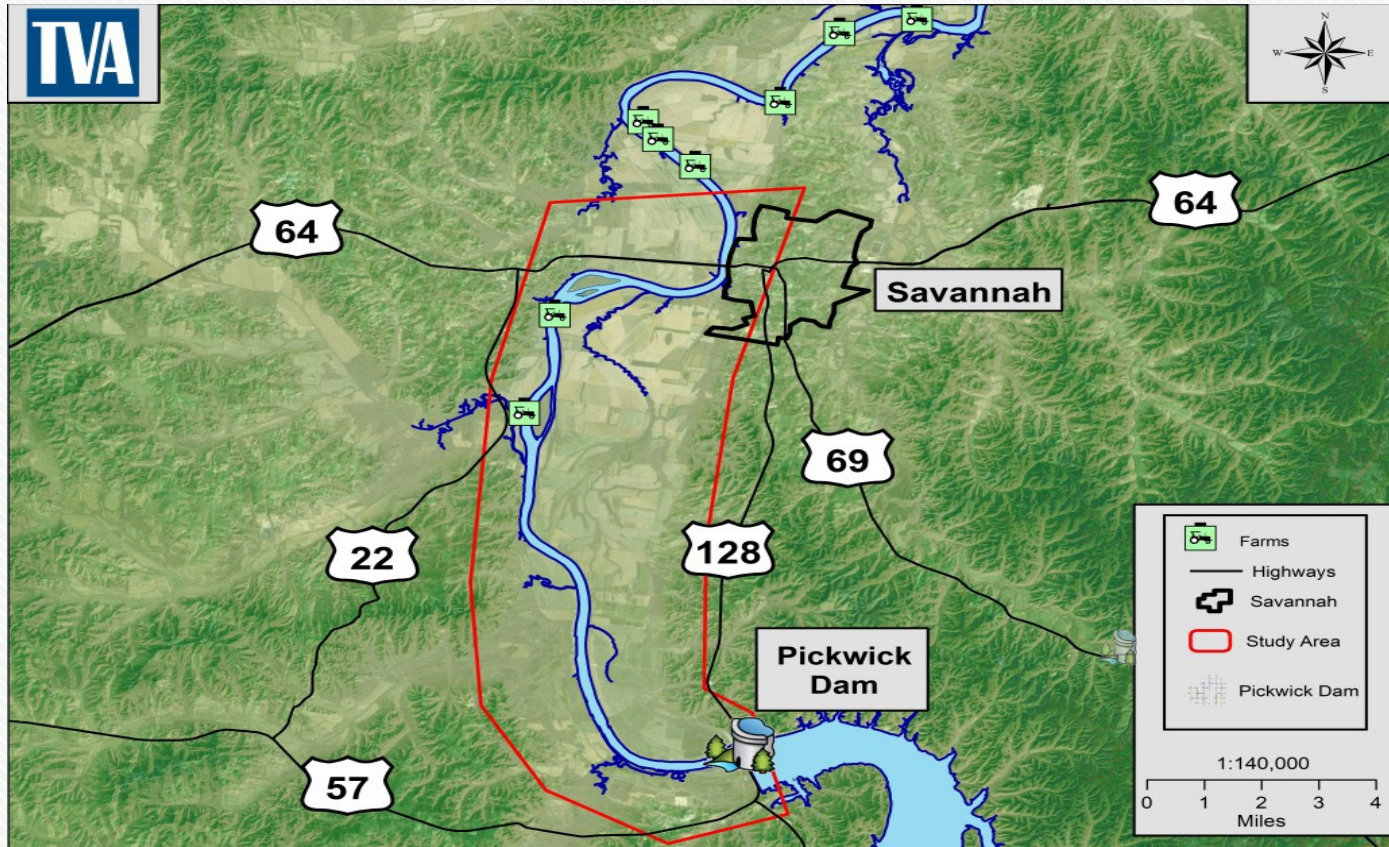
3-4, 2019

# Shoreline Erosion on Tennessee River



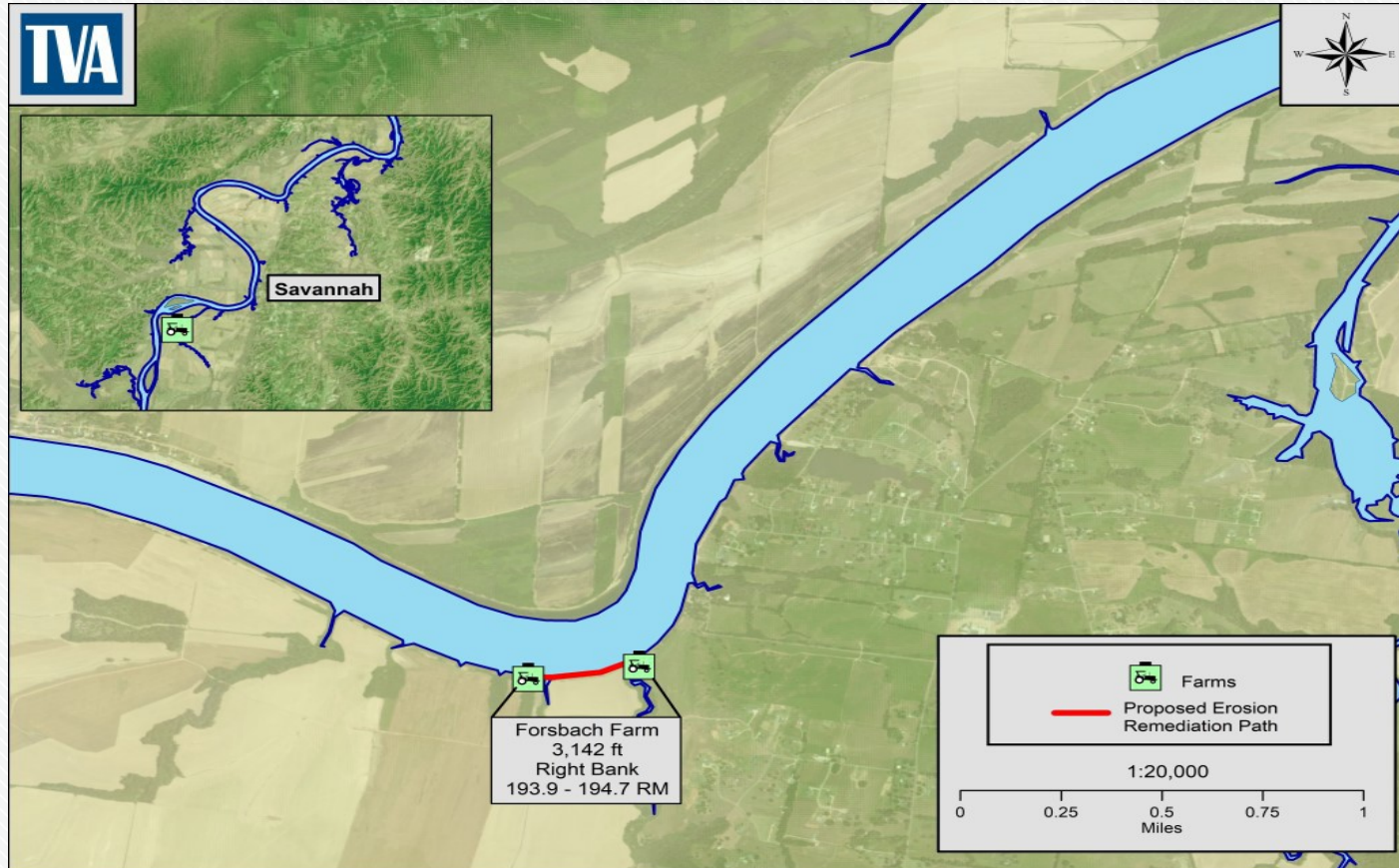


# Farms Located on Tennessee River





# Demonstration Stabilization Project





# Forsbach Before

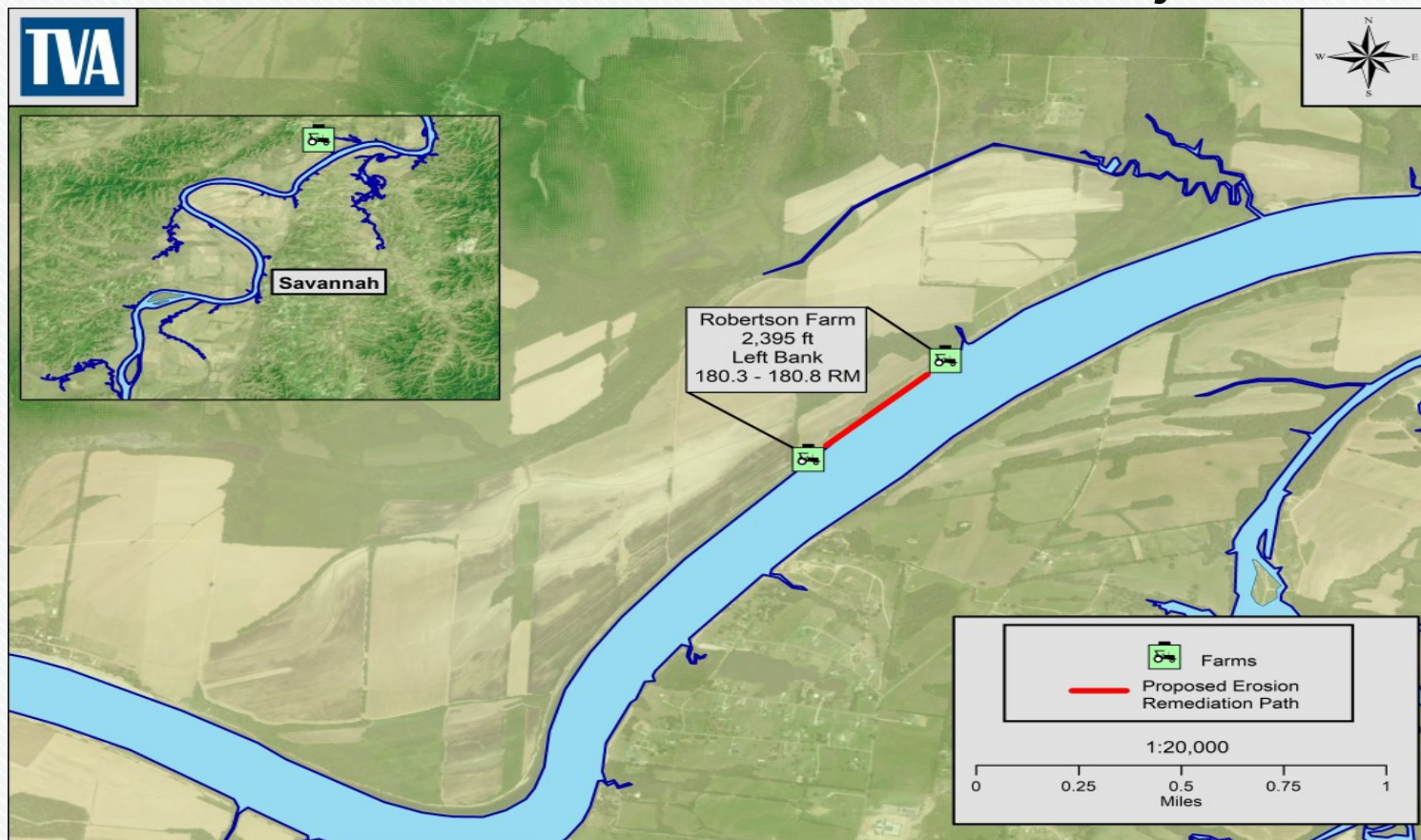


# Forsbach After





# Second Demonstration Project





# Robertson Farm



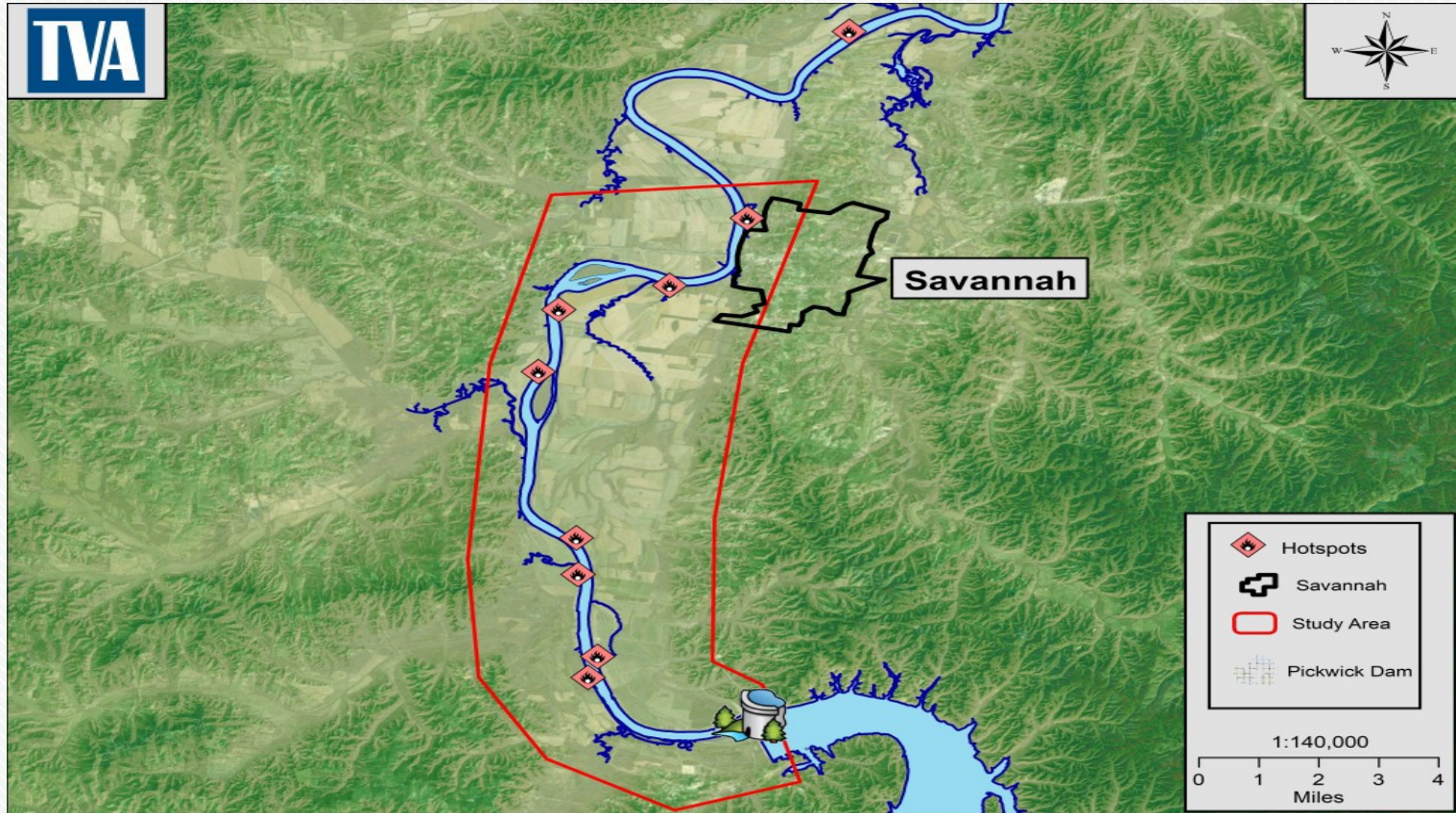
# Erosion Study

- Determine Extent of Soil Erosion
- Identify Hotspots and Collect Shoreline Characteristics
- Determine Soil Strength
- Suggest Best Stabilization Practices



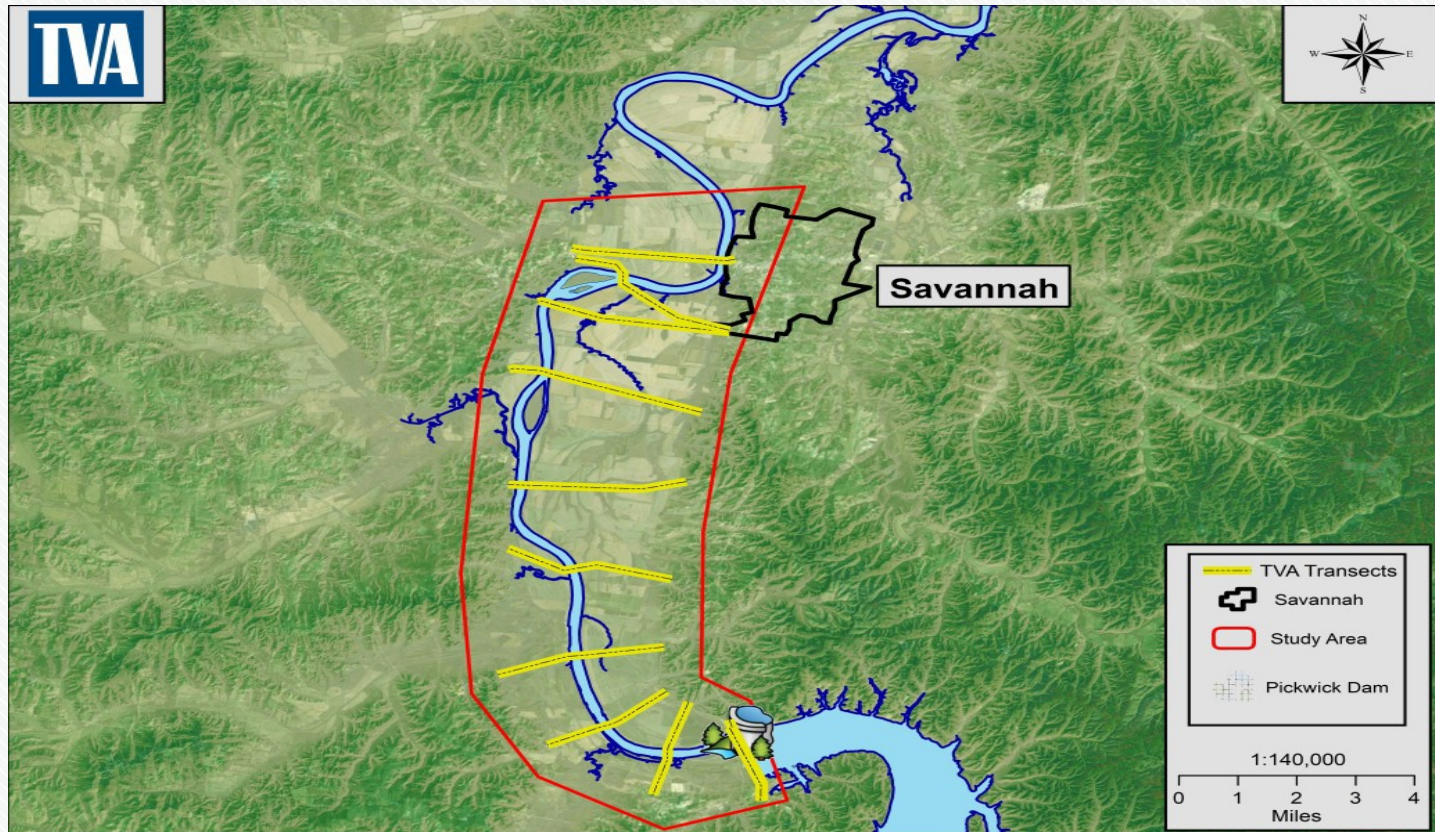


# Shoreline Erosion Hotspots



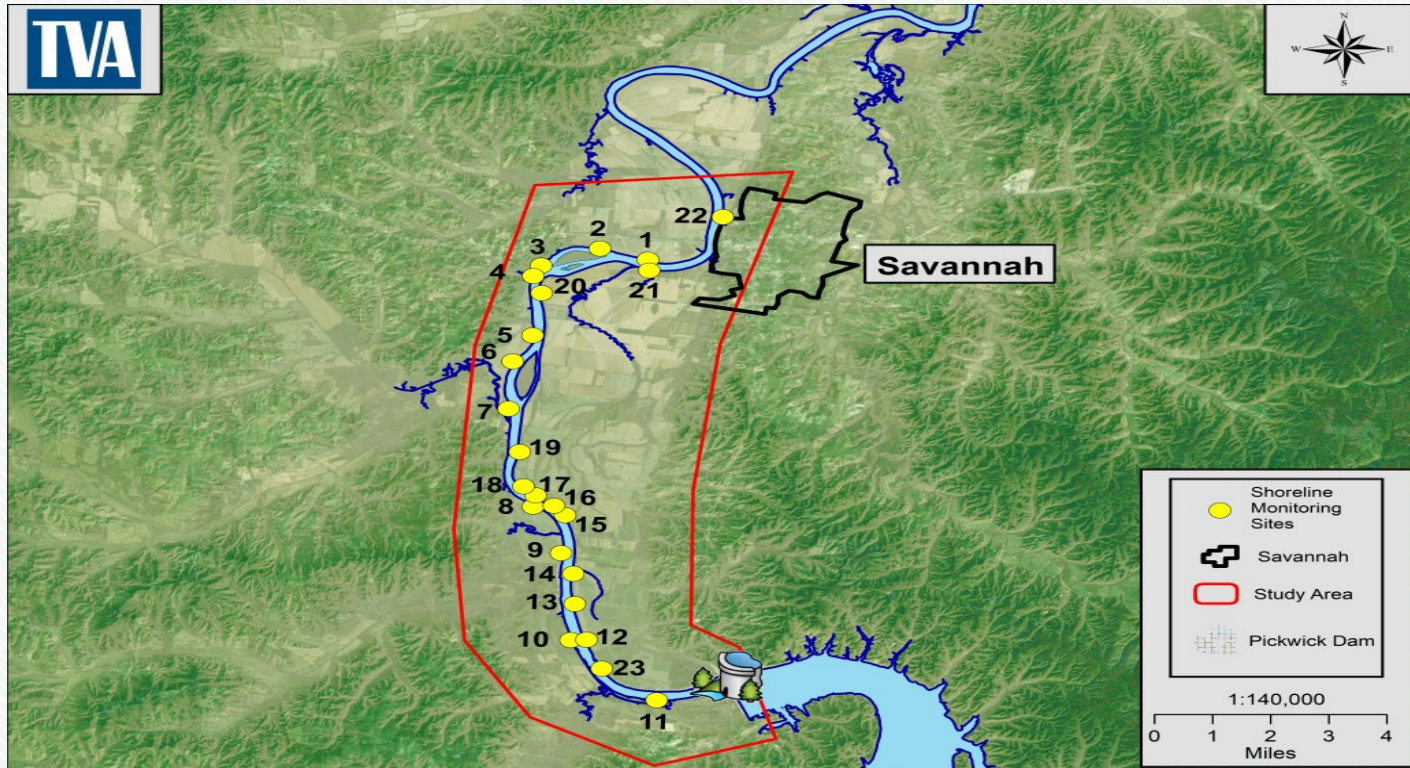


# TVA Transects





# Shoreline Erosion Monitoring Sites



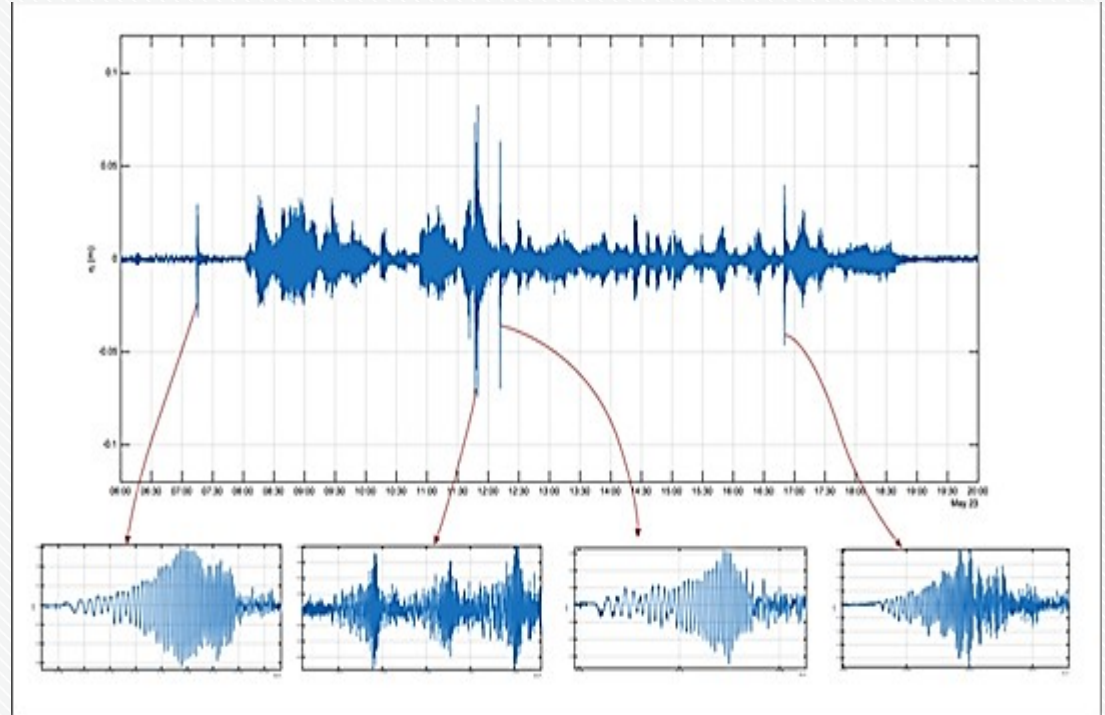


# Soil Resistance to Erosion





# Boat Wakes



# Study Results

- Determine major influences on erosion
- Identify Most Cost Effective Stabilization Practices
- Recruit Additional Partners
- Leverage Additional Resources



# Questions?



# Wrap up and Adjourn

- Field trips bus location
- Breakfast at the hotel
- September meeting date
- Term 11



Lunch Break

Meeting Adjourned for Today

Meeting will reconvene tomorrow, 4/4, at 8:30 am



Day 2



# Regional Resource Stewardship Council

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April 4, 2019  
Kentucky Dam Village Resort



A rectangular photograph with a white border is centered on a dark blue background. The photograph shows a close-up of a wooden plank with a weathered, greyish-brown texture. The word "welcome" is written across the plank in a white, cursive script. The letters are slightly raised, giving the impression of a painted or stenciled message. The lighting is soft, highlighting the texture of the wood and the smoothness of the script.

*welcome*

# Agenda – April 4, 2019

<b>8:30</b>	<b>Welcome and Recap</b>	Liz, Facilitator
<b>8:35</b>	<b>Council Discussion / Form Advice</b>	Council
<b>9:25</b>	<b>Prepare for Public Comment Period</b>	
<b>9:30</b>	<b>Public Comment Session</b>	Liz
<b>10:30</b>	<b>Break</b>	
<b>10:45</b>	<b>Finalize Advice Statement</b>	
<b>11:05</b>	<b>Natural Resources Update</b>	Bucky Edmondson
<b>11:15</b>	<b>By-laws update</b>	Amy
<b>11:30</b>	<b>Wrap Up</b>	Liz
<b>11:45</b>		
<b>12:00</b>	<b>Adjourn</b>	Liz
	(lunch available for Council Members)	

# Day 1 Recap

- Navigation and Flood Control
- Invasive Species
- Erosion Control



# Announcements

- Administrative By-laws updated
- Next meeting date and location
- 11<sup>th</sup> term – April 2020
- Meeting reimbursements



# RRSC Discussion

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Break

Prepare for Public Comment Period



# Public Comment Period

- **Public participation is appreciated**
- **This is a listening session; responses are typically not provided**







# TVA Natural Resources Update

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April 4, 2019

Bucky Edmondson, Director of Natural Resources

# Natural Resources Focus Areas

**Reservoir  
Lands  
Planning**

**Section 26a  
& Land Use  
Agreements**

**Public Land  
Protection**

**Land &  
Habitat  
Stewardship**

**Nuisance &  
Invasive  
Species  
Management**

**Cultural  
Resource  
Management**

**Water  
Resource  
Stewardship**

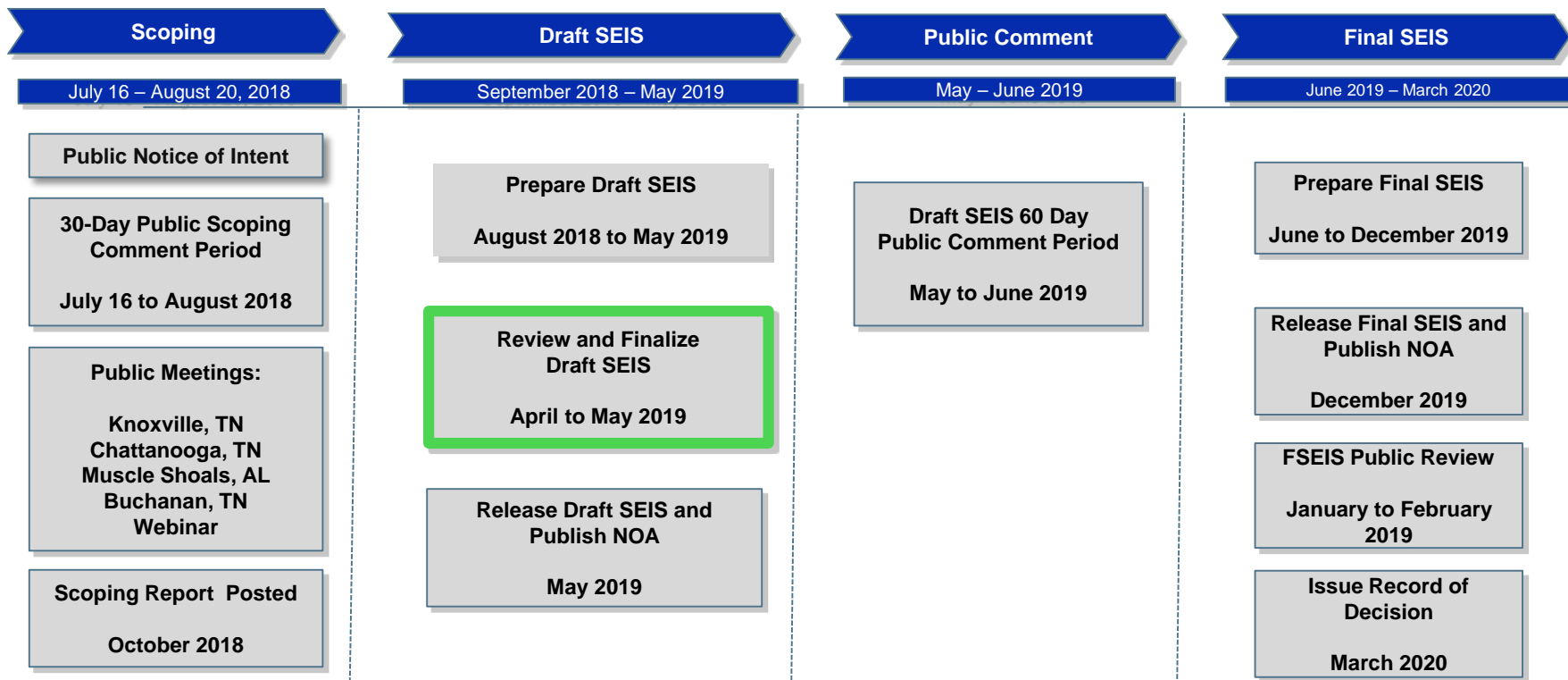
**Recreation**

**Ecotourism**

**Public  
Outreach &  
Information**



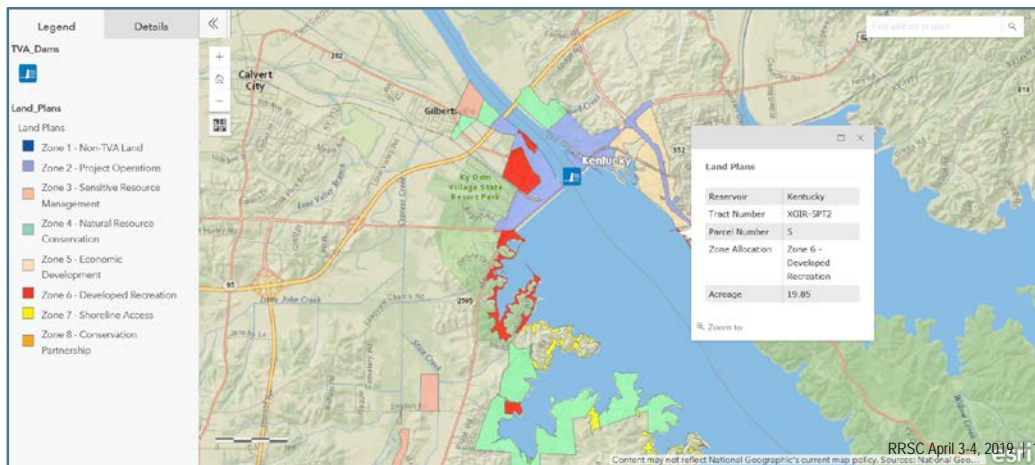
# 2020 NRP Update Schedule



Please note the schedule is subject to change.

# Reservoir Lands Planning

- Watts Bar Reservoir Land Plan Amendment - due early summer
- Tellico Reservoir Land Management Plan - begins in May 2019
- Reservoir Land Planning Viewer Map <https://www.tva.gov/landplans>
  - Interactive land planning zone map with address search box and optional aerial imagery background



# Floating Cabin Program

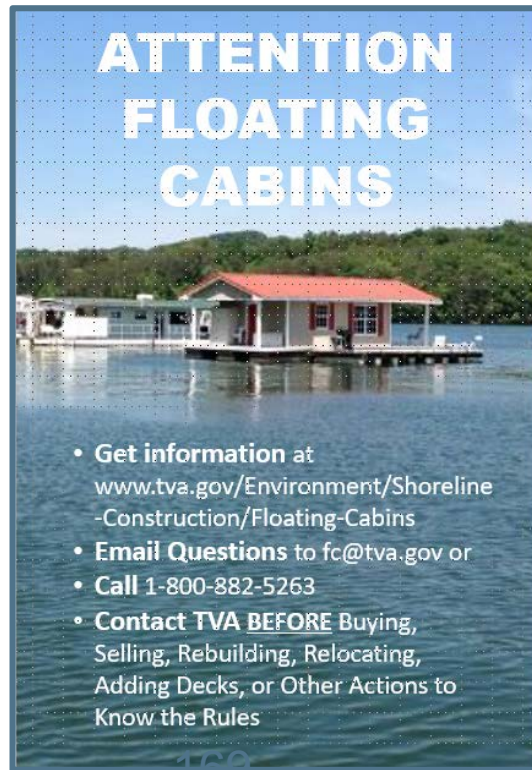
- Phase 1 Rules effective October 1, 2018
- Phase 2 Rules target Summer 2019
  - Electrical, wastewater, flotation, mooring, & compliance fees
  - Permitting, rebuilds, transfers, locations, schedule
- Hardspots for Rules
  - Compliance Fee Amount
  - Enclosing Open Space
  - Attachments





# Floating Cabin Program

- Stakeholder Advisory group
- Engagement and Information
  - Marina visits
  - One on one conversations
  - Updated web pages
  - Informational posters
  - Upcoming summer interactions





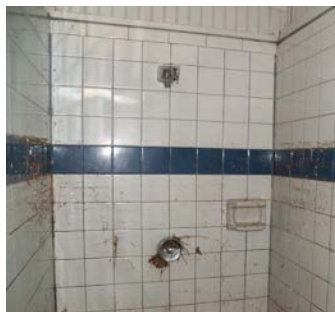
# Flood Damage Assessments

Began assessing TVA properties as soon as it was safe

- Focused on frequently visited areas
  - Campgrounds on Dam Reservations
  - Day use areas
  - Launching ramps
  - Courtesy piers below the dams
  - Dewatering areas
  - Trails
- More remote TVA public lands need assessment

# Flood Damage Impacts

- Anticipate over \$1.2 million dollars to repair flood damaged assets
- Recovery will likely take several years
- High impact areas are located in the West Region in the tailwater areas of Wheeler, Wilson, Pickwick and Kentucky





# Community Engagement

- 18 Reservoir and Community Cleanups with 16 communities
- 300+ Outreach events in 63 communities
- Bassmaster Classic fishing tournament with record attendance
- TVA Science Kids – World Water Monitoring for more than 6,000 children



# Community Engagement

Upcoming activities include

- Hidden Rivers film viewing
- National Geographic Tennessee River Valley film launch
- Volunteer events (Earth Day, Trails Day and National Public Lands Day)
- 41 more cleanups planned



# Community Engagement

Upcoming activities include

- Gunterville HydroFest and fishing tournaments with TVA's mobile aquarium
- Environmental education programs focused on water monitoring
- 300 more outreach events and educational activities planned





# My Lake Guntersville Campaign

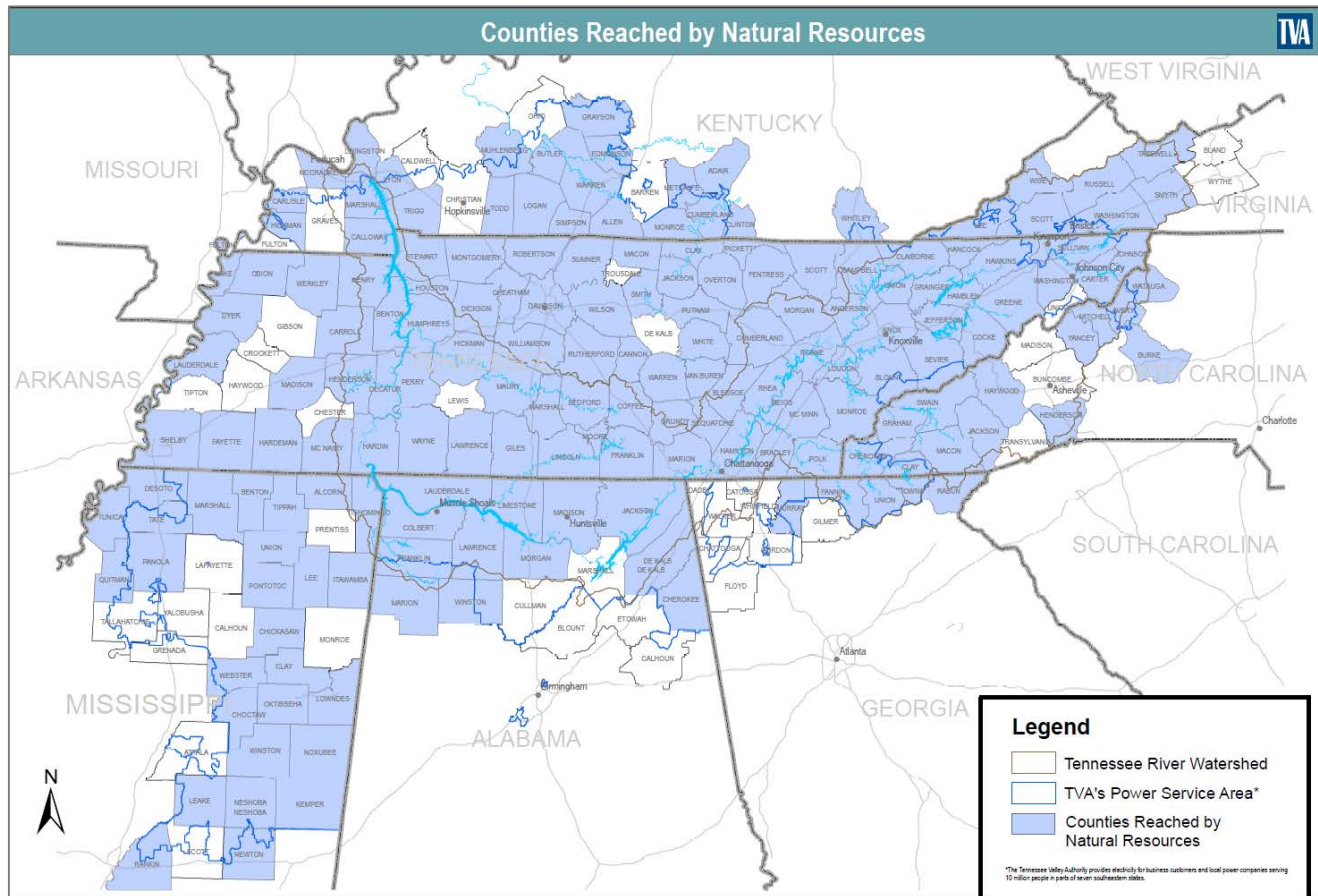
The W.E.T. Foundation and its partners support the protection and preservation of Lake Guntersville.

- Raise awareness and money to address threats to healthy and safe lake
- Manage invasive species including plants, zebra mussels and Asian Carp
- Halt island erosion, water contamination and trash

Ongoing social media campaign that will begin mid-April and run throughout the year as funding permits



# Counties Reached Through Stewardship Efforts





Questions





# Finalize Advice Statement

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# Wrap Up and Adjourn

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*Thank you and please travel safely!*