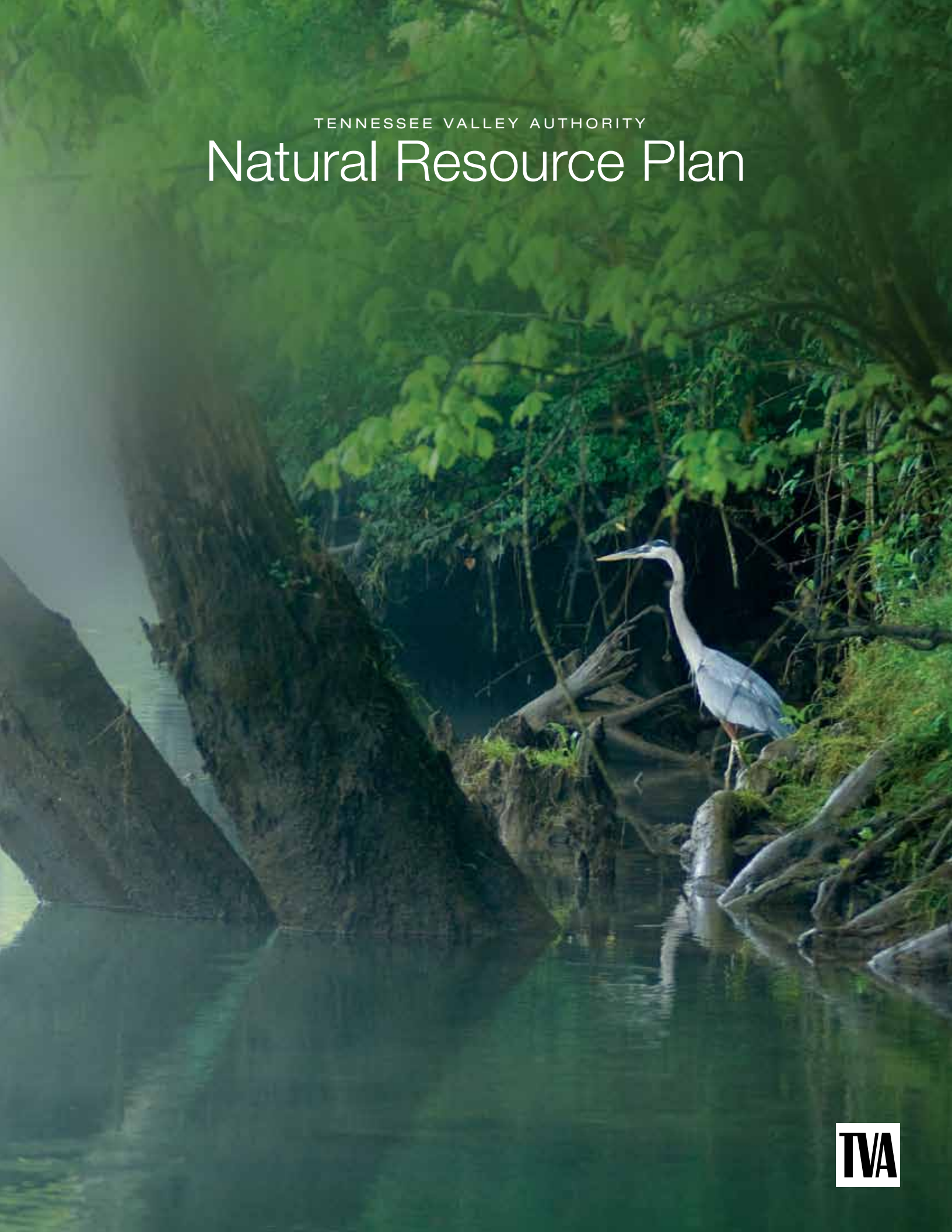
TENNESSEE VALLEY AUTHORITY

Natural Resource Plan



Message from the CEO

Those of us who live in the Tennessee Valley appreciate the remarkable and picturesque natural resources of our region. Yet, how often do we consider the value they bring to our everyday existence?

Public waterways and lands, which TVA is entrusted to manage, are vital to the quality of our lives. We all know water is essential for living, but it is also critical to generating the electricity that powers our homes, businesses and industries at a low cost.

In addition to the benefit of clean water, public shoreline and reservoir, river and stream access are central to many forms of recreation we enjoy in the Tennessee Valley, from boating and paddling to hiking and fishing. These activities, in turn, draw tourists whose recreation spending fuels local economies and creates jobs in large and small communities.

Industries are also attracted to the Tennessee Valley by the low-cost electricity, available land and access to a navigable river system. Companies can find the property, power and supplies they need to manufacture items to ship across the globe. This commerce occurs here, and employs tens of thousands of people here, in part because TVA properly manages the region's natural resources and public lands.

Just as TVA mapped out its future power generation in its recent Integrated Resource Plan, our agency has now developed a 20-year plan for natural resource management and ongoing stewardship activities.

The Natural Resource Plan creates a sound framework for balancing land use, human activity and conservation in order to achieve the greatest public benefit from our natural resources. It focuses on providing recreational opportunities; prompting economic growth; protecting sensitive cultural resources, habitat and wildlife species; and promoting water quality.

Because stewardship is a shared responsibility, the plan identifies new partnership opportunities, including continuing to work with distributors of TVA-generated power. The plan also creates avenues for greater public involvement such as volunteerism, and environmental education and outreach.

Natural resource management may not be the first thing on your mind while camping along Kentucky, Wilson, Chickamauga, Melton Hill or Fontana reservoirs, or floating down the Tennessee, Clinch, Hiwassee, Ocoee, Duck or Toccoa rivers. But every day TVA is focused on protecting and enhancing these waters and surrounding public lands.

TVA presents this Natural Resource Plan because our mission focuses on responsible stewardship, alongside clean and reliable energy and sustainable economic development. We hope this document helps you understand how all these TVA initiatives tie together for the betterment and enjoyment of life in the Tennessee Valley.

Tom Kilgore
President and CEO
Tennessee Valley Authority

Reader's Guide

The Natural Resource Plan (NRP) offers a broad range of programs to be used during the implementation of TVA's natural resources road map over the next 20 years. This reader's guide offers an overview of the NRP's structure, helping to provide clear direction to different areas of information within the document.

Executive Summary

The executive summary is an abridged version of the NRP, highlighting key goals of the plan, a history of environmental stewardship spending, an implementation outline with performance measures, and a discussion on benefits and risks.

Chapter 1 – Introduction

The introduction gives an overview of TVA's natural resources management history, objectives and programs. It also provides an overview of the NRP including its scope, how it was developed, and a discussion of natural resource management benefits.

Chapter 2 – NRP Road Map for Success

The road map for success outlines the NRP's three-phase implementation approach. It also discusses funding the plan, what success will look like, and the risks associated with not implementing the plan.

Chapters 3-8 – Resource Area Chapters

Each resource area has a dedicated chapter that presents TVA's strategy for how it will meet future stewardship responsibilities. These chapters include a brief history, a stated goal, expected outcomes and an implementation strategy for each resource area. This helps to present a high-level picture of current and future resource management efforts before getting into the details of each related program. Each resource area program included in the preferred alternative is then presented according to the following structure:[1]

Program Name

Provides a brief description of the program, defining it in a broad overview rather than through specific activities. It also identifies (if applicable) how programs align across resource areas. For instance, if a program within cultural resources management will have residual benefits or consequences for a program in another resource area (e.g., biological), this is specifically identified. The purpose is to define these alignments at the program level, as compared to the resource area level as identified in Chapter 2.

Scope: Refers to the applicable geographic area of this program. Examples include TVA reservoir lands, the Tennessee River watershed, or all TVA recreation areas.

TVA Span of Control: Refers to the degree of control TVA has over the resource(s) associated with the program. Examples include direct control (e.g., TVA forest lands), partial control (TVA has some control but often works in partnership or within a third-party agreement), and no control (e.g., enforcement of water quality standards).

Current Activities: Outlines current activities associated with the program. This level of effort matches Alternative A of the EIS.

NRP Activities: Provides a list of activities that TVA will implement over the 20-year NRP span. Collectively, all of the NRP activities presented in this document represent the preferred alternative (Alternative D) in the environmental impact statement.

Expected Benefits: Outlines unique, program-specific benefits of implementing the above NRP activities. These supplement the overall natural resources management benefits discussed in Chapter 1 and offer a brief discussion of why TVA is implementing each program.

[1] Chapter 7 – Reservoir Lands Planning follows a different structure, given that the resource area is not programmatic in nature.

Table of Contents

Executive Summary

The Natural Resource Plan 3
History of Environmental Stewardship Spending 4
Road Map for Success 5
Measures of Success 7
Benefits 7
Risks 8
Funding 8
Resource Area Summaries 9

Chapter 1 – Introduction

1.1 Tennessee Valley Authority History 25
1.2 Overview of TVA's Vision and Environmental Policy 26
1.3 Overview of the Natural Resource Plan 28
1.3.1 Resource Areas 29
1.3.2 Geographic Scope 30
1.3.3 Out of Scope 31
1.3.4 Stakeholders 31
1.4 Development Process 35
1.4.1 Determine the Scope of the NRP 35
1.4.2 Develop, Analyze, and Evaluate NRP Programs 36
1.4.3 Release the Draft NRP and EIS for Public Comment 37
1.4.4 Finalize and Issue the NRP 37
1.5 Past TVA Environmental Stewardship Spending 37
1.6 Benefits 38
1.6.1 Public and Economic Benefits 39
1.6.2 Ratepayer Benefits 39

Chapter 2 – NRP Road Map for Success

2.1 Implementation Strategy 43
2.1.1 Phase I: Years 1 to 3 43
2.1.2 Phase II: Years 4 to 5 46
2.1.3 Phase III: Years 6 to 20 48
2.2 Funding 48
2.3 Measures of Success 49
2.4 Risks 52

Chapter 3 – Biological Resources

3.1 Goal 58
3.2 Benefits 58
3.3 Implementation Strategy 58
Land Stewardship 59
Habitat and Species Management 60
Dispersed Recreation 61
Public Outreach and Awareness 62
3.4 Measures of Success 62
3.5 Resource Area Programs 63
3.5.1 Threatened and Endangered Species Program 64
3.5.2 Wetlands Management 66
3.5.3 TVA Sensitive Resources Data Management 68
3.5.4 Natural Areas Management 70
3.5.5 Migratory Birds Management 71
3.5.6 Grasslands and Agricultural Lands Management 72
3.5.7 Dewatering Projects Management 74
3.5.8 Forest Resource Management 76
3.5.9 Nonnative Invasive Plant Management 78
3.5.10 Nuisance Animal Control 79
3.5.11 Terrestrial Greenhouse Gas Sequestration Management 80
3.5.12 Wildlife Habitat Council – Third-Party Certifications 81
3.5.13 Wildlife Habitat Enhancement Partnerships 82
3.5.14 Boundary Maintenance 83
3.5.15 Land Conditions Assessment and Land Stewardship Maintenance 84
3.5.16 Conservation Planning 86
3.5.17 Dispersed Recreation Management 87
3.5.18 Leave No Trace 88
3.5.19 Trails Management 89

Chapter 4 – Cultural Resources

4.1 Goal 93
4.2 Benefits 93
4.3 Implementation Strategy 93
Enforcement 94
Protection 95
Data Management 96
Public Outreach and Awareness 97
4.4 Measures of Success 97
4.5 Resource Area Programs 98
4.5.1 Archaeological Monitoring and Protection 99
4.5.2 Archaeological Resources Protection Act 101
4.5.3 Native American Consultation 102
4.5.4 Native American Graves Protection and Repatriation Act 103
4.5.5 National Historic Preservation Act Section 106 104
4.5.6 Preservation Program 105
4.5.7 Preserve America 106
4.5.8 Archaeological Outreach (Thousand Eyes) 108
4.5.9 Corporate History Program 109

Chapter 5 – Recreation Management

5.1 Goal 114
5.2 Benefits 115
5.3 Implementation Strategy 115
Innovation 116
Enhancement/Expansion 117
Data Management 118
Public Outreach and Awareness 119
5.4 Measures of Success 119
5.5 Resource Area Programs 120
5.5.1 Management of Campgrounds on Dam or Power Plant Reservations 121
5.5.2 Management of Campgrounds off Dam or Power Plant Reservations 122
5.5.3 Day-Use Areas on Dam Reservations 123
5.5.4 Day-Use Areas off Dam Reservations 124
5.5.5 Stream Access Sites 125
5.5.6 Annual Tours 126
5.5.7 Recreation Information Management 127
5.5.8 Boating Density Assessments 128
5.5.9 Reservoir Lands Recreation Inventory Management 129
5.5.10 Recreation Design Principles 130
5.5.11 Recreation Planning, Assistance and Technical Support 131
5.5.12 Tennessee Valley Camp-Right Campground Program 132
5.5.13 Dispersed Recreation Management 133
5.5.14 Trails Management 133
5.5.15 Leave No Trace 133
5.5.16 Tennessee Valley Clean Marina Program 133

Chapter 6 – Water Resources

6.1 Goal 138
6.2 Benefits 138
6.3 Implementation Strategy 139
Water Quality Management 140
Data Management 142
Strategic Partnerships 143
Public Outreach and Awareness 144
6.4 Measures of Success 144
6.5 Resource Area Programs 145
6.5.1 Aquatic Ecology Management 146
6.5.2 Stream and Tailwater Monitoring Program 147
6.5.3 Climate Change Sentinel Monitoring 148
6.5.4 Strategic Partnership Planning 149
6.5.5 Tennessee Valley Clean Marina Program 150
6.5.6 Water Resource Outreach Campaign 151
6.5.7 Reservoir Shoreline Stabilization/ Riparian Management Program 152
6.5.8 Nutrient Source – Watershed Identification and Improvement Program 154
6.5.9 Northern Gulf of Mexico/Mississippi River Basin Nutrient Load Reductions Program 156

Chapter 7 – Reservoir Lands Planning

7.1 History of Reservoir Lands Planning 161
7.2 Goal 164
7.3 Comprehensive Valleywide Land Plan 165
Overview 165
Planning Process 168
Benefits 169
7.4 Implementation Strategy 170
7.5 Measures of Success 170
7.6 Zone Definitions 171
7.7 Current Land Zone Allocations By Reservoir 175

Chapter 8 – Public Engagement

8.1 Goal 179
8.2 Benefits 179
8.3 Implementation Strategy 180
Education and Communication 181
Involvement 182
Partnerships 183
8.4 Measures of Success 183
8.5 Resource Area Programs 184
8.5.1 Environmental Education 185
8.5.2 Volunteer Program 186
8.5.3 Foundation and Trust Fund 187

In Closing 189

Glossary and Acronyms 190

List of Figures

Executive Summary

Figure 0.1 Historical TVA essential stewardship activities spending 4
Figure 0.2 Overview of the NRP implementation strategy 5

Chapter 1 – Introduction

Figure 1.1 Environmental Policy alignment with TVA's mission 26
Figure 1.2 IRP-NRP project deliverables framework 28
Figure 1.3 NRP resource areas and supporting objectives 29
Figure 1.4 NRP geographic scope 30
Figure 1.5 Natural resource planning process 35
Figure 1.6 Key inputs to the NRP decision-making process 36
Figure 1.7 Benefits of natural resources management 38

Chapter 2 – NRP Road Map for Success

Figure 2.1 Overview of the NRP implementation strategy 42
Figure 2.2 NRP measures of success 50
Figure 2.3 Potential risks associated with not implementing resource management activities 53

Chapter 5 – Recreation Management

Figure 5.1 Land conveyed by TVA for recreation management 113

Chapter 7 – Reservoir Lands Planning

Figure 7.1 History of lands under TVA management 161
Figure 7.2 Summary of reservoir land management plans by planning methodology 163
Figure 7.3 Current zone allocations and Comprehensive Valleywide Land Plan ranges 166

Chapter 8 – Public Engagement

Figure 8.1 Resource area-specific public outreach programs 178

NATURAL RESOURCE PLAN

Executive Summary

The Natural Resource Plan 3

History of Environmental Stewardship Spending 4

Road Map for Success 5

Measures of Success 7

Benefits 7

Risks 8

Funding 8

Resource Area Summaries 9
- Biological Resources Summary 9
- Cultural Resources Summary 11
- Recreation Management Summary 13
- Water Resources Management Summary 15
- Reservoir Lands Planning Summary 17
- Public Engagement Summary 19

In the 1930s, President Franklin D. Roosevelt needed innovative solutions to lift the nation out of the depths of the Great Depression. TVA is considered one of his most innovative actions. Roosevelt envisioned TVA as an agency different from any other. He asked Congress to create "a corporation clothed with the power of government but possessed of the flexibility and initiative of a private enterprise." On May 18, 1933, Congress passed the Tennessee Valley Authority Act.

TVA was created to foster the economic and social well-being of the people of the Tennessee Valley, including the wise use and conservation of the region's natural resources. Below is an excerpt from a letter written by Arthur E. Morgan, the first chairman of the TVA board, to the agency on March 2, 1956, highlighting the importance of TVA's involvement in preserving and protecting the Valley's lands:

> *"As the population of our country increases and as leisure time increases, the need for recreation space, and for bits of unspoiled nature to which people can go for refreshment of spirit, will continue to increase. Past generations have been so close to pioneering days that there has been lacking a sense of urgency in the preservation of fine bits of nature. It may be a generation or two more before the full importance of that need is recognized. I have felt that in the meantime the best we can do is to hold the fort, to keep our fine, unspoiled recreation areas in that condition until such an appreciation of them grows which will insure the necessary protection. For your help in this process of standing guard I am deeply grateful."*

The Natural Resource Plan

The NRP is an integral step in achieving the mission set forth in the TVA Act as well as fulfilling the responsibilities associated with being a good steward of the lands and resources that TVA manages. It is a living, dynamic document that will be reviewed, revisited and updated at regular intervals, not to exceed five years. The NRP looks strategically at both renewable and nonrenewable resources, underscoring the importance of protecting those resources that will be lost forever if they are not actively protected or improved today. TVA is one piece of the solution and recognizes the need for a coordinated and collaborative effort to meet the near- and long-term resource needs. As such, the NRP is designed to:

- Integrate the objectives of six resource areas (biological, cultural, recreation, water, public engagement and reservoir lands planning)
- Provide optimum public use benefit
- Balance competing and sometimes conflicting resource uses

These competing interests, coupled with today's environmental awareness and focus on preserving nonrenewable resources, underscore the necessity for a consistent approach to the management of federal lands and waters in the care of TVA.

History of Environmental Stewardship Spending

TVA's responsibility for stewardship of the waters and public lands of the Tennessee Valley was established in the TVA Act of 1933. From its inception and through most of the 1950s, TVA received federal appropriations to fund its operations. In 1959, Congress passed legislation that made the TVA power system self-financing. However, TVA continued to receive appropriations for its stewardship programs to supplement funding from power revenues and nonpower revenue sources such as agricultural leases, timber sales, and recreation management and user fees.

The Energy and Water Development Act of 1998 ended federal appropriations and required TVA to fund nonpower programs that constitute "essential stewardship activities" with power revenues and other funds. The term "essential stewardship activities" was interpreted to include, and be limited to, those types of stewardship activities for which TVA was receiving appropriations at the time the legislation was enacted. Such activities include dam safety and maintenance, navigation, flood control, and NRP-related programs. At the time the law was passed, TVA was spending approximately $79 million on these activities.

Since 1999, TVA has continued to support these stewardship activities at comparable levels, funding activities almost entirely from the sale of electricity (see Figure 0.1). In 2010, TVA spent approximately $65 million on essential stewardship programs and associated capital improvement projects. Approximately $7 million to $8 million of this amount funded programs that are evaluated in the NRP.

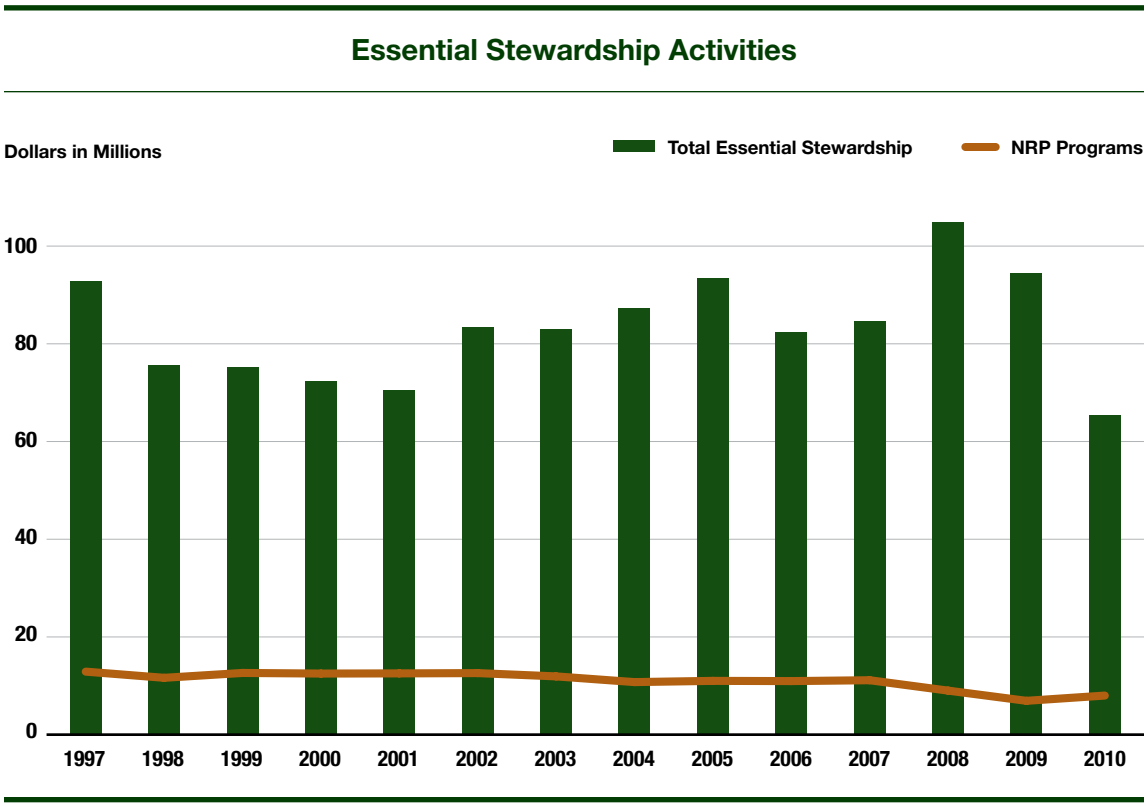


Figure 0.1 Historical TVA essential stewardship activities spending

Road Map for Success

The NRP represents TVA's high-level strategy for managing its natural resources in the near and long term. Detailed implementation plans will be developed based on the NRP to drive specific implementation efforts. To guide its NRP-related stewardship efforts and provide a means for measuring results, TVA has developed a "road map" as a guide over the next three, five, and 20 years:

PHASE I

Establish a Foundation for Success While Maintaining Baseline Activities

Keys to Success
- Maintain current efforts to meet regulatory and legal requirements
- Expand data management and information sharing opportunities
- Gain a better understanding of the resource base and current conditions
- Develop and maintain partnerships to support implementation efforts
- Strengthen integration between resource areas during implementation
- Establish an NRP assessment process and metrics to measure results
- Begin adapting reservoir land plans to single-use parcel allocation methodology

PHASE II

Implement Programs to Sustain, Maintain and Improve Resource Conditions

Keys to Success
- Evaluate NRP implementation efforts and refresh the plan based on progress
- Continue to address resource needs through a systematic implementation approach
- Establish or partner with a foundation and trust fund to support expansion of NRP programs
- Continue to strengthen collaborative working environments
- Finish updating remaining reservoir land plans to single-use parcel allocation

FIVE-YEAR NRP REFRESH CYCLE

PHASE III

Continue to Enhance and Improve TVA's Stewardship Efforts

Keys to Success
- Refresh NRP on a five-year cycle
- Focus enhancement or expansion efforts through building partnerships, corporate sponsorships, or other collaborative means
- Update reservoir land management plans on a rotational or as-needed basis

Figure 0.2 Overview of the NRP implementation strategy

Phase I: Years 1 to 3

Initially, TVA will focus its efforts on establishing a foundation for stewardship success while maintaining a baseline level of effort that ensures legal and regulatory compliance. TVA will implement a "boots on the ground" data collection and lands assessment strategy to gain a better understanding of the condition of resources under its care. This will inform future planning activities and support TVA's drive toward an integrated planning approach across resource areas as well as with its regional and national partners. To support these relationships, TVA will work to make data available to partners, maintaining a comprehensive natural resources database. In addition, TVA will create a monitoring and assessment process to track the progress made by NRP programs and activities. Also, TVA will begin adapting reservoir land plans to a single-use allocation methodology.

Phase II: Years 4 to 5

TVA will continue to implement NRP programs to sustain, maintain and improve resource conditions. This includes evaluating NRP stewardship efforts today as part of the first five-year refresh cycle. To begin with, TVA will define its approach to identifying and addressing resource needs in an integrated manner over the near- and long-term horizon. As TVA advances its implementation activities, it will focus on establishing mechanisms or best practices to sustain such levels of effort. This includes actively seeking opportunities for collaborative working environments as well as ways to better involve the general public in financial stewardship support and day-to-day management. Additionally, TVA will focus on completing its Comprehensive Valleywide Land Plan.

Phase III: Years 6 to 20

At this point, the NRP has gone through a complete refresh cycle and has refocused its stewardship efforts as needed. TVA will continue to enhance and improve its stewardship efforts in an integrated manner with its partners and the general public. The NRP is a living, breathing document and will continue to evolve over its 20-year life span.

Measures of Success

An integral component of the NRP is a defined method by which TVA will measure and monitor progress throughout the 20-year life cycle of the plan. While these success measures do not provide details of each individual program, together they provide metrics by which to measure the success of the NRP as a whole. See Section 2.3 for addional detail.

Benefits

The Natural Resource Plan provides a number of benefits to the public, to the resources that TVA protects, and to the ratepayers. TVA's work in natural resource management is a key piece of its integrated business model, and this investment will help it sustain accessible natural resources and recreational sites for the people of the Tennessee Valley in an efficient and effective manner.

Access to and use of outdoor recreation has been shown to correlate to healthier lifestyles and thus a higher quality of life. In addition to ensuring a high quality of life for residents of the Tennessee Valley, the programs in the NRP create a number of positive economic impacts. The 80 recreational sites and approximately 293,000 acres of surrounding land and reservoirs operated and managed by TVA attract millions of visitors each year to enjoy the region's natural and water resources. These visitors create significant economic stimulus for the surrounding communities.

Proper management of natural resources can also create significant benefits for ratepayers. The NRP helps satisfy TVA's requirement for its essential stewardship responsibilities that come with managing the river. Control of the river allows responsible management of the water for thermal control of key generation assets and for hydro generation. Each of these helps reduce power costs, resulting in low electricity rates for residents of the Tennessee Valley.

The NRP helps TVA to evaluate benefits at both a programmatic and Valleywide level, highlighting the advantages inherent in implementing a strong stewardship culture. As a whole, NRP-related programs are expected to provide a fourfold benefit for every dollar spent.

Risks

If TVA does not effectively and efficiently manage the resources entrusted to it, it faces both near- and long-term risks, including not fully achieving the goals of the Environmental Policy or resource management accountabilities assigned to it by the TVA Act. These risks can result in a broad range of impacts. Examples include impacts to public health and safety, economic development, quality of life, nonrenewable resources, and public perception of TVA.

While each program has its own unique risks, there are overarching concerns and challenges associated with not implementing the NRP (see Figure 2.3). For example, if TVA does not actively preserve or protect the region's resources, such as archaeological artifacts, there is a risk of losing them forever. Additionally, partnerships are an essential component of TVA's implementation strategy. Not seeking these relationships would jeopardize the ability to effectively and efficiently manage TVA lands.

TVA will work to mitigate risks with collaborative and comprehensive natural resources management efforts through the NRP.

Funding

The estimated annual cost required to achieve the NRP measures of success is between $19 million and $20 million.[1] Funding for the remaining years of the plan will be dependent upon a number of factors, including:

- User fees
- Reallocation of essential stewardship funding
- Increased recreation agreements
- Increased application fees
- Annual budgeting process
- Compliance funding
- Partnerships
- Sponsorships (e.g., corporate)
- TVA base budget

In years when available resources from these sources are high, more dollars will be applied to NRP programs. In years when available resources from the sources above are limited, less funding will be applied to NRP programs, though never falling below meeting legal and regulatory compliance. As a result, TVA may need to reprioritize its spending in these years to ensure compliance obligations are met. This may result in stopping or reducing its commitment to some programs in order to enhance others. Actual funding levels for each year of the plan will be determined through the annual budgeting process.

[1] Funding levels presented in the NRP are not inflation-adjusted and represent 2011 dollars.

Biological Resources Summary

What Is Biological Resources Management?

Biological Resources Management programs address two major elements:

- Human uses of the land, such as wildlife habitat management, forestry, agriculture and dispersed recreation. Dispersed recreation includes activities such as hiking, bird-watching and bank fishing that do not require the support of man-made facilities
- Biological resources activities supporting plant and animal species diversity and endangered species management, including TVA's compliance with natural resource-related laws, regulations and executive orders

TVA manages biological resources while providing many types of recreational opportunities for the public across approximately 293,000 acres of reservoir land, approximately 11,000 miles of shoreline, and about 42,000 miles of tributary streams and rivers.

Goal

TVA will manage biological resources under its care in a holistic, ecologically sound manner to maintain biological diversity while supporting multiple uses to meet stakeholder expectations.

Benefits

Within biological resources, TVA has structured its implementation strategy based on the characteristics in the table below.

Through management efforts in this resource area, TVA expects to realize the following benefits:

- Improved understanding of current land and resource conditions to support future planning and data sharing efforts
- Increased protection and enhancement of biologically diverse habitats (e.g., threatened and endangered species)
- Successful outreach efforts creating enhanced public awareness of the land use impacts and potential for transport of invasive or nonnative species and plants into habitats
- Promotion of environmentally sustainable dispersed recreational use of TVA-managed lands
- Development of partnerships with other resource management agencies and nongovernmental organizations to further resource management efforts in the region

Characteristic	Current	NRP
Land Stewardship Actively gather resource data to address and prioritize land maintenance and stewardship needs.	Various, incomplete databases	Central, comprehensive database
Habitat and Species Management Develop and implement proactive methodologies to protect, manage and enhance biodiversity in the Tennessee Valley.	Reactive	Proactive
Dispersed Recreation Maximize public land use benefits by protecting, maintaining and expanding recreational and educational opportunities.	Fragmented	Coordinated
Public Outreach and Awareness Conduct proactive, integrated education efforts about the importance of biological resources and their effect on quality of life.	Independent	Integrated

Program	Description
Threatened and Endangered Species Program	Complies with Section 7 of the Endangered Species Act, under which TVA is required to consult with the U.S. Fish and Wildlife Service concerning the effect of its actions on threatened and endangered species designated by the service.
Wetland Management	Implements a proactive approach to identify, manage and protect TVA-managed wetlands.
Sensitive Resources Data Management	Manages TVA's biological databases, which contain an ecological inventory of rare plants, animals, natural communities, natural areas, and other sensitive natural resource features, to ensure information is current.
Natural Areas Management	Manages TVA's natural areas, which are ecologically significant sites, lands set aside for specific natural resource management objectives, and lands that contain sensitive biological, cultural or scenic resources.
Migratory Birds Management	Develops and implements migratory bird management plans, and increases involvement in regional working groups.
Grasslands and Agricultural Lands Management	Increases habitat diversity across the TVA landscape through management of agricultural licenses and partnerships with state and other federal agencies and nongovernmental organizations.
Dewatering Projects Management	Operates nine dewatering projects on Kentucky and Wheeler reservoirs either alone or in partnership with state and other federal agencies.
Forest Resource Management	Manages the mature forest cover on TVA's public lands for watershed protection benefits.
Nonnative Invasive Plant Management	Manages the effects of nonnative invasive plant infestation under and beside forest canopies, small forest openings, open and early successional habitat lands, and sensitive resource areas and habitats.
Nuisance Animal Control	Manages the effects of nuisance animals on TVA lands, facilities and recreational users. These efforts hope to protect public health and safety (e.g., feral hogs), TVA assets (e.g., bird impacts to power lines and transformers), and adjacent private property (e.g., flooding caused by beavers) from damage.
Terrestrial Greenhouse Gas Sequestration Management	Focuses on continuing TVA's participation in research projects and third-party consortiums on terrestrial carbon sequestration, which is the storage of carbon in the biomass created by perennial vegetation such as root systems and tree trunks.
Wildlife Habitat Council – Third-Party Certifications	Process to apply for a third-party certification of projects that enhance wildlife habitats on TVA properties and manages the already certified projects.
Wildlife Habitat Enhancement Partnerships	Focuses on collaborating with state and other federal agencies, individuals, and nongovernment organizations to improve habitats and increase wildlife-oriented recreational opportunities on TVA-managed lands.
Boundary Maintenance	Establishes and maintains TVA's reservoir property boundaries to assist in the identification and reduction of encroachments from adjacent landowners and to enhance protection of natural and cultural resources through clear markings and signage.
Land Condition Assessment and Land Stewardship Maintenance	Describes two types of assessments of land conditions: comprehensive land conditions assessment and rapid land conditions assessment (see Chapter 9 – Reservoir Lands Planning). These processes provide a prioritized list of tasks to address land maintenance needs that are identified.
Conservation Planning	Supports collaborative natural resource planning initiatives throughout the southeastern U.S.
Dispersed Recreation Management	Provides an approach toward managing and enhancing all of TVA's informal recreation sites. Informal recreation refers to lands available for public use (e.g., hiking, camping, bank fishing, bird-watching) that are not supported by formal recreation facilities.
Leave No Trace	Educates outdoor enthusiasts regarding the effects of dispersed recreation activities on the environment and helps them reduce those impacts.
Trails Management	Provides a systematic inventory and maintenance plan to manage over 100 miles of existing trails located on TVA-managed lands.

For more information, please visit www.tva.gov/nrp

Cultural Resources Summary

What Is Cultural Resources Management?

Cultural Resources Management programs address two major elements:

- Compliance with federal legislation on culturally and historically significant sites
- Partnerships and public education to foster awareness and preservation of cultural and historical resources

To date, TVA has documented an estimated 11,500 archaeological sites on or adjacent to its reservoir and power properties. Approximately 5,320 historic structures have been identified on or near TVA-managed public lands. Of these, 85 historic structures are listed on the National Register of Historic Places, and about 235 are considered either eligible or potentially eligible for listing. In addition, nine registered historic districts exist on TVA-managed lands.

Goal

TVA will meet its stewardship responsibilities in the Tennessee Valley region through the sound protection of cultural resources.

Benefits

Within cultural resources, TVA has structured its implementation strategy based on the characteristics in the table below.

Through management efforts in this resource area, TVA expects to realize the following benefits:

- Effective and sustained protection of sensitive, nonrenewable cultural resources and their archaeological context under TVA's management
- Improved relationships with stakeholders that attach cultural value to TVA-managed lands
- Identification and management of historic properties pursuant to Section 110 of the National Historic Preservation Act in a manner that benefits both the resource and the public
- Increased education and awareness of the importance of protecting cultural resources through public outreach efforts
- Compliance with all relevant laws and regulations concerning cultural resources

Characteristic	Current	NRP
Enforcement Support enforcement efforts to protect the cultural resources found on TVA-managed lands.	Limited	Expanded
Protection Monitor and protect archaeological resources to prevent looting and shoreline erosion.	Responsive	Proactive
Data Management Compile and maintain accurate and up-to-date data on cultural resources.	Minimal, fragmented	Enhanced, collaborative
Public Outreach and Awareness Conduct proactive, integrated education efforts about the importance of cultural resources and their effect on quality of life.	Reactive, independent	Targeted, integrated

Program	Description
Archaeological Monitoring and Protection	Confirms that TVA is protecting the archaeological resources located on the lands it manages, pursuant to Section 110 of the National Historic Preservation Act and the Archaeological Resources Protection Act.
Archaeological Resources Protection Act	Manages the preservation and protection of archeological resources and sites on TVA lands in accordance with the law.
Native American Consultation	Involves consultations with federally recognized tribes to meet the objectives of the Native American Graves Protection and Repatriation Act, the National Historic Preservation Act, the American Indian Religious Freedom Act, Executive Order 13007, Executive Order 13175, the 1994 executive memorandum regarding government-to-government relationships with tribal governments, and the 2009 presidential memorandum regarding tribal consultation.
Native American Graves Protection and Repatriation Act	Confirms that the requirements of the Act are being met. This provides for the protection of Native American human remains, funerary objects, sacred objects and objects vital to Native American cultural identity.
National Historic Preservation Act Section 106	Manages compliance with the requirements of Section 106 of the law, under which TVA must consider the effect of its actions on historic properties and allow the Advisory Council on Historic Preservation an opportunity to comment on the action.
Preservation Program	Manages historic properties under TVA's purview in accordance with Section 110 of the National Historic Preservation Act.
Preserve America	Develops a plan for the potential use of historic properties suitable for heritage tourism, improves TVA's knowledge about historic resources under its care and improves its leadership in preserving these resources.
Archaeological Outreach (Thousand Eyes)	Increases public awareness of the need to protect archaeological sites located on public lands.
Corporate History Program	Maintains a record of TVA's rich history and provides educational and outreach opportunities to promote TVA's historical significance to the region, nation and world.

For more information, please visit www.tva.gov/nrp

Recreation Management Summary

What Is Recreation Management?

Recreation management encompasses operating TVA-run campgrounds and day-use areas as well as conducting recreation assessments, designing recreation improvement programs, and developing visitor guidelines.

From its beginning, TVA has encouraged the development of a wide variety of outdoor recreation facilities and opportunities in the Tennessee Valley. Throughout the years, TVA has allocated approximately 21,200 acres of reservoir lands for developed recreational purposes, particularly on TVA reservoirs and shorelines.

Goal

TVA will protect and conserve natural resources while providing recreation opportunities across the region.

Benefits

Within recreation management, TVA has structured its implementation strategy based on the characteristics in the table below.

Through management efforts in this resource area, TVA expects to realize the following benefits:

- Increased recreation opportunities on TVA-managed lands
- Improved and up-to-date recreation information to support TVA and regional planning efforts
- Greater diversity of recreation opportunities through collaboration and partnerships
- Promotion of sustainable resource technologies on recreation properties (e.g., Melton Hill campground site)
- Integrated operation activities and partnerships that support outdoor recreation opportunities to more effectively manage lands and waters under TVA's stewardship

Characteristic	Current	NRP
Innovation Evolve recreation areas to meet best management practices and sustainable technologies.	Standard facilities	Demonstration facilities
Enhancement/Expansion Seek improvement and growth in recreation opportunities.	Maintenance focused	Improvement focused
Data Management Compile and maintain accurate and up-to-date data on recreation areas.	Various, incomplete	Comprehensive
Public Outreach and Awareness Conduct proactive, integrated education efforts about the importance of recreation and its effect on quality of life.	Ambiguous information	Interactive tools

Program	Description
Management of Campgrounds on Dam or Power Plant Reservations	Oversees TVA's eight campgrounds located on dam or power plant reservations in Alabama and Tennessee, making approximately 460 campsites available to the public.
Management of Campgrounds off Dam and Power Plant Reservations	Oversees TVA's four campgrounds located on other reservoir properties in Alabama and Tennessee, making approximately 215 campsites available to the public.
Day-Use Areas – on Dam Reservations	Manages TVA's day-use areas (various types of recreational facilities available to the public free of charge; amenities typically include picnic sites, pavilions, fishing piers, restrooms and trails) on dam reservations.
Day-Use Areas – off Dam Reservations	Manages TVA's day-use areas that are located off dam reservations.
Stream Access Sites	Administers TVA's stream access sites (typically consists of a parking area, picnic area, and developed access to the stream) and supports blueways (water paths or trails developed with launch points or camping locations) partnerships.
Annual Tours	Leads annual media and technology transfer tours to showcase TVA's technology integration and efforts to promote sustainability at recreation areas.
Recreation Information Management	Directs onsite (e.g., signage) and offsite (e.g., Internet-based) recreation information. This is used for impact analyses associated with environmental reviews of TVA actions, to perform recreation demand analyses, and to provide information to partners and stakeholders.
Boating Density Assessments	Conducts boating density impact analysis for TVA projects or proposals requiring TVA's approval.
Reservoir Lands Recreation Inventory Management	Creates and maintains an up-to-date, easily accessible database on recreation facilities and services, both TVA and non-TVA, available on TVA-managed reservoirs, along with stakeholder and user input concerning TVA's recreation areas and facilities.
Recreation Design Principles	Implements standard construction designs and products that promote compliance with the Americans With Disabilities Act Accessibility Guidelines, principles of universal design, or other accredited design standards, as appropriate.
Recreation Planning, Assistance and Technical Support	Provides planning and technical services to third parties for new or existing parks, recreational programs, and other reservoir-oriented facilities on a fee or sponsorship basis.
Tennessee Valley Camp-Right Campground Program	Promotes sustainable campgrounds that provide safe, high-quality camping experiences through campground certification programs; modeled after the Tennessee Valley Clean Marina Program.

For more information, please visit www.tva.gov/nrp

Water Resources Management Summary

What Is Water Resources Management?

Water Resources Management is focused on supporting collaborative efforts to improve the quality of the Tennessee Valley region's streams, rivers and reservoirs.

The Tennessee River watershed encompasses parts of seven states in the Southeast totaling 40,000 square miles and 11,000 miles of shoreline. TVA operates the Tennessee River and its tributaries as an integrated system to provide a wide range of public benefits, such as year-round navigation, flood-damage reduction, affordable electricity, improved water quality, water supply, land use, and recreation.

Goal

TVA will promote water quality and aquatic habitat improvements across the Tennessee River watershed through collaborative partnerships by providing water quality data and technical support to conduct water resource stewardship efforts within the watershed, including TVA-managed lands and facilities.

Benefits

Within water resources, TVA has structured its implementation strategy based on the characteristics in the table below.

Through management efforts in this resource area, TVA expects to realize the following benefits:

- Improved protection and enhancement of aquatic habitats and biological communities
- Greater public awareness of land use impacts and the potential for invasive species (e.g., foreign species transported into habitats)
- Expanded collaborative efforts (funding and resources) to better evaluate and protect exceptional biodiversity within the Tennessee River watershed
- A more comprehensive understanding of stream, reservoir and tailwater conditions to help inform future water resource initiatives
- Increased participation in meeting the objectives of the Clean Water Act

Characteristic	Current	NRP
Water Quality Improvement Proactively identify and address sources of water contamination and actively protect healthy waters.	Responsive, local	Prioritized, regional
Data Management Collect and share water resource data to provide a comprehensive view of conditions in the Tennessee River system.	Independent	Collaborative
Strategic Partnerships Develop relationships with regional, state and other federal agencies to support stewardship opportunities and produce measurable water quality improvement.	Minimal, as available	Expanded, proactive
Public Outreach and Awareness Conduct proactive, integrated education efforts about the importance of water resources and their effect on quality of life.	Internal, water resource focused	External/ internal, integrated

Program	Description
Aquatic Ecology Management	Focuses on the enhancement of aquatic biological communities in TVA streams, reservoirs and tailwaters.
Stream and Tailwater Monitoring	Monitors streams and tailwaters to evaluate biological conditions and diversity that reflect watershed conditions.
Climate Change Sentinel Monitoring	Focuses on collecting biological, chemical and physical data in each of the five predominant eco-regions in the Tennessee Valley.
Strategic Partnership Planning	Focuses on building strong partnerships with state and other federal agencies, and with regional nongovernmental organizations, to address stewardship issues of mutual importance and drive measurable improvement of health of the region's waters.
Tennessee Valley Clean Marina Program	Promotes environmentally responsible marina and boating practices and will directly link to recreation and to TVA's permitting authority under Section 26(a) of the TVA Act.
Water Resource Outreach Campaign	Increases public awareness and involvement through the promotion of water resource protection and improvement best practices.
Reservoir Shoreline Stabilization / Riparian Management	Helps control critical shoreline erosion, including protecting significant cultural and other sensitive resources, maintaining or improving water quality, and enhancing aquatic and wildlife habitat.
Nutrient Source - Watershed Identification and Improvement	Establishes goals or targets to reduce nutrients (phosphorus), sediment or both in TVA-managed reservoirs.
Northern Gulf of Mexico/Mississippi River Basin Nutrient Load Reductions	Conducts modeling projects to determine what nitrogen source-load reduction opportunities exist in the lower Tennessee River basin.

For more information, please visit www.tva.gov/nrp

Reservoir Lands Planning Summary

What Is Reservoir Lands Planning?

As a steward of critically important natural resources across the Tennessee Valley, TVA has a duty to manage its lands in a sustainable manner for present and future generations. Reservoir lands planning guides TVA management decisions on natural resources and property administration. TVA's Land Policy, approved by the board in 2006, governs the planning, retention and disposal of land under TVA's stewardship.

TVA's integrated resource management approach focuses on balancing flood control, navigation, power generation, water quality, recreation and other land use needs. Lands planning is an integral part of meeting TVA's objectives.

Goal

TVA will strive to continue to balance shoreline development, recreational use, sensitive and natural resource management, industrial use and other land uses in a way that maintains the quality of life and other important values across the region.

Benefits

As part of the NRP, the methodology for reservoir lands planning will transition from reservoir-specific plans to a Comprehensive Valleywide Land Plan (CVLP). The CVLP examines resource demands and trends holistically to establish an allocation range for each land use zone (see below).

Allocation Designation		Current Allocation	CVLP Range
Zone 2	Project Operations	7%	5% - 7%
Zone 3	Sensitive Resource Management	17%	16% - 18%
Zone 4	Natural Resource Conservation	61%	58% - 65%
Zone 5	Industrial	2%	1% - 2%
Zone 6	Developed Recreation	8%	8% - 10%
Zone 7	Shoreline Access	5%	5%

Benefits

Within reservoir lands planning, TVA has structured its implementation strategy based on the characteristics below.

By selecting the Comprehensive Valleywide Land Plan, TVA will:

- Provide a systematic method for planning public lands to balance stewardship objectives, resource and public needs, and TVA obligations
- Establish target ranges for allocations to each land use zone
- Increase flexibility and clarity in the lands planning process
- Create a balance between competing and sometimes conflicting land uses

Characteristic	Current	NRP
Planning Approach Define approach for future evaluation and planning of TVA reservoirs.	Responsive, local	Prioritized, regional
Methodology Establish methodology to classify parcels or tracks within TVA reservoirs.	Independent	Collaborative
Zone Definitions Define appropriate use of TVA-managed lands.	Minimal, as available	Expanded, proactive
Planning Cycles Determine frequency by which land plans are developed, reviewed and updated.	Internal, water resource focused	External/ internal, integrated

For more information, please visit www.tva.gov/nrp

Public Engagement Summary

What Is Public Engagement?

TVA has been charged with managing its natural resources in an integrated manner to ensure the protection, enhancement and conservation of these resources for future generations to enjoy. TVA is developing overarching public engagement programs to increase public awareness and promote opportunities for volunteer involvement, environmental education, financial/resource assistance and collaborative partnerships.

Goal

TVA will actively develop and evolve public engagement programs to increase public awareness, education and involvement opportunities (e.g., volunteers) in support of implementing NRP programs in an integrated manner with external stakeholders.

Benefits

Within public engagement, TVA has structured its implementation strategy based on the characteristics in the table below.

Through management efforts in this resource area, TVA expects to realize the following benefits:

- Increased public awareness and appreciation of the natural resources of the Tennessee Valley region through an integrated education and communication effort across all resource areas
- Greater public understanding of the value and benefits associated with the protection of natural resources
- Increased sense of public ownership and pride in the management of the region's natural resources

Characteristic	Current	NRP
Education and Communication Create awareness and understanding of the importance and availability of natural resources throughout the Tennessee Valley.	Independent, by resource area	Integrated
Involvement Create opportunities for public involvement in natural resources management.	Independent, by resource area	Integrated
Partnerships Develop and maintain strategic relationships with state and other federal agencies, nongovernment organizations, distributors of TVA power, foundations, businesses and academia.	Independent, by resource area	Integrated

Program	Description
Environmental Education Program	Establishes opportunities to share natural and cultural resource information with a variety of audiences, such as school groups, civic groups and other organizations, elected officials, business leaders, and the general public.
Volunteer Program	Enhances TVA's resource stewardship capabilities by tapping into the strengths of the TVA community and providing opportunities for the public to assist in resource protection, improvement and enhancement.
Foundation and Trust Fund Management	Builds strong partnerships with regional and local stakeholders and organizations, as well as with corporations with ties to or interest in the Tennessee Valley that are looking for opportunities to have a positive environmental impact in the region

For more information, please visit www.tva.gov/nrp

CHAPTER 1

Introduction

1.1 Tennessee Valley Authority History **25**

1.2 Overview of TVA's Vision and Environmental Policy **26**

1.3 Overview of the Natural Resource Plan **28**

1.3.1 Resource Areas 29

1.3.2 Geographic Scope 30

1.3.3 Out of Scope 31

1.3.4 Stakeholders 31

1.4 Development Process **35**

1.4.1 Determine the Scope of the NRP 35

1.4.2 Develop, Analyze and Evaluate NRP Programs 36

1.4.3 Release the Draft NRP and EIS for Public Comment 37

1.4.4 Finalize and Issue the NRP 37

1.5 Past TVA Environmental Stewardship Spending **37**

1.6 Benefits **38**

1.6.1 Public and Economic Benefits 39

1.6.2 Ratepayer Benefits 39

For more than seven decades, the Tennessee Valley Authority has been improving the quality of life in the Tennessee Valley region through its threefold mission of providing affordable and reliable power, promoting sustainable economic development, and operating as a steward of the region's natural resources. To meet its environmental stewardship mission, TVA has developed a dedicated plan to guide its natural resources management, water resource protection and improvements, and sustainable land use activities over the next 20 years.

1.1 Tennessee Valley Authority History

President Franklin D. Roosevelt needed innovative solutions to lift the nation out of the depths of the Great Depression, and TVA is considered one of his most innovative actions. Roosevelt envisioned TVA as an agency different from any other. He asked Congress to create "a corporation clothed with the power of government but possessed of the flexibility and initiative of a private enterprise." On May 18, 1933, Congress passed the Tennessee Valley Authority Act. (A copy of the TVA Act is available on the TVA website at www.tva.com/abouttva/pdf/TVA_Act.pdf.)

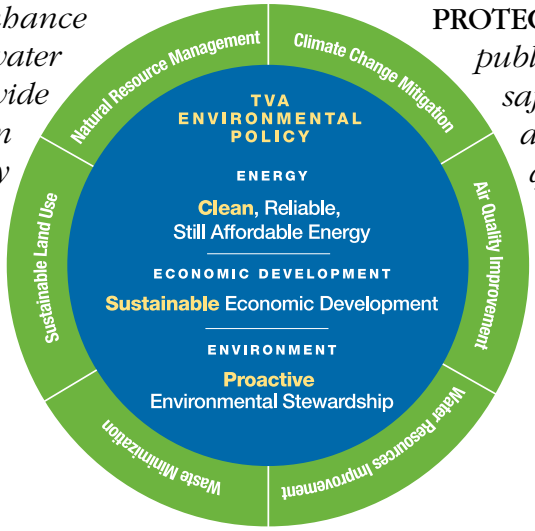
From its beginning,[1] TVA has held fast to its strategy of integrated resources solutions, even as the issues changed over the years. Each challenge the people of the Tennessee Valley region faced — whether it was the need for power, navigation to transport goods to and from larger markets, flood control, malaria prevention, reforestation, or erosion control — was studied in its broadest context. TVA operates a system of dams and reservoirs in the Tennessee River Valley for the purposes of flood control, navigation and power production. In addition, TVA's environmental stewardship efforts have historically focused on improving water quality while providing recreational opportunities and a wide range of other public use benefits.

[1] A short TVA history can be found at www.tva.com/abouttva/history.htm.

1.2 Overview of TVA's Vision and Environmental Policy

TVA's renewed vision[2] — to become one of the nation's leading providers of low cost and cleaner energy by 2020 — will be achieved through acting to meet the region's needs for the future, while improving TVA's core business today. In alignment with TVA's vision, the NRP will focus on proactive stewardship through the protection and enhancement of the region's natural resources. In addition, the NRP will support local and regional economic development as well as ensure compliance with legal and regulatory stewardship requirements.

On May 19, 2008, the TVA board of directors approved the TVA Environmental Policy, which was reviewed and confirmed again in 2010. Its overarching objective is for TVA to engage in proactive environmental stewardship in a balanced and ecologically sound manner. As shown in the center of Figure 1.1, the Environmental Policy also integrates environmental leadership with all aspects of the TVA mission.



ENHANCE – *Enhance land and water resources to provide multiple benefits in the Tennessee Valley region, making it a better place to live, work and play.*

PROTECT – *Foster public health and safety by improving air and water quality and protecting the region's natural resources.*

REDUCE – *Reduce consumption of water resources and the generation of waste and by-products for a sustainable future.*

Figure 1.1 Environmental Policy alignment with TVA's mission

[2] See http://www.tva.com/abouttva/vision.htm for additional information on TVA's vision and the supporting strategic priorities.

The Environmental Policy is organized into six strategic objectives that encompass the variety of challenges faced by TVA (see Figure 1.1) tied to energy production and environmental stewardship. The NRP focuses on the execution, in part or in whole, of three Environmental Policy strategic objectives and critical success factors:

Water Resource Protection and Improvement

- Mitigate TVA's impact on aquatic systems while balancing thermal cooling needs with consumptive use
- Integrate the impacts of water quality and quantity into the long-range planning and decision-making process
- Collaborate in community outreach and partnerships through voluntary demonstrations of the efficient use of water resources and protection of water quality

Sustainable Land Use

- Actively manage TVA lands to meet the desired conditions for their purpose as defined in the reservoir land management plans
- Improve reservoir shoreline conditions through collaborative partnership initiatives and balance the multiple uses of the reservoirs in accordance with TVA's Land Policy and Shoreline Management Policy
- Manage TVA lands, mineral rights and shoreline access to better achieve environmental commitments while meeting the needs for recreation, residential access and economic development

Natural Resource Management

- Allow for properly managed, eco-friendly dispersed recreation while balancing the protection of biological, cultural and heritage resources
- Promote ecological diversity and wildlife habitats on TVA lands through partnerships and voluntary initiatives
- Increase the level of environmental quality and management consistency among TVA-managed and leased recreation facilities

1.3 Overview of the Natural Resource Plan

Historically, TVA has taken various approaches to managing the reservoir lands and biological, cultural, recreation and water resources in its care. By establishing the Environmental Policy, TVA created expectations for a more systematic and integrated approach toward managing energy production and environmental stewardship. The Integrated Resource Plan (IRP) and this Natural Resource Plan are implementation plans for TVA's mission as described in the agency's Strategic Plan. The IRP focuses on the power supply portfolio, whereas the NRP focuses on biological and cultural resources, water resources, recreation, coordinated public engagement, and reservoir lands planning. Figure 1.2 (below) shows how the IRP and NRP deliverables fit together.

In addition, TVA has prepared an environmental impact statement to assess the impact of the NRP and its reasonable alternatives on the environment.[3] The EIS:

- Describes the stewardship programs that are ongoing and are being evaluated for future implementation as part of the NRP
- Assesses the potential environmental impacts associated with implementing the various alternatives

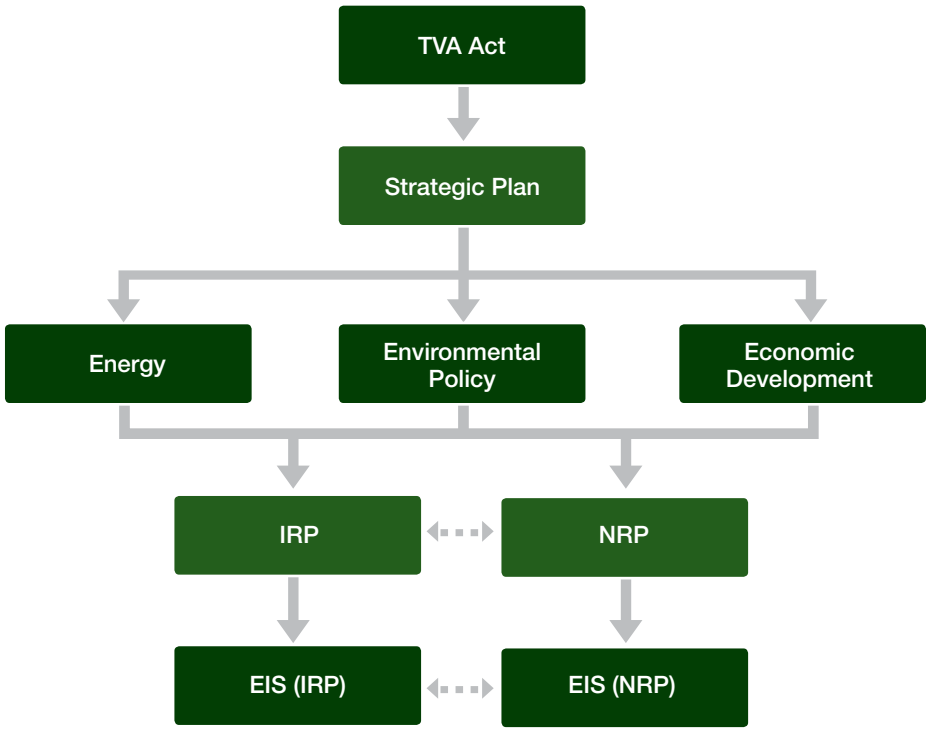


Figure 1.2 IRP-NRP project deliverables framework

[3] The EIS is in accordance with 1) the National Environmental Policy Act, 42 USC § 4321 et seq.; 2) the Council on Environmental Quality regulations for implementing the National Environmental Policy Act, 40 CFR Parts 1500-1508; and 3) TVA's procedures for implementing the National Environmental Policy Act.

1.3.1 Resource Areas

The NRP is presented in six resource areas:

The NRP:

- Aligns TVA's stewardship programs and plans with the Environmental Policy
- Provides a strategic plan that:
  - Guides TVA's land and resource management decisions and actions
  - Integrates effective, efficient natural resource stewardship objectives with the goal of optimizing the public use benefits of TVA-managed lands
  - Strikes a balance between the competing and sometimes conflicting resource uses of TVA-managed lands
- Provides TVA staff with a reference manual to guide implementation activities
- Provides clarity and transparency to the public

Figure 1.3 NRP resource areas and supporting objectives

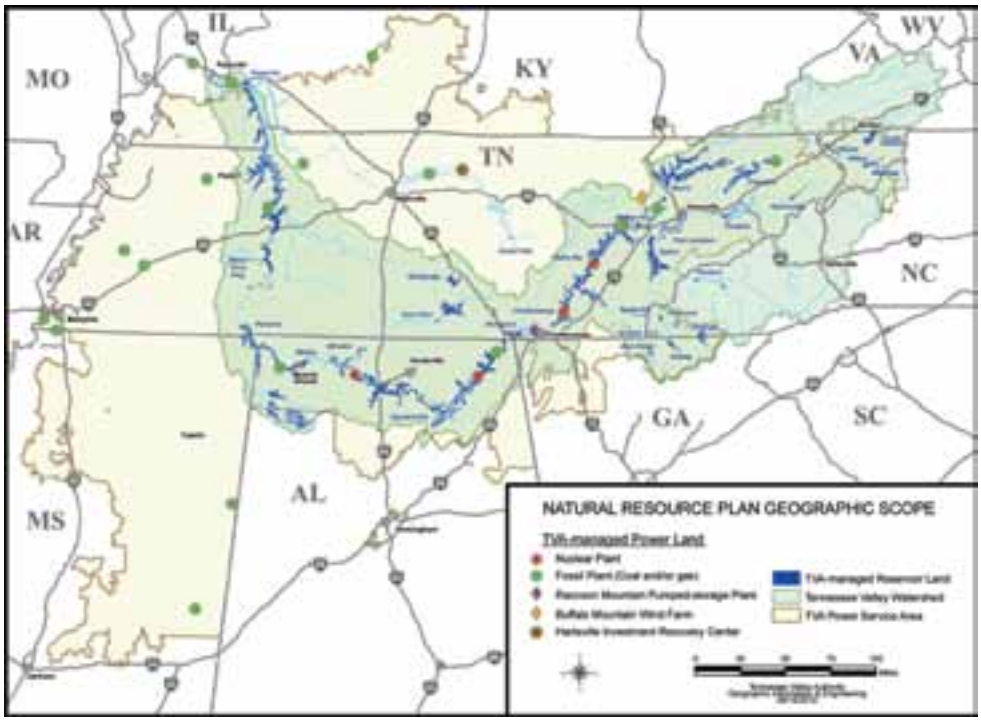
The NRP is designed to integrate the objectives of all of the resource areas, provide optimum public benefit, and balance competing and sometimes conflicting resource uses. These competing uses and external development pressures, coupled with increasing recognition of the importance of preserving nonrenewable resources, underscore the necessity for a consistent approach to the management of federal lands and water resources in the care of TVA.

In addition, the NRP aligns with the Obama Administration's establishment of the America's Great Outdoors Initiative, which promotes and supports innovative community-level efforts to conserve outdoor spaces and to reconnect Americans to the outdoors. The short-term intent of the initiative is to create a national dialogue about conservation and outdoor activities that supports the efforts of private citizens and local communities. As part of the NRP, TVA is identifying programs and goals that are integral to ensuring the appropriate management and protection of natural resources as well as building the necessary relationships and partnerships to effectively implement and manage these resources in the future.

1.3.2 Geographic Scope

The geographic scope of the NRP includes the Tennessee River watershed and TVA lands over which it has direct control within the power service area, with the exception of transmission line corridors. The breadth or reach of each program is highlighted in its respective resource area chapter (Chapters 3 through 8).

The biological resources, cultural resources, and reservoir lands planning components of the NRP focus primarily on the approximately 293,000 acres of TVA-managed reservoir lands. Recreation management focuses on those recreation facilities and programs directly managed by TVA and stream access sites located near TVA-managed reservoirs. The geographic scope for the water resource management component of the NRP includes the entire Tennessee River watershed as shown in Figure 1.4.



- Approximately 293,000 acres of reservoir properties
- 46 reservoirs
- Seven states
- Approximately 11,000 miles of shoreline
- Approximately 650,000 acres of impounded surface water
- Approximately 42,000 miles of tributary streams and rivers
- 11,500 archaeological sites (documented to date)
- 5,320 historic structures identified
- 235 historic sites eligible/potentially eligible for the National Register of Historic Places
- Approximately 800 miles of commercially navigable waterways
- 85 historic structures listed in the National Register of Historic Places
- Nine registered historic districts
- 270 campgrounds and marinas
- Approximately 75 TVA recreation areas
- 81 stream access sites

Figure 1.4 NRP geographic scope

As it relates to power plant properties, the NRP may be applied to the portion of lands located outside the secured area of each site to ensure that plant security requirements and needs are not infringed. These properties will remain power assets, and power generation will remain the primary function.

1.3.3 Out of Scope

The NRP aligns with and builds upon many existing TVA plans and initiatives, most notably TVA's Shoreline Management Policy, Land Policy, and Reservoir Operations Policy.[4] Items that are considered out of scope in the NRP include, but are not limited to:

- Aquatic plant management
- Mosquito management
- Reservoir release improvements programs
- Shoreline permitting activities
- Land allocations for residential development
- Operation of the reservoir system
- Commercial recreation agreements

These activities have already been addressed through comprehensive public review processes and are the subject of other policies. In addition, TVA is not proposing a mineral rights policy as part of this effort.

1.3.4 Stakeholders

TVA gained valuable insight into the NRP by listening to different perspectives, viewpoints and sometimes-competing objectives. This played a prominent role in defining the direction for TVA's natural resources management effort in the near and long term. TVA actively sought input from the Regional Resource Stewardship Council, peer agencies and the general public.

[4] Shoreline Management Policy - http://www.tva.gov/river/landandshore/landuse_shore.htm
Reservoir Operations Policy - http://www.tva.gov/environment/reports/ros_eis/
Land Policy - http://www.tva.gov/river/landandshore/land_policy.htm

Regional Resource Stewardship Council Members

Mike Ball, Representative
Alabama House of Representatives, Huntsville, Alabama

Karl W. Dudley, President and CEO
Pickwick Electric Cooperative, Selmer, Tennessee

Jean Kellems Elmore, West Point, Mississippi

Bill Forsyth, Chairman
Murphy Electric Power Board, Murphy, North Carolina

Ronald Fugatt, General Manager
Newport Utilities, Hixson, Tennessee

Michael Goodman, Environmental Manager
Temple-Inland, Waverly, Tennessee

Phil Hazle, Calloway County Elected Jailer
New Concord, Kentucky

Mark Hommrich, President
Volunteer Barge and Transport, Brentwood, Tennessee

Renee V. Hoyos, Executive Director
Tennessee Clean Water Network, Knoxville, Tennessee

Mark Iverson, General Manager
Bowling Green Municipal Utilities, Bowling Green, Kentucky

Mitch Jones, President
Tennessee Marina Association, Knoxville, Tennessee

Avis Kennedy
Army Corps of Engineers (retired), Nashville, Tennessee

George B. Kitchens, General Manager and CEO
Joe Wheeler Electric Membership Corporation
Trinity, Alabama

Tom Littlepage, Chief, Water Management Section
Office of Water Resources, Alabama Department of Economic and Community Affairs, Montgomery, Alabama

Robert J. Martineau Jr., Commissioner
Tennessee Department of Environment and Conservation
Nashville, Tennessee

John K. Matney, President
The Harbor Company, Bristol, Virginia

W.C. Nelson Jr., President
Nelson Tractor Company, Blairsville, Georgia

Paul Sloan, Tennessee Department of Environment and Conservation, Nashville, Tennessee

Russell Townsend, Tribal Historic Preservation Officer
Eastern Band of the Cherokee Indians
Cherokee, North Carolina

Deborah K. Woolley, President and CEO
Tennessee Chamber of Commerce and Industry
Nashville, Tennessee

"We need to be responsible stewards of the Tennessee River for this and future generations. The value the river provides to our region – economic, environmental, and recreation – is incalculable, and we must provide our water resources the care and management they deserve. This Natural Resource Plan reflects TVA's commitment to do that."

— George Kitchens
General Manager and CEO
Joe Wheeler Electric Membership Corporation

"Programs in the Natural Resource Plan, in addition to promoting responsible stewardship, generate significant economic benefits for the Tennessee Valley."

— Deborah K. Woolley
President and CEO
Tennessee Chamber of Commerce and Industry
Chairwoman, RRSC

Regional Resource Stewardship Council

As competition for finite resources grows, fulfilling TVA's integrated resource stewardship mission requires increased cooperation with other public agencies and private entities. It is in the interest of TVA and the public to establish a forum to regularly attain advice on stewardship trends, opportunities and challenges. In 1999, TVA established the Regional Resource Stewardship Council to advise TVA on its stewardship activities and the priorities among competing objectives and values. In addition to these responsibilities, the council serves as a stakeholder group and provides input for the development of the NRP. The council was established under the Federal Advisory Committee Act. Its meetings are open to the public, and the proceedings, including names of current and past members, are published at www.tva.com/rrsc.

TVA facilitated discussions among members of the Regional Resource Stewardship Council on the issues they believed were important to a successful NRP. Meetings were held in July 2009, October 2009, March 2010, January 2011, April 2011 and June 2011. The views of council members were collected on the entire range of assumptions and strategies in the NRP. To aid with development of the plan, the RRSC provided the following guiding principles:

1. 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.
2. Continue to invest. The most desirable outcome would be a visible public use benefit garnering public support and maximizing return on investments.
3. Create public awareness of TVA's nonpower accomplishments and current activities.
4. Balance the cost of all programs borne by ratepayers with TVA's low-cost energy mission and economic development.
5. Where possible and appropriate, integrate and leverage cross-program benefits with each other into a "portfolio."
6. Recognize that some activities are part of program implementation – not stand-alone programs.
7. Explore the risks of doing or not doing stewardship activities. (The priority should be protecting nonrenewable resources.)
8. Encourage and incorporate public input into the development of the NRP, allowing for sufficient time and opportunity to comment.
9. Be clear and concise on communicating the NRP with the public.
10. Explain the purpose and process of the NRP and its limitations.
11. The NRP is a living document. Ensure review and revise as needed at appropriate intervals, not to exceed five years.

Peer Agencies

During the development of the NRP, TVA met with several state and federal agencies in the Tennessee Valley to gain additional perspective on the trends, challenges and opportunities associated with natural resources management. These meetings helped to provide key input and insights that were incorporated in the final NRP. An additional goal of these discussions was to begin strengthening the peer network throughout the Tennessee Valley, helping to create a more coordinated and collaborative working environment for future resource management efforts.

TVA met with agencies in all seven states, including:

- U.S. Forest Service
- U.S. National Park Service
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- Alabama Department of Conservation and Natural Resources
- Georgia Department of Natural Resources
- Kentucky Department of Fish and Wildlife Resources
- Kentucky State Nature Preserves Commission
- Mississippi Department of Wildlife, Fisheries, and Parks
- North Carolina Wildlife Resources Commission
- North Carolina Department of Environment and Natural Resources
- Tennessee Wildlife Resources Agency
- Virginia Department of Game and Inland Fisheries
- Virginia Department of Conservation and Recreation

1.4 Development Process

The NRP was developed in four steps:

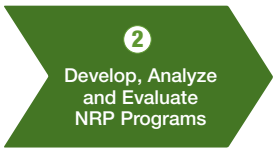
Figure 1.5 Natural resource planning process

1.4.1 Determine the NRP Scope

Scoping is a procedure that solicits public input to ensure that:

1. Issues are identified early and properly studied
2. Issues of little significance do not consume substantial time and effort
3. The EIS is thorough and balanced
4. Delays caused by an inadequate review are avoided

The National Environmental Policy Act and TVA procedure require that the scoping process commence soon after the decision to prepare an EIS is published. This process provides an early and open process for determining the scope and for identifying the significant issues related to a proposed action. On June 15, 2009, TVA published a notice of its intent to prepare an EIS and to conduct a comprehensive study, the IRP, of its future energy and environmental stewardship needs. In order to provide a better focus on TVA's stewardship activities, a decision was made in fall 2009 to separate the IRP and NRP, with the IRP focused on future energy needs and the NRP focused on environmental stewardship needs. The notice of intent included the scope of both projects, the IRP and the NRP. Public scoping began with the publication of the notice in the Federal Register in June 2009. Following the decision to separate the IRP and NRP, TVA announced an additional 30-day public comment period for the NRP beginning Oct. 2, 2009. During this scoping period (June - November 2009) TVA held seven public meetings and received more than 600 comments pertaining to stewardship.



1.4.2 Develop, Analyze and Evaluate NRP Programs

The NRP defines programs for each resource area based on a set of goals and expected outcomes that align with the Environmental Policy objectives. TVA analyzed each program based on its qualitative and quantitative benefits, cost and other strategic considerations to see how it would perform or respond given different decision criteria. This evaluation was accomplished by combining the following inputs and perspectives to ensure each program is compared without bias.

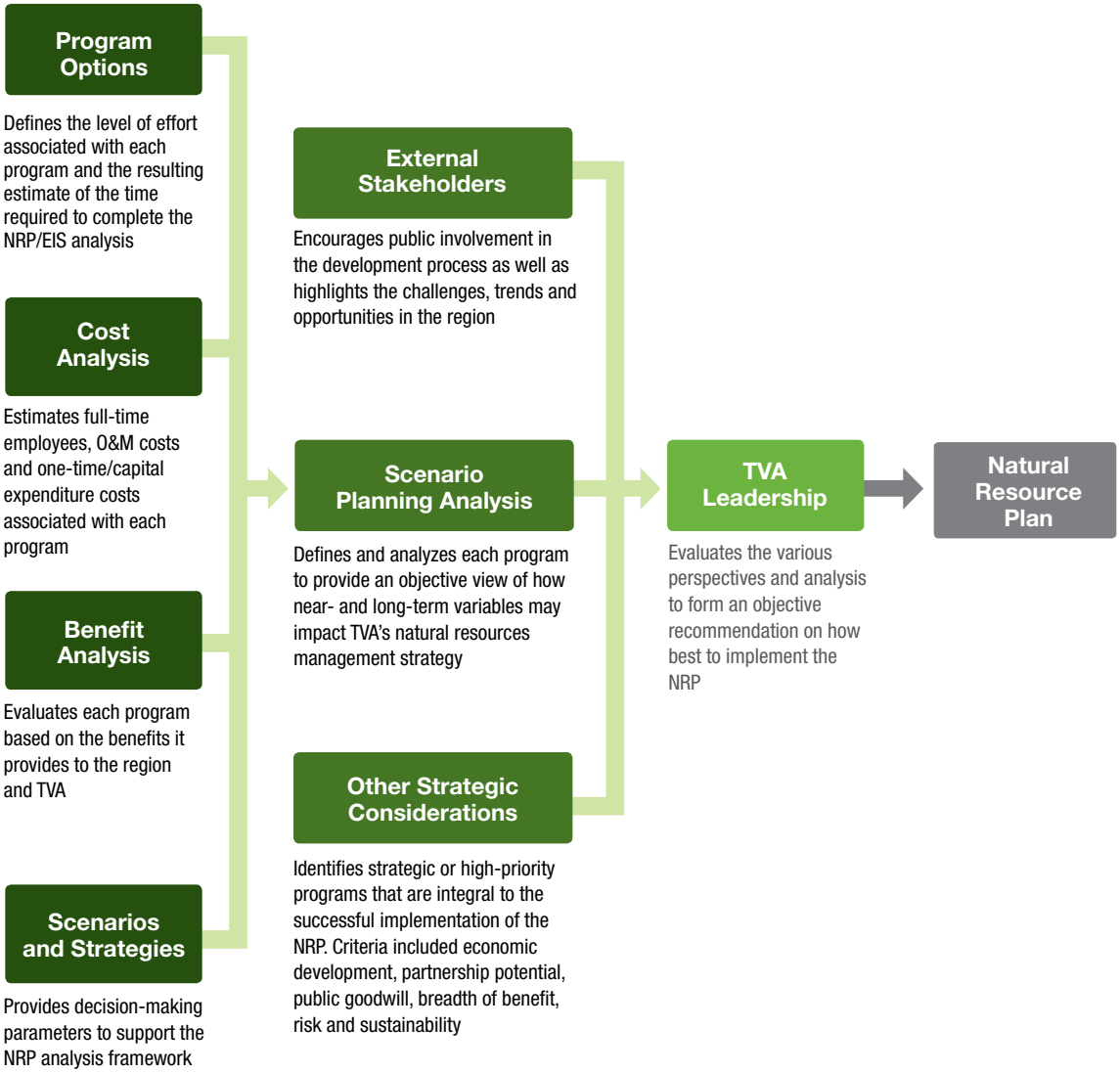


Figure 1.6 Key inputs to the NRP decision-making process

1.4.3 Release the Draft NRP and EIS for Public Comment

The draft NRP and EIS were presented to the public for review and comments. As in the preliminary scoping period, TVA encouraged public comments on these documents. Following the release of the NRP in March 2011, TVA held a 45-day comment period. TVA hosted three public meetings across the valley and solicited written comments to collect public input during this period. Substantive comments on the draft NRP and EIS are addressed in the final EIS (see Volume II). More than 225 comments were received during this comment period from state and other federal agencies, organizations and concerned citizens.

1.4.4 Finalize and Issue the NRP

TVA revised the NRP and EIS after considering public comments and conducting additional analyses. To complete the development process, a 30-day public comment period will be held after the Notice of Availability of the final EIS is published in the Federal Register. Following this, the final NRP will be presented to the TVA board for its consideration and the board's decision will be described and explained in a Record of Decision published in the Federal Register.

1.5 Past TVA Environmental Stewardship Spending

TVA's responsibility for stewardship of the waters and public lands of the Tennessee Valley was established in the TVA Act. From its inception in 1933 through most of the 1950s, TVA received federal appropriations to fund its operations. In 1959, Congress passed legislation that made the TVA power system self-financing. However, TVA continued to receive appropriations to fund its stewardship programs. In addition, TVA's funding for stewardship activities also came from power revenues when benefits to the power system were provided and from nonpower revenues such as agricultural leases, timber sales and recreation user fees.

Programs for which appropriated funding was provided changed over the years. In general, funding was provided for:

Operations and Maintenance Funding

- Daily reservoir operations
- Dam safety
- Navigation
- Reservoir release improvements
- Water resources
- Regional water supply
- River action teams
- Land resources
- Plant and mosquito management
- Shoreline erosion and stabilization
- River basin land
- Land strategy
- Regional natural heritage and cultural resources
- Shoreline management

Capital Funding

- Dam construction and improvement
- Dam safety
- Navigation
- Reservoir release improvements
- River basin land
- Water resources

TVA also received appropriations for economic development, the Environmental Research Center, and the Land Between The Lakes National Recreation Area (LBL), but Congress discontinued appropriations to TVA for economic development after 1997, for the Environmental Research Center after 1998, and

for the Land Between The Lakes after 1999. Land Between The Lakes was transferred to the Department of Agriculture in 2000.

Public Law 105-62, the Energy and Water Development Act of 1998, required TVA to fund nonpower programs that constitute "essential stewardship activities" with power revenues and other funds. The term "essential stewardship activities" was interpreted to include, and be limited to, those types of stewardship activities for which TVA was receiving appropriations at the time the legislation was enacted. At the time the law was passed, TVA was spending approximately $79 million on these activities.

Since 1999, TVA has continued to support these stewardship activities at comparable levels, funding activities almost entirely from the sale of electricity. In 2010, TVA spent approximately $65 million on essential stewardship programs and associated capital improvement projects. Of this amount, approximately $7 million to $8 million funded programs that are evaluated in the NRP, with the remainder going toward dam safety, navigation and reservoir operations. See the Executive Summary for a chart of historical essential stewardship activity spending.

1.6 Benefits

The NRP provides a number of benefits to the public, to the resources that TVA protects, and to the ratepayers. TVA's work in natural resource management is a key piece of its integrated business model, and this investment will help it sustain accessible natural resources and recreational sites for the people of the Tennessee Valley in an efficient and effective manner. This in turn translates into low electricity rates, helping keep residents' cost of living low and quality of life in the Tennessee Valley high.

As more research is conducted and studies estimating the impact of human activity and industry on natural resources become more readily available, the short- and long-term benefits associated with proactive natural resources management become more apparent. The NRP helps TVA to evaluate benefits at both a programmatic and Valleywide level, highlighting the advantages inherent in implementing a strong stewardship culture.

Chapters 3 through 8 of the NRP discuss the expected benefits at a programmatic level. The following sections provide an overall look at the benefits associated with TVA's natural resources management. As a whole, NRP-related programs are expected to provide a fourfold benefit for every dollar spent.

Public and Economic Benefits	• Higher quality of life • Access to informal water-based recreation • Significant access to informal outdoor recreation areas (trails and other day-use areas) • Protection of nonrenewable resources (cultural, archaeological, threatened/endangered species) • Expenditures in the Valley by recreational visitors (economic development) • Marina and recreational boating reservoirs • Value of reservoir and tailwater fishing • Flood control
Ratepayer Benefits	• Thermal control of river for generation • Control of river systems for hydro generation • Revenue from recreation agreements, agricultural licenses, fees and reimbursables • Improved water resource management • Efficiencies gained through program integration • Collaborative and leveraged partnerships

Figure 1.7 Benefits of natural resources management

1.6.1 Public and Economic Benefits

Sound natural resource management provides significant benefits to the public. Access to and use of outdoor recreation has been shown to correlate to healthier lifestyles and thus a higher quality of life. In addition to ensuring a high quality of life for residents of the Tennessee Valley, programs in the NRP work to protect many of the Valley's nonrenewable resources. These resources include such things as archaeological items and endangered plant and animal species that can never be recovered once they are gone.

The programs in the NRP create a number of positive economic impacts as well. The 80 recreational sites and approximately 293,000 acres of surrounding land and reservoirs operated and managed by TVA attract millions of visitors each year to enjoy the region's natural and water resources. Recreational and boating opportunities are provided by each reservoir, and TVA dams create numerous tailwater fishing sites. In 2008-09, approximately 16.9 million people visited Tennessee state parks (many made possible by TVA's natural resources management), including an estimated 2.3 million visitors to Tennessee Valley historic sites and another 1.3 million visits to archaeological sites annually. These visits generate over $1.5 billion in total economic output ($725 million in direct expense and another $835 million in economic activity throughout the state to enable delivery of products and services) and support over 18,600 jobs in Tennessee alone.[1]

1.6.2 Ratepayer Benefits

In addition to the intrinsic value of protecting TVA's natural resources, proper management can create significant costs savings for ratepayers. When the care of the Tennessee River was entrusted to TVA, essential stewardship responsibilities were entrusted with it. The NRP fulfills a number of these responsibilities, and it helps provide the basis for maintaining control of the river.

This responsibility results in a number of benefits for the agency and its ratepayers. Control of the river allows responsible management of the water for thermal control of key generation assets and for hydro generation. Each of these helps reduce power costs. In addition, water conservation and resource management efforts by TVA can also reduce the impacts of water shortages and reduce the need for water development programs that raise the cost for water in the region.[2]

Finally, the NRP creates a number of efficiencies across stewardship programs. As programs are better integrated, opportunities to increase activities are created. These efficiencies, combined with the proactive approach to partnerships outlined in the NRP, can potentially lead to expanded implementation efforts.

[1] Economic Impacts of Tennessee State Parks, University of Tennessee Institute for Agriculture.
[2] Economic Benefits of the Tennessee Valley Authority's Natural Resource Plan, Jan. 2011.

CHAPTER 2

NRP Road Map for Success

2.1 Implementation Strategy 43
- 2.1.1 Phase I: Years 1 to 3 43
- 2.1.2 Phase II: Years 4 to 5 46
- 2.1.3 Phase III: Years 6 to 20 48

2.2 Funding 48

2.3 Measures of Success 49

2.4 Risks 52

The NRP represents TVA's high-level strategy for managing its natural resources in the near and long term. Detailed implementation plans will be developed based on the NRP to drive specific implementation efforts. To guide its NRP-related stewardship efforts and provide a means for measuring results, TVA has developed goals and success measures for the next three, five, and 20 years:

PHASE I

Establish a Foundation for Success While Maintaining Baseline Activities

Keys to Success

- Maintain current efforts to meet regulatory and legal requirements
- Expand data management and information sharing opportunities
- Gain a better understanding of the resource base and current conditions
- Develop and maintain partnerships to support implementation efforts
- Strengthen integration between resource areas during implementation
- Establish an NRP assessment process and metrics to measure results
- Begin adapting reservoir land plans to single-use parcel allocation methodology

PHASE II

Implement Programs to Sustain, Maintain and Improve Resource Conditions

Keys to Success

- Evaluate NRP implementation efforts and refresh the plan based on progress
- Continue to address resource needs through a systematic implementation approach
- Establish or partner with a foundation and trust fund to support expansion of NRP programs
- Continue to strengthen collaborative working environments
- Finish updating remaining reservoir land plans to single-use parcel allocation

FIVE-YEAR NRP REFRESH CYCLE

PHASE III

Continue to Enhance and Improve TVA's Stewardship Efforts

Keys to Success

- Refresh NRP on a five-year cycle
- Focus enhancement or expansion efforts through building partnerships, corporate sponsorships, or other collaborative means
- Update reservoir land management plans on a rotational or as-needed basis

Figure 2.1 Overview of the NRP implementation strategy

Each of these success measures is discussed in more detail on the following pages as part of TVA's implementation strategy. By identifying both near- and long-term goals and expectations, TVA is able to effectively manage and communicate its implementation efforts.

2.1 Implementation Strategy

The implementation strategy presented above identifies the objectives and keys to success associated with the NRP's three-, five-, and 20-year outlook. This creates parameters, or "bookends," by which TVA will implement its stewardship programs and activities over the life of the NRP. Supporting detailed implementation plans will be developed on an annual basis.

The core components below are focal points of the NRP throughout its life cycle.

Public Outreach and Education

Through public outreach and education campaigns, TVA will promote stewardship efforts while reinforcing the public's role in the protection and preservation of the region's natural resources. All constituents play a part in helping support the intended usage of TVA-managed lands. Educating stakeholders helps to create the awareness and understanding that are critical to maintaining and improving the state of the region's nonrenewable resources.

Partnerships

Partnerships are a critical component of future enforcement, education and operations success. The availability of partnerships may influence which programs are implemented and the order in which they occur. TVA, along with other agencies, is tasked with finding new and creative ways to deal with funding and personnel challenges to effectively manage nonrenewable resources. To support these coordination and collaboration efforts, TVA will leverage its Public Engagement programs (see Chapter 8) to help develop and foster these relationships in an integrated manner.

Program Development

A focus of the NRP is to highlight the interconnectivity of its programs across all resource areas. This integrated resource management approach aligns with TVA's mission as well as its original charge in the TVA Act. Each program is designed to maintain the resources under TVA's control, particularly the nonrenewable assets, and to do so in an integrated manner. In addition, TVA is refocusing its effort to maintain and develop field expertise in order to better identify the programs that need to be created, updated and implemented.

Resource Area Integration and Alignment

To accomplish its natural resource management goals, TVA leverages the relationships between resource areas, including their programs and activities. Activities that support mutual benefits across resource areas and programs alike will be leveraged to most efficiently and cost effectively implement the NRP. In other words, when a program is implemented in one resource area, benefits may be realized in another program in a different resource area.

2.1.1 Phase I: Years 1 to 3

Overall objective:

Establish a foundation for success while maintaining baseline activities.

Expected timeline:

Fiscal years 2012 to 2014

Keys to success:

1. Maintain current efforts to meet regulatory and legal requirements

   As part of day-to-day natural resources management, TVA will continue to meet all regulatory and legal requirements. This level of effort will be maintained throughout the life of the NRP. In addition, TVA will strive to exceed the goals set

forth in the 2008 TVA Environmental Policy. The overarching objective of the Environmental Policy is to provide cleaner, reliable and still-affordable energy, support sustainable economic growth in the Tennessee Valley, and engage in proactive environmental stewardship in a balanced and ecologically sound manner. TVA will continually adjust its stewardship activities to meet this expectation. Adjustments will include development of sustainability measures to ensure future activities are aligned with the Environmental Policy.

Also, it is essential for TVA to be flexible within its stewardship activities to address emerging issues and resource needs as they arise. Examples include, but are not limited to:

- Response to flood and storm damage
- Degraded dewatering levee conditions
- Need to preserve and protect ecological diversity (e.g., Duck River)
- Insect infestation (e.g., pine beetles)
- Disease (e.g., white nose syndrome in bats)
- Protection of sensitive resources (e.g., threatened and endangered new listing or delisting)

2. Expand data management and information sharing opportunities

Data management and accessibility are critical elements in proactive natural resources management. Because of their importance, TVA will support the development of a more collaborative and comprehensive data sharing environment with regional and national partners. These efforts will support TVA's resource management decision-making processes as well as the creation of partnership opportunities. When developed, a coordinated effort will be needed to help maintain accurate records. In addition, data management is a key input to TVA's public engagement and outreach efforts, helping to promote stewardship activities and involvement.

For example, an immediate need within data management is to coordinate with state and other federal agencies to make geographical information system (GIS) data more compatible across databases. TVA will develop and maintain Valley-wide databases for water quality data, digitized cultural resource data, threatened and endangered species data, and wetlands. These databases will be geo-referenced, and data will be available for sharing with partners and the public as appropriate.

3. Gain a better understanding of the resource base and current conditions on TVA-managed reservoir lands

The NRP defines the holistic, high-level path forward for TVA's environmental stewardship efforts. This provides direction for the development of actionable plans for stewardship of the region's resources. To inform these plans, TVA will assess its lands to identify high-priority resource needs on which to focus its efforts.

For example, TVA needs to understand the quantity and current conditions of TVA-managed trails to determine future maintenance needs and potential opportunities for expansion. When considering expansion, TVA may not be able to add trails due to a lack of maintained access roads leading to trailheads. Therefore, TVA will need to improve and expand access roads prior to adding new trails.

The information gathered during these assessments will be entered into TVA's databases. The ability to accurately capture, store and share these data helps foster a collaborative working environment across the region.

4. Develop and maintain partnerships to support implementation efforts

TVA will actively work to develop and maintain a network of partnerships to support the maximum level of implementation activities possible.

5. Strengthen integration between resource areas during implementation

The NRP is designed to show the interconnectivity of the resource areas and their programs at a high level. Annual implementation plans will clearly identify and describe the integration or linkage between programs and their supporting activities. This supports TVA's efforts to:

- Identify resource needs and enhancement opportunities
- Develop methodology to get from "where TVA is currently" to "where TVA is going"
- Ensure compliance with all legal, regulatory and policy requirements
- Prioritize implementation activities

6. Establish an NRP assessment process and metrics to measure results

A priority within the first three years of the NRP implementation strategy is to build a comprehensive assessment process to help monitor whether TVA is moving in the right direction. As part of this effort, TVA will align its measurement of results with the annual business planning cycle, creating a direct link between resource needs and the formal budgeting process. Also, the process will provide TVA with a means to benchmark its peers for comparison and analysis purposes. This process is intended to be informative, both internally and externally, helping to promote the NRP's successes and areas needing attention.

7. Begin adapting reservoir land plans to single-use parcel allocation methodology

   Converting the reservoirs planned using the multiple-use tract method to single-use parcel allocation will be the first focus under the Comprehensive Valleywide Land Plan. This group includes Chickamauga, Kentucky, Nickajack and Wheeler reservoirs. Due to the size of Kentucky Reservoir, it may be split into more manageable sizes (for example, upper end and lower end) for planning. The forecasted reservoirs, Fort Loudoun and Normandy, will be planned next, along with the unplanned reservoirs: Great Falls, Wilson, and the eight Beech River reservoirs.

2.1.2 Phase II: Years 4 to 5

Overall objective:
Implement programs to sustain, maintain and improve resource conditions

Estimated timeline:
Fiscal years 2015 to 2016

Keys to success:

1. Evaluate NRP implementation efforts and refresh the plan based on progress, a better understanding of resource conditions, and emerging needs

   To ensure that changing resource conditions are incorporated into the NRP, TVA has committed to updating the NRP on a rolling five-year basis. This process is further described in Section 2.3 (page 49). Also, as TVA's stewardship activities evolve and expand, the baseline level of effort will be adjusted accordingly. By progressively raising the baseline expectations, TVA is able to more easily identify needs and actions to incorporate into the refreshed plan.

2. Continue to address resource needs through a systematic implementation approach

   This is a continuation of Phase I's objective to ensure continuity and integration among resources areas. The NRP resources areas and programs create a web of activities that support each other during implementation. This interconnectivity makes it challenging to choose specific activities over others during implementation. Therefore, TVA will develop systematic implementation work plans that clearly identify and describe the integration or linkage between programs as well as prioritize each program based on a given set of criteria.

   For example, implementing strategic initiatives identified through rapid land conditions assessments and land conditions assessments[1] supports TVA's effort to develop a prioritized list of resource maintenance needs. These assessment methodologies help to identify Tier 1, or high quality, parcels on TVA-managed reservoir lands, allowing TVA to prioritize where to focus its improvement or enhancement efforts and money.

   TVA has defined the following criteria to be used in the prioritization process for each NRP program and activity:

   Public health and safety
   Definition:
   Ensure stakeholder safety while enjoying TVA-managed reservoir lands
   Examples:
   - Mitigation of potentially hazardous conditions (e.g., dangerous tree, dump site, user conflicts, target shooting, meth lab dumping)
   - Improved signage (boundary and interpretive)

[1] Currently, the rapid land conditions assessment and land conditions assessment tools are limited to biological resources management.

Compliance, protection and preservation

Definition:

- Comply with regulatory, legal and policy requirements while ensuring the protection and preservation of sensitive resources

Examples:

- Caves, wetlands, archaeological sites, historic sites, sensitive plant and animal communities

Assets, investments, impacts

Definition:

- Preserve assets and prior natural resource management investments to minimize degradation. This applies to physical TVA assets, investments that TVA has made to improve, protect and enhance habitats, and efforts to minimize degradation of resources and assets

Examples:

- Land assets – access control measures, boundary marking, signage (boundary and interpretive), monuments, forest access roads and parking areas, livestock fencing, and trails under TVA management
- Recreation assets – recreation facilities, boat ramps, campgrounds, day-use areas, and greenways
- Investments – native warm season grasses, watershed improvements, dewatering levee improvements
- User impacts – dispersed recreational sites, sites with degrading water quality conditions, and misuse of lands (ATV abuse)
- Impacts mitigation – monitoring and data management activities (water quality, aquatic ecology, threatened and endangered species, heritage and wetlands database, archaeological database, etc.)

Other critical needs

Definition:

- Manage emerging issues and identify proactive measures

Example:

- Integrated TVA Police monitoring and enforcement activities across all resource areas

Program enhancements

Definition:

- Introduce new activities and projects as funding and partnerships allow

Examples:

- Refreshed NRP focus, increased NRP scope, new partnerships or funding, or emergent needs (e.g., climate change)

3. Establish or partner with a foundation and trust fund to support expansion of NRP programs

As part of the NRP, TVA will establish or partner with an existing foundation and trust fund to provide an opportunity for interested stakeholders (or participants) to make a contribution toward natural resource management and sustainability in the Tennessee Valley. Once this fund or partnership is established, TVA will ensure that its management is completely independent of the agency. Additionally, TVA will investigate what strategies other businesses are using to determine which environmentally friendly or sustainable practices they are willing to support. With this information, TVA will develop a methodology to recruit and encourage participation.

See Chapter 8 – Public Engagement for additional information.

4. Continue to strengthen collaborative working environments

   Throughout the NRP, TVA will focus efforts on maintaining existing and creating new working relationships with state, local and other federal agencies as well as nongovernmental organizations (includes the general public). This will support TVA and its partners in the advancement and sustainability of their environmental efforts.

5. Finish updating remaining reservoir land plans to single-use parcel allocation

   In this phase, TVA will finish updating all outstanding reservoir land plans to the single-use parcel allocation methodology.

2.1.3 Phase III: Years 6 to 20

Overall objective:
Continue to enhance and improve TVA's stewardship efforts

Estimated timeline:
Fiscal years 2017 to 2031

Keys to success:

1. Refresh NRP on a five-year cycle

   Key milestones include, but are not limited to:
   - Elevate programs to newly established levels
   - Maintain resources at an optimum level to meet the needs, demands and desired conditions of the Valley
   - Continue to implement improvement and enhancement efforts
   - Actively identify and address resource needs, including management of emerging issues

2. Focus enhancement or expansion efforts through building partnerships, corporate sponsorships, or other collaborative means

3. Update reservoir land management plans on a rotational or as-needed basis

   Once all reservoirs are updated to the single-use parcel allocation methodology, the reservoirs previously planned using this method will then be updated in an order that gives consideration to the age of the current plan and any developing trends that warrant review.

2.2 Funding[2]

Funding includes the personnel and dollar expectations for each resource area to be implemented in the NRP. TVA is committed to meeting the annual resource requirements for compliance with legal and regulatory obligations. However, the intent of the NRP is not to stop at compliance, but rather to strive towards fully implementing the preferred alternative within a 20-year time frame. This "no-regrets strategy" will require a coordinated approach to attain the necessary resources to support the programs and activities presented.

The estimated annual cost required to achieve the NRP measures of success is between $19 million and $20 million. This new level of support will serve as the baseline for NRP funding going forward. Funding for the remaining years of the plan will be dependent upon a number of different factors, including:

- User fees
- Reallocation of essential stewardship funding
- Increased recreation agreements
- Increased application fees

[2] Funding levels presented in the NRP have not been inflation-adjusted and represent 2011 dollars.

- Annual budgeting process
- Compliance funding
- Partnerships
- Sponsorships (e.g., corporate)
- TVA base budget

In years when available resources from these sources are high, more dollars will be applied to NRP programs. In years when available resources from the sources above are limited, less funding will be applied to NRP programs, though never falling below legal and regulatory compliance. As a result, TVA may need to reprioritize its spending in these years to ensure compliance obligations are met. This may result in stopping or reducing its commitment to some programs in order to enhance others. Actual funding levels for each year of the plan will be determined through the annual budgeting process.

2.3 Measures of Success

An integral component of the NRP is a defined method by which TVA will measure and monitor progress throughout the 20-year life cycle of the plan. The measures of success shown in the table on the following page were selected for the NRP. While these success measures do not provide details of each individual program, together they provide metrics by which to measure the success of the NRP as a whole.

Resource Area	Measures of Success	Time Frame
Biological Resources	Complete land conditions assessment of all undeveloped TVA lands • Address 100% of identified safety issues • Improve or maintain 75-85% of lands to meet "fair" or "good" criteria	8-10 years
	Ensure 100% of low-risk dewatering facilities meet dam safety guidelines	8-10 years
	Conduct boundary maintenance and meet signage needs on all TVA property	8-10 years
	Maintain all trails and informal recreation areas in "good" condition or close area permanently or until brought up to standard	20 years
Cultural Resources	Protect 30-40% of critically eroding sites	20 years
	Evaluate for affiliation 70-90% of NAGPRA items on TVA land	20 years
	Conduct archaeological surveys on 60,000-100,000 acres of TVA land	20 years
Recreation	Certify 80-100 campgrounds in Camp-Right Campground Program	20 years
	Ensure 70-90% of day-use areas meet "good" criteria	20 years
	Continue management of 30-35 stream access sites	Annually
Water	Certify 110-130 clean marinas	20 years
	Reassess the water quality and aquatic life of all streams and reservoirs and share data	3-5 years
	Reduce 20,000-25,000 tons of nutrients and sediment in partnership with others	20 years
Lands Planning	Convert all reservoir land management plans to single-use parcel allocation	3-5 years
	Update all 46 reservoir land management plans	Every 5-10 years
	Refresh the Comprehensive Valleywide Land Plan	Every 3-5 years
Public Engagement	Integrate all education programs across resource areas and implement 8-10 resource area modules	3-5 years
	Leverage TVA efforts by 2-3 times using external resources	10 years
	Develop GIS databases and share with partners to facilitate resource management	5-10 years

In addition to these measures of success, TVA will comply with all laws and regulations as well as fulfill its essential stewardship responsibilities

Figure 2.2 NRP measures of success

By regularly evaluating both overall stewardship and program results, TVA will be able to quickly refocus its natural resources management efforts to meet the ever-changing needs and desired conditions of the region's resources. This will be accomplished through two review cycles.

1. **Annual NRP Review**
   The goal of the annual NRP review is to provide a forum for TVA to regularly assess and evaluate its NRP implementation efforts. Each year, TVA will measure its progress against the NRP measures of success and update the Regional Resource Stewardship Council on progress made.

2. **5-Year NRP Refresh Cycle**
   The goal of the five-year NRP refresh cycle is to incorporate new information and changing conditions into the NRP on a regular basis, ensuring that TVA is effectively meeting the ever-changing needs and demands of the Valley's resources.

2.4 Risks

If TVA does not effectively and efficiently manage the resources entrusted to it, it faces both near- and long-term risks, including not fully achieving the goals of the Environmental Policy or resource management accountabilities assigned to it by the TVA Act. These risks can result in a broad range of impacts. Examples include impacts to public health and safety, economic development, quality of life, nonrenewable resources, and public perception of TVA.

While each program has its own unique risks, there are overarching concerns and challenges associated with not implementing the NRP (see Figure 2.3). For example, if TVA does not actively preserve or protect the region's resources, such as archaeological artifacts, there is a risk of losing them forever. Additionally, partnerships are an essential component of TVA's implementation strategy. Not seeking these relationships would jeopardize the ability to effectively and efficiently manage TVA lands.

TVA will work to mitigate risks with collaborative and comprehensive natural resources management efforts through the NRP.

Risk	Biological	Cultural	Recreation	Water	Reservoir Lands Planning	Public Engagement
Public health and safety issues	●	●	●	●	●	●
Unmet recreation needs	●	●	●	●		
Loss of heritage tourism and eco-tourism opportunities	●	●				
Loss of nonrenewable resources	●	●		●	●	
Compliance-related sanctions or costs	●	●	●	●		
Degraded terrestrial and aquatic habitats	●			●		
Decreased biodiversity	●			●		
Increased management costs (inefficient operations)	●	●	●	●	●	
Water quality impacts	●	●	●	●		
Economic development impacts	●	●	●	●		●
Reduced public awareness and involvement	●	●	●	●	●	●
Insufficient or out-of-date information	●	●	●	●	●	●
Damaged relationships with state, local and other federal agencies, and nongovernmental organizations	●	●	●	●		●
TVA reputation	●	●	●	●	●	●

Figure 2.3 Potential risks associated with not implementing resource management activities

CHAPTER 3

Biological Resources

3.1 Goal 58

3.2 Benefits 58

3.3 Implementation Strategy 58
Land Stewardship 59
Habitat and Species Management 60
Dispersed Recreation 61
Public Outreach and Awareness 62

3.4 Measures of Success 62

3.5 Resource Area Programs 63
3.5.1 Threatened and Endangered Species Program 64
3.5.2 Wetlands Management 66
3.5.3 TVA Sensitive Resources Data Management 68
3.5.4 Natural Areas Management 70
3.5.5 Migratory Birds Management 71
3.5.6 Grasslands and Agricultural Lands Management 72
3.5.7 Dewatering Projects Management 74
3.5.8 Forest Resource Management 76
3.5.9 Nonnative Invasive Plant Management 78
3.5.10 Nuisance Animal Control 79
3.5.11 Terrestrial Greenhouse Gas Sequestration Management 80
3.5.12 Wildlife Habitat Council – Third-Party Certifications 81
3.5.13 Wildlife Habitat Enhancement Partnerships 82
3.5.14 Boundary Maintenance 83
3.5.15 Land Conditions Assessment and Land Stewardship Maintenance 84
3.5.16 Conservation Planning 86
3.5.17 Dispersed Recreation Management 87
3.5.18 Leave No Trace 88
3.5.19 Trails Management 89

TVA manages biological resources while providing many types of recreational opportunities for the public. With nearly 650,000 acres of impounded surface water (surface or pool area of the reservoirs) and approximately 293,000 acres of reservoir land, 11,000 miles of shoreline, and 42,000 miles of tributary streams and rivers, this land-and-water reservoir system represents a significant natural resource base offering numerous opportunities for resource management. Together, these public lands provide TVA with leadership opportunities in resource conservation and emerging resource management areas such as terrestrial greenhouse gas sequestration.

TVA has a long and storied history in the management of biological resources, especially in the areas of forestry, reclamation, fisheries and wildlife management. The TVA Act recognized the role of forest management in the restoration of the region's natural resources. The goals of TVA forestry programs included optimum forest productivity, economic expansion, watershed protection and environmental enhancement. Through the years, TVA worked with agencies and stakeholders to encourage better forest management, efficient wood utilization, environmental protection, reforestation and mine reclamation.

TVA developed the first forest tree nurseries in the Tennessee River Valley and assisted Valley states in developing their tree production capabilities. Between the 1930s and the 1960s, more than 600 million seedlings were produced at TVA's two forest nurseries for distribution across the region. From the 1950s through the 1970s, TVA conducted a program to inventory forested land in

the region, complementing the U.S. Forest Service's national inventory system. Through the 1980s and 1990s, TVA initiated some of the first computerized forestry planning tools in the nation, which were used to complete a systematic inventory of its forested properties. This inventory was used to guide forestry management activities. During the 1990s and 2000s, private land development adjacent to TVA-managed land increased dramatically, raising pressure on TVA's forests and leading TVA to balance private land use with traditional forest management goals.

From its earliest days, TVA has been committed to protecting and improving wildlife habitat. Between the 1930s and 1950s, TVA transferred more than 195,000 acres of land to federal and state agencies for the development of wildlife management areas and refuges. This effort provided significant benefits to varied resident and migratory wildlife and provided significant wildlife-oriented recreation opportunities for the region. In 1978, TVA initiated a wildlife restoration project aimed at restoring various animal populations. These introductions of species, conducted in partnership with state and other federal agencies and private organizations, resulted in the establishment of self-sustaining populations of several species, such as osprey and bald eagles. During the 1970s and 1980s, TVA was instrumental in developing techniques to restore productive wildlife habitat to previously disturbed lands. TVA was recognized nationally for its work in reclaiming surface-mined lands and developing a wildlife-oriented model reclamation plan for southern Appalachia in cooperation with the U.S. Fish and Wildlife Service.

In the 1970s, TVA created a regional natural heritage database project to collect and store biological data. The database served to help guide effective conservation and land planning activities and to help TVA comply with the National Environmental Policy Act, the Endangered Species Act (ESA), wetland regulations under the Clean Water Act, executive orders and other federal and state regulations and legislation. In addition to maintaining the database, TVA monitored the health and status of threatened and endangered plant and animal species located at approximately 40 sites on TVA-managed lands. TVA also established a cave protection program designed to protect threatened and endangered species and other sensitive resources.

3.1 Goal

TVA will manage biological resources under its care in a holistic, ecologically sound manner to maintain biological diversity while supporting multiple uses to meet stakeholder expectations.

3.2 Benefits

Through management efforts in this resource area, TVA expects to realize the following benefits:

- Improved understanding of current land and resource conditions to support future planning and data sharing efforts
- Increased protection and enhancement of biologically diverse habitats (e.g., threatened and endangered species)
- Successful outreach efforts creating enhanced public awareness of land use impacts and the potential for transport of invasive or nonnative species/plants into habitats
- Promotion of environmentally sustainable dispersed recreational use of TVA-managed lands
- Development of partnerships with other resource management agencies and nongovernmental organizations to further resource management efforts in the region

3.3 Implementation Strategy

Through implementation of the Natural Resource Plan, TVA's biological resource management programs focus on protecting and enhancing the biological resources of the Tennessee Valley. This will be accomplished through the continued evaluation of biological resources, which will allow TVA to prioritize and then preserve sensitive resources (e.g., threatened and endangered species) and unique resources (e.g., old growth bottomland hardwood stands), as well as conserve renewable resources (e.g., forests and native warm season grasses) in a sustainable manner to support diverse habitats for wildlife populations.

The NRP programs will promote environmentally sustainable recreational use on TVA-managed lands. Dispersed recreation, such as camping, bank fishing, and hiking, can create both positive and negative impacts on natural resources. TVA will take a proactive approach to reducing the negative impacts such as habitat or species damage while providing users with sustained, high-quality recreational experiences.

Finally, partnerships and cooperative projects with state and other federal agencies and nongovernmental organizations will be developed in an effort to support the current biological resources management efforts. It is critical for regional stakeholders to collaborate on protection, enhancement and conservation efforts. A key component in developing these relationships is the sharing of natural resource data. TVA will work with its partners to establish a compatible and comprehensive database of natural-resource-related information to help support and inform the various programs and activities being performed across the Tennessee Valley. This data sharing effort is not unique to biological resources and will, in the long term, be coordinated with other databases both internal and external to TVA.

Within biological resources, TVA has structured its implementation strategy based on the following characteristics:

- Land stewardship
- Habitat and species management
- Dispersed recreation
- Public outreach and awareness

Land Stewardship

Currently, many components of TVA's biological resources management are being conducted in a fragmented manner, with missed opportunities for integration among complementary programs. Work is often reactive, with a limited view of the ramifications on a Valleywide basis and outdated or insufficient natural resource data for some areas of TVA-managed lands.

As part of determining how best to meet the future needs of the Valley's resources, TVA must first reestablish its baseline data for reservoir lands under its management. Through the NRP, TVA will develop centralized, comprehensive databases using tools such as the Land Conditions Assessment to enable prioritization of land stewardship efforts. TVA is able to maximize the value of every dollar spent by making better information available to aid in its activity planning efforts, including:

- Identifying maintenance needs
- Improving public health and safety
- Ensuring compliance with regulatory requirements
- Protecting sensitive resources
- Preserving TVA assets
- Conserving the Valley's natural resources for future generations

Habitat and Species Management

Current terrestrial habitat management and sensitive resource protection activities again tend to be reactive. Under the NRP, TVA will develop and implement a variety of proactive methodologies in order to enhance and protect the diverse natural resources that TVA manages. Examples include:

TVA's forest resources and natural areas

TVA has over 200,000 acres of manageable forested reservoir properties. Over the last 15 to 20 years, TVA has managed these resources largely with a focus on maintenance activities. During this period, forest health, age and structure diversity, and overall wildlife habitat quality have in many cases deteriorated. Enhancing the focus on forest resource management will begin to reverse this decline and will create improved forest conditions, benefiting all resource areas within the NRP. Concurrently, TVA manages 154 natural areas throughout the Tennessee Valley. These areas protect some of the most biologically diverse and sensitive habitats occurring on TVA lands, including unique plant, animal, cultural and scenic habitats.

Threatened and endangered species

As a federal agency, TVA is required under the Endangered Species Act to manage the populations of threatened and endangered species on TVA-managed lands. TVA plays a leadership role in the protection and management of several terrestrial species and their habitats. As part of the NRP, TVA will further strengthen its leadership role throughout the Tennessee Valley to enhance working relationships and data sharing in support of regional initiatives. To assist with this effort, TVA will increase its support for its Natural Heritage Program database of rare and sensitive species and its wetlands database and examine additional opportunities to proactively manage threatened and endangered resources nationally and regionally.

TVA-managed waterways and reservoirs

In connection with its more than 293,000 acres of reservoir land, the TVA-managed waterways and reservoirs create extensive year-round, temporal, seasonal, migration and over-wintering habitat for hundreds of forest, aquatic and wetland migratory bird species. These collective habitats in conjunction with surrounding mountains and plains provide a unique resource critical to the survival of many species in the southeastern United States. In addition, these types of programs improve wildlife-focused dispersed recreation opportunities for those who enjoy these resources.

TVA's dewatering projects on Kentucky and Wheeler reservoirs

These projects are the cornerstones for migratory waterfowl management in the Tennessee Valley region. They provide thousands of acres of high-quality habitat and significant opportunities for waterfowl hunting and wildlife observation. These areas, managed in concert with both state and federal wildlife agencies, are examples of successful long-term partnerships that greatly benefit natural resources and local economies. Focusing efforts in this area will result in high-quality wildlife and wetlands habitat management and dispersed recreation opportunities, which will provide substantial social benefits to stakeholders. They will also provide substantial financial benefits to local and regional economies.

Dispersed Recreation

TVA's current work in the dispersed recreation area is somewhat fragmented. TVA has developed methodologies to evaluate the effects of dispersed recreation. However, work to remedy those impacts has not been conducted on a prioritized or regular basis.

Through the NRP, TVA will focus on improving conditions for those who enjoy hiking, camping, and other activities on the lands that it manages. TVA's reservoir properties attract more than 6 million visits annually for dispersed recreation purposes, and these visits generate local and regional economic benefits. The unintended consequences of this heavy use are impacts to public land that need to be managed to ensure that environmental and social conditions remain sustainable. Dispersed recreation activities support TVA's effort to maximize the benefits of TVA-managed lands for public use by maintaining, enhancing, and expanding recreational and educational opportunities for Valley stakeholders to enjoy, while minimizing associated impacts.

TVA will utilize tools such as the land conditions assessment to identify high priority tracts of TVA-managed land for evaluation of dispersed recreation opportunities and impacts. These evaluations will then be used to prioritize the remediation work. Also, TVA will reevaluate trail and dispersed recreation needs as part of the five-year NRP refresh cycle to ensure it is meeting public demand and the intended use of the resources. Opportunities for partnerships also exist to help in expanding trail offerings through a coordinated build and maintain effort.

Public Outreach and Awareness

TVA's current biological resources efforts in public outreach and awareness are reactive and usually independent of other resource areas. Each NRP program contains a component of public outreach, which can vary from direct interactions or campaigns with the public to supplying information for other programs to utilize in outreach efforts. Educating the public plays an integral role in day-to-day management. It is essential to create public awareness of issues that focus on preventive and proactive measures to improve and protect natural resources throughout the Tennessee Valley. Through the NRP, TVA will conduct proactive, integrated efforts not only with other resource areas, but also with state and other federal agencies and nongovernmental organizations to educate the public about the importance of biological resources and their positive effects on the quality of life in the Tennessee Valley.

3.4 Measures of Success

Implementation efforts in this resource area will be regularly evaluated to track progress using the following measures of success:

Resource Area	Measures of Success	Time Frame
Biological Resources	Complete land conditions assessment of all undeveloped TVA lands • Address 100% of identified safety issues • Improve or maintain 75-85% of lands to meet "fair" or "good" criteria	8-10 years
	Ensure 100% of low-risk dewatering facilities meet dam safety guidelines	8-10 years
	Conduct boundary maintenance and meet signage needs on all TVA property	8-10 years
	Maintain all trails and informal recreation areas in "good" condition or close area permanently or until brought up to standard	20 years

3.5 Resource Area Programs

When developing the NRP, TVA identified programs and activities to support the goals of each resource area. The following sections discuss each program in more detail, highlighting current activities, NRP activities, and expected implementation benefits. In addition, relationships between resource areas and other programs are discussed to help show linkages throughout the NRP.

3.5.1 Threatened and Endangered Species Program

The threatened and endangered species program primarily addresses compliance with Section 7 of the Endangered Species Act, under which TVA is required to consult with the U.S. Fish and Wildlife Service concerning the effect of its actions on species listed by the Service. Consultation can be required for projects proposed by TVA, those subject to permitting by TVA (e.g., approvals under Section 26a of the TVA Act), or those requiring the use of TVA land. TVA is directed under Section 7(a)(1) to utilize its authority "…in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species…"

Within the NRP, this program aligns with the following resource areas and programs:

- Archaeological monitoring and protection (Cultural)
- Reservoir shoreline stabilization/riparian management (Water)
- Stream and tailwater monitoring (Water)
- Climate change sentinel monitoring (Water)

Scope: As a federal agency, TVA's responsibilities under the Endangered Species Act apply throughout TVA's operational footprint. Its management of threatened and endangered species primarily occurs on TVA-owned lands.

TVA Span of Control: TVA's span of control over threatened and endangered species varies by species (both plants and animals). TVA can directly influence listed species having large portions of their total population on TVA lands. Other, more widespread species are under partial or no span of control.

Current Activities

As required by Section 7(a)(2) of the Endangered Species Act, TVA consults with the U.S. Fish and Wildlife Service as appropriate concerning the potential for projects proposed by TVA or subject to approval by TVA (e.g., land use agreements and approvals under Section 26a of the TVA Act) to affect

endangered species. This is a required obligation of TVA as a federal agency. TVA also conducts management activities to aid in the conservation of threatened and endangered species according to the guidance in Section 7(a)(1) of the Endangered Species Act. Many of TVA's current endangered species management activities are conducted to comply with U.S. Fish and Wildlife Service biological opinion requirements and commitments resulting from environmental reviews.

Approximately 40 sites containing populations of federally listed animals and plants on TVA-managed lands are monitored. These monitoring activities were designed in cooperation with U.S. Fish and Wildlife and, as appropriate, other federal and state agencies. These data are reported to appropriate resource agencies and are used to protect these sensitive resources and to make informed decisions about land management and operational actions.

NRP Activities

- Continue to comply with the requirements of the Endangered Species Act and implementation of biological opinion requirements
- Continue monitoring of select species populations
- Create monitoring plans, develop and implement management actions, seek partnerships and catalog select species where management opportunities and/or emergent issues exist within the region
- Continue cave protection activities

Expected Benefits

Key benefits of this program are:

- Improved threatened and endangered species and habitat protection
- Compliance with Endangered Species Act regulations
- Increased resource knowledge, which results in informed decisions and reduced project costs and cycle times
- Improved coordination and communication with regulators
- Increased water quality benefits (e.g., protection of cave environments protects subterranean water resources)

3.5.2 Wetlands Management

Wetlands are highly productive and biologically diverse ecosystems that provide multiple public benefits such as flood control, reservoir shoreline stabilization, improved water quality, and habitat for fish and wildlife resources. The wetlands management program seeks to implement a proactive approach to identify, manage and protect wetlands under TVA's care.

Within the NRP, this program aligns with the following resource areas and programs:

- Nutrient source – watershed identification and improvement program (Water)
- Reservoir shoreline stabilization/riparian management (Water)
- Lands planning

Scope: TVA reservoir lands and TVA power lands

TVA Span of Control: Direct control on properties that TVA fully owns and manages and partial control on lands in cooperation with various state and federal agencies

Current Activities

TVA is guided by Executive Order 11990 (Protection of Wetlands, 1977), which directs federal agencies to minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In addition, TVA utilizes the sensitive resources database to evaluate 26a permit applications for potential impacts to wetlands. TVA works with applicants (and the U.S. Army Corps of Engineers if needed) to avoid impacts wherever possible or determine necessary mitigation actions. TVA has taken a proactive approach to wetlands protection by establishing red zone wetlands in its Shoreline Management Initiative of 1998.

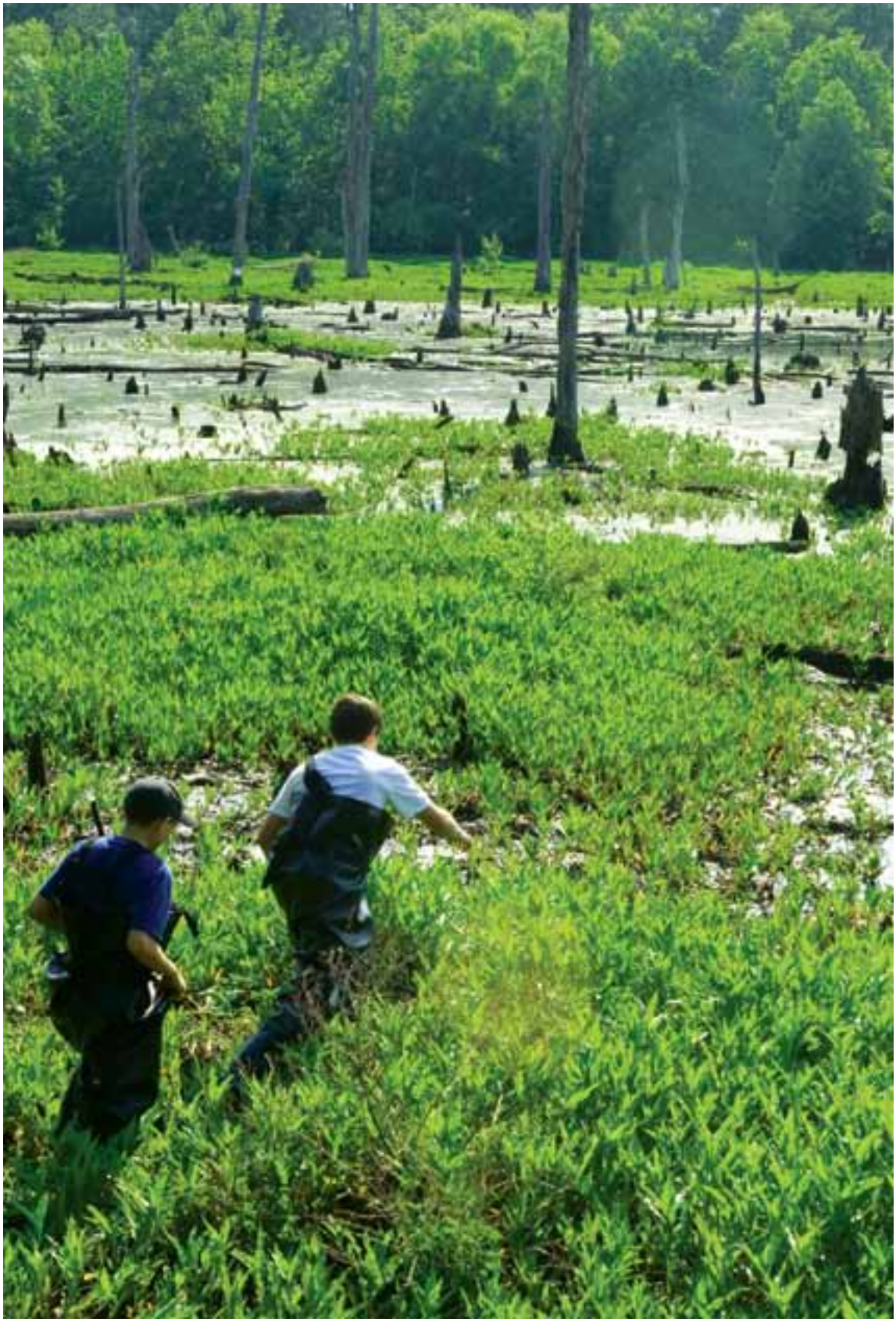
NRP Activities

- Continue implementation of current TVA wetland management and protection practices on TVA-managed lands

Expected Benefits

Key benefits of this program are:

- Protection of wetland resources to preserve their function and support fish and wildlife resources
- Improved water quality through the wetlands' filtering capability (keeping sediment out of reservoir) and prevention of shoreline erosion (providing a buffering effect for wave action)
- Increased eco-tourism opportunities resulting in greater economic benefits (dispersed recreation, fishing)
- Consistency with Executive Order 11990
- Expanded and improved knowledge and information of wetlands functions and values (wetlands database)
- Enhanced collaborative working environment through information sharing and pilot project activities with state, other federal, and nongovernmental organization partners



3.5.3 TVA Sensitive Resources Data Management

TVA's sensitive resources data management is maintained through the TVA Natural Heritage and wetlands databases. The TVA Natural Heritage database is a biological database that contains an ecological inventory of rare plants, animals, natural communities, natural areas, and other sensitive natural resource features. This extensive database also includes champion trees, colonial bird roosting sites, and areas managed by other federal, state or local entities. The TVA Natural Heritage database is affiliated with and uses the same information storage system as the NatureServe network of natural heritage programs in North and Central America. This ensures consistent data among the seven Valley states in which TVA operates. TVA maintains cooperative data exchange agreements with its federal and state conservation partners, ensuring that most current data are used to make informed decisions.

In addition to the TVA Natural Heritage database, TVA also maintains a wetlands database. Several geospatial data layers have been developed to support the assessment of proposed projects on wetland resources. These data layers are used for a GIS-level resource assessment and preliminary reviews for ground surveys and wetlands' delineations. The wetland data available include more than 1,850 scanned National Wetlands Inventory maps that have been geo-referenced and combined to provide a seamless coverage of the TVA region. The National Wetlands Inventory maps, covering approximately 70 percent of the TVA region, are in a digitized format for spatial analysis. TVA uses these data for environmental reviews, conservation planning, and endangered species management activities.

These data are integral to informing other programs and activities across all resource areas as well as collaborative efforts with external stakeholders (e.g., state and other federal agencies).

Scope: For the purposes of the NRP, the scope of this program is focused within the TVA power service area. On occasion (e.g., power purchase agreements outside the service area, fuel purchases, coal leases, etc.), there is a business need to seek data from outside the TVA power service area. When this need arises, TVA utilizes its membership in the NatureServe network as well as relationships with U.S. Fish and Wildlife to access the necessary information. Various state natural heritage programs and Fish and Wildlife offices maintain these data nationwide.

TVA Span of Control: Direct control over the TVA owned databases, partial control over shared data, and no control over data sought from state agencies, other federal agencies, and natural heritage programs

Current Activities

TVA actively maintains its inventory records using the following data sources:

- Information from museums and herbaria
- Results of field surveys by TVA and others
- Formal data exchanges with natural heritage programs in the seven Valley states
- Formal data exchanges with the U.S. Fish and Wildlife Service
- Information from professional contacts in other agencies and academia
- Results from TVA's endangered species monitoring and field assessments
- Unpublished and published scientific literature

Data users access the database for environmental reviews and planning purposes. All users are trained biologists, foresters or

ecologists who receive additional training on the use and proper interpretation of data contained in the database. They also receive supplemental training annually to improve interpretive skills and to be exposed to current conservation issues. These data are provided to data users via a comprehensive GIS-based computer system. To ensure compliance with the Endangered Species Act, TVA has developed standards used to interpret these data.

NRP Activities

- Continue current management of TVA Natural Heritage and wetlands databases
- Honor data sharing agreements among TVA, state and other federal resource agencies
- Add new data users for environmental review and planning purposes

Expected Benefits

Key benefits of this program are:

- Promotion of proactive management and protection of the Valley's sensitive resources through increased knowledge and data sharing of resource information
- Enhanced collaborative working environment through data sharing activities with state, federal, and nongovernmental organization partners
- Improved TVA awareness of challenges facing sensitive resources as well as willingness to work with others on solutions
- Improved development of avoidance, minimization and mitigation measures as part of project planning due to an increase in sensitive resources data availability, resulting in reduced compliance costs and avoided (potential) project delays

3.5.4 Natural Areas Management

This program manages TVA's natural areas, which are ecologically significant sites, lands set aside for particular management objectives, and lands that contain sensitive biological, cultural or scenic resources. The TVA natural area program includes small wild areas, habitat protection areas, wildlife observation areas, and ecological study areas.

Within the NRP, this program aligns with the following resource areas and programs:

- Archaeological monitoring and protection (Cultural)
- Lands planning

Scope: TVA-managed lands (includes power properties as well as reservoir lands)

TVA Span of Control: Direct control over TVA-managed lands and partial control over areas that are cooperatively managed with state or other federal resource agencies

Current Activities

In 1983, in recognition of the importance of unique natural resources, TVA established a policy for the identification and protection of natural areas. TVA manages 154 natural areas throughout the TVA region. Key activities include on-site condition assessments, erection of gates or barriers, trails management, and installation of regulatory and interpretive signage. TVA partners with state agencies and nongovernmental organizations to support monitoring, maintenance, trail development, and nonnative invasive plant control in these natural areas. Information on and boundaries of both TVA and state natural areas are maintained in the TVA Sensitive Resources database. Recently, due to funding and personnel constraints, TVA has not actively monitored the conditions of its natural areas.

NRP Activities

- Monitor and assess TVA's natural areas to develop a prioritized list of maintenance or improvement needs (assess approximately one-third of natural areas annually)
- Develop and implement comprehensive natural area management plans (assess approximately 15 natural areas annually)
- Establish criteria for a natural areas planning process to designate new or remove existing natural areas on TVA-managed lands

Expected Benefits

Key benefits of this program are:

- Expanded and improved knowledge of and information about sensitive resources, resulting in enhanced habitat protection of some of the Valley's unique areas (e.g., nonnative invasive plant control, boundary maintenance, species habitat enhancement, etc.)
- Increased opportunities for eco-tourism resulting in greater local and regional economic benefits (dispersed recreation)
- Enhanced public awareness and appreciation of unique natural areas
- Enhanced collaborative working environment through information sharing activities with state, federal, and nongovernmental organization partners

3.5.5 Migratory Birds Management

The migratory bird management program is composed of two elements: development and implementation of migratory bird management plans and increased involvement in regional working groups. For example, TVA is looking to renew its involvement in the Partners in Flight working group and seek partnerships for potential related projects.

Within the NRP, this program aligns with the following resource areas and programs:

- Recreation activities (both formal and dispersed recreation)
- Environmental education (Public Engagement)

Scope: TVA power service area and TVA reservoir lands

TVA Span of Control: Direct control within the reservoir system and dewatering areas and partial or no control on adjacent non-TVA lands (e.g., state wildlife management areas, U.S. Fish and Wildlife refuges, private lands)

Current Activities

TVA inventories, monitors and manages migratory birds on TVA-managed lands. Although it is not specifically mandated, TVA complies with Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. TVA is a signatory to the Partners in Flight joint memorandum of understanding venture, which is outdated.

In 2004, as a result of the Reservoir Operations Policy, TVA altered the drawdown schedule on several reservoirs to balance competing uses of the reservoir system (e.g., recreation, water supply, water quality, flood control, power generation and navigation). Concern about the resulting impacts to shorebird populations led TVA to establish a five-year working group composed of federal and state agencies, nongovernmental organizations, and volunteers to learn more about shorebird resources in the Valley (Tennessee River Valley Shorebird Working Group).

During the late 1990s and early 2000s, TVA developed numerous resource management unit plans (see Section 3.5.15) that help provide sustainable habitat for migratory birds and other wildlife populations. These plans are still being used to manage TVA lands across the Tennessee Valley.

NRP Activities

- Comply with Executive Order 13186
- Support and participate in national and regional migratory bird management planning efforts, such as the U.S. Shorebird Conservation Plan, North American Waterfowl Management Plan, Migratory Bird Joint Ventures, and Landscape Conservation Cooperatives
- Continue participation in Tennessee River Valley Shorebird Working Group
- Partner with other agencies and nongovernmental organizations to implement conservation projects and to manage migratory bird populations on TVA reservoirs (e.g., waterfowl, shorebirds, double-crested cormorants, wading birds)

Expected Benefits

Key benefits of this program are:

- Improved habitat for migratory birds and monitoring of long-term trends for select species
- Enhanced collaborative working environment and relationships through information sharing activities with state, federal, and nongovernmental organization partners
- Increased tourism resulting in greater local and regional economic benefits (e.g., bird-watching and waterfowl hunting)

3.5.6 Grasslands and Agricultural Lands Management

The TVA grasslands and agricultural lands management program strives to increase habitat diversity across the TVA landscape. Grasslands and agricultural lands are lands that are nonforested and are maintained in early successional habitat or agricultural fields (e.g., row crops and hay forage). TVA manages these nonforested lands to maintain ground cover to prevent erosion, provide open and early succession wildlife habitat, enhance local agribusiness, provide future land maintenance cost savings, and maintain maximum flexibility for future management scenarios (e.g., carbon sequestration).

Within the NRP, this program aligns with the following resource areas and programs:

- Reservoir shoreline stabilization/riparian management (Water)
- Environmental education (Public Engagement)
- Lands planning

Scope: TVA reservoir lands and TVA power lands

TVA Span of Control: Direct control over TVA-managed lands and partial control on TVA lands that are under agriculture agreements with other agencies and local farmers

Current Activities

TVA grasslands and agricultural lands management activities are accomplished through agricultural licenses with individual farmers and cooperative agreements with state agencies, other federal agencies and nongovernmental organizations (e.g., dewatering areas) as well as prioritized habitat enhancement projects on the 10 existing TVA reservoir management unit plans.

NRP Activities

- Continue to manage agricultural licenses and cooperative federal and state agency agreements on over 10,000 acres of TVA-managed lands
- Partner with other federal and state agencies and nongovernmental organizations in efforts to manage and enhance TVA grasslands and agricultural lands

Expected Benefits

Key benefits of this program are:

- Increased diversity and quality of wildlife habitat, water quality benefits, and dispersed recreational opportunities (e.g., wildlife viewing, hunting, etc.)
- Enhanced local agribusiness, resulting in a positive effect on local economies
- Demonstrated carbon management (e.g., by converting grasslands and agricultural lands to forest) and energy crop production (e.g., switch grass)
- Long-term maintenance cost savings associated with proactive management of nonforested lands
- Revenue generated from agricultural licenses

3.5.7 Dewatering Projects Management

The dewatering projects management program operates, either alone or in partnership, nine dewatering projects on Kentucky and Wheeler reservoirs. A dewatering area is an area that is seasonally flooded as part of a waterfowl management program by TVA, the Tennessee Wildlife Resources Agency (TWRA), Alabama Department of Conservation and Natural Resources, and U.S. Fish and Wildlife. The projects are operated as part of the Tennessee and Wheeler national wildlife refuges and state wildlife management areas.

Within the NRP, this program aligns with the following resource areas and programs:

- Archaeological monitoring and protection (Cultural)
- Environmental education (Public Engagement)

Scope: Dewatering projects on TVA reservoir lands

TVA Span of Control: Direct control over the dewatering areas, which TVA owns, and partial control where it has agreements with state and other federal agencies to manage the lands within the dewatering areas

Current Activities

While primarily built for mosquito control, the dewatering areas are currently managed for waterfowl habitat and dispersed recreation (e.g., hunting, fishing, wildlife viewing). Other benefits of these areas include protection of bottomland hardwoods, slope protection for relocated highways and railways, and agriculture lands. TVA has entered into agreements with the Alabama Department of Conservation and Natural Resources, TWRA, and U.S. Fish and Wildlife for the management and cost sharing of operation and maintenance of these areas. Specific operation and management activities include maintaining earthen levees and operating pump house and water control gates. U.S. Fish and Wildlife, TWRA, and Alabama Conservation and Natural Resources manage the land base within the dewatering areas, including maintenance of ditches, planting of crops, regulation of hunting activities, etc.

As a result of refocused efforts on dam and levee safety, TVA recently conducted a comprehensive dewatering area review to assess the status and make recommendations for refurbishment of each unit.

TVA has contractual agreements for highway and railroad embankment protection within dewatering areas (e.g., U.S. Highway 70 and railroad bridge at Camden, Tenn. dewatering area).

NRP Activities

- Continue management of current projects (includes maintaining or upgrading existing contractual agreements)
- Refurbish dewatering areas based on dewatering unit engineering and hydrologic reviews
- Operate, manage and maintain dewatering area projects at upgraded conditions
- Work with local and regional partners to incorporate nature-based tourism into management of dewatering area projects.

Expected Benefits

Key benefits of this program are:

- A nationally recognized overwintering waterfowl habitat, along with good habitat for other wildlife, including sensitive species
- Protection of wetland habitats, bottomland forests, cultural resources, agricultural lands, and highway and railroad embankments
- Outstanding waterfowl hunting opportunities, along with other dispersed recreational opportunities (e.g., wildlife viewing, bank and boat fishing, hiking and biking trails, etc.)
- Economic benefits to local communities through tourism and agriculture

3.5.8 Forest Resource Management

The majority of TVA's public lands (more than 75 percent) are in mature forest cover that offers outstanding environmental watershed protection benefits. These benefits include slow release of storm water runoff, which helps in flood control; structural interception of rainfall or dissipation; evapotranspiration; and control of soil erosion.

TVA will manage its forest resources (all of the resources of the forest plant community, including the wildlife it supports) in a holistic manner, including:

- Forest access roads and parking areas management
- Forest resource and watershed protection
- Forest vegetation management
- Other public benefits (e.g., dispersed recreation, visual resources management, habitat enhancement)

Within the NRP, this program aligns with the following resource areas and programs:

- Archaeological monitoring and protection (Cultural)
- Recreation activities (both formal and dispersed recreation)
- Environmental education (Public Engagement)
- Reservoir shoreline stabilization/riparian management (Water)

Scope: TVA reservoir lands and power properties

TVA Span of Control: Direct control over TVA-managed lands and partial control of TVA lands that are under agreements for management by other agencies

Current Activities

TVA has been a pioneer of watershed protection, including the establishment of agency tree seedling nurseries, tree improvement programs, reforestation (planting of millions of trees), soil erosion control, sediment management, and provision of technical forest resource management guidance across the region. TVA has over 100 miles of earth forest roads used by the public. Proper management of these forest roads includes best management practices that minimize soil erosion and off-site impacts that can adversely affect water quality.

Since discontinuation of its Forestry Prescription Process in the mid-1990s, TVA's forest management efforts have been limited in scope. These efforts have involved only small-scale salvage operations in response to storm or insect damage and planned harvests primarily for habitat enhancement. These actions have involved less than 1 percent of TVA's undeveloped lands. TVA's other forestry related efforts have been limited to mitigating tree hazards and encroachments involving tree cutting or other vegetative disturbances.

NRP Activities

- Manage tree hazards and tree cutting/vegetation damage encroachments
- Continue small-scale vegetation (tree removal) operations associated with storm or insect damage and forest wildlife habitat enhancements
- Monitor broad forest trends on TVA-managed lands and conduct basic forest protection activities (e.g., insects and disease, nonnative invasive plants, age-class of forest stands, prescribed burns)
- Provide support to state forestry assessment plans
- Develop and maintain a qualified fire management crew for local responses and to protect TVA assets

Expected Benefits

Key benefits of this program are:

- Improved forest resources, wildlife habitats, and scenic beauty
- Increased water quality benefits
- Better knowledge of forest resource trends and management needs
- Increased dispersed recreation opportunities
- Economic benefits to local communities through tourism
- Protection for cultural and sensitive resources (e.g., plant communities, shoreline erosion reduction, etc.) through proactive forest resource management
- Support for TVA's carbon management efforts
- Minimized long-term forest management costs through sustainable monitoring and improvement practices

3.5.9 Nonnative Invasive Plant Management

This program manages the effects of nonnative invasive plant infestation under and beside forest canopies, small forest openings, open and early successional habitat lands, and sensitive resource areas and habitats. Nonnative invasive plants infest a variety of forested and nonforested habitats. These plants can reduce forest productivity, hinder forest use and management activities, and degrade biodiversity and wildlife habitat. Nonnative invasive plants can include trees, shrubs, vines, grasses, ferns and forbs.

Within the NRP, this program aligns with the following resource areas and programs:

- Archaeological monitoring and protection (Cultural)
- Campground management (Recreation)
- Day-use areas (Recreation)
- Reservoir shoreline stabilization/riparian management (Water)

Note: TVA's aquatic plant management program is not within the scope of the NRP.

Scope: All TVA property has the potential for nonnative invasive plant issues, including power properties and reservoir lands.

TVA Span of Control: Direct control on land TVA owns and manages and partial control on TVA lands containing developed recreation facilities and lands where TVA has agreements with state and other federal agencies

Current Activities

Currently, TVA actively manages nonnative invasive plants in areas where habitat improvements have been made (e.g., native warm season grass fields). Also, TVA works to control these plants in natural areas, on trails, and on dam reservation properties. Control is accomplished by mechanical means (e.g., hand grubbing, mowing, mulchers), chemical control (e.g., selective herbicides), and prescribed burning.

NRP Activities

- Control nonnative invasive plants on at least 1,000 acres of TVA-managed lands per year
- Develop a prioritized plan to control nonnative invasive plants on areas with sensitive resources (e.g., designated natural areas), habitat enhancements, or high public use, emphasizing areas with high partnership potential

Expected Benefits

Key benefits of this program are:

- Improved forest resources, wildlife habitats, and associated biodiversity
- Protection for cultural and sensitive resources (e.g., kudzu control at historic sites, native versus nonnative sensitive plants, etc.)
- Increased dispersed recreation opportunities
- Potential to reduce TVA's long-term control costs
- Increased protection of water resources and migratory bird habitat quality (e.g., alligator weed and water primrose)

3.5.10 Nuisance Animal Control

The nuisance animal control program manages the effects of nuisance animals on TVA lands, facilities, and recreational users to protect:

- Public health and safety (e.g., feral hogs)
- TVA assets (e.g., bird impacts to power lines and transformers)
- Adjacent private property from damage (e.g., flooding by beavers)

This process involves the removal of nuisance animals from the affected area. Common nuisance wildlife species for TVA include, but are not limited to, vultures, Canada geese, double-crested cormorants, herons, pigeons, gulls, beavers, raccoons, squirrels, bats, groundhogs, various other rodents, and feral or released domestic animals.

Within the NRP, this program aligns with the following resource areas and programs:

- Campground management (Recreation)
- Day-use areas (Recreation)
- Environmental education (Public Engagement)
- Reservoir shoreline stabilization/riparian management (Water)

Scope: All TVA property has the potential for nuisance animal issues, including power properties, reservoir lands, and developed recreation facilities

TVA Span of Control: Direct control on land TVA owns and manages and partial control on TVA lands containing developed recreation facilities and lands where TVA has agreements with state and other federal agencies

Current Activities

The primary objective of TVA's nuisance animal control program is to reduce natural resource and facility damage caused by nuisance species in a practical, humane and environmentally acceptable manner. TVA has entered into a contractual agreement for the management of nuisance animals with the Wildlife Services section of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service. Wildlife Services holds all federal and state permits that are required to conduct control activities with various wildlife species.

NRP Activities

- Resolve animal damage conflicts via existing contractual agreement with USDA Wildlife Services
- Develop and implement proactive strategies to manage feral or released domestic animals on TVA-managed lands

Expected Benefits

Key benefits of this program are:

- Improved public and TVA employee health, safety and property
- Support for TVA transmission and operational reliability and related cost savings
- Protection of TVA's earthen dams and levees
- Reduced liability for adjacent private property
- Enhanced protection of cultural, sensitive and natural resources
- Increased protection of water resources and island habitats (e.g., vegetation on shorelines eroded due to double-crested cormorants)
- Increased dispersed recreation opportunities
- A positive public perception associated with proactive land management and maintenance

3.5.11 Terrestrial Greenhouse Gas Sequestration Management

The terrestrial greenhouse gas (GHG) sequestration management program is focused on continuing TVA's participation in research projects and third-party consortiums on terrestrial carbon sequestration, which is the storage of carbon in the biomass created by perennial vegetation such as root systems and tree trunks. TVA will continue its research efforts near Watts Bar nuclear plant as well as its involvement in the PowerTree and Utilitree consortiums, which are joint partnerships between electric companies that sponsor projects to sequester carbon dioxide.

As background, a carbon offset is an equivalent reduction in carbon dioxide or other greenhouse gases (GHGs). They are generated in a sector and/or region outside the boundary of an emissions cap or trading program. Offsets could potentially be used as a compliance mechanism under a national carbon reduction program. Initiatives similar to current terrestrial carbon sequestration research projects may be used to reduce future compliance costs if carbon legislation is passed. In order to obtain certified and verified offsets from terrestrial GHG sequestration activities, particular GHG accounting protocols must be followed (e.g., determination of applicability, development of baseline emissions, measurement and verification of emission reductions, third-party reviews). Future types of terrestrial carbon sequestration projects that TVA may consider include:

- Forest creation and reforestation activities
- Forest type conversion
- Forest clearing and deforestation avoidance
- Conservation farming techniques

Scope: TVA-managed reservoir lands

TVA Span of Control: Direct control on TVA-managed reservoir lands

Current Activities

Currently, TVA is engaged in carbon offset research projects on 41 acres of TVA-managed lands at Watts Bar Nuclear Plant to build institutional knowledge of terrestrial carbon sequestration programs. TVA is currently involved in this research project for the purpose of:

- Obtaining information to develop internal expertise on how to generate carbon credits from a terrestrial carbon sequestration project in order to hedge risk associated with a carbon-constrained world
- Obtaining certified carbon reduction credits
- Showcasing TVA's historic land and water stewardship mission
- Demonstrating new and advanced solid and aboveground carbon measurement technologies

TVA currently participates in two voluntary consortiums, PowerTree Carbon Company and Utilitree Carbon Company LLC, that are conducting reforestation, afforestation, and forest management projects to sequester carbon.

NRP Activities

- Conduct research projects on 41 acres focusing on issues related to terrestrial greenhouse gas management
- Continue existing involvement in third-party consortiums (PowerTree and Utilitree) focusing on issues related to terrestrial GHG management practices

Expected Benefits

Key benefits of this program are:

- Development of internal knowledge regarding generation of carbon offset credits from a terrestrial carbon sequestration project
- Keeping TVA abreast of trends and best management practices for carbon management

3.5.12 Wildlife Habitat Council – Third-Party Certifications

The Wildlife Habitat Council (WHC) is a Maryland-based nonprofit organization that provides a third-party certification program that encourages corporations to enhance wildlife habitats on their properties. WHC certification adds value to programs by providing third-party credibility and an objective evaluation of projects. Wildlife Habitat Council biologists work with member companies to inventory wildlife populations, identify wildlife enhancement projects, and form teams of employees to administer them. Wildlife projects vary from site to site, but typically include maintaining wildlife food plots, establishing native grass and wildflower meadows, and providing artificial nesting structures for bluebirds, tree swallows, wood ducks and other species.

Within the NRP, this program aligns with the following resource area and program:

- Environmental education (Public Engagement)

Scope: All TVA property has the potential for Wildlife Habitat Council projects, including power properties, reservoir lands, and developed recreation facilities.

TVA Span of Control: Direct control on land TVA owns and manages and partial control on TVA lands containing developed recreation facilities and lands where TVA has agreements with state and other federal agencies

Current Activities

In 1998, TVA established a formal relationship with the Wildlife Habitat Council. TVA projects currently certified by the council include Colbert Fossil Plant, Raccoon Mountain Pumped Storage Plant, and the Muscle Shoals Reservation. TVA's Reservoir Releases Improvements Program (see Reservoir Operations Study, 2004, for additional information) has also received council certification. This program is credited with improving more than 300 miles of aquatic habitat by increasing the amount of dissolved oxygen and keeping the riverbed wet at all times.

NRP Activities

- Continue management of current certified projects
- Apply for Wildlife Habitat Council certification of the TVA Natural Resource Plan

Expected Benefits

Key benefits of this program are:

- Enhanced credibility of TVA management activities by the public through third-party review and certification
- Enhanced TVA corporate identity and pride (i.e., verify TVA is doing the right thing)

3.5.13 Wildlife Habitat Enhancement Partnerships

The wildlife habitat enhancement partnerships program focuses on collaborating with other federal and state agencies, individuals and nongovernmental organizations to improve habitats and increase wildlife-oriented recreational opportunities on TVA-managed lands.

Within the NRP, this program aligns with the following resource areas and programs:

- Reservoir shoreline stabilization/riparian management (Water)
- Environmental education (Public Engagement)
- Tennessee Valley Camp-Right Campground Program (Recreation)

Scope: TVA power lands, TVA reservoir lands, and developed recreation facilities

TVA Span of Control: Direct control on land TVA owns and manages and partial control on TVA lands containing developed recreation facilities and lands where TVA has agreements with state and other federal agencies

Current Activities

TVA actively cooperates with various agencies, individuals and nongovernmental organizations to improve habitat on TVA-managed lands. Examples include:

- U.S. Fish and Wildlife Service, Tennessee Wildlife Resources Agency, Alabama Department of Conservation and Natural Resources – dewatering areas (see dewatering projects management program, Section 3.5.7, for additional information)
- Individual farmers – wildlife enhancement projects on TVA-managed lands under agricultural licenses
- Quail Forever – establishment of native warm season grass and food plots on Tellico, Watts Bar, and Melton Hill reservoirs
- Ducks Unlimited – construction and erection of wood duck nesting boxes on TVA-managed lands across the region and habitat restoration efforts on the Camden dewatering area
- The National Wild Turkey Federation – establishment of native grass and food plots on TVA-managed lands
- University of Tennessee and local native plant nurseries – establishment and management of native wildflower meadows on certain TVA-managed lands

NRP Activities

- Improve habitat on at least 750 acres of TVA-managed lands per year through partnership efforts only

Expected Benefits

Key benefits of this program are:

- Increased habitat and species diversity
- Potential water quality benefits (e.g., prevent erosion on TVA lands through vegetative habitat enhancement)
- Increased dispersed recreation opportunities and associated economic benefits
- Reduced nonnative invasive plants on projects areas
- Improved collaborative working and data sharing environment with various partner organizations
- A positive public perception associated with proactive habitat management

3.5.14 Boundary Maintenance

The boundary maintenance program establishes and maintains TVA's reservoir property boundaries to assist in the identification and reduction of encroachments by owners of adjacent lands and to enhance the protection of natural and cultural resources through clear markings and signage. Within the NRP, this program aligns with the following resource areas and programs:

- Archaeological monitoring and protection (Cultural)
- Environmental education (Public Engagement)

Scope: TVA reservoir lands

TVA Span of Control: Direct control on TVA-owned and managed reservoir properties

Current Activities

TVA prioritizes and implements annual boundary maintenance as needed at the reservoir level. However, due to staffing and funding constraints over the last 20 years, TVA has not proactively maintained boundaries on reservoir lands. Recently, as recommended by the Regional Resource Stewardship Council, TVA has begun to refocus its boundary maintenance efforts.

Boundaries are maintained by completing a four-step process:

1. TVA identifies priority areas to conduct boundary maintenance based on developmental pressures and timber harvest activities on adjacent properties, lack of existing boundary markings, elapsed time since the last boundary maintenance, and outcomes of other TVA processes.
2. A desktop review is conducted using aerial photos of the area, site-specific photos, and maps. This information, along with a data sheet, is taken to the boundary maintenance location.
3. The boundary line is located on the ground and denoted with the appropriate paint color. The following data are also collected during boundary maintenance: date of boundary maintenance, feet of boundary marked, TVA monument numbers and conditions, and type of additional maintenance needed (if any). TVA property signage is placed approximately 200 feet apart along each boundary line.
4. The data collected during boundary maintenance are transferred to a GIS database.

NRP Activities

- Conduct boundary maintenance (e.g., mapping, surveying, reestablishment, signage, etc.) at the reservoir level
- Develop a regional prioritization process for determining boundary maintenance needs at the reservoir level
- Address all regional boundary maintenance needs on a 10-year cycle while incorporating the latest and future survey technologies to assist in the process (e.g., lasers and GIS versus transits and stadia rod)

Expected Benefits

Key benefits of this program are:

- Reduction of encroachments and unauthorized uses of TVA-reservoir lands
- Enhanced value to recreationists through shared knowledge and information of TVA-reservoir lands (includes the public, adjacent landowners, agencies, and other nongovernmental organizations)
- Increased protection of all natural resources, including sensitive and cultural resources
- Improved land conditions across the Valley by maintaining lands and boundaries

3.5.15 Land Conditions Assessment and Land Stewardship Maintenance

The land conditions assessment and land stewardship maintenance program includes two types of assessments: comprehensive land conditions assessment (LCA) and rapid land conditions assessment (RLCA) (see Chapter 7 – Reservoir Lands Planning). These processes provide a prioritized list of tasks to address land maintenance needs that are identified. The program implements access control and other stewardship measures to ensure public health and safety (e.g., removal of dangerous trees), protect natural and sensitive resources, minimize soil erosion, and prevent other environmental impacts (e.g., trash and litter). It includes construction and maintenance of roads to allow access for identified needs and tasks (e.g., construction, agricultural and timber activities).

Between 1998 and 2001, TVA developed 10 unit plans, addressing long-term (25-year), land-based resource management activities on lands allocated for natural resource conservation or sensitive resource management. The unit plans cover a total of 17,675 acres of land and were developed with substantial stakeholder input. Primary objectives of the unit plans were to provide sustainable amenities and benefits to the public through cost-effective management of unit-based resources, including habitat enhancement, sensitive resource management, access improvement, enhanced recreational opportunities, water quality improvements and forest health. An example of a unit plan

can be found at www.tva.com/environment/reports/boone/.

Within the NRP, this program aligns with the following resource areas and programs:

- Archaeological monitoring and protection (Cultural)
- Reservoir shoreline stabilization/riparian management (Water)
- Lands planning

Scope: TVA reservoir lands and natural areas on power property (e.g., Shawnee Fossil Plant)

TVA Span of Control: Direct control on land TVA owns and manages and partial control on TVA lands where it has agreements with state and other federal agencies

Current Activities

TVA currently assesses land conditions using established land condition assessments and other resource management methodologies on about 10,000 acres of TVA-managed lands per year. These assessment tools and methodologies drive the prioritization of stewardship maintenance and management activities on TVA's lands.

Also, TVA manages the implementation of 10 existing unit plans on approximately 18,000 acres along eight reservoirs. Annual tasks include maintaining native warm season grass plantings and other wildlife habitat plantings, controlling invasive plants, maintaining access roads, and implementing forest improvements.

NRP Activities

- Assess 20,000 to 35,000 acres of TVA-managed lands annually. Execute a comprehensive approach for assessing all TVA reservoir properties in an effort to eventually replace the past rapid land condition assessments with a comprehensive land assessment (hard data/information)
- Implement prioritized stewardship activities addressing public health and safety, asset preservation, and resource management needs based on land assessments (e.g., access control, road maintenance, sensitive resources protection, habitat improvement)
- Transition from the unit plan implementation methodology to the RLCA/LCA task prioritization methodology

Expected Benefits

Below are some of the key benefits TVA hopes to provide by implementing this program:

- Improved public health and safety across TVA-managed lands, which in turn helps to reduce possible costs associated with hazard management
- Increased protection of natural, cultural and sensitive resources
- Increased knowledge of existing resource conditions, locations and needs on TVA lands (e.g., signage, brochures, self-guided tours, etc.) to enhance value to recreationists and other users (e.g., universities)
- Protection of prior TVA investments on reservoir lands (e.g., habitat enhancements, access roads, invasive control)
- Creating a positive perception associated with proactive land maintenance (e.g., water quality improvements via minimized sediment runoff, wildlife habitat enhancements, forest resource management)

3.5.16 Conservation Planning

The conservation planning program supports natural resource planning initiatives throughout the southeastern U.S., including regional planning efforts with nongovernmental organizations, development of recovery plans for threatened and endangered species, development of state wildlife action plans and fisheries programs, and many other small- and large-scale conservation planning efforts.

Scope: TVA's power service area

TVA Span of Control: Direct control over conservation planning involving TVA-managed lands

Current Activities

TVA has participated in and provided data to many regional conservation-planning efforts throughout the southeastern U.S. These conservation planning efforts include eco-regional planning efforts with nongovernmental organizations, development of recovery plans for federally listed species, development of state wildlife action plans and fisheries programs, and many other small- and large-scale conservation planning efforts. Because TVA's influence crosses state lines, it has been able to bring a unique perspective to these plans.

NRP Activities

- Continue to be advisers and participants in planning organizations
- Partner with regulatory and resource management agencies in state, local and regional conservation planning efforts

Expected Benefits

Key benefits of this program are:

- A comprehensive approach to collectively address regional natural resource issues
- Increased partnership opportunities
- Improved cooperation between agencies managing similar resources
- Reduced compliance costs
- Creation of larger-scale, collaborative conservation initiatives

3.5.17 Dispersed Recreation Management

The dispersed recreation management program provides a proactive approach toward managing impacts on TVA public lands associated with dispersed recreational use (e.g., camping, hiking, bank fishing, hunting, bird-watching). This management will enhance dispersed recreation sites on TVA public lands, thus providing the user with a higher quality recreational experience. Dispersed recreation sites are not supported by formal recreation facilities such as parking areas, shower buildings and developed campsites.

Within the NRP, this program aligns with the following resource areas and programs:

- Archaeological monitoring and protection (Cultural)
- Reservoir shoreline stabilization/riparian management (Water)
- Environmental education (Public Engagement)
- Stream access sites (Recreation)
- Recreation design principles (Recreation)

Scope: Primary scope is TVA reservoir lands with additional dispersed recreation occurring on or around power properties (e.g., Saltillo power site and Murphy Hill power site)

TVA Span of Control: Direct control on land TVA owns and manages and partial control on TVA lands where it has agreements with state and other federal agencies

Current Activities

TVA identifies and evaluates the condition of dispersed recreational areas for potential impacts to TVA-managed lands. To date, it has identified and evaluated 265 dispersed recreation areas, which typically include multiple individual sites. TVA attempts to repair at least one heavily impacted area per year.

NRP Activities

- Collect data on dispersed recreation sites identified during lands condition assessment
- Repair 5 – 15 heavily impacted dispersed recreation sites annually
- Implement 5 – 10 key projects annually (e.g., new projects such as shoreline fishing sites and improved recreation access)
- Implement web-based educational campaign to promote eco-friendly dispersed recreation
- Develop and implement multi-year dispersed recreation plans
- Issue regulations on dispersed recreation facilities to enhance enforcement capabilities

Expected Benefits

Key benefits of this program are:

- Increased eco-tourism resulting in greater economic benefits
- Unique recreational opportunities for the public, such as bank fishing, hiking, bike trails, and wildlife viewing in areas where these activities are currently limited
- Enhanced value to recreationists through shared knowledge and information of TVA-reservoir lands (includes the public, adjacent landowners, agencies, and other nongovernmental organizations)
- Decreased impacts to forests, wildlife, cultural resources, sensitive species, water quality, and scenic quality of TVA reservoir lands
- Support to address and correct conflicting use issues (e.g., four wheelers interfering with deer hunters)

3.5.18 Leave No Trace

The Leave No Trace program is a national and international program designed to educate outdoor enthusiasts about the effects of dispersed recreation activities on the environment and to help them reduce those impacts.

Within the NRP, this program aligns with the following resource areas and programs:

- Archaeological monitoring and protection (Cultural)
- Reservoir shoreline stabilization/riparian management (Water)
- Environmental education (Public Engagement)

Scope: All TVA property has the potential to utilize the Leave No Trace program, including power properties, reservoir lands, and developed recreation facilities

TVA Span of Control: Direct control on land TVA owns and manages and partial control on lands where TVA has agreements with state and other federal agencies

Current Activities

Currently, TVA participates in this program by making information available at select recreational areas and TVA field offices.

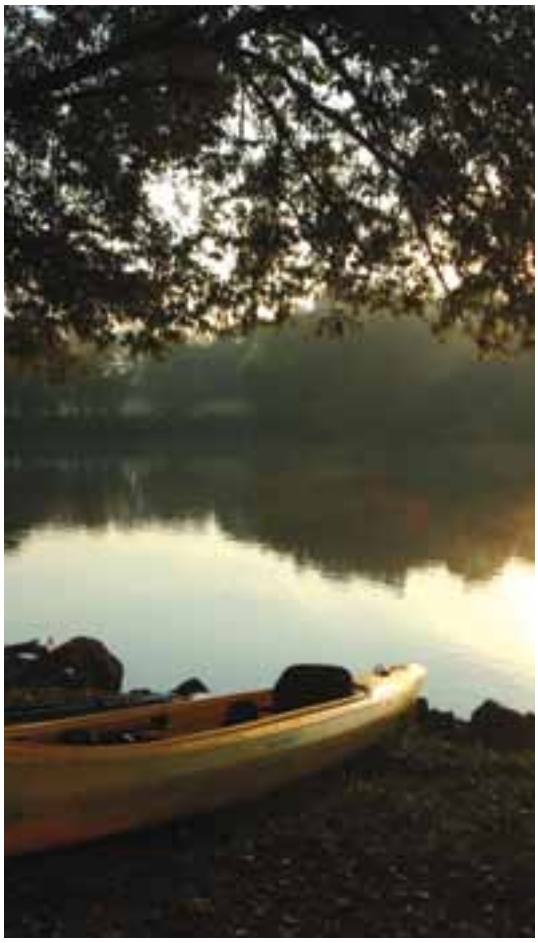
NRP Activities

- Continue to participate in Leave No Trace program
- Promote the Leave No Trace program throughout the region by providing educational information to users at recreation facilities and sites (both at information kiosks and through interactions with recreationists in the field), local businesses, and on the web

Expected Benefits

Key benefits of this program are:

- Decreased impacts to forests, wildlife, cultural resources, sensitive species, water quality, and scenic quality of TVA reservoir lands
- Increased quality of dispersed recreational experiences
- Enhanced value to recreationists through shared knowledge and information of TVA reservoir lands (e.g., additional signage and responsibility information)
- Reduced operation and maintenance costs to clean up litter and manage the dispersed recreation areas



3.5.19 Trails Management

The trails management program will provide a systematic inventory and maintenance plan to manage over 100 miles of existing trails on TVA-managed lands. Trail usage provides recreational opportunities to the public, including hiking, running, mountain biking, wildlife viewing, scenic viewing, and other outdoor pursuits. TVA will collaborate with state, local and other federal agencies and nongovernmental organizations to:

- Provide a better quality recreation experience through proper maintenance and management of existing trails throughout the Valley
- Develop additional trails and maintenance plans in areas where needs are not being met

Within the NRP, this program aligns with the following resource areas and programs:

- Volunteer program (Public Engagement)
- Environmental education (Public Engagement)
- Recreation activities

Scope: All TVA property has the potential to offer TVA-managed trails, including power properties, reservoir lands, and developed recreation facilities

TVA Span of Control: Direct control on land TVA owns and manages and partial control on TVA lands containing developed recreation facilities and lands where TVA has agreements with state and other federal agencies

Current Activities

TVA has over 100 miles of existing trails located on TVA-managed lands. Currently, it does not have a systematic inventory or a maintenance plan for existing trails. Maintenance activities are restricted to reduction of safety hazards (e.g., removal of obstacles and surface enhancements) and placement of directional and regulatory signage. TVA also coordinates trail projects with potential partners to establish sustainable projects.

NRP Activities

- Proactively manage existing trail systems to include a systematic inventory and management/maintenance plan

Expected Benefits

Key benefits of this program are:

- Increased eco-tourism resulting in greater economic benefits
- Increased access opportunities to allow for additional dispersed recreational opportunities, such as wildlife viewing, bank fishing, scenic observation, etc.
- A positive public perception associated with proactive land management and maintenance

CHAPTER 4

Cultural Resources

4.1 Goal 93

4.2 Benefits 93

4.3 Implementation Strategy 93

Enforcement 94

Protection 95

Data Management 96

Public Outreach and Awareness 97

4.4 Measures of Success 97

4.5 Resource Area Programs 98

4.5.1 Archaeological Monitoring and Protection 99

4.5.2 Archaeological Resources Protection Act 101

4.5.3 Native American Consultation 102

4.5.4 Native American Graves Protection and Repatriation Act 103

4.5.5 National Historic Preservation Act Section 106 104

4.5.6 Preservation Program 105

4.5.7 Preserve America 106

4.5.8 Archaeological Outreach (Thousand Eyes) 108

4.5.9 Corporate History Program 109

The earliest TVA-related archaeological surveys began in 1933 with the building of the first TVA dam at Norris, Tenn. As dam construction spread to sites across the region, archaeological surveys were conducted at various reservoir basins, including Wheeler, Pickwick, Guntersville, Chickamauga and Kentucky. Surveys conducted on TVA-managed lands from 1940 through 1960 were sporadic until the National Historic Preservation Act was passed in 1966. It requires federal agencies to consider the potential effects of a proposed action on historic properties and outlines an approach for agencies to consider in preserving cultural resources. Since the act was passed, TVA has conducted archaeological surveys on 30 reservoirs.

Over the last few decades, scientific and technological advancements have resulted in improved archaeological survey techniques. Because some investigations were conducted prior to the development of modern survey methods, archaeological survey coverage and site documentation on TVA-managed lands varies from site to site. To date, TVA has documented an estimated 11,500 archaeological sites on and adjacent to its reservoir and power properties. Approximately 5,320 historic structures have been identified on or near TVA-managed public lands. Of these, about 235 are considered either eligible or potentially eligible for listing in the National Register of Historic Places and 85 historic structures are listed in the Register. Nine registered historic districts exist on TVA-managed lands. Authorized by the National Historic Preservation Act and administered by the National Park Service, the National Register of Historic Places helps identify, evaluate and protect America's historic and archaeological resources.

The majority of the historic structure data has come from individual county surveys on file with the state historic preservation officers and from past TVA surveys, primarily associated with TVA's reservoir lands planning. Comprehensive work at South Holston, Douglas, Chatuge, Normandy and Tims Ford reservoirs and partial coverage at Boone, Fort Patrick Henry and Norris reservoirs supplemented these surveys.

TVA manages a number of significant archaeological sites that have made important contributions to the understanding of prehistory in the southeastern U.S. These resources include the Seven Mile Island Archaeological District (listed on the National

Register), Dust Cave in Alabama, the Hiwassee Island and Ledbetter sites in Tennessee, the Jonathan Creek site in Kentucky, and Yellow Creek in Mississippi, as well as hundreds of other sites that have been studied since the inception of TVA.

4.1 Goal

TVA will meet its stewardship responsibilities in the Tennessee Valley region through the sound management and protection of cultural resources. TVA is committed to maintaining its public lands in good environmental health to support multiple uses in meeting diverse stakeholder expectations.

4.2 Benefits

Through management efforts in this resource area, TVA expects to realize the following benefits:

- Effective and sustained protection of sensitive, nonrenewable cultural resources and their archaeological context under TVA's management
- Improved relationships with stakeholders that attach cultural value to TVA-managed lands
- Identification and management of historic properties pursuant to Section 110 of the National Historic Preservation Act in a manner that benefits both the resources and the public
- Increased education and awareness of the importance of protecting cultural resources through public outreach efforts
- Compliance with all relevant laws and regulations concerning cultural resources

4.3 Implementation Strategy

Cultural resources management is unique in that the majority of activities performed by TVA and other agencies are required under legal or regulatory statutes. TVA's management of cultural resources historically has been focused on complying with these requirements. As part of the NRP, TVA will strengthen the integration of cultural resources with other resource areas, helping to gain efficiencies in enforcement, identification and protection efforts.

Within cultural resources, TVA has structured its implementation strategy based on the following characteristics:

- Enforcement
- Protection
- Data management
- Public outreach and awareness

Enforcement

TVA has a responsibility to both protect and enhance the broad array of cultural resources found on the lands it manages across the Tennessee Valley region. The agency currently has two Archaeological Resources Protection Act (ARPA) officers on staff. It conducts coordinated enforcement efforts (both through partnerships and public outreach campaigns) to monitor the approximately 293,000 acres of reservoir properties, as well as inundated lands that are periodically exposed in TVA reservoir drawdowns. This level of effort meets legal and regulatory requirements, but it is difficult to efficiently and effectively monitor all archaeological sites on TVA properties. To this end, TVA will continue the use of the ARPA officers and will use the Thousand Eyes archaeological outreach program to enhance enforcement efforts. The Thousand Eyes program promotes public awareness of the resources in TVA's care and of the need for public involvement in their protection. As TVA hosts public events, it will promote the protection of these resources and ask the public to help discourage looting.

Protection

As a strategic priority, TVA will enhance its efforts to monitor and protect archaeological resources to prevent looting and shoreline erosion. The primary tool for doing so is the archaeological monitoring and protection program. Protection is a critical element in preserving these nonrenewable sites for future generations. TVA can also improve its preservation program to ensure a more complete inventory of these resources for better overall cultural resource management. This program will provide the public with more information about TVA's nonrenewable cultural resources and, along with the Thousand Eyes program, will provide more information about the importance of protecting these resources. TVA's preservation program will also evaluate and nominate sites for protection on the National Register of Historic Places.

Data Management

TVA currently maintains a historical and archaeological sites database. However, this information has been limited and is not regularly maintained. Data management needs to be a collaborative effort, both internally and externally. TVA will continue to collect data through its preservation program to support the identification and protection of historic sites. In addition, TVA has the opportunity to better leverage other internal information gathering processes to improve collection of data on cultural resources. For example, assessment of cultural resources can be integrated into the existing lands condition assessment. Although this is an effective tool for habitat assessments, it currently does not evaluate cultural, water or recreation needs on these lands. In the future, TVA will align and integrate field level data collection efforts to cover all resource areas. All of the information gathered will be directly incorporated into the proposed cultural resources database. Additionally, TVA will seek opportunities to coordinate compatible data with tribes and state and other federal agencies in the region. This will strengthen the data sharing efforts and improve collaborative enforcement and protection activities across the Tennessee Valley.

Public Outreach and Awareness

As mentioned above, public outreach is an essential part of TVA's cultural resources management program. Through the archaeological outreach program (Thousand Eyes), TVA will continue efforts to increase educational outreach to provide the best long-term protection of these resources by encouraging the public to take an interest in resource protection. In addition, TVA will actively publicize and communicate its rich history to promote the importance of maintaining the historic resources (e.g., lands and cultural artifacts) in its care. These efforts will be accomplished in coordination with TVA's public engagement programs, supporting the development of partnerships, educational materials, and volunteer opportunities.

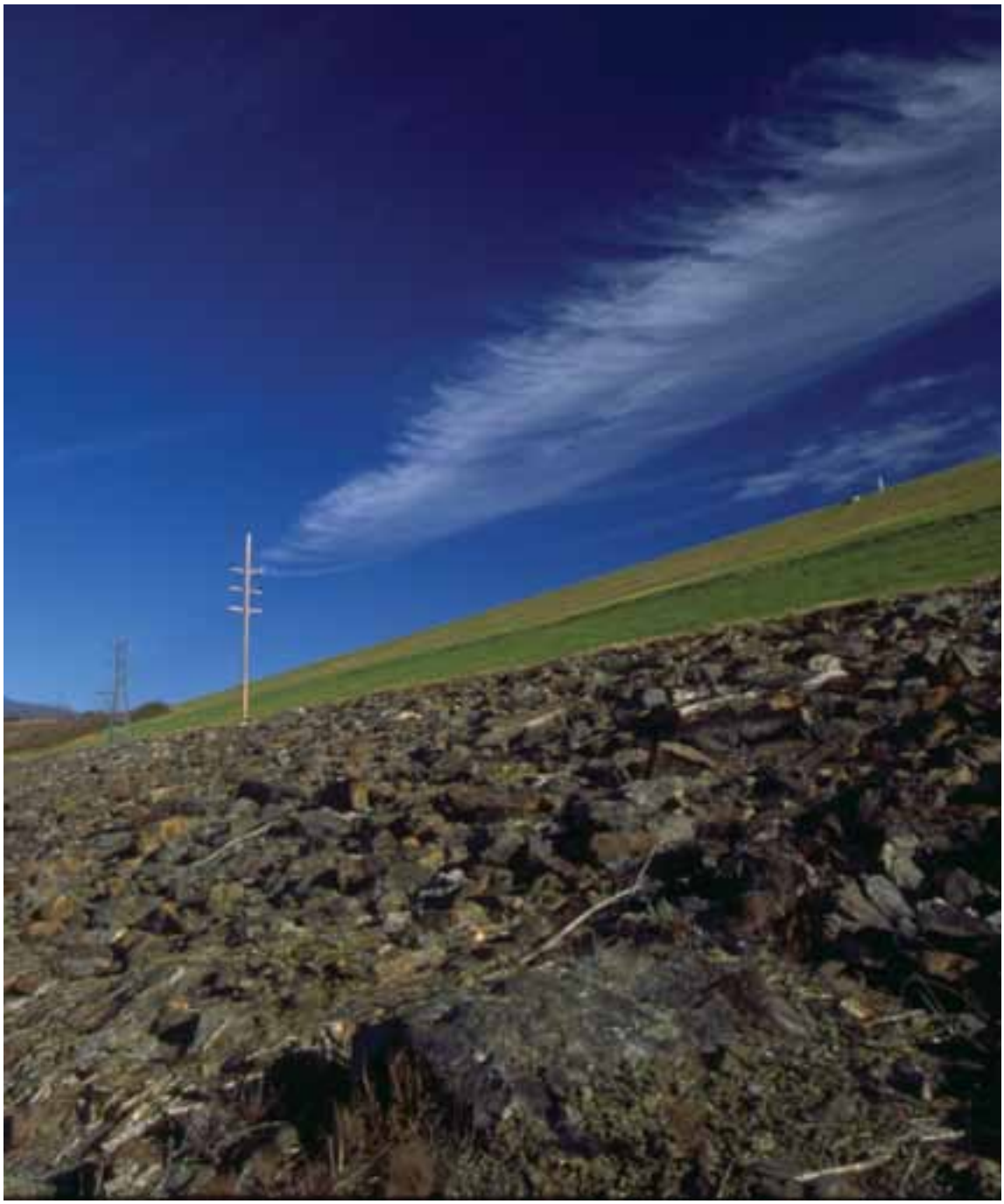
4.4 Measures of Success

Implementation efforts in this resource area will be regularly evaluated to track progress using the following measures of success:

Resource Area	Measures of Success	Time Frame
Cultural Resources	Protect 30-40% of critically eroding sites	20 years
	Evaluate for affiliation 70-90% of NAGPRA items on TVA land	20 years
	Conduct archaeological surveys on 60,000-100,000 acres of TVA land	20 years

4.5 Resource Area Programs

When developing the NRP, TVA identified programs and activities to support the goals of each resource area. The following sections discuss each program in more detail, highlighting current activities, NRP activities, and expected implementation benefits. In addition, relationships between resource areas and other programs are discussed to help show linkages throughout the NRP.



4.5.1 Archaeological Monitoring and Protection

The archaeological monitoring and protection program ensures that TVA is protecting the archaeological resources located on its managed lands, according to Section 110 of the National Historic Preservation Act and the Archaeological Resources Protection Act.

Within the NRP, this program aligns with the following programs from other resource areas:

- Reservoir shoreline stabilization/riparian management (Water)
- Threatened and endangered species (Biological)
- Natural areas (Biological)
- Dewatering projects management (Biological)
- Forest resource management (Biological)
- Nonnative invasive plant management (Biological)
- Nuisance animal control (Biological)
- Boundary maintenance (Biological)
- Land conditions assessment and land stewardship maintenance (Biological)
- Dispersed recreation (Biological)
- Leave No Trace (Biological)

Scope: All TVA reservoir lands and power property are included for archaeological monitoring and protection.

TVA Span of Control: Direct control pursuant to relevant laws and regulations

Current Activities

TVA has historically taken measures to protect approximately 0.2 mile of shoreline containing archaeological resources each year. This primarily involves reducing shoreline erosion by using different biological and physical methods such as riprap and vegetative plantings. However, the level of effort

associated with this activity has decreased in recent years. TVA is required to protect archaeological resources under Section 110 of the National Historic Preservation Act and the Archaeological Resources Protection Act, but it has discretion in how to do this. Most recently, the majority of archaeological sites monitored and protected have been in conjunction with other TVA resource protection projects.

NRP Activities

- Protect archaeological sites of up to 0.6 tributary reservoir shoreline miles or up to 1.1 main stem reservoir shoreline miles per year
- Monitor archaeological sites on 150 to 250 miles of reservoir shoreline per year

Expected Benefits

Assigning an economic benefit to archaeological sites is not always possible due to the sensitive nature of these resources and the meaning they share with the ancestral groups that place a cultural value on them. However, under the Archaeological Resources Protection Act, archaeologists are mandated to determine an "archaeological value" in the prosecution of criminal penalties under the act. In addition, a commercial value is often placed on the artifacts that are removed as a result of illegal activity. While placing a dollar amount on archaeological sites and artifacts can be controversial and must be handled in a sensitive manner, it is possible to estimate the amount of information lost each year due to looting and erosion.

In this perspective, key benefits of this program are:

- Preservation of several million dollars of scientific data annually
- Increased management knowledge and prioritization of resources in need of protection to help guide future management decisions
- Increased generation of accurate data on the annual loss of resources in order to better evaluate the need for protection of these resources
- Preservation of these nonrenewable resources for future generations
- Increased information gathered from these sites, providing a better understanding of the history of the nation and Tennessee Valley and providing enjoyment to the approximately 1.3 million people in the TVA region who visit archaeological sites

4.5.2 Archaeological Resources Protection Act

The Archaeological Resources Protection Act program ensures that archaeological resources and sites on TVA-managed lands are preserved and protected in accordance with the law. The act provides civil and criminal penalties for violations of its provisions. A violation occurs when an individual excavates, removes, damages, or otherwise alters or defaces, or attempts to excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands without a permit under the act.

Scope: All TVA-managed lands are included in the Archaeological Resources Protection Act program.

TVA Span of Control: Direct control pursuant to relevant laws and regulations

Current Activities

The TVA Police have dedicated officers for the enforcement of the Archaeological Resources Protection Act criminal provisions. These officers typically conduct inspections with approximately 1,000 security checks per year. Four or five cases are brought to the U.S. Attorney's office each year for proposed criminal prosecutions. In addition, TVA manages and protects archaeological site information and provides permits for approved archaeological studies on TVA-managed lands.

NRP Activities

- Conduct Archaeological Resources Protection Act inspections with 1,000 security checks per year

Expected Benefits

Key benefits of this program are:

- Decreased incidences of looting through public awareness of the enforcement process
- Greater appreciation for cultural resources
- Recaptured costs through prosecutions of these crimes with fines of up to $250,000 per incident.

4.5.3 Native American Consultation

The Native American consultation program involves consultations with federally recognized tribes to meet the objectives of the Native American Graves Protection and Repatriation Act (NAGPRA), the National Historic Preservation Act, the American Indian Religious Freedom Act, Executive Order 13007 (Indian Sacred Sites, 1996), Executive Order 13175 (Consultation and Coordination With Indian Tribal Governments, 2000), the 1994 executive memorandum regarding government-to-government relationships with tribal governments, and the 2009 presidential memorandum regarding tribal consultation.

Scope: TVA consults as appropriate with the following federally recognized tribes that have a cultural interest in the Tennessee Valley region:

- Absentee Shawnee Tribe of Oklahoma
- Alabama-Coushatta Tribe of Texas
- Alabama Quassarte Tribal Town
- Cherokee Nation
- Chickasaw Nation
- Choctaw Nation of Oklahoma
- Eastern Band of Cherokee Indians
- Eastern Shawnee Tribe of Oklahoma
- Jena Band of Choctaw Indians
- Kialegee Tribal Town
- Mississippi Band of Choctaw Indians
- Muscogee (Creek) Nation of Oklahoma
- Poarch Band of Creek Indians
- Seminole Tribe of Florida
- Seminole Nation of Oklahoma
- Shawnee Tribe
- Thlopthlocco Tribal Town
- United Keetoowah Band of Cherokee Indians in Oklahoma

TVA Span of Control: Direct control pursuant to relevant laws and regulations

Current Activities

TVA conducts formal consultation with federally recognized tribes to meet the objectives of the laws and executive orders mentioned above. To facilitate such consultation, TVA has established a tribal liaison as the agency's point of contact. TVA conducts formal consultation workshops with federally recognized Native American tribes once every five years.

NRP Activities

- Coordinate and conduct consultation with federally recognized Indian tribes
- Conduct formal consultation workshops with federally recognized tribes every five years

Expected Benefits

Key benefits of this program are:

- Increased knowledge of cultural resources for TVA
- Development of possible partnerships with these tribes and their population of approximately 450,000 to educate the public about the importance of preserving nonrenewable resources, create possible joint cultural preservation opportunities, and improve the understanding and application of diverse cultural perspectives

4.5.4 Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act program ensures that the requirements of the act are being met. This provides for the protection of Native American human remains, funerary objects, sacred objects, and objects vital to Native American cultural identity.

Scope: All Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony found on TVA-managed lands or otherwise under the control of the agency are included in this program.

TVA Span of Control: Direct control for compliance with this act and its associated regulations

Current Activities

TVA participates in a number of activities related to the Native American Graves Protection and Repatriation Act, including:

- Consultation with federally recognized tribes concerning those remains in TVA's control that may be culturally affiliated and assisting tribes in their repatriation
- Consultation with federally recognized tribes concerning disposition of remains in TVA's custody that are culturally unidentifiable
- Consultation with federally recognized tribes when NAGPRA items are inadvertently discovered or intentionally excavated
- Determination of disposition of NAGPRA items excavated or discovered after 1990
- Maintenance of NAGPRA inventory
- Preparation of NAGPRA notices of inventory completions

NRP Activities

- Comply with the Native American Graves Protection and Repatriation Act

Expected Benefits

Key benefits of this program are:

- Improved relations with federally recognized Native Americans
- Provision of equal treatment of the dead across ethnic affiliations
- Increased knowledge of cultural resources

4.5.5 National Historic Preservation Act Section 106

The National Historic Preservation Act Section 106 program manages compliance with the requirements of Section 106 of the law, under which TVA must consider the effect of its actions on historic properties and allow the Advisory Council on Historic Preservation an opportunity to comment on the action.

Within the NRP, this program aligns with the following resource areas and programs:

- Dispersed recreation (Biological)
- Campground management (Recreation)
- Day-use area management (Recreation)
- Camp-Right (Recreation)
- Reservoir lands planning (General)

Scope: Consultation is conducted for any TVA undertaking as defined by Section 106 of the National Historic Preservation Act.

TVA Span of Control: Direct control to consider the effects that its undertakings may have on historic properties

Current Activities

TVA reviews approximately 1,500 projects each year to determine effects on historic properties and manages existing mitigation obligations.

NRP Activities

- Conduct reviews required by the National Historic Preservation Act Section 106
- Establish database for managing mitigation obligations

Expected Benefits

Key benefits of this program are:

- Meeting future compliance obligations in the review of federal undertakings by following regulations and statutes
- Increased protection of cultural resources and knowledge
- Increased public enjoyment of these resources by the people in the TVA region who visit historic sites
- Decreased compliance costs and decreased staff time requirements

4.5.6 Preservation Program

The preservation program manages historic properties under TVA's control in accordance with Section 110 of the National Historic Preservation Act. Federal agencies are responsible for identifying and protecting historic properties in a manner that benefits both the resource and the public.

Within the NRP, this program aligns with the following resource area and program:

- Environmental education (Public Engagement)

Scope: The preservation program manages historic properties located on TVA-managed land.

TVA Span of Control: Direct control of the management and protection of the historic properties located on these lands

Current Activities

Consistent with Section 110 of the National Historic Preservation Act and the Archaeological Resources Protection Act, TVA currently surveys approximately 2,000 acres annually to identify archaeological sites within areas under its management.

TVA receives hundreds of questions each year about its history. The agency maintains resource information through various means, including a collection of historic photographs that document the history of the agency beginning in 1933. This collection has more than 17,000 photographic negatives, which are being scanned for preservation purposes. TVA also maintains a database on cemeteries that were relocated as a result of TVA projects and uses these data to respond to inquiries from the public. In addition, the agency maintains a collection of historic artifacts in coordination with the corporate history program.

NRP Activities

- Conduct archaeological surveys of 1,000 to 3,000 acres of TVA-managed lands per year
- Maintain historic photo collection, cemetery database, and TVA's historic agency information
- Maintain the current database or develop a comprehensive database to unify TVA's cultural resource data sources in one location for improved resource management
- Improve curation and management of the TVA Historic Collection
- Conduct identification surveys of historic structures on TVA-managed lands
- Annually evaluate and nominate two to four sites to the National Register of Historic Places
- Improve the preservation program through the development of implementation procedures

Expected Benefits

Key benefits of this program are:

- Establishment of long-term goals for completion of TVA inventory obligations under Section 110 of the National Historic Preservation Act
- Increased management knowledge and prioritization of management actions
- Increased protection of sites, resulting in increased enjoyment for the people in the TVA region who visit historic sites
- Decreased costs through savings in staff time and field work due to retrieval of data
- Improved decision-making capabilities from increased resource knowledge of site locations
- Potential to join and contribute to an interagency working group on cultural resources data management

4.5.7 Preserve America

The Preserve America program develops plans for the potential use of historic properties suitable for heritage tourism. This program improves TVA's knowledge about historic resources under its care and its leadership in preserving these resources, as required by Executive Order 13287 (Preserve America, 2003).

Within the NRP, this program aligns with the following resource area:

- Public engagement (General)

Scope: The Preserve America program concerns resources located on all TVA-managed lands.

TVA Span of Control: Direct control of the management and protection of the historic properties located on these lands in a manner that benefits both the resource and the public

Current Activities

TVA is evaluating the adaptive reuse of historic buildings located on a portion of the Muscle Shoals Reservation.

NRP Activities

- Conduct adaptive reuse studies of TVA historic buildings
- Submit National Historic Preservation Act Section 3 report on Section 110 progress every three years
- Develop and implement a plan for TVA-owned historic properties suitable for heritage tourism

Expected Benefits

Key benefits of this program are:

- Preservation and increased use of historic buildings through adaptive reuse studies
- Compliance with Section 110 of the National Historic Preservation Act
- Increased public access to historic properties that can provide educational opportunities to benefit both the resources and the public

4.5.8 Archaeological Outreach (Thousand Eyes)

The Thousand Eyes archaeological outreach program increases public awareness of the need to protect archaeological sites located on public lands.

Within the NRP, this program aligns with the following resource areas and programs:

- Environmental education (Public Engagement)
- Volunteer program (Public Engagement)
- Dispersed recreation (Biological)
- Recreation management (General)

Scope: The Thousand Eyes archaeological outreach program concerns resources located on all TVA-managed lands.

TVA Span of Control: Direct control pursuant to relevant laws and regulations

Current Activities

TVA has established an outreach program to promote the protection of archaeological sites on all TVA-managed lands. Approximately two to three outreach activities are sponsored annually. TVA has recently installed signs along its managed lands informing the public of penalties under the Archaeological Resources Protection Act.

NRP Activities

- Conduct up to 10 events involving up to five partners each year

Expected Benefits

Key benefits of this program are:

- Reduced looting, which may involve the permanent destruction of nonrenewable archaeological resources
- Increased enjoyment to participants in the program
- Increased educational outreach to provide the best long-term protection of these resources by encouraging the public to take an interest in resource protection

4.5.9 Corporate History Program

The corporate history program maintains a record of TVA's rich history and provides educational and outreach opportunities to promote TVA's historical significance to the region, the nation and the world. In addition, TVA will develop an oral history program, which involves interviewing individuals about their past and learning about important TVA or national events.

Within the NRP, this program aligns with the following resource area and program:

- Environmental education (Public Engagement)

Scope: TVA corporate history concerns all TVA-managed lands.

TVA Span of Control: Direct control

Current Activities

TVA maintains its historic photograph collection, and TVA's Corporate Historian participates in outreach opportunities as available. The Corporate Historian also collects data regarding current TVA history and provides requested information regarding TVA's past to the public.

NRP Activities

- Develop a formal TVA corporate history program and provide regular updates to the TVA Timeline
- Develop an oral history program
- Develop an annual public outreach history component and associated website

Expected Benefits

The key benefit of this program is:

- Increased education for the public about TVA's historical significance to the region, nation and world

CHAPTER 5

Recreation Management

5.1 Goal 114

5.2 Benefits 115

5.3 Implementation Strategy 115
- Innovation 116
- Enhancement/Expansion 117
- Data Management 118
- Public Outreach and Awareness 119

5.4 Measures of Success 119

5.5 Resource Area Programs 120
- 5.5.1 Management of Campgrounds on Dam or Power Plant Reservations 121
- 5.5.2 Management of Campgrounds off Dam or Power Plant Reservations 122
- 5.5.3 Day-Use Areas on Dam Reservations 123
- 5.5.4 Day-Use Areas off Dam Reservations 124
- 5.5.5 Stream Access Sites 125
- 5.5.6 Annual Tours 126
- 5.5.7 Recreation Information Management 127
- 5.5.8 Boating Density Assessments 128
- 5.5.9 Reservoir Lands Recreation Inventory Management 129
- 5.5.10 Recreation Design Principles 130
- 5.5.11 Recreation Planning, Assistance, and Technical Support 131
- 5.5.12 Tennessee Valley Camp-Right Campground Program 132
- 5.5.13 Dispersed Recreation Management 133
- 5.5.14 Trails Management 133
- 5.5.15 Leave No Trace 133
- 5.5.16 Tennessee Valley Clean Marina Program 133

From its beginning, TVA has encouraged the development of a wide variety of outdoor recreation opportunities, particularly on TVA reservoirs and shorelines. As part of these efforts, TVA transferred forestlands to the National Park Service and the U.S. Forest Service for those agencies to manage them and make them available for recreational use. Other lands under TVA's control were made available for recreation purposes through auctions, easements and other means. The table at right provides a summary of land conveyed by TVA to other agencies or nongovernmental organizations for wildlife management and recreation use.

Type of Recreation Area	Number of Areas (approximate)	Acres (approximate)
Public Parks	**213**	**40,900**
State	77	33,300
County	61	3,900
Municipal	74	3,500
Fair Association	1	200
Public Access Areas and Roadside Parks	**178**	**1,120**
Federal (U.S. Forest Service)	17	40
State	116	1,000
Local	45	80
Wildlife Refuges	**30**	**202,000**
National Wildlife Refuges	2	115,900
State Management Areas and Refuges	28	86,100
National Forests and Parks	**6**	**232,400**
National Forests	4	62,000
National Park	1	170,000
National Parkway	1	400
Other	**332**	**9,000**
Group Camps and Clubs	32	3,500
Commercial Recreation Areas	300	5,500
Totals	**759**	**485,420**

Figure 5.1 Land conveyed by TVA for recreation management

For further information, a detailed chronology of TVA's recreation history is provided in Appendix B of the Natural Resource Plan Environmental Impact Statement (www.tva.com/nrp).

TVA continues to provide public lands for developed recreational purposes through the reservoir lands planning process described in Chapter 7. During the planning process, tracts of TVA-managed lands around a reservoir or groups of reservoirs are categorized based upon a suitable use that is consistent with TVA policy and guidelines and applicable laws and regulations. Over the years, TVA has allocated approximately 21,200 acres for developed recreational purposes. Nearly 90 percent of these lands are currently committed under existing contractual agreements. TVA continues to entertain commercial or public recreation requests for development of remaining lands.

When the TVA board approved the Land Policy Assessment for Recreation Development, it directed staff to review TVA-managed lands designated for recreational development to verify the suitability and capability of lands assigned this classification. This assessment evaluated needs for public boat access, commercial marinas, campgrounds, recreational visitor lodging, developed land-based day-use facilities, water access, and dispersed land-based opportunities. The conclusions of these assessments can be viewed at www.tva.com/environment/land/assessment/recreation.htm.

In 2005, TVA developed a recreation strategy aimed at collaboratively enhancing recreational opportunities and addressing unmet recreational needs while managing the resources of the Tennessee River system. This strategy laid out guiding principles for how to best design and develop recreation programs. These principles were used in developing NRP programs, and the guiding principles are reflected in the success measures for recreation management listed below.

5.1 Goal

TVA will protect and conserve natural resources while providing recreational opportunities across the region. TVA is committed to maintaining and enhancing recreation opportunities and addressing unmet needs through comprehensive recreation programs and strategic partnerships.

5.2 Benefits

Through management efforts in this resource area, TVA expects to realize the following benefits:

- Increased recreation opportunities on TVA-managed lands
- Improved and up-to-date recreation information to support TVA and regional planning efforts
- Greater diversity of recreation opportunities through collaboration and partnerships
- Promotion of sustainable resource technologies on recreation properties (e.g., Melton Hill campground site)
- Integrated operation activities and partnerships that support outdoor recreation opportunities to more effectively manage lands and waters under TVA's stewardship

5.3 Implementation Strategy

TVA's recreation management programs are designed to facilitate a wide range of recreational opportunities across all resource areas. An ongoing challenge in recreation management is the ability to meet current and future user demand. TVA manages a total of 12 campgrounds (eight on-dam and four off-dam properties), 63 day-use areas (30 on-dam and 33 off-dam properties), and 81 stream access sites. Meeting user demand requires both a comprehensive data collection effort and a collaborative operations and communications effort. TVA will continue to actively plan, collect and manage recreation information to ensure it is meeting public needs. In addition, TVA will foster an integrated approach toward recreation management, building on opportunities outside of formal recreation facilities such as cultural (e.g., archaeological sites), water quality (e.g., shared locations for sampling stations), and biological resources (e.g., bird-watching).

Within recreation management, TVA has structured its implementation strategy based on the following characteristics:

- Innovation
- Enhancement/expansion
- Data management
- Public outreach and awareness

Innovation

Recreation best management practices are evolving alongside the drive toward "green and clean" technologies. Currently, TVA is in the forefront of innovative recreation facilities, as seen at the Melton Hill Dam Campground area. At this site, TVA is demonstrating how renewable energy, energy efficiency measures, water conservation, and recycled coal combustion products can be integrated into a sustainable campground and recreation area. The area is powered by a wind and solar energy "microgrid" with battery systems for energy storage. It is currently in a test phase, but TVA is collecting data to validate the cost-effectiveness and feasibility of building more flagship facilities throughout the Tennessee Valley. TVA will continue to evaluate and improve its Camp-Right Program, building on other resource area successes such as the Clean Marina Initiative within water resources. Also, the data collected during the test phase of Melton Hill will be shared with partners throughout the region to help highlight the importance of sustainable, energy efficient campground facilities.

Enhancement/Expansion

TVA, in coordination with its partners, will continue to look for recreation opportunities within all activities. This may be in the form of new recreational opportunities, facility improvements or new facility construction. At a minimum, TVA will make proactive upgrades to its facilities consistent with universal accessibility design standards and the Americans with Disabilities Act (ADA) accessibility guidelines. TVA will leverage recreational data, both collected internally and shared, to support decision-making processes for expansion opportunities. Also, new recreational opportunities are not limited to facilities. For example, these may include coordination with other resource areas, such as biological and water resources, to provide access roads to new blueway or stream access sites. These efforts will include day-use areas, which are additional facilities that TVA provides for public use, both on and off the dam reservations, such as boat ramps, picnic sites, pavilions, and fishing piers. Enhancement efforts will also piggyback on TVA's innovative technologies, with a long-term goal of bringing management of its on-dam campground and day-use facilities to a higher level.

Data Management

Currently, TVA manages recreation information to create awareness within the user base of recreational opportunities and to support future resource management decision-making processes.

TVA posts much of its recreation data to its website (www.tva.com/river/recreation). However, this information is not comprehensive of all TVA reservoir properties and is not always up to date. TVA's database was last updated in 2006. In the future, TVA will maintain this information on a biannual cycle. In addition, TVA will further the support of all recreation facilities through its recreation inventory management program. This program facilitates the creation and maintenance of an up-to-date, easily accessible database on recreation facilities and services available on TVA-managed reservoirs. It will allow access to web-based and hand-held device information in real time while helping evaluate potential impacts and stakeholder input on future recreation needs and upgrades.

In support of its decision-making processes, TVA uses data from impact analyses associated with environmental reviews of TVA actions to perform recreation demand analyses and provide information to partners and stakeholders on usage and demand trends. TVA will continue to create and maintain an up-to-date, easily accessible database of recreation facilities and services on TVA-managed lands. This information will be compatible with data from other federal and state agencies as well as nongovernmental organizations, helping to foster partnerships and collaborative data sharing opportunities.

Public Outreach and Awareness

Developed recreation facilities and the associated TVA signage often represent the public face of TVA's nonpower operations. It is important for TVA to be viewed positively in the area of recreation management, enhancing both public enjoyment of the lands and increasing the opportunity to promote other natural resource programs and messages at recreation facilities. TVA recognizes that recreation management is an integral component of its education and outreach efforts. TVA is committed to maintaining and enhancing recreation opportunities and addressing unmet recreation needs through comprehensive recreation programs and strategic partnerships. Public outreach campaigns help lead awareness efforts that directly influence the ability of TVA to manage its natural resources. For example, TVA will implement an annual tours program to provide an opportunity to showcase its integration of innovative technologies into recreation areas as well as new recreational opportunities across resource areas. These programs will align with public engagement programs to ensure coordination in education, communication and volunteer efforts.

5.4 Measures of Success

Implementation efforts in this resource area will be regularly evaluated to track progress using the following measures of success:

Resource Area	Measures of Success	Time Frame
Recreation	Certify 80-100 campgrounds in Camp-Right Campground Program	20 years
	Ensure 70-90% of day-use areas meet "good" criteria	20 years
	Continue management of 30-35 stream access sites	Annually

5.5 Resource Area Programs

When developing the NRP, TVA identified programs and activities to support the goals of each resource area. The following sections discuss each program in more detail, highlighting current activities, NRP activities, and expected implementation benefits. In addition, relationships between resource areas and other programs are discussed to help show linkages throughout the NRP.

5.5.1 Management of Campgrounds on Dam or Power Plant Reservations

The campground management program on dam and power plant reservations manages eight campgrounds in Alabama and Tennessee.

Campground areas and associated day-use recreation facilities on these reservations encompass approximately 1,085 acres and annually support between 750,000 and one million visitors. These facilities have an in-season (Memorial Day to Labor Day) occupancy rate of around 80 percent. User fees provide an average of $500,000 in TVA revenue annually. TVA's Facilities Management maintenance compounds and staff are located on these properties and support TVA's recreation program by providing operations, maintenance and repairs to these facilities.

Within the NRP, this program aligns with the following resource areas and programs:

- Volunteer program (Public Engagement)
- Foundation and trust fund (Public Engagement)
- National Historic Preservation Act Section 106 compliance (Cultural)
- Nonnative invasive plant management (Biological)
- Nuisance animal control (Biological)

Scope: This program includes recreation areas on TVA-managed dam and power plant reservations.

TVA Span of Control: Direct control over the eight campgrounds on dam or power plant reservations, including the ability to execute a secure lockdown, and enhanced information management to allow testing of campsite reservations

Current Activities

TVA currently operates and manages eight campgrounds located on dam or power plant reservations. Annually, TVA proactively upgrades two campground facilities and amenities consistent with ADA accessibility guidelines, building codes and emerging technologies. TVA has established the Melton Hill Dam Campground and associated day-use areas as a flagship "sustainable recreation area" to test emerging technologies and provide results to agencies and other recreation facility owners or operators. Where appropriate, items deemed cost effective are upgraded at TVA's other developed recreation areas.

NRP Activities

- Manage eight campgrounds
- Make one to eight proactive upgrades to campgrounds consistent with Americans with Disabilities Act accessibility guidelines, and provide new or upgraded fixed assets with best available sustainable technologies
- Establish and maintain one flagship campground for installation and testing of emerging technologies with innovative design and efficiency measures

Expected Benefits

Key benefits of this program are:

- Revenue generated for TVA through the management of the campgrounds and installation of the ADA upgrades
- Reduced carbon emissions with the development of a flagship campground
- Increased enjoyment of these recreation areas by between 750,000 and 1 million visitors annually with educational information and recreational events (e.g., fishing tournaments, fall foliage events, family gatherings)

5.5.2 Management of Campgrounds off Dam or Power Plant Reservations

This campground management program manages TVA's four campgrounds not associated with dam or power plant reservations. They are located on reservoir shoreline properties in Alabama and Tennessee.

Campground areas and associated day-use recreation facilities in this program encompass approximately 724 acres and annually support around 200,000 visitors with an in-season (Memorial Day to Labor Day) occupancy rate of around 80 percent. Fees from these campgrounds average around $350,000 annually. With one exception, TVA's Facilities Management maintenance compounds and staff are located in reasonable proximity to these properties and support TVA's recreation program by providing operations, maintenance and repairs to these facilities.

Within the NRP, this program aligns with the following resource areas and programs:

- Volunteer program (Public Engagement)
- Foundation and trust fund (Public Engagement)
- National Historic Preservation Act Section 106 compliance (Cultural)
- Nonnative invasive plant management (Biological)
- Nuisance animal control (Biological)

Scope: This program includes recreation areas on TVA-managed land that are not on dam or power plant reservations.

TVA Span of Control: Direct control over these four campgrounds in this program, including enhanced information management to allow testing of campsite reservations

Current Activities

TVA continually evaluates options for contractual agreements for the future management of these four facilities, along with the potential closure of these facilities. Annually, TVA proactively upgrades one campground facility and amenities consistent with ADA standards, building codes and emerging technologies.

NRP Activities

- Seek third-party agreements for four campgrounds or consider closure for at least one if a third-party agreement is unavailable.
- Make up to three proactive upgrades to campgrounds consistent with ADA guidelines and provide new or upgraded fixed assets with best tested sustainable technologies
- Seek and implement contractual agreements to manage campgrounds located on other reservoir properties

Expected Benefits

Key benefits of this program are:

- Generated revenue for TVA through the management of the campgrounds and installation of the ADA upgrades
- Increased enjoyment of these recreation areas by approximately 300,000 visitors annually

5.5.3 Day-Use Areas on Dam Reservations

This program manages 30 day-use areas on TVA dam reservations. Various types of recreational facilities are available to the public free of charge, including pavilions, picnic sites, visitor centers, swimming beaches, bathhouses, boat ramps and courtesy docks, restrooms, trails, fishing berms and piers, playgrounds, and associated signage and infrastructure.

Day-use areas on dam and power plant reservations encompass approximately 3,000 acres and annually support around 1 million visitors. TVA's Facilities Management maintenance compounds and staff are located on these properties and support TVA's recreation program by providing operations, maintenance and repairs to these areas and facilities.

Within the NRP, this program aligns with the following resource areas and programs:

- Volunteer program (Public Engagement)
- Foundation and trust fund (Public Engagement)
- National Historic Preservation Act Section 106 compliance (Cultural)
- Nonnative invasive plant management (Biological)
- Nuisance animal control (Biological)

Scope: This program includes recreation day-use areas on TVA-managed dam and power plant reservations.

TVA Span of Control: Direct control over these 30 day-use areas located on dam or power plant reservations, including the ability to execute a secure lockdown

Current Activities

TVA proactively upgrades one day-use area consistent with ADA guidelines, building codes, and emerging technologies while implementing one sustainable initiative per year. TVA manages 13 picnic pavilions at these areas that can be reserved for a small fee. TVA continually evaluates contractual agreements for the future management of these facilities as well as the potential closure of these facilities.

NRP Activities

- Continue to operate and manage 30 day-use areas located on dam reservations
- Implement up to two best tested sustainable initiatives per year plus upgrades to meet ADA guidelines

Expected Benefits

Key benefits of this program are:

- Generated revenue for TVA through management of the campgrounds and installation of the ADA upgrades
- Reduced carbon emissions based on sustainable initiatives
- Increased enjoyment of these day-use areas by approximately 1 million visitors annually

5.5.4 Day-Use Areas off Dam Reservations

TVA manages 33 day-use recreation areas located off dam reservations. They offer various types of recreational facilities that are available to the public free of charge. TVA maintains these areas on an as-needed basis and utilizes TVA's Facilities Management and local contractors to provide upgrades, maintenance and repairs.

Within the NRP, this program aligns with the following resource areas and programs:

- Volunteer program (Public Engagement)
- Foundation and trust fund (Public Engagement)
- National Historic Preservation Act Section 106 compliance (Cultural)
- Nonnative invasive plant management (Biological)
- Nuisance animal control (Biological)

Scope: This program includes recreation day-use areas on TVA-managed dam and power plant reservations.

TVA Span of Control: Direct control over the 33 areas and facilities in this program

Current Activities

Currently, TVA proactively upgrades one day-use area consistent with ADA guidelines, building codes, and emerging technologies while implementing one sustainable initiative per year. TVA manages three picnic pavilions that can be reserved for a small fee on these areas. TVA continually evaluates contractual agreements for the future management of these facilities as well as the potential closure of these facilities.

NRP Activities

- Continue to operate and manage 33 day-use areas located off dam reservations
- Proactively upgrade one or two day-use areas per year consistent with ADA guidelines
- Seek, develop and implement contractual agreements to manage up to 33 off-dam reservation areas or review the areas for closure

Expected Benefits

Key benefits of this program are:

- Generated revenue for TVA through management of the campgrounds and installation of the ADA upgrades
- Increased enjoyment of these day-use areas by between 800,000 and 1 million visitors annually

5.5.5 Stream Access Sites

TVA manages stream access sites and supports blueways partnerships. A stream access site consists of an access road, parking area, picnic site and developed access to the stream. A blueway is a water path or trail developed with launch points, camping locations, and points of interest for canoeists and kayakers. In the late 1970s and early 1980s, TVA's recreation program was administered under Board Policy Code Title XII. TVA reviewed 62 Tennessee Valley streams with over 1,800 stream miles, evaluated some 260 possible stream access sites, and recommended acquisition for future public access of around 140 sites. Some sites were acquired for public use by state and local agencies.

Within the NRP, this program aligns with the following resource areas and programs:

- Dispersed recreation (Biological)
- Public engagement (General)

Scope: TVA owns fee title to 105 parcels comprising 81 stream access sites, which consist of approximately 125 acres on 24 streams and rivers. On an as-needed basis, TVA manages, maintains and repairs some 31 sites. Other sites are managed under third-party agreements.

TVA Span of Control: Direct control over the 31 sites not currently in third-party agreements and partial control over the 50 sites included in contractual agreements

Current Activities

TVA owns 81 stream access sites. It has entered into contractual, fee-based agreements for the management of 50 sites and manages the remaining 31 sites. The agency continues to entertain requests from stakeholders for the management of stream access sites not currently under contract. All stream access areas are available to the public at no charge.

NRP Activities

- Manage fee ownership of 81 stream access sites comprising 105 parcels
- Manage 31 stream access sites and investigate blueways partnerships on TVA land
- Continue to manage and/or seek, develop and implement additional third-party agreements for up to 81 stream access sites. Includes options to close sites.

Expected Benefits

Key benefits of this program are:

- Increased enjoyment of these stream access sites by fishermen, paddle sport enthusiasts, and other local tourists
- Increased potential for partnerships with state park agencies

5.5.6 Annual Tours

TVA plans to lead annual media and technology transfer tours to showcase its technology integration and efforts to promote sustainability at recreation areas.

TVA will develop communications plans and tour packages tailored for a spring media event and fall technology transfer tour. The tours will review the innovative technologies integrated with recreation areas and facilities and review the benefits and knowledge gained from various technologies being studied. The spring media tour will announce the upcoming recreation season and highlight the benefits from TVA's recreation resources, including technology upgrades, lands made available to commercial and public recreation providers, and public information outlets such as TVA's website and hand-held device applications. Technology transfer tours will be designed for an audience of commercial and public owners and operators and will share plans, specifications, costs and benefits of technologies featured and tested at the Melton Hill Sustainable Recreation Area.

Within the NRP, this program aligns with the following resource area and program:

- Public engagement (General)

Scope: The annual tours program will take place at TVA's commercial recreation areas.

TVA Span of Control: Direct control of the program

Current Activities

There are no current activities. As part of the NRP, this will be a new program designed to help promote TVA's stewardship innovation and efforts.

NRP Activities

- Conduct up to four annual tours that feature emerging green technologies on recreation areas

Expected Benefits

Key benefits of this program are:

- Enhanced public understanding of TVA recreational resources
- Showcasing of TVA as a leader in technology innovations integrated with sustainable recreation areas

5.5.7 Recreation Information Management

The recreation information management program manages onsite sources, such as signage, and offsite sources, such as website information. TVA uses the information for impact analyses associated with environmental reviews of TVA actions, to perform recreation demand analyses, and to provide information to partners and stakeholders.

Within the NRP, this program aligns with the following resource area and program:

- Volunteer program (Public Engagement)

Scope: This program extends to all TVA properties allocated for developed recreation, recreation areas associated with dam and power plant reservations, and fee-owned stream access sites.

TVA Span of Control: Direct control of this recreation information management program, including collection, messaging, media and dissemination. This information supports TVA partnerships and environmental reviews.

Current Activities

TVA provides educational presentations to the public while maintaining and enhancing the existing signage, Internet, and hand-held device presence. TVA is currently engaged in on-site education programs and outreach efforts pertaining to those lands allocated for developed recreation through the reservoir lands planning process.

NRP Activities

- Maintain and strive to enhance existing Internet presence in support of the Environmental Information Center, partners and stakeholders

Expected Benefits

A key benefit of this program is:

- Delivery of accurate and understandable information to a greater number of partners and stakeholders in real time with self-service capability from enhanced signage, Internet presence and functionality, and hand-held device applications
- Improved database functionality and comprehensiveness

5.5.8 Boating Density Assessments

TVA conducts boating density assessments for internal projects or for external proposals requiring its approval.

This program is a planning tool that provides TVA with a desktop level estimate of recreational boating impacts from proposed boat access projects (marina, community dock and boat ramp) on TVA reservoirs. This tool provides information to facilitate the estimated impact analyses associated with environmental reviews of TVA actions and is shared with the state boating law administrators.

Within the NRP, this program aligns with the following resource areas and programs:

- Water resources (General)
- Reservoir lands planning (General)

Scope: All TVA reservoirs

TVA Span of Control: Direct control of boating density assessments as the background information is generated from internal inventories and databases in support of TVA environmental reviews and 26a permitting.

Current Activities

When reviewing certain requests for new or expanded water-based recreational facilities, TVA completes boating density assessments as a planning tool in support of the associated environmental review.

NRP Activities

- Conduct assessments as needed to support evaluation of permit requests and land use proposals

Expected Benefits

Key benefits of this program are:

- Increased management knowledge and potential for better protection of resources and greater value of recreation experience
- Enhanced image for TVA as a leading agency in developing new planning and management tools for recreational boating

5.5.9 Reservoir Lands Recreation Inventory Management

The reservoir lands recreation inventory management program creates and maintains an up-to-date, easily accessible database on recreation facilities and services available on TVA-managed reservoirs. It includes both TVA and non-TVA facilities, along with stakeholder and user input concerning the recreation areas and facilities.

Scope: This program covers all TVA recreation land and links information directly to TVA's external website, hand-held applications, and the federal Recreation One-Stop program (www.recreation.gov). It also supports inquiries to the Environmental Information Center.

TVA Span of Control: Direct control of the database inventory collection, updates and dissemination to partners and stakeholders and the recreation user surveys

Current Activities

TVA maintains an up-to-date inventory of all public, private and quasi-public recreational facilities on or near shoreline properties. The inventory is currently updated on a three-year cycle. The updates include basic and noncyclical visitor use and satisfaction surveys, assessments of the condition of recreational facilities and areas, and campground evaluations. TVA also conducts field reconnaissance of recreation facilities located on TVA-managed lands to ensure ongoing compliance with applicable requirements under TVA's control. TVA shares recreational information and provides technical support to other agencies and stakeholders as requested.

NRP Activities

- Update recreation inventory for up to 23 TVA-managed reservoirs per year

- Conduct user surveys, field reconnaissance and assessments to ensure ongoing compliance with regulations

Expected Benefits

Key benefits of this program are:

- Increased enjoyment for recreationists through improved reservoir management, management knowledge of recreation areas, and potential protection of resources and value of recreation experience

5.5.10 Recreation Design Principles

The recreation design principles program implements standard construction designs and products that promote compliance with ADA guidelines, principles of universal design, or other accredited design standards, as appropriate. This process ensures that TVA recreation facilities and amenities are usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

Within the NRP, this program aligns with the following resource areas and programs:

- Dispersed recreation (Biological)
- Tennessee Valley Clean Marina (Water)

Scope: This program will take place on TVA recreation properties.

TVA Span of Control: Direct control over final design and construction of developed recreation areas operated by TVA on TVA fee-owned lands

Current Activities

TVA involves teams of professionals from various engineering disciplines, landscape architects, and architects in developing design plans for upgrades, renovations, and new construction to reflect the latest in accepted universal design principles and incorporate recycled building materials, technology innovations, and resource conservation measures and systems.

NRP Activities

- Implement standard construction designs that promote compliance with the ADA accessibility guidelines, principles of universal design, or other accredited design standards.

Expected Benefits

Key benefits of this program are:

- Increased management knowledge, shared knowledge, and potential for increased protection of resources
- Increased value of recreation experience

5.5.11 Recreation Planning, Assistance and Technical Support

The recreation planning, assistance and technical support program provides planning and technical services to third parties for new or existing parks, recreational programs and other reservoir-oriented facilities on a fee or sponsorship basis. TVA's recreation program supports TVA's broader mission of economic development and allows for TVA to provide recreation consultation when requested. TVA maintains a library of standard plans and site plans for over 170 public and community parks in support of planned projects in the region.

Scope: Agencies in the Tennessee Valley can get help from TVA with recreation properties on their lands.

TVA Span of Control: Direct control of information shared under this program to ensure accuracy and success of project design, implementation and construction.

Current Activities

TVA utilizes regional recreation data to guide potential expansion of new campgrounds on TVA-managed lands allocated for developed recreation via the reservoir lands planning process. On a fee basis, TVA utilizes its technical staff, existing and emerging standards, and plan library to share knowledge with agencies and commercial operators in planning upgrades, renovations, expansions, or new facilities around the reservoir system on non-TVA lands (generally on municipal or public lands).

NRP Activities

- Utilize regional recreation data to guide potential development of new campgrounds and marinas on TVA-managed lands allocated for developed recreation use
- Utilize TVA technical staff, existing and emerging standards, and plan library to support recreation plans and projects requested by local, state and other federal agencies on a fee basis

Expected Benefits

A key benefit of this program is:

- Increased management knowledge and protection of resources

5.5.12 Tennessee Valley Camp-Right Campground Program

The Tennessee Valley Camp-Right Campground Program is an initiative by TVA and partners to promote sustainable campgrounds that provide safe, high-quality camping experiences while demonstrating recycling and technology innovations, conserving the natural resources of the region, and providing universal accessibility. This will generally include community and commercial recreation facilities on TVA-leased land. This program has been modeled after the Tennessee Valley Clean Marina program (see Chapter 6 – Water Resources).

Within the NRP, this program aligns with the following resource areas and programs:

- Tennessee Valley Clean Marina (Water)
- Wildlife habitat enhancement partnerships (Biological)
- Public engagement (General)
- National Historic Preservation Act Section 106 compliance (Cultural)

Scope: Recreation areas on TVA-leased lands

TVA Span of Control: TVA has direct control over the development and implementation of this program.

Current Activities

Currently this program does not exist at TVA. However, TVA and partners are developing this as a pilot program at five campgrounds by the end of the 2011 calendar year.

NRP Activities

- Establish certification program to promote environmentally responsible campgrounds and camping practices
- Certify one or two campgrounds per year

Expected Benefits

Key benefits of this program are:

- Reduced environmental impact and risk of campground infrastructure, operations and user activities
- Operational cost savings through responsible camper practices
- Heightened environmental awareness through camper education
- Increased enjoyment by campers, resulting in increased visitation
- Reduced regulatory noncompliance
- Conservation of resources for future generations
- Improved relationships with campground owners and operators

5.5.13 Dispersed Recreation Management

The dispersed recreation management program is covered in Chapter 3 – Biological Resources. However, the implementation of this program will cross multiple resource areas, including recreation management.

5.5.14 Trails Management

The trails management program is covered in Chapter 3 – Biological Resources. However, the implementation of this program will cross multiple resource areas, including recreation management.

5.5.15 Leave No Trace

The Leave No Trace program is covered in Chapter 3 – Biological Resources. However, the implementation of this program will cross multiple resource areas, including recreation management.

5.5.16 Tennessee Valley Clean Marina Program

The Tennessee Valley Clean Marina Program is covered in Chapter 6 – Water Resources. However, the implementation of this program will cross multiple resource areas, including recreation management.

Geoprobe

CHAPTER 6

Water Resources

6.1 Goal 138

6.2 Benefits 138

6.3 Implementation Strategy 139

Water Quality Management 140

Data Management 142

Strategic Partnerships 143

Public Outreach and Awareness 144

6.4 Measures of Success 144

6.5 Resource Area Programs 145

6.5.1 Aquatic Ecology Management 146

6.5.2 Stream and Tailwater Monitoring Program 147

6.5.3 Climate Change Sentinel Monitoring 148

6.5.4 Strategic Partnership Planning 149

6.5.5 Tennessee Valley Clean Marina Program 150

6.5.6 Water Resource Outreach Campaign 151

6.5.7 Reservoir Shoreline Stabilization/Riparian Management Program 152

6.5.8 Nutrient Source-Watershed Identification and Improvement Program 154

6.5.9 Northern Gulf of Mexico/Mississippi River Basin Nutrient Load Reductions Program 156

The Tennessee River watershed encompasses parts of seven states in the Southeast totaling nearly 40,000 square miles. TVA has been actively involved with water resources and river system integration since 1933, when Congress charged the agency with managing and serving as the steward of the Tennessee River and its watershed. Many of TVA's programs to date have been associated with construction and improvement of new dams and reservoirs and their operation as well as the broader stewardship mission of TVA. Specific activities include (but are not limited to):

- Address erosion and suspended sediment in the Tennessee River watershed
- Study TVA reservoir limnology (i.e., freshwater ecosystems)
- Monitor and improve water quality in reservoirs, rivers and tailwaters
- Maintain and enhance reservoir aquatic habitats for fisheries
- Document and track stream biology
- Study hydrology and water quality impacts of different land uses
- Work in partnership with other stakeholders to reduce impacts of land practices in the Tennessee River watershed and sub-watersheds
- Collect and utilize water resource information to plan, site, construct and operate TVA fossil and nuclear electric generation stations

As decades have passed, TVA's unique role and value to the region have evolved, and its programs have evolved to address the demands placed on the river system. In the early 1980s, TVA began a systematic effort to improve conditions downstream from its dams where issues were known to exist. TVA's capital investment of $44 million between 1991 and 1996 and current multimillion-dollar annual operational expenses have created significant benefits. For example, these investments have helped to increase dissolved oxygen levels as well as improve flow rates in rivers downstream from TVA dams. As a result, the number and diversity of fish and insects have increased in these sections of river, and there has been a significant growth in tailwater fishing. In addition, capital investments have been made to upgrade or expand aeration systems in tailwaters as well as develop "put-and-take" cold-water trout fisheries in coordination with state wildlife resource agencies in the region.

Today, TVA continues to operate the Tennessee River and its tributaries as an integrated system to provide a wide range of public benefits, such as year-round navigation, flood-damage reduction, affordable electricity, improved water quality, water supply, land use and recreation. TVA's water resource responsibilities are geographically bound by the Tennessee River watershed and not politically bound by state borders. Thus, TVA can focus on water resources in a watershed setting, enabling it to more holistically manage resources for today and for the use of future generations.

As part of this effort, TVA works in concert with state and other federal agencies to protect and improve water quality while maintaining an in-depth knowledge of changing conditions in the river system. TVA helps to build and catalyze partnerships, promote public outreach efforts, and provide technical support to implement key water resource initiatives throughout the Tennessee River watershed. Also, TVA has historically played a national role as a test case for the development of tools and best management practices that can be used for maintaining and improving water quality on a national level.

These TVA water resources management programs support the objective of the federal Clean Water Act to "restore and maintain the chemical, physical and biological integrity of the nation's waters." A part of the Environmental Protection Agency's strategy to meet this objective is its Healthy Watersheds Initiative. This initiative augments the watershed approach with proactive, holistic aquatic ecosystem conservation and protection. The Healthy Watersheds Initiative includes both assessment and management approaches that encourage states, local governments, watershed organizations, and others to take a strategic, systematic approach to conserve healthy components of watersheds. In this way, the organizations avoid additional water quality impairments in the future. TVA's experience in holistic watershed resource management aligns with and benefits the Environmental Protection Agency's strategy.

TVA's stewardship responsibilities do not include regulation of water pollution. The U.S. Environmental Protection Agency and each of the states that share the Tennessee River develop pollution regulations and grant permits for discharges to the river and its tributaries. TVA facilities that have the potential to discharge pollutants into river water, such as hydroelectric or fossil-fueled generating plants, obtain the appropriate permits for routine facility discharges in accordance with these regulations. In accordance with Section 26(a) of the TVA Act, however, TVA does have authority to issue permits for water withdrawals and for the

construction and maintenance of discharge and other structures or obstructions affecting navigation, flood control, or public lands or reservations along, across, or in the Tennessee River or any of its tributaries. Through associated National Environmental Protection Act reviews, TVA considers environmental effects of its permitting actions under Section 26(a) of the TVA Act.

The NRP focuses exclusively on programs and activities to maintain and improve water resource conditions not associated with reservoir operations. Activities associated with the operation of the TVA reservoir system are presented in the Reservoir Operations Study (2004). As a result of the study, the TVA board established a policy that continues to govern reservoir operations and is not reevaluated in this planning effort. See www.tva.com/environment/reports/ros_eis/ for additional information on reservoir operations.

6.1 Goal

TVA will promote water quality and aquatic habitat improvements across the Tennessee River watershed through collaborative partnerships by providing water quality data and technical support to conduct water resource stewardship efforts within the watershed, including on TVA-managed lands and at TVA facilities.

6.2 Benefits

Through management efforts in this resource area, TVA expects to realize the following benefits:

- Improved protection and enhancement of aquatic habitats and biological communities
- Greater public awareness of land use impacts and the potential for invasive species (e.g., foreign species transported into habitats)
- Expanded collaborative efforts (funding and resources) to better evaluate and protect exceptional biodiversity within the Tennessee River watershed
- A more comprehensive understanding of stream, reservoir and tailwater conditions to help inform future water resource initiatives
- Increased participation in meeting the objectives of the Clean Water Act

6.3 Implementation Strategy

TVA's objective is to manage water resources by conducting water resource improvement efforts on TVA-managed lands and facilities and promoting voluntary programs that will reduce both point and nonpoint source water pollution within the Tennessee River watershed, resulting in cleaner water in which to swim, fish and play. The NRP helps TVA to focus its water resources management efforts in an integrated manner, supporting both resource area and external stakeholder needs.

Federal, state and local stakeholders play separate, but complementary roles in water resource management. Successful and sustainable projects can only be accomplished through collaboration and cooperation of multiple organizations and agencies. One agency or organization cannot accomplish this alone. Below is an overview of some roles key stakeholders play in maintaining and enhancing the waters in the Tennessee River watershed:

- The U.S. Environmental Protection Agency and Tennessee Valley states' water pollution control agencies develop protective water quality standards and pollution regulations that ensure states' waterways meet the requirements set forth by the 1972 amendments to the federal Water Pollution Control Act, known as the Clean Water Act.
- The U.S. Fish and Wildlife Service bears the responsibility for identifying, listing, protecting and recovering aquatic species that are threatened or endangered.
- Other federal and state agencies, such as the U.S. Geological Service, the U.S. Army Corps of Engineers, and states' fish and wildlife agencies, collect, maintain and implement efforts to manage and improve aquatic resources. States maintain lists and accountabilities for protecting threatened and endangered aquatic species.
- Nongovernmental organizations, including public watershed organizations and private citizens, work with federal, state and local organizations to identify water quality issues, develop implementation plans, and implement improvement projects.
- TVA's role in water resource management includes:
  - Complying with federal and state water pollution control regulations at its power facilities by managing river flows and improving the quality (dissolved oxygen) of releases from its dams
  - Working with stakeholders to implement stewardship efforts in the Tennessee River watershed. This includes collecting, managing and sharing water quality and aquatic resource (biological) information with stakeholders, making improvements to TVA public lands and shorelines, and working in concert with state and other federal agencies, nongovernmental organizations, and private citizens to improve water resource conditions.
  - Providing public outreach information and assistance to its stakeholders in carrying out its water resource management accountabilities under the TVA Act
  - Supporting a sustainable effort in protecting and improving water resources for current and future generations

Within water resources, TVA has structured its implementation strategy based on the following characteristics:

- Water quality management
- Data management
- Strategic partnerships
- Public outreach and awareness

Water Quality Management

To support regional and national water quality initiatives, TVA will implement a variety of water resource improvement programs to:

- Lessen adverse impacts on water quality by TVA-managed properties
- Protect healthy waters that contain exceptionally diverse aquatic biological communities
- Identify sources of high nutrient loading and support initiatives to mitigate those impacts

Part of TVA's water resources management implementation strategy will be to identify methods to directly reduce nutrients, sediment loads, and other contaminants that are within TVA's control. TVA will focus on nutrient source identification and improvement opportunities within the TVA system of reservoirs. The consequences of not proactively addressing nutrients as a regional and national issue will be significant from both a future regulatory and current needs perspective. TVA's implementation strategy will involve TVA initially in partnership efforts to demonstrate nutrient load reduction opportunities, techniques and successes within the Tennessee Valley. These efforts will be expected to favorably impact a number of water bodies identified on states' 303(d) lists of impaired waters.

Recently, there has been an increased focus on reducing nutrient loading as a national priority. Efforts associated with this focus will result in reduced impacts of nutrients both in TVA reservoirs and downstream waters as well as reduced public water-supply and wastewater treatment costs. An example of an emerging priority issue is nutrient loading, particularly of nitrogen, and its effect on

hypoxia in the northern Gulf of Mexico. Hypoxia is a condition in which natural waters have a low concentration of dissolved oxygen, resulting in unsustainable aquatic environments for most game, commercial, and other fish and shellfish species. An expanding area of depleted oxygen concentrations, referred to as the "dead zone" in the Gulf, is having a tremendous ecological and economic impact. Although the impacts of nutrient yields from the Tennessee River delivered to the Gulf may not be completely understood, TVA's strategy will implement a proactive program to demonstrate nutrient load identification and reduction opportunities that will target the major sources of nutrient loading. The ultimate goal is to reduce nonpoint and point source inputs delivered to the northern Gulf of Mexico.

Potential partners in water quality management will include states' water pollution control agencies, the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force, Ohio River Valley Sanitation Commission, Electric Power Research Institute, Natural Resources Conservation Service, Environmental Protection Agency, U.S. Army Corps of Engineers, and other interested stakeholders.

In addition, wetlands restoration plays an important role in water resources management. Primary wetland functions that affect water resources include:

- Shoreline protection
- Erosion reduction
- Trapping and removing sediment particulates (suspended solids)
- Retaining (recycling) excess nutrients
- Groundwater recharge and stream flow maintenance
- Flood protection—by retaining excess runoff after a storm, and then releasing it slowly and with lower concentrations of storm water pollutants
- Providing habitat for fish and wildlife, including organisms that they feed upon
- Providing spawning areas for fish and other aquatic organisms (lake margin and riverine wetlands)

TVA includes wetlands restoration, creation and enhancement as one of several water resource management improvement methodologies. Program activities associated with wetlands management are described in Section 3.5.2.

Data Management

Currently, TVA assesses stream conditions in 611 hydrologic units in the Tennessee River watershed tracked by 11-digit identification numbers on a five-year cycle (approximately 110 sites monitored annually). Data are provided to state water pollution control agencies and stakeholders as requested.

As part of the NRP, TVA will refocus aquatic monitoring and management programs to measure and assess conditions in the Tennessee River and reservoir system that will provide the information needed to identify opportunities for making improvements, detect significant changes, and document successes. Part of TVA's data management effort is to work with its partners to establish a compatible and comprehensive database of water resource-related information to help support and inform the various programs and activities being performed across the Tennessee Valley. This data sharing effort is not unique to water resources and will, in the long-term, be coordinated with other databases both internal and external to TVA. See the stream and tailwater monitoring program discussed in Section 6.5.2 for examples of how TVA will monitor, capture and share water resource-related information throughout the watershed.

In addition, TVA's data management and collection efforts will focus on addressing the effects of climate change on water resources, which have the potential for influencing the unique biodiversity within the Tennessee Valley. The Council on Environmental Quality implementing instructions have been issued directing federal agencies to evaluate climate change risks and vulnerabilities and to manage both the short- and long-term effects of climate change on their mission and operations through adaptation planning. TVA's Environmental Policy states that "TVA will be proactive in addressing environmental concerns, including those related to global climate change." TVA will join in collaborative partnerships with other agencies and stakeholders to conduct long-term climate change sentinel monitoring, helping to provide early warning that climate change effects are beginning to occur. This proactive approach will support the planning of actions to lessen or mitigate future effects should they begin to develop. Partnerships will be sought with states to detect climate change effects on streams and wildlife. The Tennessee Wildlife Resource Agency has indicated that long-term monitoring systems that are strategically designed to evaluate climate change effects and wildlife responses are a high priority for that agency. Other potential partners will include the U.S. Geological Survey, the U.S. Fish and Wildlife Service, the National Parks Service, and the U.S. Forest Service.

Strategic Partnerships

TVA will develop and maintain strong strategic partnerships with state, regional and national organizations to address mutually important water resource stewardship opportunities that will deliver measurable improvements to water quality in the Tennessee Valley watershed. To support and expand implementation efforts, TVA will work to maintain existing partnerships and explore the potential for new partnerships to address such stewardship opportunities.

TVA is in a unique position to help integrate and focus proactive state and federal water quality improvement programs. TVA will pursue the establishment of regional working groups to promote the collaboration of state, federal and other stakeholders. As a strategic priority, TVA will establish and support a Tennessee River watershed improvement team to develop a comprehensive watershed improvement plan and drive implementation efforts. This team will include various internal organizations (e.g., River Operations) as well as external agencies and nongovernmental organizations. With stakeholder input, this team and its plan will help ensure a coordinated approach to identify water quality stressors that could be addressed with stewardship activities to achieve measurable results. Focus areas will include those activities and land use practices in the watershed that have the potential to directly or indirectly have a negative impact on the water quality of the Tennessee River and its tributaries.

Public Outreach and Awareness

TVA's current water resources efforts in public outreach and awareness are reactive and usually independent of other resource areas. Each NRP program contains a component of public outreach, which can vary from direct interactions or campaigns with the public to supplying information for other programs to utilize in outreach efforts. Educating the public also plays an integral role in day-to-day management. It is essential to create public awareness of issues that focus on preventive and proactive measures to improve and protect natural resources throughout the Tennessee Valley. Through the NRP, TVA will conduct proactive, integrated efforts with state and other federal agencies and nongovernmental organizations to educate the public about the importance of water resources and their effect on the quality of life in the Tennessee Valley. In addition to, or as part of these programs, TVA will voluntarily seek out opportunities and write grant proposals for partners and share technology and expertise with stakeholders.

6.4 Measures of Success

Implementation efforts in this resource area will be regularly evaluated to track progress using the following measures of success:

Resource Area	Measures of Success	Time Frame
Water	Certify 110-130 clean marinas	20 years
	Reassess the water quality and aquatic life of all streams and reservoirs and share data	3-5 years
	Reduce 20,000-25,000 tons of nutrients and sediment in partnership with others	20 years

6.5 Resource Area Programs

When developing the NRP, TVA identified programs and activities to support the goals of each resource area. The following sections discuss each program in more detail, highlighting current activities, NRP activities, and expected implementation benefits. In addition, relationships between resource areas and other programs are discussed to help show linkages throughout the NRP.

6.5.1 Aquatic Ecology Management

The aquatic ecology management program will focus on enhancement of aquatic biological communities in TVA streams, reservoirs and tailwaters. This may include activities such as habitat improvements, biological monitoring, and pollution reduction. In addition, TVA will identify and develop public outreach information and opportunities to raise public awareness of land use practices that degrade aquatic communities and of exotic and invasive aquatic species.
In addition, this program will include a focus on protection of aquatic biodiversity by identifying and actively protecting exceptionally diverse aquatic biological communities, such as the Clinch, Powell and Duck watersheds. These efforts include:

- Identifying protection needs through biological monitoring and habitat assessment activities
- Fostering the coordination efforts among stakeholders to make better management decisions
- Participating in public outreach efforts to raise public awareness of exceptional biological diversity
- Proactively implementing protection measures

Within the NRP, this program aligns with the following resource area and program:

- Threatened and endangered species program (Biological)

Scope: Tennessee River watershed

TVA Span of Control: No control over external impacts to the resource

Current Activities

TVA has worked in the past to enhance aquatic biologic communities through, for example, introduction of lake sturgeon into the Tennessee River as well as habitat enhancement to recover fish and mussels in the tailwaters below Tims Ford Dam. This program is intended to advance these efforts in a systematic manner moving forward.

NRP Activities

- Partner and actively participate in maintaining and enhancing aquatic biological communities
- Join and support collaborative partnerships to identify and implement protection needs, foster partnerships, and conduct outreach efforts in up to three healthy watersheds (Clinch, Powell and Duck watersheds)

Expected Benefits

Key benefits of this program are:

- A stronger understanding of factors affecting aquatic habitats and biological communities
- Protection and improvement of aquatic habitats and biological communities
- Increased knowledge and protection of threatened and endangered species
- Improved public awareness of land use impacts and a potential for invasive species (e.g., foreign species transported into habitats)
- Strengthened relationships with existing and new partners
- Expanded collaborative efforts (funding and resources) to better evaluate and protect exceptional biodiversity within the Tennessee River watershed
- Increased recognition of exceptional "hot spots" of biological diversity within the Tennessee River watershed and TVA's commitment to partnering on improvement and protection efforts

6.5.2 Stream and Tailwater Monitoring Program

The stream and tailwater monitoring program uses biological monitoring to evaluate biological conditions and diversity that reflect watershed conditions. This information is used for decision making by water resource managers throughout the Tennessee River Valley (e.g., states, TVA, etc.) to target and track improvements. Also, it helps create public awareness about water resource conditions, increasing the opportunity for water resource managers to become involved in monitoring and data collection activities. Data gathered through stream and tailwater monitoring are used to measure certain effects below dams and to track operational changes resulting from the Reservoir Operations Study (2004). The primary biological monitoring tool is the Index of Biological Integrity for fish communities. This methodology is used to identify both healthy and unhealthy streams and also to target and track success of stream improvement projects.

Within the NRP, this program aligns with the following resource area and program:

- Threatened and endangered species program (Biological)

Scope: Tennessee River watershed

TVA Span of Control: Partial control, as TVA manages stream and tailwater monitoring efforts in coordination with state agencies in the Tennessee Valley

Current Activities

TVA assesses stream conditions in 611 hydrologic units in the Tennessee River watershed tracked by 11-digit identification numbers. Currently, 110 sites are assessed annually, allowing TVA to assess all hydrologic units on a five-year cycle. Data are provided to state water pollution control agencies and stakeholders as requested.

NRP Activities

- Conduct 110 to 125 stream assessments per year
- Share stream and reservoir data

Expected Benefits

Key benefits of this program are:

- A proficient understanding of stream and tailwater conditions
- Ability to make more informed watershed management decisions
- Targeted and tracked watershed and tailwater improvement efforts
- Additional support for state and TVA programs separate from the NRP (e.g., state 305(b) reports, environmental reviews, river operations, tailwater monitoring across the watershed, permitting and relicensing of power facilities)
- One of the most comprehensive aquatic biological data sets in the nation

6.5.3 Climate Change Sentinel Monitoring

The climate change sentinel monitoring program will focus on collecting biological, chemical, and physical data in each of the five predominant ecoregions (Level III)[1] in the Tennessee Valley: Blue Ridge, Ridge and Valley, Southwestern and Central Appalachians, Interior Plateau, and Southern Plains. The location and timing of potential climate change effects on the unique biodiversity within the Tennessee River watershed are uncertain and currently not being assessed. Therefore, TVA will use historical data and information gathered as part of this sentinel monitoring program to provide early warning if adverse climate change effects need to be taken into consideration during future business planning efforts. This will be a collaborative effort, aligning with other initiatives to determine the vulnerability of aquatic ecosystems and water quality to climate change.

Within the NRP, this program aligns with the following resource area and program:

- Threatened and endangered species program (Biological)

Scope: Tennessee River watershed

TVA Span of Control: Partial control as TVA and partners oversee the monitoring of sentinel stations but do not have control over the onset of climate change

Current Activities

Currently, TVA collects various stream and tailwater data in its river systems. However, these efforts are not specifically aligned with climate change monitoring, which is being proposed as a new program in the NRP.

NRP Activities

- Monitor one or two watersheds per year in each of the five predominant ecoregions (i.e., five to 10 watersheds) in the Tennessee Valley for long-term trending analysis
- Monitor two sentinel locations per prioritized watershed (i.e., up to 20 monitoring sites)
- Manage data, conduct trending analysis, and report findings on a five-year cycle

Expected Benefits

Key benefits of this program are:

- Enhanced data collection and understanding of potential climate change effects on streams and their biodiversity
- Improved planning efforts due to early identification of climate change mitigation needs and strategies for aquatic species protection
- Improved knowledge and information sharing with agencies and other stakeholders for assessment and planning activities
- Consistency with Executive Order 13514 (Federal Leadership in Environmental, Energy and Economic Performance, 2009) and Council on Environmental Quality implementing instructions to evaluate climate change risks and vulnerabilities

[1] Designation of ecoregions is based on the premise that distinct ecological regions can be identified through the analysis of the patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity. Level III ecoregions subdivide the North American continent into 182 distinct ecoregions. Of these, 104 lie partly or wholly within the United States.

6.5.4 Strategic Partnership Planning

The strategic partnership planning program will focus on building strong partnerships with state, other federal, and regional nongovernmental organizations to address stewardship issues of mutual importance to drive measurable improvement of the region's waters. Also, this program will explore market-based opportunities (e.g., water pollution banking or trading) for improving water quality. This program will facilitate regional working groups in order to:

- Develop regional collaborative projects to improve water quality in the Tennessee River watershed
- Provide technical assistance through enhanced data collection and sharing opportunities
- Build relationships with key contacts at agencies and organizations throughout the Tennessee Valley
- Network with current and prospective financial contributors to enhance TVA's ability to secure external funding

Scope: Tennessee River watershed

TVA Span of Control: Not applicable

Current Activities

Currently, TVA actively partners with state, other federal, and local organizations to address various water resource improvement initiatives. Partnership activities include identifying water quality concerns, coordinating and implementing improvement efforts, developing new and existing partnerships, and creating consistent public awareness and education materials. However, as part of the NRP, TVA is proposing a new program to help its water resource partnership efforts become more comprehensive and integrated throughout the Tennessee Valley.

NRP Activities

- Maintain existing relationships and partnerships for water quality protection and improvement efforts
- Develop new or enhance existing strategic relationships and partnerships focused on regional water resource planning efforts

Expected Benefits

Key benefits of this program are:

- A clear understanding of Valleywide water resource concerns and mutual agreement on paths forward with partners (e.g., strategy or priorities, funding, resource requirements, etc.)
- Effective best management practices for protecting and improving water resources
- Improved working relationships with state and national partners
- Reestablished focus on partnerships at a regional level

6.5.5 Tennessee Valley Clean Marina Program

The Tennessee Valley Clean Marina Program promotes environmentally responsible marina and boating practices and will directly link to recreation and to TVA's permitting authority under Section 26(a) of the TVA Act. The Clean Marina Program is designed to reduce water pollution and erosion in the Tennessee River watershed. All new marinas will be required to be certified as part of this program, which encourages boater education, improves coordination among state agencies, and helps communicate marina best-management practices. Also, the program offers incentives for environmentally innovative and proactive marina operations, and it supports the National Clean Boating Campaign.[2]

Within the NRP, this program aligns with the following resource area and program:

- Recreation management's public outreach and engagement efforts

Scope: Tennessee River watershed

TVA Span of Control: Partial control because TVA manages the certification program in coordination with marina owners and operators

Current Activities

TVA is working with marina owners and operators to maintain 80 certified clean marinas throughout the Tennessee Valley.

NRP Activities

- Collaborate with marina owners to maintain their clean marina certifications
- Develop and provide marina owners/operators with outreach materials and training on existing obligations and best management practices to protect water quality
- Certify one new marina per year

Expected Benefits

Key benefits of this program are:

- Increased awareness with existing marina owners and customers about environmentally protective requirements and best boating practices
- Improved water resources conditions in TVA-managed reservoirs as a result of the implementation of best management practices
- Enhanced public perception of TVA stewardship efforts
- Strengthened compliance with federal and state regulations (e.g., waste water management, fuel management, solid waste management, etc.)

[2] The National Clean Boating Campaign is a year-round program to promote good stewardship of water resources by boating families, marina operators, boat dealers and manufacturers.

6.5.6 Water Resource Outreach Campaign

The water resource outreach campaign program will increase public awareness and involvement through the promotion of water resource protection and improvement best practices. Campaigns will include focused efforts to:

- Protect and improve reservoir shoreline
- Address storm water management issues and sustainable land use practices
- Address other emerging resource concerns (e.g., nutrient and sediment reductions, climate change, Gulf hypoxia, etc.)

Within the NRP, this program aligns with the following resource areas and programs:

- Environmental education (Public Engagement)
- Other resource area-specific public outreach efforts

Scope: Tennessee River watershed

TVA Span of Control: Partial control as TVA will collaborate with regional and national partners to implement this program

Current Activities

TVA has historically completed public outreach campaigns through other activities that were included in the quality growth program, the water efficiency program, and targeted watershed initiatives. Also, TVA has an existing three-year commitment with the Tennessee Department of Agriculture to deliver quality growth workshops and demonstration projects. However, as part of the NRP, TVA is proposing to create a formal program that helps focus its water outreach campaigns in a coordinated and integrated fashion.

NRP Activities

- Evaluate, develop and execute public outreach activities to raise awareness of water resource protection and improvement efforts (includes addressing other resource area concerns)

Expected Benefits

Key benefits of this program are:

- Increased public awareness of the importance and value of protecting water resources within the Tennessee River basin
- Enhanced sense of public ownership in the day-to-day management of the basin's water resources
- Enhanced perception of TVA as a leader in water resource stewardship

6.5.7 Reservoir Shoreline Stabilization/Riparian Management Program

TVA is charged with management and stewardship of some 11,000 miles of reservoir shoreline. A number of these reservoir shoreline areas are classified as sensitive resource areas, as they contain cultural and archaeological resources. These are resources that TVA is mandated by federal law to protect. There are also sites being impacted by soil erosion that have other resource values, such as recreational areas that have been extensively developed and are heavily used by the public.

The reservoir shoreline stabilization/riparian management program will help control critical shoreline erosion. Its goals include protecting significant cultural and other sensitive resources, maintaining or improving water quality, and enhancing aquatic and wildlife habitat. Treatment of these sites will include innovative techniques for stabilization (e.g., soil bioengineering) as well as the improvement of traditional methods (e.g., use of geotextiles in the application of rock riprap).

Within the NRP, this program aligns with the following resource areas and programs:

- Archaeological monitoring and protection (Cultural)
- Wildlife habitat enhancement partnerships (Biological)
- Land conditions assessment and land stewardship maintenance (Biological)
- Dispersed recreation management (Biological)

Scope: TVA reservoir lands and managed shoreline

TVA Span of Control: Direct control over TVA-managed lands and shoreline

Current Activities

TVA has historically managed its shoreline stabilization efforts on a project-by-project basis as needs and funding allowed. TVA, with the support of its partners, has successfully protected almost 100 miles of critically eroding reservoir shoreline on about 500 sites across the multi-state reservoir system. Also, TVA has established criteria for determining the health of TVA-managed reservoir shorelines as described in the Shoreline Management Initiative (1998).

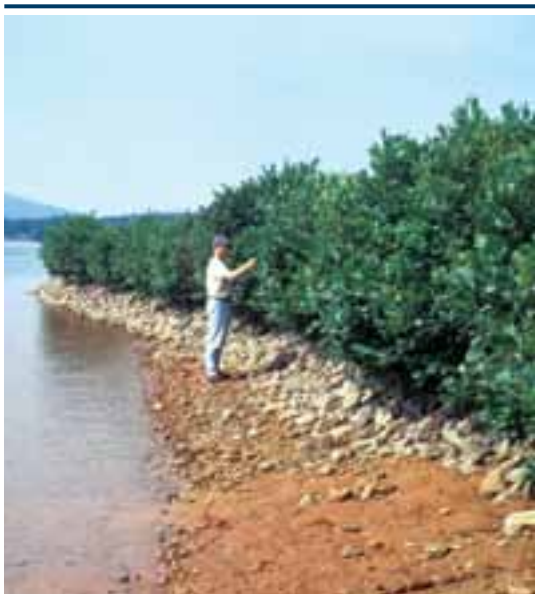
NRP Activities

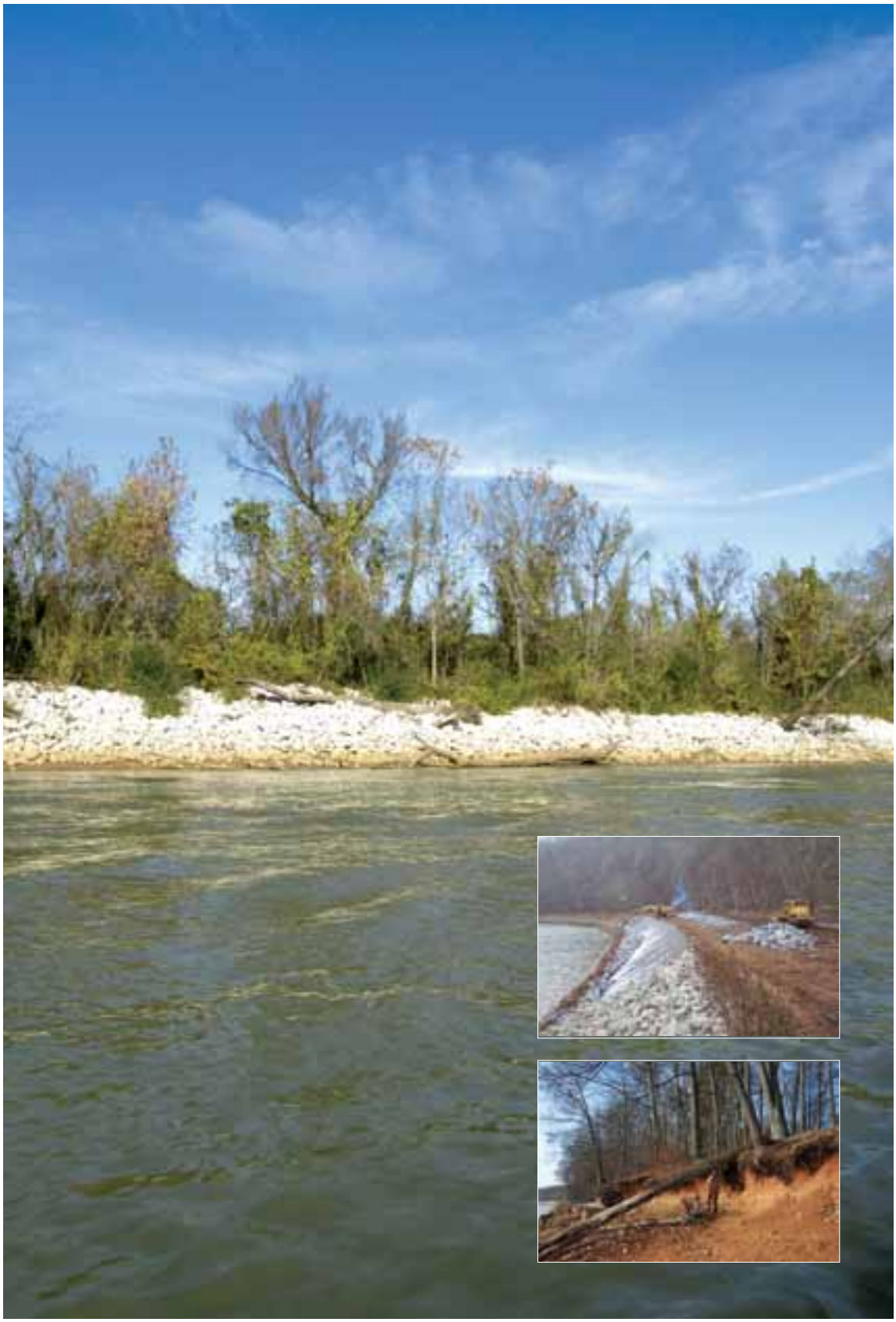
- Stabilize up to three miles of critically eroding shoreline per year

Expected Benefits

Key benefits of this program are:

- Stabilization of critically eroding TVA reservoir shoreline and public land
- Protection and improvement of water resources; preservation of public land from erosion; recreational opportunities; preservation of significant cultural and biological resources, wildlife habitat, and scenic beauty





6.5.8 Nutrient Source-Watershed Identification and Improvement Program

The nutrient source-watershed identification and improvement program will establish goals or targets to reduce nutrients (e.g., phosphorus), sediment, or both in TVA-managed reservoirs. It will use existing and monitored nutrient and flow data to assess the nutrient status of TVA reservoirs, helping to target the top three reservoirs having the greatest potential for nutrient source load reductions. This program will provide information to not only better understand and communicate resource conditions within the Tennessee Valley, but also reduce nonpoint nutrient loading from these source-watersheds and also from point sources where appropriate. Such reductions will be proactive in the view of forthcoming regulatory numeric nutrient water quality criteria and nutrient loading allocations that

are being developed at the national and state levels. By improving water quality, potential increases in wastewater treatment costs related to emerging reduction requirements may be mitigated, providing a key economic benefit to the region. This program will link with TVA's national water resource recovery program (described in Section 6.5.9) for the northern Gulf of Mexico/Mississippi River basin.

Within the NRP, this program aligns with the following resource area and program:

- Wetlands management (Biological)

Scope: Tennessee River watershed

TVA Span of Control: Partial control as TVA will work with partners in nutrient and sediment reduction efforts but has no control over external impacts

Current Activities

Currently, TVA participates in various nutrient and sediment reduction efforts across the Tennessee River watershed. However, these efforts are performed in a "one-off" fashion. As part of the NRP, TVA needs a more prioritized and comprehensive approach to provide the intended near- and long-term benefits associated with these activities.

NRP Activities

- Conduct current targeted TVA Vital Signs and Fixed Station water chemistry monitoring programs
- Use existing and new nutrient data combined with flow data to determine and quantify the top three reservoirs receiving the greatest phosphorus and nitrogen loadings
- Develop a reservoir-specific improvement plan for one or two of the top three reservoirs over the life of the NRP
- Implement plan to reduce point-source phosphorus reaching one TVA-managed reservoir by 5,000 pounds
- Implement plan to reduce 720 to 1,080 tons per reservoir of suspended sediment transported from watershed streams into one or two of the top three reservoirs
- Implement plan to reduce 1,100 to 1,650 pounds per reservoir of phosphorus transported from watershed streams into one or two of the top three reservoirs

Expected Benefits

Key benefits of this program are:

- Identification of the major phosphorus and sediment loading sources from watersheds into TVA reservoirs, helping to develop focused nutrient load reduction initiatives
- Reduced phosphorus loads into some streams that are currently included in states' lists of nutrient impaired waters (required by Section 303(d) of the Clean Water Act)
- Replicable methods and techniques for achieving measurable phosphorus and sediment load reductions and improvements in water quality
- Lower potable water treatment costs
- Proactive nutrient reductions to meet expected future regulatory requirements (increase public perception). See northern Gulf of Mexico/Mississippi River basin nutrient load reductions program for additional information

6.5.9 Northern Gulf of Mexico/ Mississippi River Basin Nutrient Load Reductions Program

Similar to events that led to the federal establishment of a total maximum daily load nutrient budget to recover the Chesapeake Bay, increasing pressure and planning are underway to implement nutrient load reductions (primarily nitrogen) within the Mississippi River basin to recover an 8,000-square-mile "dead zone" (oxygen-deprived area) in the northern Gulf of Mexico. A potential source of impairment may be excessive nitrogen carried by fresh water discharged from the Mississippi River basin. The direct impact of these excessive nutrient levels is the consumption of oxygen within the water resource, creating a hypoxic zone (oxygen levels too low to support productive marine life) in the Gulf. Regulatory actions are likely to be assigned to place limitations on amounts of nitrogen loading from the major tributaries to the Mississippi River basin, including the Tennessee River. Currently, the Environmental Protection Agency has a 60,000 man-hour task order that includes determining these allocations.

The northern Gulf of Mexico/Mississippi River basin nutrient load reduction program will be a demonstration program that will conduct modeling to determine what nitrogen source-load reduction opportunities exist in a selected lower Tennessee River reservoir (Guntersville to Kentucky reservoirs). The expectation is that the key benefit of such a modeling effort will be reduced nitrogen yields delivered to the northern Gulf of Mexico hypoxic zone. The U.S. Geological Survey Sparrow model[3] has indicated that approximately 90 percent of the nitrogen transported in the lower Tennessee River is delivered to the northern Gulf of Mexico. Within the NRP, this program will link to the TVA nutrient source-watershed identification and improvement program described in Section 6.5.8. This program also will link with the national effort to recover the northern Gulf of Mexico hypoxic zone, helping to diminish the regional ecological and economic impact this zone is imposing. Potential future activities (not presented in the NRP) will use a number of effective water resource improvement tools to implement effective strategies to reduce nutrient yields from the Tennessee River.

Within the NRP, this program is not aligned with other resource areas and programs because its focus is on restoring a national water resource downstream from the Tennessee River watershed.

Scope: Within and downstream from the Tennessee River watershed

TVA Span of Control: Partial control through coordinated modeling and strategic planning efforts with other agencies

Current Activities

Currently, TVA does not actively monitor nitrogen levels exiting the Tennessee River basin. However, as part of the NRP, TVA recognizes the need to evaluate nutrient loading from the Tennessee River and is proposing this new program to guide efforts to determine potential load reduction opportunities.

NRP Activities

- Obtain, consolidate and evaluate existing data (TVA, U.S. Geological Survey, National Oceanic and Atmospheric Administration, state, Mississippi River Basin Gulf of Mexico Hypoxia Task Force, Environmental Protection Agency) from lower Tennessee River reservoirs and watersheds and select one reservoir as the focus for nutrient source loading and delivery modeling

[3] The USGS Sparrow model is a modeling tool for the regional interpretation of water-quality monitoring data. See water.usgs.gov/nawqa/sparrow/ for additional information.

- Monitor the selected reservoir for one year in order to support model development
- Develop a strategy and long-term action plan with partners that supports the strategy of nutrient load reduction to the Mississippi River basin and Gulf of Mexico

Expected Benefits

Key benefits of this program are:

- A better understanding of how nitrogen reacts within a reservoir and how its yields are exported into downstream water bodies
- A coordinated demonstration effort between local, regional and national stakeholders to show how to potentially reduce nitrogen load amounts to a damaged water resource (Gulf of Mexico hypoxic zone) of national significance
- Identification of best management practices for how best to reduce nitrogen loading into and nitrogen yields delivered out of a lower Tennessee River reservoir
- Proactive management of potential future regulatory loading allocations from the Tennessee River into the Mississippi River basin and Gulf of Mexico
- Increased (positive) public perception associated with TVA's proactive stewardship efforts to address downstream impacts of nutrients

CHAPTER 7

Reservoir Lands Planning

7.1 History of Reservoir Lands Planning 161

7.2 Goal 164

7.3 Comprehensive Valleywide Land Plan 165
- Overview 165
- Planning Process 168
- Benefits 169

7.4 Implementation Strategy 170

7.5 Measures of Success 170

7.6 Zone Definitions 171

7.7 Current Land Zone Allocations By Reservoir 175

As a steward of critically important natural resources across the Tennessee Valley, TVA has a duty to manage its lands sustainably for present and future generations. Reservoir land planning guides TVA management decisions on natural resources and property administration. TVA's Land Policy, approved by the board in 2006, governs the planning, retention and disposal of land under TVA's stewardship. The TVA board recognized the public value of reservoir lands and, by approving the Land Policy, supported the position that TVA should continue to provide for their public use and enjoyment. The board said regarding the Land Policy:

> *"TVA has a duty to manage its lands wisely for present and future generations. Accordingly, it is TVA's policy to manage its lands to protect the integrated operation of the TVA reservoir and power systems, to provide for appropriate public use and enjoyment of the reservoir system, and to provide for continuing economic growth in the Valley. Recognizing that historical land transfers have contributed substantially to meeting multipurpose objectives, it further is TVA's policy to preserve reservoir lands remaining under its control in public ownership except in those rare instances where the benefits to the public will be so significant that transferring lands from TVA control to private ownership or another public entity is justified."*

TVA's integrated resource management approach focuses on balancing flood control, navigation, power generation, water quality, recreation and other land use needs. Lands planning is one of the important tools TVA has to accomplish this.

As a tool for managing lands around its reservoirs for optimal public benefit, TVA has developed reservoir land management plans (RLMPs). Such plans support land and water program goals while balancing other competing and sometimes conflicting resource uses. By providing a clear statement of how TVA intends to manage land, and by identifying a specific use for each individual tract of land, TVA aligns the use of public lands with current policies as well as with its responsibilities under the TVA Act. Public input is sought during the planning process, and completed plans are adopted as agency policy.

7.1 History of Reservoir Lands Planning

Throughout its history, TVA has managed public lands to meet a wide range of regional and local resource development needs and to improve the quality of life, both within specific reservoir areas and throughout the Tennessee Valley. Public lands adjacent to TVA reservoirs, together with adjoining private lands, have been used for public parks, industrial development, commercial recreation, residential development, tourism development, and forest and wildlife management areas, and to meet a variety of other needs associated with local communities and government agencies.

Shortly after its creation in 1933, TVA began a massive dam and reservoir construction program that required the purchase of approximately 1.3 million acres of land for the creation of 46 reservoirs within the Tennessee Valley region. Of these 1.3 million acres, approximately 509,000 have been sold or transferred from TVA's control, the majority of which were transferred to other federal and state agencies for public use. Of the remaining land, approximately 470,000 acres are located underneath the water of the reservoir system. This leaves approximately 293,000 acres of land along these reservoirs that TVA currently manages for the benefit of the public.

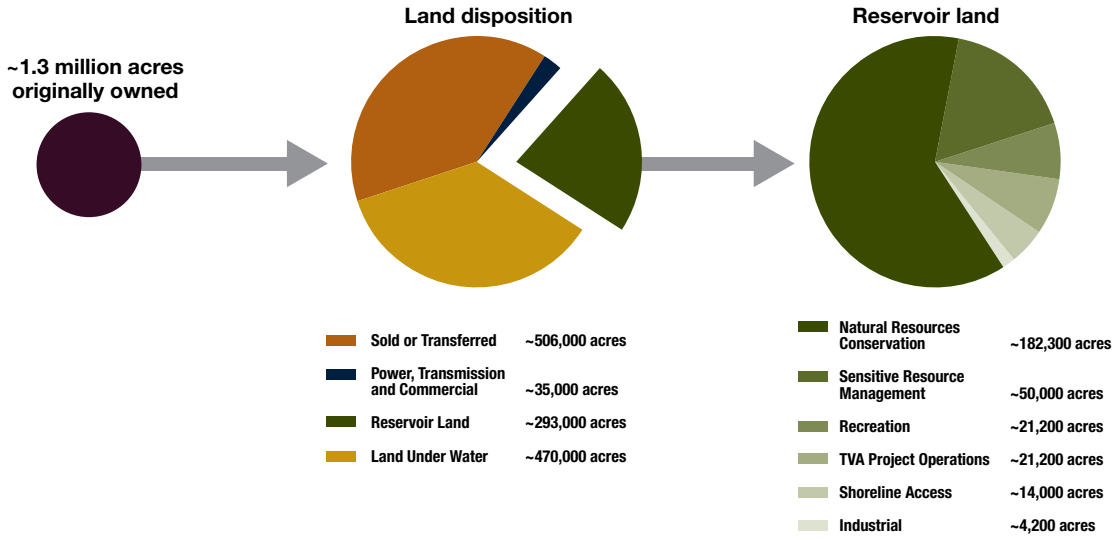


Figure 7.1: History of lands under TVA management

An increasing demand for use of these remaining lands sometimes results in conflicting public opinions regarding the most appropriate use of individual parcels. These competing interests and development pressures, coupled with today's environmental awareness, underscore the necessity for a systematic and comprehensive planning approach to the management, retention and disposal of reservoir lands managed by TVA. TVA began planning its reservoir lands in the 1960s and has implemented three different land planning methodologies for classifying reservoir lands since that time:

- Forecast system
- Multiple-use tract locations
- Single-use parcel allocations

The forecast system initially was used to guide most land use decisions. The forecast system was an in-house process to document actual and prospective uses for certain TVA-managed land around a reservoir using a variable set of designations. A forecast record book was prepared to serve as a general guide for use or potential development of each TVA reservoir. Decisions on the best use of the property were made based on internal agency expertise and incorporated local and regional needs for various land uses as determined by TVA.

In 1979, TVA shifted its lands planning approach to a public forum and applied the multiple-use tract allocations methodology, which was a more systematic approach to planning reservoir lands. TVA lands were subdivided into manageable tracts and assigned appropriate multiple-use designations from 10 categories: wildlife management, forest management, recreation, cultural resources management, agriculture, navigation, visual protection, open space, special management areas and industrial sites. The narrow strips of TVA-managed land (known as marginal strips) that front property that TVA had previously sold or transferred were not included under this planning methodology. For example, TVA shoreland fronting former TVA reservoir land that was sold for private development purposes with deeded rights to apply to construct private shoreline improvements was not included in the planning effort. Additionally, the multiple-use tract allocation method often did not plan land that was committed to a long-term or permanent use, such as parcels encumbered by easements or parcels used for TVA dam reservations or power plants. Only one reservoir was considered per land plan, and the plans were approved by the TVA board as agency policy.

In 1999, in an effort to more clearly define and commit to suitable uses of reservoir lands, TVA began using the single-use parcel allocation method, which is still in use today. Similar to the multiple-use tract allocation methodology, TVA-managed lands are subdivided into manageable parcels, and each parcel is designated for a single-use or allocation. The seven zone designations under the single-use parcel allocation include: non-TVA shoreland, project operations, sensitive resource management, natural resource conservation, industrial, developed recreation, and shoreline access. A description of each zone can be found in Section 7.6. Under this methodology, RLMPs focus on individual reservoirs or groups of reservoirs. Even though some RLMPs under this method may include multiple reservoirs (e.g., Mountain Reservoirs Land Management Plan), the planning is still performed on a reservoir-by-reservoir basis. As with the multiple-use tract allocation methodology, the single-use parcel allocation RLMPs are planned in a public forum and approved by the TVA board as agency policy.

Reservoirs Valleywide (46 Total)[1]

Unplanned[2]			
Great Falls	Wilson		
Unplanned - Beech River Reservoirs Managed Under Contract by Beech River Watershed Development Authority			
Beech River	Cedar	Dogwood	Lost Creek
Pin Oak	Pine	Redbud	Sycamore
Forecast System (1960s-1979)			
Fort Loudoun	Normandy		
Multiple-Use Tract Allocation Methodology (1979-1999)			
Chickamauga - 1989	Kentucky - 1985	Nickajack - 1990	Wheeler - 1995
Single-Use Tract Allocation Methodology (1999 - Present)			
Melton Hill - 1999	Cedar Creek - 2001	Nottely - 2010	South Holston - 2010
Tellico - 2000	Little Bear Creek - 2001	Ocoee 1 - 2010	Wilbur - 2010
Tims Ford - 2000	Upper Bear Creek – 2001	Ocoee 2 - 2010	Watauga - 2010
Cherokee - 2001	Apalachia - 2009	Ocoee 3 - 2010	Douglas - 2010
Guntersville - 2001	Blue Ridge - 2010	Beaver Creek - 2010	Nolichucky - 2010
Norris - 2001	Chatuge - 2010	Boone - 2010	Watts Bar - 2010
Pickwick - 2002	Fontana - 2010	Clear Creek - 2010	
Big Bear Creek - 2001	Hiwassee - 2010	Fort Patrick Henry - 2010	

Combined Reservoir Land Management Plan Color Key:

- **Bear Creeks Reservoirs LMP**
- **Mountain Reservoirs LMP**
- **NE Tributary Reserviors LMP**
- **Douglas-Nolichucky Tributary Reservoirs LMP**

Figure 7.2 Summary of reservoir land management plans by planning methodology

[1] Maps of the existing RLMPs and RLA data can be found at: www.tva.com/environment/land/land_mgmt_plans.htm and www.tva.com/environment/land/assessment/

[2] Minimal TVA land on reservoir

With reservoirs planned using different methodologies, it is difficult to calculate the acreage of TVA-managed lands as a whole that have been planned for sensitive resources, natural resource management, industrial development, and recreation. In order to create a consistent reservoir lands planning methodology across the Valley, reservoirs that have forecast system designations or multiple-use tract allocations are slated for conversion to the single-use parcel allocation. One challenge however is that converting each reservoir land management plan to the current methodology can be a lengthy process.

To address this issue, the rapid lands assessment (RLA) tool was developed in 2006 to quickly convert the forecast system designations and multiple-use tract allocations to single-use parcel allocations for comparison purposes. By converting parcels to the single-use allocation, TVA is able to compare reservoir lands across the Valley. The information obtained from the rapid lands assessment provides acreage estimates of lands managed in the various zones and allocations, proving invaluable for planning and analysis purposes. These data are estimates only, though, and the TVA board has not approved these estimates in lieu of the formal land plans.

7.2 Goal

TVA will strive to continue to balance shoreline development, recreational use, sensitive and natural resource management, industrial use, and other land uses in a way that maintains the quality of life and other important values across the Valley.

7.3 Comprehensive Valleywide Land Plan

Overview

As a regional development agency and the nation's largest public power provider, TVA is committed to protecting and sustaining the environmental resources of the Tennessee Valley for future generations through leadership in clean energy innovation and environmental management. In managing its public lands and resources, TVA seeks to provide efficient resource stewardship that is responsive to stakeholder interests.

TVA intends to manage its public land for an optimum level of multiple uses and benefits that protect and enhance natural, cultural, recreational and visual resources in a cost-effective manner. Through this approach, TVA ensures that resource stewardship issues and stakeholder interests are considered while optimizing benefits and minimizing conflicts.

As part of the NRP, TVA has developed a Comprehensive Valleywide Land Plan. This Valleywide Plan will guide resource management and administration decisions on the approximately 293,000 acres of TVA-managed property around 46 reservoirs. It will identify the most suitable uses for the land under TVA's control, identifying areas for project operations, sensitive resource management, natural resource conservation, industrial/commercial development, developed recreation and shoreline access.

The objectives of the Valleywide Plan, listed below, are designed to implement TVA's mission of serving the Valley through energy, environment and economic development.

Objective 1
Apply a systematic method of evaluating and identifying the most suitable uses of TVA public lands using resource data, stakeholder input, suitability and capability analyses, and TVA staff input.

Objective 2
Identify land use zone allocations to optimize public benefit and balance competing demands for the use of public lands.

Objective 3
Identify land use zone allocations to support TVA's broad regional resource development mission. TVA reservoir properties are managed to provide multiple public benefits, including recreation, conservation and economic development.

Objective 4
Provide a clear process by which TVA will respond to requests for use of TVA public land.

Objective 5
Comply with federal regulations and executive orders.

Objective 6
Enhance the protection of significant resources, including threatened and endangered species, cultural resources, wetlands, unique habitats, natural areas, water quality, and the visual character of the reservoir.

Objective 7
Provide a mechanism that allows local, state and federal infrastructure projects when the use is compatible with the zone allocation.

Under the Valleywide Plan, TVA's implementation of reservoir lands planning will shift from a reservoir-specific focus to a more comprehensive Valleywide perspective. The single-use parcel allocation methodology will still apply for individual reservoirs, but the Valleywide Plan identifies target ranges

for allocations to each land use zone for the region as a whole.

Section 7.6 contains the land use zone definitions for the Valleywide Plan and subsequent land planning efforts.

The target ranges for the Valleywide Plan were developed using the single-use parcel allocations in existing board-approved reservoir land management plans. For the remaining reservoirs that utilize a different planning methodology, the rapid lands assessment was used to identify comparable land use zone allocations. Together, the existing reservoir land management plans and information obtained through rapid lands assessments were blended together with suitability studies conducted as a result of the Land Policy to create land use zone allocations for the Valleywide Plan.

TVA anticipates that some parcels of land may be better represented by different land use allocations than those initially identified. For example, field assessments may identify additional areas that warrant the sensitive resource management allocation. In addition, TVA may determine, either for its own management purposes or as a result of public input, that certain parcels of land should be used differently from how they have been used in the past. To anticipate these reasonably foreseeable changes, the Valleywide Plan establishes an allocation range for each land use zone.

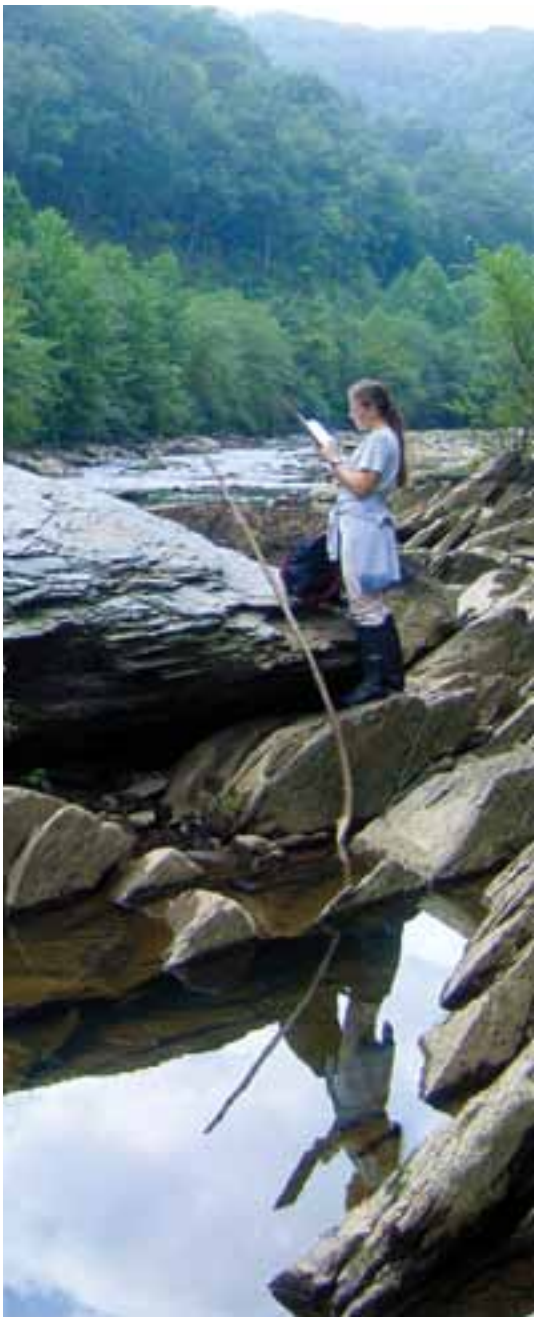
Allocation Designation		Current Allocation*	CVLP Range**
Zone 2	Project Operations	7%	5% - 7%
Zone 3	Sensitive Resource Management	17%	16% - 18%
Zone 4	Natural Resource Conservation	61%	58% - 65%
Zone 5	Industrial	2%	1% - 2%
Zone 6	Developed Recreation	8%	8% - 10%
Zone 7	Shoreline Access	5%	5%

* *Current allocations at each individual reservoir can be found in Section 7.7.*
** *Represents the percentage of land within each zone allocation. Does not represent shoreline miles.*

Figure 7.3 Current zone allocations and Comprehensive Valleywide Land Plan ranges

Ranges represent the total percentage of TVA lands that are or will be designated to each zone across TVA reservoirs as a whole. For example, Zone 3 lands (sensitive resource management) should account for 16-18 percent of the overall total when acreage from all of the 46 reservoirs planned by TVA is added together. Each individual reservoir will not necessarily have 16-18 percent of its TVA-managed lands designated to Zone 3; instead, the total of all reservoirs together will fall into that range.

During subsequent planning efforts, lands that are no longer be suitable for their current allocation would typically revert to a natural resource conservation (Zone 4) designation. If the land is capable and suitable for another use and the change is within the allocation ranges of the CVLP, reallocation to a different zone is possible. As an example, a tract allocated for project operations (Zone 2) would be reallocated to natural resource conservation (Zone 4) when its primary use is no longer needed to support project operations. If existing recreational infrastructure is present, the tract could be reallocated to developed recreation (Zone 6). Lands previously allocated to sensitive resource management (Zone 3) would only be reallocated if it is determined that the sensitive resource and/or its habitat is no longer present. In that case, the tract would be reallocated to the suitable land use identified in the planning process.



Planning Process

Under the Comprehensive Valleywide Land Plan, TVA will develop and update reservoir land management plans for a portion of a reservoir, an entire reservoir, or a group of reservoirs using the single-use parcel allocation methodology. At a minimum, the development process will consist of the key components listed below.

- TVA will collaborate with other federal and state agencies to share information and data pertaining to developed recreation, natural resource management, and water resources. During development of the NRP, TVA met with a number of agencies to seek input into the NRP process and to foster future partnerships. When conducting future lands planning efforts, TVA will build from these initial agency interactions by sharing existing resource data for the area, conducting capability and suitability analysis (as appropriate), and gathering information to predict future public needs for specific allocations.
- Draft reservoir land management plans will be issued for public comment and will include an overview of the new lands planning process, parcel descriptions, and a set of maps.
- TVA will consider proposals for alternative uses of TVA-managed lands while seeking and incorporating input from the public on the draft plans.
- TVA will continue to solicit public input into current and future needs, define project issues and concerns, and solicit feedback on a draft document during the lands planning process. In addition to issuing public notifications, TVA will consider other avenues such as public meetings, facilitated small group workshops, stakeholder consultations, and questionnaires for collecting public input. Public input is essential for making decisions concerning allocation of TVA-managed public land.
- After considering input on the draft plans, TVA will issue a final plan, which will include an overview of the lands planning process, a summary of public input, parcel descriptions, and a set of maps.

The development of each reservoir land management plan is a comprehensive planning effort. First the characteristics of each parcel are reviewed by land use specialists. Deeds of selected tracts previously sold to public entities, private entities and individuals are reviewed in order to identify existing shoreline access rights. In addition, all existing commitments are recognized, including leases, licenses and easements.

Land currently committed to a specific use is then allocated to a zone compatible with that use unless there is a need for reassessment. Committed lands include the following: properties where TVA has granted land rights (easements, leases, etc.) for specific uses, properties where TVA has previously identified resources in need of protection, TVA project operations lands (transmission lines, dam reservations, etc.), and lands fronting national forest properties. Possible reasons to change a committed land use include the prevention or remediation of adverse impacts resulting from the actions of a lease or easement holder.

Sensitive resource surveys are then conducted as appropriate on the remaining uncommitted land. The need for field reviews on uncommitted parcels is determined based on data from the TVA Natural Heritage database and the professional judgment of TVA staff, including archaeologists and biologists. Land with identified sensitive resources is placed into Zone 3 (sensitive resource management). The remaining parcels are then allocated based on reservoir planning objectives and public input. Initial

recommendations are made by consensus among the TVA planning team.

After completing the analysis, a draft plan is issued to the public. Public comments are then incorporated, and a final reservoir land management plan is issued.

Benefits

The NRP will enable TVA to better balance its stewardship objectives and obligations while ensuring sound business practices. The goal of the NRP is to integrate objectives from all of TVA's natural resource programs for the benefit of the public while balancing competing and sometimes conflicting demands on resources.

In support of this goal, the Comprehensive Valleywide Land Plan provides a holistic approach to balancing shoreline development, recreational use, sensitive and natural resource management, and other uses by taking a regional look at resource demands and trends. It creates uniformity in the lands planning process by instituting one planning methodology for all reservoirs across the Tennessee Valley and ensuring standardized parcel descriptions and zone definitions.

The Valleywide Plan also provides flexibility, creating benefit for the public. Portions of a reservoir can be planned as part of the Plan, allowing agility in financial and timing considerations, especially on larger reservoirs. The process is streamlined, as each plan meets a basic set of guidelines, shortening cycle times for planning. This will likely result in reservoirs being planned on a more regular basis than has occurred in the past, allowing TVA to be more responsive to changing conditions on each reservoir.

In addition to the benefits above, the Valleywide Plan will create significant cost savings. Currently, the costs associated with producing a reservoir land management plan range from $200,000 to $700,000 per plan. This is dependent on a number of factors, including the number and location of reservoirs in the plan and the level of public involvement. In addition, no programmatic National Environmental Policy Act coverage exists for the current land planning process, so an environmental impact statement must also be produced. Implementing the Valleywide Plan will provide programmatic NEPA coverage and reduce the duration and cost of each planning effort. Estimated production costs under the Plan will range from $20,000 to $250,000 for a single planning effort with variability dependent on the specifics of the reservoir.

Finally, and perhaps most important, the Valleywide Plan provides the public with a transparent guide to TVA's overarching goals for the Valley.

7.4 Implementation Strategy

As a first step in implementing the Comprehensive Valleywide Land Plan, reservoirs planned using the multiple-use tract allocation methodology will be converted to single-use parcel allocation. This group includes Chickamauga, Kentucky, Nickajack and Wheeler reservoirs. Because Kentucky Reservoir is so large, it is likely that it will be split into more manageable sizes (e.g., upper end and lower end) to simplify planning.

The reservoirs planned using the forecast system, Fort Loudoun and Normandy, will be converted to single-use parcel allocation next, followed by the unplanned reservoirs: Great Falls, Wilson, and the eight Beech River reservoirs.

Once all reservoirs are updated to the single-use parcel allocation methodology, the reservoirs previously planned using this method will then be updated in an order that gives consideration to the age of the current plan or any developing trends that warrant review.

Each reservoir plan update should take approximately six to 12 months to complete, with potentially more time needed to review the reservoirs currently under the older multiple-use tract allocation system. Should unforeseen circumstances occur, the Valleywide Plan allows simple adjustments in planning priorities to address emerging issues on a specific reservoir or portion of a reservoir at any time in the planning cycle.

The outcomes of each planning effort will be included in periodic updates of the NRP, and TVA will track allocation changes to ensure that they continue to fall within the Valleywide Plan total allocation percentages. As the NRP is updated, the Valleywide Plan will be updated accordingly.

7.5 Measures of Success

Implementation efforts in this resource area will be regularly evaluated to track progress using the following measures of success:

Resource Area	Measures of Success	Time Frame
Lands Planning	Convert all reservoir land management plans to single-use parcel allocation	3-5 years
	Update all 46 reservoir land management plans	Every 5-10 years
	Refresh the Comprehensive Valleywide Land Plan	Every 3-5 years

7.6 Zone Definitions

Zone	Definition
1 Non-TVA Shoreland	Shoreland that TVA does not own in fee. This land may be privately owned or owned by a governmental entity other than TVA. Uses of this non-TVA land may include residential, industrial, commercial, and/or agricultural. In many instances, TVA may have purchased the right to flood and/or limit structures on this non-TVA land (i.e., flowage easement). TVA's permitting authority under Section 26a of the TVA Act applies to construction of structures on non-TVA shoreland. Non-TVA shoreland allocations are based on deeded rights and, therefore, will not change as a result of the lands planning process. This category is provided to assist in comprehensive evaluation of potential environmental impacts of TVA's allocation decision.
2 Project Operations	Land currently used, or planned for future use, for TVA operations and public works projects, including: • **Land adjacent to established navigation operations —** Locks, lock operations and maintenance facilities, and the navigation work boat dock and bases. • **Land used for TVA power projects operations —** Generation facilities, switchyards, and transmission facilities and rights-of-way. • **Dam reservation land —** Areas acquired and managed for the primary purpose of supporting the operation and maintenance of TVA dams and associated infrastructure; secondary uses may also include developed and dispersed recreation, maintenance facilities, miscellaneous TVA field offices, research areas, and visitor centers. • **Navigation safety harbors/landings —** Areas used for tying off commercial barge tows and recreational boats during adverse weather conditions or equipment malfunctions. • **Navigation dayboards and beacons —** Areas with structures placed on the shoreline to facilitate navigation. • **Public works projects —** Includes rights-of-way for public utility infrastructure, such as sewer lines, water lines, transmission lines, and major highway projects.
3 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 law or executive order and other land features/natural resources TVA considers important to the area viewscape 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 resource 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.

CONTINUED ▶

Zone	Definition
3 Sensitive Resource Management (continued)	• **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 or 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 corridor 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. These areas will be included in Zone 3 when identified sensitive resources are present. • **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.
4 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. River corridors will be included in Zone 4 unless sensitive resources are present (see Zone 3). • **Islands** without sensitive resources or existing development.

Zone	Definition
5 Industrial	Land currently used, or planned for future use, for economic development, including businesses in distribution/processing/assembly and manufacturing. Preference will be given for businesses requiring water access. There are two primary types of uses for TVA land allocated for Industrial: **(1) access for water supply or structures associated with navigation such as barge terminals, mooring cells, etc., or (2) land-based development potential.** Areas included are: • **TVA public land under easement, lease, or license to other agencies/individuals/entities** for industrial purposes. • **TVA public land fronting land owned by other agencies/individuals/entities** for industrial purposes. In some cases, TVA land allocated to industrial use would be declared surplus and sold at public auction. Types of development that can occur on this land are: • **Industry —** Manufacturing, fabrication, and distribution/processing/assembly involving chemical, electronics, metalworking, plastics, telecommunications, transportation, and other industries. Industry does not include retail or service-based businesses. • **Industrial access —** Access to the waterfront by back-lying property owners across TVA property for water intakes, wastewater discharge, or conveyance of commodities (i.e., pipelines, rail, or road). Barge terminals are associated with industrial access corridors. • **Barge terminal sites —** Public or private facilities used for the transfer, loading, and unloading of commodities between barges and trucks, trains, storage areas, or industrial plants. • **Fleeting areas —** Sites used by the towing industry to switch barges between tows or barge terminals that have both offshore and onshore facilities. • **Minor commercial landing —** A temporary or intermittent activity that takes place without permanent improvements to the property. These sites can be used for transferring pulpwood, sand, gravel, and other natural resource commodities between barges and trucks.
6 Developed Recreation	Land currently used, or planned for future use, for concentrated, active recreational activities that require capital improvement and maintenance of developed infrastructure, including: • **TVA public land** developed for recreational purposes, such as campgrounds, day-use areas, etc. • **TVA public land under easement, lease, or license to other agencies/individuals/entities** for developed recreational purposes. • **TVA public land fronting land owned by other agencies/individuals/entities** for developed recreational purposes.

CONTINUED ▶

Zone	Definition
6 Developed Recreation (continued)	Residential use, long-term accommodations, and/or individually owned units are not permitted on land allocated for developed recreation. Types of development that can occur on this land are: • **Public recreation —** Recreation amenities developed and owned by a public agency that are open to the public. Public recreation areas may have varying levels of development, ranging from a water access site (e.g., launching ramp) to a marina facility. Facilities at public recreation areas could include playgrounds/play structures, picnic facilities, tennis courts, horseshoe areas, play courts, recreation centers, trails, greenways, natural areas, amphitheaters, food concessions (vending, snack bar), access to water for fishing and boating, swimming areas and swimming pools, launching ramps, courtesy piers, canoe access, marina facilities owned by the public entity, parking, and campgrounds. Cabins or other overnight accommodations (other than campgrounds) are only permitted if the public recreation area is operated by a state or state agency as a component of a state park system. Public recreation areas and facilities are typically owned and operated by the federal, state, county, or local government. However, private entities may operate recreation facilities on public recreation land as concessionaires under agreement with the public entity controlling the property. The use of the facilities may be offered free or for a fee. Time-forward, public-private partnerships where facilities are owned by private investors will not be approved on public recreation land. All structures and facilities should be owned by the public entity. • **Commercial recreation —** Recreation amenities that are provided for a fee to the public intending to produce a profit for the private owner/operator. These primarily water-based facilities typically include marinas and affiliated support facilities such as stores, restaurants, campgrounds, and cabins and lodges. Where applicable, TVA will require appropriate compensation for the commercial use of the property.
7 Shoreline Access	TVA-owned land where Section 26a applications and other land use approvals for residential shoreline alterations are considered in accordance with TVA's Shoreline Management Policy. Types of development/management that may be permitted on this land are: • **Residential water use facilities**, e.g., docks, piers, launching ramps/driveways, marine railways, boathouses, enclosed storage space, and non-potable water intakes. • **Shoreline access corridors**, e.g., pathways, wooden steps, walkways, or mulched paths that can include portable picnic tables and utility lines. • **Shoreline stabilization**, e.g., bioengineering, riprap, gabions, and retaining walls. • **Shoreline vegetation management.**

7.7 Current Land Zone Allocations By Reservoir

Note: Zone 1 – Non-TVA Shoreland is not represented because the parcels are private land (on which TVA owns flowage rights). The figures in the following table (1) have been rounded to the nearest whole number; (2) are an estimate based on the RLA; (3) are subject to change pending additional verification; and (4) contain a slight margin of error.

	Current Land Zone Allocation					
Reservoir	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7
Apalachia Reservoir	91	0	*	0	9	0
Beaver Creek Reservoir	11	0	0	0	86	0
Beech River Projects Reservoirs	6	0	51	0	43	0
Big Bear Creek Reservoir	7	82	0	0	10	0
Blue Ridge Reservoir	62	3	6	0	3	26
Boone Reservoir	24	17	51	0	9	<1
Cedar Creek Reservoir	10	66	10	0	8	5
Chatuge Reservoir	22	1	49	0	24	4
Cherokee Reservoir	7	12	68	0	9	3
Chickamauga Reservoir	9	34	40	1	7	10
Clear Creek Reservoir	100	0	0	0	0	0
Douglas Reservoir	50	3	40	0	6	1
Fontana Reservoir	43	0	5	0	47	4
Fort Loudoun Reservoir	33	3	18	<1	2	44
Fort Patrick Henry Reservoir	27	7	41	0	14	10
Great Falls Reservoir	100	0	0	0	0	0
Guntersville Reservoir	6	27	60	1	5	2
Hiwassee Reservoir	36	11	44	0	4	4
Kentucky Reservoir	1	2	84	2	5	6
Little Bear Creek Reservoir	18	69	2	1	6	4
Melton Hill Reservoir	11	49	24	1	8	6
Nickajack Reservoir	20	25	51	3	3	0
Nolichucky Reservoir	5	57	13	<1	25	0
Normandy Reservoir	13	15	67	0	4	<1
Norris Reservoir	3	18	67	0	7	5
Nottely Reservoir	53	0	33	0	11	2
Ocoee Reservoirs	100	0	0	0	0	0
Pickwick Reservoir	7	8	69	3	8	6
South Holston Reservoir	28	<1	46	6	19	1
Tellico Reservoir	5	17	56	2	15	4
Tims Ford Reservoir**	9	15	58	1	6	10
Upper Bear Creek Reservoir	6	81	8	0	3	2
Watauga Reservoir	46	9	38	0	8	<1
Watts Bar Reservoir***	13	28	28	3	12	17
Wheeler Reservoir	4	24	65	2	8	<1
Wilbur Reservoir	83	0	17	0	0	0
Wilson Reservoir	0	0	7	0	63	30

* *Includes narrow strip of TVA-retained land along shoreline; acreage not calculated*

** *Tims Ford Reservoir contains an additional 64 acres allocated to Zone 8, or a conservation partnership. The allocation of public lands to Zone 8 has been discontinued. However, TVA will continue to manage lands allocated to Zone 8 per agency policy*

*** *TVA is currently reviewing eight parcels of land impacted by the Kingston ash spill. The percentage of land allocated to Zones 2 and 7 may change slightly if these parcels are placed under these zones.*

CHAPTER 8

Public Engagement

8.1 Goal 179

8.2 Benefits 179

8.3 Implementation Strategy 180

Education and Communication 181

Involvement 182

Partnerships 183

8.4 Measures of Success 183

8.5 Resource Area Programs 184

8.5.1 Environmental Education 185

8.5.2 Volunteer Program 186

8.5.3 Foundation and Trust Fund 187

TVA has been charged with managing its natural resources in an integrated manner to ensure the protection, enhancement and conservation of these resources for future generations to enjoy. TVA is developing overarching public engagement programs to increase public awareness and promote opportunities for volunteer involvement, environmental education, and financial or resource assistance. These programs do not replace resource area-specific public outreach activities but rather work in concert with them to form an integrated, consistent outreach approach. Each of the programs below has an associated public engagement component:

Resource Area	Public Outreach Program
Biological Resources	• Dispersed Recreation Management • Leave No Trace • Trails Management • Boundary Maintenance • Migratory Birds Management • Dewatering Projects Management • Forest Resource Management • Nuisance Animal Control • Wildlife Habitat Council – Third-Party Certifications • Wildlife Habitat Enhancement Partnerships
Cultural Resources	• Archaeological Outreach (Thousand Eyes) • Corporate History Program
Recreation	• Annual Tours • Camp-Right Program • Recreation Information Management • Recreation Management Regulations
Water Resources	• Tennessee Valley Clean Marina Program • Water Resources Outreach Campaign
Reservoir Lands Planning	There are no significant public outreach efforts under the Reservoir Lands Planning resource area.

Figure 8.1 Resource area-specific public outreach programs

8.1 Goal

TVA will actively develop public engagement programs to increase public awareness, education and involvement opportunities (e.g., volunteer efforts) in support of implementing NRP programs. TVA will coordinate with external stakeholders to achieve this goal.

8.2 Benefits

Through management efforts in this resource area, TVA expects to realize the following benefits:

- Increased public awareness and appreciation of the natural resources of the Tennessee Valley region through an integrated education and communication effort across all resource areas
- Greater public understanding of the value and benefits associated with the protection of natural resources
- Increased sense of public ownership and pride in the management of the region's natural resources

8.3 Implementation Strategy

The public engagement programs support TVA's objective to actively develop and promote public outreach programs to increase public awareness, education and involvement opportunities in support of implementing NRP programs. TVA will coordinate this effort with external stakeholders. These programs act as a consistent link between resource areas and external stakeholders.

Within public engagement, TVA has structured its implementation strategy based on the following characteristics:

- Education and communication
- Involvement
- Partnerships

Education and Communication

Through an environmental education program, TVA will create opportunities to share natural and cultural resource information with a variety of audiences, such as school groups, civic groups and other organizations, elected officials, business leaders, and the general public. TVA will focus on web-based materials along with presentations, printed materials, and hands-on demonstrations or displays to relay information. The web-based materials will be accessed through TVA's website and include topics such as cultural and natural resources, conservation practices, water quality, native plants and wildlife habitat. TVA will explore the possibility of installing interpretive displays to promote key messages.

To maximize the effectiveness of the program, TVA will develop a process to target locations for presentations and hands-on demonstration sites, respond to requests from potential audiences, create and refresh materials, and track programs delivered. TVA will coordinate, when possible, with partners within TVA and outside of TVA to deliver environmental education programs. Recognizing the experience of other agencies involved in environmental education, TVA will consult with others as well as pull from TVA's own current and historical educational program materials to develop a purposeful and relevant program.

Involvement

The public plays an integral role in the protection, enhancement and conservation of natural resources through volunteering. By establishing a volunteer program, TVA will create a coordinated and efficient approach for recruiting, training and working with volunteers. TVA will manage such a program by identifying resource program needs, defining volunteer roles, developing relevant training, and providing guidance and oversight for volunteers. Volunteer opportunities will include activities specific to an event, such as Earth Day, National Trails Day, World Monitoring Day, and Public Lands Day. Task-based activities will include both short- and long-term volunteer opportunities such as building and maintaining TVA trails, removing non-native plants on TVA-managed public lands, planting trees and shrubs along reservoir shorelines, enhancing habitat, performing visual surveys, and collecting resource data.

The volunteer program will also include opportunities to "adopt" a section of TVA land and perform needed stewardship activities with TVA staff providing guidance.
The adoption process will provide meaningful involvement for organizations, groups or individuals and allow TVA staff to explain the importance of these stewardship activities and the fact that volunteer efforts are needed and appreciated. Engaging the public through hands-on activities is an effective way to enhance their appreciation of the resources and is likely to spur participants to share their experiences on TVA lands with others.

TVA will utilize the websites volunteer.gov and tva.com to promote volunteer opportunities and use tva.com to inform the public of the work performed. To ensure the volunteer program is successful, TVA will create a method of tracking the volunteer efforts, providing recognition to volunteers, and adapting the program as needed. Additionally, TVA will seek advice from many of the established and successful volunteer programs operated by state and other federal agencies.

Involvement also includes an opportunity for interested stakeholders or participants to make a positive contribution to stewardship activities and meet their sustainability goals through a foundation and trust fund program. TVA will establish a stand-alone foundation and trust fund to be independently managed, or it will partner with an existing fund. Additionally, TVA will investigate the strategies businesses, corporations and others are using to determine which environmentally friendly or sustainable practices those organizations are willing to support. With this information TVA will develop a methodology to recruit and encourage participation. To help promote involvement, TVA will encourage participation by targeted communications to businesses, corporations and land trust organizations, as well as annual promotions and marketing campaigns.

Partnerships

TVA will continue to develop and maintain Valleywide relationships to help create, implement and fund NRP-related programs and activities where appropriate. Potential partners include state and other federal agencies, nongovernment organizations, TVA distributors of power, foundations, businesses and academia. The benefits of such relationships include:

- Improved efficiency and effectiveness of resource management efforts
- Coordinated and comprehensive messaging and public outreach across the region
- Expanded resource management offerings and recreation opportunities, helping to maximize public benefit
- Shared information and best management practices to support regional and national resource management efforts

8.4 Measures of Success

Implementation efforts in this resource area will be regularly evaluated to track progress using the following measures of success:

Resource Area	Measures of Success	Time Frame
Public Engagement	Integrate all education programs across resource areas and implement 8-10 resource area modules	3-5 years
	Leverage TVA efforts by 2-3 times using external resources	10 years
	Develop GIS databases and share with partners to facilitate resource management	5-10 years

8.5 Resource Area Programs

When developing the NRP, TVA identified programs and activities to support the goals of each resource area. The following sections discuss each program in more detail, highlighting current activities, NRP activities, and expected implementation benefits. In addition, relationships between resource areas and other programs are discussed to help show linkages throughout the NRP.

8.5.1 Environmental Education

The environmental education program will seek to increase the public's knowledge and understanding of the value of natural resources and the challenges faced in preserving, enhancing and managing these resources for future generations. This program will also provide consistent stewardship messages across all NRP programs as well as inform the public on its role in resource management across the Tennessee Valley. Examples of educational campaigns include:

- Presenting information to stakeholders about the rich ecological and cultural resources that are within the region and the benefits of protecting these resources
- Creating and maintaining an external TVA website in conjunction with the main TVA website to highlight natural resources within the region and share ideas on how to protect them
- Developing outreach campaigns to educate youth about the importance of getting outside to enjoy the Tennessee Valley's resources

Current Activities

TVA has historically provided resource area-specific environmental education tools and programs to various audiences across the region.

NRP Activities

- Develop and implement a comprehensive and coordinated environmental education program

Benefits

Through management efforts in this resource area, TVA expects to realize the following benefits:

- Increased public awareness and appreciation of the natural resources of the Tennessee Valley region through an integrated education and communication effort across all resource areas
- Greater public understanding of the value and benefits associated with the protection of natural resources
- Increased sense of public ownership and pride in the management of the region's natural resources

8.5.2 Volunteer Program

A volunteer program will enhance TVA's resource stewardship capabilities by tapping into the strengths of the TVA community and providing opportunities for the public to assist in resource protection, improvement and enhancement. Volunteer activities will support each resource area (i.e., biological, cultural, recreation and water resources) and enhance current program offerings. The volunteer program will also create a sense of public ownership and serve as a form of public education and outreach. Examples of public involvement opportunities include:

- Members of the public assisting TVA staff to remove overgrown vegetation along a trail on TVA-managed public lands on National Trails Day
- A Girl Scout troop "adopting" a parcel of TVA-managed public land and working with TVA staff to enhance the wildlife habitat

To help promote opportunities, TVA will continue to use the www.volunteer.gov and www.tva.com websites to engage community members, corporate volunteers, local students, and other types of service or volunteer organizations.

Current Activities

TVA currently provides various volunteer opportunities across the Tennessee Valley. This program is intended to formalize these efforts in a systematic manner moving forward.

NRP Activities

- Establish and implement a formal volunteer program

Expected Benefits

Key benefits of this program are:

- Expanded education, awareness and ownership messages across the Tennessee Valley region
- Increased opportunity for public involvement in the management and improvement of the region's natural resources

8.5.3 Foundation and Trust Fund

A foundation and trust fund program will build strong partnerships with regional and local stakeholders and organizations, as well as corporations with ties to or interest in the Tennessee Valley that are looking for opportunities to have a positive environmental impact in the region. As part of this program, TVA will create an independent foundation and trust fund or partner with an existing fund to provide interested stakeholders the opportunity to fund stewardship projects with a positive environmental benefit on public lands throughout the Tennessee Valley. Though the fund will be independently managed after its creation, this program will let TVA provide a reliable mechanism to stakeholders desiring to invest in resource stewardship. Examples include:

- A corporation providing materials to stabilize a section of eroding reservoir shoreline in order to prevent archaeological artifacts buried along the shoreline from being washed away
- A local business providing materials or labor to plant shrubs and trees along the water's edge to reduce pollution entering the stream or reservoir

Current Activities

TVA does not currently participate in a stewardship-focused foundation and trust fund.

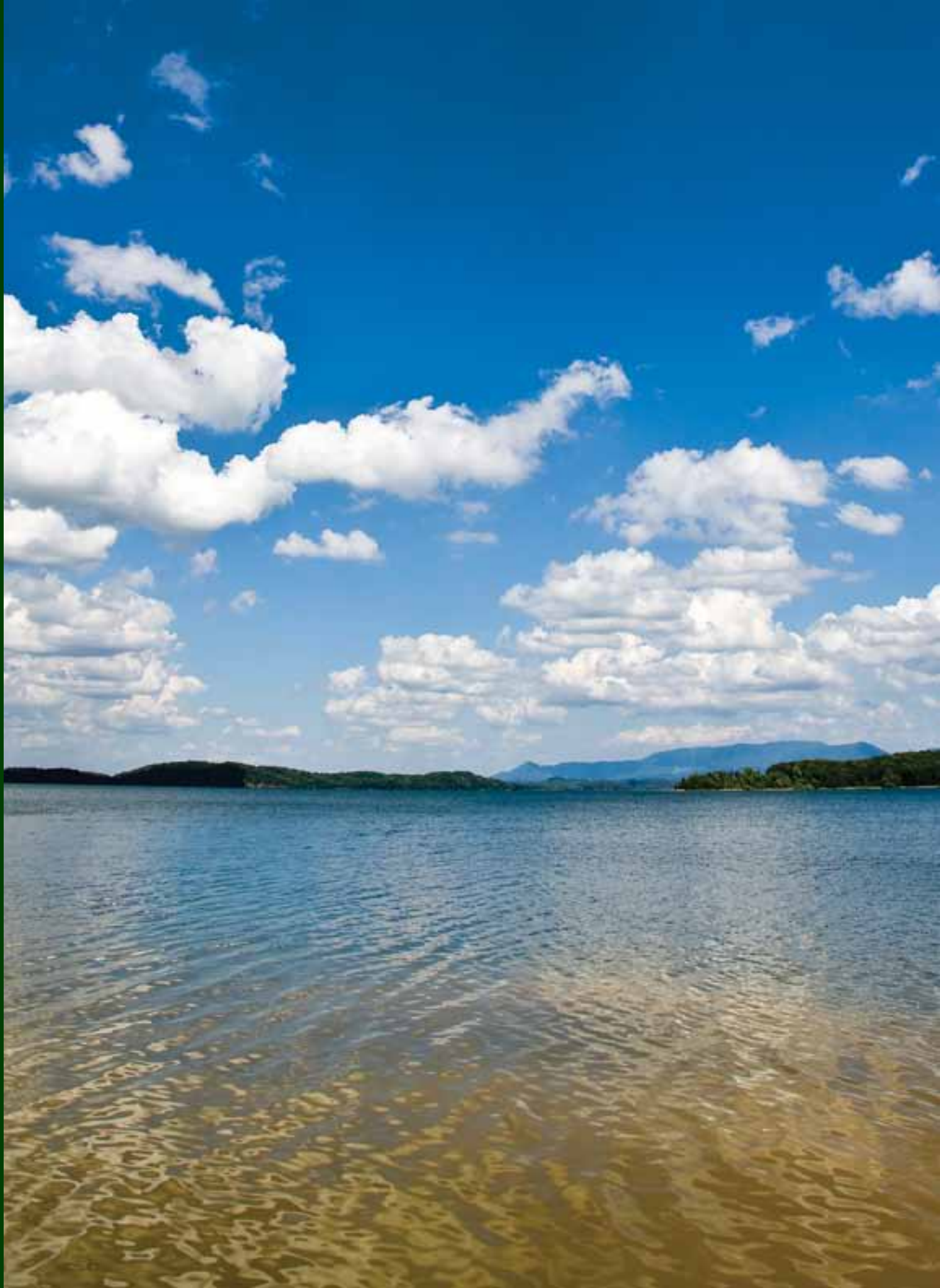
NRP Activities

- Establish an independent foundation and trust fund or form ties with an existing conservation-focused foundation and trust fund to solicit private donations to support conservation and natural resource projects and programs

Expected Benefits

Key benefits of this program are:

- Additional resources and funding for NRP programs to protect, conserve and enhance the region's resources
- Protection of additional resources and improved or expanded recreation opportunities (e.g., cultural tourism, water quality, dispersed recreation, boating, fishing, etc.)
- Enhanced public sense of ownership in the management of the region's resources



In Closing

The Natural Resource Plan was developed in recognition that greater challenges lie ahead to meet increasing environmental standards and to ensure that the finite water and land resources under TVA's stewardship are available for future generations. This document marks the first time that TVA has developed a dedicated and integrated natural resources management plan in its 77-year history. The NRP is an important evaluation for TVA, its customers and stakeholders throughout the region. Together with the Integrated Resource Plan, Reservoir Operations Study, and Shoreline Management Initiative, the NRP reflects TVA's mission to provide clean, reliable and low-cost energy, support sustainable economic growth in the region, and engage in proactive environmental stewardship in a balanced and ecologically sound manner.

The Natural Resource Plan is a living, dynamic document that will be reviewed and updated on a regular basis. It looks strategically at both renewable and nonrenewable resources, understanding the importance of protecting those resources that will be lost forever if they are not actively cared for or improved today. However, TVA is but one piece of the solution for managing the region's natural resources, and it recognizes the need for collective partnerships to help meet these stewardship responsibilities in the future.

As the demand for energy and economic growth in the region continues, efforts to sustain and promote environmental health will become even more critical, and the value of the activities described in the NRP will become even more apparent. TVA is committed to continuing its environmental stewardship efforts in a collaborative and comprehensive manner so that the land it manages can be enjoyed by the public for years to come.

Glossary and Acronyms

26a Permitting
Section 26a of the TVA Act (1933) requires TVA review and approval of plans for obstructions such as docks, bridges, outfalls, water intakes and riprap before they are constructed across, in or along the Tennessee River system and its tributaries.

Age-Class Forest Stand
The age structure of trees within a forest stand. Even-aged stands contain primarily trees of similar age. Uneven-aged stands contain trees of three or more age classes.

Americans With Disabilities Act Accessibility Guidelines
Scoping and technical requirements for accessibility to buildings and facilities by individuals with disabilities under the Americans with Disabilities Act (ADA) of 1990.

Animal Damage Control
The practice of managing conflicts between humans and animals, generally in a manner that is considered economically and humanely acceptable.

Blueway
A water path or trail that is developed with launch points, camping locations and points of interest for watercraft users (e.g., canoeists and kayakers).

Bottomland Forests
Forests that occur on river floodplains or seasonally wet areas that typically have flat topography. These forests are comprised of trees that are adapted to these conditions, with common species in the Tennessee Valley being green ash; black willow; silver and red maple; sycamore; slippery and American elm; several oaks, including willow, water, shumard, cherrybard and pin; and in the lower portions of the Valley, tupelo gum and bald cypress.

Commercial Recreation Agreements
Licenses, 19-year leases or 30-year easements with commercial operators to manage campgrounds, marinas or other facilities on TVA land.

Day-Use Area
Facilities that TVA provides for public use, such as boat ramps, picnic sites, pavilions and fishing piers. May be on or off dam reservations.

Dead Zone
Area in an aquatic system where most aquatic life will die due to the inability to successfully migrate out of an area of depleted oxygen (see Hypoxia).

Dispersed Recreation
Recreation of an informal nature such as hunting, hiking, biking, bird-watching, photography, primitive camping, bank fishing and picnicking. These activities are not associated with developed facilities although some improvements may occur for access, health and safety, or to protect the environment.

Dispersed Recreation Area
An area of land that can encompass several individual impact sites. Areas are defined by close proximity or parcel unit and usually have common access (e.g., several dispersed sites along an access road or waterfront would encompass one dispersed recreation area).

Dispersed Recreation Site
An individual site where disturbance is caused by recreational activities (e.g., one popular camping spot).

Early Successional Habitat
Habitats characterized by pioneering vegetation on an area that has been maintained in an open state, has been recently cleared, or has had the vegetation cut or removed. These habitats generally consist of grasses, forbs and small shrubs that provide habitat for wildlife species that require these components for food, safety cover and reproduction.

Ecoregions (Level III)
Distinct ecological regions that are identified through the patterns and composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity. Level III ecoregions subdivide the North American continent into 182 distinct areas; of these, 10 lie partly or wholly within the United States and five are predominant in the Tennessee Valley.

Eco-tourism
Sustainable and responsible travel to fragile, pristine, and usually protected areas that strives to be low impact and, often, small scale (as an alternative to mass tourism). Its purpose is to educate the traveler; provide funds for ecological conservation; directly benefit the economic development and political empowerment of local communities; and foster respect for different cultures and for human rights.

Essential Stewardship Activities
Certain TVA activities, formerly referred to as "nonpower" programs, that provide public services, including flood control, navigation, reservoir release improvements, mosquito/plant management, reservoir emergency preparedness, dam safety and maintenance, reservoir shoreline stabilization, recreation facilities, land management, and natural heritage/cultural resources protection.

Evapotranspiration
The sum of evaporation and plant transpiration from the earth's land surface to the atmosphere. Evaporation accounts for the movement of water to the air from sources such as the soil, canopy interception, and water bodies. Transpiration accounts for the movement of water within a plant and the subsequent loss of water as vapor through stomata in its leaves.

Fee Lands
Land owned by the United States of America in the custody and control of TVA where the public must pay a fee for use.

Feral/Released Domestic Animals
An animal that has been released and/or changed from being domesticated to being wild or untamed.

Fire Management Crew
A team of specialists trained to respond to local fire-related events and manage prescribed (controlled) fires for wildlife habitat management.

Flowage Easement Land
Privately owned lakeshore properties where TVA has (1) the right to flood the land as part of its reservoir operations, (2) no rights for vegetation management, and (3) the authority to control structures, under Section 26a of the TVA Act.

Game Species
Species of wild mammals, birds, fish or reptiles that are hunted for sport or food resources.

Heavily Impacted Dispersed Recreation Area
An area that receives substantial and repeated dispersed recreational use to the extent that the area is affected adversely. For example, an area that is used for camping to the extent that all the vegetative cover has been worn or removed from the ground surface, potentially allowing increased soil erosion.

Heritage Tourism
Tourism oriented towards the natural, cultural and historic elements of an area. These elements serve as attractions to the traveler.

Hydrologic Unit
A standardized watershed boundary classification developed by the U.S. Geological Survey that ranges in size from regional watersheds such as the Tennessee River to smaller local watersheds.

Hypoxia
A condition in which the oxygen concentration of natural waters falls below the level necessary to sustain most aquatic life. This condition, usually defined by dissolved oxygen concentrations below 2 mg/L, results when oxygen consumption, through decomposing organic material, exceeds oxygen production, through photosynthesis and replenishment from the atmosphere.

Index of Biological Integrity
A multi-metric index developed to measure the ecological health of a body of water using diversity, pollution tolerance, fish health and catch rate of species as indicators of water quality.

Integrated Resources Management
Actions providing multiple resource benefits during simultaneous time frames.

Interconnectivity
Showing a relationship between two or more things.

Land Conveyed
Land whose ownership or title has been transferred from one party to another.

Land Encroachments
An intrusion of an unauthorized or unpermitted building, improvement, or other object from one piece of land onto another piece of land (typically from a piece of private land onto a piece of public land). Examples include a fence or driveway over a property line.

Landscape Conservation Cooperatives
Certain partnerships with state, regional or federal agencies, as well as nongovernment organizations, with the purpose of promoting and facilitating efforts to address individual species associated with wetlands and communities of species.

Land Parcel
The primary unit of land in a reservoir land management plan. Parcels are geographically, functionally, and/or physically distinctive areas of land that are given a single zone designation due to location, features and characteristics. Each parcel is assigned a unique identifying number.

Limnology
The scientific study of lakes and other bodies of fresh water, including their physical and biological features.

Marginal Strip
The narrow strip of land owned by TVA between the water's edge and the adjoining private property, on which the property owner may construct private water use facilities upon approval of plans by TVA.

Migratory Bird Joint Ventures
A partnership of agencies, nonprofit organizations, corporations, tribes and individuals that implements national and/or international bird conservation plans within a specific geographic area.

Natural Area Management Plans
A plan that outlines the intent and methods by which TVA will maintain and/or improve natural areas.

Nonpoint Source Water Pollution
Pollution not originating directly from a point source (see Point Source).

Nonrenewable Resources
A natural resource which cannot be produced, grown, generated or used on a scale that can sustain its consumption rate; once the resource is used, there is no more remaining. These resources often exist in a fixed amount and are consumed much faster than nature can create them.

North American Waterfowl Management Plan
Recognizing the importance of waterfowl and wetlands to North Americans and the need for international cooperation to help in the recovery of a shared resource, the U.S. and Canadian governments developed a strategy to restore waterfowl populations through habitat protection, restoration and enhancement. The strategy was delineated in the North American Waterfowl Management Plan signed in 1986 by the Canadian Minister of the Environment and the U.S. Secretary of the Interior. This was the foundation partnership upon which hundreds of others would be built. With its update in 1994, Mexico became a signatory to the Plan.

Off-Dam Reservations
TVA-managed lands and facilities not located on a dam reservation.

On-Dam Reservations
TVA lands generally maintained to protect the integrity of the dam structure, hydroelectric facilities, and navigation lock. The reservation also provides for public visitor access to recreation opportunities, such as public boat access, bank fishing, camping and picnicking.

Overwintering
To pass through or wait out the winter season, or to pass through that period of the year when winter conditions (cold or sub-zero temperatures, ice, snow, limited food supplies) make normal activity or survival difficult.

Pest Species
Nonnative invasive species or unusually high concentrations of native pest species (e.g., southern pine bark beetle) that could pose potential threats to native ecosystems or human health.

Plan Tract
A numbered parcel of TVA fee-owned land assigned through the reservoir land planning process.

Point Source
A point source is (1) a single identifiable localized source of something with negligible extent, distinguishing it from other source geometries; or (2) any discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock concentrated animal feeding operation (CAFO), landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Power Service Area
The geographic area for which TVA generates electrical power.

Power-Tree Consortium
A consortium of 25 power generators, with the purpose of planting trees in critical habitats in the lower Mississippi River Valley.

Programmatic Agreement
Documents used to outline and integrate responsibilities of parties involved in executing TVA's mission and programs.

Recreation Areas
Properties managed by TVA that are primarily used for recreational activities such as camping, hiking, fishing, boating and other related activities.

Reservoir Land Management Plan
A plan developed by TVA to facilitate the management of the approximately 293,000 acres of TVA-managed land around its reservoirs. Plans provide a clear statement of how TVA will manage public land by identifying land for specific uses in a way that balances shoreline development, recreational use, sensitive and natural resource management, industrial, and other land uses in order to help maintain the quality of life in the Valley.

Reservoir Lands Planning
The program in which TVA develops a reservoir land management plan. Reservoir lands planning guides TVA management decisions on natural resources and property administration.

Resource Conservation
The wise use of natural resources. This refers to the management of natural resources for an entire region or for a specific parcel area. Conservation actions may include enhancement, improvement, preservation, protection and restoration of natural resources.

Resource Preservation
The act of protection of resources from any injury, harm, disturbance or destruction. Resource preservation refers to actions taken to preserve a particular resource in its current condition or state, with little or no manipulation.

Riprap
Stones placed along the shoreline for bank stabilization and other purposes.

Riparian Management
Management of vegetated buffer zones along streams, drainages and reservoir shorelines. Generally includes management activities to reduce soil erosion and filter pollutants for water quality protection as well as providing quality wildlife habitat.

Sensitive Resources
As defined by TVA, includes resources protected by state or federal law or executive order and other land features or natural resources TVA considers important to the area viewscape or natural environment.

Sentinel Monitoring
A monitoring program that serves as an "early warning" of events expected to occur through inclusion of measurements and a monitoring frequency that are sensitive to the onset of these events.

Shoreline/Shoreland
The line where the water of a TVA reservoir meets the shore when the water level is at the normal summer pool elevation.

Source Watershed
The entire stream drainage of a reservoir that is the source of water and pollutants that flow into the reservoir.

Stream Access Site
Point or location where watercraft may be launched into a river or other waterway. These may include access roads, parking lots, docks and boat ramps.

Summer Pool Elevation
The normal upper level to which the reservoirs are typically filled during summer months.

Tailwater
The flow-dominated area of water immediately downstream from a dam.

Transmission Rights-of-Way
In order to provide reliable power to its customers, TVA must service and repair its 15,900 miles of transmission lines. TVA maintains rights-of-way underneath and around its power lines to gain access for vegetation maintenance purposes.

Tributary Reservoirs
Impoundments created by dams constructed across streams and rivers that eventually flow into the Tennessee River.

U.S. Geological Survey Sparrow Model
A model developed by the U.S. Geological Survey to empirically estimate the origin and fate of contaminants in river networks and quantify uncertainties in model predictions ("Sparrow" stands for spatially referenced regressions on watershed attributes).

U.S. Shorebird Conservation Plan
A partnership effort of state and federal agencies, nongovernmental conservation organizations, academic institutions, and individuals from across the country committed to restoring and maintaining stable and self-sustaining populations of shorebirds in the U.S. and throughout the Western Hemisphere.

Utili-Tree Consortium
A consortium of over 40 companies established in an effort to create a portfolio of forestry projects that manage greenhouse gases, especially carbon dioxide.

Vital Signs and Fixed Station Monitoring
TVA's monitoring program that focuses on water quality and biological health of the TVA reservoir system and major tributaries that feed the reservoir system. The monitoring program collects information on multiple indicators of water quality and biological condition from representative areas on 31 reservoirs and the 18 largest river tributaries of the Tennessee River.

Water Pollution Banking/Trading
Pollutant trading programs are tools to help industrial and municipal wastewater dischargers meet water quality goals set out in total maximum daily loads (TMDLs) in the most cost effective manner possible. Trading allows polluters with high costs of pollutant reduction to contract with entities with lower cost of reduction to meet reduction requirements.

Wildlife Habitat Council Certification
The Wildlife Habitat Council's Corporate Wildlife Habitat Certification/International Accreditation Program recognizes commendable wildlife habitat management and environmental education programs at individual sites. Sites must demonstrate that programs have been active for at least one year with a management plan that lists goals, objectives and prescriptions and includes complete documentation of all programs.

Wildlife Management Area
Land and/or water areas designated by state wildlife agencies, such as the Tennessee Wildlife Resources Agency, for the protection and management of wildlife. These areas typically have specific hunting and trapping regulations as well as rules regarding appropriate uses by the public.

ADA	Americans With Disabilities Act
Approx.	Approximately
ARPA	Archaeological Resources Protection Act
CFR	Code of Federal Regulations
CVLP	Comprehensive Valleywide Land Plan
e.g.	Latin term, *exempli gratia*, meaning “for example”
EIS	Environmental Impact Statement
Environmental Policy	TVA 2008 Environmental Policy
ESA	Endangered Species Act
GIS	Geographic information system
i.e.	Latin term, *id est*, meaning “that is”
IRP	Integrated Resource Plan
IT	Information technology
Land Policy	TVA 2006 Land Policy
LCA	Land Conditions Assessment
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NRP	Natural Resource Plan
RLA	Rapid Lands Assessment
RLCA	Rapid Land Conditions Assessment
RLMP	Reservoir Land Management Plan
RRSC, or the council	Regional Resource Stewardship Council
TVA, or the agency	Tennessee Valley Authority
TVA board	Tennessee Valley Authority board of directors
TWI	Targeted Watershed Initiatives
Unit Plan	Resource Management Unit Plan
Valley	Tennessee River Valley

Tennessee Valley Authority
1101 Market Street Chattanooga, TN 37402-2881