



Welcome



RRSC Live and Virtual Meeting

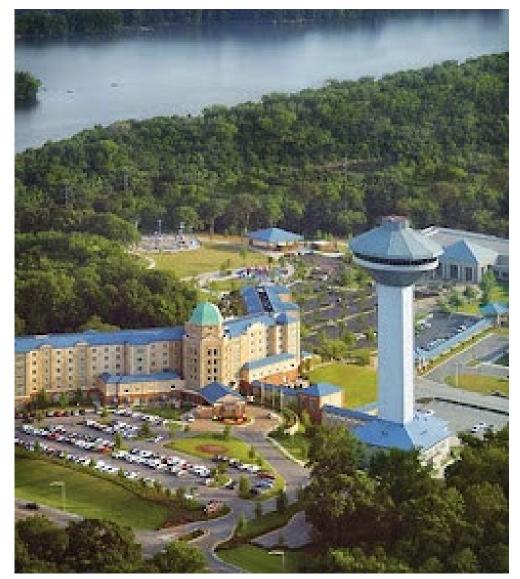
- This meeting is being recorded.
- We welcome members of the public attending virtually. They are in view and listen only mode. There will be a Public Listening Session at this meeting. Written comments are always welcomed (tva.com/rrsc).
- Any RRSC Members who are attending virtually are able to mute and unmute their own line. Council Members who are attending virtually may use the raise hand function to be recognized for questions or comments.
- RERC Members attending in person, please turn on your light when you want to comment and I will call on you. I will identify the person I call on so that those attending virtually will be able to identify the speaker. Please speak loudly so that those in the room and those attending virtually can hear your comments.



Safety First!

In case of fire or other building
 emergency, exit the doors you entered to
 the room. Exit the building via the front
 doors. Turn right and gather outside.

• In case of severe weather, you will be guided to an interior room.





Introductions

Name

Position, Organization, Location

Fun this Spring



RRSC Term 12 Members

Introductions:

Name
Position, Organization, Location
Spring Fun

Ryan Brown

Commonwealth of Virginia

RaeLynn Butler

Muscogee (Creek) Nation

Keith Carnahan

Meriwether Lewis Electric Cooperative

Alan Gates

Pennyrile Electric

Richard Holland

Packaging Corp of America

Cline Jones

Tennessee River Valley Association

Kim Klinker

Klinker Management

Ron Lambert

Nature Conservatory

Whitney Lipscomb

State of Mississippi

Tom Littlepage*

ADECA Office of Water Resources

John McConnell

McConnell Insurance Commonwealth of Kentucky

Will Nelson

Nelson Tractor Co. State of Georgia

Ron Robertson

TN Farmer

* Council Chair

Sen. Clay Schofield

Alabama Senate, District 9

Danette Scudder

TN Valley Public Power Association

Bob Sneed

Retired, Army Corps of Engineers

Catherine Via

TN Farm Bureau Federation

Stacey White

Arab Electric Cooperative, AL

Randy Wiggins

Cherokee County, NC

Greg Young

State of Tennessee



Agenda

RRSC Meeting – Day 1 March 27, 2023 Florence, AL

All times are CT

	All times are O1
1:00 pm	Welcome –Designated Federal Officer Melanie Farrell RRSC Chair Tom Littlepage Vice President, TVA South Region, Jared Mitchem
1:20	Introductions of Council Members – Jo Anne Lavender, Facilitator
	Agenda Review
1:40	FAC Briefing – Kendra Mansur, TVA Attorney
1:55	DFO Briefing – Melanie Farrell
2:15	Break
2:30	TVA Land and Habitat Stewardship Doug White Restoration, Ancient Grasslands Adam Dattilo Water Resource Improvements Shannon O'Quinn Aquatic Conservation Todd Amacker Bats 101 Liz Hamrick Native American Site Protection Erin Dunsmore
4:30	Day 1 Closing Remarks Adjourn

Agenda

RRSC Meeting – Day 2 March 28, 2023 Florence, AL

All times are CT

12:30 pm	Welcome –Designated Federal Officer Melanie Farrell RRSC Chair Tom Littlepage
12:35	Day 1 Recap Facilitator, Jo Anne Lavender
	Day 2 Agenda Review
12:40	Valley Vision 2035 Presentation - Hunter Hydas
1:40	Break
1:45	Public Listening Session
2:45	Break
3:00	River Management Update – James Everett
3:30	Natural Resources Update – Rebecca Hayden
4:00	Closing Remarks Adjourn Day 2



Federal Advisory Committee Act

Kendra Mansur, Attorney March 2023



Agenda

FACA Overview

Balanced Membership

Advice

Ethics

Diverse Views



RRSC

TVA's stewardship activities include the operation of its dams and reservoirs, its responsibilities for navigation and flood control, the management of the lands in its custody, water quality, wildlife and recreation.

From RRSC Charter 12th term



Key Elements of the Federal Advisory Committee Act

Public access

- Meetings (reasonably accessible and timely notice required—generally open to the public)
- Records (available for public inspection, subject to the Freedom of Information Act, etc.)

Structured management

- Filed charters
- Expiration after two years
- Attendance of a federal officer

Balanced Membership

- Diverse representation from the seven states
- Professional or personal qualifications to achieve the mission of regional resource stewardship
- Broad range of diverse views and interests including recreation, flood control, environment, electric power, industrial, navigation, a Federally recognized tribe, and governor nominations.

RRSC Meeting Requirements

Agenda

- Agenda prepared and approved by the DFO, or alternate DFO, in consultation with Council Chair
- 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 a majority of the members of the Council
- Advice requires an affirmative vote of majority of Council members present
- Advice may include minority or dissenting views



DIVERSE VIEWS



§2. FACA - Findings and purpose

(a) The Congress finds that there are numerous committees, boards, commissions, councils, and similar groups which have been established to advise officers and agencies in the executive branch of the Federal Government and that they are frequently a useful and beneficial means of furnishing expert advice, ideas, and diverse opinions to the Federal Government.



TVA Update

Melanie Farrell, Designated Federal Officer



New TVA Board Members

Joe Ritch

Wade White

Michelle Moore

Beth Geer

William Renick

Robert Klein





TVA Land and Habitat Stewardship

Doug White, Manager, Biological Compliance





Agenda

Restoration of Ancient Grasslands at Little Cedar Mountain, Nickajack Reservoir —Adam Dattilo, TVA Sr. Program Manager, Biodiversity

Water Resource Improvements in the Paint Rock Watershed —Shannon O'Quinn, TVA Sr. Water Resources Specialist

Aquatic Conservation in Bear Creek, Alabama
—Todd Amacker, TVA Aquatic Endangered Species Biologist

Bats 101
—Liz Hamrick, TVA Terrestrial Zoologist

North American Site Protection in North Alabama
—Erin Dunsmore, TVA Sr. Archaeologist



Restoration of Ancient Grasslands at Little Cedar Mountain –Nickajack Reservoir

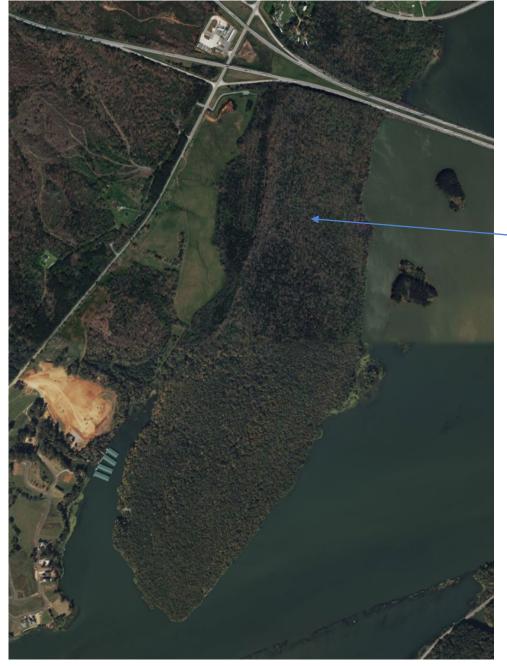
Adam Dattilo
Senior Program Manager, Biodiversity





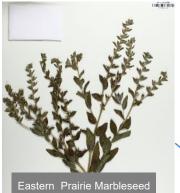




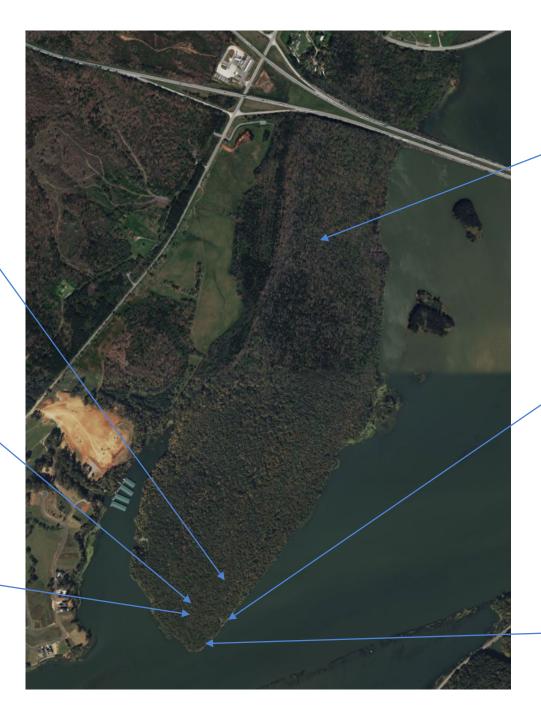


















Where are the rare species? Mostly in habitats like this...





Where are the rare species? Mostly in habitats like this...





Now almost all areas look like this...





Little Cedar Mountain Restoration

Project Objective – Restore former grassland habitats along the southern portion of Little Cedar Mountain

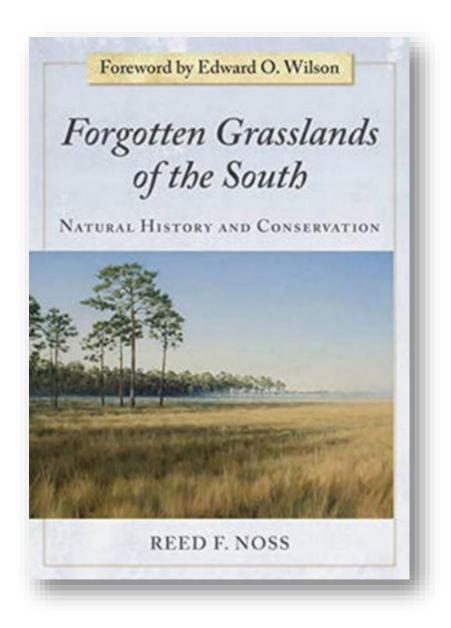
Benefits:

- Protect imperiled plant species
- Encourage pollinating insects
- Provide bat habitat
- Educate the public about resource management

How?

 Hand-clearing of trees, selective application of herbicide, prescribed fire





Published in 2012, scientific case study of some of the biologically richest and most endangered ecosystems in North America.

Tells the story of how southern grasslands arose and persisted over time and addresses questions that are fundamental for conserving these vital yet poorly understood ecosystems.





ORIGINAL RESEARCH

Open Access

Litter to glitter: promoting herbaceous groundcover and diversity in mid-southern USA oak forests using canopy disturbance and fire



Andrew L. Vander Yacht^{1*}, Patrick D. Keyser², Seth A. Barrioz², Charles Kwit³, Michael C. Stambaugh⁴, Wayne K. Clatterbuck³ and Ryan Jacobs⁵

Abstract

Background: In oak-dominated communities throughout eastern North America, fire exclusion and subsequent woody encroachment has replaced the "glitter" of once robust and diverse wildflower and grass layers with leaf-litter dominance. Restoring the important herbaceous components of Eastern oak ecosystems could involve pairing heavy canopy disturbance with growing-season fire, but potential negative effects warrant research. Beginning with 20 ha replicates of closed-canopy forest at three sites across Tennessee and North Carolina, USA, we monitored groundcover response to combinations of thinning (none; light: 14 m² ha⁻¹ residual basal area; and heavy: 7 m² ha⁻¹) and seasonal fire (none; March: pre leaf expansion; and October: pre leaf abscission) from 2008 to 2016.

Results: Before treatments, woody plants and leaf-litter-dominated groundcover and herbaceous plants were rare (<6% groundcover, 118 species). By 2016, herbaceous groundcover averaged 59% after heavy thinning and three



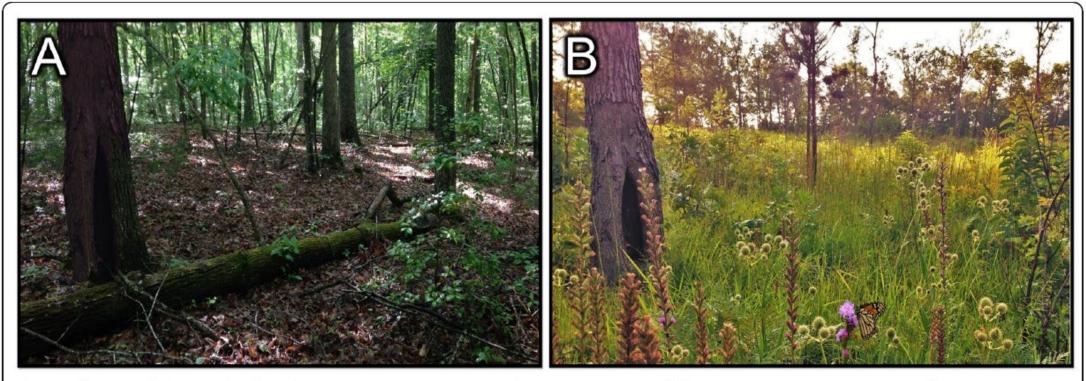


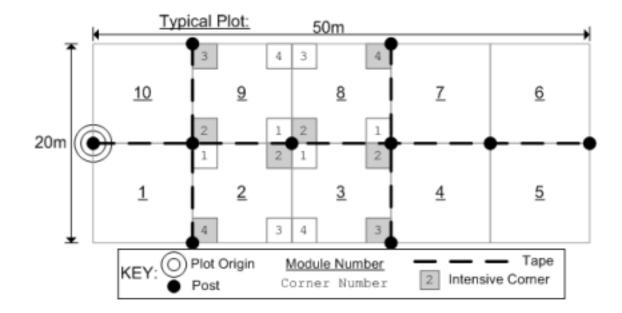
Fig. 4 Influence of oak woodland and savanna restoration on groundcover at Catoosa Wildlife Management Area near Crossville, Tennessee, USA. Panel **A** depicts pre-treatment conditions in 2008, and panel **B** depicts response by 2016 after thinning to 7 m² ha⁻¹ residual basal area and burning in October three years (2011, 2013, and 2015). Photographer was lead author A. Vander Yacht



Research and Restoration: Collaboration











On-the-ground Activities



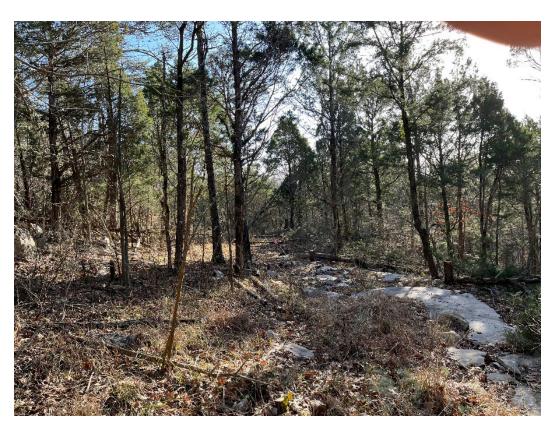


Selective clearing in 2019, more extensive tree cutting in January 2023



Limited tree clearing





2017 2023



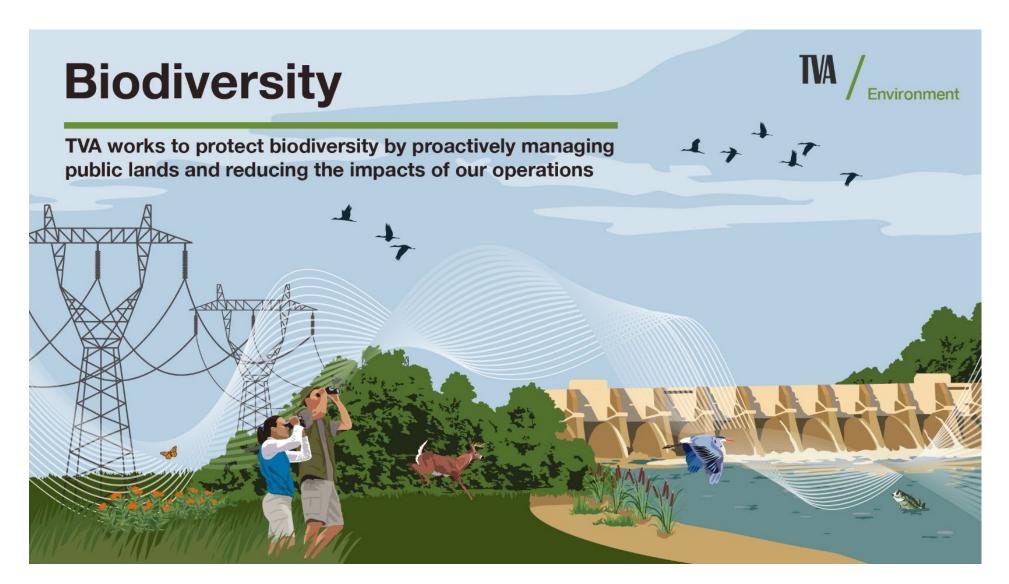
Early Results & Next Steps

- No quantitative data yet, but sun-loving wildflowers and grasses are more abundant than before
- Removed invasive plant populations
- Populations of blazing star and eastern prairie marbleseed are flowering and reproducing at new locations
- These positive results are with modest trees clearing and before implementation of prescribed fire
- If weather cooperates, planning to conduct prescribed fire in summer 2023

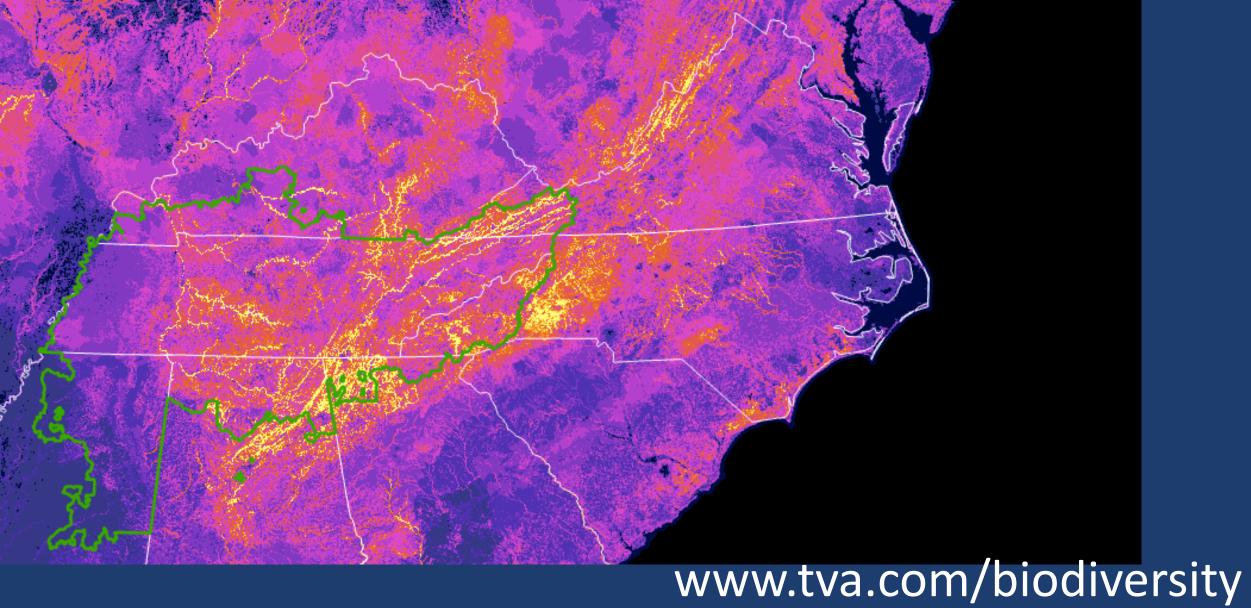


Fruiting eastern prairie marbleseed



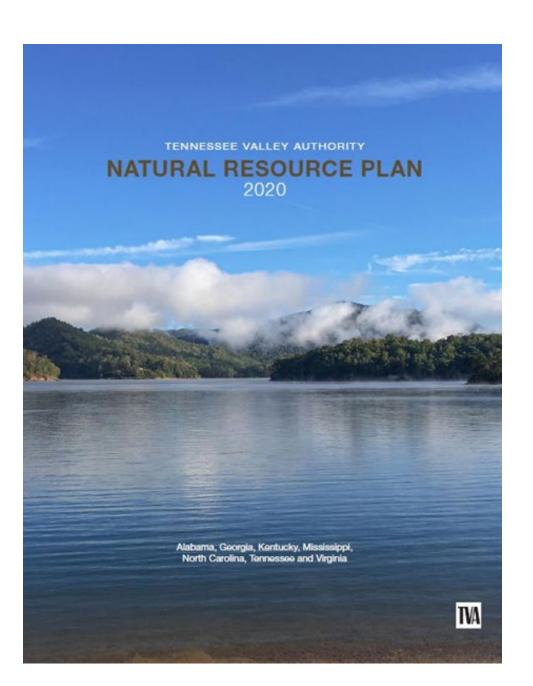










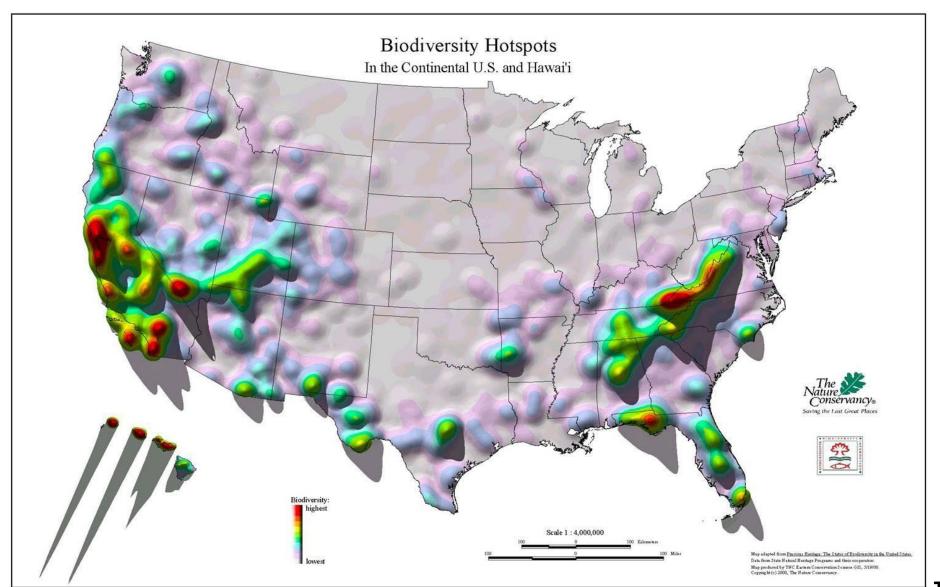




Natural Resource Plan

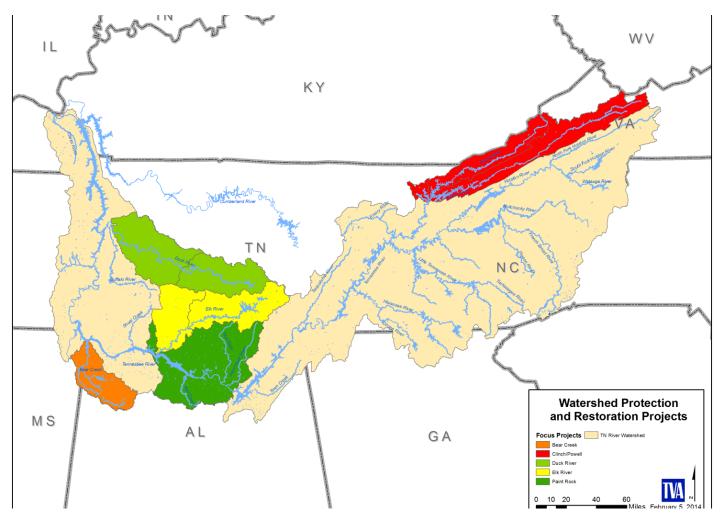
Nuisance & Section 26a Reservoir Land & **Public Land** Invasive Permitting & Lands Habitat Land Use **Protection Species Planning** Stewardship Agreements Management Cultural Water **Public** Outreach & Recreation **Ecotourism** Resource Resources Management Information **Stewardship**







TVA Focus Watersheds





Improvement Goals

- Provide adequate data for sound decision making
- Identify and build partnerships
- Partner to prioritize watersheds and projects
- Implement projects to protect water quality and biodiversity

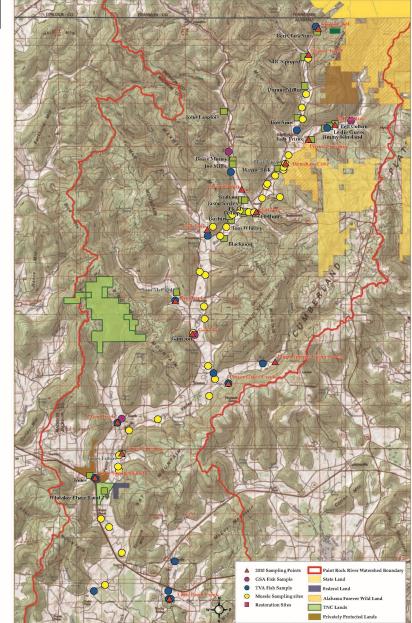




Paint Rock Watershed Jackson County, AL

Biodiversity Hotspot:

- 98 species of fish and about 58 different species of mussel.
- Two mussel species (pale lilliput and Alabama lampshell) and one fish (palezone shiner) are found nowhere else in the world
- Another three imperiled fish (sawfin shiner, blotchside logperch, and snail darter) occur as well.









Stream Assessments

Assessed fish communities at 15 different locations, conducted mussel surveys at 37 sites, and walked/floated over 80 miles of stream to identify barriers and eroding streambanks.

Fish Community Monitoring



Mussel Surveys





Aquatic Barrier Removal

Replaced a low water bridge on Estill Fork to provide safe access to the community and restored stream connectivity for aquatic life.

Estill Fork Bridge (Before)



Estill Fork Bridge (After)





Streambank Stabilization

Restoration on 550 linear feet of streambank utilizing bank grading, toe protection, erosion matting, and riparian plantings of native seedlings and grasses over 0.3 acre to help secure the streambank and the footprint of the project

Pre-restoration



Ongoing restoration





Accomplishments

Implemented over 42 Conservation projects

Established approximately eight miles of riparian buffer

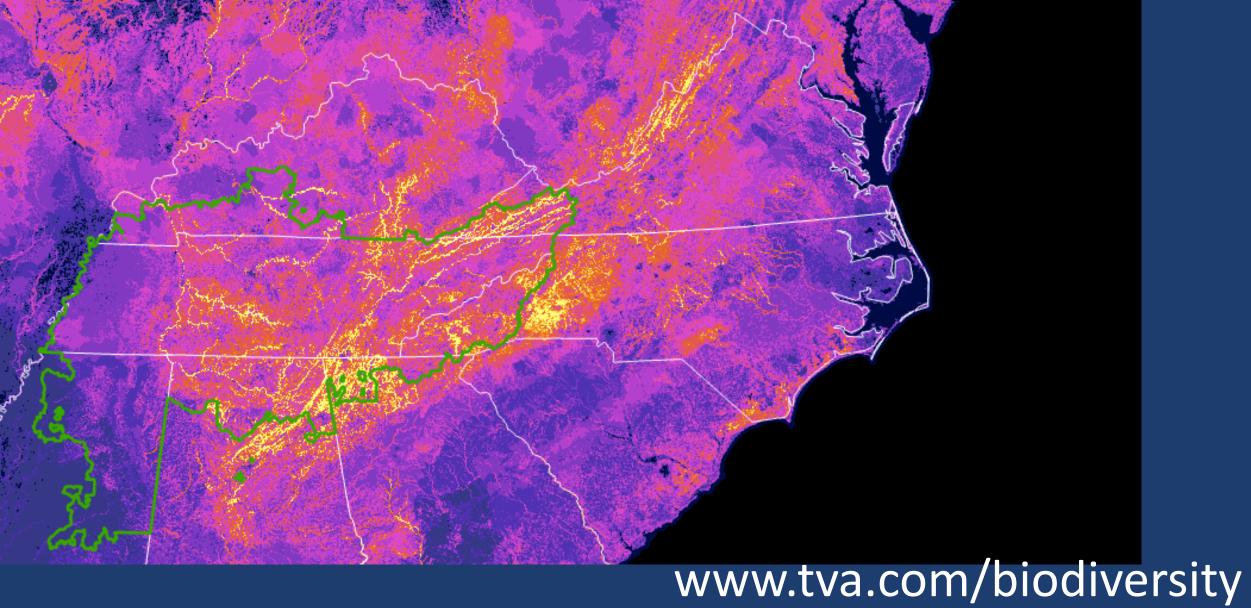
Planted 35,000 hardwood trees

Acquired 30,000 acres of conservation lands

Reintroduced over 1000 freshwater mussels











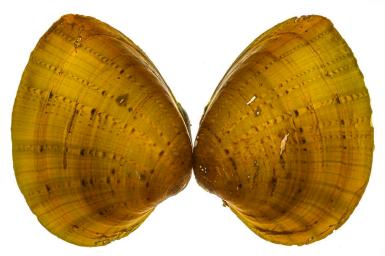
Routine Operations Consultation Compliance (ROCC)





Why Do Mussels Matter?

"The Livers of the Rivers..."









How Do They Reproduce?







In Action!





Mussel Monitoring in Bear Creek



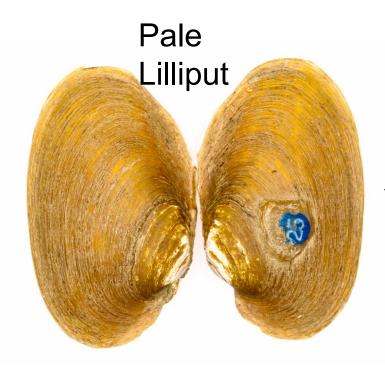


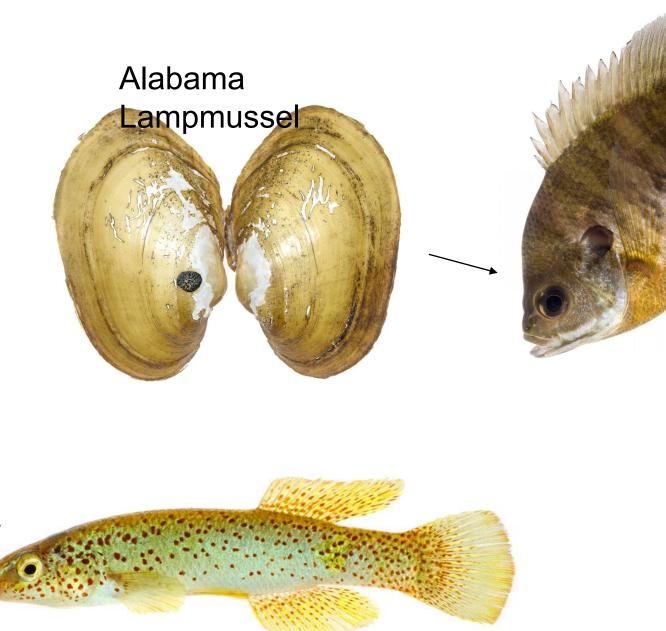
Conservation Hail Mary





Working With Partners













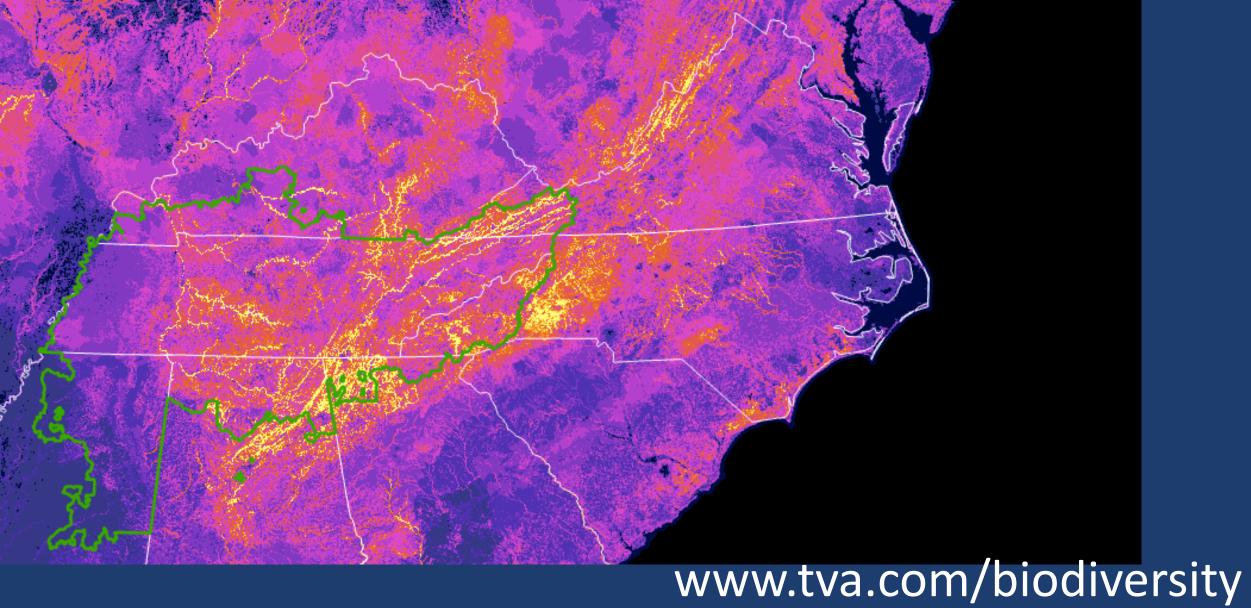




THE UNIVERSITY OF ALABAMA®











1300+ species of bats worldwide

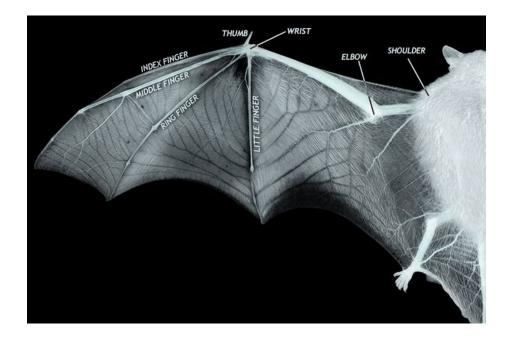
47 species in United States

- 16 Alabama species

Class: Mammals

Order: Chiroptera

■ Chiroptera = Latin for "Hand Wing"











Where do Bats Live in the TVA Region?



Where do Bats Live in the TVA Region?

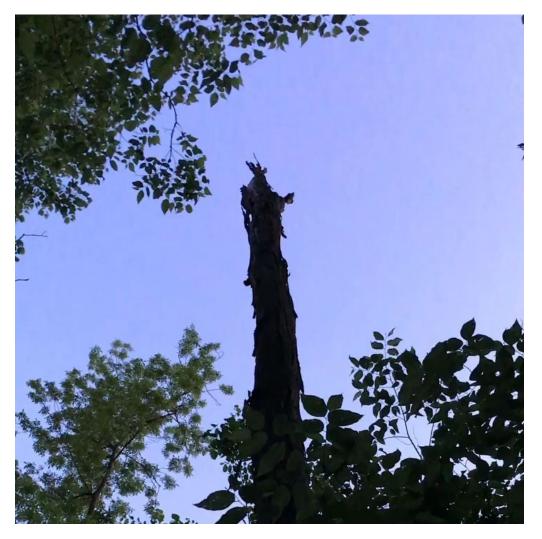


Where do Bats Live in the TVA Region?





Emergence count on an Indiana bat roost tree





Federally Listed Bats in the TVA Region

Listed under the Endangered **Species Act:**

- Gray batIndiana bat
- Northern long eared batVirginia big-eared bat

Expected to be listed in 2023 & 2024:

- -Tri-colored bat
- -Little brown bat

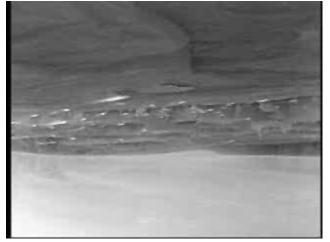




What are we doing to help?









Habitat Restoration

Invasive species management, forest management, prescribed burning

Artificial Roosting Structures

Brandenbark poles

Research

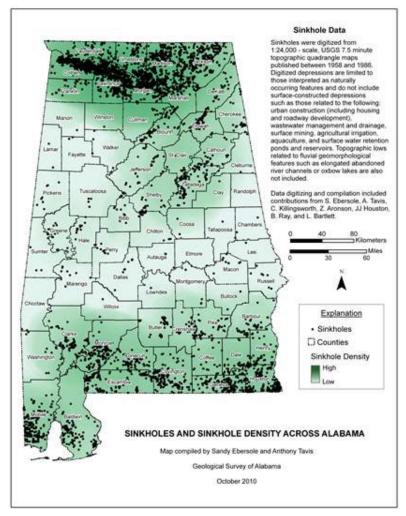
Telemetry studies, WNS monitoring studies, migration studies, graduate research funding, annual monitoring

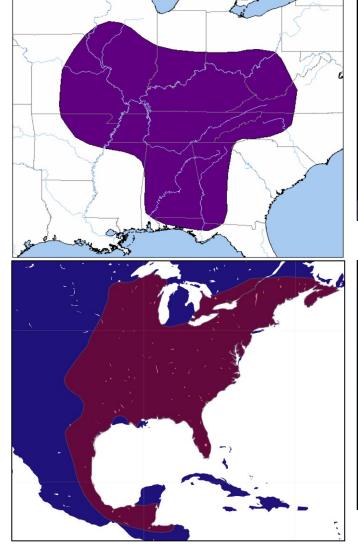
Cave Gating

Protects bats from human disturbance while roosting in caves



What are we doing to help? – Cave Protection







Gray Bat – Endangered



Tricolored Bat – Endangered



What are we doing to help? - Cave Protection



- Key Cave Partnership with USFWS
- Collier Cave
- Gray Bats and Tricolored Bats
- Cultural Resources



Key Cave

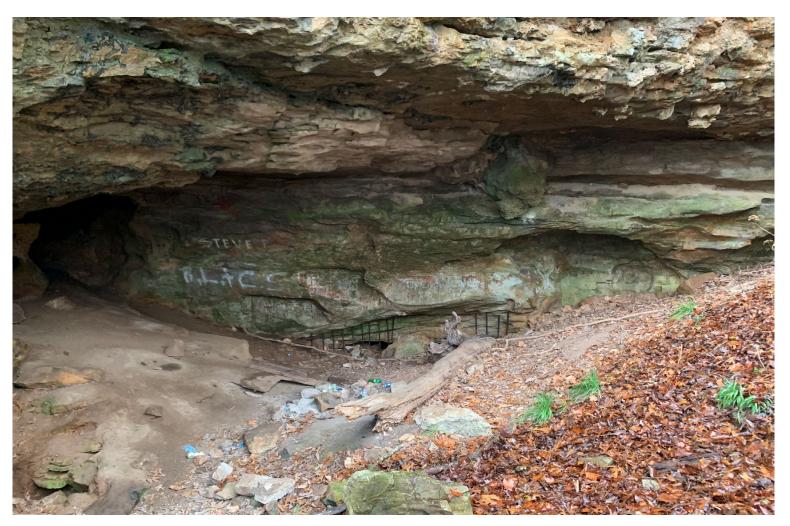
- National Wildlife Refuge
- Endangered Bats
- Alabama Cave Fish only population
- Cultural Resources





Collier Cave

- Mined for Saltpeter
- Heavily Visited
- 96% Decline Tricolored Bats
- Gray Bat Use
- Cultural Resources
- 2023 Bat Survey is promising!

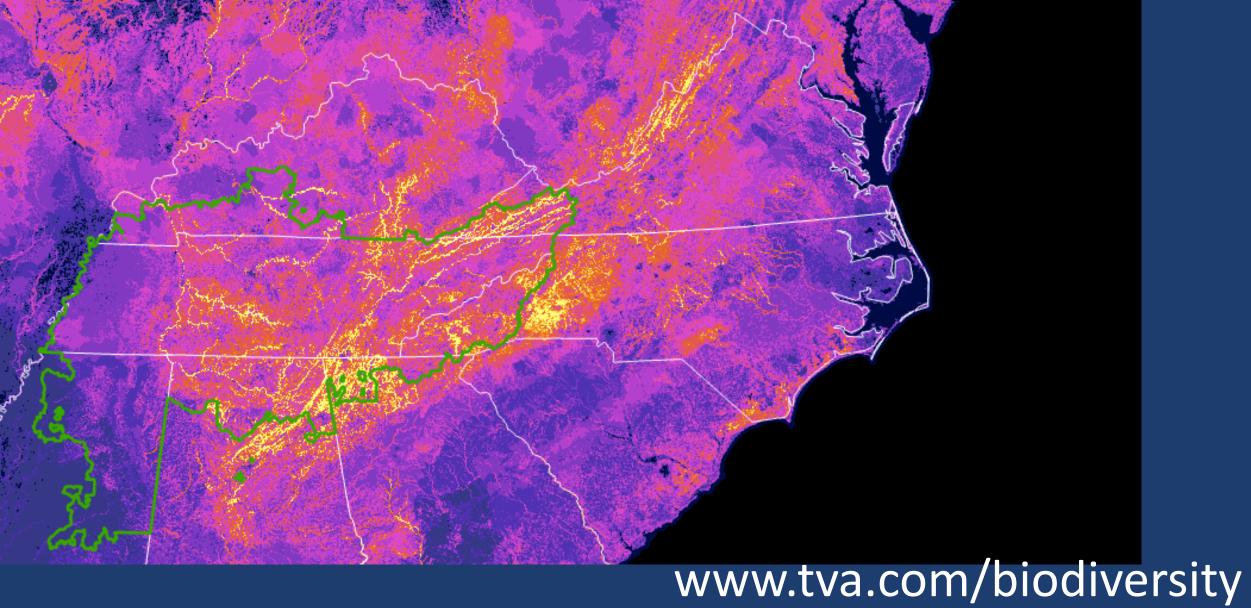




Video: Collier Cave Protection Process









Native American Site Protection in North Alabama

Erin Dunsmore TVA Senior Specialist, Archaeology



TVA Cultural Program

- Consult with Federally Recognized
 Indian Tribes Government to Government
- Engage and Partner with Tribes
- Manage and Protect Native American Sacred Places
- Manage and protect over 12,500 archaeological sites on TVA land
- Federal Laws and Regulations
 - National Historic Preservation Act
 - Archaeological Resource Protection Act
 - Native American Graves Protection and Repatriation Act





Manage and Protect

TVA has many program areas focused on the management and protection of Native American resources:

- Preservation Program identify, evaluate and manage
- Archaeological Site Monitoring & Protection
 Program prioritize resources for protection
- ARPA Enforcement Program –Cultural Compliance works with TVA Police to enforce criminal violations of the law
- Thousand Eyes Archaeological Outreach
 Program engage public on need to protect
 these important places





Addressing Looting: Tribal Consultation Meeting 2019

- TVA hosted ARPA consultation meeting in Huntsville Alabama
- Six Tribes present
- Discussion between TVA and Tribal representatives about ways to stop the on-going looting problem
- Ramping up outreach efforts in Lauderdale/Colbert County region
- Discussion on permanent protection measures at five sites where desecration and vandalism had occurred



Challenges

How do we protect the site without impacting additional ancestral remains?

How can we avoid drawing further attention to the site?

How can we ensure that these efforts would be successful?

Caves located in areas difficult to access with equipment.

Would capping/permanent closure be considered an adverse effect under Section 106 of the National Historic Preservation Act?



Cave Protection Measures

- Equipment and materials brought by barge
- Entrances filled with cellular concrete held in place with forms
- Metal mesh secured around the entrance to the cave – no ground disturbance conducted
- Shotcrete sprayed on surface of metal mesh to provide 3rd barrier



Other Protection Measures

- Equipment and materials brought by barge
- Site protected with wetland mats and tracked equipment
- Metal mesh installed
- Rock (6-12 inches in diameter) laid 12-18 inches high



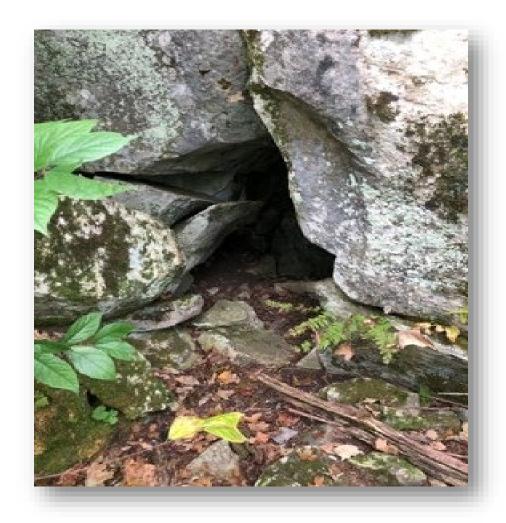












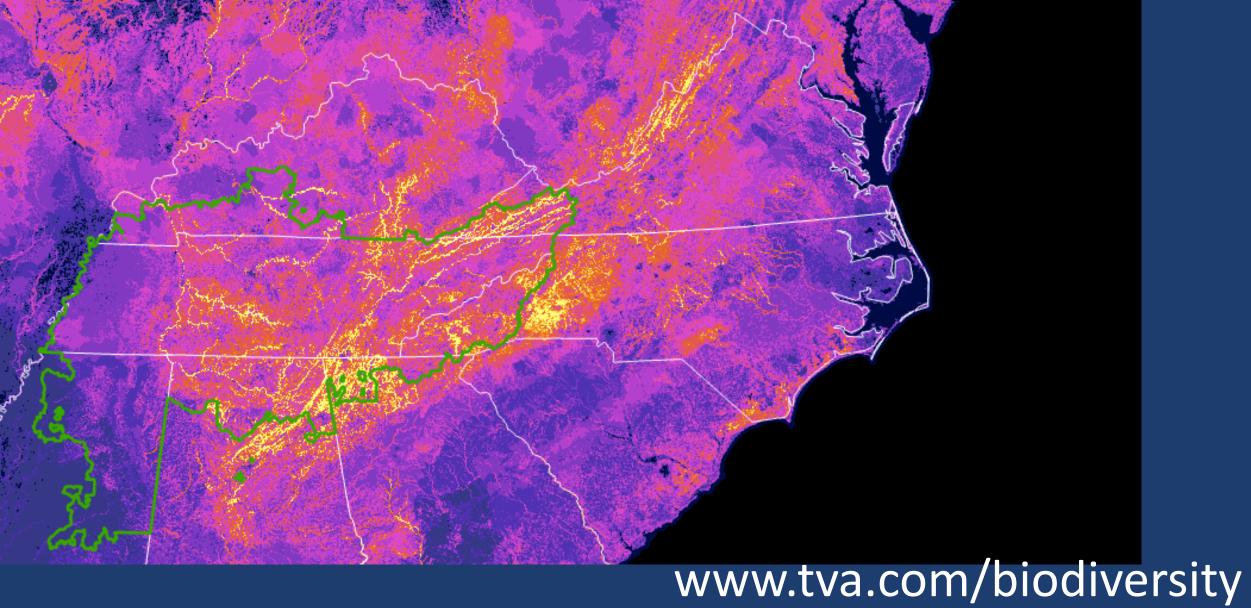














BREAK



Closing Remarks



Adjourn

Day 2 RRSC Meeting
Begins at 12:30 pm Central







Welcome



Day 1 Recap



Agenda

RRSC Meeting – Day 2 March 28, 2023 Florence, AL

All times are CT

12:30 pm	Welcome –Designated Federal Officer Melanie Farrell RRSC Chair Tom Littlepage
12:35	Day 1 Recap Facilitator, Jo Anne Lavender
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3:00	River Management Update – James Everett
3:30	Natural Resources Update – Rebecca Hayden
4:00	Day 2 Closing Remarks Adjourn



Valley Vision 2035:

Developing the Vision for the Valley Public Power Model

Hunter Hydas

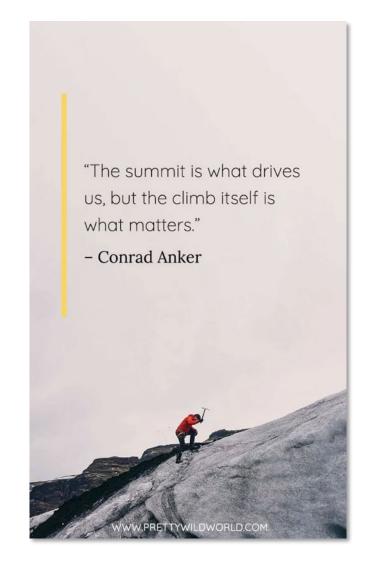
RRSC Update

March 28, 2023

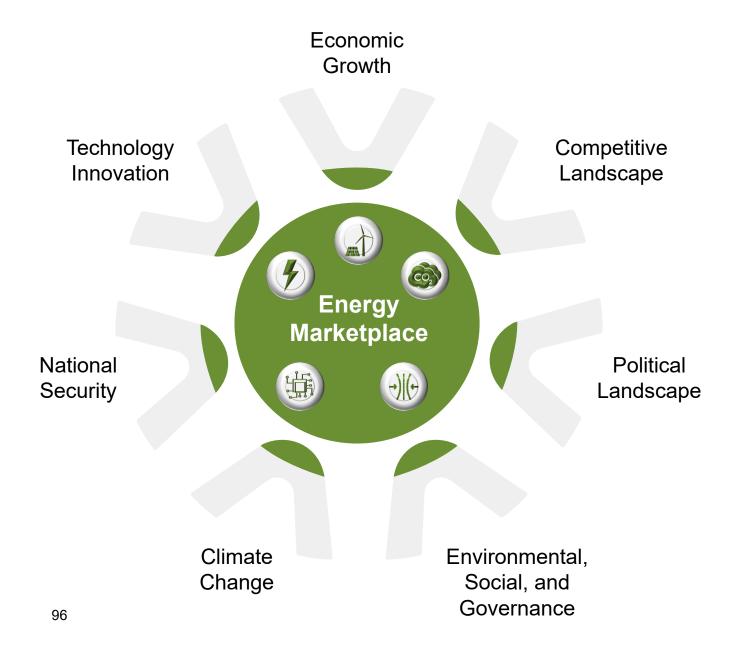


Today's Meeting

- Create an understanding of the need for Valley Vision 2035
- Provide an overview of the approach, schedule, and process
- Discuss current progress and the path ahead
- Align on RRSC roles in relation to Valley Vision 2035
- Discuss how Valley Vision 2035 fits together with the Integrated Resource Plan







Why Valley Vision 2035?

Market forces are reshaping and evolving the energy marketplace at rapid speeds:

- Decentralization
- Decarbonization
- Electrification
- Digitization
- Resiliency



Goal of Valley Vision 2035



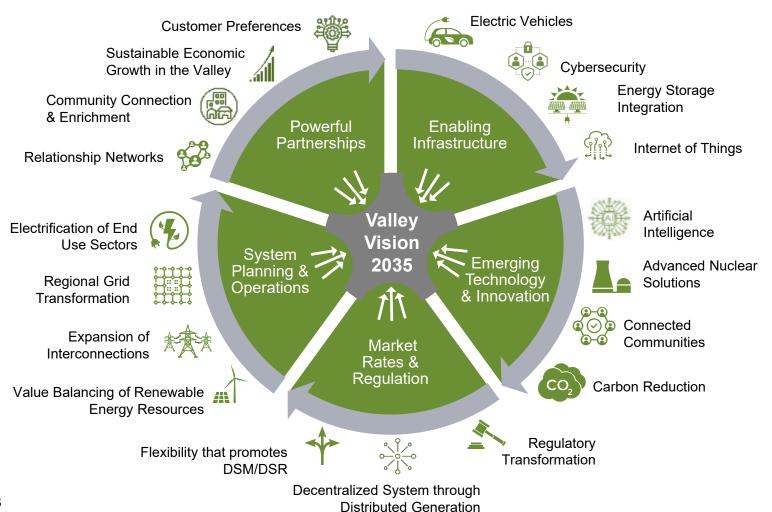
The energy industry is ever-changing, and the customer marketplace is experiencing unprecedented and ongoing transformation.

To ensure that we best meet customer needs in the future, we need a collective vision to evolve public power in the region we serve.



Valley Vision 2035 Overview

Valley Vision 2035 is designed to explore the emerging energy industry and community trends and uncertainties and establish a foundation for creating value for the Valley.





Valley Vision 2035 Participants

Collaboration Group

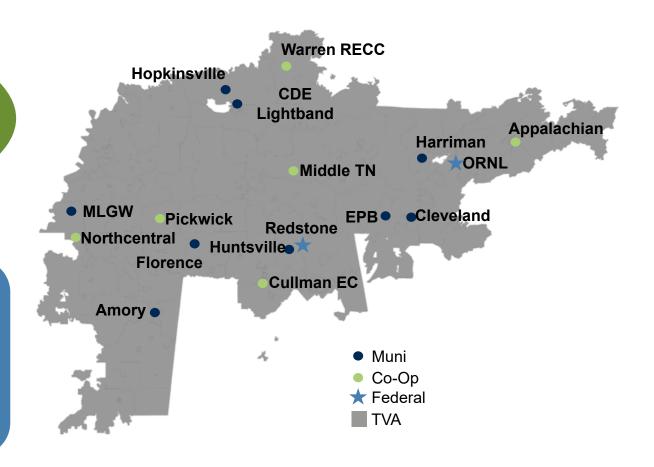
- LPCs
- Large Federal
- Customer Associations
- TVA

Content Partners

- Select energy organizations, e.g., R&D, Consulting, Services, Government, and Associations, etc.
- Valley inflight initiatives

Federal Advisory Committees (RERC & RRSC)

 Comprising members of regional government, customers, academia, and advocacy groups





The Collaboration Group codified the following success criteria for Valley Vision 2035

Align on the Future



- Creates Valley alignment on future industry and marketplace trends that will impact TVA, its Partners, and Customers in 15 years
- Allows us to understand our customers' future needs and expectations and adapt our value proposition to meet them

Align Valley Participants



- Creates a mutual understanding of the differences, opportunities, and potential future disruptions across the entire system (generation through distribution to customer)
- Defines roles and responsibilities to efficiently plan for the future of the Valley

Align on Direction



- Provides direction (accounting for local differences) that is actionable and nimble to prepare for anticipated Valley energy marketplace changes
- Strengthens and optimizes the Valley Public Power Model as a whole



Valley Vision 2035 Approach Key Features



Collaborative

Embraces active learning, listening, and customer engagement



Comprehensive

Utilizes the PECTEL*
framework to identify
future Energy industry and
Valley marketplace trends
and uncertainties



Visionary

Considers plausible future
Energy industry and Valley
marketplace scenarios
while stretching the
bounds



Directive

Translates the future Valley marketplace to specific business model attribute changes and needs

Valley Vision 2035 Approach

*PECTEL: Political/Regulatory, Economic, Customer/Cultural, Technological, Environmental, and Legal



Valley Vision 2035 Approach and Timeline

Step 1: Foundation Step 2: Define Step 3: Construct Step 4: Translate Step 5: Publish **Understand industry** Define factors driving Translate Valley Vision Construct future Valley Document and publish landscape and Valley change and identify 2035 into business marketplace scenarios Valley Vision 2035 foundation trends and uncertainties model attributes December 2021 through June 2022 through December 2022 through March 2023 through July 2023 through July 2022 December 2022 March 2023 August 2023 October 2023



Progress to Date and Path Forward



Key Accomplishments by the Numbers



20

Confirmed Content Partners



3

Components of the Valley Public Power Model defined



15

Collaboration Group meetings conducted (7 remaining)



58

PECTEL drivers defined, discussed, and vetted



33

Presentations covering "Big Picture", Valley Foundation, and various technical topics completed



24

Most impactful drivers on the Valley energy marketplace identified



Confirmed Content Partners

R&D/Consulting/Energy Services

























Associations/Customer











Government/Academia













Valley Vision 2035 Topic Categories



Electricity/Financial Markets

Topics focused on methods to increase customer/consumer access to new technologies and explore energy market and financial options and how others are preparing



Customer and Community Participation

Topics focused on the different ways that groups of customers and communities may participate in the evolving energy marketplace



New Technology Deployment and Grid Integration

Exploration of emerging, future, and disruptive technologies and how they can be optimally deployed and integrated into grid operations



Regulatory, Environmental and Policy Issues (includes ESG)

Exploration of opportunities and challenges relating to technological advances and environmental impacts and identified regulatory and policy approaches to grid modernization with the desired environmental objectives attained



Metering, Communications and Data

Issues related to the current state and future impacts to metering, data collection and frequency, and the communication networks used to support the reliable delivery of energy services



Ratemaking

Exploration of rate alternatives to support the future electricity grid



Reliability, Resiliency and Security

Issues exploring the ability to provide continuous and trustworthy levels of RR&S, notwithstanding the many obstacles and challenges presented with grid modernization



Future Business Model

Exploration of potential ways the utility business and operating model will change to adapt to innovation across the grid



Collaboration Group Meeting Common Themes



Progress

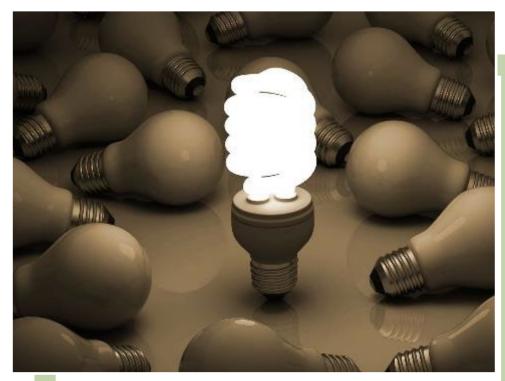
- All Collaboration Group members feel the initiative is progressing well and have enjoyed the meetings, especially in-person
- LPCs will move at different paces when transitioning to meet the future marketplace
- Differences between Co-Ops and Munis are important factors for addressing future marketplace changes
- In the end, we will need to create alignment across all LPCs

"We've created a good foundation but are ready to dive in deeper"

"One size won't fit all"



Collaboration Group Meeting Common Themes (Cont'd)



Key Takeaways

- Electrification, especially EVs and industrial, could present a big challenge for the Valley in a very short time frame
- The future marketplace will require us to be more integrated in our planning processes across the Valley
- The Valley cannot sacrifice reliability and resiliency in pursuit of grid modernization and decarbonization – both are foundational to customer satisfaction and national security
- Flexibility options, in their current form, may hinder the transition to the future energy marketplace
- We'll need to educate end-use customers on the outcomes of Valley Vision 2035 e.g., the value of the Public Power Model and DER deployment policy, benefits, what makes sense for them, etc.

"Most of the future pressure will be on the distribution system"

"Electrification is coming and we can't control the timing"

"We need to prepare our system now to handle the changing marketplace"



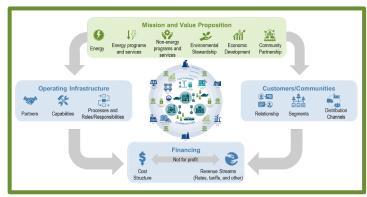
Valley Public Power Model Components

Foundational and Unique Attributes



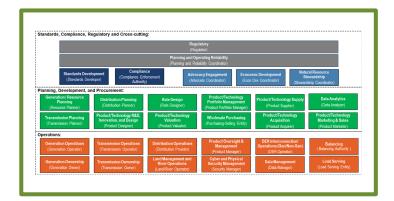
Articulates the foundational and unique features of the Valley Public Power Model that has delivered significant benefit to the Valley for over 85 years

Valley Business Model



Describes how the Valley Public Power Model creates and delivers value, in economic, environmental, social, or other contexts

Functional Roles and Responsibilities



Defines roles and responsibilities to efficiently plan, manage, and operate in the future Valley marketplace

Will not likely change in the future

Will most likely change in the future as the marketplace evolves



Foundational and Unique Valley Public Power Attributes

Mission of Service

Created to transform and economically develop the communities within the Valley which we will continue to do as we prepare for the future

Public Ownership

Owned by and operated for the citizens we serve

Unique Business Model

Self regulated, federally owned/controlled generation and transmission paired with locally controlled Municipalities and Co-Ops

Customer Focused

Dedicated to the singular mission of delivering the highest level of service and value at the least cost to our customers and member-owners for the long-term



Local Control

Local, independent regulation and governance ensures decision-making involves our members and reflect the values of the community

Not for Profit and Low Cost

Excess revenues stay in the local community with access to lower cost tax-exempt financing and less expensive federal generation, e.g., hydro

Natural Resource Stewardship

Provide flood control and protect and enhance the beautiful natural resources of the Tennessee Valley

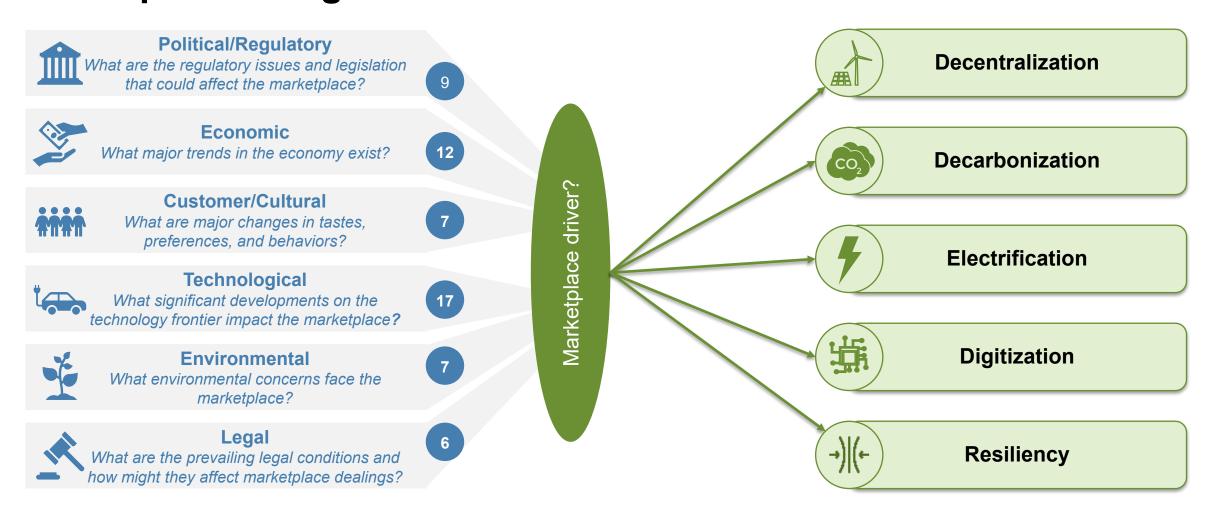
Local Economic Development

Invest back into the communities we serve and attract businesses and industries due to low, stable rates, exceptional reliability, and sustainability





Fifty-eight drivers vetted that will influence one or more of these marketplace categories





Most Impactful Valley Vision 2035 Energy Marketplace Drivers

Legal

- Decarbonization, generation fuel limitations, and renewable mandates
- Transmission access
- Cybersecurity laws

Environmental

- Clean tech waste disposal requirements
- Public or special interest group challenges
- Natural gas opposition, e.g., bans for new hook-ups
- Requirements for permitting and siting

Political/Regulatory

- Environmental legislation and regulations
- Energy market regulations
- Grid (T&D) reliability requirements
- TVA and LPC Board composition/policy

Valley Vision

Technological

- DER and utility-scale generation technology
- Fuel technology
- Transportation technology
- Storage technology
- Load mgmt./grid enabling technology

Economic

- Natural gas prices
- Storage prices
- Supply chain sourcing and efficiency
- Workforce availability

Customer/Cultural

- Valley customer perception related to clean energy
- Consumer expectations regarding data availability, information, insights, and convenience
- Competitor penetration (demand for a "trusted energy advisor")
- Industrial ESG and resiliency decisions



Valley Vision 2035 – The Path Ahead

Key Drivers (Trends and Uncertainties)

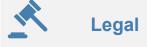












Example Uncertainty Groupings

Decentralization

Decarbonization

Electrification

Digitization

Resiliency

Example Scenarios (illustrative)

What does the Valley energy marketplace look like in each scenario?

Scenario 1	Scenario 2
Scenario 3	Scenario 4

Level of Decentralization

Level of Electrification/ Decarbonization

Potential Business Model Impacts

For each scenario:

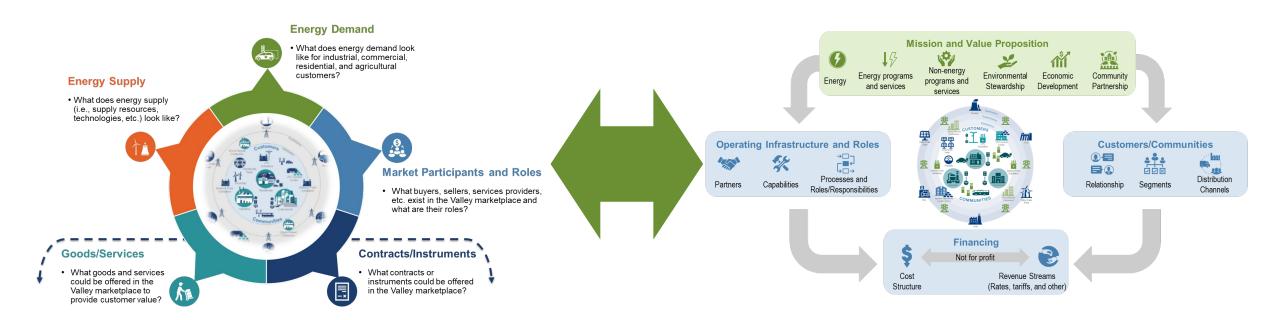
- What new customer needs will we need to satisfy?
- What new capabilities will we require?
- How might roles and responsibilities change?
- What new pricing, rates, and tariff structures or programs will be required?



For each scenario, we will determine how we continue to deliver value in the changing Valley energy marketplace

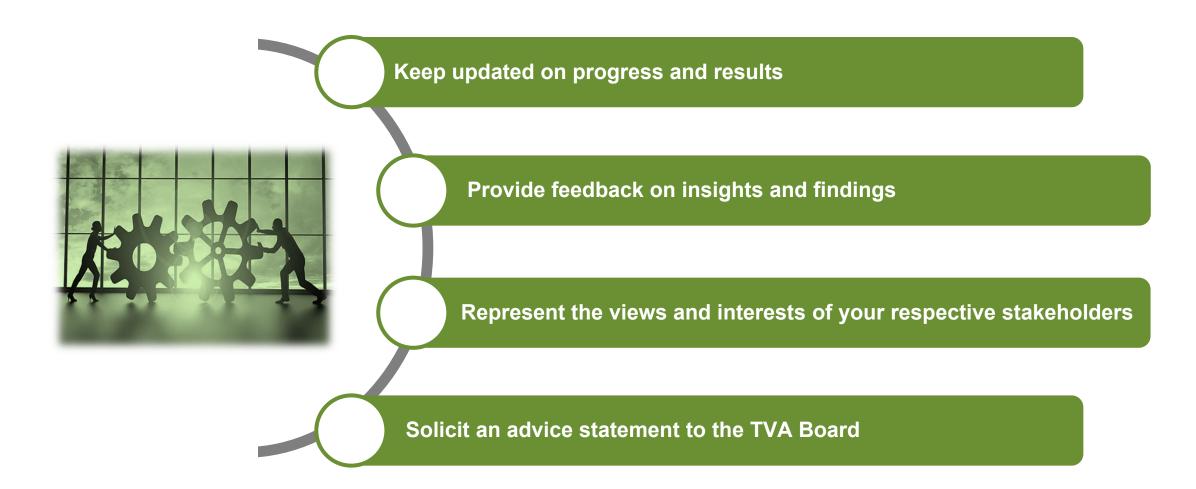
Describes what the Valley energy marketplace looks like in the future for each scenario

Determines how the Valley public power model will need to adapt/change to deliver value in each scenario





RRSC roles in relation to Valley Vision 2035





Relationship to the Integrated Resource Plan



Comparison of Valley Vision 2035 to the IRP

Valley Vision 2035



TVA Integrated Resource Plan

Demand, Customer Marketplace



Supply Portfolio

Explores emerging issues and uncertainties that have the potential to significantly impact our energy marketplace and the operation of the holistic system



Identifies an optimal energy resource plan that performs well under a variety of future conditions

TVA, Valley Partners (LPCs), Customer Associations, and large Federal customers



TVA, LPCs, Customer Associations, industrial customers, non-governmental (energy and environ.), state government/agencies, Research, Academia, Economic Development organizations, and others

No direct involvement; conversation between TVA, Valley customers, and Customer Associations



Direct involvement through public outreach webinars and briefings and open comment periods

Considers plausible future Valley energy marketplace scenarios and translates them to potential Valley Public Power business model attribute changes and needs



Utilizes a least-cost analytical framework and multiple scenarios of the future to determine how potential power generation resource portfolios could perform in different market and external conditions



Valley Vision 2035 Timing Relative to the IRP

Key Valley Vision 2035 Work Products Most impactful Valley energy marketplace PECTEL drivers December 2022 Valley 2035 energy March marketplace scenarios 2023 Potential Valley Public Power June 2023 business model changes October Publish Valley Vision 2035 2023



- Establish IRP Working Group
- Review and discuss Valley Vision 2035 results to-date
- Discuss insights for consideration by the IRP Working Group
- Ongoing Provide updates and solicit feedback

TVA Integrated Resource Plan Process

Develop inputs and framework

Analyze and evaluate

Identify preferred plan/direction



BREAK



Public Comment



This is a listening session; responses are typically not provided



Thank You



BREAK



River Management Update

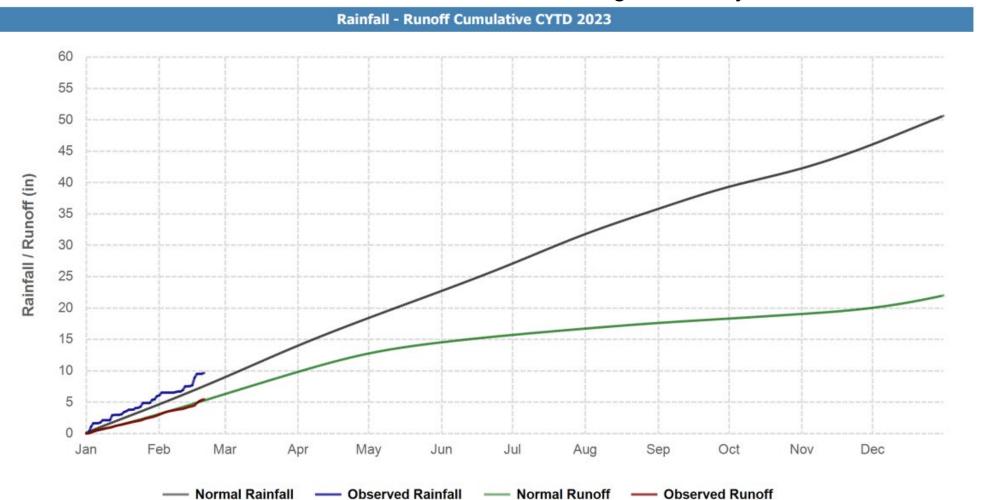
James Everett

March 28, 2023



2023 Rainfall and Runoff

• 128% of normal rainfall and 104% of normal runoff through February 20, 2023





Flood Control

- Saw overall drier conditions in the late fall, transitioned to more normal pattern in winter
- Flood damages averted approaching \$10 billion since TVA inception and averages over \$300 million annually
- Flood Risk
 - Section 26a Permits & National Environmental Policy Act Review
 - Compliance with TVA's Flood and Power Storage Loss Guidelines
 - Compliance with Executive Order 11988
 - Analysis of Executive Order 13690
- Hydrology and Hydraulics
 - Climate Change Study
 - Dam Safety Support
 - Downstream Consequences Analysis (DCA)
 - Semi-Quantitative Risk Analysis (SQRA)
 - Probabilistic Flood Hazard Analysis (PFHA)
 - Nuclear Support

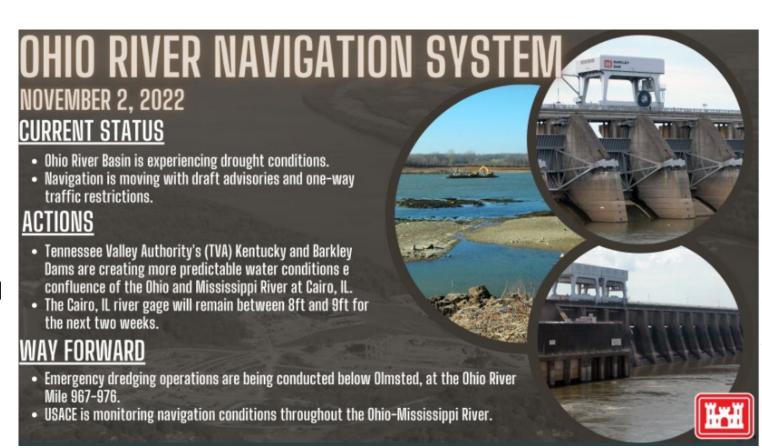






Community Benefits – Navigation

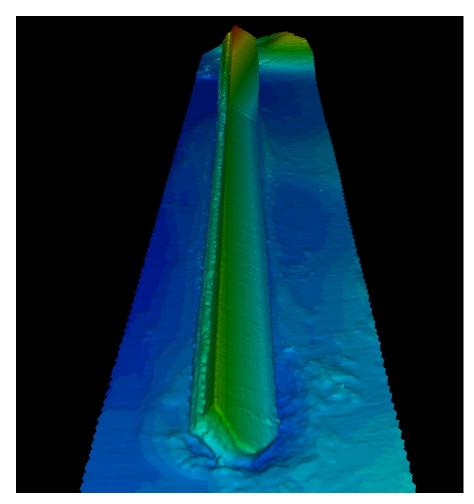
- Releases from reservoirs support the nations inland waterway transportation system through efficient commodity movement
- Supported continued navigation during the 2012 and now 2022 significant drought on the Ohio and Mississippi Rivers
 - The Tennessee and Cumberland Rivers provided more than one-third of the flow down the Mississippi River with only 5% of the drainage area





Navigation - Wilson Lock Guard Wall

- Exploring temporary solutions based on the USACE Engineer Research and Development Center (ERDC) 2-D model analysis using a system of barges, in addition to providing a helper boat to support lock operations
- Exploring funding sources for the guard wall permanent solution
- Communicating with the navigation industry and congressional stakeholders on existing lock restriction impacts and the path forward





Navigation - New Kentucky Lock and Chickamauga Replacement Lock

Kentucky Lock

- Approximately 41% complete
- Total cost estimate is \$1.5 billion
- Total expended: \$644 million
- Completion date: September 2030



Chickamauga Lock

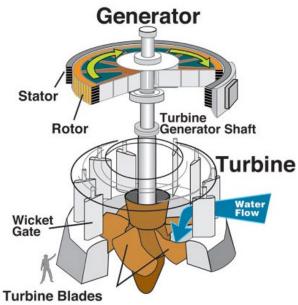
- Approximately 53% complete
- Total cost estimate is \$757 million
- Total expended: \$399 million
- Completion date: under review





Power Generation & Winter Storm Elliot

- 3,538 MW Conventional Generating Capacity (109 Units)
- 1,653 MW Pumped-storage Capacity (4 units)
- Coordinated significant Hydro Generation support during the extreme weather event.
 - Hydro System provided over 136 GWH 12/22 to 12/23
 - Pre-storm strategy, real-time response and coordinated increased releases with stakeholders
 - Spilled water at key locations to realize more upstream energy
- Total Hydro Value realized in CY2022 was over \$923M or almost double a normal year



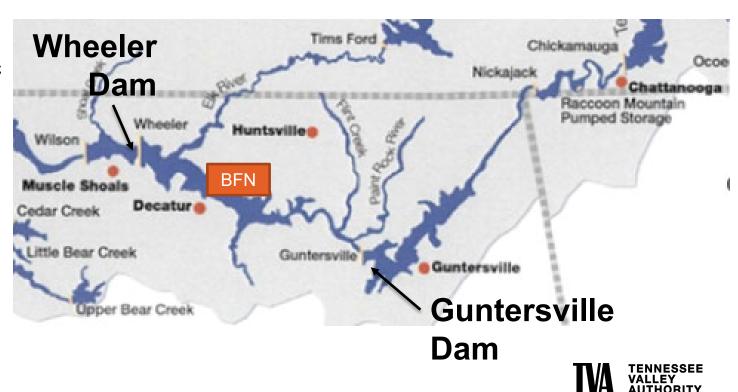






Hydrothermal - Browns Ferry Nuclear Plant (BFN) and Guntersville Dam (GUH) have had significant aquatic vegetation incursions starting in 2019

- Guntersville Reservoir has had abundant aquatic vegetation in the reservoir for many years
- Wheeler Reservoir started having aquatic plant overgrowth issues in 2019
- Wet years with frequent spillway use at GUH allowed plants to travel into Wheeler Reservoir and take root
- Plant volume and dominant species vary from year to year.
- The processes behind this variability are not yet understood



Hydrothermal - Browns Ferry Aquatic Vegetation Incursions

- Summer 2019 started seeing an increase in vegetation at the BFN intake
- July 20-31, 2020 large incursion event induced a forced outage on two units and decreased power on 3rd unit.
- Mechanical harvesters have been removing the weeds to keep the plant operating since 2020
- A raking system installed at the plant intake removes plants the harvesters did not capture
- Aquatic vegetation volume was somewhat lower in 2022--Unsure of the reason for the decrease
- Vegetation detection & removal are a significant cost impact to TVA





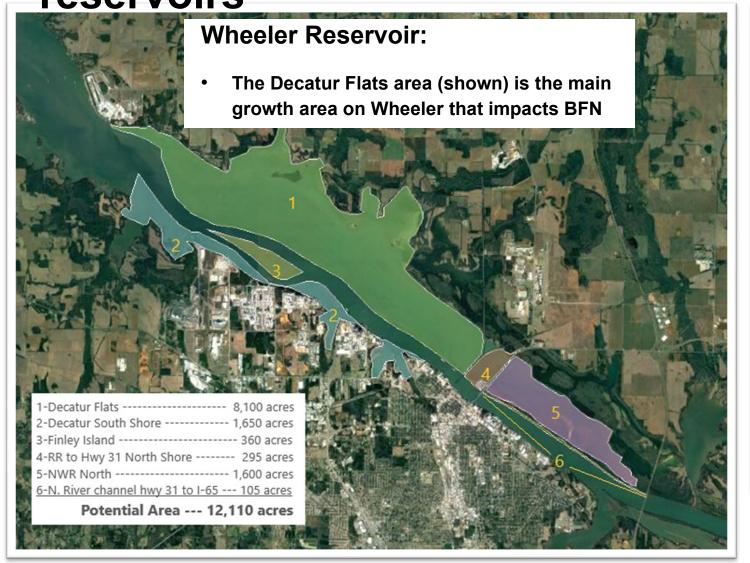
Guntersville Dam experiences clogging of the hydropower units from aquatic plant accumulation against the dam

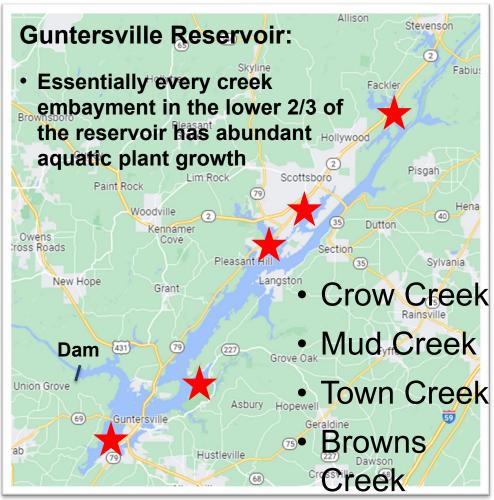


- Vegetation is pulled downward to the turbine intake pipes when turbines are in use, and the trash rack on the intake pipe catches the material and becomes clogged.
- Multiple clogging events occurred at Guntersville Dam and Wheeler Dam over the last 2-3 years
- 2022 Multiple Guntersville hydro units had to be shut down for weeks at a time so the intake trash racks could be cleaned of aquatic plant debris



Hydrothermal - Plants take root in shallow areas in both reservoirs







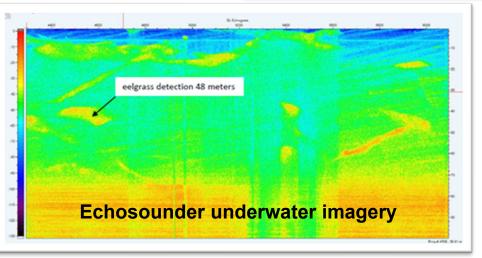
Hydrothermal - Solutions to help the power plants deal with

the aquatic plants

 Evaluating a bubble curtain to install as a plant barrier at Browns Ferry and at Guntersville Dam

- **Bi-weekly field observations** via airboat or helicopter identify vegetation mats approaching the power plants
- Installed underwater "echosounders" in key locations to detect large plant masses moving down the river
- Cameras installed at Guntersville Dam and in several locations near Browns Ferry visually detect aquatic vegetation clumps before they reach the power plants
- Developing a plant growth and travel model of Wheeler Reservoir to forecast of vegetation growth, movement and accumulation
- Evaluating the impact of the zebra mussel population on aquatic plant growth. Mussels influence turbidity in the reservoir. High mussel population years may have higher plant growth rates due to clearer water.

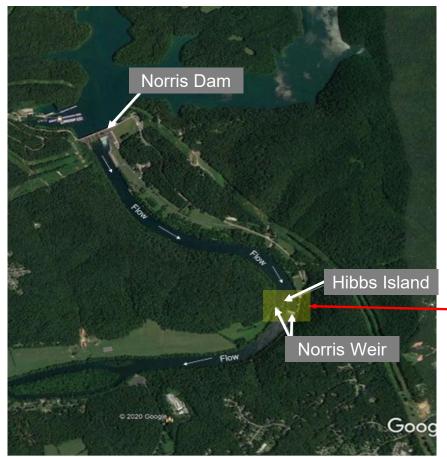




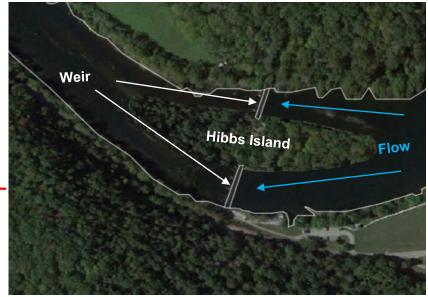


Reservoir Release Improvements - Rehabilitating Hibbs Island

Throughout the years, high flow releases from Norris Dam (such as spilling) have resulted in high river currents that caused part of the about 10.6-acre island to erode and deteriorate.



Weir Function: Ensuring a constant minimum flow during non-power generation from Norris Dam

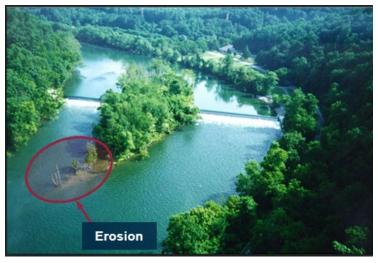




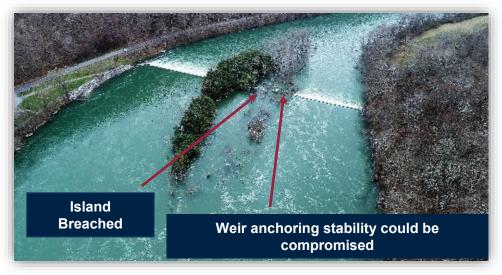
TENNESSEE VALLEY AUTHORITY

Hibbs Rehab Project Objectives

- Decrease erosion over island, increase useful life of weirs
 - Help to guarantee minimum flow through weirs
 - Sustain aquatic life and fisheries below the weir
 - Public attraction & recreation
- Install a berm across the center of the island between the existing concrete weir abutments
- Eliminates flow over the island to help prevent erosion
- Implementation is scheduled to begin April 2023



Generation from TVA Norris Dam



Spilling from TVA Norris Dam, 2019





Water Supply

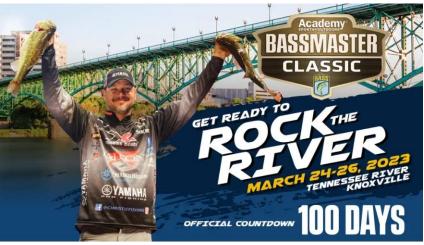
- Reviewed Section 26a permits for water intakes in the Tennessee Valley
- Published "Water Use in the Tennessee Valley for 2020 and Projected Use in 2045" in Summer 2022
- Performed Drought Analysis and Impact Studies
 - TVA's Drought Management Plan
 - Dendrochronology
- Completed a Water Availability Study for Normandy Reservoir incorporating results of the dendrochronology study.
- Ongoing Tennessee Valley Water Partnership (TVWP) webinars for engagement and feedback with the seven Valley States, EPA, NOAA, and USGS.





Recreation

- Largely popular Bassmaster's Classic, hosted in Knoxville, TN on the headwaters of the Tennessee River
- Preparing for the 2023 Tailwater Recreation Season (March Oct.)
- Invasive Carp
 - Issued the Programmatic Environmental Assessment December 15, 2021 with a Finding of No Significant Impact (FONSI) - Kentucky and Wilson are the top two candidates for a barrier system
 - Continued monitoring for Invasive Carp in the Tennessee River System the leading edge remains at Pickwick Dam, but some carp have been found
 in Guntersville by TVA and Alabama Department of Wildlife and Fisheries
 - TVA is partnering with the U.S. Army Corps of Engineers (USACE) and the U.S.
 Fish and Wildlife Service (USFWS) on the Programmatic Environmental
 Assessment for barriers on the Tennessee River, Tennessee-Tombigbee River
 Basin, and Cumberland River
 - TVA and the USACE are developing a Memorandum of Agreement as required by the Water Resources Development Act (WRDA) legislation







Outreach







- Conducted numerous public and stakeholder briefings throughout the year including virtual and inperson River Forecast Center tours
- RFC Hosted all nine members of the TVA Board, including 6 new members
- Continued strong presence and engagement on TVA's social media platforms
- Hosted 31 tours and briefings that reached 650 stakeholders



Operational Knowledge and Succession Planning

- Knowledge Transfer and Retention Initiative
 - 7 key Jobs/Programs are working to capture knowledge needed for role by documenting tools, contacts, training programs, etc
- Rotational and Temporary Assignments
 - FY22-23 RvM supported 6 rotational and temporary assignments to allow employees to develop skills and broaden their understanding of other work in River Management.
- Onboarding and Job Shadowing
 - New employees in the RFC participate in an onboarding and training program to introduce to all employees to employees across River Management and key business partners
 - Informal job shadowing is encouraged to learn key jobs/programs across River Managment

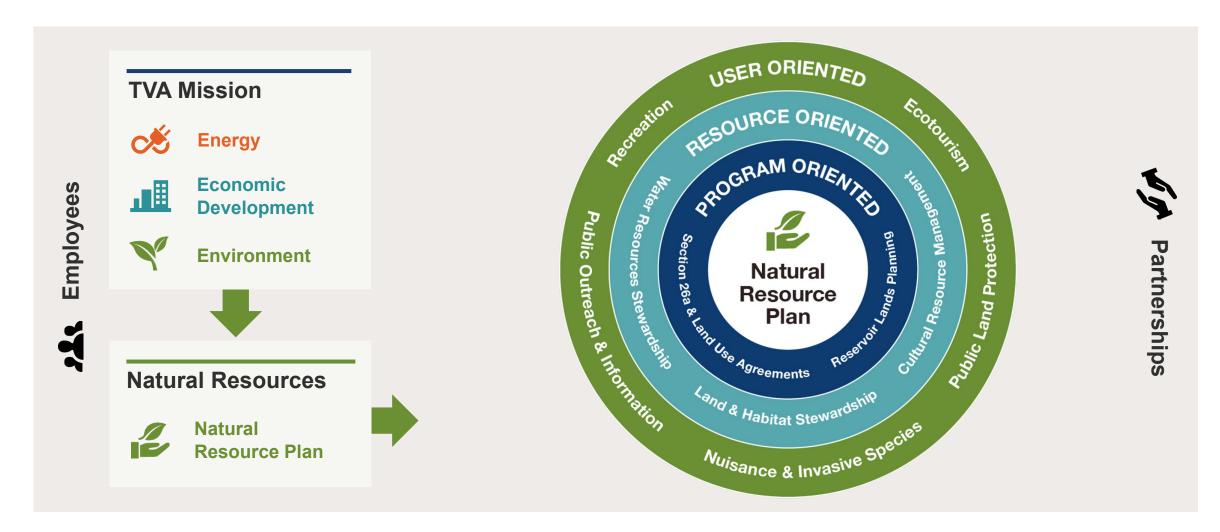








TVA Natural Resources





Land & Habitat Stewardship



- 1. Threatened and Endangered Species
- 2. Wetland Management
- 3. Sensitive Resources Data
- 4. Natural Areas Management
- 5. Grass Land and Agricultural Land Management
- 6. Dewatering Projects Management
- 7. Forest Resource Management
- 8. Conservation Planning

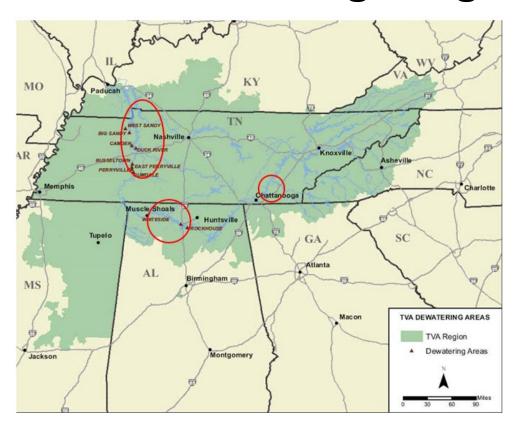








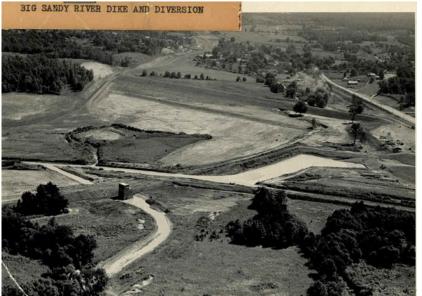
TVA's Dewatering Program















Dewatering Program











Grasslands and Agricultural Lands Management







GALM and Pollinators





Shortleaf Pine Initiative









Trails





Singing River Bridge

Patton Island Overlook Trail Head Completed 2004 River Heritage Trail Under Construction

River Heritage Park Trail Head Completed 2008 Wilson Lock and Dam



Trails





Little Bear Fishing Pier

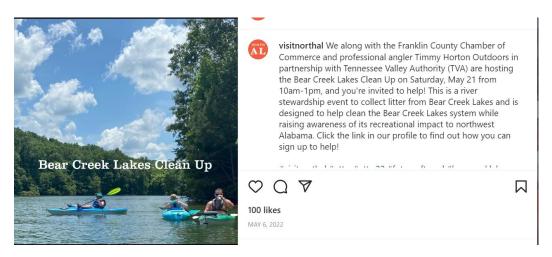








Alabama Mountain Lakes Cleanup











Other updates – Floating Cabins











Other updates – Fontana Village







Sandhill Crane Festival, Other Outreach









Bassmaster Classic







Rockpile Recreation Area













Closing Remarks

Next RRSC Meetings: Advice Statements will be given

August 21-22 – Cultural Compliance Guntersville, AL

September 26-27 –Joint Meeting with RERC Valley Vision Nashville, TN



Adjourn



Drive Safely!



