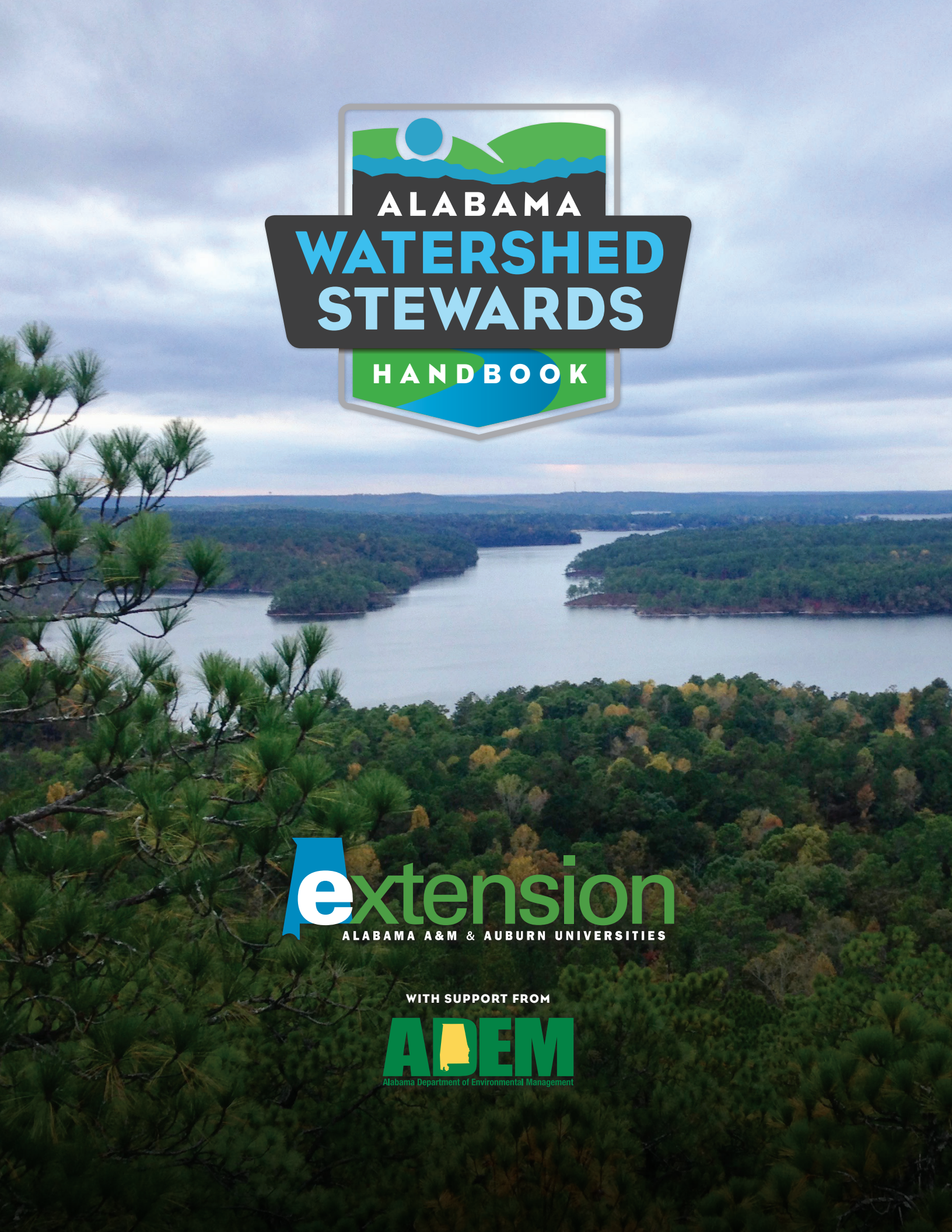
ALABAMA
WATERSHED
STEWARDS
HANDBOOK
extension
ALABAMA A&M & AUBURN UNIVERSITIES
WITH SUPPORT FROM
ADEM
Alabama Department of Environmental Management

ALABAMA WATERSHED STEWARDS HANDBOOK

A WATER RESOURCE TRAINING CURRICULUM

ALABAMA COOPERATIVE EXTENSION SYSTEM
WATER PROGRAM 2019

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FOR MORE INFORMATION

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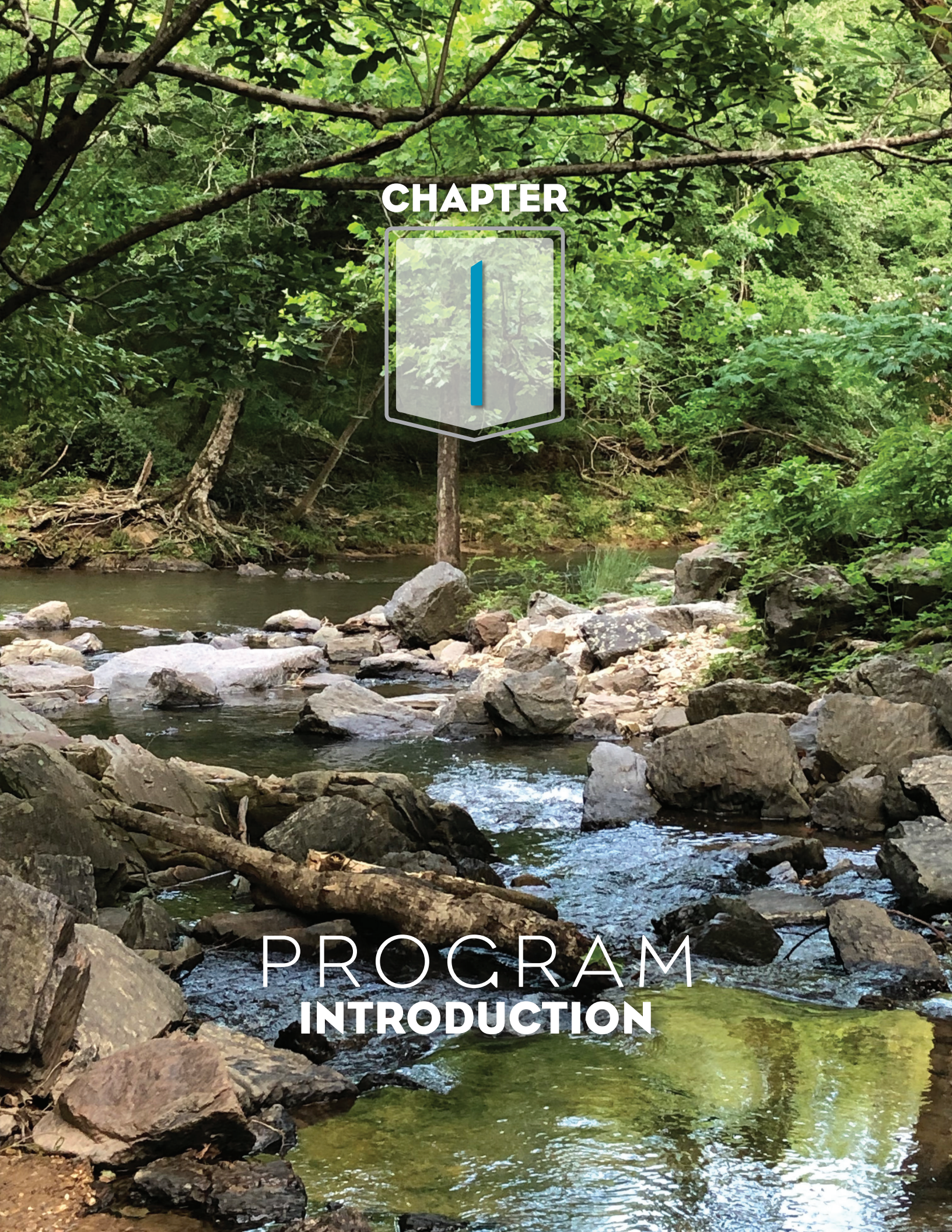

CHAPTER

1

PROGRAM INTRODUCTION

Program Introduction

ABOUT THE ALABAMA WATERSHED STEWARD PROGRAM

The Alabama Watershed Steward (AWS) program is an educational training developed by the Alabama Cooperative Extension System in cooperation with the Alabama Department of Environmental Management, US Environmental Protection Agency (EPA), and other partner agencies, including Alabama Water Watch with the Auburn Water Resources Center. This curriculum was adapted from the Texas Watershed Steward Handbook created by the Texas A&M University System Department of Soil and Crop Sciences, Texas AgriLife Extension Service, the Texas State Soil & Water Conservation Board, and US Environmental Protection Agency Region 6. The purpose of the AWS program is to promote healthy watersheds, increase understanding of the potential causes of water resource degradation, and provide the knowledge and tools needed to prevent and resolve water quality problems.

The broad goals of the AWS program are the following:

- **make citizens more aware of and knowledgeable about water issues**
- **empower individuals to become community leaders in dealing with water issues**
- **encourage local efforts and activities to improve water quality and watersheds**
- **improve and protect the quality of local land, water, and natural resources**

ABOUT THIS HANDBOOK

The *Alabama Watershed Steward Handbook: A Water Resource Training Curriculum* was written for participants in the AWS program. In this handbook you will learn everything from the basics of watersheds and how they work to how human activity influences water quality and why it matters to how to become a community leader in water quality. This handbook will give you the background, principles, and tools you need to become an Alabama watershed steward. It is designed to be an educational resource and training guide for watershed stewards throughout the state.

The following information will be covered in this handbook:

- **Chapter 1** provides an introduction to the program and an overview of the importance of watershed stewardship.
- **Chapter 2** topics include what watersheds are, how they work, and the role they play in day-to-day human activities in Alabama.
- **Chapter 3** topics include water quality parameters and watershed impairments, how watersheds can become polluted, pollutant impacts on waterways, and how land use impacts water quality. You will learn about Alabama's specific water quality standards and laws, how Alabama monitors water bodies, and how you can report issues related to your watershed.
- **Chapter 4** topics involve how to use a watershed approach to improve the quality of water in your area. You will learn about best management practices that you and others can implement to reduce the amount of pollutants in the watershed.
- **Chapter 5** topics involve the role community leadership plays in sustainable watershed management. You will learn how to get involved and how community groups work to improve water quality. You also will gain tips for doing this successfully.

The information in this handbook is for educational purposes only. Reference to commercial products and/or trade names is made with the understanding that no discrimination is intended and no endorsement by the Alabama Cooperative Extension System or its partners is implied.

Figure 1.1. Streams are magnificent ecosystems. (Photo credit: Alabama Water Watch)

WHO ARE ALABAMA WATERSHED STEWARDS?

Anyone with a willingness to learn and a desire to improve, conserve, and protect local water, land, and natural resources can become an Alabama watershed steward by attending a training. This includes homeowners, agricultural producers, decision-makers, and community leaders who live in a watershed and depend on its valuable resources.

The first step to become a watershed steward is to attend the one-day workshop. From there you will complete a course evaluation, join the mailing list, and receive a course completion certificate. The course will increase your awareness and knowledge about water issues as well as inspire you to participate in conservation programs and activities to improve and protect water and natural resources. The AWS program is open to people of all ages regardless of socioeconomic status, race, color, sex, handicap, or national origin.

THE IMPORTANCE OF WATERSHED STEWARDSHIP

Stewardship means taking the responsibility to care for the well-being of something that is valued. Watershed stewardship means caring for the water, air, and biodiversity in an entire watershed, while acknowledging that all resources are connected and affected by natural and human activities. Water is the most critical component of life. Without clean, available water resources, we cannot survive.

Figure 1.2. Water is one of the most critical components of life.

Many people think of streams only as conduits, carrying water to lakes and the sea; however, streams are magnificent ecosystems. An ecosystem includes living organisms, their nonliving physical environment, and all the interactions occurring among them (predation, competition, and effects of physical factors on organisms). In an ecosystem all species depend on each other. The flow of matter and energy of the ecosystem is a result of the relationships between **biotic** and **abiotic** factors. Being a watershed steward means understanding the intricacies that impact land and water resources and working to protect them.

Aquatic ecosystems are frequently at risk not only from the increasing human demand for water but from the effects of natural and human-induced stressors such as climate, pollution, and land use change. The quality and quantity of water within our watersheds are greatly affected by the way we choose to manage and live on the land. The water flowing across the land is impacted either positively or negatively by the management of that watershed area. The land management of our upstream neighbors impacts the quality of water flowing downstream.

Figure 1.3. We all live in a watershed.

Every one of us lives and works in a watershed. Good watershed stewardship is crucial to ensuring the sustainability of our water resources for generations to come (figure 1.3). If we, the public, become educated about our watersheds and understand how our activities affect them, we can act more responsibly to preserve, protect, and enhance these vital resources.

THE WORLD'S WATER

Did you know that water is a finite resource? The total amount of Earth's water does not change. Water is never created, it is only recycled. The **hydrologic cycle**, or the **water cycle**, links land, air, and water within a watershed.

When it rains (figure 1.4), water falls to the ground and either percolates **(infiltrates)** into the soil, returns to the air (**evaporation** and **transpiration**), or flows over the surface of the land (**runoff**). Water runoff can pick up and carry dissolved and suspended substances, such as chemicals and sediments, into water bodies, which in turn impacts both water quality and aquatic life. Land use activities in a watershed can impact both water quality and quantity. Watersheds and water bodies are not constrained within political boundaries (like state or country lines), meaning that how we treat our water resources locally can impact many others downstream.

WATER USE IN THE UNITED STATES

Water is one of Alabama's most precious natural resources, with more than 132,000 miles of streams and rivers, diverse wetland ecosystems, coastal waters, reservoirs, and groundwater (US Geological Survey. National Hydrography Dataset). The quality of water that flows through our communities is a reflection of our quality of life and lifestyles.[15]

Table 1.1. US Water Withdrawals by Category in 2015

Category	Water Used (billion gallons/day)
US water withdrawals	321.4
Thermoelectric	132.9
Mining	4
Self-supplied industrial	14.8
Aquaculture	7.55
Livestock	2
Public supply	38.9
Self-supplied domestic	3.3
Irrigation	118.1

Estimated use of water in the United States in 2015: U.S. Geological Survey Circular 1441:65.

Figure 1.4. Accumulating rainwater ultimately infiltrates the soil, evaporates, or becomes runoff.

Figure 1.5. Alabama waters provide opportunities for outdoor recreation and fun.

WATER USE IN ALABAMA

Alabama's water resources are important for economic growth and sustainability and for quality of life. The rivers, lakes, and streams in the state help to sustain communities, provide support for industries and jobs, generate power, irrigate crops, provide critical transportation avenues and links, maintain wildlife (habitat and diversity), and provide many opportunities for recreation (figure 1.5). Management of these water resources must be based on periodic comprehensive assessments of the amount of water available in the state. Maintaining this valuable resource depends on wise stewardship of our watersheds.

Alabama has three sectors of water use: (1) public supply, (2) agriculture (aquaculture, golf courses, irrigation, and livestock), and (3) industrial, thermoelectric, and mining. Since 1950, when the United States Geological Survey (USGS) first conducted water-use compilations, important changes in water use have occurred over the years in Alabama. These changes have been driven by population growth, economic and industrial development, changes in technology, and compliance with state and federal laws. In the last few years, increased awareness of the value of water efficiency and conservation has resulted in more efficient use of water from Alabama's rivers, lakes, reservoirs, and groundwater.

Did you know?

- Nationally, about 63.5 million acres were irrigated in 2015, 34.7 million acres (55 percent) with sprinkler systems, 23.3 million acres with surface (flood), and almost 5.5 million acres with micro-irrigation systems. The national average application rate for 2015 was 2.09 acre-feet per acre.[5]
- The amount of surface water consumed in the United States is almost twice as much as the amount of groundwater used. In 2015, more surface water than groundwater was withdrawn for all categories of use except domestic, livestock, and mining; however, irrigation is nearly evenly split between surface water and groundwater.[5]
- Approximately 10 to 15 percent of the US population, mostly in rural areas, relies on private, federally unregulated supplies of drinking water, such as groundwater wells and surface water that are not subject to EPA standards under the Safe Drinking Water Act.[11] [12]
- The average person uses 20 to 80 gallons of water each day at home: washing dishes (10 gallons), flushing a toilet (3 gallons), taking a shower or bath (20 to 30 gallons), and washing a load of clothes (20 to 30 gallons).[6]
- The use of bottled water has been increasing by 25 percent each year.[8]
- Approximately two-thirds of the human body is made up of water. The brain and heart are composed of 73 percent water, the lungs about 83 percent, skin 64 percent, muscles and kidneys 79 percent, and bones 31 percent.[7]

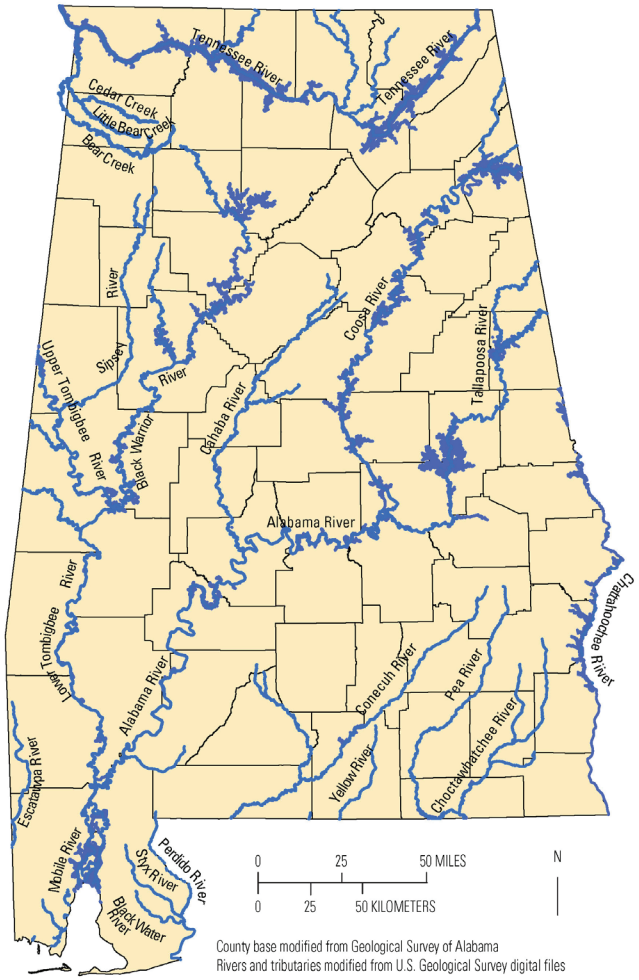

Figure 1.6. Major rivers and tributaries of Alabama.[4]

ALABAMA WATER FACTS

- Alabama's springs, streams, rivers, lakes, and wetlands are home to more species of aquatic and semiaquatic animals than any other state in the union.[10]
- Alabama's undergroundwater supplies are estimated at about 553 trillion gallons, or more than 16 times the amount of surface water.[10]
- At 1,438 miles, Alabama leads the nation in miles of navigable channels, with 16 lock-and-dam structures on six river systems.[10]
- Seventeen major streams flow through Alabama; 10 of these have headwaters inside the state, and the other 7 originate in other states.[10]
- Alabama is divided into 16 river basins with over 132,000 miles of river and stream channels.[1]
- Alabama has over 7,694 acres of ponds and lakes.[1]
- Freshwater wetlands in Alabama make up estimated 3,600,000 acres.[1]
- Alabama's 22.7 million acres of forestland accounts for 70% of the total land area of the state and 80% of these forested acres are owned by non-industrial private landowners.[2]
- Alabama has the third most forested acreage in the 48 contiguous states, behind only Georgia and Oregon.[2]

Figure 1.7. Alabama has 22.7 million acres of forestland including longleaf pine forests.

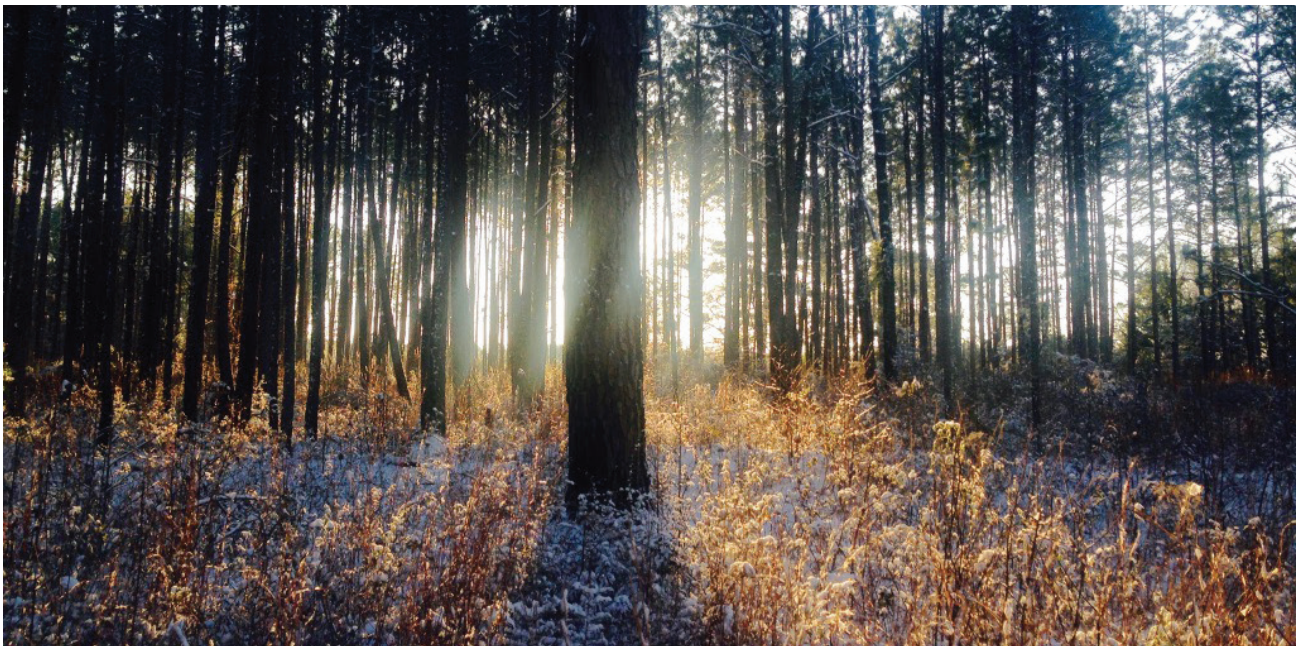

Figure 1.8. Alabama's water resources include this large pool below Hidden Falls at Chewacla State Park.

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