



Regional Resource Stewardship Council

November 14 - 15, 2017
Guntersville, Alabama



Safety First



Building Emergency Plan

Introductions



- Name
- Organization
- Favorite Recreational Activity



Today's Meeting

Agenda – Nov 14, 2017

8:30	TVA Welcome	Joe Hoagland, VP, Enterprise Relations and Innovation and Designated Federal Officer
	RRSC Welcome	Avis Kennedy, Council Chair
	Introductions and Agenda Review	Liz Upchurch, Facilitator
8:50	FACA Briefing	Kendra Mansur, Office of the General Counsel
9:00	DFO Briefing	Hoagland
9:10	River Management Update	James Everett
9:30	Break	
9:45	Natural Resources Update	Bucky Edmondson
10:15	TVA Natural Resource Plan Update	Rusty Smith
10:40	TVA Public Land Protection Program	Milli Warren
11:45	Adjourn	
11:45	Lunch to follow for Council Members	

Agenda – Nov 15, 2017

8:30	Welcome and Recap	Liz Upchurch, Facilitator
8:45	Preliminary Water Use Report	Amanda Bowen
9:15	Prepare for Public Comment Period	
9:30	Public Comment Period	Upchurch, Facilitator
10:30	Council Discussion / Form Advice	Upchurch, Facilitator and Council
12:00	Wrap Up and Adjourn (lunch available for Council Members)	Kennedy / Hoagland

RRSC Meeting Facilitation

- DFO (or his designee) will facilitate and ensure good order during all open discussions
- Only one speaker or attendee is permitted to comment at a time
- To be recognized by the Chair (or meeting facilitator) in order to provide comment, please turn your name card on its side



The Federal Advisory Committee Act and The Regional Resource Stewardship Council

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

RRSC Meeting Protocols

Agenda

- Joe Hoagland, Vice President, Enterprise Relations and Innovation, is the Designated Federal Officer (DFO)
- Agenda prepared and approved by the DFO in consultation with Council Chair, Avis Kennedy
- 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
- Recommendations to TVA Board shall require an affirmative vote of at least eleven Council members present on that date
- Council members 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



Thank you
for your participation and advice.



DFO Briefing

Joe Hoagland, Vice President, Enterprise Relations and Innovation
Designated Federal Officer

June 2017 Meeting Recap

- Meeting held June 6-7, 2017, in Knoxville, TN
- Welcomed new members to the RRSC
- Informational Presentations on TVA's Land and River Management including Dam Safety, Natural Resource Management, and TVA's Comprehensive Land Plan.
- Primary meeting topic was on the ecotourism benefit of TVA's Management of Public Land and Economic Development.
- Formal Council advice was also provided by the Council on how to manage the balance of events, types of events and additional ways TVA could support communities throughout the region in this area.

Today's Meeting Goals

- *Welcome new Members to the 9th Term of the RRSC and provide a brief orientation*
- *Provide an update to the RRSC on TVA Natural Resource Stewardship and River Operations.*
- *Provide an overview of the preliminary 2015 Water Use Report , changes to this version, and how TVA uses this data*
- *Floating Cabins update and prep for draft rule review in early spring 2018.*
- *Update on the Natural Resource Plan Update and next steps.*
- *Provide an overview and gain advice on TVA Public Land Protection*



River Management Update

James H. Everett, PE

River Management Focus Areas

River Management is responsible for scheduling the day-to-day, integrated operation of the Tennessee River system and balancing the competing demands on the system and the overall value to the public.

Our integrated operations provide multiple benefits to the people of the Valley



Flood Damage
Reduction



Power
Generation



Water Supply



Navigation



Water Quality



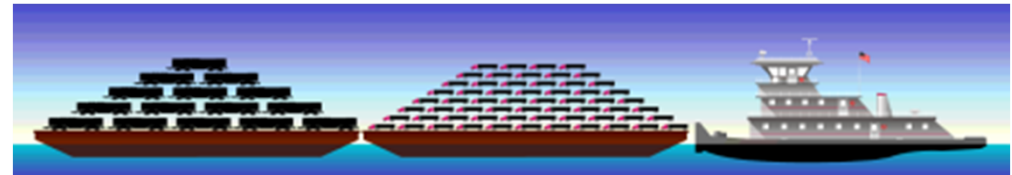
Recreation



Flood Control & Navigation

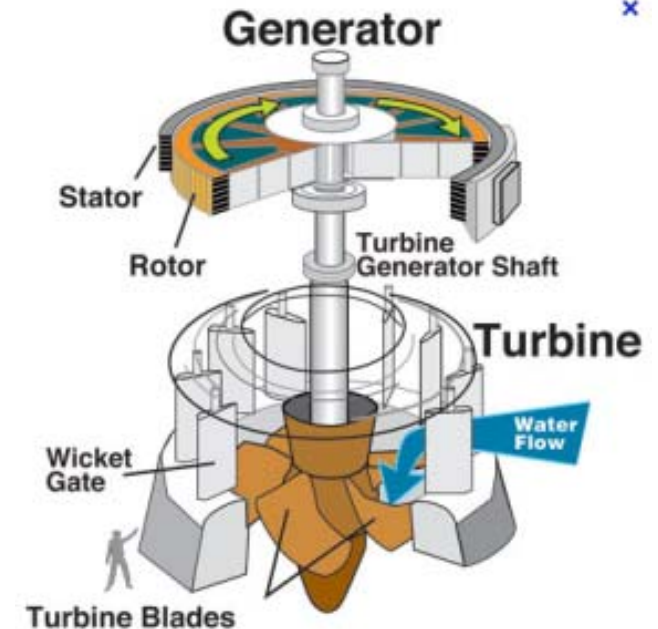


- Cost-effective transportation
 - Raw Materials, Coal, Grains, Aggregates, Iron, Steel, Petroleum
 - ~ \$1B/year in shipper savings
 - 652 Miles of Navigable Waterways
 - Partnerships w/ the USACE
- Store water during flood to reduce crest
 - Issue flood forecasts for regulated system
 - Release water at non-flood rate after crest
 - Annual average flood damages averted are \$260 million (\$6.8 billion to date)



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
- Used to displace more expensive fuels
- Water temperature support at thermal generating plants



Water Supply and Quality



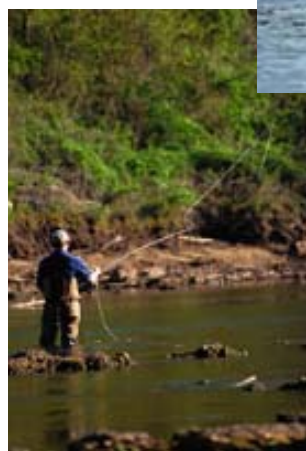
- Temperature and Dissolved Oxygen monitoring
- Adaptive Management for T&E species
- Minimum flow for downstream habitat
- Thermal compliance at TVA fossil and nuclear sites

- Over 700 Surface 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



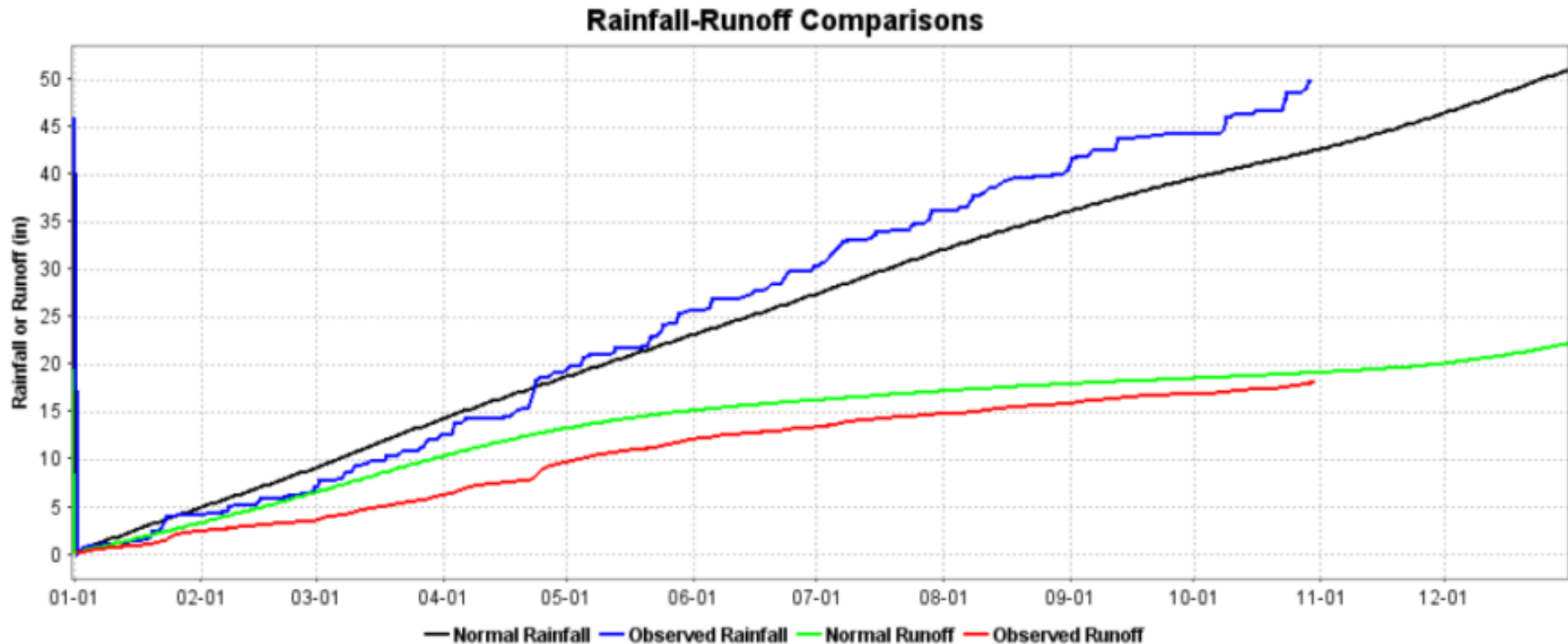
Recreation

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



2017 Rainfall/Runoff

- 118% or normal rainfall and 95% of normal runoff



2017 Hurricane Season

Record Breaking Season

- 10 consecutive storms reached hurricane status (hasn't happened since 1893)
 - 3 Different Category 4 hurricanes made U.S. landfall (first time in history)
 - September 2017 was most active month for Atlantic hurricanes on record (about 3.5 times the normal activity)
 - On track to be in the top five years in terms of hurricane force and activity
- Took proactive steps ahead of the storms to position the system well
 - Provided updates to key stakeholders and the public through social media



Source: The Weather Channel

2017 River Management Highlights

- Averted over \$2.5 million in flood damages in April 2017 through reservoir system operations
- Managed operations resulting from challenging weather conditions, including extreme drought, heavy spring rains, and remnants from 2 major hurricanes
- Maintained over 3,000 aids to navigation on Tennessee River secondary channels and tributaries to make waterways safer for users of the system
- Completed a major state-of-the-art upgrade of the computer modeling platform in the River Forecast Center, consolidating decades of legacy software and data management tools
- Coordinated with nuclear plant personnel to ensure no hydrothermal derates where taken
- Scheduled 228 Special Operations/Flows at TVA dams to accommodate a variety of public events, fishing tournaments, water quality sampling, shoreline clean up, etc.

Other Outreach

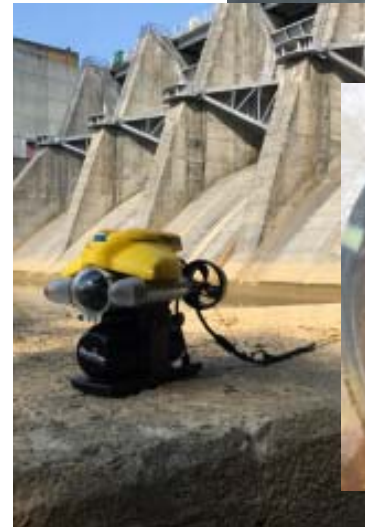
- Tennessee Valley Water Partnership
- Direct stakeholder outreach to Trout Unlimited during long term hydro unit outages
- Dozens of educational tours of the River Forecast Center
- Participation in community outreach programs, STEM, Robotics, Bike/Boat/Bark/Brew event, etc
- Coordination of operations due to complications at the USACE projects on the Ohio River
- Hundreds of media interviews across the Valley
- Facebook Live events and routine social media updates
- Live news coverage of locking through Fort Loudoun aboard the TVA M/V Sideview
- Continued partnership with UT College of Landscape design



TVA Dam Safety Program

Protect lives and property by ensuring that TVA-owned dams are designed, constructed, operated, and maintained as safely and as reliably as is practicable.

- 121 TVA dams and impoundments (87 river dams)
- Avg. age of river dams is 67 years
- Established multi-year Dam Safety Assurance Program to:
 - Reduce risk of dam event
 - Improve safety of dams
 - Asset preservation
 - Up-to-date design basis
 - Compliance with TVA Dam Safety procedures



Boone Dam Seepage Rehabilitation Project

- Seepage identified in October 2014
- Degraded foundation threatens safety of dam
- Interim measures taken to reduce risks
- Safety of workers and community remain overriding priority
- Cost estimate – up to \$450 million
- Schedule commitment – 5 to 7 years (July 31, 2022)
- Project components
 - Investigative drilling and grouting
 - Install upstream and downstream berms
 - Install concrete barrier wall through the embankment dam into rock



Additional Dam Safety Challenges

Pickwick Landing Dam Seismic Rehab



- Embankment dam does not meet TVA seismic stability criteria
- Installed 24/7 seismic warning system
- Design and construction of rehab FY17-20 (\$100M)

Little Bear Creek Dam Seepage Response



- Muddy seepage noted 04/2017
- Lowered reservoir and conducted investigations
- Installed seepage filter
- Targeted investigative drilling and grouting begins 11/2017
- Determine pool restrictions, if any, before spring fill



Questions?





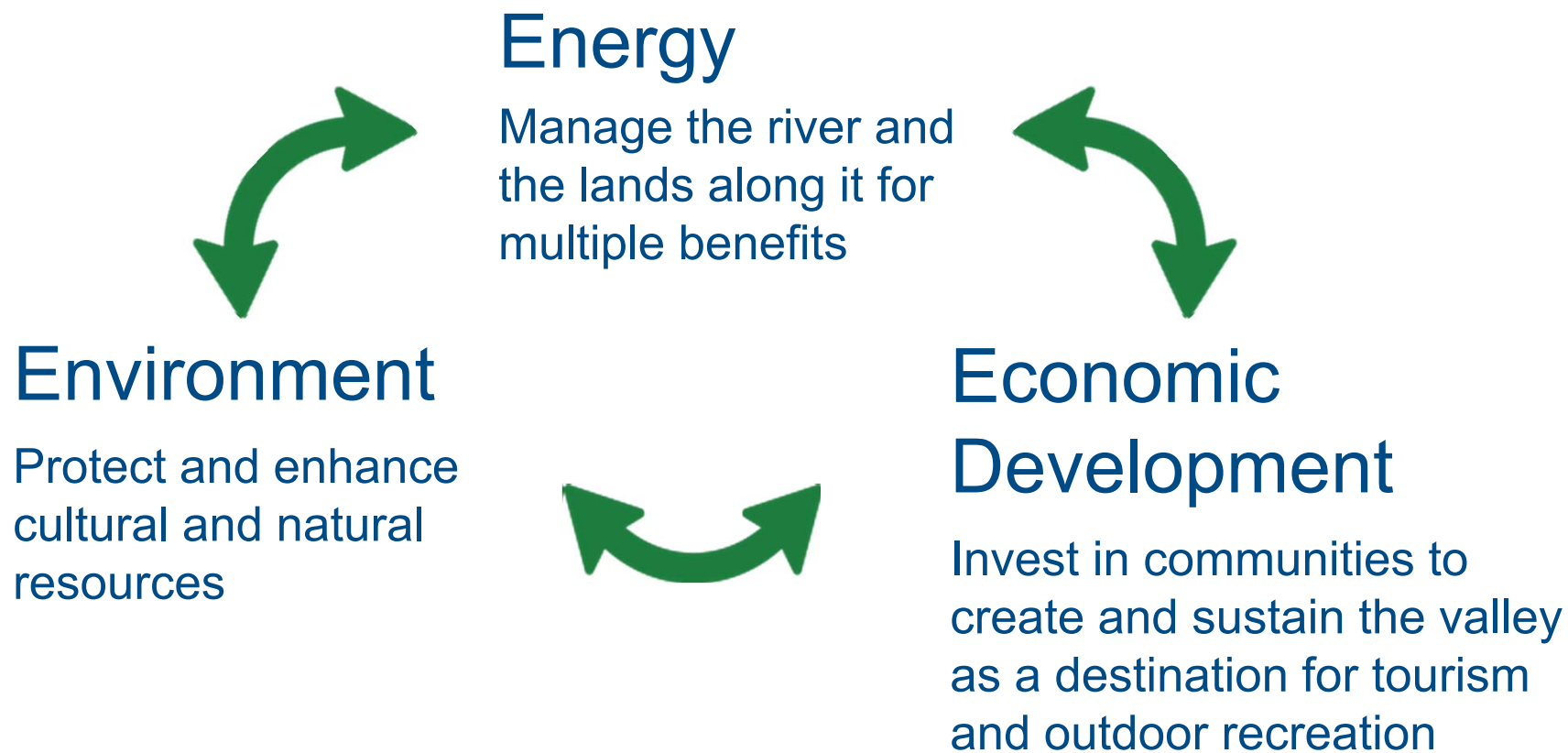
TVA Natural Resources Update

Bucky Edmondson, Director
Natural Resources

Agenda

- FY17 Natural Resources highlights
- Floating cabins update
- FY18 efforts

TVA exists to make our region the best place in the country to live, work and play



TVA Natural Resources Focus Areas

**Land, Wildlife,
& Habitat
Management**

**Public
Outreach &
Information**

**Commercial
& Public
Recreation**

**Public Land
Protection**

**Water
Resources
Stewardship**

**Cultural
Resources
Stewardship**

**Reservoir
Lands
Planning**

Ecotourism

**Section 26a
Permitting &
Land Use
Agreements**

**Nuisance &
Invasive
Species
Management**



Land, Wildlife and Habitat Management

Collaborate to enhance wildlife habitat and resources conditions of public lands and waters

293,000 acres of reservoir lands to manage

- Managed thousands of acres of forests and natural grasslands for wildlife habitat including non-game and games species
- Enhanced Shortleaf Pine forests on reservoir lands
- Explore options to protect rare species and their habitat including the state-listed four-toed and spotted salamanders



Public Outreach and Information

Collaborate to increase awareness and appreciation of resources, and create opportunities for community involvement in resource stewardship

Support partnerships throughout the Power Service Area and the watershed

- Provided environmental education programs to more than 10,000 children
- Received 135 **positive** news stories on our stewardship efforts Valleywide
- Encouraged sustainable camping and boating through the Camp-Right and Clean Marina at 70 campgrounds and 35 marinas
- Engaged communities in over 650 outreach events and volunteer opportunities



Commercial and Public Recreation

Collaborate to enhance recreational opportunities and accessibility on public lands

Manage 6 TVA campgrounds, over 80 public recreation areas, 80 stream access sites and approximately 160 miles of trails across the Valley

- Enhanced TVA Dam Reservations and reservoir lands including upgrades to picnic areas, campgrounds and playgrounds
- Collaborated with local, state and federal partnerships to enhance and improve public recreation such as boat ramps and trails
- Improved dispersed recreation areas including upgrades to informal camping areas and access roads





Water Resources Stewardship

Collaborate to protect and improve aquatic habitat in the Tennessee River watershed

Tennessee River watershed ~ 41,000 square miles, high in aquatic biodiversity

- Implemented Shade Your Stream in western North Carolina (Little TN River watershed) with over 900 participants
- Expanded buffer to the Duck and Elk Rivers in middle Tennessee
- Removed barrier to improve habitat for native brook trout in Unicoi County, TN
- Hosted outreach events to engage over 4,000 people





Cultural Resources Stewardship

Collaborate to protect cultural resources and increase awareness of protection needs

Over 11,500 identified cultural resource sites across the Valley

- Collaborated with representatives from federally recognized tribes to conduct limited excavations at Hiwassee Island for the Hiwassee Island Field School.
- Protected over 6,500 linear feet of shoreline (9 archaeological sites)
- Held week long tribal consultation on repatriation of Native American Burials, funerary objects and the protection of archaeological resources in the Valley





Eco-Tourism

Collaborate to promote and enhance recreational opportunities to support tourism and local economies

- Supported regional planning efforts and tourism studies
- Partnered with communities to enhance recreation and tourism opportunities including the Ocoee whitewater agreement
- Expanded and promoted the National Geographic Geo-tourism interactive MapGuide (www.tennesseevalleygeotourism.org/)



Whitewater Recreation on the Ocoee River

- Partnership between the Ocoee River Outfitter Association, State of Tennessee, U.S. Forest Service and the Tennessee Valley Authority
- TVA conducting an Environmental Assessment
- State of TN created Recreation Trust Fund in 2017 and allotted \$11.8M for 15-yr water release contract
- Estimated to generate \$44M in economic activity for the region each year
- Most visited whitewater river in the U.S. (2012)



Section 26a Permitting & Land Use Agreements

Facilitate and support reservoir community development and partnerships through Section 26a permitting and land use agreements

- Supported public and commercial recreation through over 1,400 permits and land use agreements
- Enhanced municipal recreational opportunities by granting use of TVA lands through leases or easements
- Promoted and supported special events (e.g., fishing tournaments) or small scale recreation activities on TVA lands



Floating Cabins – Next Steps

On December 16, 2016, the Water Infrastructure Improvements for the Nation Act 2016 (WIN) was enacted, which amends Section 9 of the TVA Act of 1933. The Board is authorized to allow the use of floating cabins indefinitely if maintained by the owner to reasonable health, safety, and environmental standards as required by the Board, and the owner has paid any fee assessed that is necessary and reasonable for ensuring compliance.

Phase 1 Section 26a rule amendments are drafted to: Redefine non-navigable houseboats and floating houses as floating cabins; prohibit new floating cabins after December 16, 2016; and require owners to register their structures. More detailed Phase 2 rule amendments addressing specific required standards will be proposed in 2018 after stakeholder input is completed. Proposed rule amendments will be published in the Federal Register for public comment.





Nuisance & Invasive Species Management

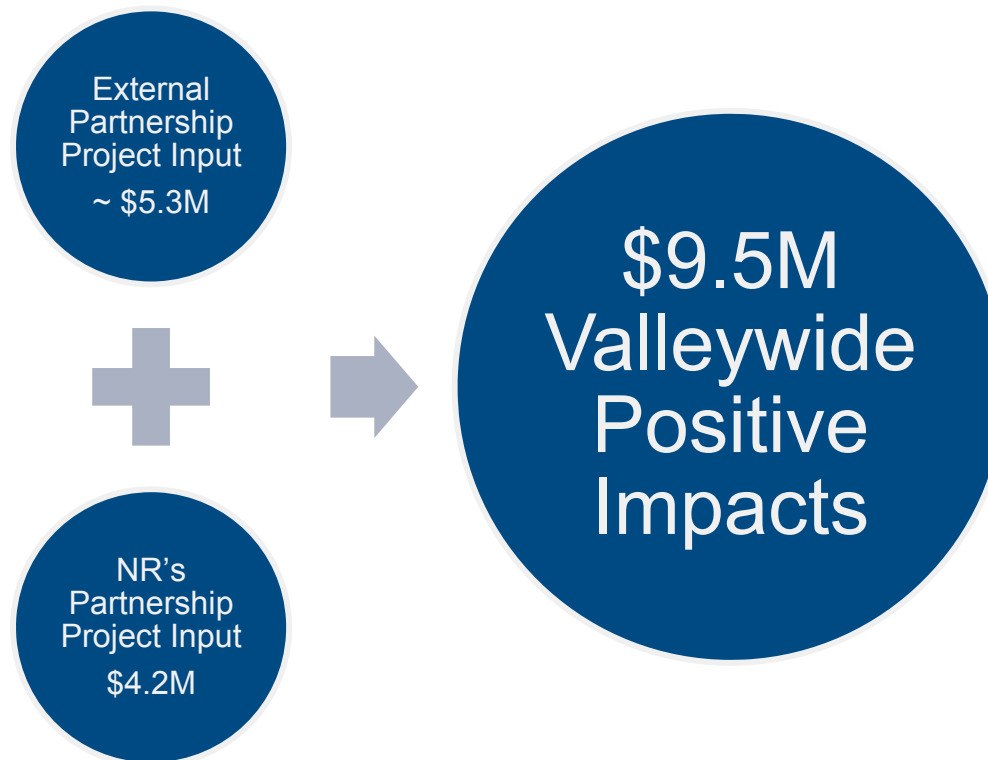
Identify and manage nuisance plants in TVA reservoirs and on TVA lands, manage nuisance animal species on TVA lands

650,000 acres of reservoir surface area and 293,000 acres of TVA public lands

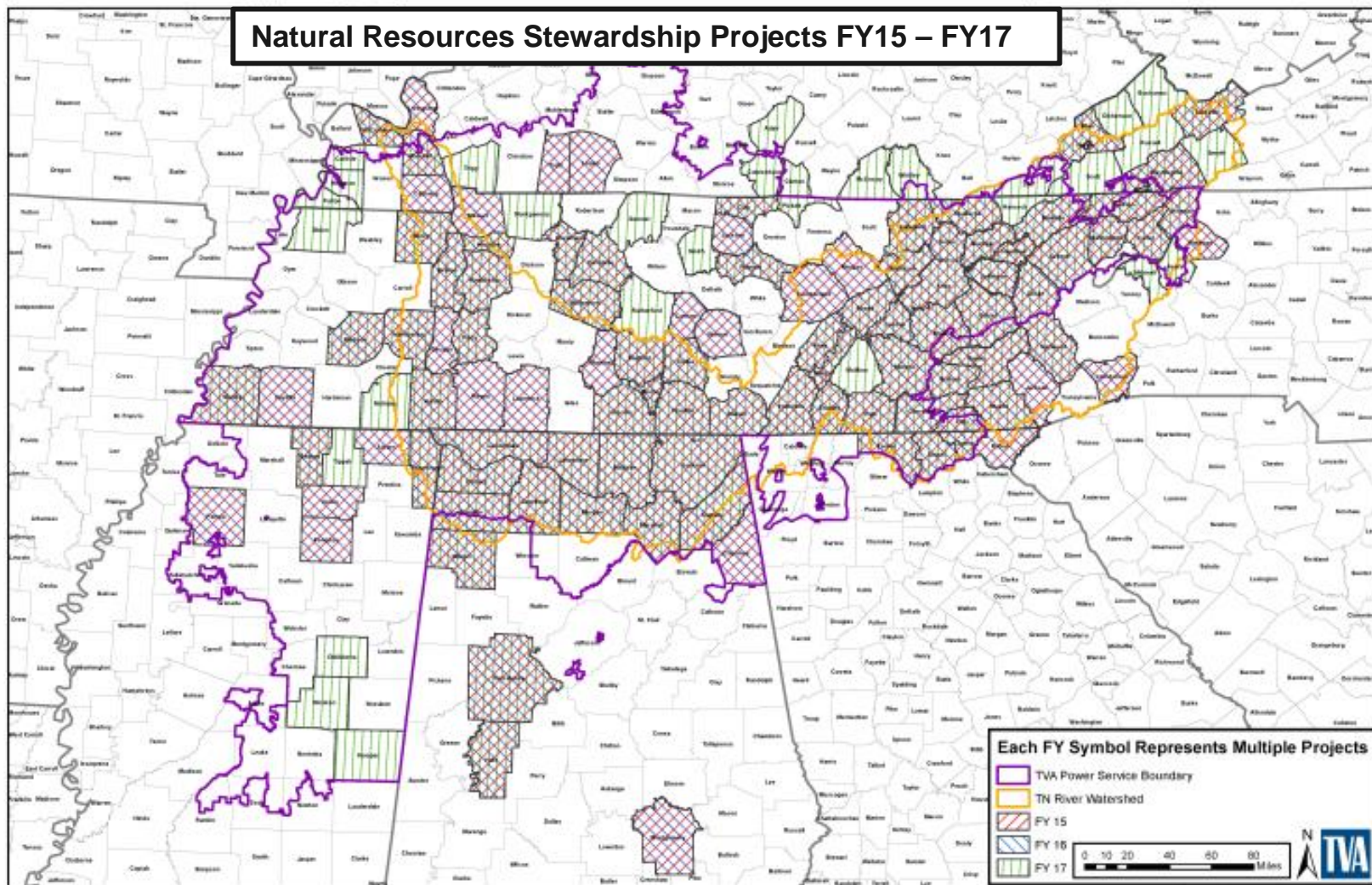
- Treated 1,216 acres of reservoir surface aquatic plants in developed public access areas
- Implemented public outreach efforts on aquatic plants and non-native plants
- Manage invasive plant species on TVA public lands
- Collaborate to address nuisance animal species around the Valley



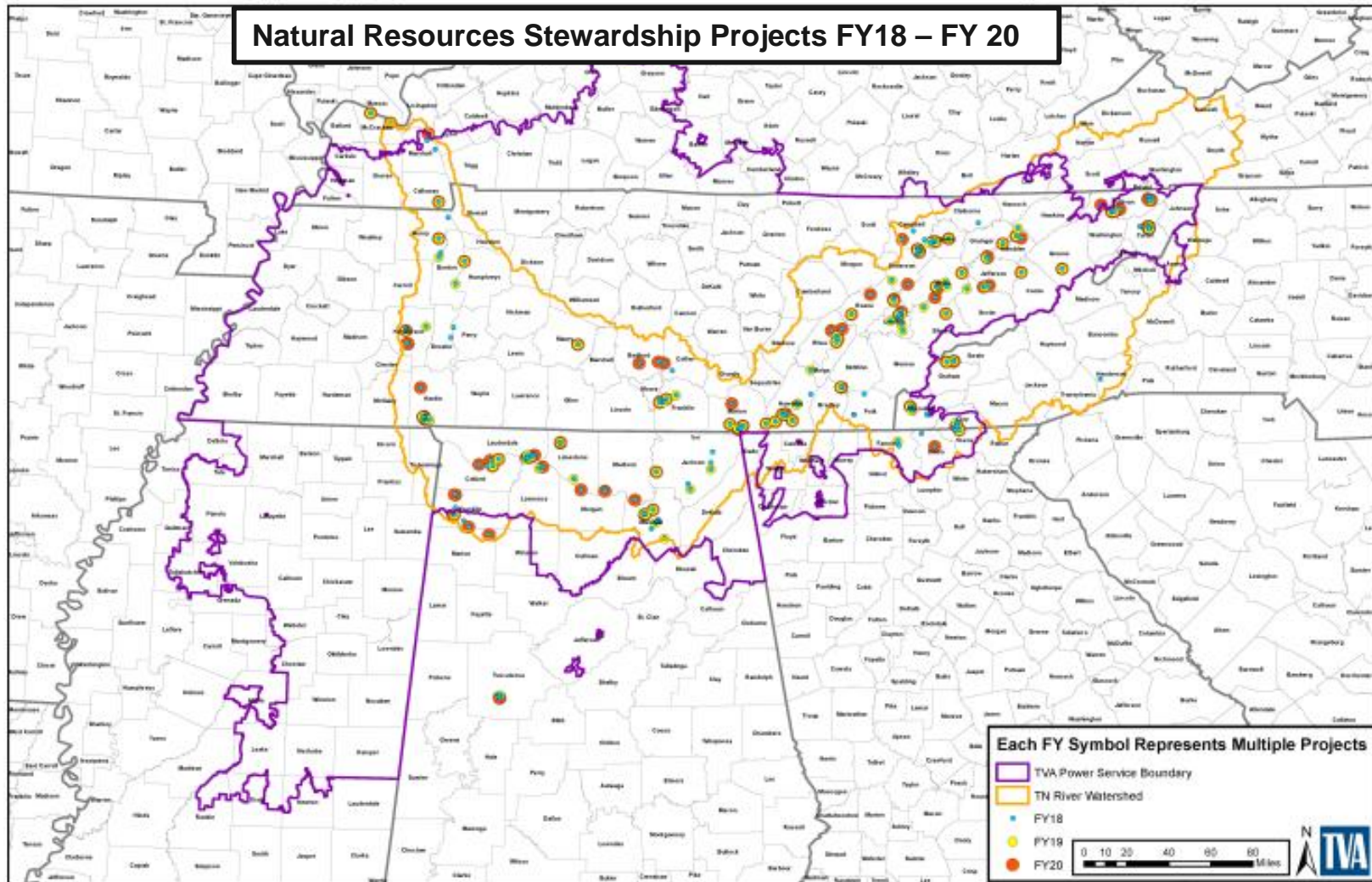
Power of Partnerships



Natural Resources Stewardship Projects FY15 – FY17



Natural Resources Stewardship Projects FY18 – FY 20



FY18 Stewardship Efforts

- NRP update
- Public Land Policy
- Lands Planning for Tellico and parts of Watts Bar
- Partnership projects in recreation and wildlife habitat
- Enhancements to Dam Reservation facilities
- Increase efforts to build partnerships and expand stewardship work across Valley

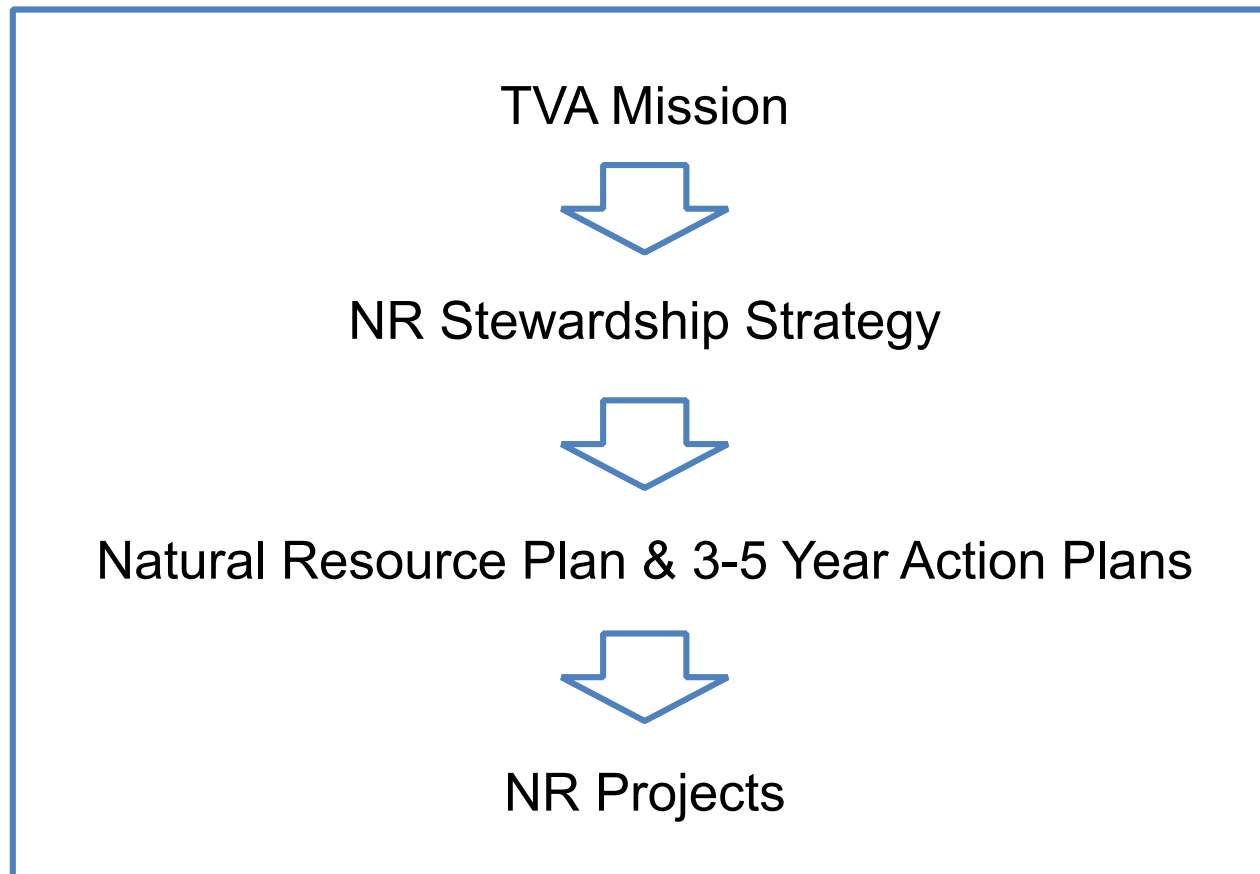




TVA Natural Resource Plan

Russell Smith, Natural Resources

TVA Natural Resource Plan



TVA's Mission of Service

TVA exists to make our region
the best place in the country
to live, work and play.

Natural Resources – Stewardship Strategy

To fulfill TVA's mission, NR serves the people of the TVA region by remaining agile, balancing competing demands, and being a catalyst for collaboration in order to:

- Create and sustain destinations for recreation and opportunities for learning and research
- Protect and enhance biological, cultural, and water resources, and TVA's programmatic interests through integrated management of the Tennessee River system and public lands
- Assist water-based community development with technical support, land agreements, and permitting using planning, clear regulations, meaningful guidelines, and consistent enforcement

NR Focus Areas

**Land, Wildlife,
& Habitat
Management**

**Public
Outreach &
Information**

**Commercial
& Public
Recreation**

**Public Land
Protection**

**Water
Resources
Stewardship**

**Cultural
Resources
Stewardship**

**Reservoir
Lands
Planning**

Ecotourism

**Section 26a
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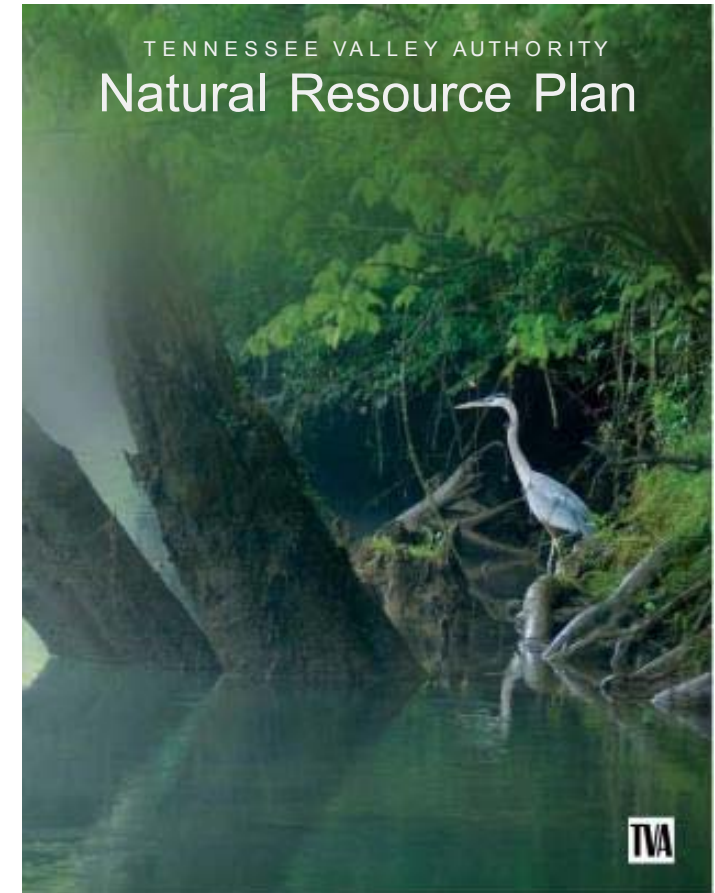
**Nuisance &
Invasive
Species
Management**

Natural Resource Plan 2018 Update

Natural Resource Plan

Managing the River comes with the responsibility, along with the TVA mandated mission on Stewardship, to do a first class job of managing the water, shoreline, and natural resources.

– RRSC Guiding Principles, Jan. 2011



Natural Resource Plan

Published in 2011 as a 20-year guidance document

6 Resource Areas

Biological, Cultural, Water, Recreation,
Lands Planning and Public Engagement



Programs



Goals or Activities



Natural Resource Plan

TVA considered 4 levels of implementation in the Environmental Impact Statement

- No Action
- Custodial
- Blended (selected level)
- Flagship

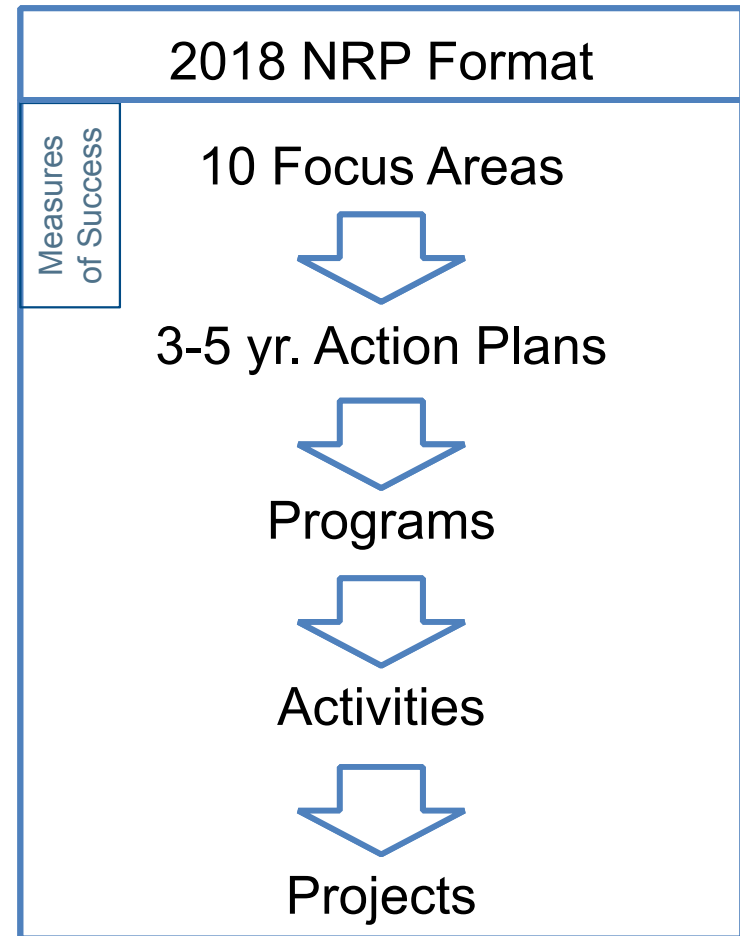
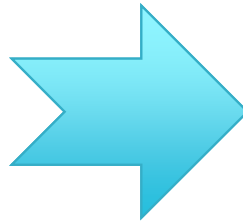


Natural Resource Plan – Update

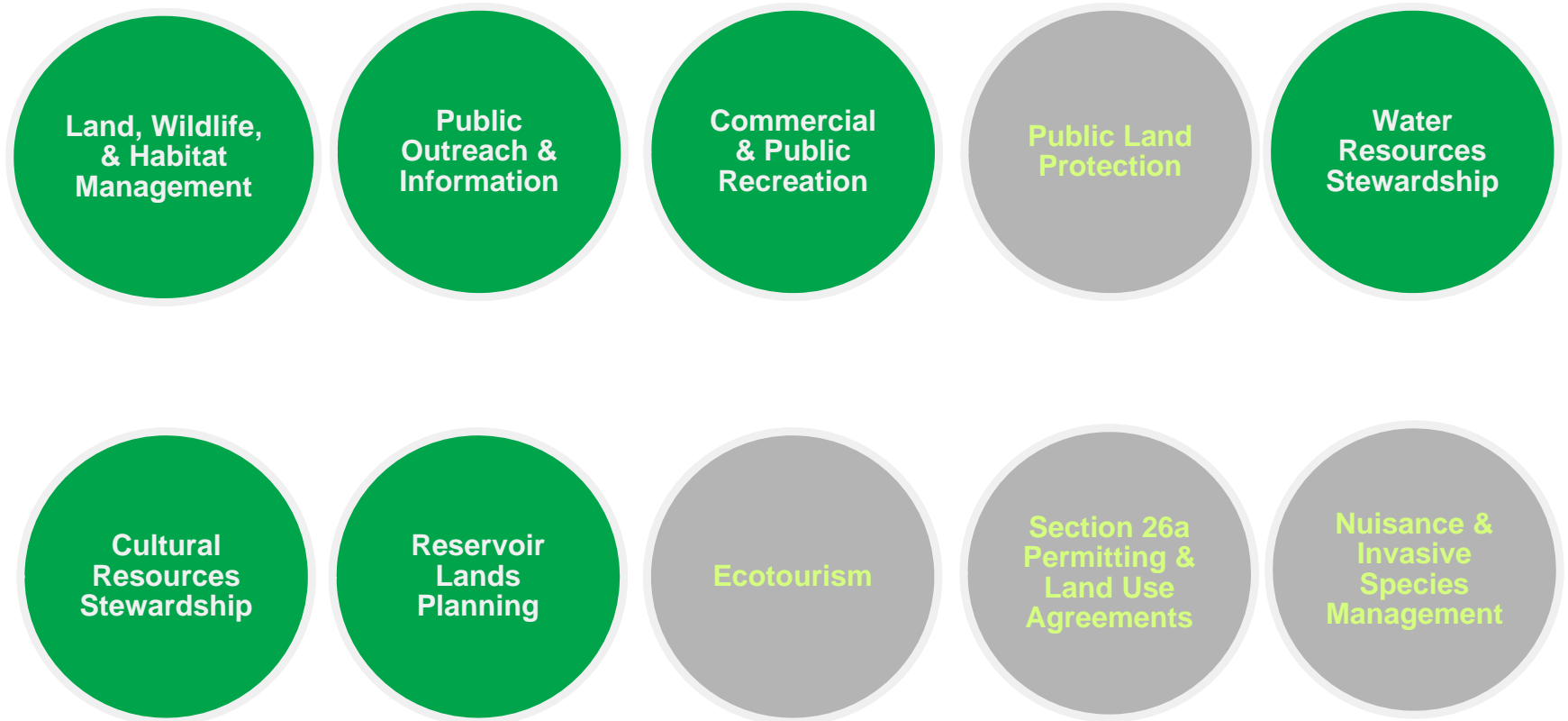
Goals:

- Use lessons-learned to create updates programs and activities
- Update text to align with TVA Mission and NR Strategy
- Enhance strategic guidance and alignment of NR work
- Be better equipped to answer your question of 'where do I spend the last dollar'

Natural Resource Plan – Structure



NR Focus Areas in the NRP



Schedule

Natural Resource Plan Update

FY17

Complete an annual review

Capture lessons learned and knowledge gained since 2011

Evaluate stewardship needs and wants

Assess programs, activities and measures of success

Capture NR efforts omitted from 2011 NRP

Schedule

Natural Resource Plan Update

FY18

NEPA – Environmental Assessment

Engage Stakeholders, including the RRSC and the Public

Prepare NRP Update for public and release to Public





Introduce Advice Topic and Questions

Advice Questions

1. If TVA pursues the sale of public land to resolve legacy house encroachments with flexibility, how can TVA discourage future house encroachments?
2. What role should TVA play in protecting the public land it has in its custody and control? In what ways should the public be informed of this role?
3. Based on previous advice, if TVA's direction is to take a firm approach on enforcement and resolution of future encroachments, are there situations where deviating from this approach should be considered as appropriate?
4. How can TVA engage its silent stakeholders, particularly those who are public land advocates and do not support the use of public property for private gain but may not currently participate in opportunities to express their viewpoints to TVA leadership?



Public Land Protection

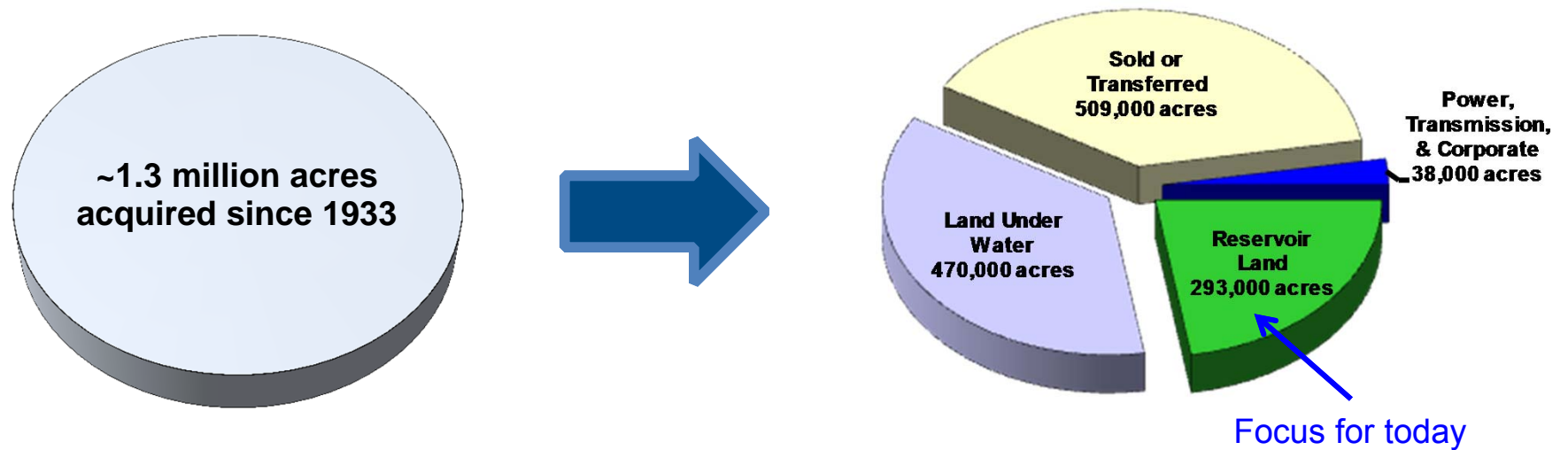
Milli Warren

Purpose

- Discuss differences between private land and TVA public land
- Summarize TVA's implementation of prior RRSC advice
- Receive advice on TVA's public land protection efforts



TVA Land Acquisition and Utilization



Reservoir Land Planning Zones



Private Land versus TVA Public Land

- Resolution of disputes
- Court jurisdiction
- How and why property is acquired
- Public involvement



Private vs. Public: Resolution of Disputes

Encroachment Resolution Options

- Private Land
 - Easement, Disposal, Removal/Litigation, Adverse Possession
- TVA Public Land
 - TVA Policy and Congressional Disposal Authorities, Sufferance Agreement, Removal/Litigation

Private vs. Public: Court Jurisdiction

- Private Land
 - State Court Levels: Depends on state law, typically Circuit or Chancery Court
- TVA Public Land
 - Federal Court Level: U.S. District Court



Private vs. Public: How and Why TVA Public Land was Acquired

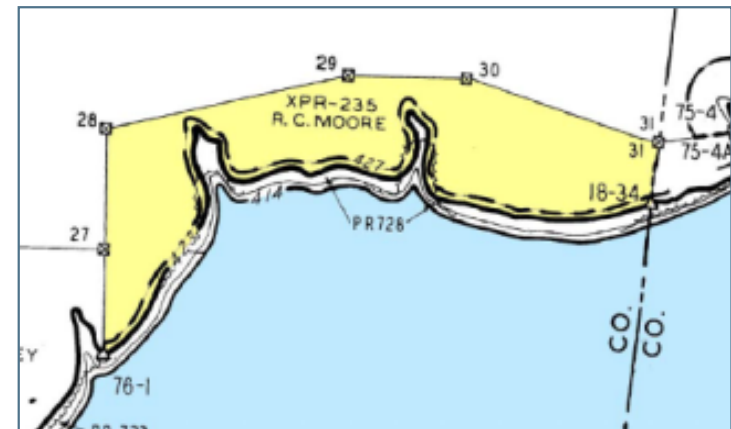
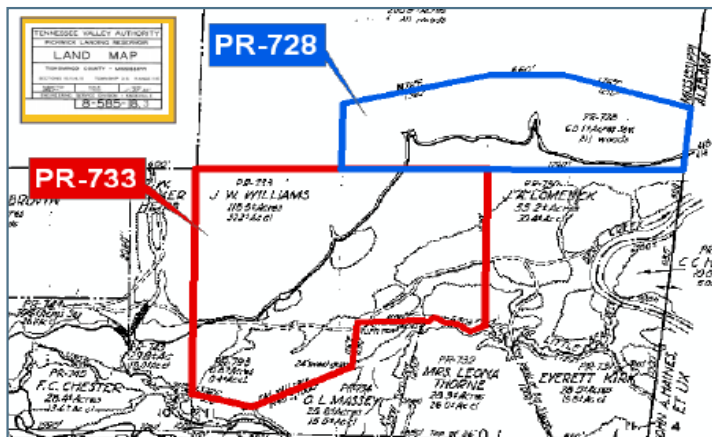
- Congressional authority to acquire land in the name of the United States of America and entrusted to TVA as an agent of the United States to accomplish the purposes of the TVA Act
- Land was acquired for construction of dams, reservoirs, and other purposes of the TVA Act



Private vs. Public: How and Why TVA Public Land was Acquired

Boundary Types

- Acquisition vs. Sale
- Straight Line vs. Contour
- Sale with Retained Rights



Private vs. Public: Public Involvement

- The public has historically been very involved in TVA's land and shoreline management policy development
 - In the 1990s for TVA's Shoreline Management Initiative (which later became the Shoreline Management Policy), a total of 29 public meetings were held and 9,400 public comments, suggestions, and issues were received.
 - In the development of the Land Policy in 2006, TVA received over 5,000 public comments with over 92 percent opposed to the sale of public land for private residential purposes.
- Recent efforts have not garnered the same level of public engagement
 - In 2016, the Floating Cabin Policy received 434 individual comments from 151 submittals
 - The 2017 Multiple Reservoirs Land Management Plan covering 8 reservoirs received 95 comments

TVA's Public Land Stewardship

- TVA has been entrusted to manage and protect approximately 293,000 acres of public land along its reservoir system and must balance land uses in order to achieve the greatest public benefit for the people of the Tennessee Valley.
- TVA has a prominent history of resource stewardship work. TVA has dedicated additional resources to enhance these efforts and increase investment in TVA public land.
- Implementation of over 650 projects in four years across the Valley continues to have a positive impact in the communities we serve and on TVA's reputation with our stakeholders.



Violations and Encroachments



- Despite these focused efforts, TVA continues to experience abuse of TVA public land and has challenges resolving unauthorized uses.
- TVA has documented approximately 15,000 violations and encroachments (V&Es) on reservoir property, and many more undocumented cases likely exist. Approximately 3,500 of these known V&Es remain unresolved.
- V&Es can occur on TVA land or on private land where TVA retains land rights or Section 26a jurisdiction.

Violations and Encroachments

V&Es encompass all unauthorized uses of TVA public land, including:

- Trash dumping
- Permanent or temporary structures, such as houses and boat docks, built without permission or in non-compliance with TVA policies, regulations, permits, or contracts
- Damage from motorized vehicles



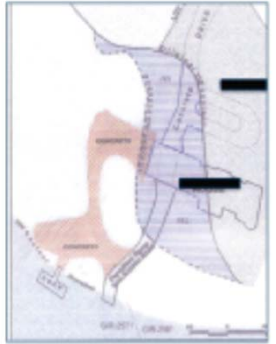
Prior RRSC Advice

- TVA discussed encroachment resolution with a focus on legacy house encroachments with the RRSC in September 2015. Meeting minutes can be found at <https://www.tva.gov/About-TVA/Our-Public-Advisory-Councils/Regional-Resource-Stewardship-Council>.
- The Council provided advice and agreed there should be no net loss of public land. The Council however had diverging views on how to resolve encroachments.
- The Council provided TVA with a broad range of ideas to address encroachments.

Encroachment Examples

Kentucky Reservoir

- House under construction and partially on TVA property discovered in 1999
 - Structures on TVA property include partial house, garage, underground boathouse, driveway, and fill
 - Concrete driveway and patios were also constructed on TVA property but private property owner (owner) was required to remove certain unnecessary portions
 - Owner admitted to not having a property survey conducted prior to construction
- Owner was approved for a sufferance agreement in 2004
 - Agreement acknowledges encroachment and allows it to continue with no modifications with an annual fee to TVA of \$3,375
 - TVA reserves the right to require removal of the encroachments but has not exercised this right
- Owner continues to explore the possibility of obtaining clear title without removing the encroachments



Source: 2012 TVA Property and Encroachment Records | 12

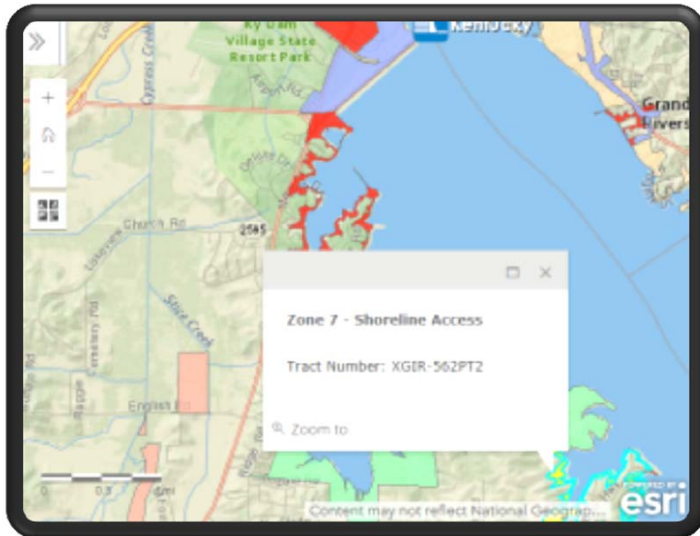
Prior RRSC Advice

Consensus Advice Statement

Public lands continue to be valuable to the citizens that TVA serves. The Council believes there should be no net loss of public lands under TVA's policies. Address existing dwelling encroachments with a blend of existing regulations and flexibility. Pending a robust communication plan, all future encroachments should be handled with limited flexibility / a firm approach using existing mechanisms. Have clear guidance, be consistent and treat all fairly when it comes to public land.

TVA's Implementation of Prior RRSC Advice

Does the Council have additional ideas or guidance on how to prevent encroachments on TVA property?



- In FY16 and FY17, TVA marked approximately 235 miles of public land boundary, with a more focused effort on land bordering private residential land in FY17
- Updates to TVA website included an interactive map viewer showing planned zones and more information for residential neighbors and potential homebuyers
- Completed Phase 1 of a project to comprehensively update TVA's internal Stewardship Guidelines
- Conducted 15 Realtor Workshops in FY17

TVA's Implementation of Prior RRSC Advice

For permanent structures, should TVA develop more flexible resolution options?

As part of an overall Public Land Protection Program, TVA is considering a Public Land Protection Policy for review by the Board of Directors. The Policy could potentially address TVA public land on the reservoirs and may include the following items:

- Acknowledgment of the value of TVA public land and reaffirmation of Board support for TVA's efforts in protecting TVA public land from damage and encroachments and for citation authority.
- Expectations for the public and TVA staff with regard to past and future encroachments.
- Direction to TVA staff to promulgate land management regulations and delegate approval to TVA management.
- Flexibility to resolve legacy encroachments that meet specified criteria.

Public Land Protection Program

In an attempt to resolve existing and discourage future V&Es, TVA is developing a Public Land Protection Program which encompasses efforts in four areas:

- Education and outreach
- Policies and regulations (including citation authority)
- Prevention
- Enforcement and resolution



Legacy House Encroachments

- One of the challenges in public land protection work is addressing encroachments that have been in existence for many years. TVA refers to these as “legacy” issues.
- Approximately 110 suspected legacy house encroachments are documented on TVA public land. There are potentially more in existence but not documented.
- Options to resolve these encroachments have typically been limited to sufferance agreements (a 30-day revocable license allowing the encroachment to remain for a fee), removal, or litigation.
- Because these options are resource-intensive both for TVA and the adjacent property owner and do not always provide the permanent solution that both parties seek, these issues have been challenging to address.

Legacy House Encroachment Resolution

- Natural Resources seeks flexibility to resolve legacy house encroachments in a permanent, efficient, and effective manner.
- TVA is considering small disposals to resolve legacy house encroachments. This would be in addition to our other resolution tools (i.e., removal, sufferance agreement, litigation).
- TVA will review for conformity with existing policies (i.e., Land Policy) as well as options for exceptions to these policies, if necessary.



Questions for the RRSC

1. If TVA pursues the sale of public land to resolve legacy house encroachments with flexibility, how can TVA discourage future house encroachments?
2. What role should TVA play in protecting the public land it has in its custody and control? In what ways should the public be informed of this role?
3. Based on previous advice, if TVA's direction is to take a firm approach on enforcement and resolution of future encroachments, are there situations where deviating from this approach should be considered as appropriate?
4. How can TVA engage its silent stakeholders, particularly those who are public land advocates and do not support the use of public property for private gain but may not currently participate in opportunities to express their viewpoints to TVA leadership?





Lunch Break

Meeting Adjourned for Today

Meeting will reconvene tomorrow, 11/15, at 8:30 AM

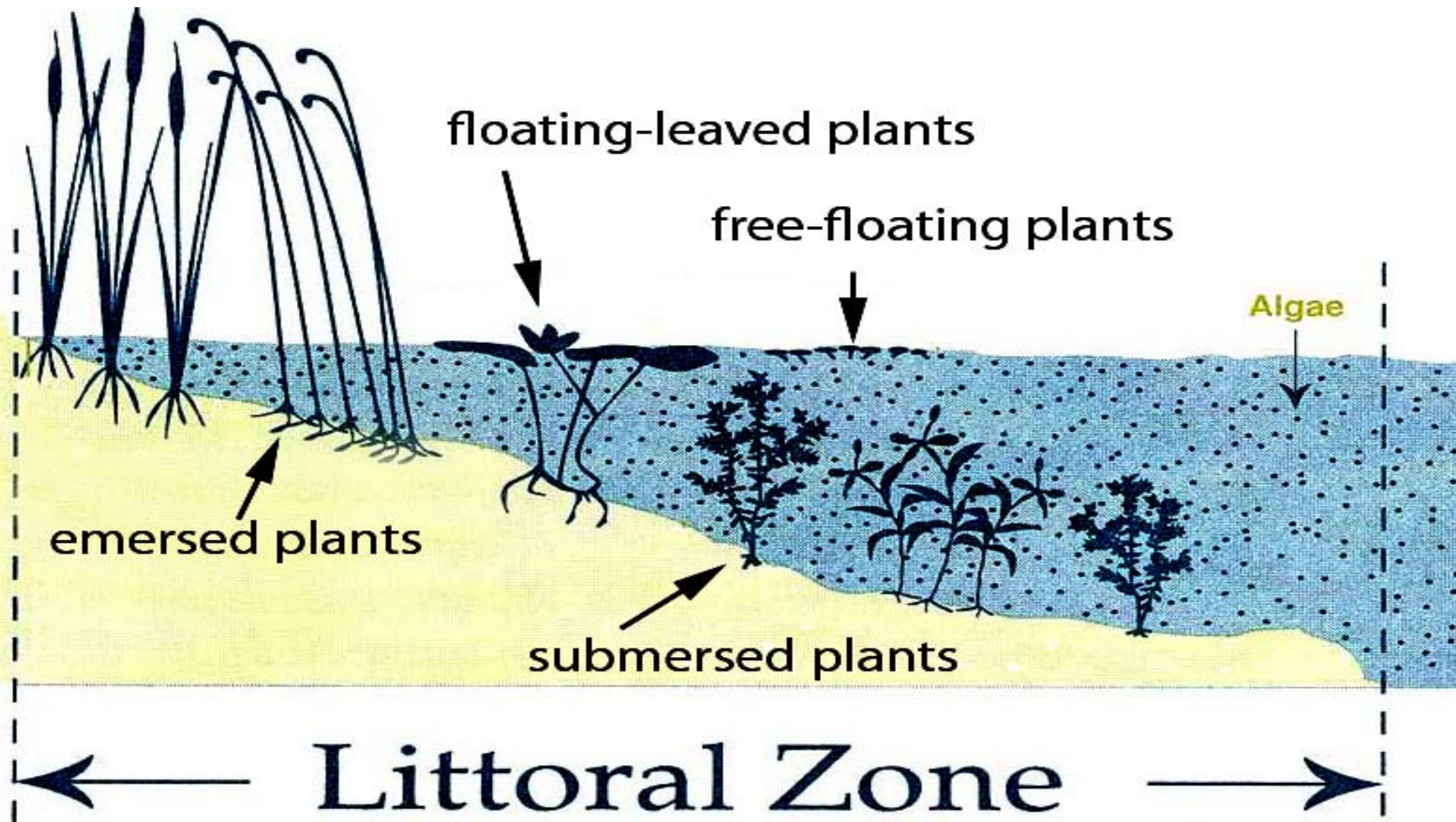


Aquatic Plant Management Program

Dr. Brett Hartis
Program Manager
TVA Aquatic Plant Management Program







Why Aquatic Plants?

- Habitat for fish and food/ habitat for wildlife
- Stabilization
- Oxygenation of water
- Aesthetics



How do aquatic plants spread?

- Fragmentation
- Water movement, wind
- Animals (wading birds, aquatic mammals)
- Human activities



Invasive vs. Native

- Non-indigenous
- Adversely affects habitats
- No natural enemies
- Threaten biological diversity



- Endemic
- Occurs naturally
- Part of ecosystem
- Natural enemies
- “Geographically Relative”









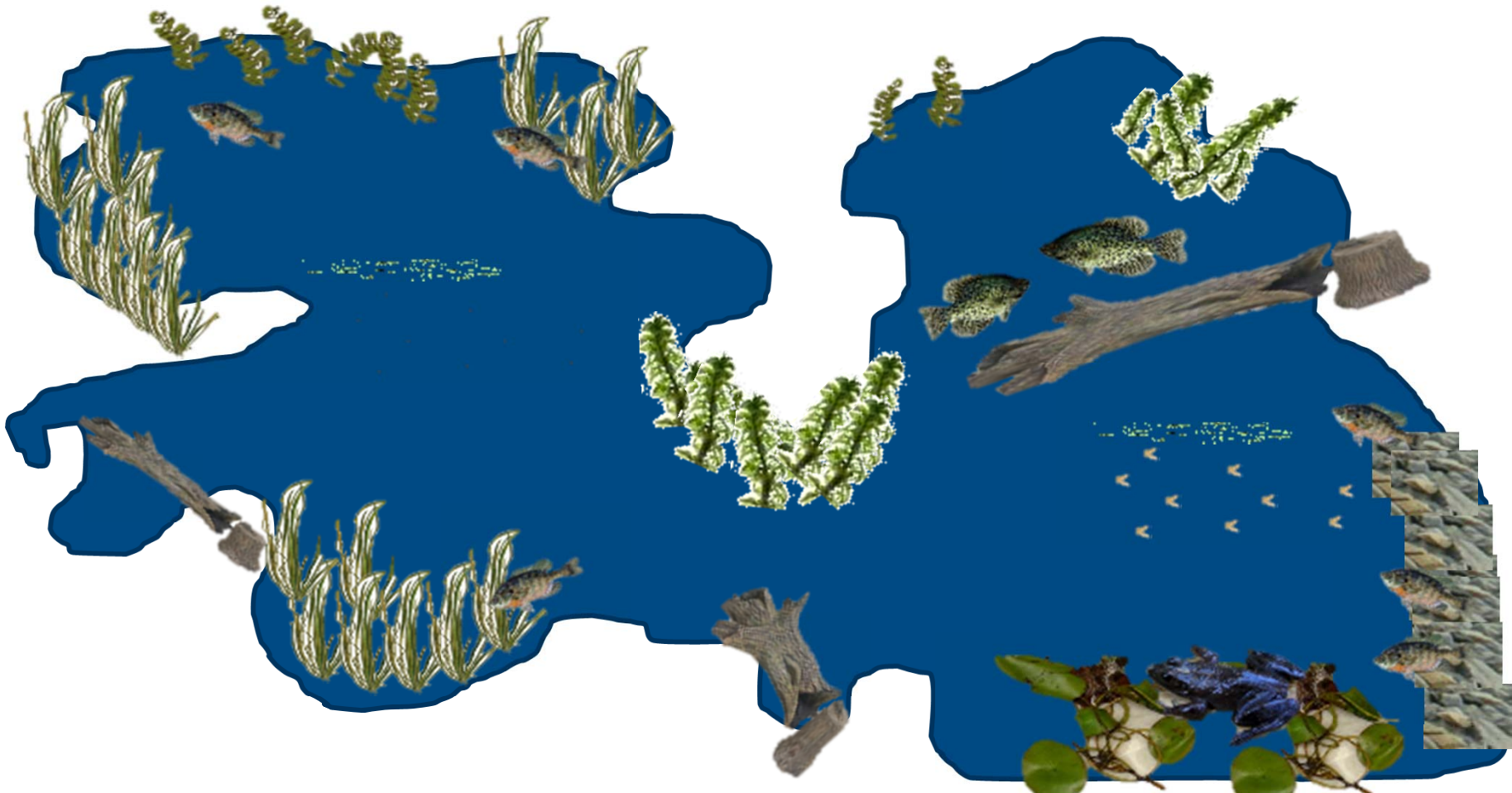
What's the Big Deal?

- Outcompetes Native/ Beneficial Species
- Fluctuations in Water Quality
- Changes Habitat and Food Web
- Reduce water storage capacity
- Reduces/ Halts Use
- *Impact Local Economy



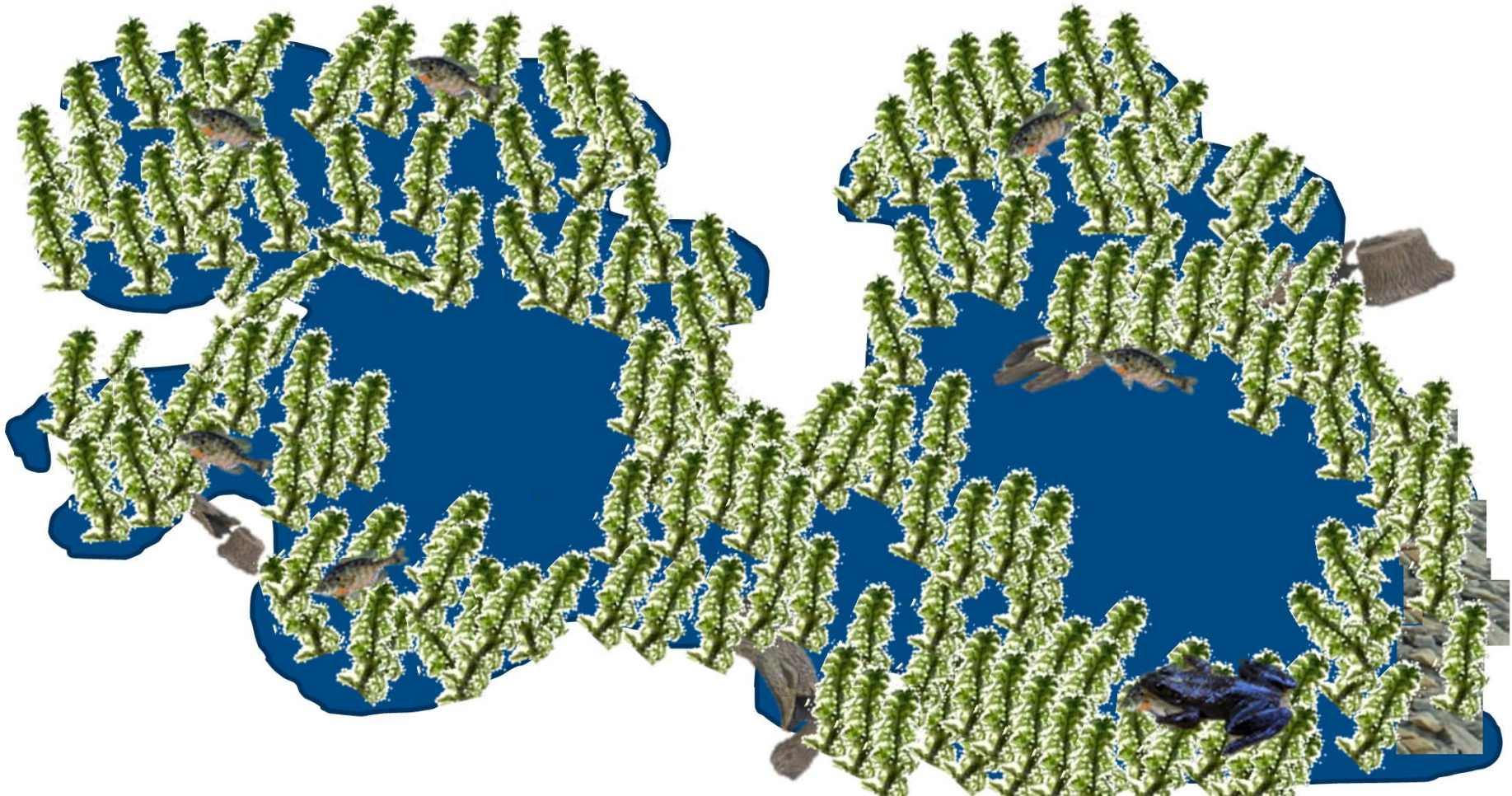
BIODIVERSITY

- **Balanced, Diverse Habitat**



BIODIVERSITY

- **Reduced Habitat Complexity/ Unbalanced Diversity**



Why are some invasive and noxious in reservoirs?

- Clear, Shallow water
- High levels of nutrients
- No Enemies
- Competitive Advantage



BIODIVERSITY

- Typical Reservoir Habitat



BIODIVERSITY

- Increased Reservoir Habitat



Why Manage Aquatic Plants?

- **Irrigation**
- **Drainage**
- **Flood control**
- **Water supply**
- **Power Operations**
- **Aesthetics**
- **Aquaculture**
- **Transportation**
- **Mosquito control**
- **Fishing/Recreation**







Flood Control/ Commercial Use





Mosquito

© N.P.C.A

More on mosquitoes

An. quadrimaculatus



A. aegypti



TVA and Aquatic Plant Management

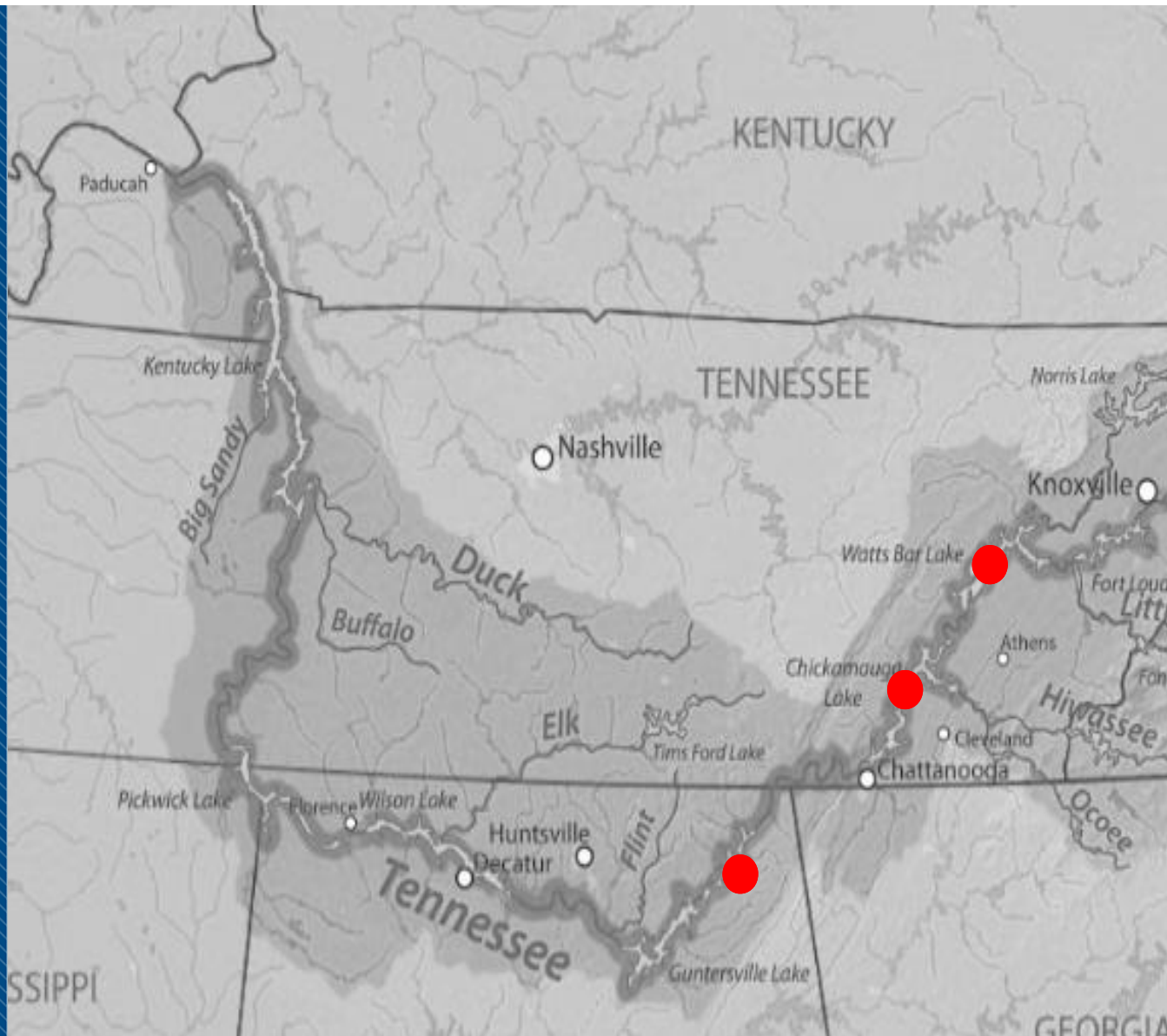
- Main stem reservoirs (1930s and 1940s)
- Vector control/ Malaria prevention
- Focus – Management of Emergent/ Woody Vegetation and Water Level Manipulation



Introduction of Milfoil

- *Myriophyllum spicatum* – Late 1950s
- By Late 1960s – 27,000 acres in TVA
- Focus - **ERADICATION**





Early Days of APM



Early Days of APM



Early Days of APM



Realizing Tradeoffs



A Few Numbers...

- Guntersville (#6), Kentucky (#12), Pickwick (#36), Chickamauga (#41)
- Freshwater fishing, majority Bass – ~ \$40B in US, \$853M annually in AL, \$237M Food, Lodging, Trans.



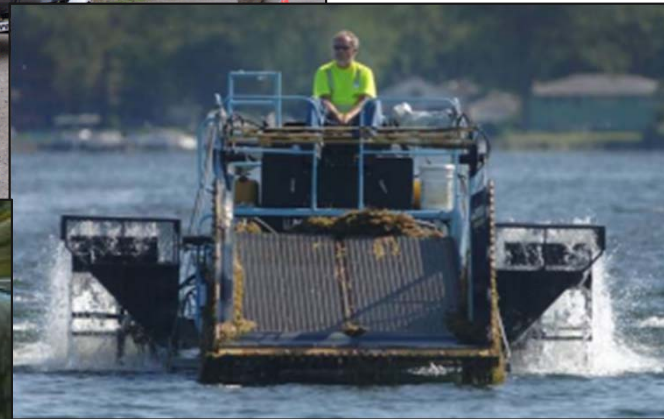
A Few More Numbers...

- Invasive plants filling a niche they were never meant to fill....
- Reservoirs = First Invasion..... More to come
- Agencies spending \$\$\$Billions on **Necessary** management... limited budgets



Control Options

- Prevention
- Cultural
- Mechanical/Physical
- Biological
- Chemical



Prevention/ EDRR



Cultural/Physical Mgt.

- **Modify environment to create less favorable conditions**
- **Environmental impacts and cost varies by technique**



Mechanical Techniques

- Site specific control
- Short-term
- Can spread issue
- Relatively Expensive



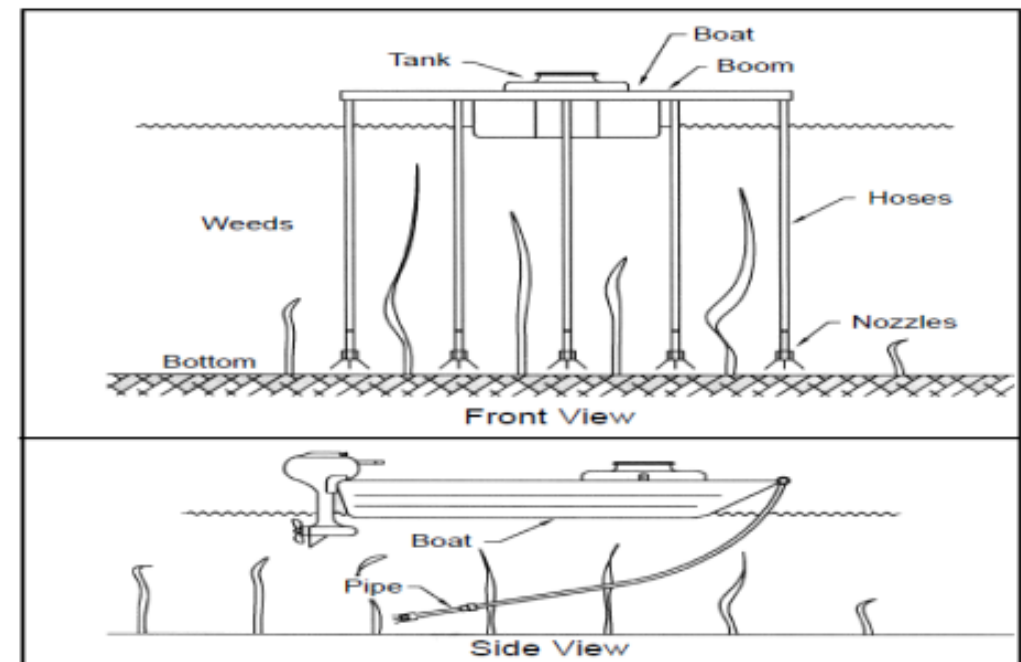
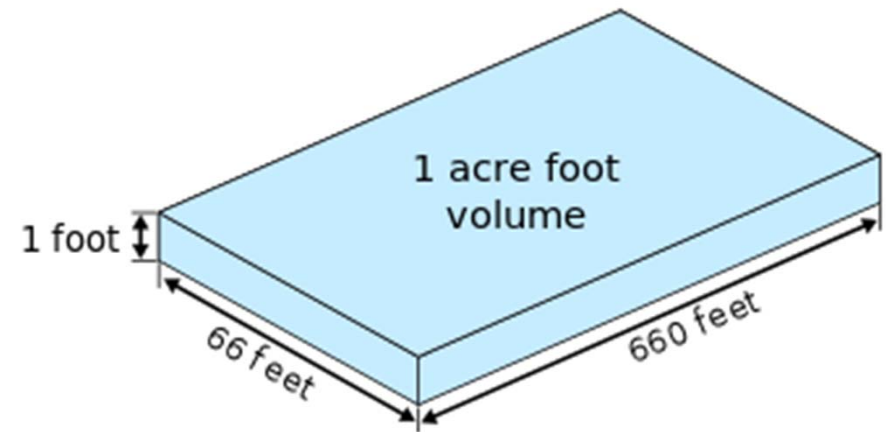
Biological

- **Relatively non-selective**
- **Often used in reservoir management**
- **Not desired in water with extensive native vegetation**
- **Relatively cost effective**
- **Stocking rates and survey critical**



Chemical

- Aquatic labeled herbicides
- Contact vs. Systemic
- Selective vs. Broad-spectrum
- Contact Time/ Exposure



Nearshore Herbicide Applications



Mechanical Harvester

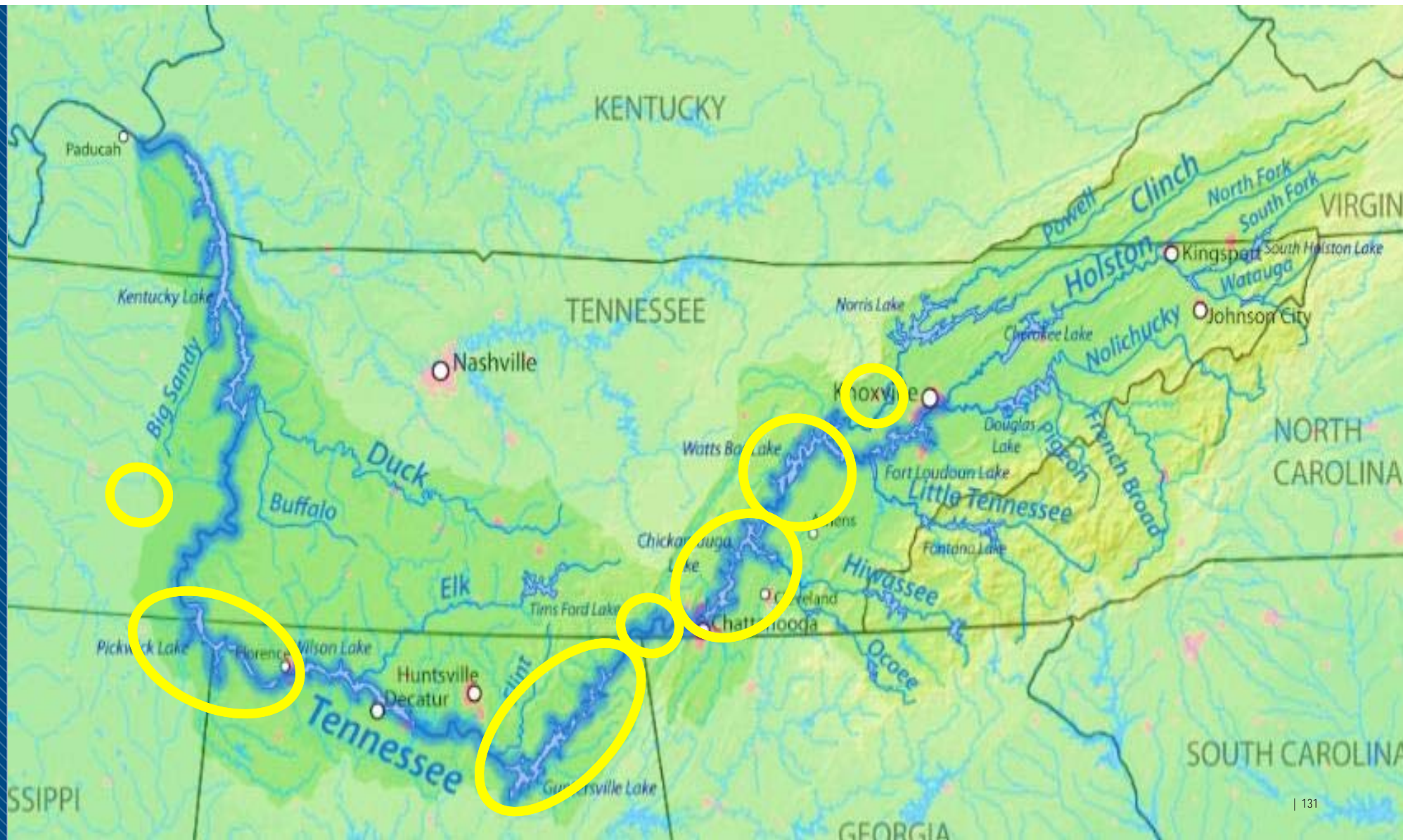


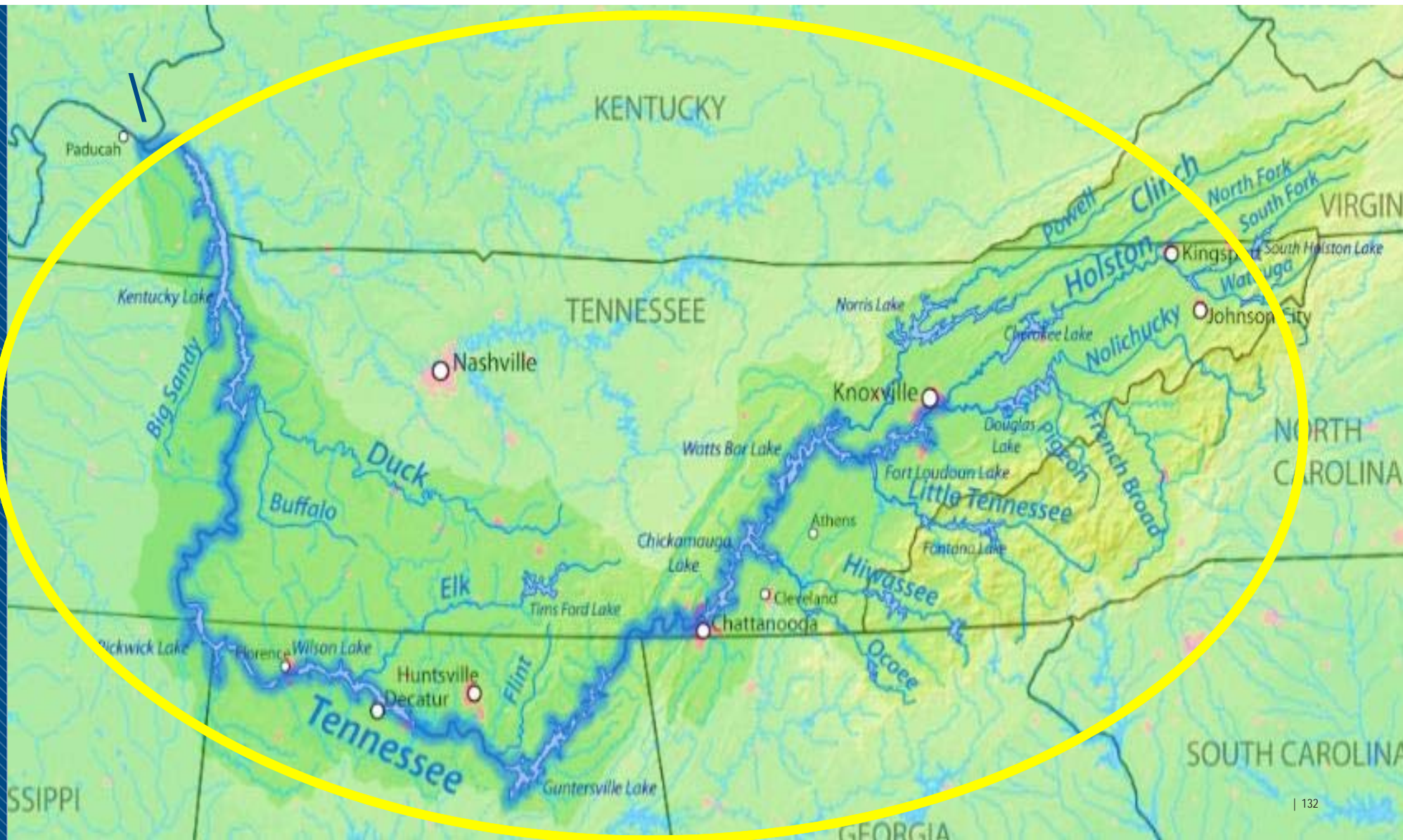
Integrated Management Strategy

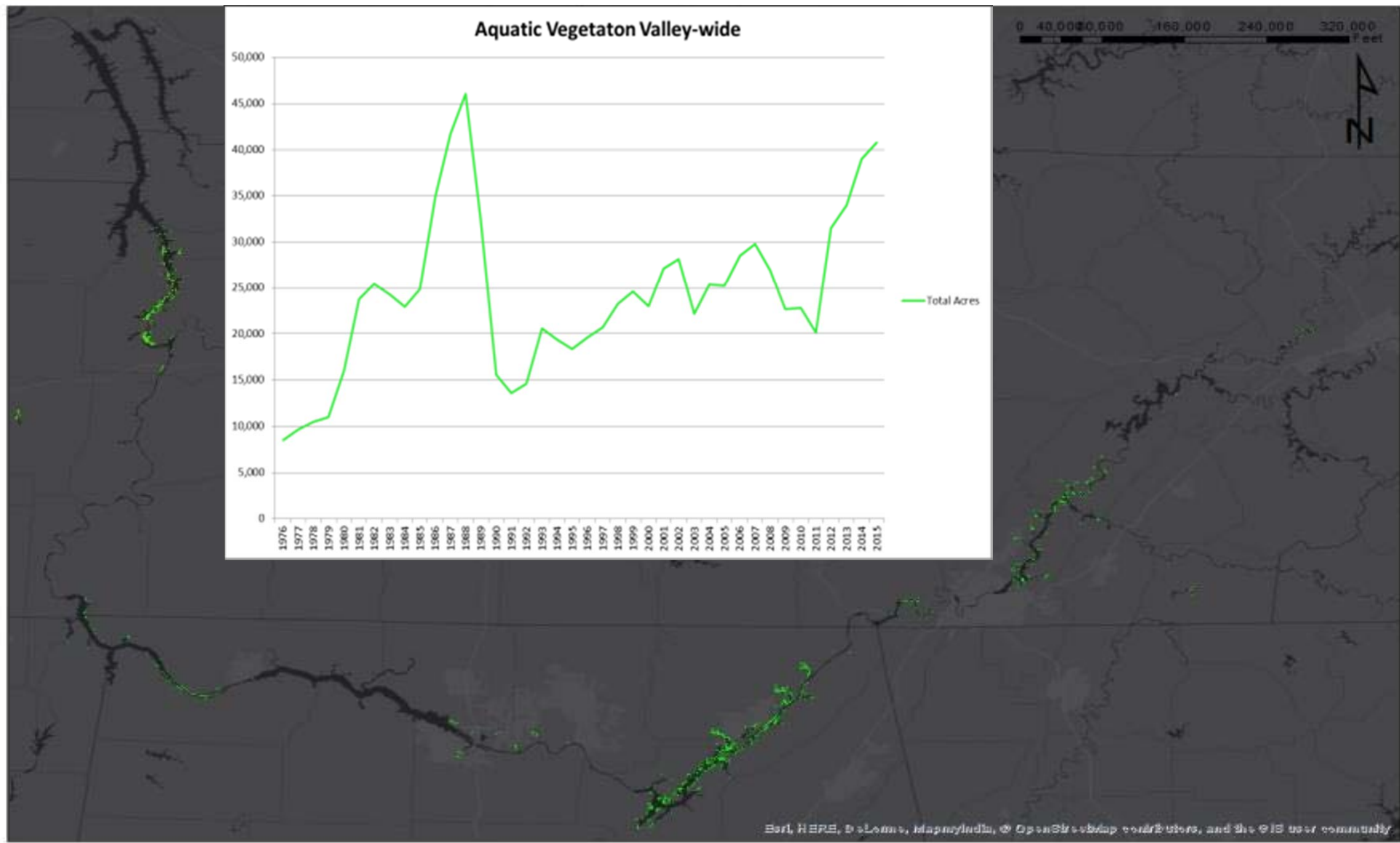


Hydrilla











Hydrilla



Milfoil



Spiny Naiad

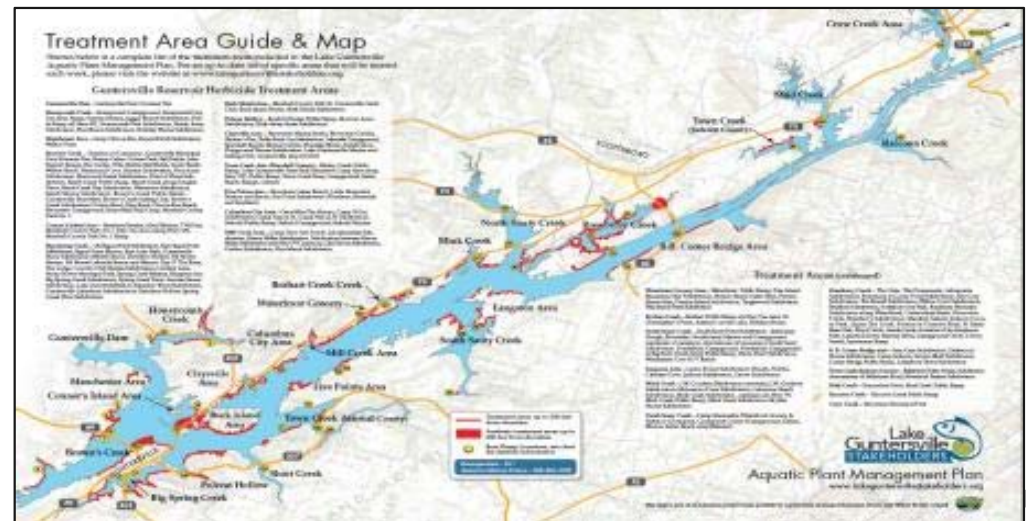


Developed Public Access Area



Stakeholder Driven Management

- “All those with a vested interest in the resource”
- Water Body Specific
- Develop Informed, Integrated Consensus Plan - Balance User Needs



The Key to Sound Management



Plant Camp





Tennessee Valley Authority

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Economic Development

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American Lotus

Submersed stems of this native species (*Nelumbo lutea*) provide excellent habitat and cover for both invertebrates and the juvenile fish that eat them. The large canopy formed by American lotus is the perfect ambush opportunity for larger fish.

Fishability/ Seasonal Techniques

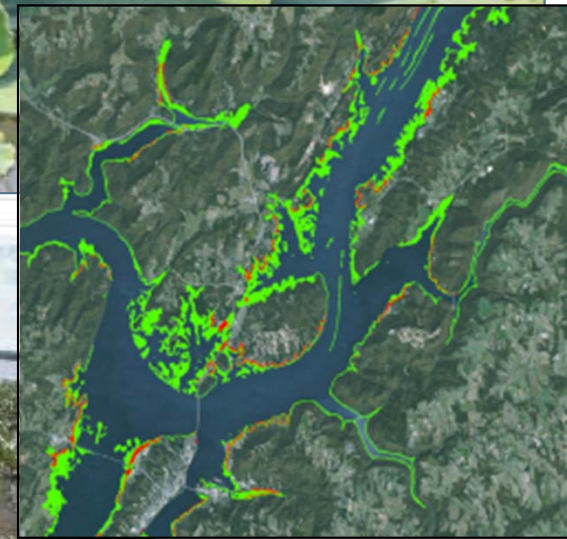
Spring—American lotus sprouts from seed or existing rhizomes (underground roots), and the leaf stem will begin to grow toward the surface where a leaf will begin growth from the end of the stem. As newly sprouted leaf stems emerge from the rhizome, fishing a jig or craw in and around these stems is recommended.

Summer—The plant will continue to rapidly grow, forming new plants along the rhizome all summer long. Large colonies of the plant will form along the shoreline with some leaves floating and others standing high above the water resembling a tuba. The formation of large leaves is the perfect opportunity to dissect large holes between leaves. An open understory can hold monster bass awaiting a meal.

Fall—Lotus will produce seed in large seed pods growing above the water's surface. The green pods will begin to turn brown and face down where the seeds will be released. The large floating leaves will begin to die and wither in late fall. As many leaves stand erect in the fall, flipping the stem bases of these massive plants becomes a great opportunity. A frog can also be worked over the large leaves and into large holes between the plants.

Winter—American lotus will overwinter using its extensive rhizome network. American lotus will be less present in winter and targeting this specific plant should be avoided.

Habitat Value



External Outlets

Where has all the grass gone?

December 7, 2015

[Tweet](#) [Log in](#)



Dr. Brett Hartis

We all know the story. The frog bite from a month ago was so hot that you just can't wait to get back on the water, but a busy work schedule has kept the Ranger parked for the past few weeks. No worries, you've got Saturday slated to fish those giant weed mats on your favorite lake. You arrive Saturday morning and are shocked to find that your salad-covered bass haven has now been replaced with a "veggie free" water hole. The only sign of grass is a tad of brown milfoil washed up on the boat ramp. Where has all the grass gone?

Believe it or not, this is a common scenario as winter takes its grip. What may appear nothing short of an alien abduction of your favorite grass is actually a naturally occurring process. Senescence, or the condition or process of

140



Do you have a question
about TVA Public Land?
Call 1-800-882-5263

**PUBLIC LAND
INFORMATION CENTER**

MONDAY – FRIDAY
8:00 A.M. – 6:00 P.M. EST
7:00 A.M. – 5:00 P.M. CST



email: plic@tva.com • website: www.tva.com/plic





Regional Resource Stewardship Council

November 14 - 15, 2017
Guntersville, Alabama



Agenda – Nov 15, 2017

8:30	Welcome and Recap	Liz Upchurch, Facilitator
8:45	Preliminary Water Use Report	Amanda Bowen
9:15	Prepare for Public Comment Period	
9:30	Public Comment Period	Upchurch, Facilitator
10:30	Council Discussion / Form Advice	Upchurch, Facilitator and Council
12:00	Wrap Up and Adjourn (lunch available for Council Members)	Kennedy / Hoagland

Day 1 Recap

- Updates on River and Natural Resource Management
- Update of Natural Resource Plan
- TVA Public Land Protection Program



Water Use in the Tennessee Valley for 2015: Preliminary Results

Amanda Bowen, PE
November 15, 2017

The Importance of Water in the TN Valley

“The principal water problem in the early twenty-first century will be one of inadequate and uncertain supplies...”

- National Research Council

TN River System is the fifth largest river system in the US

Nearly 5 million people rely on the Tennessee River and its tributaries for their source of drinking water

Over 700 surface water intakes rely on TVA's reservoirs for adequate supply



Why the Concern?



The **quality of life** in our region **depends upon ample water** for homes, businesses, farms, meeting places, and recreational activities



Dependable water is as fundamental to the economic growth of the region as is dependable, low-cost electricity



It is anticipated that **water supply and water-quality issues, coupled with emerging water-use conflict over a fixed supply, will continue to increase** across the southeast

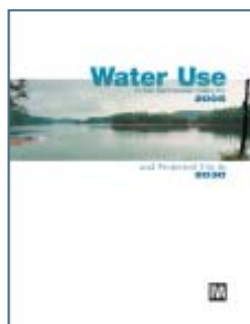
Southeastern US Population Growth

	1990 Population ¹	2015 Population ¹	Growth Rate (%)
Georgia	6,478,149	10,199,398	57
North Carolina	6,632,448	10,035,186	51
Virginia	6,189,197	8,367,587	35
Tennessee	4,877,203	6,595,056	35
US Average	248,790,925	320,896,618	29
Alabama	4,040,389	4,853,875	20
Kentucky	3,686,892	4,424,611	20
Mississippi	2,575,475	2,989,390	16

¹US Census

Water Use Report History

Water Use Study initiated with 2000 Water Use Estimates and 2030 Projections



Validates estimates from the 2000 Report and increases projections to 2035



2000

2005

2010

2015

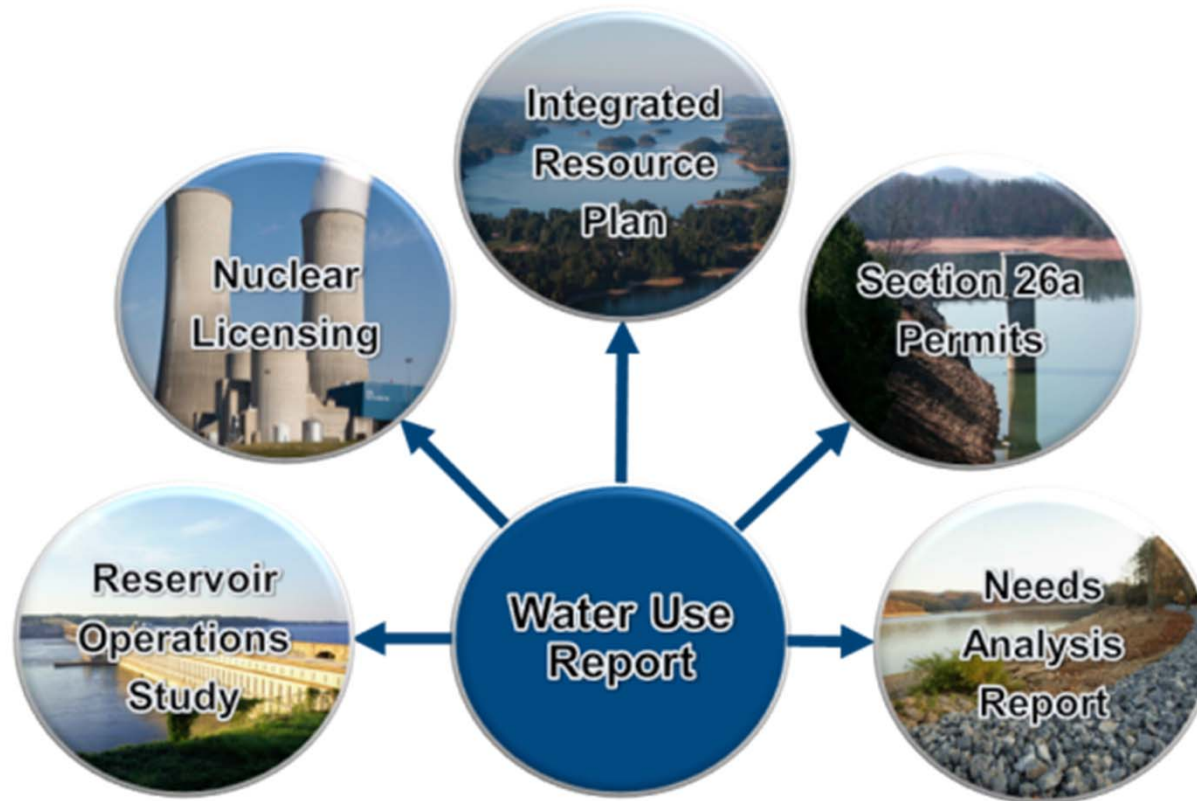


Validates estimates from the 2000 Report and verifies projections to 2030



Validates estimates from 2000 Report and plans to increase projections to 2040

TVA's Uses of the Water Use Report



Improvements from Previous Reports

- Only Report Data by Reservoir Catchment Areas
 - Previous reports reported data by State/County, 6 digit HUC, and Reservoir Catchment Area
 - Improved to align with TVA's uses of the report
- Extend projections to 2040
 - Previous Reports reported to 2030 and 2035
 - Improved to further projection
- Enhanced Graphics with GIS Partnership
 - Previous reports had minimal graphics
 - Improved for visual interpretation of results

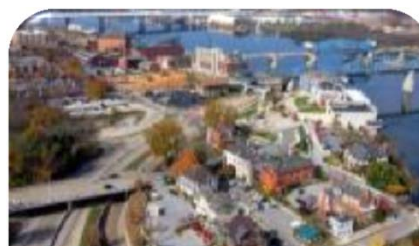
Water Use in 2015

Withdrawal Total – 10.0 billion gallons per day



Thermoelectric Cooling

8,224 mgd
~82% of total



Municipal Supply

695 mgd
~7% of total



Industrial Supply

1,033 mgd
~10% of total



Irrigation

63 mgd
~1% of total

Water Use in 2015

Withdrawal Total – 10.0 billion gallons per day

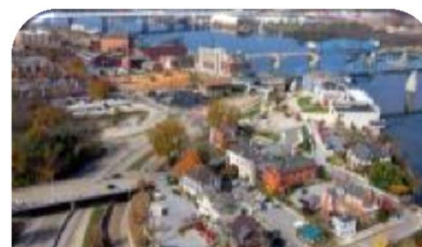
Return Total – 9.59 billion gallons per day



Thermoelectric Cooling

8,224 mgd
~82% of total

**8,155 mgd
~1% loss**



Municipal Supply

695 mgd
~7% of total

**462 mgd
~33% loss**



Industrial Supply

1,033 mgd
~10% of total

**974 mgd
~6% loss**

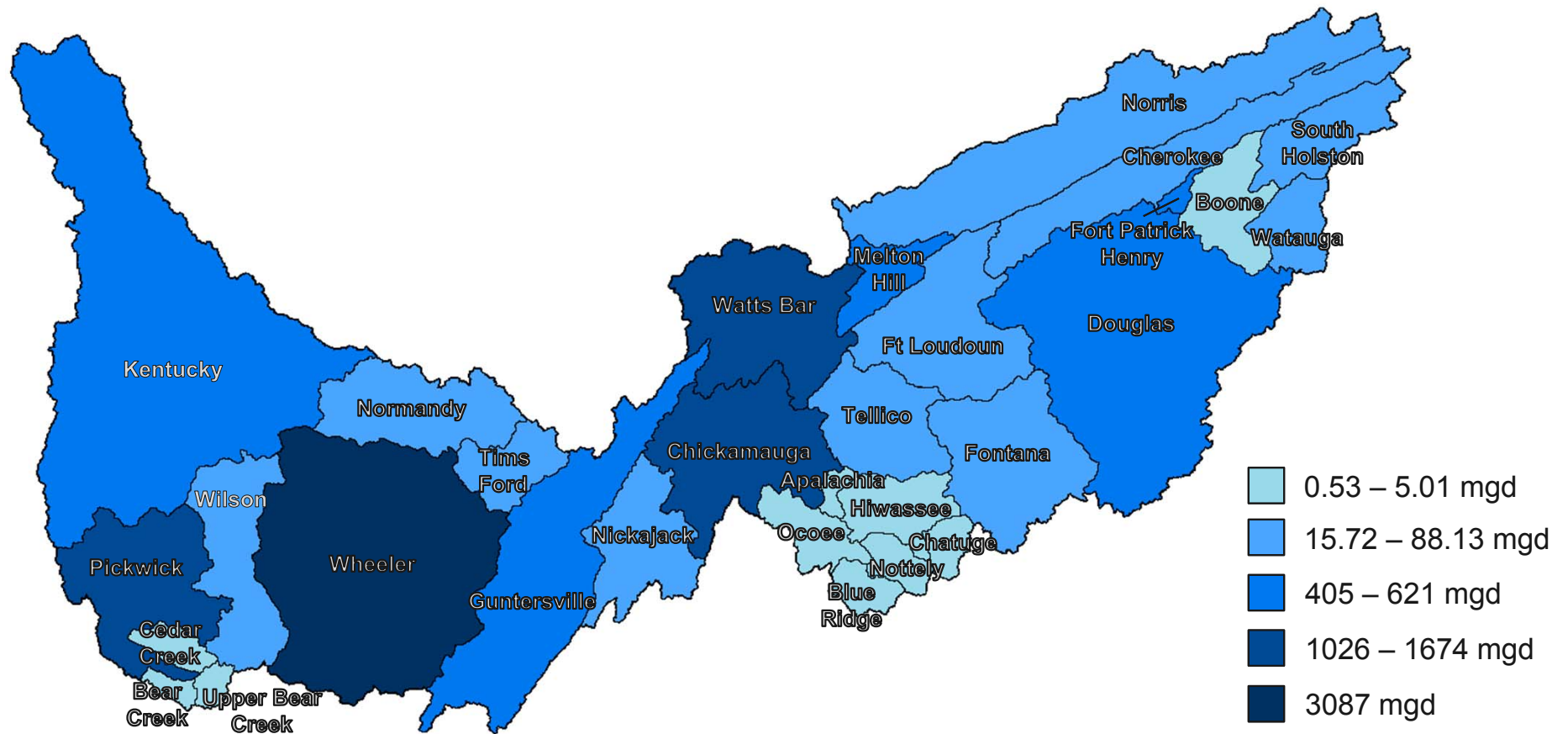


Irrigation

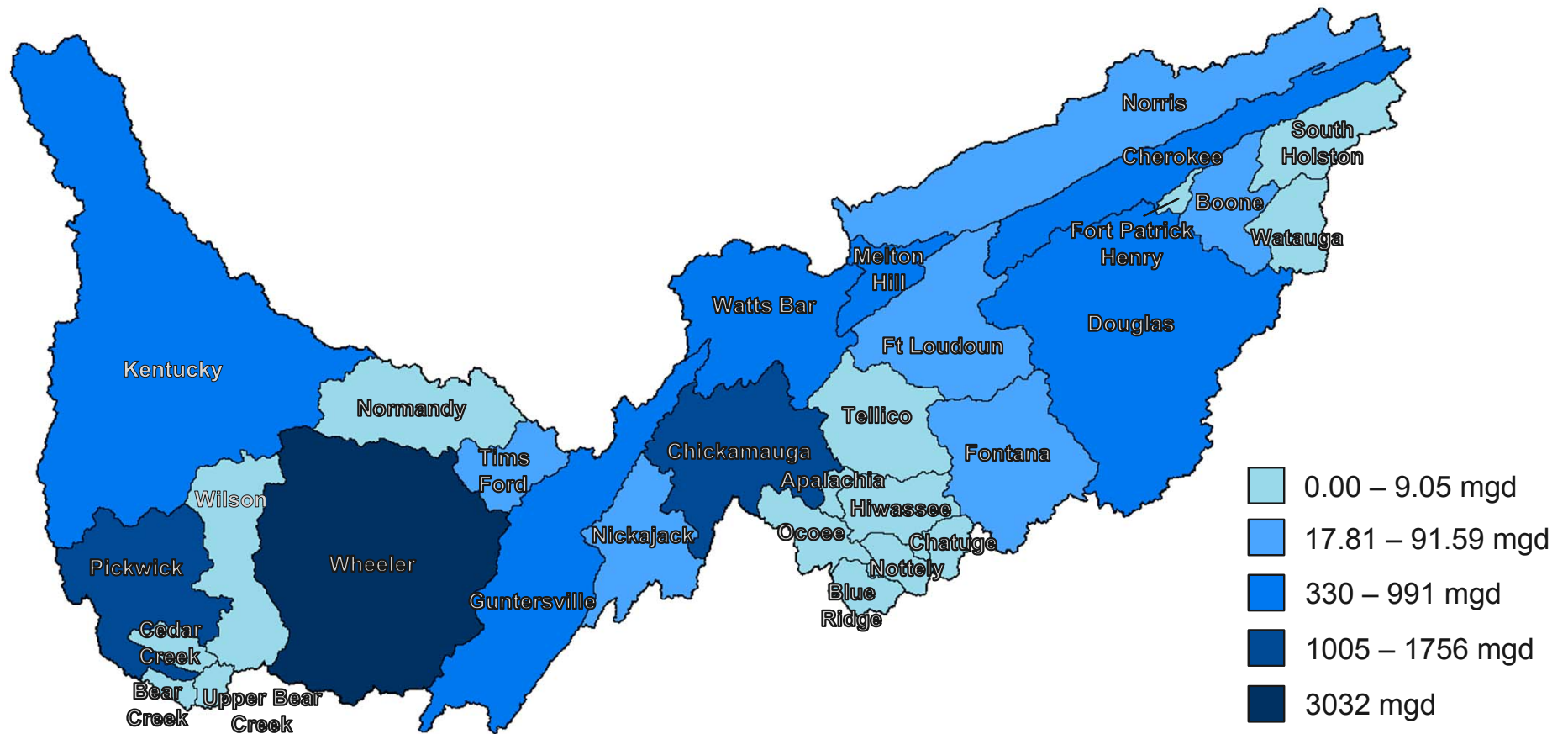
63 mgd
~1% of total

**0 mgd
100% loss**

Withdrawals by Reservoir



Returns by Reservoir



Comparison of Water Use Over 20 Years

	1995 (mgd)	2000 (mgd)	2005 (mgd)	2010 (mgd)	2015 (mgd)	% Change 1995 to 2015
Total Withdrawal	10,008	12,211	12,437	11,951	10,015	+0.1%
Thermoelectric	8,010	10,276	10,531	10,046	8,224	+2.7%
Industrial	1,030	1,205	1,179	1,148	1,033	+0.3%
Public Supply	574	662	684	723	695	+21%
Irrigation	48	69	43	34	63	+31%
Consumptive Use	Unknown	649	432	471	424	
Consumptive Use as % of WD		5.3%	3.5%	3.9%	4.2%	

Steps Before Final Publication

- Complete projections to 2040
- Complete peer review

Goal is for the publication to be released to the public on tva.gov early 2018





Break
Prepare for Public Comment Period

Public Comment Period

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





RRSC Discussion and Advice

Advice Questions

1. If TVA pursues the sale of public land to resolve legacy house encroachments with flexibility, how can TVA discourage future house encroachments?
2. What role should TVA play in protecting the public land it has in its custody and control? In what ways should the public be informed of this role?
3. Based on previous advice, if TVA's direction is to take a firm approach on enforcement and resolution of future encroachments, are there situations where deviating from this approach should be considered as appropriate?
4. How can TVA engage its silent stakeholders, particularly those who are public land advocates and do not support the use of public property for private gain but may not currently participate in opportunities to express their viewpoints to TVA leadership?



Wrap Up and Adjourn



Lunch



Thank you and please travel safely!

- ◆ The RRSC provided the following “guiding principles” for the NRP during its meeting in January, 2011

Guiding Principle	How It Is Incorporated
Managing the river comes with the responsibility, along with the TVA mandated mission on Stewardship, to do a first class job of managing the water, shoreline, and natural resources	— The NRP, at a minimum, provides TVA with a plan to go beyond basic legal requirements and satisfy the goals of the proactive stewardship set forth in the Environmental Policy
Continue to invest. Biggest success is public-use benefit (visible) to garner public support and maximize benefits/return on investments	— A third-party natural resource economist was retained to evaluate the public benefit of each proposed program, and results were taken into consideration during NRP development
Cost of all programs borne by rate payers and must be balanced with TVA’s low-cost energy mission and economic development	— The NRP presents multiple implementation tools and strategies to meet the growing resource challenges associated with natural resources management (e.g., partnerships, volunteer program, etc.)
Where possible and appropriate, integrate and leverage cross-program benefits with each other into a “portfolio” (e.g., water quality reservoir improvement with Clean Marinas, aquatic biology, etc.)	— TVA has proposed an NRP program mix that takes into account the interconnectivity of each resource area and its supporting programs, helping to establish a foundation on which TVA may build more comprehensive stewardship practices in the future



RRSC Guiding Principles: Summary (Cont'd)

Guiding Principle	How It Is Incorporated
Recognize that some activities (e.g., public outreach, data management, evaluation, boundary marking, etc.), are part of program implementation – not stand-alone programs	<ul style="list-style-type: none">— Some programs presented in the draft NRP were mainly focused on implementation or data collection methods (e.g., LCA's, recreation surveys, foundation and trust fund)— The final NRP will separate out “tools” versus “programs”, providing a clearer distinction for public understanding
Create public awareness of TVA's non-power accomplishments and current activities	<ul style="list-style-type: none">— The NRP provides a history of TVA's past accomplishments across the four resource areas and promotes a number of public outreach programs
Look at risks of doing/not doing stewardship activities (priority on protecting non-renewable resources, e.g., threatened and endangered species, archeological, and historical resources)	<ul style="list-style-type: none">— At a minimum, the draft NRP assessed compliance with all laws, regulations, and policies. Moving forward, TVA is committed to addressing the risks of not meeting this level of support in the final NRP
Be clear and concise on communicating the NRP with the public (clarify “custodial,” “flagship,” valuation process, TVA statutory requirements, etc.)	<ul style="list-style-type: none">— TVA continues to promote the NRP throughout the Valley, providing opportunities for the public to ask questions and submit comments. In addition, TVA is committed to incorporating public feedback in the final NRP

Guiding Principle	How It Is Incorporated
Encourage and incorporate public input into the development of the NRP, allowing for sufficient time and opportunity to comment.	— Public input is being solicited through the public comment period, visits to a number of other agencies, and RRSC advice
Explain the purpose and process of NRP and its limitations	— The introductory chapters of the draft NRP provide a detailed description of the purpose and overall planning process as well as highlight how the NRP will drive stewardship decisions in the future
The NRP is a living document. Ensure review and revise as needed at appropriate intervals, not to exceed five years	— TVA is committing to update the NRP on a regular schedule similar to the IRP (every 5 years)

Charter of the Regional Resource Stewardship Council

(Ninth Term)

1. **Committee's Official Designation.** Regional Resource Stewardship Council (the Council).
2. **Authority.** The Council is a discretionary advisory committee established under the authority of the Tennessee Valley Authority (TVA) in accordance with the provisions of the Federal Advisory Committee Act (FACA), as amended, 5 U.S.C., App. 2.
3. **Objective and Scope.** Under the TVA Act, the Tennessee Valley Authority has been charged with the wise use and conservation of the natural resources of the Tennessee River drainage basin and adjoining territory for the general purpose of fostering the orderly and proper physical, economic, and social development of the Tennessee Valley region. As the region has developed and the population grown, the stewardship of its natural resources has become both more complex and more important. TVA has always cooperated and worked closely with other public agencies and private entities that have responsibilities for and interest in the use and conservation of the region's natural resources. As competition for finite resources grows, fulfilling TVA's integrated resource stewardship mission will require increased cooperation with these other public agencies and private entities. It is in TVA's interest, and the interest of the public it serves, to establish a mechanism for routinely obtaining the views and advice of the public agencies and private entities involved in and affecting natural resources stewardship. Accordingly, TVA establishes the Regional Resource Stewardship Council to provide TVA advice on its stewardship activities and the priorities among competing objectives and values. 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.
4. **Description of Duties.** In accordance with the Tennessee Valley Authority Act of 1933 and the Federal Advisory Committee Act, the purpose of the Council is to provide advice only, and TVA retains sole responsibility for the management and operation of its stewardship activities and for all decisions regarding matters under consideration by the Council.
5. **Agency or Official to Whom the Council Reports.** The Council reports its advice to the committee of the TVA Board of Directors having responsibility for natural resource stewardship.
6. **Support.** TVA shall provide the Council with sufficient facilities in which to conduct its meetings and to provide a repository for its minutes and other records. TVA will also provide the Council with appropriate clerical support as needed. TVA shall provide such additional funding as reasonably necessary to achieve the purposes for which the Council was created and shall provide any further guidelines and management controls as may be necessary to further the objectives of the Council.
7. **Estimated Annual Operating Costs and Staff Years.** The estimated annual operating costs of the Council are \$120,000 and TVA staff time equal to 1.0 full-time equivalent.
8. **Designated Federal Officer.** The TVA Board of Directors, or its designee, shall appoint the Designated Federal Officer (DFO) for the Council, which shall be a full-time or permanent part-time employee of TVA. As required by law, the DFO (or other employee designated

and trained as an alternate DFO) shall approve or call all of the Council's meetings and any meetings of subcommittees, approve the agenda for each meeting, attend all meetings of the Council and its subcommittees, adjourn any meeting when the DFO determines adjournment to be in the public interest, and chair meetings when the designated Chair of the Council is not in attendance and when directed to do so by the TVA Board of Directors or its designee.

- 9. Estimated Number and Frequency of Meetings.** The Council shall meet approximately twice annually at the call of the DFO in concurrence with the Chair of the Council.
- 10. Duration.** The Council is expected to be needed on a continuing basis.
- 11. Termination.** In accordance with the Federal Advisory Committee Act, the Council will terminate no more than two years from the effective date of this charter unless it is renewed.
- 12. Membership and Designation.** Members of the Council shall be considered representatives of the group, organization, or other entity identified by TVA in making the appointment. The Council shall consist of up to 20 members appointed by TVA. All members of the Council shall be persons possessing demonstrated professional or personal qualifications relevant to achieving TVA's stewardship mission. The TVA Board of Directors, or its designee, shall ensure that the membership of the Council is balanced and that it represents and includes a broad range of diverse views and interests, including recreational, environmental, industrial, business, consumer, educational, and community leadership interests.

The Governors of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia will each be asked to nominate a member to the Council, taking into account the need for a balanced and diverse membership.

TVA shall appoint seven members nominated by the Governors and shall appoint up to 13 additional members. The membership of the Council shall include at least four members representing distributors of TVA power and at least one member representing each of the following interests: a directly served customer of TVA, a beneficiary of TVA's navigation program, a beneficiary of TVA's flood control program, a recreational interest, and an environmental interest. TVA will appoint up to four additional members to ensure a balanced representation of a broad range of views.

Each member shall be appointed for a term of two years. Whenever a vacancy occurs, TVA may appoint a replacement for the remainder of the applicable term. TVA shall designate one Council member as Council Chair.

Each member shall serve without compensation and shall not be considered an employee of TVA. However, members engaged in the performance of their Council duties away from their homes or regular places of business may be allowed reimbursement for travel expenses, including per diem in lieu of subsistence, as authorized by 5 U.S.C. 5703.

- 13. Subcommittees.** TVA will create any subcommittees which may be necessary to fulfill the Council's mission. Any subcommittees created must report back to the Council, and shall

not provide advice or work products directly to TVA.

- 14. Recordkeeping.** The records of the Council, formally and informally established subcommittees, or other subgroups of the Council shall be handled in accordance with General Records Schedule 6.2 or other approved agency records disposition schedule. These records shall be available for public inspection and copying, subject to the Freedom of Information Act, 5 U.S.C. § 552.

- 15. Filing Date.** April 29, 2016