

Appendix A – Global Reporting Initiative (GRI) Metrics

TVA’s Sustainability Report is intended to provide data and context for TVA’s sustainability performance over the previous fiscal year. To meet stakeholders’ needs for comparable and material data in sustainability reporting, TVA engages with industry-standard disclosure frameworks, including the following Global Reporting Initiative and the Sustainability Accounting Standards Board. TVA’s data management processes support data accuracy and consistency across reporting platforms. All metrics are reviewed by the Disclosure Control Committee and internal subject matter experts during the Sustainability Report review process before publication.

Disclosure	Location	Metric	FY 21	FY 22	FY 23
GRI 2: General Disclosures 2021					
2-1 Organizational details	10-K	Total Owned Summer Net Capability at the end of year (MW) ⁵	32,433	32,012	32,139
		Owned Coal Summer Net Capability at the end of year (MW)	6,580	6,580	5,815
		Owned Natural Gas Summer Net Capability at the end of year (MW) ⁵	12,183	11,777	12,638
		Owned Nuclear Summer Net Capability at the end of year (MW)	8,275	8,232	8,232
		Owned Petroleum (Diesel) Summer Net Capability at the end of year (MW)	9	9	9
		Owned Total Renewable Energy Resources Summer Net Capability at the end of year (MW)	5,386	5,409	5,440
		Owned Biomass/Biogas Summer Net Capability at the end of year (MW)	0	0	0
		Owned Geothermal Summer Net Capability at the end of year (MW)	0	0	0
		Owned Hydroelectric Summer Net Capability at the end of year (MW)	5,385	5,408	5,439
		Owned Solar Summer Net Capability at the end of year (MW)	1	1	1
		Owned Wind Summer Net Capability at the end of year (MW)	0	0	0
		Owned Other Summer Net Capability at the end of year (MW)	0	5	5
		Total Owned Net Generation (GWh)	139,300	135,667	135,528
		Nuclear Generation (GWh)	66,265	64,475	67,102
		Natural Gas and/or Oil-Fired Generation (GWh)	33,290	36,259	34,467
		Coal-fired Generation (GWh)	23,391	20,999	20,896
		Hydroelectric Generation (GWh)	16,354	13,934	13,063
		Petroleum Generation (GWh)	0	0	0
		Total Renewable Energy Resources Generation (GWh)	16,354	13,934	13,063
		Total Purchased Power Generation (GWh)	20,478	29,789	24,263
Purchased Power Renewable Generation (GWh)	7,269	8,684	7,838		
2-3 Reporting period, frequency and contact point	Sustainability Report, p. 1				

Disclosure	Location	Metric	FY 21	FY 22	FY 23
2-6 Activities, value chain and other business relationships	Public Power Partnerships	Commercial Retail Electric Customer Count (average of CY) ⁴	17	16	17
	10-K	Industrial Retail Electric Customer Count (average of CY) ⁴	43	45	44
	Supplier Diversity	Residential Retail Electric Customer Count (average of CY) ⁴	0	0	0
2-7 Employees	10-K	Total Number of Employees	10,192	10,390	10,901
2-8 Workers who are not employees	10-K	Total Number of Contractors	15,544	16,227	15,676
2-9 Governance structure and composition	Governance	Total number of Board of Director Members	7	5	9
2-10 Nomination and selection of the highest governance body	Bylaws of the Tennessee Valley Authority				
2-11 Chair of the highest governance body	Board of Directors				
2-12 Role of the highest governance body in overseeing the management of impacts	Board Practices				
2-13 Delegation of responsibility for managing impacts	Board Practices				
2-14 Role of the highest governance body in sustainability reporting	Charter of the External Stakeholders and Regulation Committee, V. Responsibilities of the Committee, C. Corporate Sustainability				
2-15 Conflicts of interest	Board Conflict of Interest Policy				
2-16 Communication of critical concerns					
2-17 Collective knowledge of the highest governance body					
2-18 Evaluation of the performance of the highest governance body	10-K				
2-19 Remuneration policies	10-K				
2-20 Process to determine remuneration	10-K				
2-21 Annual total compensation ratio	10-K				

Disclosure	Location	Metric	FY 21	FY 22	FY 23
2-23 Policy commitments	Appendix E - TVA Sustainability-Related Disclosures, Plans and Policies				
2-25 Processes to remediate negative impacts	NEPA at TVA				
2-26 Mechanisms for seeking advice and raising concerns	Our Public Advisory Councils				
2-27 Compliance with laws and regulations		Compliance: Notice of Violations (NOV)	1	4	1
2-29 Approach to stakeholder engagement	Get Involved Stay Involved				
2-30 Collective bargaining agreements	Union Partnerships (tva.com)	Percentage of total employees covered by collective bargaining agreements	60%	58%	58%
GRI 3: Material Topics 2021					
3-1 Process to determine material topics	Sustainability Report, p. 6				
3-2 List of material topics	Sustainability Report, p. 6				
3-3 Management of material topics	Sustainability Report, p. 6				
GRI 201: Economic Performance 2016					
201 General Response		Non-Fuel Delivered Cost of Power (cents/kWh)	3.22	3.18	3.40
		Retail Rate (cents/kWh)	9.18	10.25	10.25
		Operating Cash Flow (\$M)	3,256	2,948	2,872
		Net Income (\$M)	1,512	1,108	500
		Nuclear Unit Capability Factor	90.5%	N/A	N/A
		Annualized Nuclear Online Reliability Loss Factor (%)	NEW	1.13%	1.53%
		Load Not Served (System Minutes)	3.2	4.5	3.1
		Reliability Rating (Transmission System) (%)	99.999%	99.999%	99.999%
		Inventory Value—Materials and Supplies Inventory (\$M)	775	808	849
		External Nuclear Performance Measures	91.1%	94.0%	94.1%
		Total Annual Capital Expenditures (\$M) ⁶	1,963	2,361	2,526
		Coal Equivalent Availability Factor (EAF)	71.6%	74.9%	74.8%
		Combined Cycle Equivalent Availability Factor (EAF)	85.3%	83.3%	83.9%
		Economic Development - Capital Investment in the Valley (\$B)	8.8	10.2	9.2

Disclosure	Location	Metric	FY 21	FY 22	FY 23
201-1 Direct economic value generated and distributed	10-K	Operating Revenues (\$M)	10,503	12,540	12,054
		O & M Expense (\$M)	2,890	2,986	3,372
		Total Spend (\$M)	5,144	5,580	6,168
		Total Financing Obligations (\$B) ¹	20.5	20.3	20.5
	10-K	Annual Tax Equivalent Payments (\$M) ⁷	500	512	611
201-2 Financial implications and other risks and opportunities due to climate change	Climate Action Adaptation and Resiliency Plan				
201-3 Defined benefit plan obligations and other retirement plans	10-K	Qualified pension plan liabilities (\$B)	13.3	10.5	10.1
		Net periodic benefit cost (\$M)	258	258	199
GRI 202: Market Presence 2016					
202-1 Ratios of standard entry level wage by gender compared to local minimum wage					
GRI 203: Indirect Economic Impacts 2016					
203-1 Infrastructure investments and services supported		Incremental Annual Electricity Savings from EE (MWh) (CY)	19,777	37,708	133,896
		Incremental Annual Investment in EE programs (\$) (CY)	25,386,000	33,296,000	39,105,000
203-2 Significant indirect economic impacts		Jobs Created (#)	22,599	26,512	12,276
		Jobs Retained (#)	58,350	40,027	46,135
		Flood Management: Avoided Flood Damage (\$M)	170	3	7
GRI 204: Procurement Practices 2016					
204 General Response		Supplier Diversity: Total Diverse Business Spend (\$M)	365	518	522
		Supplier Diversity: Diverse Business Utilization (%)	10.8%	13.9%	12.4%
		Supplier Diversity: Total Small Business Spend (\$M)	856	1.1 billion	1.2 billion
		Supplier Diversity: Small Business Utilization (%)	25.2%	30.3%	28.2%
		Supplier Diversity: Total Valley Business Spend (\$B)	1.8	2	2.4
204-1 Proportion of spending on local suppliers	Supplier Diversity	Valley Spend Utilization (%)	52.80%	55.3%	57.3%
GRI 205: Anti-corruption 2016					
205-1 Operations assessed for risks related to corruption	10-K				
205-2 Communication and training about anti-corruption policies and procedures	Code of Conduct				
	Executive Code of Conduct Supplier Code of Conduct	Percent employees completing ethics training (%)	NEW	NEW	100%

Disclosure	Location	Metric	FY 21	FY 22	FY 23
205-3 Confirmed incidents of corruption and actions taken	OIG TVA Semiannual Report: October 1, 2022 - March 31, 2023 Semiannual Report: April 1, 2023 - September 30, 2023	Ethics violations (#)	NEW	NEW	23
GRI 207: Tax 2019					
207-1 Approach to tax	10-K 10-K				
207-2 Tax governance, control, and risk management	TVA Act, Section 13				
207-4 Country-by-country reporting	10-K				
GRI 302: Energy 2016					
302-1 Energy consumption within the organization		Building source energy use (MMBTU)	NEW	NEW	2,031,414
	TVA FY 22 Sustainability Scorecard	Building renewable energy use (MWh)	NEW	NEW	75,572.7
		Building non-renewable energy use (MWh)			277,758.1
		Building Renewable Energy Use (% renewable sources) (EO 13834)	20.2%	20.7%	21.4%
		Building Non-Renewable Energy Use (% non-renewable sources) (EO 13834)	NEW	NEW	78.6%
302-4 Reduction of energy consumption	Federal Sustainability Plans and Performance	Building Energy Intensity Progress (% reduction from FY2003: Btu/GSF) (EO 13834)	74.80%	76.40%	81.40%
		Sustainable Buildings Progress (% reduction from baseline: GSF)	22.3%	22.3%	22.3%
302-5 Reductions in energy requirements of products and services	TVA EnergyRight	Gross energy savings from EnergyRight energy efficiency programs (kWh)	NEW	NEW	118,305,331
		Gross carbon avoidance from EnergyRight energy efficiency programs (Tons)	NEW	NEW	356,536
GRI 303: Water and Effluents 2018					
303-1 Interactions with water as a shared resource	Managing the River				
303-2 Management of water discharge-related impacts	Water Quality (and Reservoir Release Improvement Program)				
303-3 Water withdrawal		Water: Total Water Withdrawal-non consumptive (Billions of Liters/Net MWh) (CY)	0.0000823	0.000231	0.000089
		Total water withdrawal (Megaliters) (CY)	NEW	NEW	12,206,388
303-4 Water discharge		Total water discharge (Megaliters) (CY)	NEW	NEW	12,109,136
303-5 Water consumption		Water Supply: Freshwater Consumption Rate (All Generation) (Billions of Liters/Net MWh) (CY)	0.0000008	0.0000007	0.0000007
		Total freshwater consumption (Megaliters) (CY)	NEW	NEW	97,252

Disclosure	Location	Metric	FY 21	FY 22	FY 23
GRI 304: Biodiversity 2016					
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas		See GRI Appendix			
304-2 Significant impacts of activities, products and services on biodiversity		See GRI Appendix			
304-3 Habitats protected or restored		See GRI Appendix			
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations		See GRI Appendix			
GRI 305: Emissions 2016					
305 General Response		Clean Energy (Power from carbon-free sources delivered) (%)	56%	52%	55%
305-1 Direct (Scope 1) GHG emissions	Sustainability Report, p. 20 Carbon Report	CLIMATE: TVA CO ₂ e Scope 1 Emissions (Metric tons) (CY)	40,374,877	41,184,773	38,208,030
		CLIMATE: TVA CO ₂ Tons from Owned Generation (Metric tons) reported in CY	38,437,510	38,966,496	36,261,940
		CLIMATE: Purchased Generation CO ₂ Emissions (Metric tons)	7,192,903	9,883,774	8,113,999
		CLIMATE: Owned and Purchased Generation CO ₂ Emissions (Metric tons) CY	45,630,413	48,850,518	44,375,939
305-2 Energy indirect (Scope 2) GHG emissions	FY 2022 Sustainability Scorecard	CLIMATE: TVA CO ₂ e Scope 2 Emissions (Metric tons) (CY) ⁸	142,802	122,840	132,355
305-4 GHG emissions intensity		CLIMATE: CO ₂ Emissions rate - System TVA Scope 2 CO ₂ Emissions Rate (Owned and Purchased lbs/MWh) reported in CY	637.67	658.06	624.94
		CLIMATE: TVA Emissions (Owned CO ₂ Tons/GWh) (CY/FY)	303	317	295
		CLIMATE: TVA Emissions (Owned CO ₂ Metric Tons/Net MWh) (CY/FY)	0.276	0.287	0.268
		CLIMATE: Owned and Purchased Generation Emissions (Owned and Purchased CO ₂ Metric Tons/Net MWh) (CY/FY)	0.286	0.338	0.278
305-5 Reduction of GHG emissions		Scope 1 and 2 GHG Emissions (% reduction from FY2008)	58.4%	64.1%	61.1%

Disclosure	Location	Metric	FY 21	FY 22	FY 23
305-7 Nitrogen oxides (NO _x), sulfur oxides (SO _x), and other significant air emissions		Air: TVA SO ₂ Emissions (Metric tons) (CY) ⁵	25,226	22,331	17,736
	Air Quality	Air: TVA NO _x Emissions (Metric tons) (CY) ⁵	15,210	15,270	13,221
		Non-Generation Fugitive CO ₂ e Emissions: Sulfur Hexafluoride (Metric tons) (CY)	74,619	62,133	81,236
		Air: TVA Mercury Emissions (kg) (CY)	22.26	39.17	47.44
GRI 306: Waste 2020					
306-1 Waste generation and significant waste-related impacts	10-K				
306-2 Management of significant waste-related impacts	Coal Ash (tva.com)				
306-3 Waste generated	Environmental Policy	Total non-hazardous industrial waste generated (Metric tons)	NEW	NEW	12,160
306-4 Waste diverted from disposal		Non-hazardous Municipal Solid Waste Diversion (% diverted/recycled) ²	2.98%	0.8%	1.8%
		Waste: Coal Combustion Products Beneficially Used (%) (CY)	59%	82%	87%
306-5 Waste directed to disposal		Non-hazardous waste directed to disposal (Metric tons)			
		Waste: Low-level radioactive waste disposal rate (ft ³ /MWh) (CY)	0.002533	0.002798	0.002076
		Waste: Amount of Hazardous Waste Disposed (Metric tons) (CY)	50.1	32	127
GRI 308: Supplier Environmental Assessment 2016					
308-1 New suppliers that were screened using environmental criteria	Supplier Code of Conduct Green Procurement	Sustainable Acquisition Progress – Obligations in Dollars containing Statutory Environmental Requirements (% of contract dollars with environmental clauses)	96.7%	97.5%	91.7%
308-2 Negative environmental impacts in the supply chain and actions taken					
GRI 401: Employment 2016					
401-1 New employee hires and employee turnover	DEIA Report FY 2023	Diverse external hires (%)	NEW	NEW	41.4%
		Total number of new employee hires	NEW	NEW	1,059
		Total number of employee turnover	NEW	NEW	559
401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	10-K Benefits & Quality of Life	Part-time employees are offered most benefits that full-time employees receive. Under certain circumstances, Leaves, FEGLI, Optional Long-Term Disability may not be available to part-time employees. Temporary benefits can vary based on full-time or part-time status			
401-3 Parental leave	Benefits & Quality of Life				
GRI 403: Occupational Health and Safety 2018					

Disclosure	Location	Metric	FY 21	FY 22	FY 23
403-8 Workers covered by an occupational health and safety management system		Workers covered by an occupational health and safety management system (#)	NEW	NEW	26,577
403-9 Work-related injuries		Safe Workplace (RIR)	0.26	0.44	0.26
		Lost Time Case Rate (OSHA)	0.04	0.07	0.04
		Days Away, Restricted, and Transfer (DART) rate (OSHA)	0.11	0.17	0.03
		Serious Injury Incident Rate (SIIR)	0.03	0.02	0.02
		Work-related Fatalities	0	1	1
403-10 Work-related ill health					
GRI 404: Training and Education 2016					
404-1 Average hours of training per year per employee		Training for Career Advancement (hours/employee)	68.65	70.16	76.29
404-2 Programs for upgrading employee skills and transition assistance programs	Benefits & Quality of Life (tva.com)	Continuing Education Contributions (\$)	436,764	465,684	479,156
404-3 Percentage of employees receiving regular performance and career development reviews		Percentage of employees receiving regular performance and career development reviews	NEW	NEW	100%
GRI 405: Diversity and Equal Opportunity 2016					
405-1 Diversity of governance bodies and employees		Military Share of Workforce (%)	17.9%	17.54%	17.27%
		People of Color Share of Workforce (%)	11.24%	11.81%	12.50%
		Women Share of Workforce (%)	20.37%	20.78%	20.99%
		Share of workforce under 30 years old	NEW	NEW	11%
		Share of workforce 30-50 years old	NEW	NEW	52.9%
		Share of workforce over 50 years old	NEW	NEW	36.1%
		Total number of Female Board of Director Members	1	1	3
		Total number of Minority Board of Director Members	1	0	0
405-2 Ratio of basic salary and remuneration of women to men		Ratio of basic salary and remuneration of women to men	NEW	NEW	91.46 %
GRI 406: Non-discrimination 2016					
406-1 Incidents of discrimination and corrective actions taken	No FEAR Report Equity Action Plan	Number of complaints filed pursuant to the No FEAR Act	NEW	NEW	33
		Total number of final agency actions finding discrimination	NEW	NEW	3
GRI 407: Freedom of Association and Collective Bargaining 2016					

Disclosure	Location	Metric	FY 21	FY 22	FY 23
407-1 Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	Supplier Code of Conduct Union Partnerships				
GRI 408: Child Labor 2016					
408-1 Operations and suppliers at significant risk for incidents of child labor	Supplier Code of Conduct TVA Code of Conduct, p. 50				
GRI 409: Forced or Compulsory Labor 2016					
409-1 Operations and suppliers at significant risk for incidents of forced or compulsory labor	Supplier Code of Conduct				
GRI 410: Security Practices 2016					
410-1 Security personnel trained in human rights policies or procedures	TVA Police				
GRI 411: Rights of Indigenous Peoples 2016					
411 General Response	Tribal Consultation Action Plan	Tribal Engagement	57	38	45
GRI 413: Local Communities 2016					
413-1 Operations with local community engagement, impact assessments and development programs		Back-to-Business Credit Program (\$)	3,219,298	N/A	N/A
		Community Care Fund (\$)	1,771,177	4,450,875	2,425,655
	Environmental Reviews Get Involved, Stay Involved	Environmental & Community Engagement (# Children participating)	26,777	3,800	
		Employee Hours Volunteered (Hours)	2,637.5	1,800.8	
		Stakeholder Survey (%) ³	78.3%	79.4%	81.0%
		Customer Loyalty (VOC Survey Results) ³	70.3%	71.3%	70.3%
		Media Tone (Positive and Neutral) ³	85.7%	83.3%	
GRI 414: Supplier Social Assessment 2016					
414-1 New suppliers that were screened using social criteria	Supplier Code of Conduct Office of the Inspector General				
GRI 415: Public Policy 2016					
415-1 Political contributions	TVA is a federal agency prohibited from participating in lobbying activities.				
GRI 418: Customer Privacy 2016					

Disclosure	Location	Metric	FY 21	FY 22	FY 23
418-1 Substantiated complaints concerning breaches of customer privacy	Protecting the Grid TVA Privacy Program Complaint Resolution Process				

¹ Revised due to reclassifications.

² Does not include construction and demolition waste.

³ Three-year average, not annual rate.

⁴ Customer count is based on meters in accordance with the definition on Form EIA-861 Annual Electric Power Industry Report.

⁵ Data does not include Caledonia Combined Cycle Plant, a leased facility operated by TVA.

⁶ Construction Expenditures based on Statement of Cash Flows.

⁷ Revised from previous reporting to address errors.

⁸ Does not include transmission and distribution losses associated with owned power system.

New and Retained Job Definitions

“New jobs” in the TVA fiscal year are newly created, paid positions at a facility of a TVA customer. “Positions” are calculated by adding (1) the number of full-time, on-site employees and/or independent contractors at the facility, (2) the total number of full-time work-from-home employees and independent contractors who reside in the TVA service territory and who spend 100% of their work time on facility-related matters, and (3) the total hours worked on facility-related matters by (a) full-time and part-time on-site employees at the facility and (b) full-time and part-time work-from-home employees who reside in the TVA service territory and who spend less than 100% of their work time on facility-related matters, divided by the number of work hours of such employees based on a 40-hour workweek. A “TVA customer” means an entity that purchases power from TVA or a distributor of TVA power. New jobs reported by TVA may include positions created during the current TVA fiscal year and certified projections of anticipated positions to be created within a five-year time frame. New job numbers reported by TVA are certified and provided to TVA by TVA customers.

“Retained jobs” are paid positions at a facility of a TVA customer that were created prior to the current TVA fiscal year and that continue to be filled in the current TVA fiscal year. “Positions” are calculated by adding (1) the number of full-time, on-site employees and/or independent contractors at the facility, (2) the total number of full-time work-from-home employees and independent contractors who reside in the TVA service territory and who spend 100% of their work time on facility-related matters, and (3) the total hours worked on facility-related matters by (a) full-time and part-time on-site employees at the facility and (b) full-time and part-time work-from-home employees who reside in the TVA service territory and who spend less than 100% of their work time on facility-related matters, divided by the number of work hours of such employees based on a 40-hour work week. A “TVA customer” means an entity that purchases power from TVA or a distributor of TVA power. Retained job numbers reported by TVA are certified and provided to TVA by TVA customers. All statistics reported are based on best available data.

Supporting Material

Disclosure 304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas

The TVA region, which includes the Power Service Area and the Tennessee River watershed, extends across about 129,000 square miles of seven states, including portions of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia (Figure 1). Numerous areas within this region, both aquatic and terrestrial, are known to support high levels of biodiversity and a disproportionate number of plant and animal species that are tracked and classified as rare at either the state or federal level. In 2021, the TVA Board of Directors approved a Biodiversity Policy (Biodiversity (tva.com)), which recognizes the important role TVA plays in

conserving species throughout the region. In the Policy, TVA recognizes:

“the importance of biodiversity to the quality of life of the region’s residents, and we work to proactively protect biodiversity through stewardship of public lands, management of the Tennessee River system, local and regional partnerships, and integration of species and habitat conservation in project planning”

TVA seeks to make life better for the people we serve through the integrated management of our region’s resources. TVA achieves this by focusing on Energy, Environment, and Economic Development. This holistic approach, combined with the large TVA service area, positions TVA as a regional leader in biodiversity conservation in an increasingly developed world.

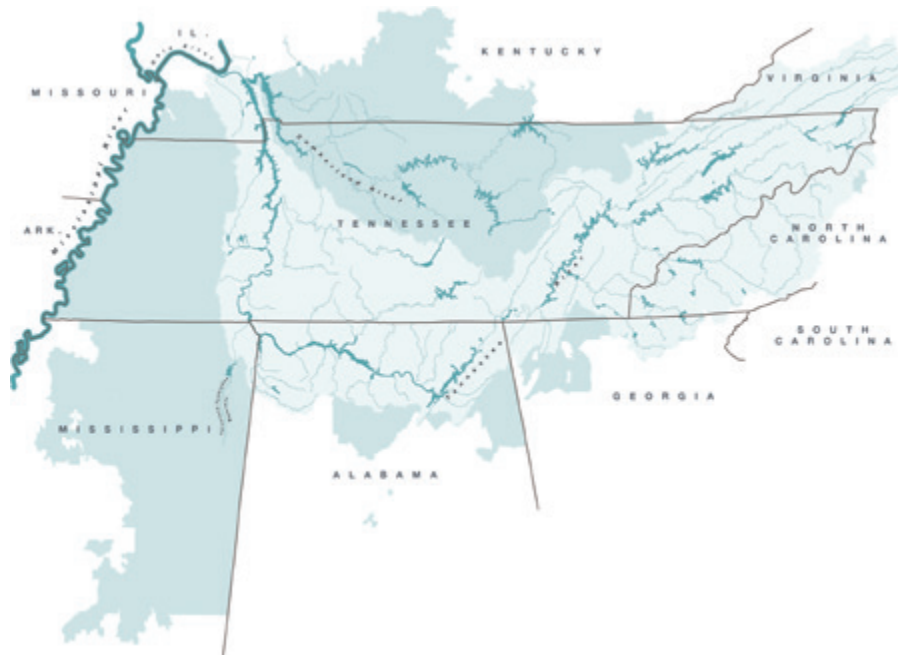


Figure 1. TVA Region comprised of the Tennessee River Watershed (light teal) and Power Service Area (teal).

Across the TVA region, TVA operates fossil plants, nuclear plants, natural gas combustion turbines, natural gas combined cycle plants, a diesel generator site, and solar sites. TVA also acquires power from a variety of other producers, generally through power purchase agreements (PPAs). These agreements include some smaller non-renewable PPAs, as well as renewable PPAs that include 4,000 small-scale solar facilities contracted under TVA renewable programs and a growing number of utility scale solar projects ([Our Power System \(tva.com\)](#)).

TVA’s hydroelectric system comprises 29 power-generating dams, a pumped storage plant near Chattanooga called Raccoon Mountain, and purchased power from eight dams on the Cumberland River operated by the U.S. Army Corps of Engineers. All but one of TVA’s power-generating dams are located on the Tennessee River system, which includes a number of tributaries, including the Holston, Clinch, Ocoee, Little Tennessee, Hiwassee, Elk, Duck, Nolichucky, Nottely, Nantahala, French Broad, Pigeon, Cheoah, and Powell, among others. TVA also operates non-power dams throughout the Tennessee River system for flood control and to provide recreational opportunities ([Hydroelectric \(tva.com\)](#)).

The TVA transmission system is the link from our generating sites to energy consumers, providing power through a network of 153 local power companies to 10 million people in the region. The system is comprised of about 16,400 miles of transmission line situated on about 240,000 acres. TVA actively manages vegetation on these rights-of-way (ROW) with the primary goal of maintaining reliability of the transmission system.

TVA also routinely maintains vegetation on about 7,000 acres of land associated with dam reservations, corporate facilities, and other facilities. These lands are managed at varying levels of intensity according to site characteristics. Management intensity ranges from frequently manicured landscapes at public-facing corporate facilities to sites that are mowed or otherwise maintained once a year or less frequently.

In addition to facilities that directly support generation and transmission of electricity, TVA manages about 293,000 acres of public land. Management of this land is guided by the Natural Resource Plan ([Natural Resource Plan \(tva.com\)](#)) and seeks to meet multiple objectives, including enhancement of biodiversity. This land is often associated with the Tennessee River system, where parcels are located adjacent to or near the river and its tributaries. The Natural Resource Plan also drives projects focused on conserving aquatic biodiversity, largely in conjunction with partners, in areas outside TVA land holdings. Selected TVA stewardship projects conducted during Fiscal Year (FY) 2023 can be found here: ([2023-Stewardship-Book](#)).

TVA operates across a wide geographic area. Aspects of those operations intersect multiple public and private resource managers that seek, at least in part, to manage terrestrial systems for biodiversity on protected lands. TVA operations intersect protected areas in a few primary ways, including on lands directly managed by TVA. TVA has a lands planning process that allocates individual parcels on its reservoir land to guide public land management on each of its reservoirs ([2020 Natural Resource Plan](#)). Three of the seven allocations have a direct nexus with biodiversity and conservation. They are described below.

1. Sensitive Resource Management: Land managed for protection and enhancement of sensitive resources. Sensitive resources, as defined by TVA, include resources protected by state or federal laws or executive orders and other land features/natural resources TVA considers important to the area view scape or natural environment. Recreational natural resource activities, such as hunting, wildlife observation and camping on undeveloped sites may occur in this zone, but the overriding focus is protecting and enhancing the sensitive resources the site supports. Areas included are:

- TVA-designated sites with potentially significant archaeological resources.
- TVA public land with sites/structures listed in or eligible for listing in the National Register of Historic Places.
- Wetlands - Aquatic bed, emergent, forested and scrub-shrub wetlands as defined by TVA.
- TVA public land under easement, lease, or license to other agencies/individuals for resource protection purposes.
- TVA public land fronting land owned by other agencies/individuals for resource protection purposes.
- Habitat protection areas - These TVA natural areas are managed to protect populations of species identified as threatened and endangered by the U.S. Fish and Wildlife Service, state-listed species and any unusual or exemplary biological communities/geological features.

- Ecological study areas - These TVA natural areas are designated as suitable for ecological research and environmental education by a recognized authority or agency. They typically contain plant or animal populations of scientific interest or are of interest to an educational institution that would utilize the area.
- Small wild areas - These TVA natural areas are managed by TVA or in cooperation with other public agencies or private conservation organizations to protect exceptional natural, scenic or aesthetic qualities that can also support dispersed, low-impact types of outdoor recreation.
- River corridors with sensitive resources present - A river corridor is a segment of a river and the adjacent land along the banks. River corridors often consist of a linear green space of TVA land serving as a buffer to tributary rivers entering a reservoir.
- Significant scenic areas - Areas designated for visual protection because of their unique vistas or particularly scenic qualities.
- Champion tree site - Areas designated by TVA as sites that contain the largest known individual tree of its species in that state. The state forestry agency "Champion Tree Program" designates the tree, while TVA designates the area of the sites for those located on TVA public land.
- Other sensitive ecological areas - Examples of these areas include heron rookeries, uncommon plant and animal communities and unique cave or karst formations.

2. Natural Resource Conservation: Land managed for the enhancement of natural resources for human use and appreciation. Management of resources is the primary focus of this zone. Appropriate activities in this zone include hunting, timber management to promote forest health, wildlife observation and camping on undeveloped sites. Areas included are:

- TVA public land managed for wildlife or forest management projects.
- TVA public land under easement, lease, or license to other agencies for wildlife or forest management purposes.
- TVA public land fronting land owned by other agencies for wildlife or forest management purposes.
- Dispersed recreation areas maintained for passive, dispersed recreation activities, such as hunting, hiking, bird-watching, photography, primitive camping, bank fishing and picnicking.
- Shoreline conservation areas - Narrow riparian strips of vegetation between the water's edge and TVA's back-lying property that are managed for wildlife, water quality or visual qualities.
- Wildlife observation areas - TVA natural areas with unique concentrations of easily observed wildlife that are managed as public wildlife observation areas.
- River corridor without sensitive resources present - A river corridor is a linear green space along both stream banks of selected tributaries entering a reservoir managed for light boat access at specific sites, riverside trails and interpretive activities.
- Islands without sensitive resources or existing development.

3. Project Operations: Land currently used, or planned for future use, for TVA operations and public works projects. The most relevant aspect of this designation for biodiversity is:

- Dam reservation land - Areas acquired and managed for the primary purpose of supporting the operation and maintenance of TVA dams and associated infrastructures; secondary uses may also include developed and dispersed recreation, maintenance facilities, miscellaneous TVA field offices, research areas and visitor centers.

While dam reservation lands are often managed for non-conservation purposes, these sites also contain habitats managed specifically for native species, such as grasslands managed with prescribed fire to enhance pollinator and wildlife habitat.

While not every aspect of these zone allocation criteria directly applies to biodiversity conservation, on the whole, species conservation is an important component of how these parcels are managed, particularly in the Sensitive Resource Management and Natural Resource Management designations. Together, parcels with these designations account for about 247,000 acres.

Another nexus of TVA operations and protected areas is the intersection of TVA transmission ROW easements and federal, state, or non-profit land managers. Examples of these land managers include the National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service, state parks, state wildlife agencies, land trusts, and municipal parks. While the specific management objectives of these entities varies based on institutional mandates, local managers, and resources present, TVA uses the Office level – Sensitive Area Review (O-SAR) process to flag portions of ROW easements that occur on protected land. This internal process maps protected areas using geographic information systems (GIS) software. TVA staff review this GIS layer before work occurs on a given transmission line ROW to determine if a protected area occurs in the proposed project footprint. If known sensitive resources are present or if the land managers expressed specific concerns about the scope of the planned work, TVA works to minimize or eliminate adverse impacts of the proposed vegetation management or infrastructure project. At the end of FY 2023, TVA had 777 natural areas polygons in the O-SAR database that extend across almost 28,000 acres of transmission line ROW.

While there is no accepted single measure of biodiversity or habitat quality, the presence of plant or animal species that are tracked as rare at the federal or state level often indicates high quality habitat that supports a multitude of species. While not a complete picture, these species of conservation concern (SOCC) can be used as a proxy to help identify sites with high levels of biodiversity. TVA defines species of conservation concern as any plant or animal species that has a NatureServe global rank of G1, G2, or G3 or is tracked by a state in the Tennessee Valley with a NatureServe state rank of S1, S2, or S3 ([Definitions of NatureServe Conservation Status Ranks](#)).

Areas of high biodiversity, or high concentrations of SOCC, do not occur uniformly across the landscape. Many areas across intersecting TVA operations have been heavily disturbed by previous or current land-use or management practices and are incapable of supporting intact native plant communities. This disturbance is sometimes the result of TVA operations, particularly on TVA lands associated with generation sites or support facilities like maintenance bases, corporate offices, or substation sites. Since transmission ROW are comprised primarily of easements that TVA does not own, degraded landscapes on ROW are often the result of land management practices conducted by the land owner.

In the TVA region and outside of protected areas mentioned above, landscape features most likely to support higher levels of biodiversity and SOCC include aquatic habitats, caves, and native grasslands on TVA transmission line ROW. These consequential sites are located across the TVA region. TVA biologists and environmental scientists frequently work with conservation partners in these areas to both better understand populations of SOCC and improve the conditions on the ground.

Disclosure 304-2 Significant impacts of activities, products and services on biodiversity

The term biodiversity has no single accepted definition, but at its simplest, it can be thought of as “the variability among living things from all sources...” (Convention on Biological Diversity 1992). This diversity, at the molecular, species, and community level, is a hallmark of intact ecosystems that produce services integral to economic stability and human well-being. While this definition and comparable alternatives may be useful to ecologists, they are difficult to communicate to a general audience or meaningfully apply in the context of TVA operations. To address this practical issue, TVA developed a relatively simple definition that describes biodiversity as:

“The full variety of plant and animal species native to the service area and how those species interact to form ecological systems”.

TVA supports and conducts many types of conservation efforts meant to further our core mission of environmental stewardship. While all these efforts have a valid objective, not every project has an appreciable biodiversity focus or intersection. Agency actions that do have a biodiversity focus or intersection are called Biodiversity Activities. These activities are defined as:

“Any TVA effort that furthers conservation of native species and ecosystems in the Tennessee Valley.”

Biodiversity is difficult to quantify on a landscape scale and there is no single standard to determine the net impacts of a company's operations on the natural world. However, TVA does implement numerous Biodiversity Activities that directly enhance biodiversity in the TVA region. The three categories of Biodiversity Activities are:

1. *On-the-Ground Action* - Efforts that directly enhance habitat for native species, including species of conservation concern (SOCC), even if that is not the primary objective of the activity. Actions can be executed directly by TVA or funded, in whole or part, by TVA and implemented by conservation partners.
2. *Monitoring and Research* - Efforts focused on understanding population dynamics of sensitive species, the distribution of plants and animals, the effectiveness of land management actions, and the effects of TVA operations on the biodiversity of the service area.
3. *Education and Outreach* - Public outreach and educational efforts that contain biodiversity-related content. This category includes TVA-led or TVA-funded partner organization efforts to implement public-facing events and educational sessions that focus on the importance of protecting biodiversity in the TVA region.

Biodiversity Activities can be ongoing programs that have relatively large impacts extending over hundreds or thousands of acres or discrete activities implemented at a specific place and time. In FY 2023, TVA engaged in 267 Biodiversity Activities that spanned all seven states of the TVA region. These activities are designed to

have positive impacts on the biodiversity of the region and can be standalone, voluntary conservation efforts or projects and programs designed to offset or mitigate TVA impacts associated with generation and transmission of electricity, operation of the Tennessee River system, or promoting economic development.

As a federal agency, TVA must comply with the National Environmental Policy Act. This federal law requires that TVA assess the environmental effects of proposed actions – such as new projects, agency plans, or changes to operations – prior to making decisions. As part of these environmental reviews and depending on the scope of the proposed action, TVA biologists perform field reviews, at their discretion, to identify resources that may be affected by the action and to determine the extent of those effects. TVA biologists are subject matter experts that specialize in terrestrial animals, aquatic animals, botany, and wetland biology and make determinations on how proposed actions could adversely affect or benefit species of conservation concern, aquatic/terrestrial habitats that are unique or important for biodiversity, the extent of invasive species, and wetlands. TVA seeks to avoid significantly impacting species or habitats important for maintaining biodiversity.

TVA conducts actions across large portions of the seven-state region where the agency operates (see 304-1), but most aspects of TVA operations do not have the potential for significant impacts on biodiversity as defined by GRI. This is because 1) most TVA actions do not intersect areas of high biodiversity, and 2) active involvement of TVA biologists helps to avoid the most severe impacts that could result from proposed projects or operational changes.

Maintenance activities at generation sites typically occur in areas that have been previously disturbed by construction and operation of the facilities. It is uncommon for these sites to support areas of high biodiversity. New construction of generation and transmission infrastructure often intersects natural habitats and results in both temporary and permanent environmental impacts, but these actions rarely result in significant impacts on biodiversity. This is because participation of TVA biologists in the environmental review process generally results in scope changes – when warranted – that reduce impacts to biodiversity below a threshold of significance or important sites for biodiversity are avoided all together. Even though most TVA operations do not have the potential to significantly impact biodiversity, management of the Tennessee River system and vegetation management along transmission line rights-of-way do intersect large portions of the landscape that support high biodiversity.

Aquatic environments in the southeastern United States are known to support high levels of biodiversity, particularly for mussels, snails and fish. In fact, the Tennessee and Cumberland River drainages are among the most biologically diverse river systems in North America and support many species at risk of extinction. Construction and operation of TVA dams have adversely impacted many aquatic species, though dam construction occurred before a modern understanding of the importance of biodiversity in aquatic systems. TVA dams provide many critical benefits, including flood control and generation of carbon-free energy, but operation of these dams also results in altered flow regimes, varying levels of in-stream temperature and dissolved oxygen, barriers to fish movement, and direct mortality in turbines.

TVA employs biodiversity activities to monitor and ameliorate the impacts associated with managing the river system. Some of these include:

Reservoir Release Improvement

The Reservoir Release Improvement Program, which is monitored with the Index of Biotic Integrity and Benthic Index of

Biotics Integrity programs, has the dual objectives of increasing wetted perimeter and dissolved oxygen below 14 TVA dams. Since it began in 1992, the program has improved dissolved oxygen in more than 300 river miles and water flow in more than 180 river miles. In addition, TVA has long-term monitoring stations on tributary reservoir tailwaters to assess improvements in aquatic communities that can be attributed to this program.

Index of Biotic Integrity

This program samples over 800 Tennessee River tributaries on a rotation to assess water quality using presence and diversity of fish and benthic macroinvertebrates as indicators of system health. The long-term dataset extends from the late 1980s to the present day and tracks trends in water quality and species distribution. It is a significant contribution to overall knowledge of the biodiversity of the Tennessee River system. In addition, the program aids in rare species monitoring and protection, provides long-term data used by TVA and other conservation partners, and facilitates collection of voucher specimens – representative sample organisms that are deposited in museums in perpetuity.

Tims Ford Dam Operations - reduction in variable flows

TVA modifies operations associated with hydropower generation at Tims Ford Dam with the goal of increasing tailwater temperature in the spring and summer and of lessening water level fluctuations year-round, especially at times critical to successful reproduction of the boulder darter, a federally endangered fish. Operational changes attempt to simulate natural flow regimes and water temperatures downstream of Tims Ford Dam. Because of the changes to the operation of Tims Ford Dam agreed to by TVA and the U.S. Fish and Wildlife Service, unnatural flow variability is reduced.

Dams without supplemental aeration

Dissolved oxygen levels are monitored at all dams that do not currently have aeration capability. If dissolved oxygen levels lower than 5 parts per million are consistently observed below any dam, measures will be implemented to modify that dam's discharge rates to improve dissolved oxygen concentration when feasible. Established minimum flows are monitored and modified if needed to ensure that there is adequate minimum flow in the tailwater reaches to maintain fish and mussel populations.

Fish protection at cooling water intake structures – Clean Water Act Section 316(b) compliance

The Final Clean Water Act Section 316(b) Rule (2014) provides that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact from impingement of juvenile and adult fish on intake screens and entrainment of fish eggs and larvae through the screens and into the cooling system. Sites must comply by reducing their intake flow via operational measures or installing technologies (e.g., modified fish-friendly traveling water screens with fish return) that will safely return fish back to the reservoir.

Grasslands are among the most imperiled plant communities in North America. A few generations ago, native grasslands were relatively abundant in portions of the South; today they are rare (Noss 2013). Among other causes, habitat loss in native grasslands has occurred as a result of farming/cultivation, development, fire suppression, and invasive species. As a result, maintained transmission line ROWs are often among the only relatively intact open herbaceous habitats remaining on the landscape in the TVA region. Approximately 20 globally rare herbaceous communities, as defined by NatureServe, have the potential to occur within TVA transmission ROWs. In addition to species-rich grassland communities, ROW also support over 550

occurrences of plant SOCC. Typically, these SOCC are present only because periodic removal of woody plants from the ROW maintain the sunny conditions needed for these species to thrive.

Even though TVA vegetation management of transmission line ROWs has a net benefit on rare plant species and grassland habitats, tools like herbicide can negatively impact these sensitive resources. TVA's [Transmission System Vegetation Management: Final Programmatic Environmental Impact Statement](#) outlines the full suite of avoidance measures TVA employs to reduce impacts and increase benefits of the program. TVA uses the Office level - Sensitive Area Review program (O-SAR), which is an internal process developed to protect sensitive resources on transmission line ROWs.

In the first phase of the O-SAR process, qualified biologists perform reviews of the entire transmission system every 3 years. These desktop reviews use computer-based mapping programs and a wide array of digital data in lieu of field surveys to ascertain where sensitive resources may occur on TVA transmission line ROWs. If during the review, data indicate a sensitive resource may be present, a polygon that defines the area of interest is created within the O-SAR database and overlaid on the segment of transmission line ROW under review.

In the second phase of the O-SAR review process, specific guidance governing transmission ROW vegetation management is appended to every identified sensitive resource polygon. This guidance results in the assignment of a "Class" level for each polygon that is accompanied by specific guidance provided to TVA transmission ROW personnel to support further vegetation management planning efforts. The guidance may be informational or prescriptive and may result in limitations of particular control measures, requirements for notification to TVA biologists, or the need for site-specific field surveys to be performed by TVA biologists prior to work activities. This guidance constitutes an important aspect of the implementation of best management practices to minimize environmental impact. The guidance is particularly important to clearly define what vegetation maintenance activities are permissible within sensitive areas, taking into account the specific sensitive resources that occur or might occur on a given section of transmission ROW. The guidance also seeks to give certainty and flexibility to TVA transmission ROW personnel, who develop vegetation control activities over large areas under schedule and budget constraints.

In FY 2023, TVA employed the following Biodiversity Activities related to ROW vegetation management.

Conserving state and federally listed plant species before TVA ROW vegetation management

Over 550 occurrences of SOCC occur on TVA ROWs. The Office level - Sensitive Area Review program (O-SAR) facilitates intra-agency coordination before ROW vegetation management activities commence. The resulting avoidance measures conserve species across the transmission system including many instances of globally rare plants that often only occur on the ROW and not in the surrounding landscape.

Rare plant monitoring: federally listed plants on TVA ROW
TVA transmission line ROWs support multiple populations of plant species that are listed as endangered or threatened under the Endangered Species Act. TVA has committed to monitoring these populations over the 20-year life of the programmatic ROW vegetation management consultation with the U.S. Fish and Wildlife Service, which was completed in conjunction with the programmatic Environmental Impact Statement.

Disclosure 304-3 Habitats protected or restored

Energy, Environment, and Economic Development are all part of

the core TVA mission that seeks to make life better for the people we serve. While critical to TVA and the region, both generation and transmission of electricity and economic development projects have the potential to negatively impact biodiversity. On the other hand, initiatives and projects that aim to further TVA's environmental goals are often focused on protecting species and habitats. The two chief internal drivers for species conservation work include the Natural Resource Plan and Biodiversity Policy. The TVA Natural Resource Plan ([Natural Resource Plan \(tva.com\)](#)) guides much of the agency work that seeks to protect biodiversity on 293,000 acres of TVA reservoir lands and in the Tennessee River watershed. The scope of the TVA Biodiversity Policy ([Biodiversity \(tva.com\)](#)) is agency-wide and seeks to integrate species and habitat protection (or avoidance) into projects where the primary objective is to construct, operate, and maintain generation and transmission infrastructure or promote economic development. The value of nesting biodiversity activities (See section 304-2) within these types of projects depends on many factors including location and scope, but in an increasingly developed world, including conservation within the scope, can be very impactful and important in protecting biodiversity across the landscape.

TVA protects a significant portion of the approximately 293,000 acres of public land surrounding its reservoirs. As described in disclosure 304-1, TVA has a formal process for designating and managing about 247,000 acres to meet conservation objectives including preservation of biodiversity. In addition, TVA works to restore terrestrial communities on the 293,000 acres, in aquatic communities in the Tennessee River watershed, and increasingly on lands used for the generation and transmission of electricity. The following are selected On-the-Ground Action biodiversity activities (See 304-2 for more on biodiversity activities) conducted in FY 2023. The activities seek to directly enhance habitat for native species. Some of these include:

Grassland Restoration at Primary Systems Operation Center

TVA is restoring grassland habitat at almost 19 acres on the Primary Systems Operation Center site in Meigs County, Tennessee. This work will foster biodiversity and reduce mowing costs compared to standard mowing practices. The site will be mowed outside of the breeding bird season and weed/woody species will be selectively treated with herbicide to promote a species rich grassland populated with native plants.

Grasslands and Agricultural Lands Management (GALM)

The GALM program focuses on enhancing biological diversity on TVA's non-forested lands. Management of these lands provides habitat diversity for a wide range of plant and animal communities, as well as other environmental benefits and public use opportunities. These lands are maintained in early successional plant communities or agricultural fields, such as native warm season grasses, row crops and hay forage. Some GALM activities also fall under the "Stewardship Project Approach" and have an explicit conservation objective. This subset of GALM activities uses tools like prescribed fire to promote biodiversity by establishing early successional wildlife habitat, promoting diverse plant communities comprised of native grasses/forbs, and controlling invasive plants. This program is a part of the Land and Habitat Stewardship Focus Area of the TVA Natural Resource Plan.

Aquatic Ecology Management

The Aquatic Ecology Management Program focuses on the enhancement of aquatic biological communities in streams, reservoirs and tailwaters of the Tennessee River watershed. This enhancement may include activities, such as habitat improvement, biological monitoring and pollution reduction.

Partnering with local organizations and state and federal agencies to conduct outreach efforts to promote the value of the Tennessee River and its aquatic biodiversity is a key objective. This program is a part of the Water Resources Stewardship Focus Area of the TVA Natural Resource Plan.

Forest Resource Management

In the Forest Resource Management Program, TVA oversees forest resources by developing management plans to balance multiple uses, such as enhancing habitat, managing vegetation and controlling exotic, invasive plant species. Examples of forest health and enhancement projects include reforestation, prescribed fire, invasive vegetation control, native species conversion, implementation of unit management plans, wildlife habitat enhancements and scaled timber harvest and salvage activities. This program is part of the Land and Habitat Stewardship Focus Area in TVA's Natural Resource Plan.

Dewatering Projects Management

TVA operates, either alone or in partnership, seven dewatering projects on Kentucky Reservoir in Tennessee (Big Sandy, West Sandy, Camden, Duck River, Busseltown) and Wheeler Reservoir in Alabama (Harris-Sweetwater/Whiteside, Rockhouse). The original intent in developing dewatering areas was for malaria control. Dewatering areas currently are managed to provide food and habitat for wildlife, protect bottomland hardwood forests and provide hunting and fishing opportunities. TVA contributes funds to maintain the dewatering sites that cover approximately over 21,000 acres on Kentucky Reservoir and 4,300 acres on Wheeler Reservoir. This program is in the Land and Habitat Stewardship Focus Area of TVA's Natural Resource Plan.

Disclosure 304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations

TVA defines a species of conservation concern (SOCC) as any plant or animal species that has a NatureServe global rank of G1, G2, or G3 or that is tracked by a state in the Tennessee Valley with a NatureServe state rank of S1, S2, or S3 ([Definitions of NatureServe Conservation Status Ranks](#)). Generally, SOCC includes all species tracked as rare across the states where TVA operates and all species covered by the Endangered Species Act. While similar to the IUCN Red List for the TVA region, the TVA list of SOCC is more inclusive and contains more species.

TVA evaluates the potential impacts to SOCC when assessing the overall impacts of operations, including the planning and execution of voluntary conservation projects. These evaluations typically occur during the scoping stage of projects and are associated with an environmental review conducted in compliance with laws such as the National Environmental Policy Act and Endangered Species Act. While TVA complies with all local, state, and federal regulations, these two federal laws specifically trigger assessments of project-related impacts on biodiversity and SOCC. TVA has internal processes that ensure all proposed actions that have the potential to affect specific SOCC are reviewed by trained biologists that specialize in botany, terrestrial zoology, and aquatic biology. TVA is able to conduct these in-depth reviews because of the data and expertise maintained within the agency.

TVA is unique amongst all utilities in the United States in that it is a [NatureServe Network](#) partner and maintains an in-house Regional Natural Heritage Database. TVA manages these data in coordination with [NatureServe](#), which is the authoritative source of biodiversity

	AL	GA	KY	MS	NC	TN	VA	Grand Total
Fungus			1		6	2	7	16
Invertebrate Animal	137	44	102	27	102	163	163	738
Nonvascular Plant	7	5	13	10	22	37	14	108
Vascular Plant	131	125	195	166	90	372	91	1170
Vertebrate Animal	33	47	83	49	52	137	51	452
Grand Total	308	221	394	252	272	711	326	2484

data throughout North America. The TVA Regional Natural Heritage Database contains over 45,000 site-specific records of SOCC for all seven states across the TVA region. TVA also shares data with all seven state Natural Heritage programs. TVA biologists use these data to drive conservation and help ensure TVA projects avoid impacting species and their habitats.

As of FY 2023, the TVA Regional Natural Heritage Database contained records of 2,484 SOCC across the seven-state TVA region. Conservation status is tracked at the state level and some species are tracked across multiple states.

In FY 2023, TVA conducted 76 biodiversity activities that intersected SOCC. These biodiversity activities spanned all seven states of the TVA region and include 48 Monitoring and Research and 28 On-the-Ground Action activities; Education and Outreach activities were not included here. The biodiversity activities conducted by TVA range in size and scope from smaller, discrete actions to larger programs that span many years and multiple states. Of the 76 biodiversity activities intersecting SOCC, 60 were voluntary while the remainder had a regulatory nexus. For the 16 compliance-driven biodiversity activities, TVA biologists and subject matter experts played a direct role in designing and/or implementing the program or project to reduce

impacts of agency actions or promote species conservation. A select list of TVA biodiversity activities intersecting SOCC is included below.

Rare plant monitoring - Ruth's golden aster

Ruth's golden aster is a federally endangered species that occurs only below TVA dams on the Hiwassee and Ocoee Rivers in Polk County, Tennessee. The activity supports TVA Section 7(a)(1) responsibilities under the Endangered Species Act, which charges federal agencies to aid in the conservation of listed species. Understanding population dynamics helps to prevent extinction of this plant and conserve other species also found in the respective rivers.

Grassland restoration at Little Cedar Mountain

Portions of Little Cedar Mountain, a TVA site in Marion County, Tennessee, contain remnant native grasslands. These open areas contain a high proportion of native species, several of which are tracked by the State of Tennessee. In FY 2023, TVA cleared trees from around the edges of the glades and removed invasive plants. Thus far work has increased density of native grasses and wildflowers, including several species of SOCC.

Tuscumbia darter conservation and grassland enhancement at Lawrence County Solar

The North Alabama Solar Site encompasses about 2,800 acres in Lawrence County, Alabama, and is being developed as a utility scale solar site. As part of this effort, TVA is pursuing a multi-year study of the population dynamics of the imperiled fish Tuscumbia darter with the ultimate goal of enhancing habitat in Wheeler Branch for that species and for the rare round-rib *Elimia* snail. In FY 2023, TVA replanted about 30 acres of old agricultural field with native grasses and wildflowers. This field and Wheeler Branch will be managed as a single unit to benefit in-stream habitat and terrestrial plant and animal species. TVA also mulched about 15 acres of plantation pine trees and installed fire lines around 130 acres on the south side of the property. This area will be managed with prescribed fire to further enhance native grassland habitat. Multiple agencies helped with aquatic sampling in Wheeler Branch including the Alabama Department of Environmental Management, Alabama Department of Conservation and Natural Resources, and Geological Survey of Alabama.

Gray bat emergence at known summer roost sites

TVA monitors gray bat summer emergence annually across the TVA region, mostly in caves on TVA land. In FY 23, these sites included Norris Dam Cave (Campbell Co., TN), Beth Page Bridge (Franklin Co., TN), Bluff Cave (Jackson Co., AL), Blythe Ferry Cave (Meigs Co., TN), Hartsville Nuclear Plant (Troup Co., TN), Marble Bluff Cave (Roane Co., TN), Nickajack Cave (Marion Co., TN), Hambricks Cave (Marshall Co., AL), Quarry Cave (Marshall Co., AL), Collier Cave (Lauderdale Co., AL), Featherfoot Cave (Decatur Co., TN), and Williams Bluff (Sevier Co., TN). The activity supports TVA Section 7(a)(1) responsibilities under the Endangered Species Act.

Piper Cave restoration

The Nature Conservancy is using money granted from TVA to clean up several tons of debris from Piper Cave (Smith Co., TN) and install a bat-friendly gate. The federally endangered gray and northern long-eared bats, proposed endangered tri-colored and little brown bat, and state-listed Allegheny woodrat are all present. The activity supports TVA 7(a)(1) responsibilities under the Endangered Species Act.

Nashville crayfish follow-up surveys

As a result of U.S. Fish and Wildlife consultation, TVA relocated a population of federally endangered Nashville crayfish outside the area that would be impacted during the scheduled replacement of a transmission line structure. Data from follow-up surveys indicated more individual crayfish present after the structure was replaced because direct impacts of transmission infrastructure repair work were avoided and the streambanks were concurrently stabilized.

Cave gate construction for TVA partners

TVA worked with external partners including the U.S. Forest Service and National Park Service to construct cave gates that will be used to protect bat species occurring in cave and mine sites. In FY 2023, the partnership resulted in construction of 11 cave gates at locations in Daniel Boone National Forest and 2 for the Big South Fork. TVA possesses unique expertise in cave gate construction and is supplying this service to partners at cost. The activity supports TVA Section 7(a)(1) responsibilities under the Endangered Species Act.

Fencing of federally-listed plant Mohr's Barbara's button in Jefferson County, Alabama

TVA worked to install temporary fencing around populations of the federally-threatened plant Mohr's Barbara's button near a transmission line in Jefferson County, Alabama. This was done to prevent impacts during pole replacement in January 2023. In addition, the timing of the outage required for the transmission repair was moved from summer 2023 (growing season) to the winter (dormant season) to further reduce the likelihood of impacting the species during maintenance work.

Little Tennessee Native Fish Conservation Partnership Freshwater Mussel Release

TVA partnered with the North Carolina Wildlife Resources Commission and the Eastern Band of Cherokee Indians to release 1,600 freshwater mussels in the Little Tennessee River watershed.

Sicklefin Redhorse monitoring

TVA participated in a multi-agency collaboration to monitor sicklefin redhorse populations and promote future conservation actions. This SOCC, which is a culturally significant species to the Eastern Band of Cherokee Indians, is restricted to the upper Hiwassee and Little Tennessee river basins.

References

Noss, Reed F. 2013. *Forgotten Grasslands of the South: Natural History and Conservation*. Island Press.

Tennessee Valley Authority. 2017. *Transmission System Vegetation Management: Final Programmatic Environmental Impact Statement*.