Claytor Project
FERC No. 739

Shoreline Management Plan

November 14, 2022
Appalachian Power Company

Claytor Project
Shoreline Management Plan

Table of Contents

Appendices

List of Tables

List of Figures

Glossary

ACOE	U.S. Army Corps of Engineers
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Access Guidelines
AEP	American Electric Power
APCO	Appalachian Power Company
Active Erosion	Areas that are 1) more than 1 foot in height above base elevation that are bare and void of vegetation or other stabilizing material, 2) areas that are experiencing undercuts and/or sloughing off the parent material or 3) areas directly adjacent to the shoreline that have the potential to deposit sediment or soil material into the Lake.
Appalachian	Appalachian Power Company
Adjacent or Adjoining Property Owner	An individual, group, or entity that has title to land that abuts the land or lot in question
Base Elevation	Reference elevation representing the 1846-contour line National Geodetic Vertical Datum, 1929 (NGVD) for Claytor Lake.
Boat Slip (Slip)	A watercraft docking area confined on at least two sides by sections of a dock, pier, or piling. One boat slip can accommodate only one boat at a time.
Carrying Capacity	A determination of the type and level of visitor use that can be accommodated while sustaining the desired resource and social conditions
Clean Water Act	Federal legislation that, among other things, gives states the authority to certify that projects licensed and approved by federal agencies meet state water quality standards.
Community Dock	A boat dock or pier directly related and adjacent to a subdivision, cluster development, condominium, or planned development, owned and/or controlled by the owners of the lots of such subdivision or

	development, and which may be used by the owners of the individual lots or units within the subdivision or development, and which has a commonly owned or shared walkway.
Courtesy Pier	An access dock with no slips for use while launching or retrieving boats.
DA	Department of Army
Dangerous Structure	Any building, dock, platform, pier, wall, or other structure within the Project boundary for the Claytor Project that, through damage, deterioration, infestation, improper maintenance, or for any other reason or reasons, becomes unsafe, unsanitary, or which constitutes a hazard or is otherwise dangerous to human life, health, or safety.
DBH	Diameter at Breast Height is the standard for measuring trees. DBH refers to the tree diameter measured at 4.5 feet above the ground. DBH can be measured quickly with a specially calibrated diameter tape, often referred to as a d-tape, that displays the diameter measurement when wrapped around the circumference of a tree. If you don't have access to a d-tape, you can find the diameter of the tree using a string, a measuring tape, a thumb tack, and a calculator. 1. With the measuring tape, measure 4.5 feet up the trunk of the tree from the ground. Use a thumb tack to mark the height on the tree. 2. Wrap your string around the tree trunk at 4.5 feet. Make sure the string is straight and tight around the trunk, and mark or cut the circumference on the string. 3. Measure the length of string to get the circumference of the tree. 4. Convert the circumference measurement to diameter by dividing the circumference by pi (3.14). If the tree is on a slope, 4.5 feet is measured from the high side.

Dock	A platform extending from a shore over water and supported by piles, pillars, or flotation materials, used to secure, protect, and provide access to boats or personal watercraft or for recreation (e.g., fishing, wildlife viewing, etc.).
Dock Limitation Line	A line deliniating the dock construction limits between adjacent parcels as shown on a subdivision plat approved by the municipality and recorded in the appropriate Clerk of the Circuit Court's Office.
Enclosure	A portion of space on a dock, separated by walls or partitions from other parts in such a manner to as to separate or enclose the space.
Extended Property Lines	A linear extension of the property lines shown on county tax maps or on a recorded survey prepared by a Licensed Land Surveyor of those lines landward of the 1850-foot contour line projected into Project lands and waters for Claytor Lake.
Fairway	An area of open water extending outward from the open end of a boat slip intended to provide navigation room for a boat to exit or enter its moorings. Adjacent docks with opposing slips share the same fairway.
FERC	Federal Energy Regulatory Commission
Floating Enclosed Structure	Floating enclosed structures are enclosed boathouse-type structures that resemble houseboats but are not registered with the Virginia Department of Wildlife Resources as a watercraft and are typically tied to shoreline.
FOCL	Friends of Claytor Lake.
GIS	Geographic Information System
GPS	Global Positioning System
IMZ	Impact Minimization Zone
Jetty	A structure extended into the lake to influence the current or to protect a harbor, beach, or structure.

Lateral Mark	An aid to navigation indicating the edge of a channel
License	License which was issued to Appalachian Power Company for the Claytor Project by the Federal Energy Regulatory Commission's *Order Issuing New License* on December 27, 2011
Littoral Habitat	Shallow water highly suitable for various fish species
Marina	A facility situated on a hore that typically provides launching and secure moorings for water-borne craft, supplies, fuel, and marine equipment sales and repair services.
NGVD, 1929	National Geodetic Vertical Datum, 1929
Non-Lateral Mark	Navigational aids that give information about topics other than the edge of a channel
Off-water	An area of land that does not abut the Project boundary
On-water	An area of land that abuts the Project boundary and whose side lot lines when extended into the Project boundary do so in such a manner that the land encompassed or contained within the side lot lines also abuts the base elevation.
Personal Watercraft	A motorboat less than sixteen feet in length which uses an inboard motor powering a jet pump, as its primary motive power and which is designed to be operated by a person sitting, standing, or kneeling on, rather than in the conventional manner of sitting or standing inside, the vessel.
Project boundary	Reference elevation generally representing the 1850-foot contour NGVD for Claytor Lake, except in those areas defined by survey above or beyond the referenced contour elevation.

Public Use Area	An area or facility that is open to the public with equal and unobstructed use of such facilities to all members of the public without regard to race, color, religious creed, or national origin. Such uses may be subject to specific operating hours or a reasonable fee for use.
RHA	Rivers and Harbors Act of 1899
SCORP	Statewide Comprehensive Outdoor Recreation Plan
Service Dock	A dock that is used to provide services such as gasoline dispensing, boat rental, etc.
Side Set Back	A distance from the dock limitation line in which construction of facilities is not allowed.
SMP	Shoreline Management Plan
USCG	United States Coast Guard
USDA	United States Department of Agriculture
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries (subsequently named the Virginia Department of Wildlife Resources on July 1, 2020)
VDH	Virginia Department of Health
VDHR	Virginia Department of Historic Resources
VDWR	Virginia Department of Wildlife Resources (previously identified as the Virginia Department of Game and Inland Fisheries prior to July 1, 2020)
Virginia Natural Heritage Program	A program that represents a comprehensive effort to inventory and preserve the animal, plant and natural community resources of the Commonwealth of Virginia and is a part of the VA Department of Conservation and Recreation
Virginia State Historic Preservation Office (VA SHPO)	An office within the Virginia Department of Historic Resources whose mission is to foster, encourage, and support the stewardship of Virginia's significant

	historic, architectural, archaeological, and cultural resources.
VMRC	Virginia Marine Resources Commission
Watercraft	Any boat, ship, vessel, barge, or other floating craft.
Wetlands (Wetland areas)	Transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

1.0 INTRODUCTION

1.1 Purpose and Authority

The purpose of the Shoreline Management Plan (SMP) for the Claytor Project No. 739 (Project) is to provide guidelines and regulations for shoreline development for Claytor Lake. The SMP must also ensure the protection and enhancement of the Project's recreational, environmental, cultural, and scenic resources and the Project's primary function, which is the production of electricity.

Appalachian Power Company (Appalachian) has the authority to develop a shoreline management plan under its current license approved by the Federal Energy Regulatory Commission (FERC) and in accordance with the Federal Power Act Sections 10(A)(1) and 4(e) (Appendix A). The development of the SMP was originally undertaken with the intent of receiving additional authority to permit development within the Project boundary from the FERC. Prior to the FERC's *Order Issuing New License* on December 27, 2011 (License), Appalachian operated the Project pursuant to its previous license which was effective July 1, 1981. According to Article 36 (Appendix B) of that license, the FERC only allowed Appalachian to permit residential docks, shoreline stabilization, and a number of other types of development. This authority was granted to Appalachian provided the proposed use is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the Project. Because obtaining prior Commission approval for every use or occupancy of project land was unduly burdensome, Appalachian prepared the SMP to grant permission for piers, landings, boat docks, marinas, or similar structures beyond the usual 10 watercraft limit previously allowed in Article 36.

Appalachian continues to work with Pulaski County, the county in which Claytor Lake is located, as well as state and federal agencies and non-governmental organizations to coordinate the permitting processes that are currently in place. Appalachian has developed this SMP, in consultation with a SMP Work Group, with strict definitions for shoreline development and exacting standards for such development. This document is intended to provide guidance for any proposed development within the Project boundary. Any proposals that deviate from the SMP would require FERC approval, but any proposals that are deemed appropriate under the SMP would be within the authority of Appalachian to approve.

Appalachian is not the sole permitting authority on Claytor Lake, nor should it be perceived that Appalachian is a one stop shop for all permits. All facilities must comply with all applicable local, state, and federal regulations. Applicants are required to obtain all necessary governmental permits or approvals, a FERC order[1] (if applicable) and written authorization from Appalachian prior to beginning any activity/construction within the Project boundary.

[1] There are instances where there are existing FERC Orders pertaining to properties on Claytor Lake. In such cases, amendments may be required prior to beginning any new activity/construction within the Project boundary.

1.2 Goals and Objectives

The overall goal for the SMP is to develop a management tool that will help provide guidance for fulfilling license responsibilities and obligations for the Project, including protecting and enhancing the Project's environmental, scenic, and recreational values. This overall goal and the specific goals outlined here apply solely to those lands and waters contained within the Claytor Project's Project boundary. Specific goals include:

1. Protecting environmental attributes such as wetlands, habitat, and spawning areas.
2. Preserving the natural scenic quality of the shoreline for both boaters and shore viewers and preserving specific scenic attributes.
3. Protecting cultural resources.
4. Enhancing recreational opportunities by considering boating densities and navigation and maximizing available use of the Project waters by the public.
5. Cooperating with Pulaski County to coordinate adjacent land uses and permitting efforts.
6. Minimizing impacts among contrasting uses.

The objectives that will enable the provisions of the SMP to meet these goals are included in the body of the SMP as parameters and regulations. Since every possible scenario cannot be anticipated, Appalachian reserves the right to issue decisions in situations not specifically covered by these regulations and will do so in a manner that protects and enhances the scenic, recreational, and environmental values of the Claytor Project. Local, state, and federal agencies shall be consulted during such decision-making processes, as appropriate.

1.3 Project Area Description

The Claytor Project is an existing conventional hydroelectric project located on the New River in Pulaski County, Virginia. The Claytor dam has four generating units, with a combined generating capacity of 75 MW. The Claytor dam has a maximum height of 137 feet above the streambed. The reservoir behind the dam has a surface area of 4472 acres at the normal full pond elevation of 1846.0 feet and approximately 100 miles of shoreline, along which are private residences and a number of public and private recreational sites. The Project boundary for the Claytor Project generally follows contour elevation 1850.0 National Geodetic Vertical Datum, 1929 (NGVD) around the perimeter of the reservoir except in those areas defined by survey beyond the referenced contour elevation.

In addition to providing hydroelectricity, the Project also serves a variety of additional purposes. The Project is used for public drinking water and a variety of water based recreational activities for residents and visitors including fishing, swimming, boating, and nature viewing.

1.4 Consultation

Appalachian received its License for the Claytor Project (No. 739), located on the New River in southwestern Virginia, from the FERC on December 27, 2011. Article 414 of the License approved and modified the SMP dated June 26, 2009 (SMP). According to the SMP, Appalachian will initially review the SMP in 5 years following FERC approval and subsequent reviews will be performed every 5 years. The review will be accomplished through consultation with a group of stakeholders similar to the steering committee. Revisions will be made to the plan based on this consultation. Further, the update will incorporate any revisions that are deemed necessary in order to protect the public recreation opportunities, aesthetic beauty, environmental features, and power production capability at the Project. SMP updates shall be submitted to the FERC for approval. At a minimum, the following entities must be consulted during any review and update of the plan: U.S. Army Corps of Engineers (ACOE), Virginia Department of Health (VDH), Virginia Department of Game and Inland Fisheries (VDGIF), Virginia Department of Environmental Quality (VDEQ), Virginia Department of Conservation and Recreation (VDCR), Virginia Department of Historic Resources (VDHR), Pulaski County and the Friends of Claytor Lake (FOCL). (Because the VDGIF was renamed the Virginia Department of Wildlife Resources (VDWR) on July 1, 2020, all references to the VDGIF in the original SMP or related orders will be interpreted as relating to the VDWR.)

Following issuance of the License in December 2011, Appalachian filed an amended SMP on June 29, 2012 to provide clarification on certain matters involving docks and bulkheads. FERC approved this amended SMP by Order Approving Amended Shoreline Management Plan issued on January 7, 2014.

On June 13, 2017, Appalachian filed an updated SMP, prepared as a result of the 5-year review conducted in consultation with the aforementioned federal, state, local agencies and/or non-governmental organizations. The Commission found that the updated SMP met the requirements of the License, provided a reasonable plan to protect the Project's shoreline resources, and to identify allowable shoreline uses in the Project boundary and the rules governing those uses. FERC approved the updated SMP by Order Approving Updated Shoreline Management Plan issued on November 13, 2017.

On October 13, 2022, Appalachian consulted with the aforementioned federal, state, local agencies and/or non-governmental organizations regarding proposed changes to the June 13, 2017 SMP approved by Order Approving Updated Shoreline Management Plan issued on November 13, 2017. Comments on the draft SMP were either incorporated into the SMP or addressed by cover letter to the Commission on November 14, 2022. This updated SMP, dated November 14, 2022, is a result of the second 5-year review.

In developing the initial June 26, 2009 SMP, Appalachian solicited input from stakeholders including governmental agencies, local governments, non-governmental organizations, and the public to identify potential project-related issues needing to be addressed during the licensing process.

Appalachian filed preliminary study plans with the FERC on June 14, 2006. Initial study plan meetings were held on July 19 and 20, 2006 to review and discuss proposed study plans. Comments on the proposed study plans were due to the Commission on September 18, 2006. A revised study plan was prepared in October of 2006.

A work group was formed to participate in the SMP development process. Participating in the work group were representatives from the VDCR, VDEQ, VDGIF, Pulaski County, FOCL and interested residents. Ten meetings were held between February 21, 2008 and June 8, 2009 to further review and discuss the SMP for the Claytor Project.

Prior to the relicensing process, Appalachian, in conjunction with Pulaski County and FOCL, developed specifications for development of various shoreline uses. Uses included private and commercial dock facilities, shoreline stabilization, shoreline alteration, and miscellaneous uses. The process included the research and review of existing rules and regulations, state agency and input from the U.S. Army Corps of ACOE, and previews by Pulaski County, FOCL, dock and bulkhead contractors and the public. Draft specifications were presented to the ACOE, VDH, VDGIF, VDEQ, VDCR and the Virginia Department of Historic Resources (VDHR). Their concerns were addressed and incorporated into the specifications, as appropriate. The specifications, which were finalized in 2003, have been incorporated into this document, where applicable.

2.0 METHODS AND PLANNING PROCESS

Various resource studies and data collection efforts were undertaken to obtain current information for the development of the SMP. This section describes the resource study methods, data collection and the planning process used to develop the parameters, shoreline classifications, and regulations that make up the SMP.

2.1 Data Collection

2.1.1 Land Use

Aerial digital ortho-rectified photographs of Claytor Lake were collected on three different days, March 8, 2007, March 11, 2007 and March 12, 2007. The photographs were digitized and used as base maps for developing an accurate shoreline and to document existing land uses within the Project boundary.

2.1.2 Shoreline Condition and Stabilization

The entire shoreline of Claytor Lake was surveyed by boat in conjunction with the Erosion and Sedimentation Study, prepared for the relicensing of the Claytor Project, to characterize the conditions of the shoreline with regard to erosion.

The field survey of reservoir shoreline characteristics was undertaken in May-June 2007. The primary purpose of this survey was to identify the effects of the Project operation on the shorelines of the reservoir and to update the existing information on shoreline protection for the reservoir. The fieldwork also identified erosion susceptibility for the banks of the reservoir shorelines and New River and identified areas of accelerated bank erosion. Results from the field reconnaissance were then used to generate a GIS database of shoreline conditions and protection for Claytor Lake.

2.1.3 Ecological Resources

Studies on wetland, riparian, debris, littoral and eagle habitats and the fringed mountain snail were prepared for the relicensing of the Claytor Project. In the Wetland, Riparian, and Eagle Habitat Study, the various habitats were mapped, inventoried and characterized throughout the Project area. Wetlands were classified following the U.S. Fish and Wildlife Service method. Wetlands comprised a small portion of the study area. Most of the palustrine wetlands were small (a couple of acres or less), with the exception of three large wetlands in the southern, riverine section. Riparian habitat provides flood abatement, and wildlife and vegetation corridors. The major vegetation cover types are described below:

- Palustrine forested wetlands are typically small in area and associated with small streams or the upper reaches of larger streams, wetlands of this type occur above full pond. Often linear in shape because they border a stream, these wetlands within 1000 feet of the impoundment result from a combination of groundwater, streamflow, and impoundment levels. Within this type of wetland, a strong moisture gradient is evident, running from annual floodplain along the stream bank and impoundment edge to a transitional wetland on the upland edge.
- Palustrine Shrub-Scrub Wetland is a low, woody wetland vegetation not typically found along the steep sides of the New River and its tributaries. Wetland shrubs do occur as a component of forested floodplain wetland, and also with scrubby trees (e.g., Black Willow) in primarily herbaceous emergent wetlands. However, the shrub-scrub cover type appears definitively only in embayments of the impoundment, usually at the mouth of a tributary in small, crescent-shaped patches fringing riprarian forest. Often the shrub-scrub vegetation occurs with coarse woody debris, some of it floating or loosely bonded to the substrate. The water appears too deep for wetland trees to thrive, yet shallow enough for the shrubs to compete well with most herbaceous growth. Typical shrub dominants of this cover type are Silky Dogwood and Smooth Alder, with typical herbaceous dominants that include Rice Cut Grass and Sweet Flag (*Acorus calamus*) in relatively deep water, and at the margins Reed Canary Grass, Spotted Touch-me-not, and Virginia Wild Rye.
- Palustrine Emergent Wetland - The only extensive development of this primarily herbaceous cover type occurs in the upper third of Claytor Lake, where the New River's particulate load settles out as current velocity begins to slow in the impoundment. The resulting sandbars that fringe or braid the river channel provide soft permanently saturated sediment suitable to the establishment of herbaceous hydrophytes. The overall dominant is Canary Reed Grass, complemented by lesser

coverage of Small-spiked False Nettle, Spotted Touch-me-not, Arrow-leaved Tearthumb and Wingstem. Relatively wet areas support a predominance of Broad-leaved Cattail, Woolgrass, Soft Bulrush, and Broad-leaved Arrowhead.

- Debris – Many coves are invested by an assemblage of woody debris, often with a component of anthropogenic trash. Some debris fragments may be stranded, but most are at last periodically afloat. The remarkable degree to which vegetation has overgrown and immobilized the fragments nearest shore indicates how relatively stable the water movement in a cove must be for most of the year. Together, the tributary-borne sediment and the stabilized debris create a substrate favorable to the development of vegetated wetland where otherwise there would be none. The deeper edge of these diminutive marginal wetlands typically comprised burreed species, bulrush species, and Broad-leaved Cattail, backed up by Cut-leaved Coneflower, Yellow Iris, manna grass species, sedge species, Spotted Touch-me-not, Small-spiked False Nettle, and Spotted Water-hemlock. Occasionally the Water-willow forms a monotypic fringe immediately abutting the woody riparian vegetation.

[Note: Wetlands not identified during the study but that are established on debris or island areas may still be jurisdictional to local, state, and federal permit programs.]

A Littoral Habitat Assessment was prepared in December of 2008 for the relicensing of the Claytor Project. The assessment included the mapping of significant habitat types including trees and large woody debris (brush piles, fallen trees, etc.). Naturally fallen and cut trees were mapped separately and further categorized based on size and whether they had heavy, medium or no branching. In addition to identifying and quantifying the amount of littoral zone habitat, the effects of construction activities on littoral habitat as related to fish spawning and rearing success in Claytor Lake was determined as well as potential measures to protect the littoral habitat.

Claytor Lake was evaluated with respect to suitability for Bald Eagle nesting and foraging habitat. For nesting, Bald Eagles require large trees within protected lands in close proximity to shoreline foraging areas.

The Fringed Mountain Snail is a globally rare land snail that has only been documented along the banks of the New River in Pulaski County, Virginia. This snail was listed as endangered by the U.S. Fish and Wildlife Service in 1983 (USFWS 1983). A field reconnaissance was completed in March 2007 to identify and map possible suitable areas of Fringed Mountain Snail (*Polygyriscus virginianus*). The reconnaissance area included the Claytor Lake Project boundary (generally the 1850-foot contour elevation), as well as Project lands above the 1850-foot NGVD contour.

2.1.4 Cultural Resources

A Cultural Resources Study was conducted in conjunction with the relicensing of the Claytor Project. This study included Phase I cultural resource investigations conducted in accordance with agreements reached with the Virginia State Historic Preservation

Office (SHPO) and the Eastern Band of Cherokee Indians (EBCI) and the Virginia Council on Indians.

Archaeological investigations resulted in the recordation of 15 new archaeological sites and two isolated finds and the re-location of two previously recorded sites. Of the 17 sites, seven are recommended potentially eligible for inclusion in the National Register of Historic Places (NHRP). Nine archaeological sites and two isolated finds are recommended ineligible for the NHRP.

The architectural survey identified one historic architectural resource within the area of potential affect.

Due to the sensitive nature of these sites and their locations, the specifics of the sites cannot be discussed within the context of this plan. However, this information has been used in the shoreline analysis as detailed in the parameters and appropriate regulatory sections.

2.1.5 Bathymetric and Topographical Data

An elevation survey was conducted in 2007 up to the 1900-foot contour elevation, utilizing 2-foot contours. Both bathymetric and land surveys were conducted.

2.1.6 Public and Private Recreation Facilities

Recreation facilities within the Claytor Project were documented. There are 6 public boat launches along Claytor Lake and there is 1 downstream of the dam on the New River. VDWR maintains all the boat launches. VDCR operates the Claytor Lake State Park which offers cabin rentals, camping facilities, hiking trails, a swimming beach, two boat launches, fishing pier, interpretative programs, picnic areas, conference center, and visitor's center.

Pulaski County owns and operates the Harry DeHaven Park which offers a boat launch, picnic areas, and a beach.

In addition, there are 4 commercial facilities within the Project boundary that provide access to the public. These businesses provide a variety of services including boat launching, concessions, gas, boat rental and equipment sales.

2.1.7 Local, State and Federal Regulations

Regulations in the Pulaski County codes and the planning principles in the Pulaski County Comprehensive Plan pertinent to the shoreline of Claytor Lake were collected, reviewed, and taken into consideration in development of the regulations included herein. Likewise, the Commonwealth of Virginia's responsibilities with regards to various related areas including but not limited to wetlands, streams, surface waters, sanitary facilities, cultural resources, erosion control and rare and endangered species were

reviewed. Federal responsibilities reviewed included wetlands, fill, dredging and excavation. The purpose of the review was to promote coordination of activities of the mutual parties involved in regulating the Project's resource values and to promote coordination of the public being served by the parties.

2.1.8 Recreation Use Density

A Recreation Assessment Study Report, prepared for the relicensing of the Claytor Project was prepared to characterize existing recreation resources and use at the Claytor Project. The Recreational Assessment Study also includes a characterization of the amount and location of watercraft on the water at various times between April and October. Aerial flights were scheduled for 8 weekends, 4 weekdays and the Saturday during Labor Day weekend. Oblique aerial photographs were taken between 11:00 a.m. and 3:00 p.m. on 13 different days. The locations of the watercraft in the aerial photos were digitized into GIS software for density analysis.

Boating density grids were created to indicate the locations where the highest levels of boating use were occurring within the Project boundary from May through October. Boating density grids were calculated for all flights. The method for calculating the boat density in acres per boat for a specific lake on a specific day is as follows:

Boating density was calculated using ESRI ArcGIS 9.2 Spatial analyst density function with the following parameters:

- The grid output extent parameter was selected to be the same as the specific lake extent because the density for the specific lake is being calculated.
- A 50 x 50-foot grid cell size was selected because this cell size is small enough that the resulting density maps don't look grainy but is large enough to keep data processing time at a practical level.
- 0.75 mile was selected for the radius parameter to smooth the GPS data to show general boat use density patterns that are easily interpreted. It is useful to smooth the specific GPS data for the following 2 reasons:
    - The boat location data were collected using oblique aerial photography; therefore, the boat locations could be digitized only at a relatively small scale.
    - Boats are not static but are often moving while the data are being collected.
- The kernel density parameter was selected to create a smoother and more easily interpreted density grid.

The resulting grid indicates density in boats per square mile. This grid was revised to take into account that some of the 0.75-mile radii around many of the grid cells included land areas. The original grid in boats per total area was divided by the proportion of available water surface area, so that the resulting grid would be in boats per square mile of surface water. Finally, the grid was converted to acres per boat to obtain the final

boating density maps. Appendix C includes the boating density and spatial distribution of watercraft recorded during the fly over's using oblique aerial photography.

The analysis revealed that the main channel of Claytor Lake between the dam and Peak Creek is most popular for boating during summer weekends, with the areas near existing ramps the most popular. However, density estimates indicate that boats typically have at least 25 acres of water per boat even on the busiest days.

The Virginia Statewide Comprehensive Outdoor Recreation Plan (SCORP) contains standards for acceptable densities for boating. The standard for power boating is 12 acres per boat.

In addition to the aerial photographs, interviews were conducted with people using the lake during peak use times. The interview included questions about individual perceptions of crowding and safety on Claytor Lake. The survey data was collected with the boat densities to establish the relationship between people's perceptions and use levels. Public site users perceive the sites and water to have at most the "average number of people" and "average number of watercraft", respectively, while shoreline property owners felt weekend crowding on the water was above average.

Recommendations included in the study include:

- Maintain the lands across from the State Park as naturally vegetated and undeveloped to protect the scenic resources in the area
- Consider the scenic value of undeveloped lands when developing the shoreline management plan and incorporate measures to protect those areas with significant scenic value.

2.1.9 Scenery Assessment

During the development of the SMP, the Shoreline Management Work Group requested more in-depth information regarding a scenic assessment than had been obtained during the studies conducted for the relicensing of the Claytor Project. The Virginia Tech Landscape Architecture Program conducted a study which included establishing criteria for identifying elements of natural and cultural beauty at Claytor Lake; identifying and mapping current scenic resources of Claytor Lake; identifying potential threats to the scenic beauty of the lake, proposing management guidelines to maintain or enhance the scenic beauty of Claytor Lake; and identifying those unique areas of the lake about which the public will most likely be concerned.

The methodology included seen area identification, visual quality assessment and visual sensitivity assessment. The seen areas or viewsheds are areas that can be seen from the centerline of the lake. Visual quality and visual sensitivity were assessed on a five-point categorical rating scale ranging from low to high. Areas with high visual sensitivity highly concern a large number of people, who participate in activities while experiencing the environment frequently. Areas with high visual quality have prominent physical

landscape features such as cliff and pasture. The visual attributes in these areas are distinct and have great viewing opportunities. Management guidelines were included for future developments.

2.2 Mapping

In preparation for the relicensing of the Claytor Project, Appalachian developed high-resolution terrain and bathymetric maps for the Project area. Data was obtained from U.S. Army Corps of Engineers reservoir bathymetry contour mapping, high-resolution orthorectified aerial photography, and acoustic mapping of the reservoir bottom. Appalachian also mapped the shoreline from the water surface to the 1900-foot NGVD contour. The contours are at 2-foot intervals extending below the elevation 1900 foot. NGVD at a nominal scale of 1:1200 (1 in. = 100 ft.). The bathymetry mapping of the reservoirs was accomplished utilizing boats mounted with single beam and multi-beam sonar equipment to measure water depths along with mobile GPS receivers to establish coordinates. The data was acquired and processed using hydrographic software. The shoreline mapping from water's edge to elevation 1900 ft. NGVD was done using aerial photography. The aerial photographs were digitized and developed using 1" =100' scale contour maps with 2-foot contours. Photographic coverage extended from Allisonia to the Virginia West Virginia border.

The shoreline classification maps were developed using the information that was collected and the parameters that were developed by the work group. The parameters include classification according to the presence of areas identified as a part of this data collection.

2.2.1 Mapping Revision Process

Appalachian recognizes that there may be minor inaccuracies associated with mapping of any type and that the resources of Claytor Lake may change over time. Individuals that believe that the classification along the shoreline adjacent to their property is inaccurate may apply in writing to Appalachian for a revision. Appalachian will then review the SMP maps and make a site visit, if necessary, to address any shoreline classification issue. If Appalachian determines that there is a discrepancy in the classification involving existing facilities, Appalachian will make the revisions. If shoreline classification maps are modified to correct any shoreline classification errors, the revised maps shall be filed with the FERC.

2.3 Shoreline Classifications

The following section presents the shoreline classifications. Classifications are not exclusive; they are inclusive from the "top down." An area designated for High Density Commercial facilities could be used for any other use, but not vice-versa.

The use of the property adjacent to the Project boundary will dictate which regulations will apply to the proposed development. When the proposed development is a "lesser" use than the shoreline classification, the regulations for the proposed development will prevail (e.g., a proposed residential dock in an area where the shoreline designation is high-density multi-use is required to meet the low-density use regulations). In addition, if county zoning and the shoreline classification do not match, the more restrictive regulations will apply (e.g., a dock in a county's residentially zoned district would have to meet the low-density regulations, even if the shoreline classification is commercial, unless the County changed their zoning for the upland use). Appendix D contains the shoreline classification maps.

Shoreline Classifications

- High Density Commercial - Project lands and waters where profit seeking individuals or entities operate facilities as a place of business. Within the Project boundary, those facilities may include areas where boats can be launched, retrieved, or docked, as well as obtain petroleum. Outside the Project boundary, associated facilities shall include provisions for food services, convenience retailing including petroleum dispensing, dry storage of watercraft or where other activities customarily associated with marinas, campgrounds, private recreation areas and private clubs take place. The high-density commercial classification includes facilities that would be expected to incur heavy amounts of boat traffic, such as marinas.

- High Density Multi-Use - Project lands and waters where boats can be launched, retrieved, or moored for the purpose of providing private access to the lake for specific residential properties including:

  - Multi-family dwellings (e.g., apartments, townhouses, condominiums).
  - Subdivision access lots that serve single-family type dwellings that are located within a parcel of land that was contiguous to the Project boundary at the time the Claytor Project was developed and that has been subdivided into individual lots. Property lines may not be vacated in order to be considered contiguous to the Project boundary at the time the Project was developed.
  - The high-density multi-use classification allows for access to the lake for more than one property owner. Such access could be in the form of multi-slip common dock areas or an access ramp with a courtesy dock depending upon the amount of shoreline available for the access area.

- Public Use - Project lands and waters where facilities are operated by non-profit organizations, the licensee, or governmental entities and that support various public recreational amenities or areas that are used for the public good. Examples of public use include public access areas, and state, district, and county parks that adjoin the Project boundary, lake clean-up facilities and other similar public use type endeavors.

- Low Density Use – The low density use classification encompasses 4 types of development. Any of the 4 types are appropriate for these areas.

- Single Family-Type Residential - Project lands and waters that support private facilities for waterfront landowners, none of which can have multi-family dwellings or provide access for off-water lots. Uses within this classification may include, among other things, piers, boat docks, and floaters.
- Low Density Multi-Use – Project lands and waters that support apartments, townhouses, and condominiums and off water or common lot access for developments.
- Low Density Commercial - Project lands and waters where profit seeking individuals or entities operate facilities as a place of business. Within the Project boundary, those facilities may include areas where boats can be docked for short periods of time by customers. Launching of boats from these facilities is not allowed. For operations outside the Project boundary, associated facilities shall include provisions for food services, convenience retailing and restaurants or private clubs. The low use commercial classification includes facilities that would be expected to incur relatively small amounts of boat traffic, such as access docks for convenience stores, restaurants, or shopping areas.
- Low Density Public Use - Project lands and waters where facilities are operated by non-profit organizations, the licensee, and/or governmental entities and that support various public recreational amenities or areas that are used for the public good. Examples of this type of public use include public access areas, and state, district, and county parks that adjoin the Project boundary, lake clean-up facilities and other similar public use type endeavors. Ramps are allowed in low density public use areas for public service uses.

- Impact Minimization Zone - Project lands and waters that have specifically identified importance from an environmental, scenic, cultural, or recreational standpoint. Development within these areas would be limited, but possible, based on a review of the related plans by appropriate local, state, and federal agencies and mitigation for any impacts to resources.

- Conservation/Environmental - Claytor Lake is important to the economy of Pulaski County and contains characteristics that make it a significant regional provider of a variety of resources. There are resources on the lake that need protection to ensure that they maintain their attributes on a local and regional scale. The types of resources that need protection include recreational opportunities, scenic beauty, water quality, fish and wildlife habitat, and wetlands. The Conservation/Environmental classification includes areas around the lake that are particularly important for protecting and enhancing these various resources. In these areas, development inside the Project boundary would be limited unless a variance can be obtained.

2.4 Parameters

The following conditions represent parameters for defining the classifications of the shorelines of Claytor Lake. Information about how these parameters are applied is included as well. All references to *existing* and *currently* are defined as of June 26, 2009.

High Density Commercial

- Shoreline with existing commercial marina facilities.

High Density Multi-Use

- Coves and main channel areas with a width of more than 500 feet when measured from contour elevation 1840 to 1840 on the other side of the cove (clear passage), * based upon the base mapping developed for the relicensing of the Claytor Project, or
- Shoreline with existing multi-use residential type facilities

* The width requirement precludes this classification in coves whose clear passage narrows to 500 feet or less and then widens out again and main channel areas that are wider than 500 feet but are upstream of locations that are less than 500 feet. Shoreline classified for High Density Multi-Use because of existing High Density Multi-Use structures may continue to exist in these areas.

For High Density Multi-Use areas, either the first or second parameter must be met.

Public Use

- Shoreline with existing public uses, or
- Areas identified for future public use.

For Public Use areas, either the first or the second parameter must be met.

Low Density Use

- Areas not otherwise classified, or
- Shoreline with areas of existing single-family docks and piers.

Impact Minimization Zone

- Areas defined as potential habitat for the Fringed Mountain Snail, or
- Areas defined as good foraging and good nesting habitat for the Bald Eagle, or
- Areas within 100 feet of a known cultural resource site contained in the VA SHPO files, or
- Areas defined as significant littoral habitat including trees and large woody debris, or
- Areas downstream of the dam and not classified as Conservation/Environmental or Public, or
- Areas defined as having High Visual Sensitivity and High or Moderate Scenic Quality in the Claytor Lake Scenic Report, or
- Areas identified considered to be unique natural features of the Claytor Project, or
- Areas within coves less than 100 feet in width, or
- Areas with no adjacent upland use other than a road right-of-way, or

- Undeveloped islands.

For the Impact Minimization Zone areas, any of the parameters may be met and will override any of the other classifications.

Conservation/Environmental

- Areas identified as stream beds in the backs of coves, or
- Wetland areas, or
- Areas identified by the Virginia Natural Heritage Program as important natural communities, or
- Areas within designated restriction zones such as between the boat barrier upstream of the Project dams and the dams themselves and areas below the dam within the boat barrier.

For the Conservation/Environmental areas, any of the parameters may be met and will override any of the other classifications.

2.5 Regulations

Since every possible scenario cannot be anticipated, Appalachian reserves the right to issue decisions in situations not specifically covered by these regulations and will do so in a manner that protects and enhances the scenic, recreational, and environmental values of the Claytor Project. Local, state, and federal agencies may be consulted during such decision-making processes, as appropriate.

Some activities are incompatible uses within the Project boundary. Prohibited uses are identified in 2.5.15.

2.5.1 High Density Commercial

High density commercial areas are defined as Project lands and waters where profit seeking individuals or entities operate facilities as a place of business. Within the Project boundary those facilities may include areas where boats can be launched, retrieved, or docked, as well as obtain petroleum. Outside the Project boundary associated facilities shall include provisions for food services, convenience retailing including petroleum dispensing, storage of watercraft or where other activities customarily associated with marinas, campgrounds, private recreation areas and private clubs take place. The high-density commercial classification includes facilities that would be expected to incur heavy amounts of boat traffic, such as marinas.

All parties desiring to construct or expand a facility adjacent to shoreline designated High Density Commercial or rebuild an existing commercial facility within the Project boundary of the Claytor Lake Reservoir must obtain authorization in writing from Appalachian and all appropriate local, state, and federal permitting authorities prior to beginning construction.

Commercial/Non-Residential uses include:

A. Facilities where boats can be launched, retrieved or moored and where provisions for petroleum dispensing, wet storage of watercraft and other activities customarily associated with marinas, campgrounds and yacht clubs are made.
B. Docks, stairways, or walkways, associated with commercial operations and facilities.
C. Other activities that may affect water storage, water rights, operational requirements or environmentally sensitive items of concerns, liability issues.

Regulations include:

1. The Project boundary for the Claytor Project is the 1850-foot contour NGVD, except those areas defined by survey beyond the referenced contour elevation.

2. All shoreline distances are measured at the 1846-foot contour NGVD for Claytor Lake. This contour elevation is also referred to as the base elevation. Verifying the location of the base elevation and all appropriate distances is the responsibility of the permit applicant.

3. All facilities must comply with all applicable local, state, and federal regulations. The applicant must obtain all necessary governmental permits or approvals, a FERC order (if applicable) and written authorization from Appalachian prior to beginning any activity/construction within the Project boundary. The facilities must meet the Commonwealth of Virginia Sanitary Regulations for Marinas and Boat Moorings. Restrooms and sewage holding tanks shall be located outside of the Project boundary.

4. All applicants must consider ADA standards and ADAAG recreation facility guidelines and adhere to any applicable laws and regulations.

5. All structures located within the 1850-foot contour elevation must be located within extended property lines or dock limitation lines and shall maintain a setback of at least 100 feet from either the extended property lines or the dock limitation lines. See Figure 4.

6. Docks and mooring buoys shall not extend more than one-fourth the distance to the opposite shoreline as measured from the base elevation or extend more than 100 feet waterward of the base elevation whichever is more limiting. See Figure 1.

7. Docks shall not block, obstruct, or otherwise impede the line of vision between public aids to navigation or the visibility of public aids to navigation and shall not encroach closer than thirty (30) feet to a lateral aid.

8. Docks shall be constructed perpendicular to the shoreline.

9. The minimum fairway between groups of dock slips or ramps shall be 2 times the length of the adjacent slip. If the two structures contain slips of different sizes, the larger slip size shall be used to determine the fairway distance.

10. Structures located between the Project boundary and the base elevation shall be limited to a structure that provides access to the dock. This includes a stairway, ramp, landing or walkway that connects the dock to the land. Only one walkway shall be permitted per structure unless otherwise required by the Pulaski County Building Code. The walkway shall not exceed six feet in width, nor be less than four feet in width. Fingers between slips shall be a minimum of three feet each. See Figure 2.

11. All fixed pier decking must be at least two feet above the base elevation.

12. Maximum heights shall be as follows:

    a. For a commercial/non-residential facility with slips on either side of a walkway, the height of the facility shall not exceed 24 feet so as to allow a roof with a maximum pitch of 4/12.
    b. For a commercial/non-residential facility with slips on one side of a walkway, the height of the facility shall not exceed 18 feet so as to allow a roof with a maximum pitch of 4/12.

13. The sides of boat docks are not to be enclosed. Boat houses are prohibited.

14. Permittees are allowed 1 enclosure per service dock. The maximum size of the enclosure shall be 48 square feet.

15. Barriers and partitions including but not limited to walls, knee walls, and bars shall not be added to the dock.

16. Two-inch minimum diameter white reflectors shall be affixed along the sides of the structure at intervals of six feet and within one foot of each of the two corners of the structure or pilings that are located farthest from the shoreline in order to identify the outline of the structure. Reflectors must be placed within two feet of the base elevation. See Figure 3. Docks extending from points of lands or peninsulas or located near the line of sight of aids to navigation shall have amber lighting in accordance with the United States Coast Guard (USCG) regulations.

17. A facility accommodating watercraft equipped with devices that produce a wastewater discharge (e.g., marine toilet, shower, sink, kitchen fixed or portable holding tank) is required to meet the Virginia Department of Health, Marina Regulations and provide sanitation facilities for pump-out and/or deposit of waste.

18. Structures built within the Project boundary must not contain any liquid or solid waste that may be discharged into the lake. (Note: Boat fueling facilities and bait tanks are exemptions to this requirement.)

19. The construction of any structure must be completed as described in the Appalachian permit. An extension may be considered if the applicant files a written request with Appalachian explaining why the additional time is needed. If during an extension period additional regulations are imposed, the new construction will be required to comply with the new regulations to the maximum extent practical.

20. The applicant must be the owner of or the Appalachian lessee of the tract of land immediately adjoining the 1850-foot contour elevation NGVD. Appalachian will hold the owner fully responsible for the permitted reservoir use (including maintaining structures in good repair). The occupancy and use permit is not an easement and does not automatically transfer to the new owner with the sale of the upland land. Upon the transfer of the upland land, the new owner(s) will be required to obtain a new occupancy and use permit in their name. (In the event that there is a lease of shoreline land by APCO, then a written assignment of that lease to the new owner is required.)

21. The dock owner will sign an acknowledgement when obtaining his or her dock permit stating that water depths may not be adequate for accessing the lake during times of low inflow or drought or for any other reason the reservoir is drawn down.

2.5.2 High Density Multi-Use

High Density Multi-Use areas are defined as Project lands and waters where boats can be launched, retrieved, or moored for the purpose of providing private access to the lake for specific residential properties including:

- Multi-family dwellings (e.g., apartments, townhouses, condominiums).
- Subdivision access lots that serve single-family type dwellings that are located within a parcel of land that was contiguous to the Project boundary at the time the Claytor Project was developed and that has been subdivided into individual lots. Property lines may not be vacated in order to be considered contiguous to the Project boundary at the time the Project was developed.

The high-density multi-use classification allows for access to the lake for more than one property owner. Such access could be in the form of multi-slip common dock areas or an access ramp with a courtesy dock depending upon the amount of shoreline available for the access area.

Community Dock Option

1. The Project boundary for the Claytor Project is the 1850-foot contour NGVD, except those areas defined by survey beyond the referenced contour elevation.

2. All shoreline distances are measured at the 1846-foot contour NGVD for Claytor Lake. This contour elevation is also referred to as the base elevation. Verifying the location of the base elevation and all appropriate distances is the responsibility of the permit applicant.

3. All facilities shall comply with all applicable local, state, and federal regulations. The applicant must obtain all necessary governmental permits or approvals, a FERC order (if applicable) and written authorization from Appalachian prior to beginning any activity/construction within the Project boundary.

4. The facilities must meet the Commonwealth of Virginia Sanitary Regulations for Marinas and Boat Moorings. Restrooms and sewage holding tanks shall be located outside of the Project boundary. A facility accommodating watercraft equipped with devices that can produce a wastewater discharge (e.g., marine toilet, shower, sink, kitchen, fixed or portable holding tank) is required to meet Commonwealth of Virginia Sanitary Regulations for Marinas and Boat Moorings.

5. Construction of new high density multi-use facilities requires consultation with and concurrence from the VA SHPO to ensure the protection of unknown cultural resources.

6. All structures located within the 1850-foot contour elevation must be located within extended property lines or dock limitation lines and shall maintain a setback of at least 100 feet from either the extended property lines or the dock limitation lines. See Figure 4.

7. Docks or mooring buoys shall not extend more than one-fourth the distance to the opposite shoreline as measured from the base elevation or extend more than 100 feet waterward of the base elevation, whichever is more limiting. See Figure 1.

8. Docks shall not block, obstruct, or otherwise impede the line of vision between public aids to navigation or the visibility of other public navigational aids and shall not encroach closer than thirty (30) feet to a public lateral aid or other navigational aid.

9. Docks shall be constructed perpendicular to the shoreline.

10. The minimum fairway between groups of dock slips or ramps shall be 2 times the length of the adjacent slip. If the two structures contain slips of different sizes, the larger slip size shall be used to determine the fairway distance.

11. Structures located between the Project boundary and the base elevation shall be limited to a structure that provides access to the dock. This includes a stairway, ramp, landing or walkway that connects the dock to the land. The maximum width of this structure shall be 6 feet.

12. A high-density multi-use dock shall be limited to no more than 4 slips per 100 linear feet of shoreline. Lift areas for personal watercraft shall be counted as square footage.

13. Slips shall be grouped together to the greatest extent possible given restrictions based on other regulations. The maximum size of dock structures located within the base elevation shall be in accordance with the following table:

Number of slips	**Square Footage allowed**
1	500 square feet
Additional slips	325 square feet for a boat slip (personal watercraft are counted as square footage)

14. Slips shall be constructed in conjunction with the construction of respective housing units.

15. All fixed pier decking must be at least two feet above the base elevation.

16. The maximum height, as measured from the base elevation to highest point on the structure, shall not exceed 24 feet so as to allow a roof with a maximum pitch of 4/12. Maximum heights shall be as follows:

    a. For a facility with slips on either side of a walkway, the height of the facility shall not exceed 24 feet so as to allow a roof with a maximum pitch of 4/12. The boat dock may have a roof, but no additional roofs or roofed areas shall be allowed to create a second story.

    b. For a facility with slips on one side of a walkway, the height of the facility shall not exceed 18 feet so as to allow a roof with a maximum pitch of 4/12.

17. Enclosures on the dock shall not be allowed. A screened area is considered an enclosure.

18. Barriers and partitions including but not limited to walls, knee walls, and bars shall not be added to the dock.

19. Two-inch minimum diameter white reflectors shall be affixed along the sides of the structure at intervals of six feet and within one foot of each of the two corners of the structure or pilings that are located farthest from the shoreline in order to identify the outline of the structure. Reflectors must be placed within two feet of the base elevation (1846-foot USGS level). See Figure 3. Docks extending from points of lands or peninsulas or located near the line of sight of aids to navigation shall have amber lighting in accordance with the USCG regulations.

20. Structures built within the Project boundary must not contain sinks, toilets, showers, or any other type of device that could cause any liquid or solid waste to be discharged into the lake.

21. The applicant must be the owner of or the Appalachian lessee of the tract of land immediately adjoining the 1850-foot contour elevation NGVD. Appalachian will hold the owner fully responsible for the permitted reservoir use (including maintaining structures in good repair). The occupancy and use permit is not an easement and does not automatically transfer to the new owner with the sale of the upland land. Upon the transfer of the upland land, the new owner(s) will be required to obtain a new occupancy and use permit in their name. (In the event that there is a lease of shoreline land by APCO, then a written assignment of that lease to the new owner is required.)

22. The dock owner will sign an acknowledgement when obtaining his or her dock permit stating that water depths may not be adequate for accessing the lake during times of low inflow or drought or for any other reason the reservoir is drawn down.

<u>Boat Ramp and Courtesy Pier Option</u>

1. The Project boundary for Claytor Lake is the 1850-foot contour NGVD, except in those areas defined by survey above or beyond the referenced contour elevation.

2. All shoreline distances are measured at the 1846-foot contour NGVD for Claytor Lake. This contour elevation is also referred to as the base elevation. Verifying the location of the base elevation and all appropriate distances is the responsibility of the permit applicant.

3. All facilities must comply with all applicable local, state, and federal regulations. The applicant must obtain all necessary governmental permits or approvals, a FERC order

(if applicable) and written authorization from Appalachian prior to beginning any activity/construction within the Project boundary.

4. The facilities must meet the Commonwealth of Virginia Sanitary Regulations for Marinas and Boat Moorings. Restrooms and sewage holding tanks shall be located outside of the Project boundary.

5. Construction of new high density multi-use facilities requires consultation with and concurrence from the VA SHPO to ensure the protection of unknown cultural resources.

6. All structures located within the Project boundary must be located within the dock limitation lines and shall maintain a setback as follows:

    a) For multi-family uses adjacent to Low Density Use areas, there shall be at least 100 feet plus a fairway equivalent to two (2) times the length of the longest slip adjacent to the dock limitation line; or

    b) For multi-family uses adjacent to High Density Commercial, High Density Multi-Use or Public Use facilities, there shall be at least 60 feet from the dock limitation line.

7. Piers shall not exceed a maximum of 1/4 cove width or 100 feet in length, whichever is less, as measured from the base elevation (Figure 1).

8. Piers shall not block, obstruct, or otherwise impede the line of vision between public aids to navigation or the visibility of public navigational aids and shall not encroach closer than thirty (30) feet to a public lateral or non-lateral mark.

9. Structures located between the Project boundary and the base elevation shall be limited to a structure that provides access to the courtesy pier and the ramp. The maximum width of this structure shall be 12 feet.

10. The maximum size of courtesy pier structures located within the base elevation shall be 800 square feet (Figure 2).

11. No enclosures shall be allowed on the pier. A screened area is considered an enclosure.

12. Two-inch minimum diameter white reflectors shall be affixed along the sides of the structure at intervals of six feet and within one foot of each of the two corners of the structure or pilings that are located farthest from the shoreline in order to identify the outline of the structure. Reflectors must be placed within two feet of the base elevation (1846-foot USGS level). See Figure 3. Docks extending from points of lands or peninsulas or located near the line of sight of aids to navigation shall have amber lighting in accordance with the USCG regulations.

13. No roofs shall be allowed on courtesy piers.

14. Boat ramp construction shall meet all local, state, and federal requirements.

15. The maximum width of a ramp lane shall be sixteen feet for a single lane or thirty-two feet for a double lane. The ramp shall have the required length to be functional.

16. Ramps shall be constructed of reinforced concrete with a minimum thickness of six inches.

17. The applicant must be the owner of or the Appalachian lessee of the tract of land immediately adjoining the 1850-foot contour elevation NGVD. Appalachian will hold the owner fully responsible for the permitted reservoir use (including maintaining structures in good repair). The occupancy and use permit is not an easement and does not automatically transfer to the new owner with the sale of the upland land. Upon the transfer of the upland land, the new owner(s) will be required to obtain a new occupancy and use permit in their name. (In the event that there is a lease of shoreline land by APCO, then a written assignment of that lease to the new owner is required.)

18. The pier owner will sign an acknowledgement when obtaining his or her dock permit stating that water depths may not be adequate for accessing the lake during times of low inflow or drought or for any other reason the reservoir is drawn down.

2.5.3 Public Use

Public use areas are defined as Project lands and waters where facilities are operated by non-profit organizations, the licensee, or governmental entities and that support various public recreational amenities or areas that are used for the public good. Examples of the public use classification include public access areas, and state, district, and county parks that adjoin the Project boundary, lake clean-up facilities and other similar public use type endeavors. Public use areas may include multi-slip docks and/or boat ramps with courtesy docks.

Multi-slip Docks

1. The Project boundary for Claytor is the 1850-foot contour, except in those areas defined by survey beyond the referenced contour elevation.

2. All shoreline distances are measured at the 1846-foot contour NGVD for Claytor Lake. This contour elevation is also referred to as the base elevation. Verifying the location of the base elevation and all appropriate distances is the responsibility of the permit applicant.

3. All facilities must comply with all applicable local, state, and federal regulations. The applicant must obtain all necessary governmental permits or approvals, a FERC order (if applicable) and written authorization from Appalachian prior to beginning any activity/construction within the Project boundary. The facilities must meet the Commonwealth of Virginia Sanitary Regulations for Marinas and Boat Moorings. Restrooms and sewage holding tanks shall be located outside of the Project boundary.

4. Construction of new public use facilities requires consultation with and concurrence from the VA SHPO to ensure the protection of unknown cultural resources.

5. All applicants must consider ADA standards and ADAAG recreation facility guidelines and adhere to any applicable laws and regulations.

6. All structures located within the Project boundary must be located within the dock limitation lines and shall maintain a setback as follows:

    a) For public uses adjacent to Low Density Use areas, there shall be at least 100 feet plus a fairway equivalent to two (2) times the length of the longest slip adjacent to the dock limitation line; or

    b) For public uses adjacent to High Density Commercial, High Density Multi-Use or Public Use facilities, there shall be at least 60 feet from the dock limitation line.

7. The docks shall not exceed a maximum of 1/4 cove width or 100 feet in length, whichever is less, as measured from the base elevation to the closest point across the cove or channel at the base elevation.

8. Docks shall not block, obstruct, or otherwise impede the line of vision between public aids to navigation or the visibility of public navigational aids and shall not encroach closer than thirty (30) feet to a lateral or non-lateral aid.

9. Docks shall be constructed perpendicular to the shoreline.

10. The minimum fairway between groups of dock slips shall be 2 times the length of the adjacent slip. If the two structures contain slips of different sizes, the larger slip size shall be used to determine the fairway distance.

11. Structures located between the Project boundary and the base elevation shall be limited to a structure that provides access to the dock. This includes a stairway, ramp or landing that connects the dock to the land. The maximum width of this structure shall be 12 feet.

12. Only floating docks or uncovered piers shall be considered for public use areas. The boat dock may have a roof, but no additional roofs or roofed areas shall be allowed to create a second story

13. Permittees are allowed 1 enclosure per service dock that may measure a maximum of 48 square feet. A screened area is considered an enclosure.

14. Barriers and partitions including but not limited to walls, knee walls, and bars shall not be added to the dock.

15. Two-inch minimum diameter white reflectors shall be affixed along the sides of the structure at intervals of six feet and within one foot of each of the two corners of the structure or pilings that are located farthest from the shoreline in order to identify the outline of the structure. Reflectors must be placed within two feet of the base elevation (1846-foot USGS level). See Figure 3. Docks extending from points of lands or peninsulas or located near the line of sight of aids to navigation shall have amber lighting in accordance with the USCG regulations.

16. The applicant must be the owner of or the Appalachian lessee of the tract of land immediately adjoining the 1850-foot contour elevation NGVD. Appalachian will hold the owner fully responsible for the permitted reservoir use (including maintaining structures in good repair). The occupancy and use permit is not an easement and does not automatically transfer to the new owner with the sale of the upland land. Upon the transfer of the upland land, the new owner(s) will be required to obtain a new occupancy and use permit in their name. (In the event that there is a lease of shoreline land by APCO, then a written assignment of that lease to the new owner is required.)

17. The dock owner will sign an acknowledgement when obtaining his or her dock permit stating that water depths may not be adequate for accessing the lake during times of low inflow or drought or for any other reason the reservoir is drawn down.

<u>Courtesy Pier and Ramp</u>

1. The Project boundary for Claytor is the 1850-foot contour, except in those areas defined by survey above or beyond the referenced contour elevation.

2. All shoreline distances are measured at the 1846-foot contour NGVD for Claytor Lake. This contour elevation is also referred to as the base elevation. Verifying the location of the base elevation and all appropriate distances is the responsibility of the permit applicant.

3. All facilities must comply with all applicable local, state and federal regulations. The applicant must obtain all necessary governmental permits or approvals, a FERC order (if applicable) and written authorization from Appalachian prior to beginning any activity/construction within the Project boundary. The facilities must meet the Commonwealth of Virginia Sanitary Regulations for Marinas and

Boat Moorings. Restrooms and sewage holding tanks shall be located outside of the Project boundary.

4. Construction of new public use facilities requires consultation with and concurrence from the VA SHPO to ensure the protection of unknown cultural resources.

5. All applicants must consider ADA standards and ADAAG recreation facility guidelines. All applicants must adhere to any applicable laws and regulations.

6. All structures located within the Project boundary must be located within the dock limitation lines and shall maintain a setback as follows:

   a) For public uses adjacent to Low Density Use areas, there shall be at least 100 feet plus a fairway equivalent to two (2) times the length of the longest slip adjacent to the dock limitation line; or

   b) For public uses adjacent to High Density Commercial, High Density Multi-Use or Public Use facilities, there shall be at least 60 feet from the dock limitation line.

7. Courtesy piers shall not exceed a maximum of 1/4 cove width or 100 feet in length, whichever is less, as measured from the 1846-foot contour NGVD to the closest point across the cove or channel at the base elevation. Verifying the location of the 1846-foot contour NGVD is the responsibility of the landowner.

8. Piers shall not block, obstruct, or otherwise impede the line of vision between public aids to navigation or the visibility of public navigational aids and shall not encroach closer than thirty (30) feet to a public lateral or non-lateral mark.

9. The minimum fairway between groups of dock slips (fairway distance) shall be 2 times the length of the adjacent slip. If the two structures contain slips of different sizes, the larger slip size shall be used to determine the fairway distance. If there are no slips in either of the structures, the minimum distance shall be 50 feet.

10. Structures located between the Project boundary and the base elevation shall be limited to a structure that provides access to the dock. This includes a stairway, ramp or landing that connects the dock to the land. The maximum width of this structure shall be 12 feet.

11. The maximum size of courtesy pier structures located within the base elevation shall be 800 square feet (Figure 2).

12. The courtesy pier shall be uncovered.

13. No enclosures shall be allowed on the courtesy pier. A screened area is considered an enclosure.

14. Two-inch minimum diameter white reflectors shall be affixed along the sides of the structure at intervals of six feet and within one foot of each of the two corners of the structure or pilings that are located farthest from the shoreline in order to identify the outline of the structure. Reflectors must be placed within two feet of the base elevation (1846-foot USGS level). See Figure 3. Docks extending from points of lands or peninsulas or located near the line of sight of aids to navigation shall have amber lighting in accordance with the USCG regulations.

15. Boat ramp construction shall meet all local, state, and federal requirements or specifications based on the ramp's intended use.

16. The maximum width of a ramp lane shall be sixteen feet for a single lane and thirty-two feet for a double lane. The ramp shall have the required length to be functional.

17. The applicant must be the owner of or the Appalachian lessee of the tract of land immediately adjoining the 1850-foot contour elevation NGVD. Appalachian will hold the owner fully responsible for the permitted reservoir use (including maintaining structures in good repair). The occupancy and use permit is not an easement and does not automatically transfer to the new owner with the sale of the upland land. Upon the transfer of the upland land, the new owner(s) will be required to obtain a new occupancy and use permit in their name. (In the event that there is a lease of shoreline land by APCO, then a written assignment of that lease to the new owner is required.)

18. The pier owner shall sign an acknowledgement when obtaining his or her dock permit that water depths may not be adequate for accessing the lake during times of low inflow or drought or for any other reason the reservoir is drawn down.

2.5.4 Low Density Use

The Low Density Use category consists of 4 types of low density development. Any of the 4 types may be developed adjacent to shoreline that has been designated as low-density use. The sub-categories are single-family residential, low-density multi-use (to serve condominiums, off water lots, apartments or multiple on water single family homes), low-density commercial, and low-density public use.

Low Density Single Family Residential

Docks and piers are to be constructed, located, and maintained according to the following:

1. The Project boundary for Claytor Lake is the 1850-foot contour NGVD, except in those areas defined by survey beyond the referenced contour elevation. These respective contours are hereafter referred to as the Project boundary.

2. All shoreline distances are measured at the 1846-foot contour NGVD for Claytor Lake. This contour elevation is also referred to as the base elevation. Verifying the location of the base elevation and all appropriate distances is the responsibility of the permit applicant.

3. All facilities must comply with all applicable local, state, and federal regulations. The applicant must obtain all necessary governmental permits or approvals, a FERC order (if applicable) and written authorization from Appalachian prior to beginning any activity/construction within the Project boundary.

4. All structures shall be constructed between the property owner's lot lines as extended into Project lands and into the water. If an extended lot line does not affect fair division of the shoreline with an adjoining neighbor, then the two property owners can mutually agree in a written document to a revised extended lot line. This agreement or waiver shall accompany all applications for construction particular to these circumstances.

5. All structures must maintain a setback of at least 15 feet from the adjoining property owner's lot line as extended and projected onto Appalachian's Project lands and the water. Appalachian may allow construction between the setback line of 15 feet and the extended lot line if the adjoining property owner(s) grants written permission and, in the opinion of Appalachian, the construction will not affect unfair use of the shoreline. In case of such permission, the agreement or waiver shall be filed with Appalachian. The minimum distance between structures shall be thirty (30) feet, unless written permission is granted to reduce the setback, in which case the minimum distance between structures shall be twenty (20) feet.

6. Structures shall not be more than 50 feet or one-fourth the width of the water body at the base elevation, whichever is less. See Figure 1. If a structure opposite the location is more than ¼ of the cove, then the two combined structures shall not exceed ½ of the cove width.

7. Docks shall not block, obstruct, or otherwise impede the line of vision between public lateral aids or the visibility of other public navigational aids and shall not encroach closer than thirty (30) feet to a public lateral aid or other navigational aid.

8. Except for a single walkway there shall be no structures or decking between the Project boundary and the base elevation

9. Only one walkway shall be permitted per structure. The walkway shall not be less than four feet in width or greater than six feet in width. See Figure 2. See Section 3.3.2 for an exception to the one walkway requirement.

10. A single-family residential lot having less than 100 feet of shoreline (as measured along the base elevation) will not be considered for a pier or dock unless it was subdivided and recorded prior to August 14, 2003. Also, unless Appalachian allowed the structure prior to August 14, 2003, no more than one pier or dock per waterfront lot will be considered for approval, unless the lot or property has more than 500 feet of shoreline as measured at the base elevation.

11. Two adjoining shoreline lots having a total of 150 feet minimum shoreline width may share a pier or dock. Shared piers and shared docks must be located on or close to the adjoining property line. Specifications for shared piers and docks are the same as for individual piers and docks, except for specifications regarding lot width. Shared pier and shared dock applicants are individually and jointly responsible for compliance with these specifications and all other applicable Appalachian policies, procedures, and requirements. Failure of one applicant to comply therewith may render both lots ineligible for a shared pier or shared dock and subject to other enforcement.

12. The maximum number of slips shall be two (2). The total overall size of a property owner's structure and slip areas shall not exceed 1,300 square feet. The square footage shall be calculated utilizing the structure, the open slip area and all existing upland improvements within the Project boundary but excluding the one six-foot wide walkway from the Project boundary to the dock as described in paragraph 9 above. Personal watercraft (PWC) lifts and ramps shall not be counted as slips but will be counted in the total square footage when calculating the size of the structure.

13. Enclosed storage areas may be permitted on docks but shall not exceed 72 square feet in size and shall be located on the lower level within twelve feet of the back of the dock as measured from the landward side, excluding the walkway. The storage area may be enclosed with siding or lattice or a combination of both in order to store accessories related to water-dependent recreation. Structures within the Project boundary shall not be used for human habitation and shall not be equipped with household fixtures such as kitchen equipment, sinks, showers, toilets, etc. The bulk storage of petroleum and chemical products is not permitted within the Project boundary, nor are sanitary sewer lines or drain fields allowed. Sinks, toilets, showers, etc. or any type of equipment or construction which will increase or cause any liquid or solid waste to be discharged into the waters of the lake will not be permitted. See Section 3.4 Nonconforming Structure Provisions for docks, piers, and similar structures constructed prior to December 27, 2011.

14. Barriers and partitions including but not limited to walls, knee walls, and bars shall not be added to the dock.

15. The maximum height of any dock structure shall not exceed 16 feet above the base elevation. For Claytor Lake the base elevation is considered to be 1846 feet above mean sea level. Cupolas are exempt from the height requirement. Additional roofs creating a second story are not allowed. See Section 3.3.2 for an exception to the 16-foot height restriction.

16. All fixed pier decking must be at least two feet above the full pond elevation of 1846 feet above mean sea level.

17. Two-inch minimum diameter white reflectors shall be affixed along the sides of the structure at intervals of six feet and within one foot of each of the two corners of the structure or pilings that are located farthest from the shoreline in order to identify the outline of the structure. Reflectors must be placed within two feet of the full pond elevation (1846-foot USGS level). See Figure 3. Docks extending from points of lands or peninsulas or located near the line of sight of aids to navigation shall have amber lighting in accordance with the USCG regulations.

18. Boat lifts and canvas boat lift covers suitable for installation in lieu of roofs are permitted for docks that are in compliance with the above specifications for new docks. Canvas boatlift covers can be no more than ten feet in height above the deck and can be used to cover the boat only.

19. Automatically or manually raising or retracting boat covers (as opposed to a cover attached solely to a boat) may be attached to a dock with a roof but may not extend out beyond the dock structure or roof to encroach the ¼ cove distance or exceed square footage requirements. Notwithstanding the foregoing, Appalachian reserves the right to prohibit such boat covers if they create a hazard (e.g., boat covers on a dock on a point lot or on the outside edge of a curve where view could be limited).

20. Any boat with a holding tank must comply with the Virginia Department of Health's Marina Regulations and the regulations of the Virginia Department of Environmental Quality.

21. The applicant must be the owner of or the Appalachian lessee of the tract of land immediately adjoining the 1850-foot contour elevation NGVD. Appalachian will hold the owner fully responsible for the permitted reservoir use (including maintaining structures in good repair). The occupancy and use permit is not an easement and does not automatically transfer to the new owner with the sale of the upland land. Upon the transfer of the upland land, the new owner(s) will be required to obtain a new occupancy and use permit in their name. (In the event that there is a lease of shoreline land by APCO, then a written assignment of that lease to the new owner is required.).

22. The dock owner shall sign an acknowledgement when obtaining his or her dock permit stating that water depths may not be adequate for accessing the lake during times of low inflow or drought or for natural conditions, siltation, or dense invasive species or for any other reason the reservoir is drawn down.

23. Appalachian reserves the right to limit the size, configuration, or location of any and all structures or not to allow construction in certain locations, if Appalachian deems it necessary to protect and enhance the scenic recreational and environmental values of the Project.

Low Density Multi-Use

1. The Project boundary for Claytor Lake is the 1850-foot contour NGVD, except in those areas defined by survey above or beyond the referenced contour elevation. These respective contours are hereafter referred to as the Project boundary.

2. All shoreline distances are measured at the 1846-foot contour NGVD for Claytor Lake. This contour elevation is also referred to as the base elevation. Verifying the location of the base elevation and all appropriate distances is the responsibility of the permit applicant.

3. All facilities must comply with all applicable local, state, and federal regulations. The applicant must obtain all necessary governmental permits or approvals, a FERC order (if applicable) and written authorization from Appalachian prior to beginning any activity/construction within the Project boundary. The facilities must meet the Commonwealth of Virginia Sanitary Regulations for Marinas and Boat Moorings. Restrooms and sewage holding tanks shall be located outside of the Project boundary.

4. All structures located within the 1850-foot contour elevation must be located within extended property lines or dock limitation lines and shall maintain a setback of at least 30 feet from either the extended property lines or the dock limitation lines. See Figure 4.

5. Docks shall not exceed a maximum of 1/4 cove width or 50 feet in length whichever is less, as measured from the base elevation (Figure 1). If a structure opposite the location is more than ¼ of the cove, then the two combined structures shall not exceed ½ of the cove width.

6. Docks shall not block, obstruct, or otherwise impede the line of vision between public aids to navigation or the visibility of public navigational aids and shall not encroach closer than thirty (30) feet to a lateral or non-lateral mark.

7. Structures located between the Project boundary and the base elevation shall be limited to a structure that provides access to the dock. This includes a stairway,

ramp or landing that connects the dock to the land. The maximum width of this structure shall be 6 feet.

8. A low-density multi-use dock shall be limited to no more than 2 slips per 100' of shoreline (as measured along the base elevation). These slips shall be grouped together to the greatest extent possible given restrictions based on other regulations.

9. If more than 1 structure exists on a property, the minimum fairway between groups of dock slips shall be 2 times the length of the adjacent slip. If the two structures contain slips of different sizes, the larger slip size shall be used to determine the fairway distance.

10. The maximum size of dock structures located within the base elevation shall be in accordance with the following table:

Number of slips	Square Footage allowed
1	500 square feet
Additional slips	325 square feet for a boat slip (personal watercraft are counted as square footage)

11. Slips shall be constructed in conjunction with the construction of residential units.

12. Enclosures on the dock are not allowed. A screened area is considered an enclosure.

13. Barriers and partitions including but not limited to walls, knee walls, and bars shall not be added to the dock.

14. The maximum height, as measured from the base elevation to highest point on the structure, shall be 16 feet. Cupolas are exempt from the height requirement. The boat dock may have a roof, but no additional roofs or roofed areas shall be allowed to create a second story.

15. Two-inch minimum diameter white reflectors shall be affixed along the sides of the structure at intervals of six feet and within one foot of each of the two corners of the structure or pilings that are located farthest from the shoreline in order to identify the outline of the structure. Reflectors must be placed within two feet of the full pond elevation (1846-foot USGS level). See Figure 3. Docks extending from points of lands or peninsulas or located near the line of sight of aids to navigation shall have amber lighting in accordance with the USCG regulations.

16. The applicant must be the owner of or the Appalachian lessee of the tract of land immediately adjoining the 1850-foot contour elevation NGVD. Appalachian will

hold the owner fully responsible for the permitted reservoir use (including maintaining structures in good repair). The occupancy and use permit is not an easement and does not automatically transfer to the new owner with the sale of the upland land. Upon the transfer of the upland land, the new owner(s) will be required to obtain a new occupancy and use permit in their name. (In the event that there is a lease of shoreline land by APCO, then a written assignment of that lease to the new owner is required.)

17. The dock owner shall sign an acknowledgement when obtaining his or her dock permit that water depths may not be adequate for accessing the lake during times of low inflow or drought or for any other reason the reservoir is drawn down.

Low Density Commercial

1. The Project boundary for Claytor Lake is the 1850-foot contour NGVD, except in those areas defined by survey above or beyond the referenced contour elevation. These respective contours are hereafter referred to as the Project boundary.

2. All shoreline distances are measured at the 1846-foot contour NGVD for Claytor Lake. This contour elevation is also referred to as the base elevation. Verifying the location of the base elevation and all appropriate distances is the responsibility of the permit applicant.

3. All facilities must comply with all applicable local, state, and federal regulations. The applicant must obtain all necessary governmental permits or approvals, a FERC order (if applicable) and written authorization from Appalachian prior to beginning any activity/construction within the Project boundary. The facilities must meet the Commonwealth of Virginia Sanitary Regulations for Marinas and Boat Moorings. Restrooms and sewage holding tanks shall be located outside of the Project boundary.

4. All structures located within the 1850-foot contour elevation must be located within extended property lines or dock limitation lines and shall maintain a setback of at least 30 feet from either the extended property lines or the dock limitation lines. See Figure 4.

5. Docks shall not exceed a maximum of 1/4 cove width or 50 feet in length, whichever is less, as measured from the base elevation (Figure 1). If a structure opposite the location is more than ¼ of the cove, then the two combined structures shall not exceed ½ of the cove width.

6. Docks shall not block, obstruct, or otherwise impede the line of vision between public aids to navigation or the visibility of public navigational aids and shall not encroach closer than thirty (30) feet to a public lateral or non-lateral mark.

7. Structures located between the Project boundary and the base elevation shall be limited to a structure that provides access to the dock. This includes a stairway, ramp or landing that connects the dock to the land. The maximum width of this structure shall be 6 feet.

8. A low-density commercial dock shall be limited to no more than 2 slips per 100' of shoreline (as measured at the base elevation). The dock shall be constructed perpendicular to the shoreline and the slips shall be grouped together to the greatest extent possible given restrictions based on other regulations.

9. The maximum size of dock structures located within the base elevation shall be in accordance with the following table:

Number of slips	Square Footage allowed
1	500 square feet
Additional slips	325 square feet for a boat slip (personal watercraft to be counted as square footage)

10. One enclosure per service dock measuring not more than 48 square feet (inside dimensions) shall be allowed.

11. Barriers and partitions including but not limited to walls, knee walls, and bars shall not be added to the dock.

12. The maximum height, as measured from the base elevation to highest point on the structure, shall be 16 feet for a structure with a pitched roof. Cupolas are exempt from the height requirement. The boat dock may have a roof but no additional roofs or roofed areas shall be allowed to create a second story.

13. Two-inch minimum diameter white reflectors shall be affixed along the sides of the structure at intervals of six feet and within one foot of each of the two corners of the structure or pilings that are located farthest from the shoreline in order to identify the outline of the structure. Reflectors must be placed within two feet of the full pond elevation (1846-foot USGS level). See Figure 3. Docks extending from points of lands or peninsulas or located near the line of sight of aids to navigation shall have amber lighting in accordance with the USCG regulations.

14. The applicant must be the owner of or the Appalachian lessee of the tract of land immediately adjoining the 1850-foot contour elevation NGVD. Appalachian will hold the owner fully responsible for the permitted reservoir use (including maintaining structures in good repair). The occupancy and use permit is not an easement and does not automatically transfer to the new owner with the sale of the upland land. Upon the transfer of the upland land, the new owner(s) will be required to obtain a new occupancy and use permit in their name. (In the event

that there is a lease of shoreline land by APCO, then a written assignment of that lease to the new owner is required.)

15. The dock owners shall sign an acknowledgement when obtaining his or her dock permit stating that water depths may not be adequate for accessing the lake during times of low inflow or drought or for any other reason the reservoir is drawn down.

Low Density Public Use

Multi-slip docks

1. The Project boundary for Claytor Lake is the 1850-foot contour NGVD, except in those areas defined by survey above or beyond the referenced contour elevation.

2. All shoreline distances are measured at the 1846-foot contour NGVD for Claytor Lake. This contour elevation is also referred to as the base elevation. Verifying the location of the base elevation and all appropriate distances is the responsibility of the permit applicant.

3. All facilities must comply with all applicable local, state, and federal regulations. The applicant must obtain all necessary governmental permits or approvals, a FERC order (if applicable) and written authorization from Appalachian prior to beginning any activity/construction within the Project boundary. The facilities must meet the Commonwealth of Virginia Sanitary Regulations for Marinas and Boat Moorings. Restrooms and sewage holding tanks shall be located outside of the Project boundary.

4. All applicants must consider ADA standards and ADAAG recreation facility guidelines. Applicants must adhere to any applicable laws and regulations.

5. All structures located within the 1850-foot contour elevation must be located within extended property lines or dock limitation lines and shall maintain a setback of at least 30 feet from either the extended property lines or the dock limitation lines. See Figure 4.

6. The docks shall not exceed a maximum of 1/4 cove width or 50 feet in length, whichever is less, as measured from the base elevations (Figure 1). If a structure opposite the location is more than ¼ of the cove, then the two combined structures shall not exceed ½ of the cove width.

7. Docks shall not block, obstruct or otherwise impede the line of vision between public aids to navigation or the visibility of public navigational aids and shall not encroach closer than thirty (30) feet to a lateral or non-lateral mark.

8. Structures located between the Project boundary and the base elevation shall be limited to a structure that provides access to the dock. This includes a stairway, ramp or landing that connects the dock to the land. The maximum width of this structure shall be 6 feet.

9. A low-density public use dock shall be limited to no more than 2 slips per 100' of shoreline. The dock shall be constructed perpendicular to the shoreline and the slips shall be grouped together to the greatest extent possible given restrictions based on other regulations.

10. The minimum fairway between groups of dock slips or ramps shall be 2 times the length of the adjacent slip. If the two structures contain slips of different sizes, the larger slip size shall be used to determine the fairway distance.

11. The maximum size of dock structures located within the base elevation shall be in accordance with the following table:

Number of slips	**Square Footage allowed**
1	500 square feet
Additional slips	325 square feet for a boat slip (personal watercraft will count as square footage)

12. Permittees are allowed 1 enclosure per service dock that may measure a maximum of 48 square feet inside dimensions. A screened area is considered an enclosure.

13. Barriers and partitions including but not limited to walls, knee walls, and bars shall not be added to the dock.

14. Only floating docks or uncovered piers shall be considered for public use areas with the exception of a service dock enclosure which may have a roof but no additional roofs creating a second story.

15. Two-inch minimum diameter white reflectors shall be affixed along the sides of the structure at intervals of six feet and within one foot of each of the two corners of the structure or pilings that are located farthest from the shoreline in order to identify the outline of the structure. Reflectors must be placed within two feet of the full pond elevation (1846-foot USGS level). See Figure 3. Docks extending from points of lands or peninsulas or located near the line of sight of aids to navigation shall have amber lighting in accordance with the USCG regulations.

16. The applicant must be the owner of or the Appalachian lessee of the tract of land immediately adjoining the 1850-foot contour elevation NGVD. Appalachian will hold the owner fully responsible for the permitted reservoir use (including maintaining structures in good repair). The occupancy and use permit is not an

easement and does not automatically transfer to the new owner with the sale of the upland land. Upon the transfer of the upland land, the new owner(s) will be required to obtain a new occupancy and use permit in their name. (In the event that there is a lease of shoreline land by APCO, then a written assignment of that lease to the new owner is required.)

17. The dock owner will sign an acknowledgement when obtaining his or her dock permit stating that water depths may not be adequate for accessing the lake during times of low inflow or drought or for any other reason the reservoir is drawn down.

Courtesy Pier

1. The Project boundary for Claytor Lake is the 1850-foot contour NGVD, except in those areas defined by survey above or beyond the referenced contour elevation.

2. All shoreline distances are measured at the 1846-foot contour NGVD for Claytor Lake. This contour elevation is also referred to as the base elevation. Verifying the location of the base elevation and all appropriate distances is the responsibility of the permit applicant.

3. All facilities must comply with all applicable local, state, and federal regulations. The applicant must obtain all necessary governmental permits or approvals, a FERC order (if applicable) and written authorization from Appalachian prior to beginning any activity/construction within the Project boundary. The facilities must meet the Commonwealth of Virginia Sanitary Regulations for Marinas and Boat Moorings. Restrooms and sewage holding tanks shall be located outside of the Project boundary.

4. All applicants must consider ADA standards and ADAAG recreation facility guidelines. Applicants must adhere to any applicable laws and regulations.

5. All structures located within the 1850-foot contour elevation must be located within extended property lines or dock limitation lines and shall maintain a setback of at least 30 feet from either the extended property lines or the dock limitation lines. See Figure 4.

6. Courtesy piers shall not exceed a maximum of 1/4 cove width or 50 feet in length, whichever is less, as measured from the base elevation. If a structure opposite the location is more than ¼ of the cove, then the two combined structures shall not exceed ½ of the cove width.

7. Piers shall not block, obstruct, or otherwise impede the line of vision between public aids to navigation or the visibility of public navigational aids and shall not encroach closer than thirty (30) feet to a lateral or non-lateral mark.

8. Structures located between the Project boundary and the base elevation shall be limited to a structure that provides access to the dock. This includes a stairway, ramp or landing that connects the dock to the land. The maximum width of this structure shall be 12 feet.

9. The minimum fairway between groups of dock slips or ramps shall be 2 times the length of the adjacent slip. If the two structures contain slips of different sizes, the larger slip size shall be used to determine the fairway distance.

10. No enclosures shall be allowed on the courtesy pier. A screened area is considered an enclosure.

11. The courtesy pier shall be uncovered.

12. Two-inch minimum diameter white reflectors shall be affixed along the sides of the structure at intervals of six feet and within one foot of each of the two corners of the structure or pilings that are located farthest from the shoreline in order to identify the outline of the structure. Reflectors must be placed within two feet of the full pond elevation (1846-foot USGS level). See Figure 3. Docks extending from points of lands or peninsulas or located near the line of sight of aids to navigation shall have amber lighting in accordance with the USCG regulations.

13. Ramps are allowed in low density public use areas for public service uses only.

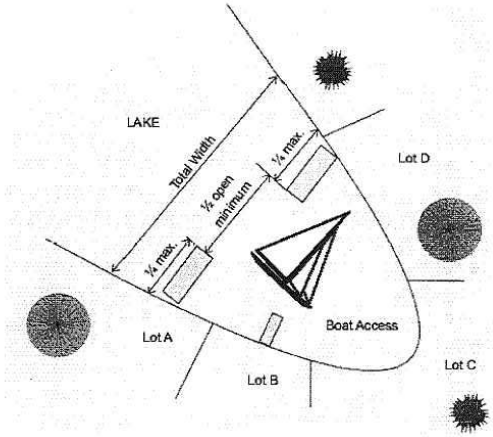
14. The applicant must be the owner of or the Appalachian lessee of the tract of land immediately adjoining the 1850-foot contour elevation NGVD. Appalachian will hold the owner fully responsible for the permitted reservoir use (including maintaining structures in good repair). The occupancy and use permit is not an easement and does not automatically transfer to the new owner with the sale of the upland land. Upon the transfer of the upland land, the new owner(s) will be required to obtain a new occupancy and use permit in their name. (In the event that there is a lease of shoreline land by APCO, then a written assignment of that lease to the new owner is required.)

15. The pier owner shall sign an acknowledgement when obtaining his or her dock permit that water depths may not be adequate for accessing the lake during times of low inflow or drought or for any other reason the reservoir is drawn down.

¼ Channel Requirement

OPEN CHANNEL REQUIREMENTS

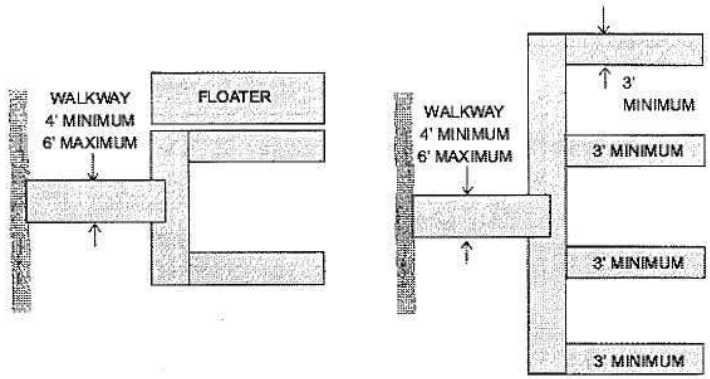
Figure 1



DRAWING NOT TO SCALE

Walkway Widths

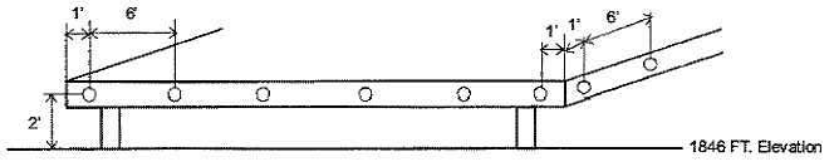
WALKWAY WIDTH REQUIREMENTS
Figure 2



DRAWING NOT TO SCALE

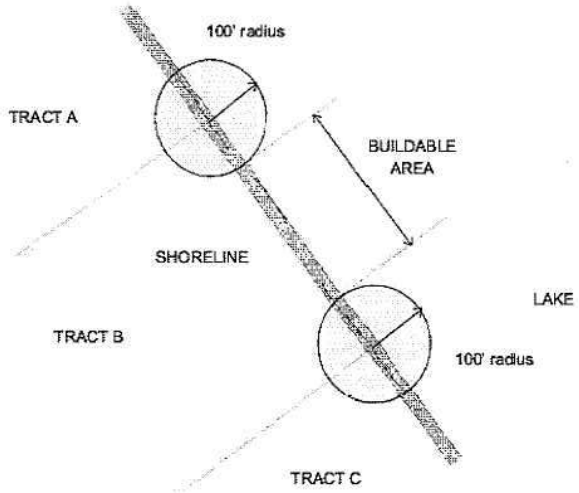
Reflector Placement

REFLECTOR PLACEMENT ON DOCKS
Figure 3



Commercial Setbacks

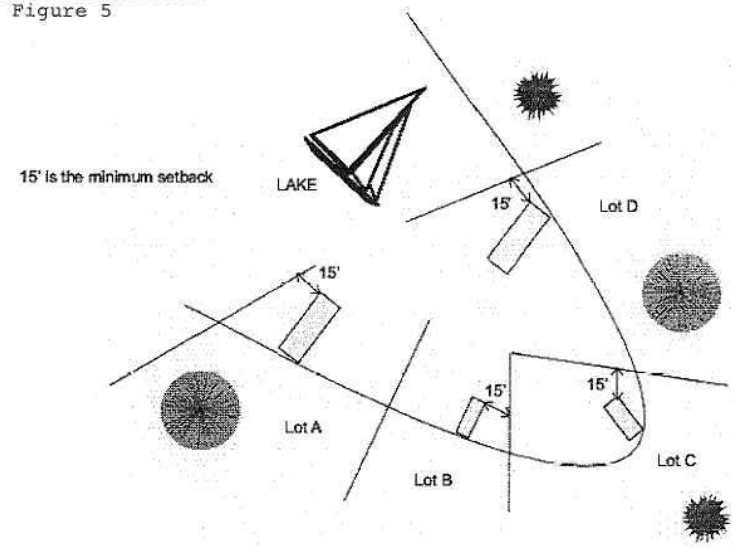
MAXIMUM POTENTIAL BUILDABLE AREA FOR COMMERCIAL FACILITIES
Figure 4



DRAWING NOT TO SCALE

Extended property lines and 15’ setback

EXTENDED LOT LINES AND SETBACKS
PRIVATE DOCK FACILITIES
Figure 5



DRAWING NOT TO SCALE

2.5.5 Impact Minimization Zone

Shoreline areas with important resources have been identified. Development within the Impact Minimization Zone (IMZ) shoreline classification must be carefully considered to ensure protection of the important resources. Individuals who wish to build any structures, conduct land disturbance, or stabilize the shoreline within the Project boundary classified as IMZ must contact Appalachian to determine the type of resource present and make application for the structure and to mitigate for the resource. Upon receipt of an acceptable application, Appalachian will contact resource agencies for comment on the application. Such agencies will have 30 days to comment or request an extension to provide comments. Once comments are received and addressed, Appalachian will either grant permission or provide a notice to the applicant denying the request. Additional permits may be required from local, state, and federal permitting authorities.

Table 2.5.5-1 IMZ Mitigation Requirements

IMZ Parameters	Mitigation
Fringed Mountain Snail Habitat	Conduct a survey as approved by the USFWS, VDWR, and the VDCR's Division of Natural Heritage to ensure no presence of or impacts to the Fringed Mountain Snail and document VDWR concurrence.
Bald Eagle Habitat	Ensure no active sites or protection of any existing sites and document VDWR concurrence.
Cultural Resource Sites	VA SHPO concurrence as evidenced by a letter from the VA SHPO approving ground-disturbing activity.
Littoral Habitat	Develop a plan to retain the littoral habitat and document VDWR concurrence. Consult with Pulaski County.
Downstream of the Dam	Develop a plan to retain the vegetation, protect nearby bald eagle habitat, obtain additional information, as required, such as velocity studies and document VDWR, VDCR and VMRC concurrence.
Scenic Areas	Develop a plan to protect the scenic nature of the property including concurrence with the guidelines set forth in the Claytor Lake Scenery Assessment (2009) and document VDWR and VDCR concurrence. Consult with Pulaski County.
Unique Natural Features of the Claytor Project	Develop a plan to protect the shoreline and unique natural features. Document VDWR and VDCR concurrence. Consult with

	Pulaski County.
Narrow Coves	For existing unsubdivided properties, develop a plan to ensure access, navigation, safety, and protect the backs of cove for access. Document VDWR and VDCR concurrence. Consult with Pulaski County.
No adjacent upland use other than a Highway Right of Way	Develop a plan to ensure protection of shoreline and document VDWR, VDOT, VDCR and Pulaski County concurrence.
Undeveloped Islands	Develop a plan to protect the land within the Project boundary of these islands including the planting of non-deciduous vegetation and document VDWR, VDCR, VDH and Pulaski County concurrence with the plan.

2.5.6 Shoreline Stabilization Regulations

Vegetative planting, bioengineering techniques and hard armoring or structural systems are common methods of erosion control methods. Vegetative planting and bioengineering techniques are encouraged and will be preferentially considered under the appropriate environmental setting. Each technique may be used separately or in combination with one another. All methods are to be constructed and located according to the specifications listed below. Property owners are cautioned that the water levels can fluctuate within the following limits: For Claytor Lake the full pond or base elevation is to be considered 1846 feet above mean sea level. Maximum pool elevation is 1847 feet above mean sea level. Maximum drawdown is 1820.7 feet above mean sea level. Reservoir elevations are measured at the dam.

Any necessary local, state, or federal permits must be obtained prior to the commencement of any work. The Virginia Department of Environmental Quality requires that local governments have erosion and sediment control programs. Local governments issue land disturbing permits after approving applicant's sediment and erosion control plans.

1. Prior to beginning any activity/construction within the Project boundary, the applicant must ensure that all erosion control structures comply with the appropriate local, state, and federal codes and subdivision covenants and any other specifications set forth by Appalachian.

2. Prior to construction, Department of the Army (DA) authorization from the U.S. Army Corps of Engineers, Norfolk District, may be required for certain activities conducted within waters of the U.S. Specifically, a DA permit is required if the proposed activity involves a discharge of dredged and/or fill material into a water of

the U.S., including wetlands, pursuant to Section 404 of the Clean Water Act (CWA) and/or if the proposed project involves any activity over, under, or within Claytor Lake, pursuant to Section 10 of the Rivers and Harbors Act of 1899 (RHA).

3. If existing vegetation is sufficient to control erosion and the shoreline is not actively eroding, the existing erosion shall remain in place.

4. The planting of native vegetation shall be utilized to control erosion, if at all possible, and can be used to reduce the force of water against a shoreline. The use of native vegetation enhances the scenic and environmental attributes of the Project and should be the first option considered for any shoreline erosion project.

5. If the planting of native vegetation can not control erosion, then bioengineering techniques shall be investigated and utilized, if possible. See Appendix E for examples of bioengineering techniques.

6. Shoreline stabilization will only be permitted in areas with active erosion, and no material is to be placed in excess of the minimum needed for erosion control.

7. Shoreline stabilization is generally not permitted in Conservation/Environmental areas. However, if there is active erosion, Appalachian will consider a request for an exception. See Section 3.3.2

8. Sand beaches are prohibited, except for public use areas.

9. Existing beaches may be maintained, but not expanded. No placement of sand is permitted below the 1846-foot contour elevation. If it is determined that the sand has caused a decrease in the depth of water in the adjacent shoreline area, the beach owner may be required to remove the beach material from within the project boundary.

10. No part of the proposed stabilization may cross the property lines as projected into Project lands and into the water. If an extended lot line does not affect fair division of the shoreline with an adjoining neighbor, then the two property owners can mutually agree in a written document to a revised extended lot line. Such agreement shall be included in the application to Appalachian.

11. All erosion control structures, are to be constructed so as not to adversely effect the shoreline contours or slopes of lands owned by Appalachian or adjoining lot owner, nor cause excessive diversion of storm water runoff onto adjoining lots.

12. Erosion control structures that are properly designed and constructed may be allowed to extend farther channelward of the base elevation. Permits from the ACOE and the VDEQ may be required. Riprap must be placed at the base of bulkheads, for the purpose of providing aquatic habitat.

13. Structures made of tires, rubble, scrap machinery, tree trunks or limbs (unless part of an approved bioengineering method), guard rail, Styrofoam products, masonry block, creosote railroad ties, landscaping timbers or similar materials are not considered erosion control structures and are not allowed within the Project boundary of Claytor Lake.

14. All fill material for erosion control structures must be obtained from an upland source, be appropriately sized sediment e.g., sandy soil or other material that allows for good drainage, confined landward of the structure, and be clean, free of debris.

15. No excavation or fill is permitted except for that specifically required for the installation of erosion control structures. The containment of sloughing areas will be allowed to minimize the collapse of bank areas and will be permitted by Appalachian on a case-by-case basis.

16. All excavated material shall be placed landward of the Project boundary elevation contour (1850 contour) on high ground and confined by adequate dikes or other retaining structures to prevent erosion and sedimentation into adjacent waters or wetlands. Excavation within vegetated wetlands is not authorized.

17. The applicant must be the owner of or the Appalachian lessee of the tract of land immediately adjoining the 1850-foot contour elevation. Appalachian will hold the owner fully responsible for the permitted reservoir use (including maintaining the structures in good repair).

18. All authorized erosion control structures must be maintained to ensure the integrity of the permitted structure. The permittee will not hold Appalachian liable for damage.

19. Alternative methods and materials may be considered. Cross section drawings must be submitted, and the VDCR shall be consulted.

20. Retaining walls emanating from Project lands are generally not allowed. However, retaining walls between the 1846- and 1850-foot contour elevations adjacent to shorelines may be considered. See Section 3.3 for additional information.

21. Since every possible situation cannot be anticipated, Appalachian reserves the right to make special rulings in cases not specifically covered by these specifications.

22. Additional resources include the USDA's *Engineering Field Handbook: Chapter 16 Streambank and Shoreline Protection* and the ACOE's *Reservoir Shoreline Erosion and Control.*

2.5.6.1 Riprap Specifications

The following specifications for riprap were developed in consultation with the VDCR.

1. Riprap shall be placed at a maximum of 2:1 (horizontal/vertical) slope for the final grade. If riprap is proposed to be placed at a slope greater than 2:1, VDCR's Shoreline Advisory Service shall review the shoreline erosion plan and their recommendations shall be provided to Appalachian in writing.

2. A minimum of two layers of armor rock should be used. (Note: armor rock is not a type of rock from the quarry. Armor rock is the title given to the top two layers of the structure sized to withstand wave or current impacts.) See Figure 6.

3. The armor rock shall weigh a minimum Class II (150-500 pounds) for properties on the portion of the main channel from the dam southwest to the bend in the river at the State Park. The armor rock shall be a minimum Class I (50-150 pounds) for the remainder of the main channel. Class I rock may be used in coves. (Please note that these classifications were developed based on wind speed and direction and water depth.)

4. The toe of the riprap shall be buried a minimum of two feet below the normal low pool elevation for Class II riprap and one foot for Class I riprap. (Note: The depth of toe is based on the expected scour from waves or currents. For example, a wave height of two feet would mean a buried toe depth of two feet below the normal low pool elevation.) If bedrock is less than the depth of toe, there is no need to go deeper.

5. An alternative to the buried toe is a riprap apron. The apron consists of two layers of armor rock placed at the channelward end of the base structure extending a minimum of four feet onto the bottom when used with Class II riprap and two feet onto the bottom when used with Class I or IA (50 pounds) riprap.

6. A layer of filter cloth shall be placed under and behind the riprap. The filter cloth shall be stabilized to prevent damage from sunlight. (Note: Woven filter cloth is recommended.) The openings of the filter cloth should be sized to prevent sediment loss through the fabric.

7. The riprap structure should be extended inland or properly connected to neighboring structures to prevent erosional flanking.

8. Jetties are prohibited.

2.5.6.2 Design Standards for Bulkheads

The following standards for bulkheads were developed in consultation with the VDCR.

1. Bulkheads may be allowed as a last resort to control erosion when a 2:1 (horizontal/vertical) slope cannot be practicably achieved or when riprap will reduce the navigable waterway or impact shallow water habitat.

2. No new bulkheads will be authorized where eroded banks are less than 3 feet high. See Section 3.3.2for an exception to the 3-foot limitation.

3. The length of the fender pile or sheet pile buried below the lake bottom shall be equal to or greater than the height above the lake bottom. (Note: depth of penetration site specific depending upon location. If the depth of penetration of the fender or sheet pile in the lake bottom is less than the height above the lake bottom, the contractor shall be required to notify the property owner in writing. Further, the property owner will be required to maintain the existing bulkhead and not expand into the Project boundary for a minimum of 25 years from the date of installation so that encroachments into the reservoir are minimized. Bulkheads may be removed at any time and replaced with riprap or other appropriate erosion control provided the appropriate permits are obtained.) See Figure 7.

4. Tongue-and-grove, shiplap or Wakefield lap construction shall be used.

5. All horizontal walers (stringers) shall be anchored to the fender piles with galvanized bolts. Walers shall be connected by lapping and bolting at fender piles. All hardware used in the structure should be galvanized.

6. A layer of filter cloth shall be placed against the sheet pile before backfilling. The filter cloth shall be stabilized against the sunlight and sized for the soils used as backfill.

7. The bulkhead shall be anchored to the bank by a tieback system. Galvanized rods and anchor piles usually compose the tieback system. To be effective, the anchorage system shall be located behind the loading, internal soil friction angle, of the wall.

8. Deadman crossbeams bolted to the anchor piles shall increase anchorage strength. It is very important to compact the fill over the deadman and anchor pile against backfilling against the bulkhead.

9. The backfill shall be a clean, good quality, sandy soil.

10. A vegetative cover shall be established behind the bulkhead after backfilling and grading.

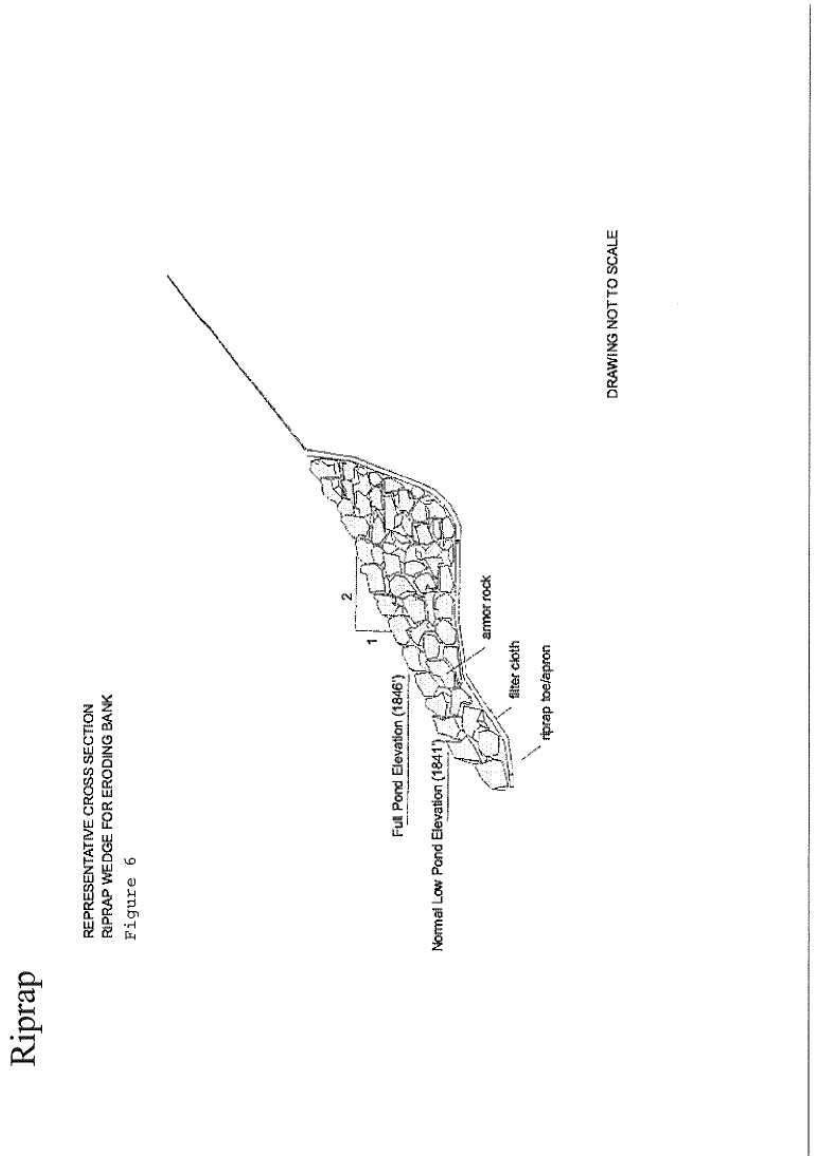
11. The bulkhead shall be extended inland or properly connected to neighboring structures to prevent erosional flanking.

12. Riprap shall be placed at the toe of the bulkhead to help prevent scouring and dissipate wave action as well as to improve shallow water habitat.

Caution

There are areas of the lake where alternative methods of shoreline stabilization will be considered on a case-by-case basis because of environmental considerations, development patterns, physical lake characteristics or other reasons.

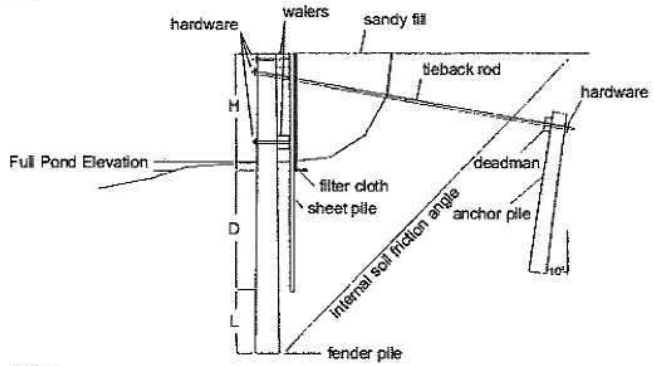
There are structures and improvements that existed prior to Appalachian initiating the revised regulations on December 27, 2011, which may not be compatible with the requirements as contained herein. These structures may be maintained though their use does not conform to the regulations contained herein. When it becomes necessary to replace a non-complying structure, the new structure must comply with the regulations in effect at the time of replacement.



Bulkheads

REPRESENTATIVE CROSS SECTION BULKHEAD

Figure 7



NOTES

H = Height of sheet pile above full pond elevation	a. All Hardware (bolts, nuts, washers, etc.) shall be galvanized.
D = Depth of sheet pile below normal low pond elevation (D should be equal to or greater the H)	b. Large end of all piles should go into ground.
L = Represents the difference in length between the sheet and fender piles (minimum of 2 to 4 feet)	c. All wood should be pressure-treated to a minimum of 1.0 lbs/3 ft. of CCA.
	d. In general, the length of the tieback rod should be equal to or greater than the length of the sheet pile.
	e. Filter cloth should extend to at least normal low pool.
	f. Fill should be free of debris and a good quality, sand soil.

DRAWING NOT TO SCALE

2.5.7 Dredging and/or Excavation Restrictions

Federal agencies and state departments can impose restrictions and/or require permits for dredging activities within the Project boundary. The ACOE is the federal agency responsible for overseeing these types of activities and/or the placement of fill and/or dredged materials in the waterway and/or wetlands through the issuance of a Section 10 Permit (Rivers and Harbor Act of 1899) or a Section 404 Permit (Clean Water Act), which is intended to protect navigable waterways and wetlands. VDEQ is the state department responsible for overseeing these activities. VDEQ often works in conjunction with the ACOE but may act separately from the federal agency when determining the need for a permit. Application is made through the ACOE and VDEQ Standard Joint Permit Application process for concurrent federal and state project review. This application will be forwarded to the VDH and the VDWR for review.

Dredging restrictions that apply within the Project boundary include:

1. Prior to dredging, Department of the Army (DA) authorization from the U.S. Army Corps of Engineers, Norfolk District, may be required for certain activities conducted within waters of the U.S. Specifically, a DA permit is required if the proposed activity involves a discharge of dredged and/or fill material into a water of the U.S., including wetlands, pursuant to Section 404 of the Clean Water Act (CWA) and/or if the proposed project involves any activity over, under, or within Claytor Lake, pursuant to Section 10 of the Rivers and Harbors Act of 1899 (RHA).

2. In addition to federal and state permits, dredging less than 25 cubic yards requires notification to Appalachian 10 working days prior to commencement of all maintenance dredging within an existing fairway or an existing boat slip. Dredging more than 25 cubic yards requires prior Appalachian permission. A pre-application site visit is recommended prior to the submission of the application.

3. Dredging and/or excavation of all vegetated wetland areas is prohibited.

4. Dredging and/or excavation near any wetland areas requires sufficient buffers to insure no adverse impacts to those areas.

5. Dredging and/or excavation between contour elevations 1844 and 1846 is prohibited in order to protect shallow water habitat unless VDWR determines that dredging will not impact shallow water habitat. Such determination shall be provided to Appalachian in writing.

6. Only accumulated sediment may be removed, and the original lake bottom may not be disturbed.

7. Dredging and/or excavation may not be performed between March 1 and July 31 of each year in order to protect fish spawning, pistolgrip mussel spawning and glochidia release.

8. Dredged and/or excavated material must be deposited outside the Project boundary in an upland site to conform to all federal, state, and local regulations. Sidecasting dredged material is construed to be a form of fill and is unauthorized.

9. Dredging and or excavation requiring ACOE and/or VDEQ approval must also be approved by Appalachian. Applications for an Appalachian permit must also include any additional required permits.

2.5.8 Excavation and Filling Restrictions

Excavating (including digging, scooping, or any other method of removing earth material) between the base elevation and Project boundary is prohibited with the exception of only the minimal amounts of excavation necessary for the proper design and installation of an erosion control structure, approved boat ramp or other approved structure. A County erosion and sediment control permit may be required. Authorizations may also be required from other local, state, and federal resource protection agencies.

Filling (including the depositing or stockpiling of material) within the Project boundary is prohibited with the exception of only the minimal amounts of fill necessary for the proper design and installation of an erosion control structure. All fill material, including riprap, must be free of pollutants. A county erosion and sediment control permit may be required. Authorizations may also be required from other local, state, and federal resource protection agencies.

Sand is considered fill and sand beaches are prohibited except in Public Use areas.

Authorizations may also be required from other local, state, and federal resource protection agencies.

2.5.9 Vegetative Cover Regulations[2]

Vegetative buffers are complex ecological systems that serve as transition zones between surface waters and upland areas. Vegetation enhances the aesthetic qualities of the lake, provides habitat for a wide variety of native species, reduces the speed and volume of stormwaters and floodwaters, and filters nutrients entering the waterbody.

[2] Commonwealth of Virginia Chesapeake Bay Local Assistance Department Draft Riparian Buffer Guidance Manual (Revised 2006)

In addition to hydroelectric power generation, the lake is used for recreation and water consumption. These regulations are intended to provide adjacent landowners the opportunity to use property within the Project boundary appropriately, while protecting the aesthetic and environmental characteristics and water quality of the lake. Vegetation within the Project boundary is a key component of each of these values.

Clearing shorelines and shallow waters of aquatic and terrestrial vegetation is discouraged. Wildlife benefit from shoreline vegetation by gaining additional cover and feeding habitat, particularly in the floodplain and riparian zones, and along areas of more gradual topography. Many fish species, including important game fish, use aquatic beds as spawning, nursery, and feeding habitat. A multi-tiered buffer consisting of mature canopy, understory trees, understory shrubs, and groundcover should be a goal for all shoreline. However, this model is not always achievable. The removal of wetland vegetation is prohibited.

Vegetation within the Project boundary must be preserved if present. Ground disturbing activities in this area must be minimal in order to maintain the function of the buffer. A property owner may apply for a permit proposing to modify the existing vegetative cover for the following reasons:

1) Provide for reasonable view of the water
2) Construct access paths to the shoreline and/or dock
3) Construct erosion control measures along the shoreline
4) General maintenance to the vegetated area

However, the function of the buffer must be replaced. Individuals shall be required to plant or pay for the planting of vegetative materials within the Project boundary in the event that vegetation is removed without a permit.

The VDEQ encourages a strict buffer policy for water quality reasons. Any vegetation removal in wetland, stream, or open water areas may require a Virginia Water Protection permit, especially if disturbance of the ground surface occurs (e.g., grubbing stumps).

Noxious vegetation may be of concern when attempting to establish a natural multi-tiered buffer. Noxious vegetation encompasses any invasive species which has become physically harmful to the health and survivability of the vegetative buffer. If the specimen does not alter the existing ecosystem, adds rather than decreases biodiversity, or does not change the change the density of existing vegetation, removal may not be necessary.

Unacceptable practices include clear-cutting any area, the removal of a complete trophic layer, the removal or disturbance of groundcover, and conversion of groundcover plants or leaf litter to lawn.

Trees may be limbed, and shrubs may be pruned (but not topped), provided the health of the specimen is maintained. No more than 25% of any plant may be removed at one time to assure plant survivability.

1) Provide for reasonable view of the water

Minor modifications may be allowed to the vegetation within the Project boundary to provide a filtered view of the water. Any modifications made must not impair the overall function of the vegetated buffer. If vegetated buffer function will be impaired, a plan for replacement plantings will be considered.

Trees and shrubs may be candidates for removal in order to provide a view of the water.

If Appalachian determines that the function of the vegetative buffer, inclusive of all trophic layers, will be impaired by the vegetative material removed, those specimen shall be replaced with native vegetation as detailed in Table 2.5-10-1 in order to maintain the overall function of the buffer and to retain a multi-tiered buffer consisting of mature canopy, understory trees, understory shrubs, and groundcover The trees or shrubs that are removed shall be replaced with native plants.

In multi-family developments, each unit should not expect a view of the water if it requires the removal of vegetation. A filtered view of the water should be provided from a common area instead.

Table 2.5.9-1. Vegetation Replacement Rates

Vegetation to be Removed	**Preferred Replacement Vegetation**	**Acceptable Alternative Vegetation**
1 sapling or tree 1"- 4" as measured at diameter at breast height (DBH)	1 tree @ equal caliper or greater	Or 1 large shrub @ 3'-4' in width Or 3 small shrubs or woody groundcover *@ 15"-18"in width
1 tree ≥ 4" as measured at DBH	1 tree @ 1 3/4" - 2" caliper per every 4" caliper of tree removed (Ex: a 16" cal. tree would require 4 trees to replace it)	Or 75% trees @ 1 3/4" - 2" and 25% shrubs per every 4" caliper of tree removed. (Ex: an 16" cal. tree removed would require 3 trees and 1 large shrub) Or 3 trees and 3 small shrubs or woody groundcover @ 15"-18" in width per 4" caliper of tree removed
1 large shrub	1 large shrub @ 3'-4' in width	Or 3 small shrubs or woody groundcover @ 15"-18" in width
* Woody groundcover is considered to be a woody, spreading shrub that remains close to the ground, to 18" high. Vines may not be considered "woody groundcover" for the		

purpose of vegetation replacement.

2) Construct Access Paths to the Shoreline and/or Dock

Minor modifications are allowed to the vegetation within the Project boundary to provide access to the shoreline and/or dock. Any modifications made must not impair the overall function of the vegetated buffer. If the vegetated buffer function will be impaired, a plan for replacement plantings will be considered.

Trees and shrubs may be candidates for removal in order to construct access paths. If Appalachian determines that the function of the vegetative buffer, inclusive of all trophic layers, will be impaired by the vegetative material removed, those specimens shall be replaced with native vegetation as detailed in Table 2.5-10-1 in order to maintain the overall function of the buffer and to retain a multi-tiered buffer consisting of mature canopy, understory trees, understory shrubs, and groundcover.

To minimize the impairment to the overall function of the vegetative buffer and to minimize erosion on the access path, vegetation or additional mulch should be used to cover the exposed soil. If paving material is needed, gravel, steppingstones, or other permeable material shall be used. Three or four inches of mulch is the preferred method. It is less expensive, can readily be replaced and holds water. It also adds to the ability for the buffer to remove nitrogen.

3) Construct erosion control measures along the shoreline

Minor modifications are allowed to the vegetation within the Project boundary in order to construct erosion control measures along the shoreline. Any modifications made must not impair the overall function of the vegetated buffer. If vegetated buffer function will be impaired or diminished, a plan for replacement plantings will be considered.

Trees and shrubs may be candidates for removal in order to construct erosion control measures. If Appalachian determines that the function of the vegetative buffer, inclusive of all trophic layers, will be impaired by the vegetative material removed, those specimens shall be replaced with native vegetation as detailed in Table 2.5-10-1 in order to maintain the overall function of the buffer and to retain a multi-tiered buffer consisting of mature canopy, understory trees, understory shrubs, and groundcover. If only one or two of the trophic layers exist prior to any vegetation removal, then the function of that buffer may be retained. However, Appalachian encourages adjacent property owners to create a multi-tiered buffer consisting of mature canopy, understory trees, understory shrubs, and groundcover.

Vegetation on steep slopes should be maintained in order to help stabilize the bank and prevent erosion. Removal of trees on a steep slope can increase the probability of a slope failure.

4) General maintenance to the vegetated area

Minor modifications are allowed to the vegetation within the Project boundary in order to keep the vegetation healthy and ensure the buffer functions properly.

If all trophic layers exist within the Project boundary and the function of the buffer is not impaired, then Appalachian may waive the replacement requirement. If the adjacent property owner is unable to replace the vegetation in accordance with Table.2.5.10-1, Vegetation Replacement Rates, then Appalachian will consider an alternative mitigation plan. Such plan shall be prepared by qualified landscape designer and be forwarded to state agencies for review and comment to ensure adequate replacement of the vegetative buffer and its function.

Dead, diseased, or dying trees or shrubbery may be candidates for removal. If Appalachian determines that the function of the vegetative buffer, inclusive of all trophic layers, will be impaired by the vegetative material removed, those specimen shall be replaced with native vegetation at half the rate as a live tree that is removed and whose replacement rate is detailed in Table 2.5-10-1 in order to maintain the overall function of the buffer and to retain a multi-tiered buffer consisting of mature canopy, understory trees, understory shrubs, and groundcover.

Existing lawns may be maintained. However, property owners are encouraged to plant native vegetation to develop all trophic layers, thus improving the function of the vegetative buffer.

A permit for removal of non-native, invasive species within the 1846 and the 1850 contours is not required. In the case of removal, Appalachian shall be notified prior to the vegetation removal so an inspection can be completed.

2.5.10 Fallen Trees Regulations

Fallen trees are trees and woody material that extend from the shoreline into the lake with the roots of the trees still attached or resting upon the shoreline. The fallen trees provide important habitat for fish and wildlife and shall be protected. The removal of existing submerged woody debris from the lake is discouraged unless such debris constitutes a navigational or public safety hazard. In the placement and construction of new docks, the removal of fallen trees should be minimized. Applicants for shoreline development will be required to mitigate for the removal of fallen trees from the lake. Mitigation may include bundling and sinking woody debris provided there are sufficient water depths and the debris would not constitute a navigational hazard. In lieu of bundling and sinking, property owners installing riprap may temporarily relocate fallen trees to install riprap and then relocate them to their original location. The amount of woody debris to be bundled and sunk may be reduced provided VDWR concurrence is obtained.

2.5.11 Restoration

A site may be considered for restoration when substantial amount of vegetative material has been removed without prior permission from Appalachian.

For every 400 square-foot unit (20'x20') or a fraction thereof, plant:

- One (1) canopy tree @ 1 ½ to 2" caliper
- Two (2) understory trees @ ¾" to 1 ½" caliper
    - Or one (1) understory tree and two (2) large shrubs @ 3-4' diameter each
- Three (3) small shrubs @ 15" to 18" diameter

2.5.12 Floating Material Regulations

Removal of floating debris and shoreline litter, such as floating logs, paper, plastic, and other unnatural forms of garbage or debris, does not require Appalachian approval as long as the method of removal complies with the other requirements of this plan.

2.5.13 Protection of Cultural Resources

In the event that any previously known or unknown cultural resource materials are discovered, all work associated with a permit must be stopped. Appalachian must be notified and consultation with SHPO must be completed before any further work within the Project boundary will be allowed to continue.

2.5.14 Prohibited Uses

Prohibited uses of land within the Project boundary include but are not limited to:

A. Manufactured homes – A structure, transportable in one or more sections, which is built on a permanent chassis, and not designed normally to be drawn or pulled on the highway except to change permanent locations but is designed to be used primarily as a dwelling, commercial building, storage unit, or semi-permanent facility, with or without a permanent foundation.
B. Trailer sites, campers, and travel trailers. Commercial campsites.
C. Decks and Boardwalks - Any decking that is constructed as a permanent or portable structure, whether it is free standing, or adjacent to a structure or mobile home, travel trailer, or any other mobile or non-mobile item.
D. Free-standing signs and roof signs – Any free-standing sign or roof sign.
E. Structures – No other structures other than docks or piers are allowed.
F. Septic – Septic tanks, septic facilities, field leach lines, pit privies, or any in ground or above ground holding, collecting, pumping, treatment, or

waste disposal systems including gray water. Excluded from this provision are septic facilities required to meet the Virginia Department of Health's Sanitary Regulations for Marinas and Boat Moorings.

G. Underground storage tanks – Any underground storage tank that may be used to store petroleum products.
H. Discharging – Discharging sewage, any liquid waste containing animal or vegetable matter, or solutions or liquids containing chemicals in solutions from any water closet, urinals, lavatories, bathtubs, sinks, showers, laundry tubs or devices, drinking fountains, floor drains, drain lines, or other sanitary fixtures, or any gray water on to the ground, or into any unapproved retention or treatment facility.
I. Depositing – Depositing in any manner any litter, refuse, garbage, debris, earthen material, rocks, or gray water within the Claytor Project boundary except at specific land sites that are designed by Appalachian for that sole purpose and as authorized under shoreline stabilization permits.
J. Grading – Alteration or removal of vegetation, trees, rocks, or dirt except as specifically authorized in writing by Appalachian.
K. Uses and activities prohibited per local ordinances or state or federal law and regulations.

3.0 SMP Implementation and Review

3.1 Permitting Responsibilities

An applicant seeking permission for an activity within the Project boundary must prepare an application to Appalachian and receive permission prior to beginning the proposed activity. The applicant may request a site visit at the beginning of the permitting process to discuss proposed activities within the Project boundary. The application must have the following information (as a minimum) to begin a review:

- Applicant and owner's name, addresses, telephone numbers
- Lake name
- A map showing the location of the property. (Ex. Lake map)
- County tax map and parcel number.
- A drawing or survey showing the location and dimensions of the proposed work including the following:
  - The location of the Project boundary
  - The location of the base elevation
  - The length of shoreline
  - All property lines
  - Dock limitation lines
- Docks, Piers and Similar Structures (**Note: Occupancy and Use applications require surveyed drawings**)
  - Distances from dock limitation lines
  - Approximate location of and distance to adjacent structures

  - Size of enclosure
  - Number of slips
  - Distance to any navigational aids within 500 feet
  - Intended users (e.g., residential lot owners, yacht clubs, general public, etc.)
- Shoreline Stabilization
  - Proof of active erosion
  - Type and size of stabilization material
  - Depth of buried toe
  - Slope
  - Length
  - Types of planting
- Dredging
  - Location of existing structures
  - Area to be dredged
  - Location of spoil area
  - Location of any wetlands
  - Amount to be removed
- Vegetative Cover
  - Size and location of vegetation to be removed
  - Size and location of vegetation to be retained
  - Revegetation plan, if applicable.

Appalachian will review the application for completeness. If the application is incomplete, Appalachian may request additional information from the applicant. Upon finding the application complete, Appalachian will determine if the proposed action is consistent with the classifications and in compliance with the regulations in this Plan. Permission for an activity within the Project boundary shall be contingent upon receipt of appropriate county, State, and Federal permits. The applicant must notify Appalachian when construction is initiated and completed so that compliance can be verified. Following inspection by Appalachian, a final inspection by Pulaski County is required. Copies of all permits including county dock or zoning permits, building permits, and upon completion of the structure, certification of the county's final inspection shall be submitted to Appalachian. Projects will be considered complete when 100% of all construction activities are completed. The activities will be inspected periodically for compliance with use agreement requirements and other regulations.

3.2 Fees

To meet the intent of Appalachian's license Article 416 and additional license requirements, Appalachian may, among other things, establish a program for granting permission for certain types of use and occupancy of Project lands and waters, which may be subject to the payment of a reasonable fee to cover Appalachian's costs of administering the permit program. Any fees implemented by Appalachian would be commensurate with the expenses of implementing the SMP.

3.3 Appeal Process

Should any property owner wish to appeal the administrative decision(s) made relative to this SMP, they may do so by appealing the decision in writing to the Hydro Manager or his/her designee:

Hydro Manager
Appalachian Power Company
P.O. Box 2021
Roanoke, VA 24022

Any requests made shall at a minimum include all pertinent information to be considered including property plats, photographs, correspondence, permits, and drawings, etc. Property owners may consult with Pulaski County in its request.

If there is still a disagreement following the decision of the Hydro Manager on the appeal, the Federal Energy Regulatory Commission may be contacted by the property owner:

Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

3.4 Variance and Exception Processes

There may be cases that warrant exception from the regulations and the classifications in this SMP. Appalachian will consider whether a variance or an exception from the SMP is warranted on a case-by-case basis, taking into consideration hardships as well as compliance with the SMP and Appalachian's licensing requirements.

3.4.1 FERC Variance Requests

In order to be considered for a variance, individuals must make application to Appalachian. As part of this application, the applicant shall include receipts from certified letters indicating notification in writing to all adjoining property owners of the applicant's intent. Appalachian shall be copied on the certified letter to the adjacent property owners. The adjacent property owners along with Pulaski County shall be given 30 days to provide written comments to Appalachian prior to Appalachian finalizing its review. Comments will be available for public review. If the variance request fits within the licensing requirements and the intent of this SMP, then Appalachian will prepare a draft environmental assessment (EA) and forward the EA and application to the appropriate state and federal agencies for review and comment. Agencies will be given thirty (30) days to either comment or request an extension to provide comments. Once comments are received and resolved, the variance request and the agency comments will be reviewed by Appalachian and a decision will be made as to whether it will be forwarded to the FERC for action.

In considering a FERC variance request, Appalachian will consider its license requirements, the intent of the SMP and the protection of the Project's scenic, recreational, and environmental values, federal state and local agency comments and comments from affected property owners. In addition, Appalachian will consider the use of the proposed request such as whether or not it is a water-dependent use or whether the activity could take place outside of the Project boundary. Appalachian will also consider the protection of any identified resources. Appalachian will not consider FERC variance requests for structures with habitable or other non-project non-water dependent uses, roofs that create a second story on a dock or for retroactive approval of actions that took place after the SMP, approved December 27, 2011, and that are in violation of the SMP.

Appalachian may consider seeking a FERC variance under Section 3.3 in the following situations:

1. Appalachian may consider seeking a FERC variance for a single-family dock structure in the Conservation/Environmental classification classified as such because of wetlands, stream beds, Natural Heritage Communities or scrub/shrub habitat under the following conditions:

    i. The lot was subdivided prior to December 27, 2011, and does not include shoreline classified in such a way that would allow for the placement of a dock outside of the Conservation/Environmental area OR
    ii. A formal wetland delineation is provided that documents the extent of the wetland and the structure can be placed outside of this area.
    iii. In both cases, an agreed upon dock structure shall be developed in consultation with appropriate local, state and federal agencies in order that the structure minimizes impacts to the identified resource.

2. Appalachian may consider seeking a FERC variance for a retaining wall on Project lands but only if necessary to stabilize the bank as demonstrated by detailed engineered drawings of the proposed structure that have prepared and signed/stamped by licensed engineer. If the retaining wall is 2 feet in height or less, the requirement that the drawings be prepared, signed/stamped by a licensed engineer may be waived. The area in front and behind the retaining wall that is within the 1850-foot contour elevation will be required to be revegetated with native plants.

3. Changes in the shoreline classifications require a FERC variance under Section 3.3 of the SMP. (Note: These changes are different from mapping revisions to correct minor inaccuracies where the shoreline was improperly classified. Those changes can be made by Appalachian under Section 2.2.1 Mapping Revision Process.) Changes to shoreline classification may be considered on a case-by-case basis, taking into consideration the Pulaski County rezoning process, consultation with local, state, and federal agencies, compliance with Appalachian's license requirements and the intent of the SMP.

3.4.2 Appalachian Exceptions

There may be cases that warrant exception from the regulations and the classifications in this SMP. Appalachian will consider whether or an exception from the SMP is warranted on a case-by-case basis, taking into consideration hardships as well as compliance with the SMP and Appalachian's licensing requirements. Exceptions which Appalachian will consider granting without having to obtain a FERC variance include the following:

1. Appalachian may consider an exception to the 16-foot height restriction on certain dock structures. This request will be reviewed on a case-by-case basis based on the following considerations:

    i. The applicant can demonstrate why 16 feet is not adequate to accommodate his or her boat.
    ii. The location of the proposed dock is such that the water depths and navigation lane within the cove can accommodate the larger boat.
    iii. The applicant is able to obtain written approval signed by the adjacent neighbor(s) whose viewsheds could be impeded by the taller structure, as determined by Appalachian.
    iv. The additional height does not result in a total height in excess of 19 feet as measured from base elevation.
    v. The additional height is not to allow for a second story that is roofed.

vi. If the proposed dock is in an IMZ classification, the request will have to go through the Section 2.5.7 Impact Minimization Zone review process before Appalachian would grant an exception.
vii. Cupolas are exempt from the 16-foot height requirement.

To be considered for an exception to the 16 ft. limitation, the applicant shall submit the following information:

☐ Plan view and elevation drawings of the proposed dock with pertinent dimensions on a survey.
☐ Documentation as described above to demonstrate 16 feet is not adequate.

The applicants shall obtain approval in writing from impacted adjacent property owners. A site visit will be conducted by Appalachian prior to determining if an exception will be considered. Appalachian will determine impacted adjacent property owners.

2. Appalachian may consider an additional walkway (not less than four feet in width or greater than six feet in width) to an upper or lower deck on docks serving single family uses in order to improve access. At a minimum, the applicants shall obtain approval in writing from adjacent property owners. One walkway from the Project boundary to the dock may be excluded from the total square footage calculation.

3. Appalachian may consider an exception for shoreline stabilization in the Conservation/Environmental classification classified as such because of wetlands, stream beds, Natural Heritage Communities, or scrub/shrub habitat under the following conditions:

i. There is evidence of active erosion;
ii. Bioengineering and vegetative techniques are utilized;
iii. A formal wetland delineation is provided that documents the extent of the wetland and the structure can be placed outside of this area or does not impact it.
iv. Consultation with appropriate local, state and federal agencies in order that the structure minimizes impacts to the identified resource.

4. Bulkheads emanating from Project waters may be allowed as a last resort to control erosion along the shoreline when a 2:1 (horizontal/vertical) slope cannot be obtained without excessive fill and there is an eroded bank of three feet or less. Appalachian may grant an exception to the three-foot limitation under the following conditions:

i. Steepness of shoreline isn't conducive for riprap at a 2:1 slope without excessive fill and it is evident that if the shoreline is not protected, erosion will continue to worsen.

ii. Bulkhead will only be installed in the area designated for access to the water (e.g., area for a dock) and may not necessarily encompass the entire shoreline length. The amount of bulkhead will be considered on a case-by-case basis.
iii. Segmental retaining walls may be considered for shoreline erosion protection if properly designated to the satisfaction of Appalachian, as demonstrated by detailed engineered drawings of the proposed structure that have been prepared and signed/stamped by licensed engineer.
iv. Mitigation of habitat existing in the area of the proposed bulkhead may be required.
v. If the proposed bulkhead is to be located in an IMZ classification, then the request for exception will have to go through the Section 2.5.6 Impact Minimization Zone review process before Appalachian would grant an exception.

To be considered for an exception to the 3 ft. limitation, the applicant shall submit the following information:

- ☐ Plan view and elevation views of the proposed bulkhead on a survey depicting the 2' contour elevations from 1840' to 1856' which demonstrate the slope and that excessive riprap would be required.
- ☐ The drawing shall include the base elevation, Project boundary and property lines.

A site visit by Appalachian will be scheduled to review any request.

3.5 Nonconforming Structure Provisions

Docks, piers, and similar structures constructed within the 1850-foot contour NGVD of Claytor Lake prior to the implementation of the SMP (December 27, 2011) do not need to be modified to meet the new requirements. These structures may continue to exist despite their nonconforming nature and may be expanded under a permit issued by Appalachian provided the nonconforming aspect of the structure is not increased.

3.5.1 Replacement of Destroyed or Damaged Structures

A dock, pier, or wall constructed within the 1850-foot contour NGVD of Claytor Lake may be replaced in its entirety if the structure is destroyed or damaged by accident, natural event, or the intentional or wrongful act of another party provided that all of the conditions listed below are met:

i. Documentation is subsequently provided to Appalachian that provides proof satisfactory to Appalachian of the details of the structure as it existed prior to December 27, 2011, and the proposed replacement structure matches those details; or Appalachian issued a permit for the

structure and the proposed replacement structure matches the permit. Documentation may include permits from Appalachian Power or Pulaski County, surveys, photos, recent aerial photographs, and drawings with dimensions, as long as all pertinent information related to size, number of slips, and location relative to extended property lines is provided.

ii. The structure was properly maintained and has not been deemed to be a "Dangerous Structure" by Appalachian under Section 3.5. hereof (Monitoring and Enforcement).

iii. Two (2) years has not lapsed since the building, dock, platform, pier, wall, and other structure was destroyed.

iv. A permit for the replacement structure is obtained from Appalachian that includes verification that the above conditions are met, and approval is obtained from Pulaski County as appropriate.

v. The structure will be placed within the buildable area or shoreline to the greatest extent possible.

3.5.2 Maintenance of a Non-Dangerous Structure

Maintenance of all structures is encouraged in order to keep a structure from becoming a "Dangerous Structure". A building, dock, platform, pier, wall, and other structures may be maintained provided that all of the conditions listed below are met:

i. The structure was properly maintained and has not been deemed to be a "Dangerous Structure" as determined under Section 3.5. hereof (Monitoring and Enforcement).

ii. Maintenance does not increase size, number of slips, dimensions or height of the structure or increase the size of any enclosure or change the design of the structure. Modifications to the size, number of slips, dimensions or height of the structure or to the size of any enclosure or the design of the structure require a permit from Appalachian and must meet the SMP requirements. Approval is to be obtained from Pulaski County as appropriate.

3.5.3 Repair of "Dangerous Structure"

A building, dock, platform, pier, wall, and other structure deemed a "Dangerous Structure" as determined under Section 3.5. hereof (Monitoring and Enforcement) may be repaired so that it is no longer considered a "Dangerous Structure" upon approval of Appalachian. The Owner shall provide to Appalachian documentation of receipt of approval of the planned repair from Pulaski County or licensed design professional in order to receive approval from Appalachian to proceed.

Portions of the "Dangerous Structure" that are located within setbacks, that extend beyond the allowable limits into the waterway, or that exceed the height requirements or enclosure requirements as defined in the SMP may not be replaced if repairs are required

as corrective actions to render the structure a non-"Dangerous Structure" is required, any new replacement structure will be required to meet the requirements of the SMP.

3.6 Monitoring and Enforcement Procedures

3.6.1 Process for Improving a "Dangerous Structure

On-going maintenance of all structures within the Project boundary for the Claytor Project is encouraged. If Appalachian observes a structure that has not been maintained and appears to be in such a state of disrepair, then Appalachian may deem a structure "Dangerous," it shall provide notice of such to Pulaski County for review under its respective codes and ordinances and request that the appropriate Pulaski County or a licensed design professional provide its views as to the necessary corrective action to abate the dangerous condition.

If Appalachian subsequently determines that maintenance of the structure is necessary in order that it is no longer deemed a "Dangerous Structure," Appalachian will notify the Owner accordingly and a timeframe for performing the necessary maintenance will be provided. If Appalachian subsequently determines that maintenance of the structure cannot make it such that it is no longer deemed a "Dangerous Structure," Appalachian will notify the Owner accordingly and a timeframe for removing the structure will be provided. Inaction by the Owner in regard to completing required maintenance as described above will automatically result in the structure being classified as a "Dangerous Structure".

If the Owner of the structure does not comply with the requirements imposed by Appalachian as outlined above within the time frame stipulated, Appalachian shall take any legal actions necessary to have the situation rectified to Appalachian's satisfaction.

Floating enclosed structures that are attached or moored to the shoreline and which are not registered as watercraft with the VDWR shall not be relocated along the shoreline and must be registered with Appalachian by January 2, 2024. Appalachian and/or its designee will conduct annual inspections to determine if the structure has been expanded, relocated, developed into a dangerous structure, or is in violation of some other provision of the SMP such as being used for human habitation. Such floating structures shall not be replaced and shall be removed from within the Project boundary by January 1, 2025, unless permission to remain is obtained from the upland property owner adjacent to the Project boundary or otherwise provided.

3.6.2 Consequences for Violation

Under its FERC license, Appalachian has the authority to grant permission for certain types of use and occupancy of Project lands and waters and to convey certain interests in

Project lands and waters. However, permission is granted only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the Project. Therefore, Appalachian has the continuing responsibility to supervise and control the uses and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with, the covenants of the instrument of conveyance for any interests that it has conveyed under its FERC license. If a permitted use or occupancy is not maintained in a safe manner, violates any condition of Appalachian's FERC license or any other condition imposed by Appalachian for the protection and enhancement of the Project's scenic, recreational, or other environmental values, or if a covenant of conveyance made under the authority of its FERC license is violated, Appalachian will take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action may include, if necessary:

- Canceling permission to use and occupy Project lands or waters.
- Requiring the removal, at the permittee's sole expense, of any non-complying structures and facilities.
- Requiring appropriate restoration and/or mitigation up to and including restoring Project lands and waters to their original condition.
- Retaining security deposits.
- Suspension or cancellation of approved applications.
- Loss of any consideration for future reservoir use applications.

Appalachian is not the sole entity responsible for enforcing activities within the Project boundary. Local, state, and federal agencies have jurisdiction over lands and waters within the project boundary.

3.7 SMP Review and Update

Appalachian will initially review the SMP in 5 years following FERC approval. Subsequent reviews will be performed every 5 years. The review will be accomplished through consultation with a group of stakeholders similar to the steering committee. Revisions will be made to the plan based on this consultation. Further, the update will incorporate any revisions that are deemed necessary in order to protect the public recreation opportunities, aesthetic beauty, environmental features, and power production capability at the Project. SMP updates shall be submitted to the FERC for approval. At a minimum, the following entities must be consulted during any review and update of the plan: ACOE, VDH, VDWR, VDEQ, VDCR, VDHR, Pulaski County, and FOCL.

Appendix A
Federal Power Act
Sections 10 (A) (1) and 4 (e)

Section 10. (a) (1)
That the project adopted, including the maps, plans, and specifications, shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in section 4(e); and if necessary in order to secure such plan the Commission shall have authority to require the modification of any project and of the plans and specifications of the project works before approval.

Section 4. (e)
To issue licenses to citizens of the United States, or to any association of such citizens, or to any corporation organized under the laws of the United States or any State thereof, or to any State or municipality for the purpose of constructing, operating, and maintaining dams, water conduits, reservoirs, power houses, transmission lines, or other project works necessary or convenient for the development and improvement of navigation and for the development, transmission, and utilization of power across, along, from, or in any of the streams or other bodies of water over which Congress has jurisdiction under its authority to regulate commerce with foreign nations and among the several States, or upon any part of the public lands and reservations of the United States (including the Territories), or for the purpose of utilizing the surplus water or water power from any Government dam, except as herein provided: Provided, That licenses shall be issued within any reservation only after a finding by the Commission that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired, and shall be subject to and contain such conditions as the Secretary of the department under whose supervision such reservation falls shall deem necessary for the adequate protection and utilization of such reservations: Provided further, That no license affecting the navigable capacity of any navigable waters of the United States shall be issued until the plans of the dam or other structures affecting the navigation have been approved by the Chief of Engineers and the Secretary of the Army. Whenever the contemplated improvement is, in the judgment of the Commission, desirable and justified in the public interest for the purpose of improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, a finding to that effect shall be made by the Commission and shall become a part of the records of the Commission: Provided further, That in case the Commission shall find that any Government dam may be advantageously used by the United States for public purposes in addition to navigation, no license therefor shall be issued until two years after it shall have reported to Congress the facts and conditions relating thereto, except that this provision shall not apply to any Government dam constructed prior to June 10, 1920: And provided further, That upon the filing of any application for a license which has not been preceded by a preliminary permit under subsection (f) of this section, notice shall be given and published as required by the proviso of said subsection. In deciding whether to issue any license under this Part for any project, the Commission, in addition to the power and development purposes for which licenses are issued, shall give equal

consideration to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of, fish and wildlife (including related spawning grounds and habitat), the protection of recreational opportunities, and the preservation of other aspects of environmental quality.

Appendix B
Article 36

Article 36. (1) In accordance with the provisions of this article, the Licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain other types of use and occupancy, without prior Commission approval. The Licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the Licensee shall also have continuing responsibility to supervise and control the uses and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the Licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the Licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The types of use and occupancy of project lands and waters for which the Licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities; and (3) embankments, bulkheads, retaining walls or similar structures for erosion control to protect the existing shoreline. To the extent feasible and desirable to protect and enhance the project's scenic recreational, and other environmental values, the Licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The Licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the uses and occupancies for which it grants permission are maintained in good repair and comply with applicable State and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the Licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline. To implement this paragraph (b), the Licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the Licensee's costs of administering the permit program. The Commission reserves the right to require the Licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modifications of those standards, guidelines, or procedures.

(c) The Licensee may convey easements or rights-of-way across, or leases of, project lands for: (1) replacement, expansion, realignment, or maintenance of bridges and roads for which all necessary State and Federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4)

minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than January 31 of each year, the Licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The Licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary State and Federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary Federal and State water quality certificates or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary Federal and State approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile from any other private or public marina, (6) recreational development consistent with an approved Exhibit R or approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measure horizontally, from the edge of the project reservoir at normal maximum surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d) (7) in any calendar year. At least 45 days before conveying any interest in project lands under this paragraph (d), the Licensee must file a letter to the Director, Office of Electric Power Regulation, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G or K map may be used), the nature of the proposed use, the identity of any Federal or State agency official consulted, and any Federal or State approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the Licensee to file an application for prior approval, the Licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the Licensee shall consult with Federal and State fish and wildlife or recreation agencies, as appropriate, and the State Historical Preservation Officer.

(2) Before conveying the interest, the Licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved Exhibit R or approved report on recreational resources of an Exhibit E; or, if the project does not have an

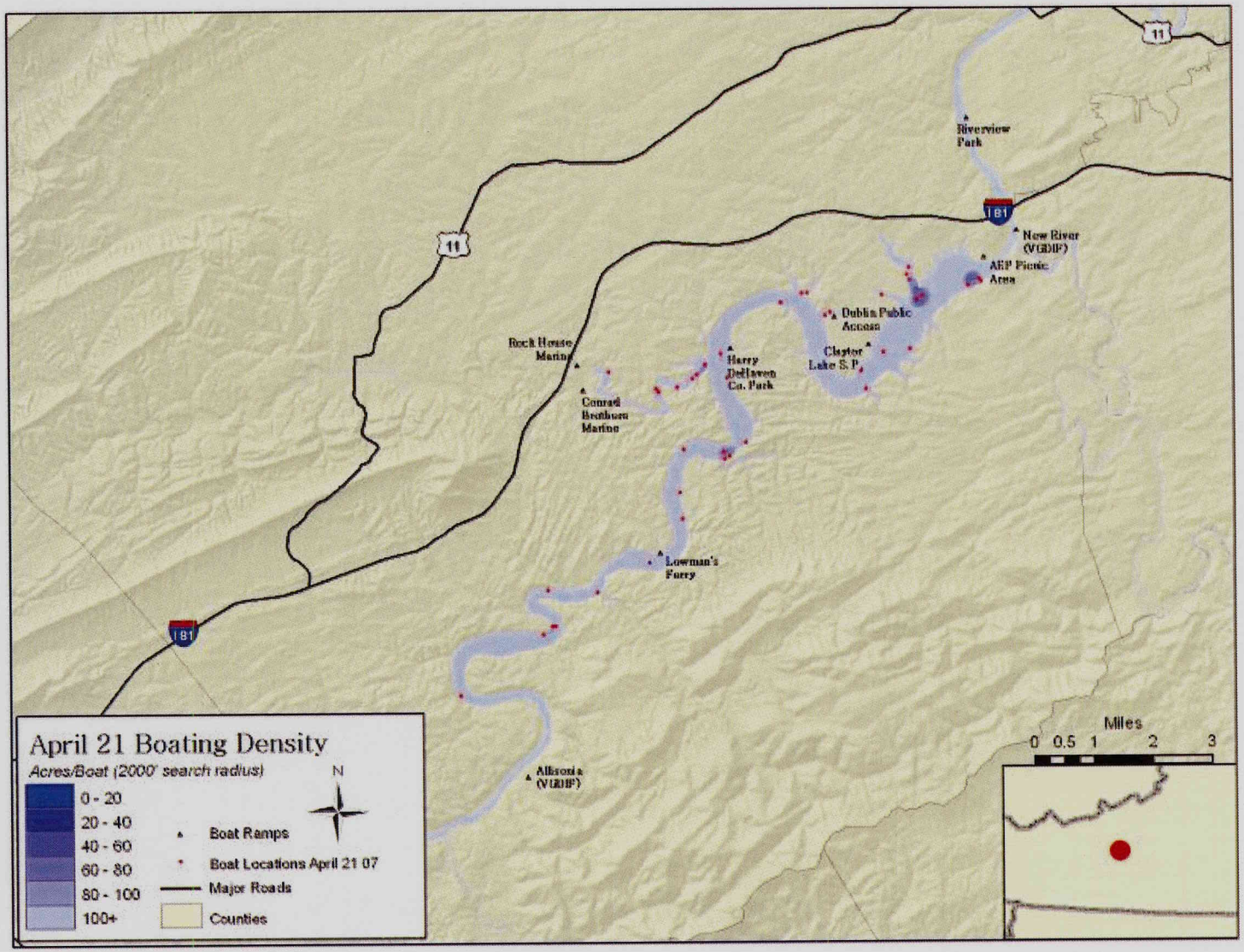
approved Exhibit R or approved report on recreational resource, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include covenants running with the land adequate to ensure that: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; and (ii) the grantee shall take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environment values of the project.

(4) The Commission reserves the right to require the Licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G or K drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised Exhibit G or K drawings would be filed for approval for other purposes.

Appendix C
Boating Density Maps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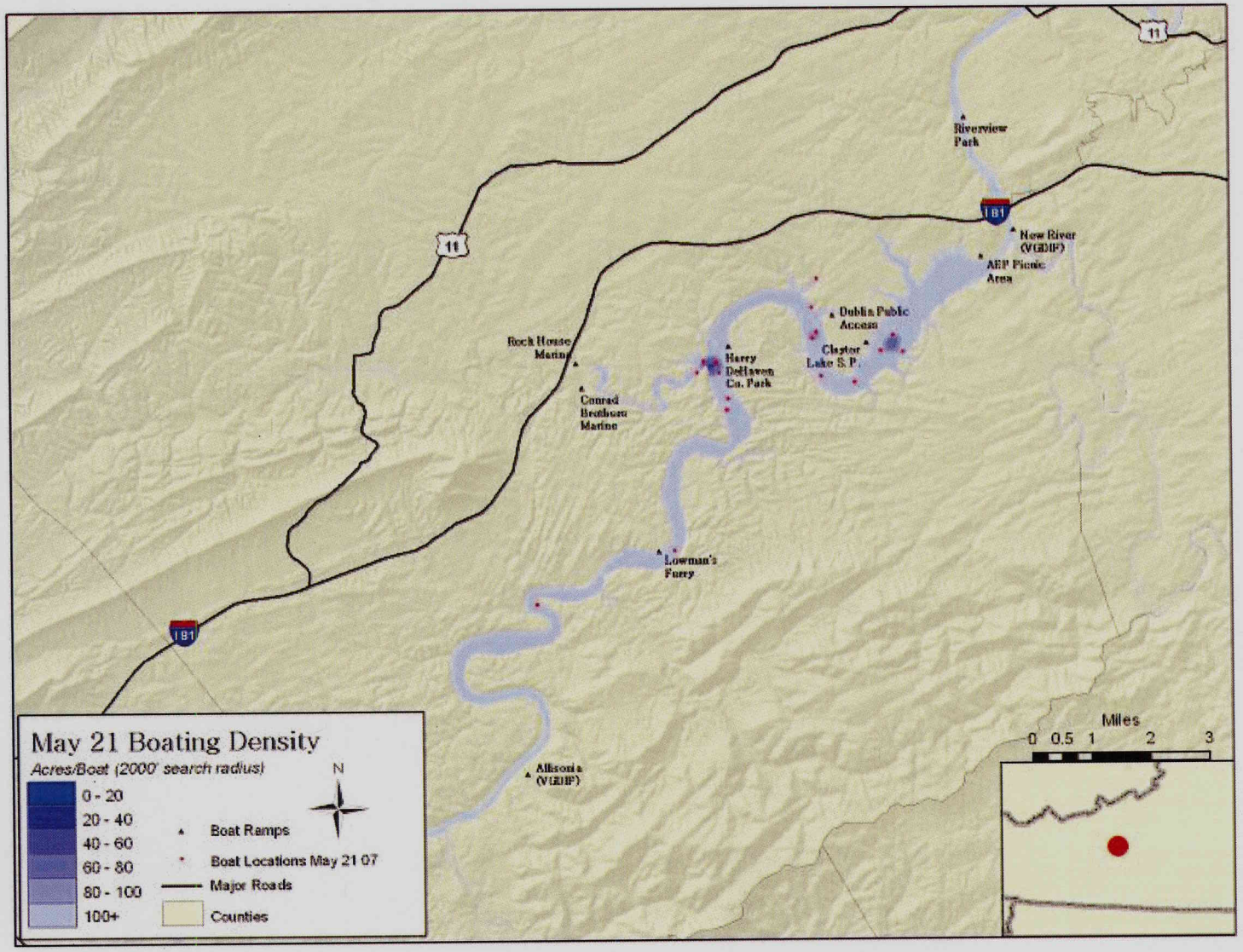
AEP Picnic Area
Dublin Public Access
Clayton Lake S.P.
Harry DeHaven Co. Park
Rock House Marina
Conrad Benham Marina
Lowman's Ferry
Allisonia (VGDIF)
11
I 81
April 21 Boating Density
Acres/Boat (2000' search radius)
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100+
Boat Ramps
Boat Locations April 21 07
Major Roads
Counties
N
Miles
0 0.5 1 2 3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Acres/Boat (2000' search radius)
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100+
N
Boat Ramps
Boat Locations May 21 07
Major Roads
Counties
Miles
0 0.5 1 2 3
Riverview Park
New River (VGDIF)
AEP Picnic Area
Dublin Public Access
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Harry Dellinger Co. Park
Rock House Marina
Conrad Brothers Marine
Lowman's Ferry
Allisonia (VGDIF)
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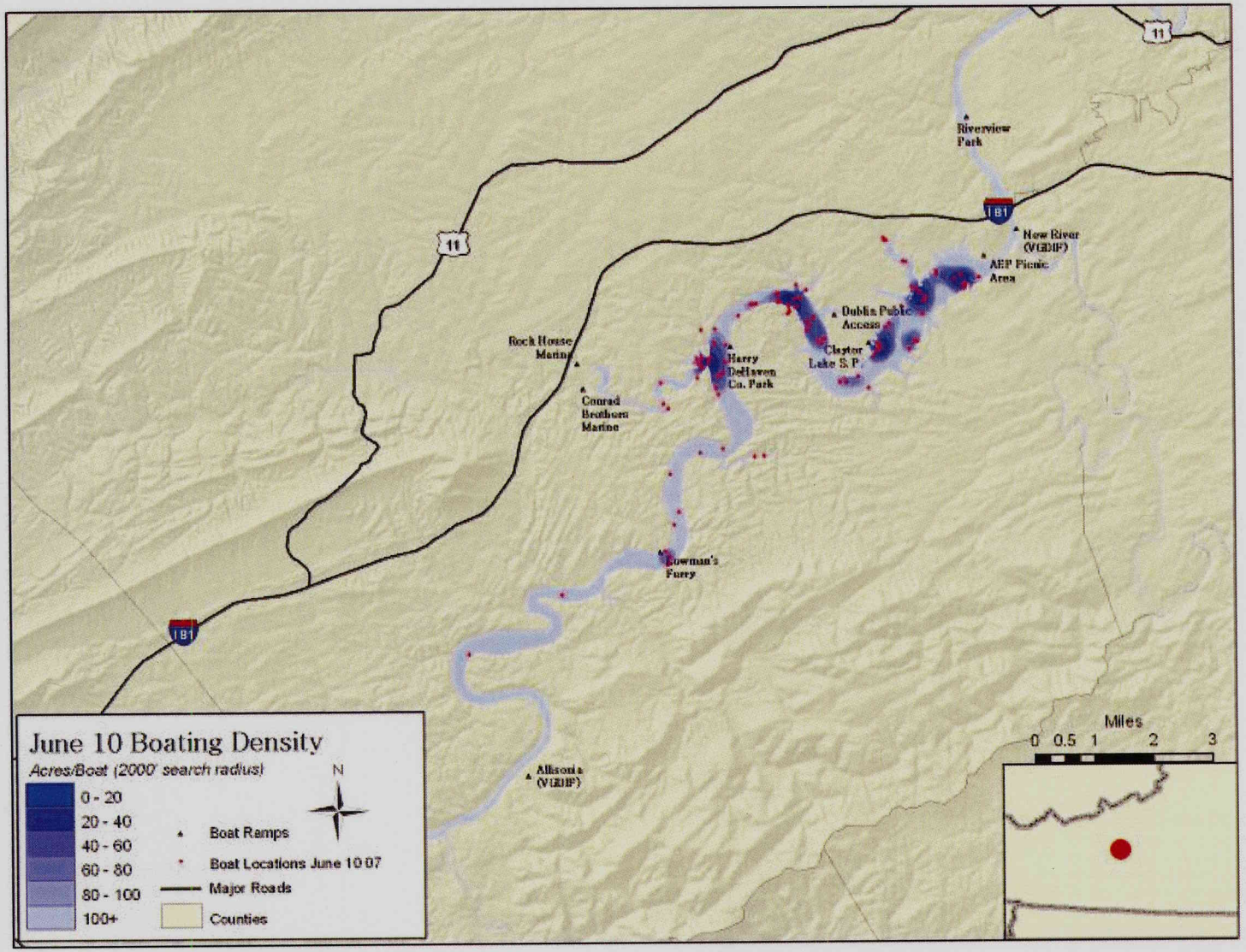
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Conrad Brothers Marina
Bowman's Ferry
Allisonia (VEDIF)
11
81
June 10 Boating Density
Acres/Boat (2000' search radius)
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100+
N
Boat Ramps
Boat Locations June 10 07
Major Roads
Counties
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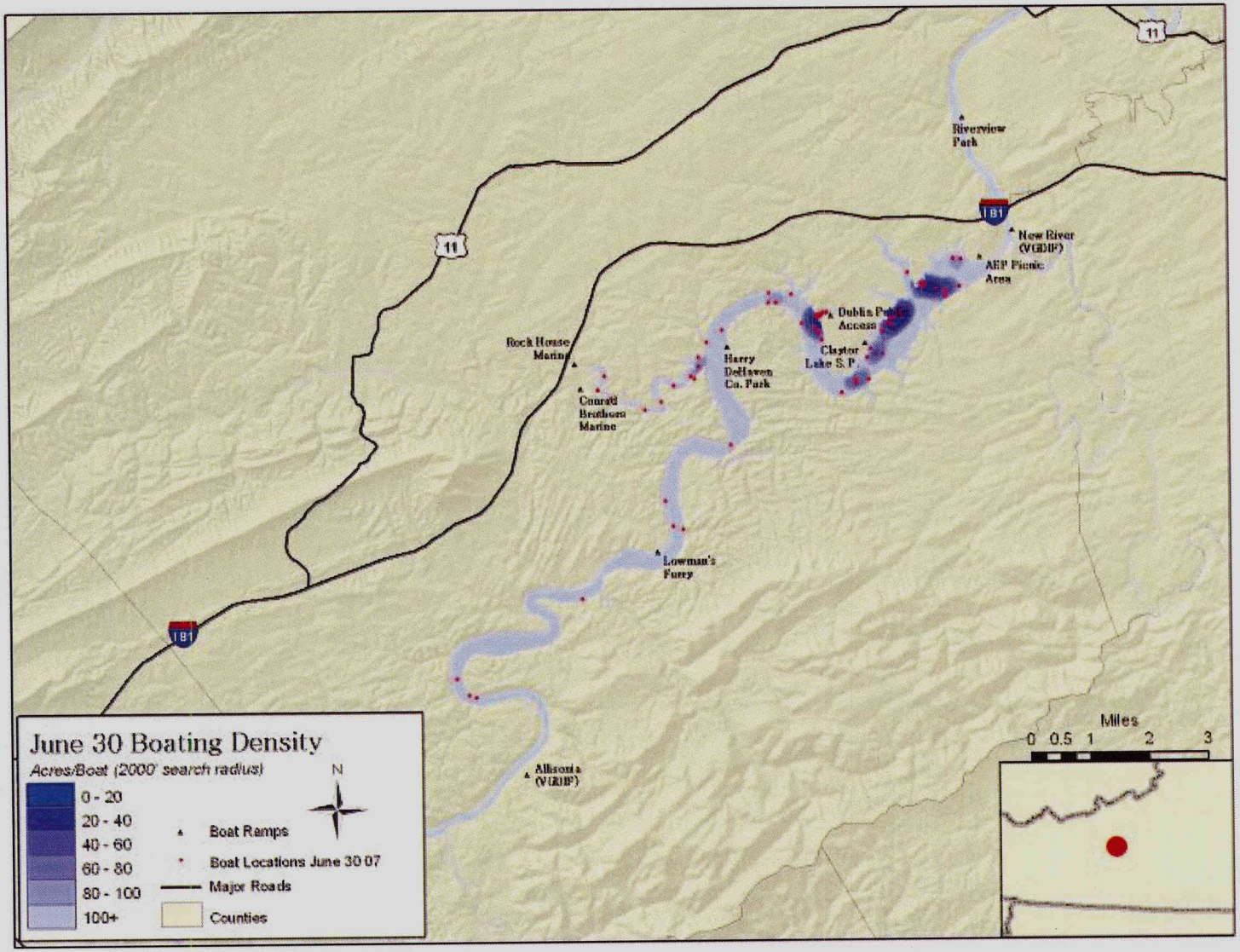
0 0.5 1 2 3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Allisonia (VERIP)
11
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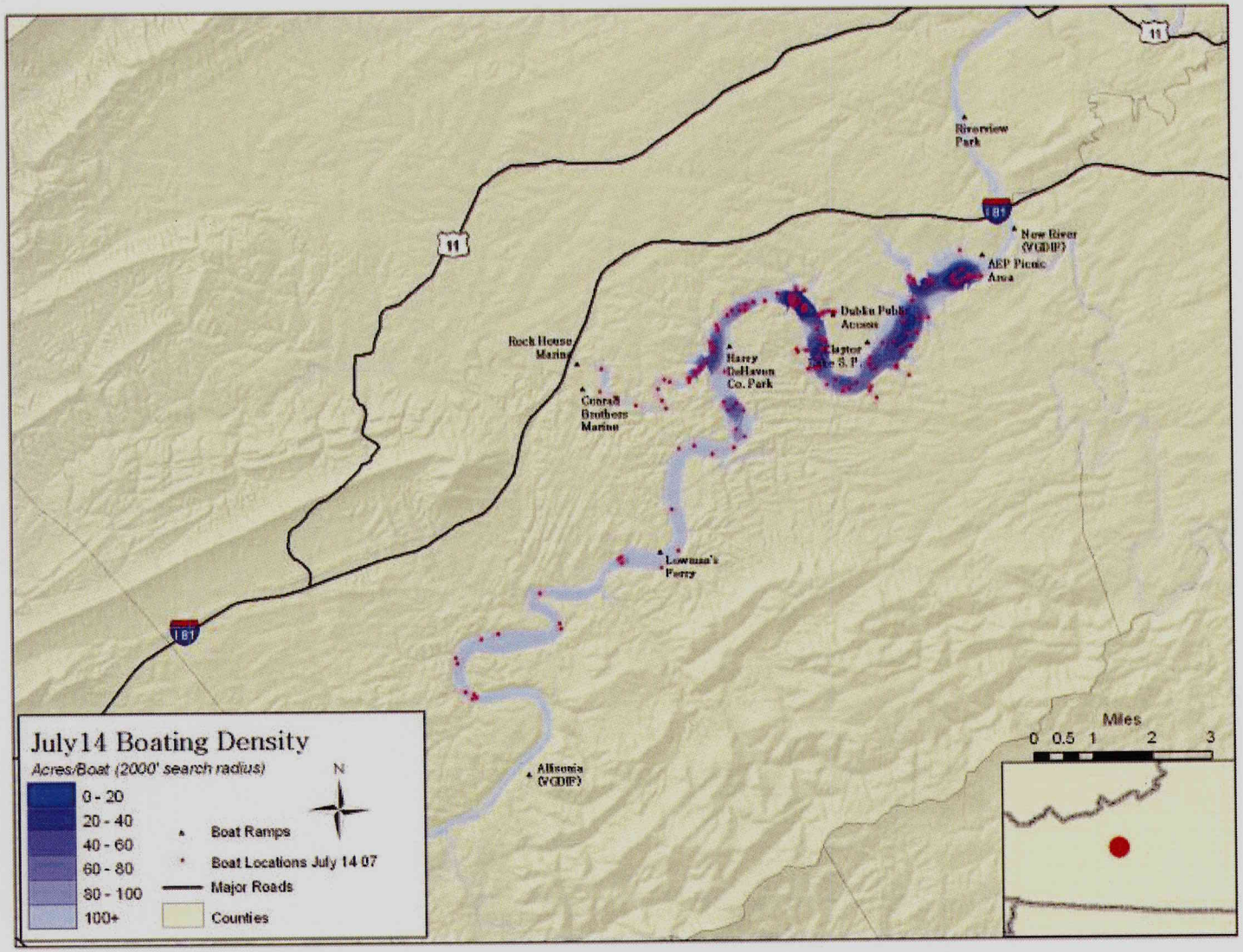
June 30 Boating Density
Acres/Boat (2000' search radius)
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100+
N
Boat Ramps
Boat Locations June 30 07
Major Roads
Counties
Miles
0 0.5 1 2 3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Acres/Boat (2000' search radius)
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80 - 100
100+
Boat Ramps
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Major Roads
Counties
N
Miles
0 0.5 1 2 3
Riverview Park
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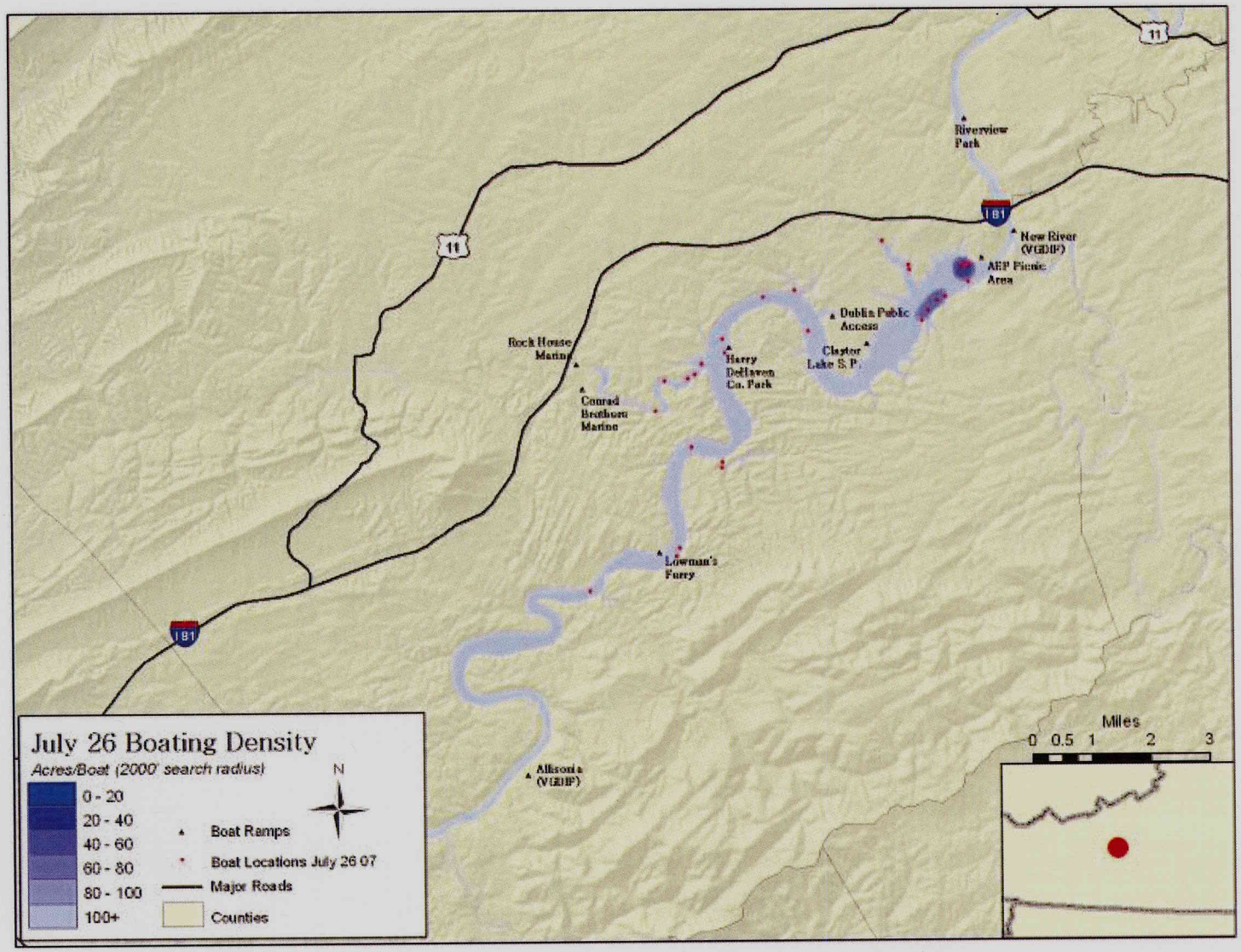
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New River (VEDIP)
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Clayton Lake S.P.
Harry DeHaven Co. Park
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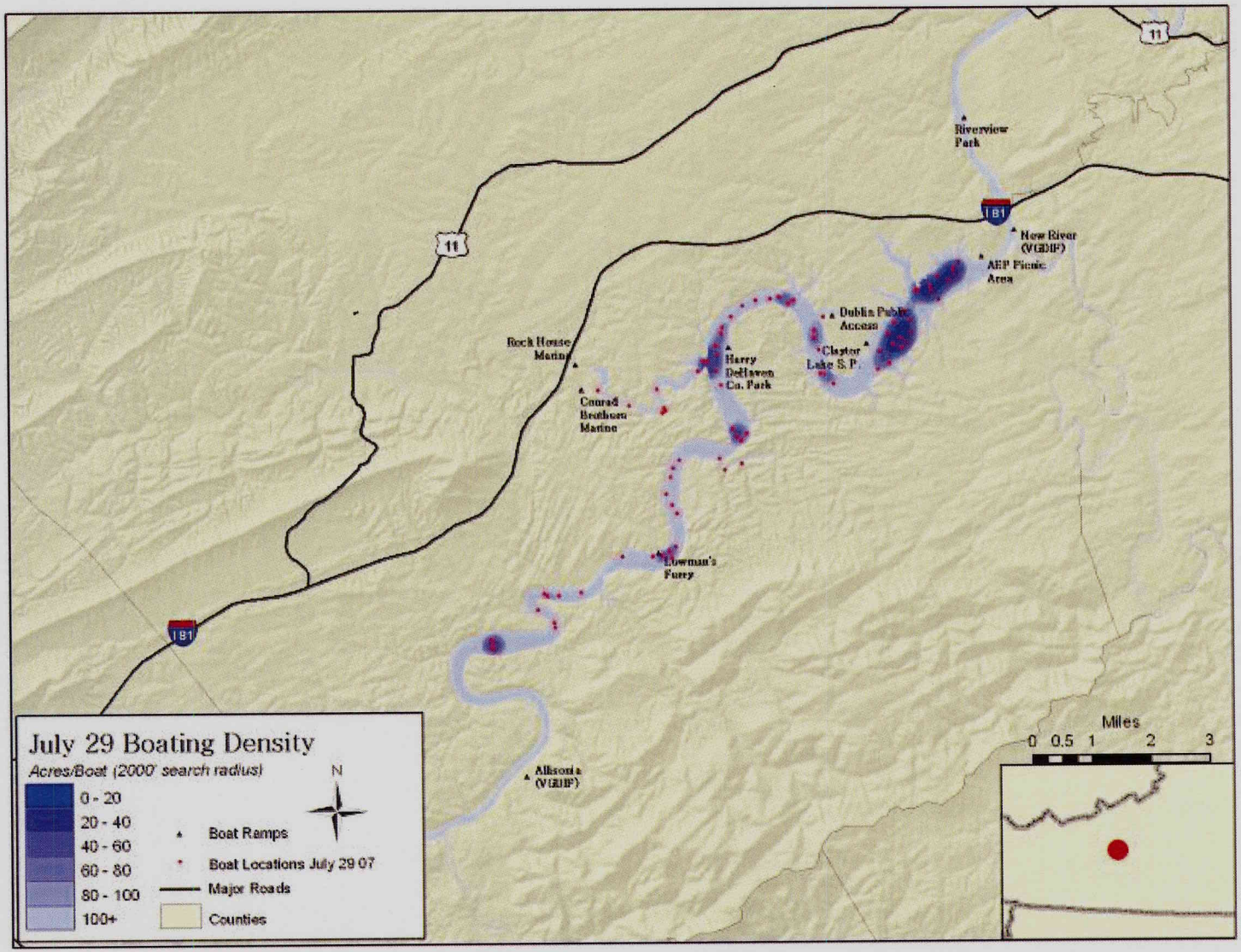
Conrad Brothers Marina
Lowman's Ferry
Allisonia (VEDIP)
July 26 Boating Density
Acres/Boat (2000' search radius)
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100+
N
Boat Ramps
Boat Locations July 26 07
Major Roads
Counties
Miles
0 0.5 1 2 3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Acres/Boat (2000' search radius)
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40 - 60
60 - 80
80 - 100
100+
Boat Ramps
Boat Locations July 29 07
Major Roads
Counties
N
Miles
0 0.5 1 2 3
Riverview Park
New River (VGDIF)
AEP Picnic Area
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Allisonia (VGDIF)
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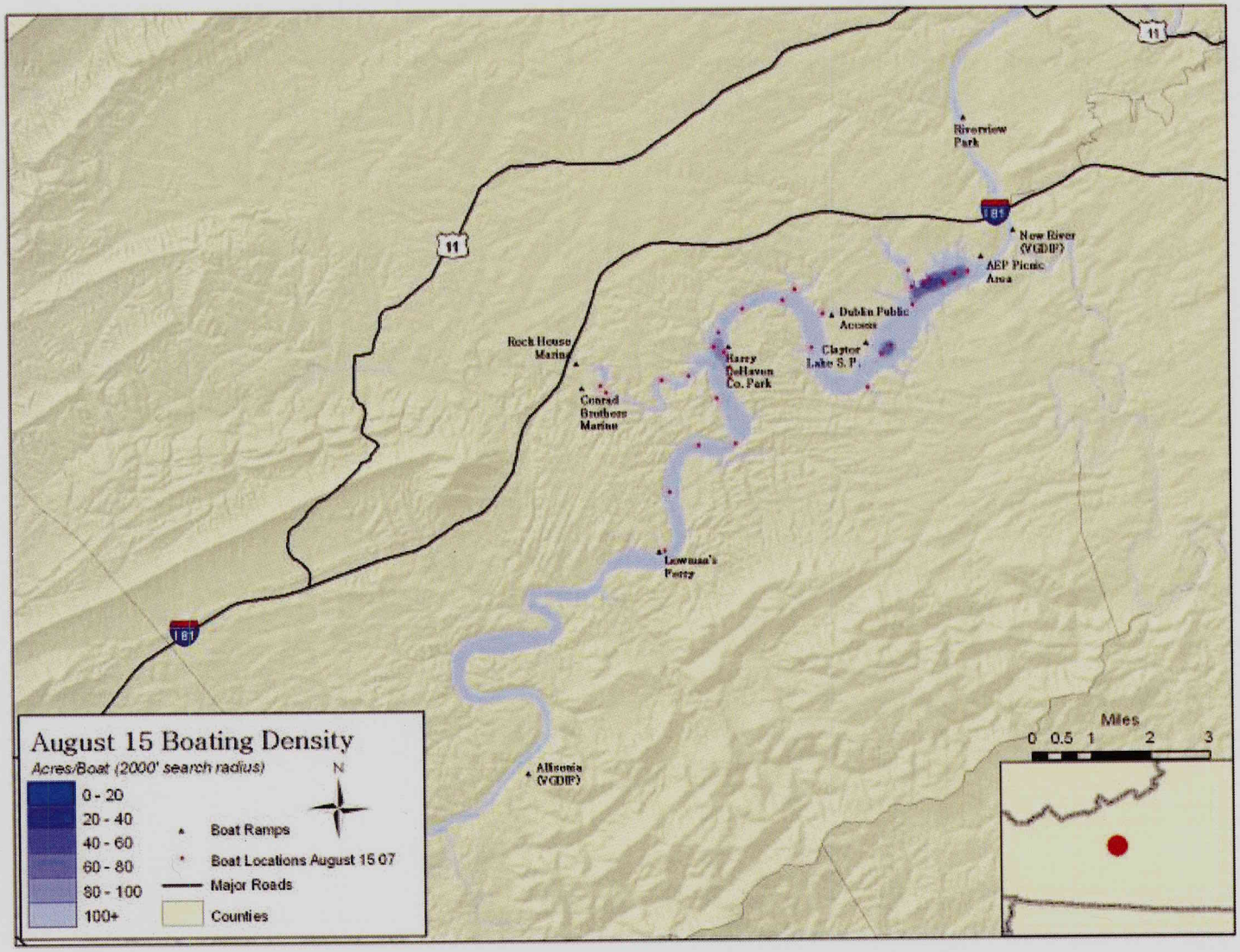
August 15 Boating Density
Acres/Boat (2000' search radius)
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100+
Boat Ramps
Boat Locations August 15 07
Major Roads
Counties
N
Miles
0 0.5 1 2 3
Riverview Park
New River (VGDIP)
AEP Picnic Area
Dublin Public Access
Clayton Lake S. P.
Harry DeHaven Co. Park
Rock House Marina
Conrad Brothers Marina
Lowman's Ferry
Allisonia (VGDIP)
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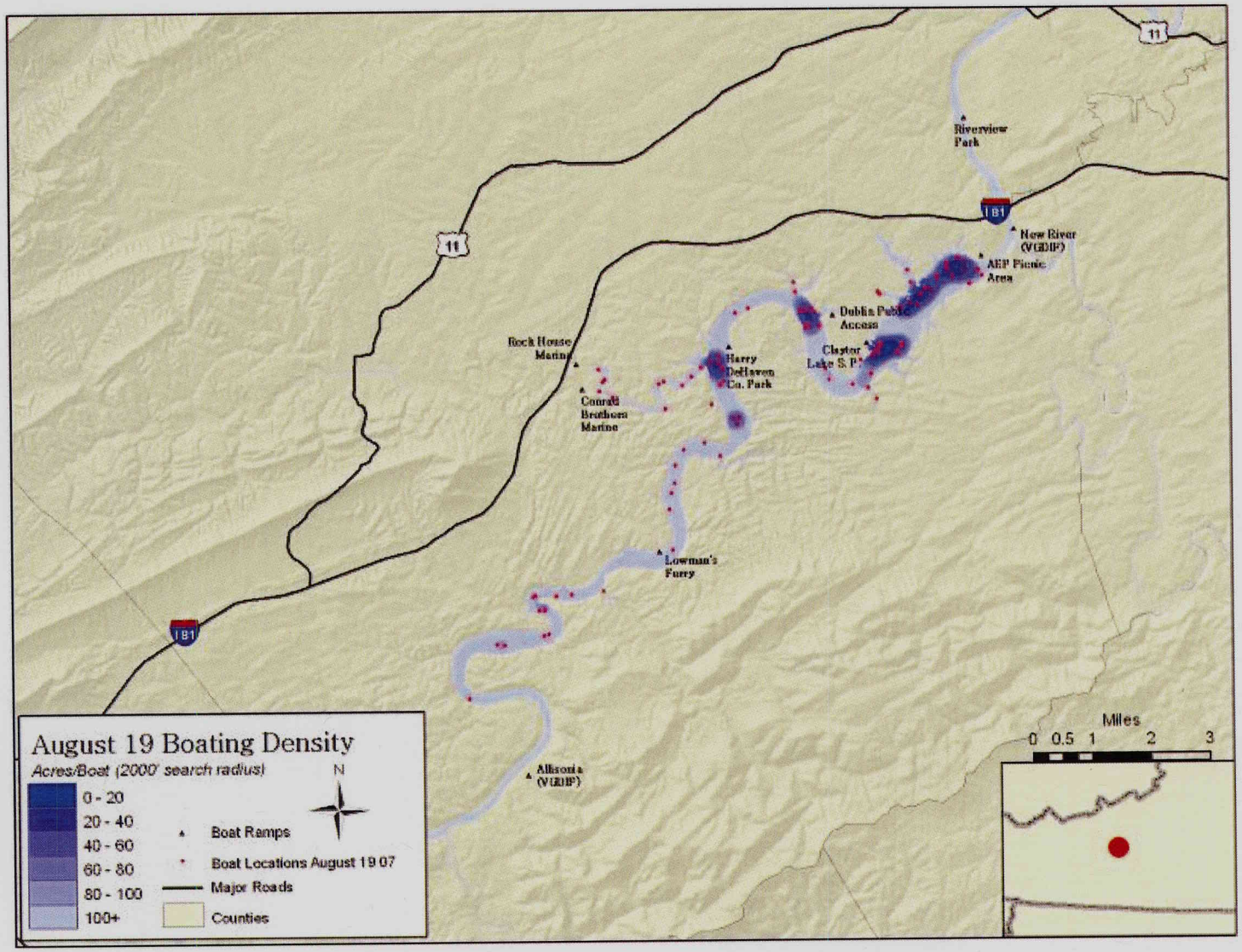
August 19 Boating Density
Acres/Boat (2000' search radius)
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100+
Boat Ramps
Boat Locations August 19 07
Major Roads
Counties
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Miles
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Riverview Park
New River (VGDIF)
AEP Picnic Area
Dublin Public Access
Clayton Lake S. P.
Harry DeHaven Co. Park
Rock House Marina
Conrad Brothers Marina
Lowman's Ferry
Allisonia (VGDIF)
11
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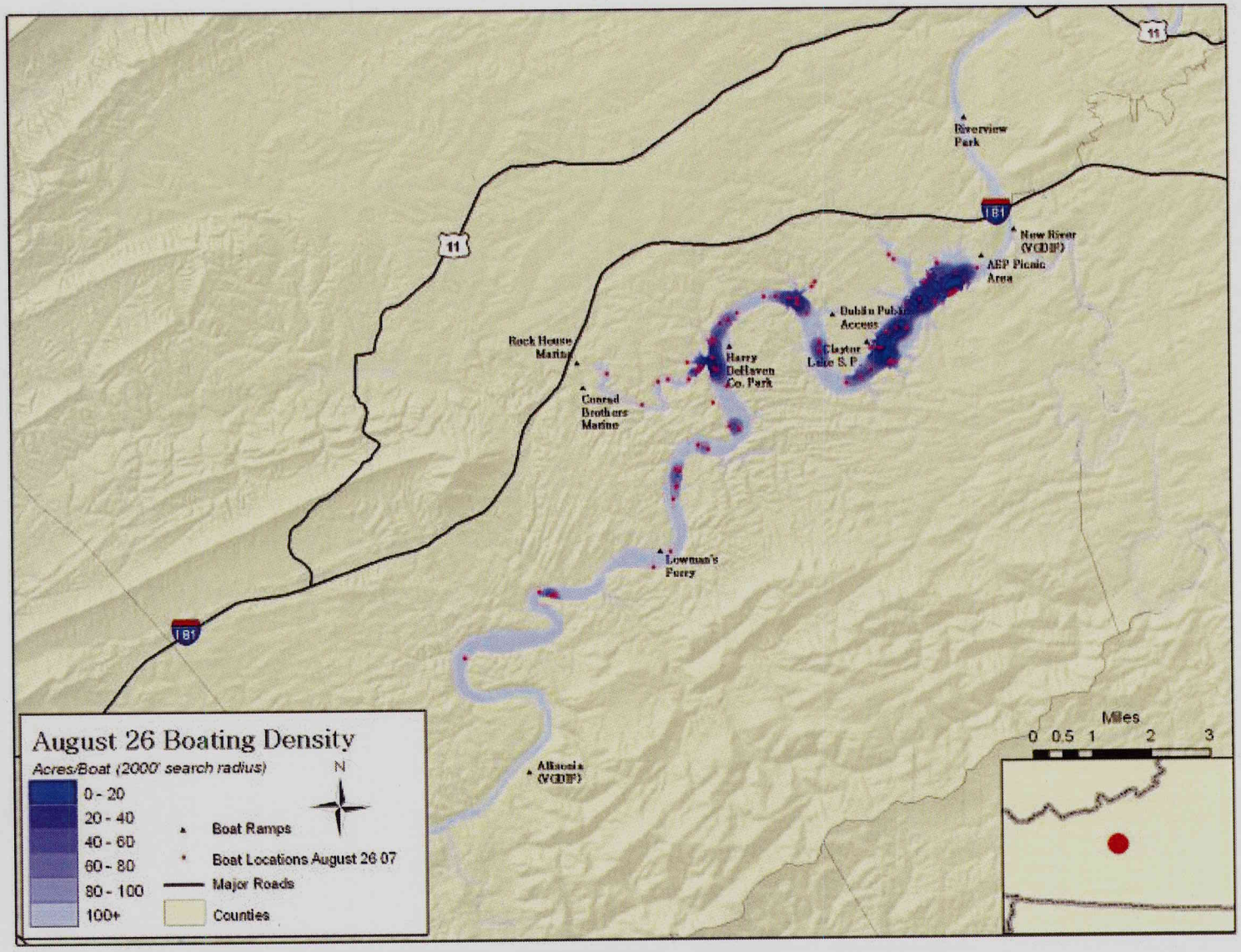
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Acres/Boat (2000' search radius)
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20 - 40
40 - 60
60 - 80
80 - 100
100+
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Boat Ramps
Boat Locations August 26 07
Major Roads
Counties
Miles
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Riverview Park
New River (VCDIF)
AEP Picnic Area
Dublin Public Access
Clayton Lake S. P.
Harry DeHaven Co. Park
Rock House Marina
Conrad Brothers Marine
Lowman's Ferry
Allacia (VCDIF)
11
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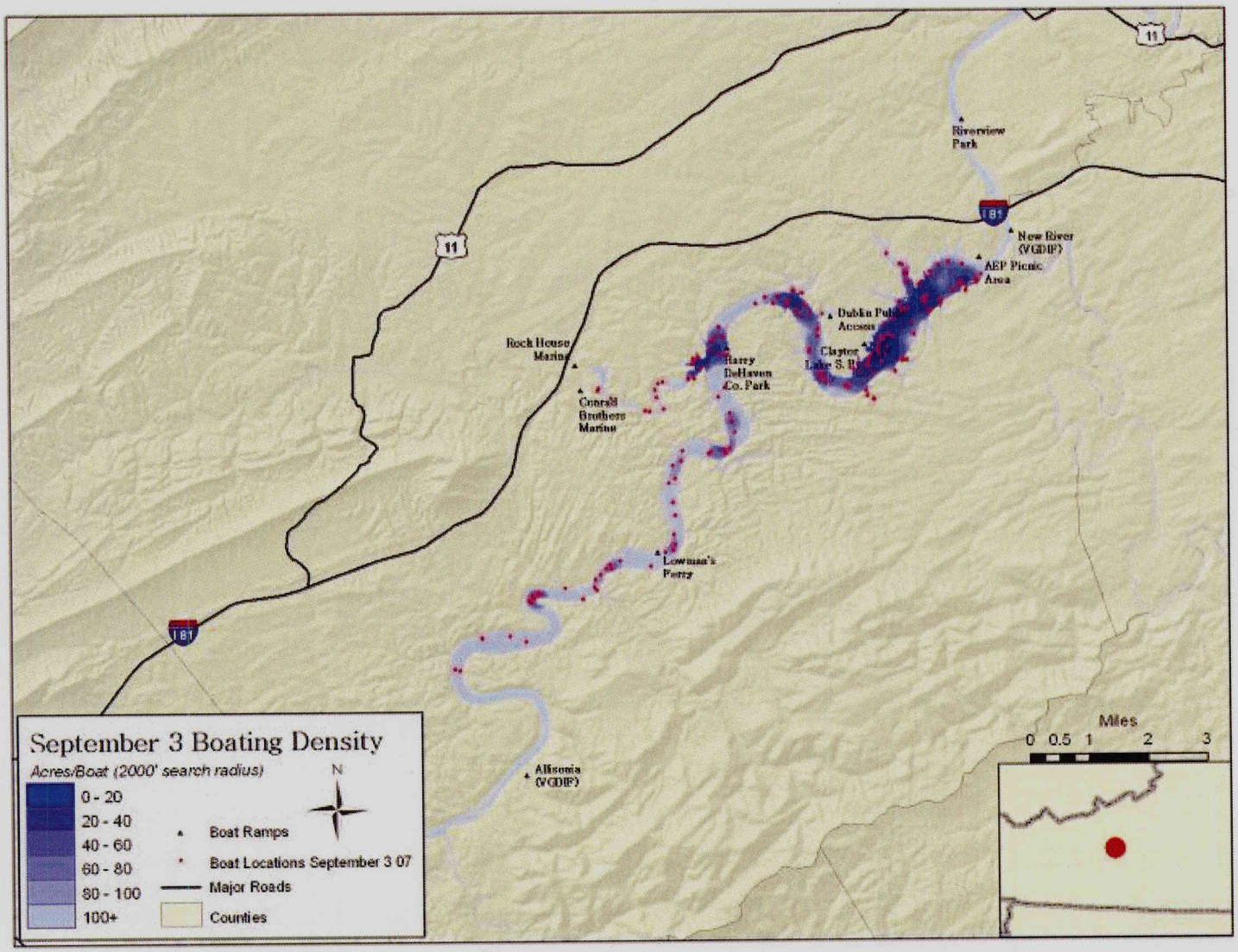
September 3 Boating Density
Acres/Boat (2000' search radius)
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100+
Boat Ramps
Boat Locations September 3 07
Major Roads
Counties
N
Miles
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Riverview Park
New River (VGDIP)
AEP Picnic Area
Dublin Public Access
Clayton Lake S. Park
Harry DeHaven Co. Park
Rock House Marina
Conrad Brothers Marina
Lowman's Ferry
Allisonia (VGDIP)
11
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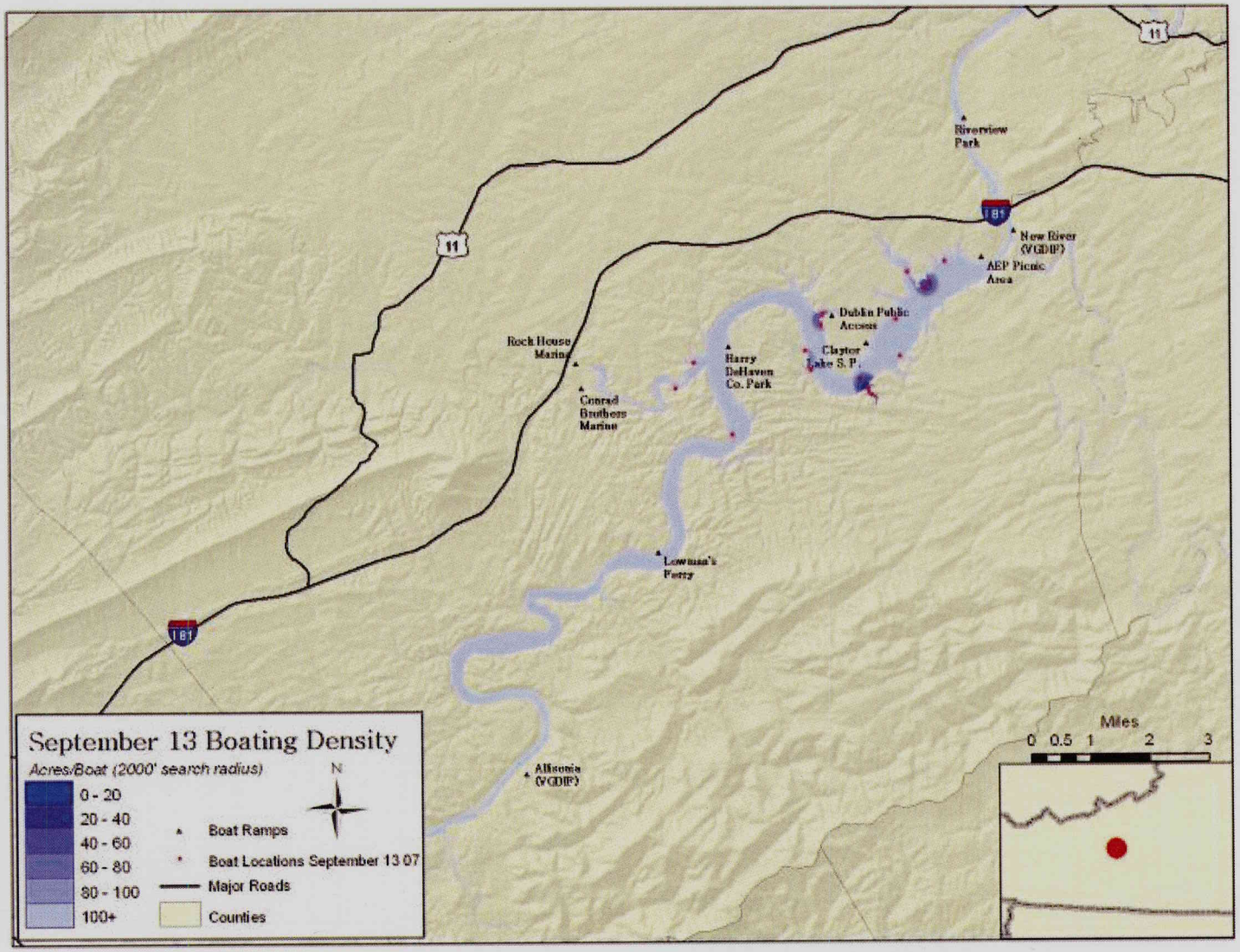
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Acres/Boat (2000' search radius)
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100+
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Boat Ramps
Boat Locations September 13 07
Major Roads
Counties
Miles
0 0.5 1 2 3
Riverview Park
New River (VGDIP)
AEP Picnic Area
Dublin Public Access
Clayton Lake S. P.
Harry DeHaven Co. Park
Rock House Marina
Conrad Brothers Marina
Lowman's Ferry
Allisonia (VGDIP)
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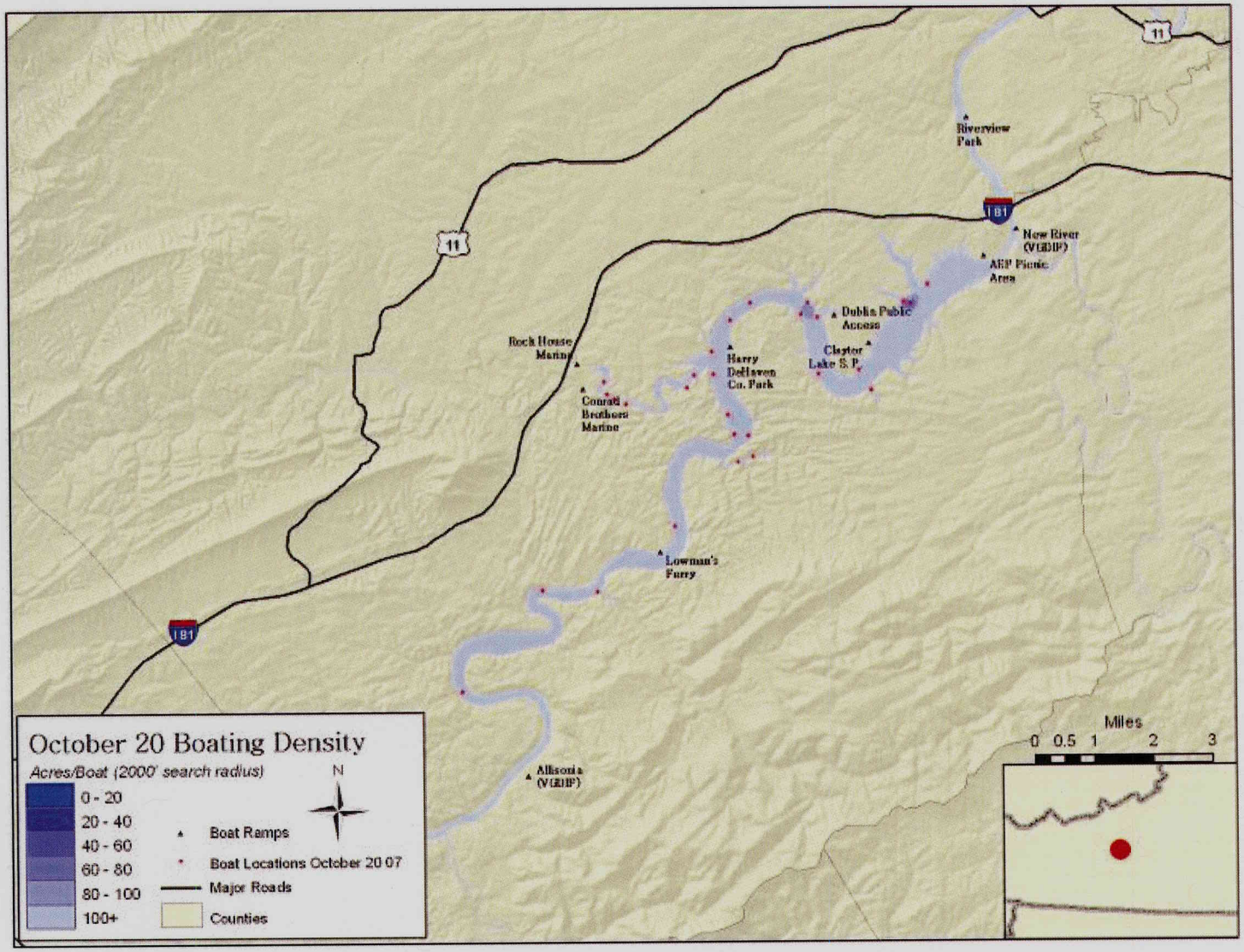
October 20 Boating Density
Acres/Boat (2000' search radius)
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100+
N
Boat Ramps
Boat Locations October 20 07
Major Roads
Counties
Miles
0 0.5 1 2 3
Riverview Park
New River (VEDIP)
AEP Picnic Area
Dublin Public Access
Clayton Lake S.P.
Harry DeHaven Co. Park
Rock House Marina
Conrad Brothers Marina
Lowman's Ferry
Allisonia (VEDIP)
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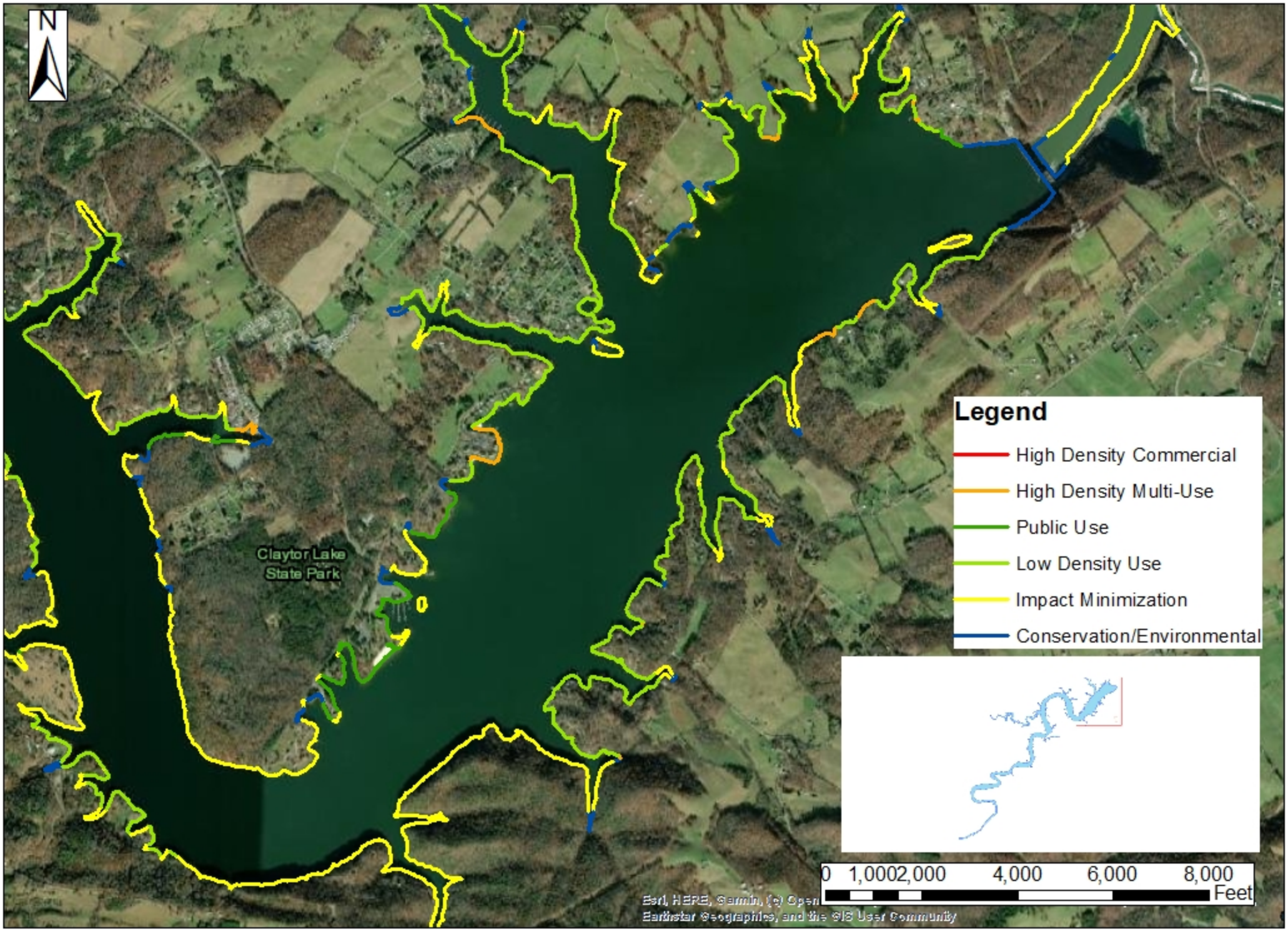
Appendix D
Shoreline Classification Maps

Claytor Lake Project No. 739

Shoreline Classifications



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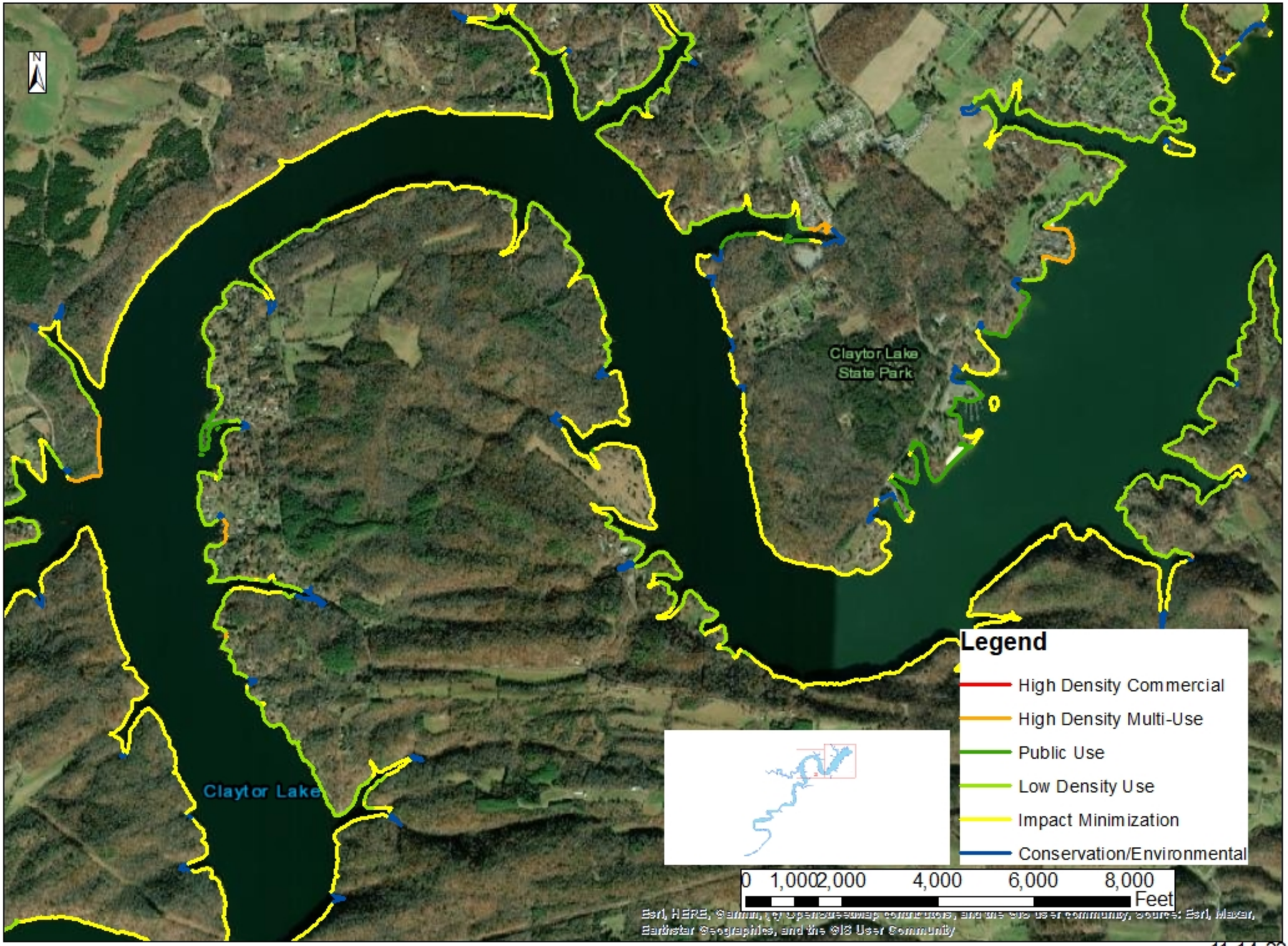
Claytor Lake Project No. 739

Shoreline Classifications



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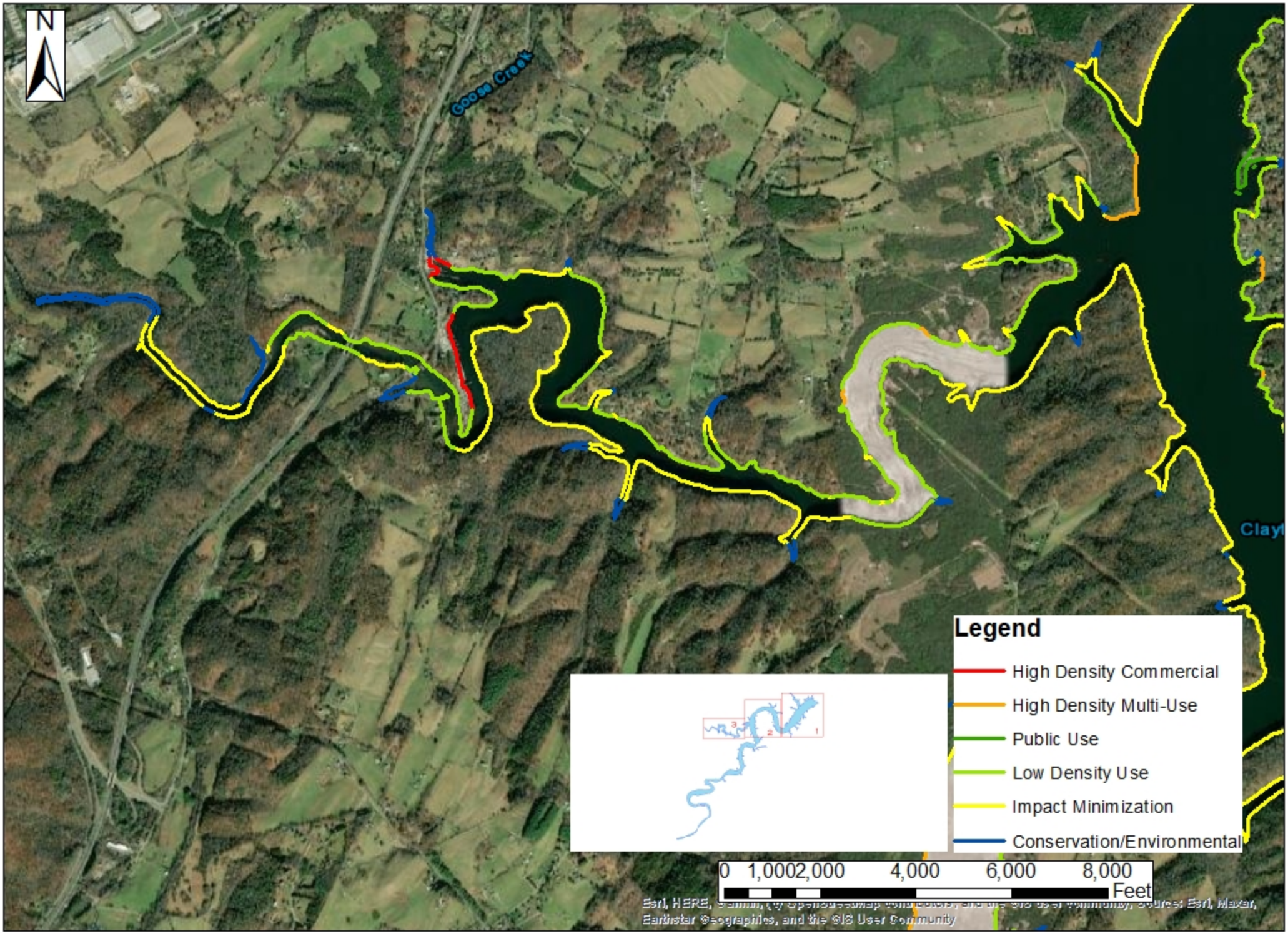

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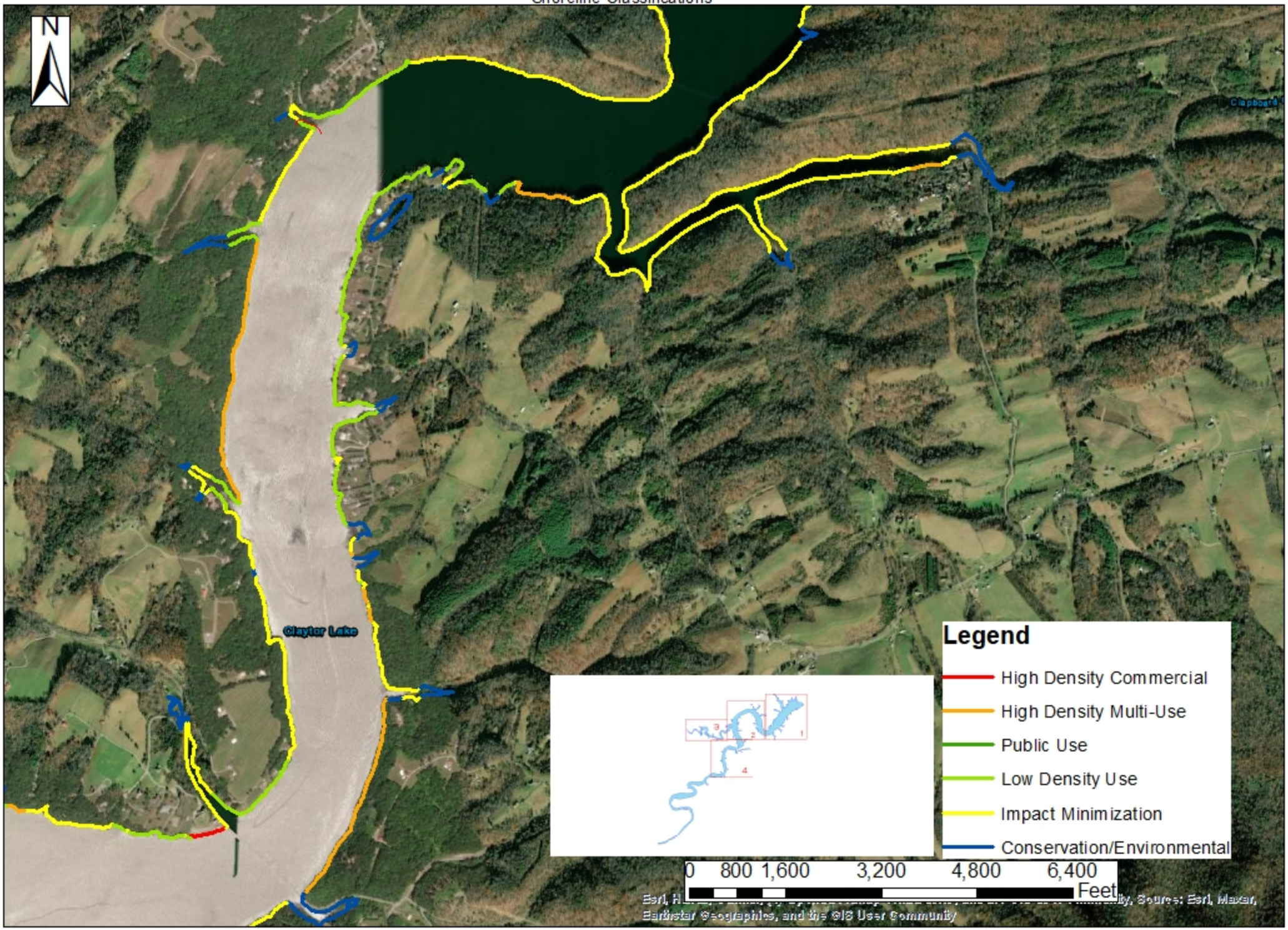

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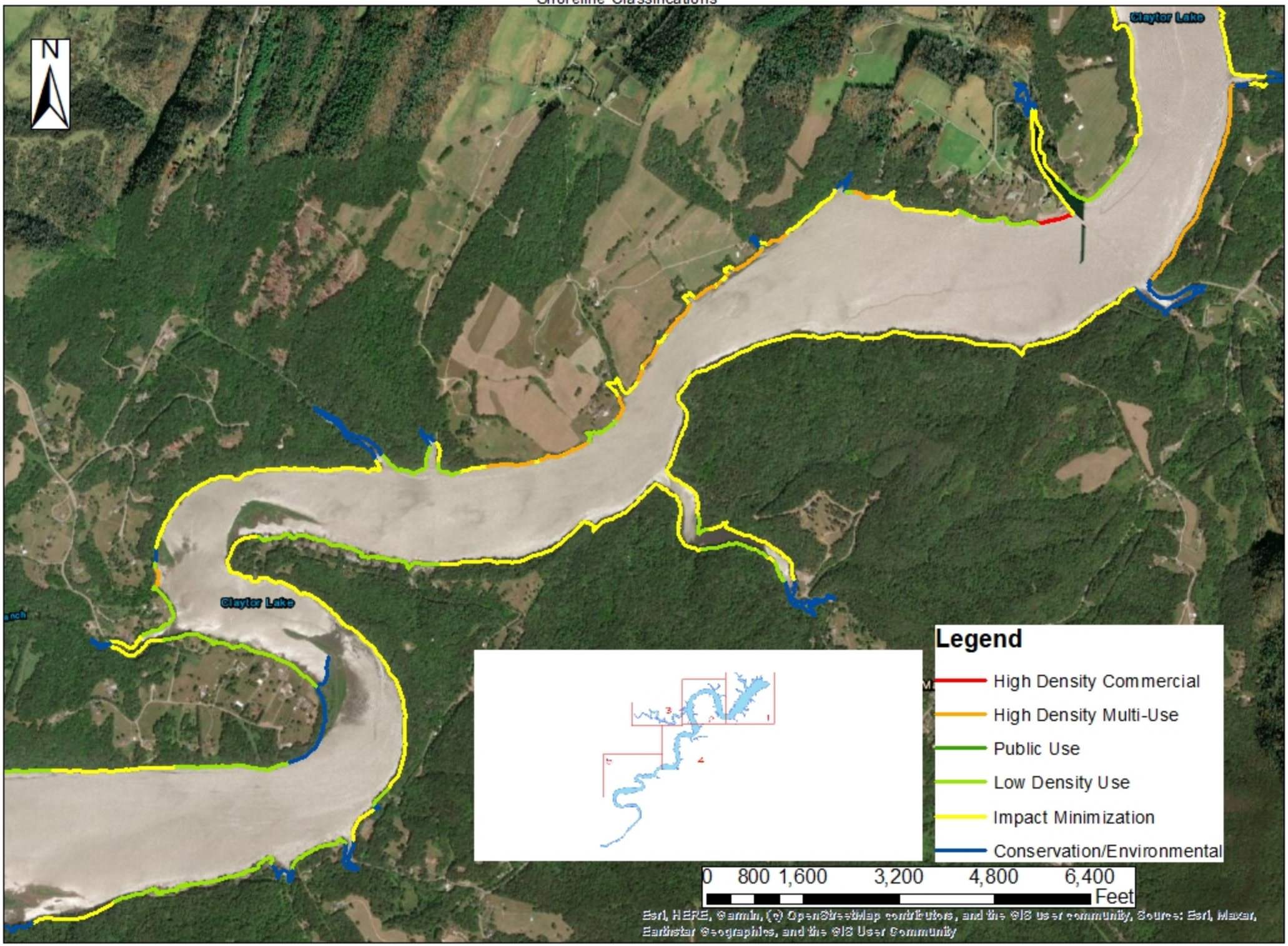

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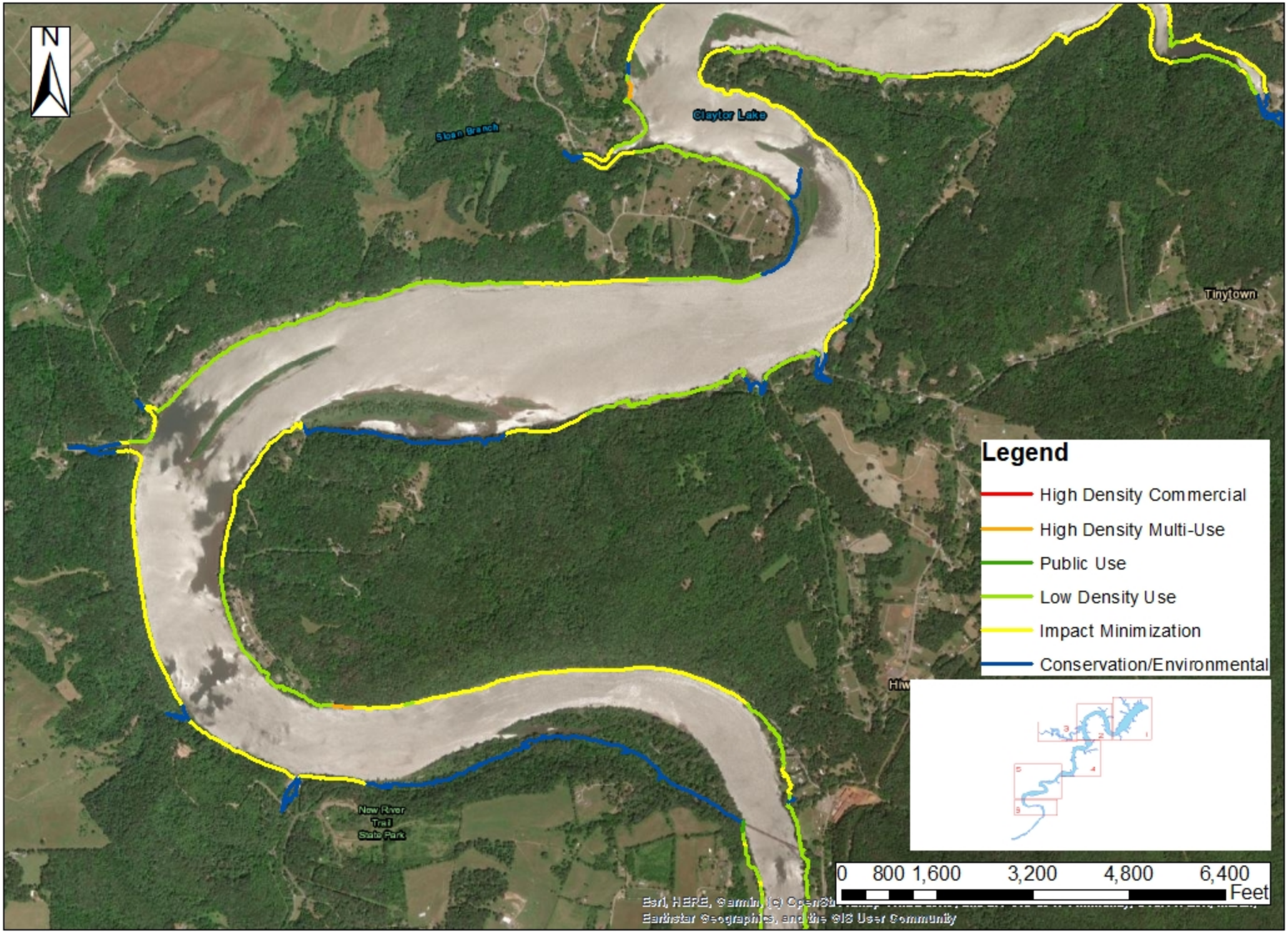

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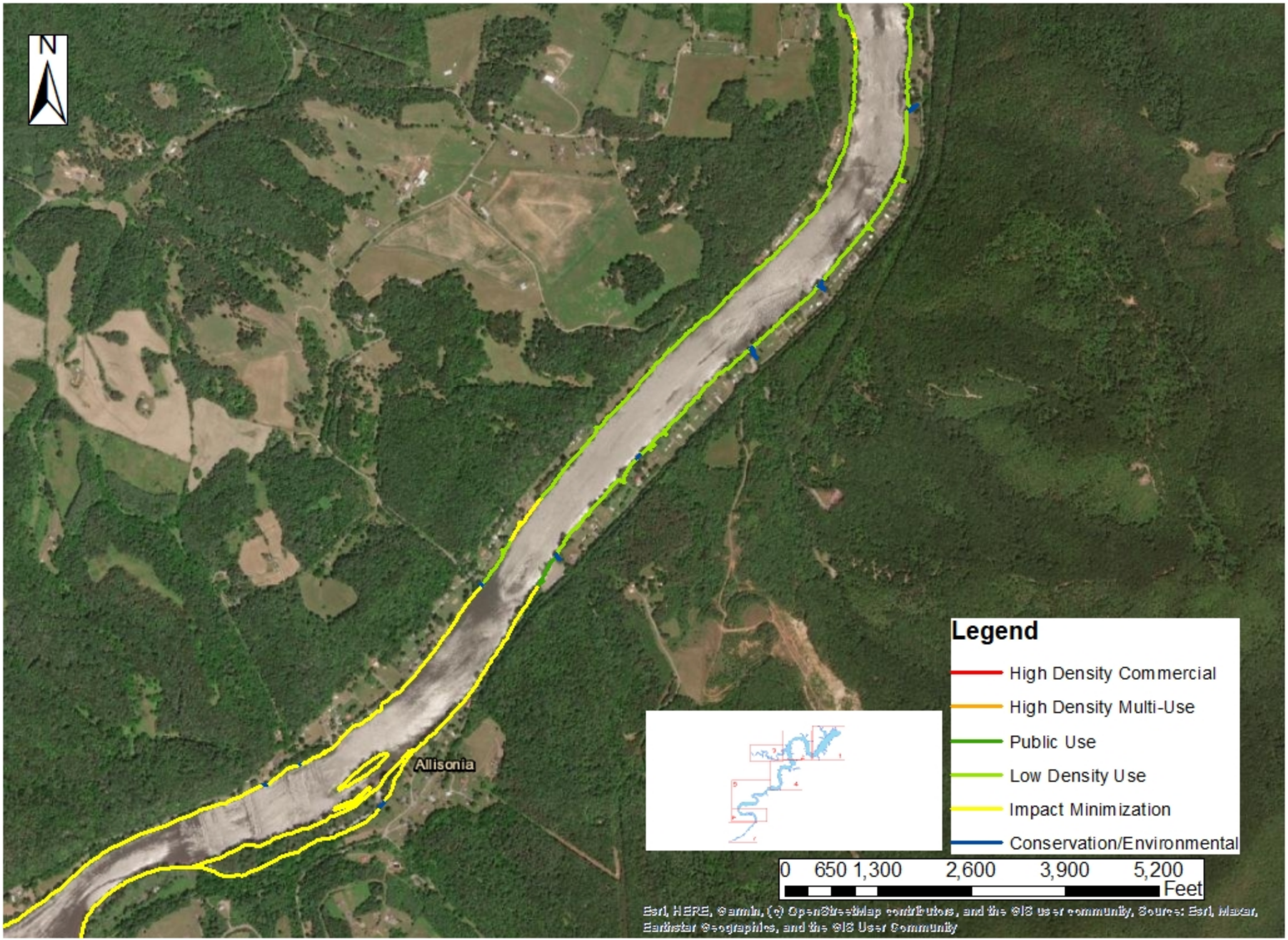
Claytor Lake Project No.739

Shoreline Classifications



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Appendix E
Virginia Tech
Claytor Lake Scenic Report
Erosion Control Techniques

Table 4.4 Comparative Matrix of Erosion Control Techniques

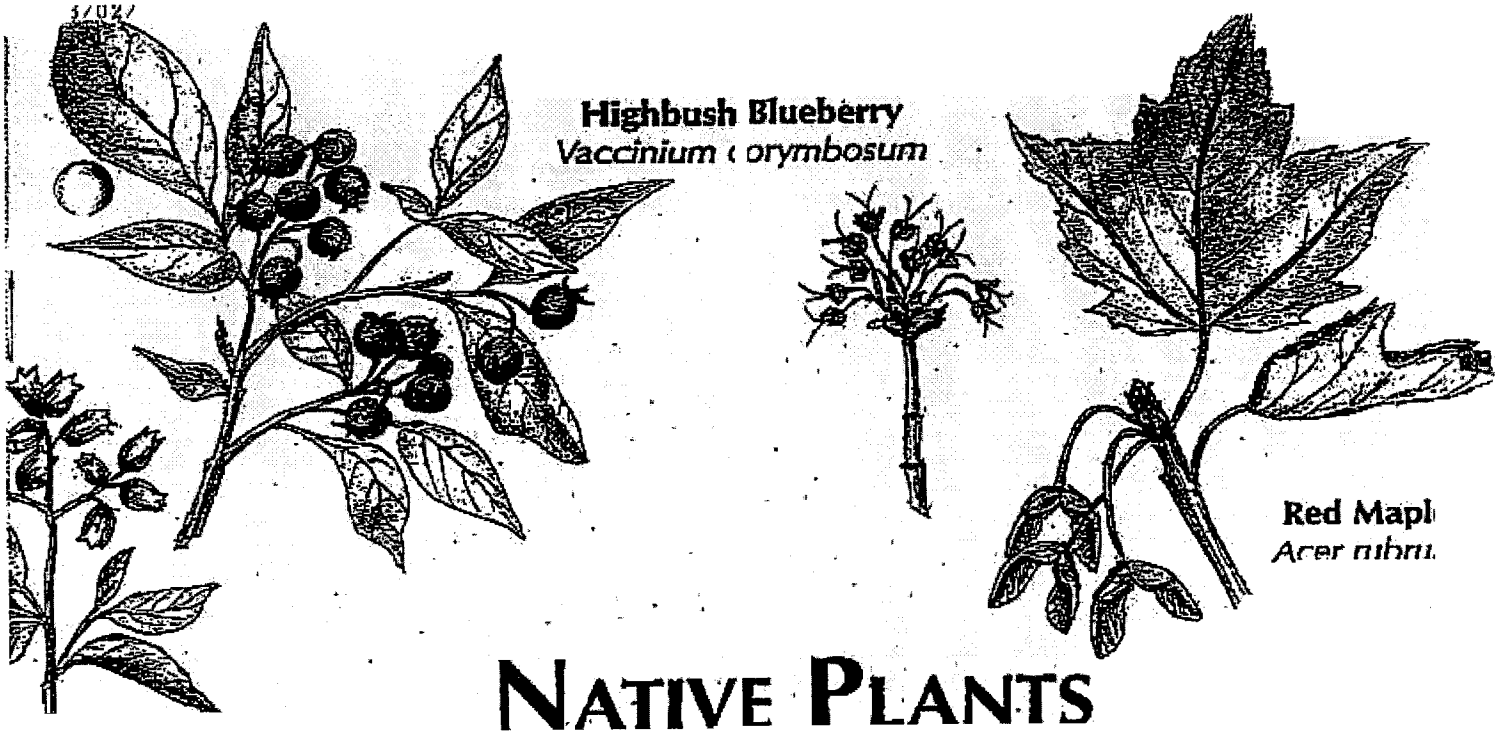
	Images	Function	Construction	Pro	Con	Suitable sites	Natural	Ecologic
Retaining Walls				They are economical and easy to install.		Better limited to those visual management units whose character includes settlement.	---	---
Rip Rap			A research on methods of planting appropriate shoreline vegetation when installing rip rap is suggested.		It may contrast visually with the natural character of the shoreline.	Less densely developed portions	--	+
Planting and Seeding		This technique dissipates wave energy, filter sediment and nutrients from upland runoff, and improve wildlife habitat for terrestrial and aquatic species.	shallow water, replant	dissipate wave energy, filter sediment and nutrients		3:1 or flatter	++	++
Live staking		This technique is more applicable as a preventive measure before severe erosion problems occur				3:1 or flatter	+	+
Coir log revetment		This technique stabilizes slopes and minimize bank erosion	placed at the foot of bank slopes or in the water, molded to fit the bank line, and then anchored in place by wooden stakes or a rock footer	blend into the natural environment and effectively trap and retain sediment, retain moisture for plant growth, and provide bank stability while new vegetation takes root and increases in density		2:1 or flatter, bank foot	++	++

Table 4.4 Comparative Matrix of Erosion Control Techniques

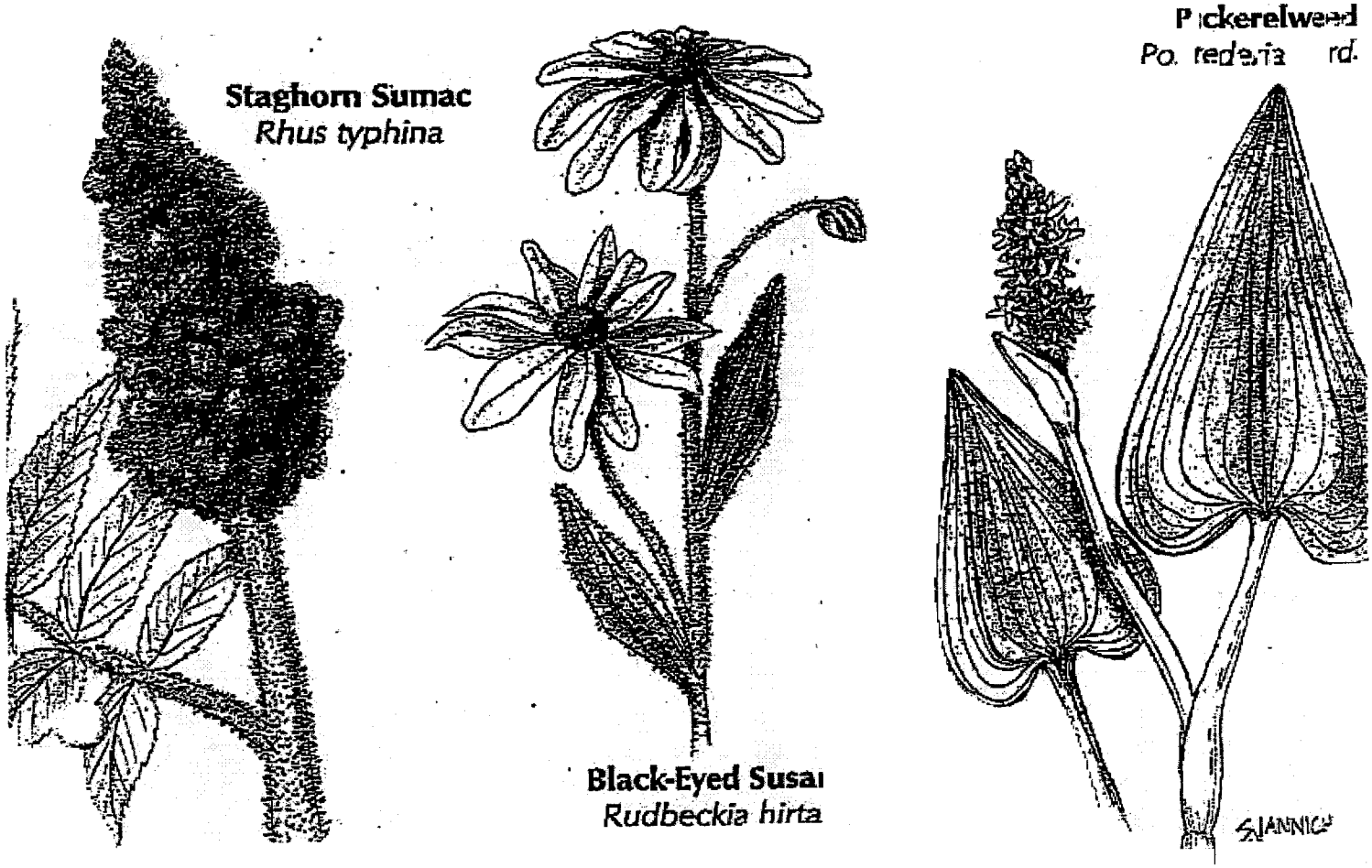
	Images	Function	Construction	Pro	Con	Suitable sites	Natural	Ecologic
Natural Fiber Matting Installation		This technique minimizes the loss of sediment from the land and trap wave-transported sediment.	laid over, can be planted with marsh grasses or riparian vegetation	flexible to be molded to the irregular surface contours; they are available from several manufacturers whose products are competitively priced			++	++
Rock Footer Placement		This technique anchors and supports bio-logs and stabilizes the restored shoreline.	supports the structural integrity of the bio-log	supports structural integrity and prevents from sloughing		Bank foot	+	+
Low-Crested Segmented Rock Sill Stabilization		This technique dissipates wave energy, protect newly planted marsh grasses from wave action in medium-energy environments	freestanding rock structures placed in the water parallel to shore to dissipate wave energy	protect newly planted marsh grasses from wave action		. This technique is applicable in newly planted areas where the bank is relatively flat.	-	++
Armoring with interlock blocks		Resistant to horizontal & vertical movement of pipelines/cables; protection against dragging anchors; wave, currents & storm protection		Permanent solution with low life-cycle cost	It will not be able to move interlocking blocks at high flows if the stream is small.	More intensively developed area	++	-
Gabions				It is potential to vegetate a standard gabion basket or wire faced wall offers unique landscaping potential as well.			- -	-

Table 4.4 Comparative Matrix of Erosion Control Techniques

Appendix F
U.S. Fish and Wildlife Service
Native Plants for Wildlife Habitat



NATIVE PLANTS
or
WILDLIFE HABITAT



Compiled by the U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, in cooperation with Irvine Natural Science Center and Adkins Arboretum.

U.S. Fish and Wildlife Service, Chesapeake Bay Field Office
The Fish and Wildlife Service is a federal agency responsible for protecting, enhancing and managing the nation's fish and wildlife resources. The Chesapeake Bay Field Office has several programs to assist private landowners and schools in wildlife habitat restoration.
Address: 177 Admiral Cochrane Drive, Annapolis, MD 21401. Telephone: (410) 573-4500.

Irvine Natural Science Center
The Irvine Natural Science Center is a private nonprofit educational organization offering programs of environmental studies and natural science to children and adults in the greater Baltimore area. The purpose of these programs is to inspire an appreciation and respect for the natural world, to increase awareness of environmental issues and to encourage individuals to sustain the earth's ecosystem.
Address: St. Timothy's School, Stevenson, MD 21153. Telephone: (410) 484-2413.

Adkins Arboretum
Adkins Arboretum contains 500 acres of native trees and shrubs arranged in natural forest types. The arboretum offers educational programs.
Address: Tuckahoe State Park, Rt. 1 Box 23, Queen Anne, MD 21657. Telephone: (410) 634-2847.

Compiled by Rich Mason and Jason Hitchcock.
Cover illustration by Sandy Janniche.
Other illustrations by Sandy Glover and Rich Mason.

November 1995

ABOUT THIS GUIDE

This guide is intended to help in the selection of native plants for habitat restoration and natural landscaping projects. All of the plants occur naturally in parts of the Mid-Atlantic region. Plants are listed in alphabetical order by Latin name within each section.

GROWTH CONDITIONS

Light

Full sun: The site is in direct sunlight for at least 6 hours a day during the growing season.

Partial sun: The site receives approximately 3 to 6 hours of direct sunlight.

Shade: The site receives less then 3 hours of direct sun.

Moisture

Flooded: Areas where standing water is present for much of the growing season. This is where typical emergent wetland plants will grow.

Wet: Areas where the soil is saturated for much of the growing season, the exception being droughts. Wet conditions can be found at the edges of ponds, streams, and rivers and in ditches. Wet conditions may exist in poorly drained soils with a high clay content. Many plants that prefer wet conditions can tolerate periodic flooding as well as periodic drought.

Moist: Areas where the soil is damp. These areas are occasionally saturated. Moist areas can be found near waterways at slightly higher elevations than wet sites. Moist conditions can be found where the sun and wind are partially blocked, such as in a woodland or on the shady side of a building.

Well-drained: Areas where rain water drains fairly quickly and puddles do not remain long after hard rains. Generally, well-drained areas consist of soils containing enough sand or silt particles to allow rain water to percolate down through the soil.

Dry: Areas in full sun or in a windy location. South-facing slopes or areas against a south-facing wall may have dry conditions. Sandy soils drain well and have a tendency to be dry. Steep hills may be dry if rain water runs off quickly. Water does not remain after a rain in dry areas.

Salinity

The range of salinity tolerance is given in parts per thousand (ppt) for the herbaceous wetland plants.

Soil

Many of the plants grow in a wide range of soil types, therefore information about soil was omitted. If your site has one of the following site conditions it would be wise to get advice on soil preparation from a nursery, botanist Cooperative Extension Office or other expert:

1. Very sandy or heavy clay soils.
2. Compacted soils. Because compacted soils have less space between individual soil particles, air and water do not move readily through these soils. Air and water movement is critical to healthy plant growth. Roots cannot grow well in compacted soils. Compaction can occur from heavy equipment and removal of topsoil.
3. Soil ph below 5.5 or above 6.8. A ph outside this rang will restrict or limit plant growth.

WILDLIFE BENEFITS

Many of the plants listed provide some type of food for wildlife including seeds, fruit, nuts, berries or nectar. A list of selected species that are known to eat part of the plant is given. Plants also provide nesting habitat and shelter for many wildlife species.

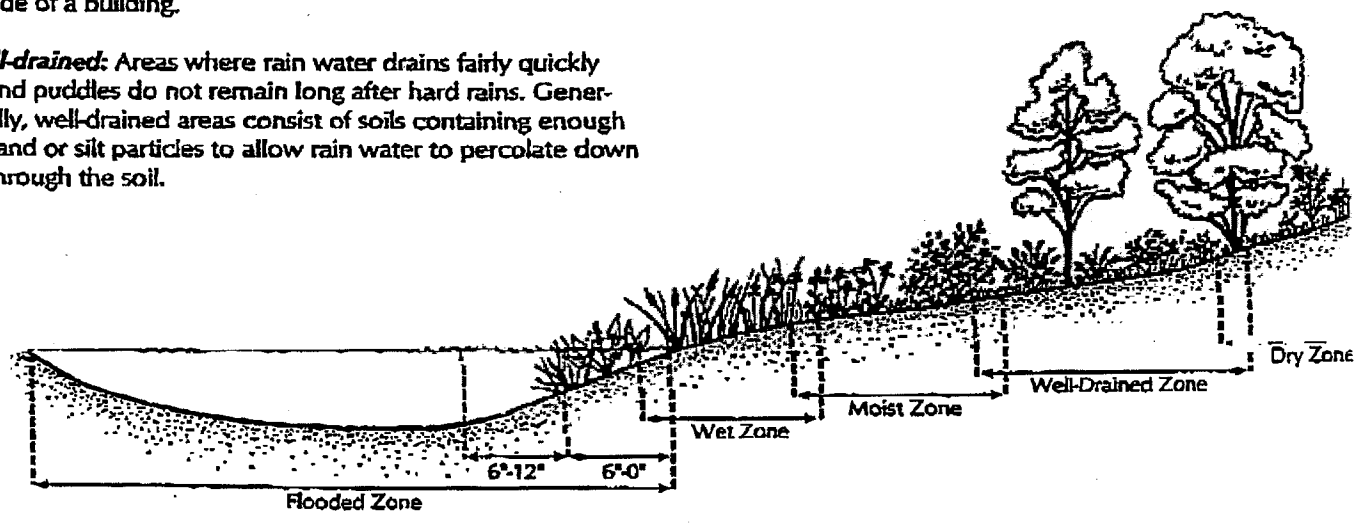


Diagram of moisture zones

WHY USE NATIVE PLANTS?

Native or indigenous plants are adapted to the local soil, rainfall and temperature conditions, and have developed natural defenses to withstand many types of insects and diseases. Because of these traits, native plants will grow without a lot of maintenance. Wildlife species evolve with plants; therefore, they use native plant communities as their habitat. Using native plants helps preserve the balance of natural ecosystems. In contrast, many natural ecosystems have been degraded by exotic, or non-native plants introduced from other parts of the world. Some of these introduced plants are invasive, meaning they do not have any natural controls. Invasive plants can spread rapidly and smother native vegetation. Ecosystems impacted by invasive exotic plants have less wildlife and plant diversity than unaffected systems. A list of invasive exotic plants to avoid is provided in the back of this guide.

WHERE TO FIND NATIVE PLANTS

Most nurseries carry some native plants. A few nurseries specialize in native plants and carry a greater selection than traditional nurseries. Plants should never be collected from the wild unless the area is being cleared for development.

TIPS ON SITE SELECTION

1. Identify areas of unused lawn that could be naturalized for less maintenance and better wildlife habitat.

2. Look for opportunities to expand the size of existing natural areas.

3. Look for ways to make corridors for wildlife by connecting natural areas with hedgerows. Hedgerows are narrow bands of vegetation like the ones found between farm fields.

TIPS ON DESIGNING A HABITAT

1. Where feasible, try to re-create components found in natural habitats. For instance, a woodland includes small herbaceous plants, small shrubs, large shrubs, small trees and large trees as well as decaying logs, dead brush and leaf litter. Incorporate as many of these features as possible into a woodland habitat project.

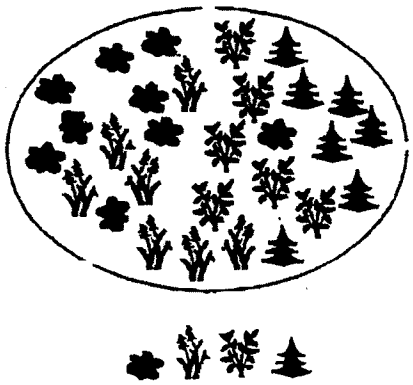
2. Arrange your native plants in aggregate groups or groves rather than individual plants surrounded by mowed lawn. Aggregate plantings resemble the natural plant communities that wildlife use as habitat. By not mowing between plants, other plants will colonize your planting, adding to the habitat diversity. Remove any invasive exotic plants.

3. Planting layout: Plants occur in natural plant communities in many different arrangements. The most common arrangement occurs when similar species of plants are loosely grouped together (see the following diagram). These groups overlap and are interspersed with other species.

4. Plant Spacing: Do not plant on a grid pattern with plants evenly spaced. Attempt to simulate the random spacing that occurs in natural plant communities. The following spacing guidelines are used to determine the number of plants needed for a specific area: Herbaceous plants 1' to 2' apart. Shrubs and small trees 5' to 8' apart. Large trees 10' to 15' apart.

5. Select a variety of plants that fruit or bloom during different times of the year to provide food for wildlife year round.

Planting Layout



Different species

6. Larger areas usually provide habitat for more species than smaller areas.

7. A diversity of plants will attract more wildlife.

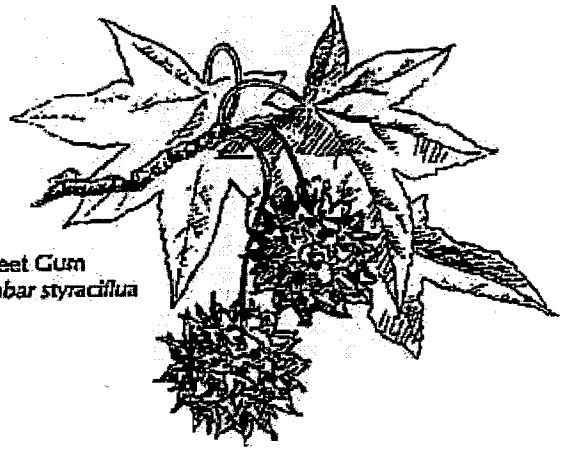
8. Provide water if possible. Bird baths or shallow dishes work well. A small temporary puddle or pool may provide a place for frogs and salamanders to lay eggs.

9. Incorporate feeders and nesting boxes to complement plantings.

10. Avoid using toxic pesticides.

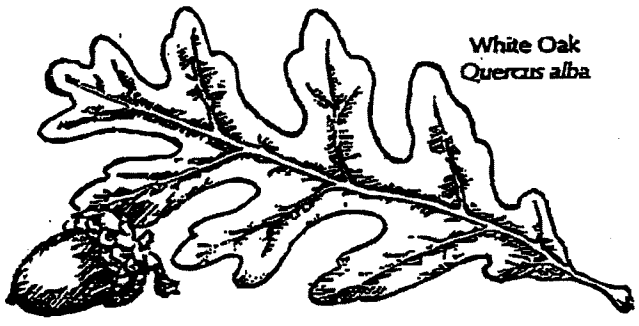
COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
LARGE TREES			
Red Maple *Acer rubrum*	Light: partial to full sun Moisture: wet to well-drained (tolerates flooding)	Red March bloom, red fall color, medium to fast growth rate, height 40'-60', aggressive–do not over plant	Food: Seeds and sap. Wildlife: chickadees, robin, cardinal, finches, chipmunk, deer
River Birch *Betula nigra*	Light: partial to full sun Moisture: wet to well-drained (tolerates flooding)	Unique peeling reddish-white bark, medium to fast growth rate, height 30'-50'	Food: fruit, sap, buds. Wildlife: ducks, nuthatches, chickadees, finches, fox sparrow, rabbit
Bitternut Hickory *Carya cordiformis*	Light: partial sun Moisture: wet to well-drained	Slender with large crown, slow to medium growth rate, height 60'-80'	Food: nuts, sap, foliage. Wildlife: woodpeckers, blue jay, nuthatches, warblers, cardinal, chipmunk
Hackberry *Celtis occidentalis*	Light: partial to full sun Moisture: wet to well-drained	Adapted to a wide range of conditions, medium to fast growth rate, height 40'-60'	Food: fruit, twigs. Wildlife: mourning dove, quail, bluebird, catbird, thrushes, sparrows, squirrel, deer
Persimmon *Diospyros virginiana*	Light: full sun Moisture: wet to well-drained	Dioecious, orange fruit used for jellies, medium to slow growth rate, height 35'-60'	Food: fruit. Wildlife: woodpeckers, mockingbird, robin, cedar waxwing, bluebird, opossum, skunk, fox, deer
Beech *Fagus grandifolia*	Light: partial to full sun (prefers partial when young) Moisture: moist to well-drained	Beautiful, smooth silvery-white bark, excellent shade tree, slow growth rate, height 50'-100'	Food: nuts, sap, buds. Wildlife: wood duck, quail, woodpeckers, blue jay, tufted titmouse, chickadees, nuthatches
White Ash *Fraxinus americana*	Light: partial to full sun Moisture: moist to well-drained	Yellow to dark maroon fall color, medium growth rate, height 50'-80'	Food: seeds, foliage. Wildlife: finches, grosbeaks, wood duck, red-winged blackbird, squirrel, deer
Green Ash *Fraxinus pennsylvanica*	Light: partial to full sun Moisture: wet to well-drained	Yellow fall color, fast growth rate, height 50'-60'	Food: seeds, foliage. Wildlife: finches, grosbeaks, wood duck, red-winged blackbird, squirrel, deer
Black Walnut *Juglans nigra*	Light: full sun Moisture: moist to well-drained (best growth in rich moist soil)	Highly prized wood, edible nuts, medium growth rate, height 50'-75'	Food: nuts. Wildlife: woodpeckers, chickadees, blue jay, warblers, junco, Carolina wren, squirrel
Sweet Gum *Liquidambar styraciflua*	Light: partial to full sun Moisture: wet to well-drained	Adapted to a wide range of conditions, yellow-red fall color, medium to fast growth rate, height 60'-80'	Food: seeds. Wildlife: mourning dove, carolina wren, finches, junco, beaver, squirrel, chipmunk

Hackberry
Celtis occidentalis



Sweet Gum
Liquidambar styraciflua

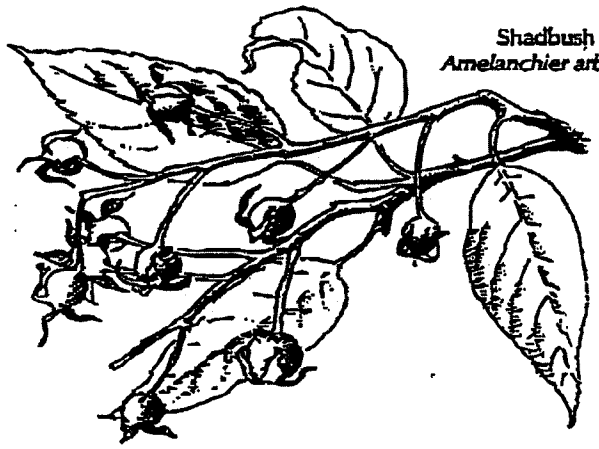
COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Tulip Poplar *Liriodendron tulipifera*	Light: partial to full sun Moisture: moist to well-drained	Graceful, large yellow flower, golden yellow fall color, fast growth rate, height 70'-120' or more	Food: seeds, sap, nectar. Wildlife: chickadees, woodpeckers, cardinal, finches, hummingbird, honeybees
Black Gum *Nyssa sylvatica*	Light: partial to full sun Moisture: wet to well-drained	Beautiful, shiny green leaves, bright red fall color, bluish berries, slow growth rate, height 30'-60'	Food: berries. Wildlife: wood duck, thrushes, woodpeckers, Eastern kingbird, cedar waxwing, squirrel
Sourwood *Oxydendrum arboreum*	Light: shade to full sun Moisture: well-drained	Pyramidal shape with drooping branches, white flowers, brilliant scarlet fall color, slow growth rate, height 25'-35'	Food: twigs. Wildlife: deer
Sycamore *Platanus occidentalis*	Light: partial to full sun Moisture: wet to well-drained	Unique white and brown peeling bark, fast growth rate, among the tallest of native trees, height 75'-100'	Food: seeds. Wildlife: finches, squirrel. Also provides nesting cavities.
Black Cherry *Prunus serotina*	Light: full sun Moisture: moist to well-drained	Adaptable to a range of conditions, white flowers, black berries, valuable timber, fast growth rate, height 40'-60'	Food: berries, sap. Wildlife: thrushes, orioles, tanagers, crows, grosbeaks, woodpeckers, deer, squirrel, rabbit
White Oak *Quercus alba*	Light: partial to full sun Moisture: well-drained	Majestic, light scaly bark, variable fall color, slow to medium growth rate, height 50'-90'	Food: acorns are a very important food source. Wildlife: quail, turkey, grouse, ducks, woodpeckers, blue jay, brown thrasher, towhee, nuthatch, squirrel, chipmunk, raccoon, gopher, opossum, deer
Swamp Oak *Quercus bicolor*	Light: partial to full sun Moisture: wet to well-drained	Good choice for wet sites, slow to medium growth rate, height 60'-70'	
Scarlet Oak *Quercus coccinea*	Light: full sun Moisture: moist to well-drained	Scarlet red fall color, medium growth rate, height 40'-60'	same as White Oak
Southern Red Oak *Quercus falcata*	Light: full sun Moisture: moist to well-drained	Large crown and limbs, good shade tree, variable fall color, medium to slow growth rate, height 70'-80'	same as White Oak
Pin Oak *Quercus palustris*	Light: full sun Moisture: wet to moist	Small branches, bronze or red fall color, medium growth rate, height 60'-80'	same as White Oak
Willow Oak *Quercus phellos*	Light: full sun Moisture: wet to well-drained	Adapted to a range of conditions, small willow-like leaves, slow to medium growth rate, height 70'-80'	same as White Oak



White Oak
Quercus alba

Tulip Poplar
Liriodendron tulipifera

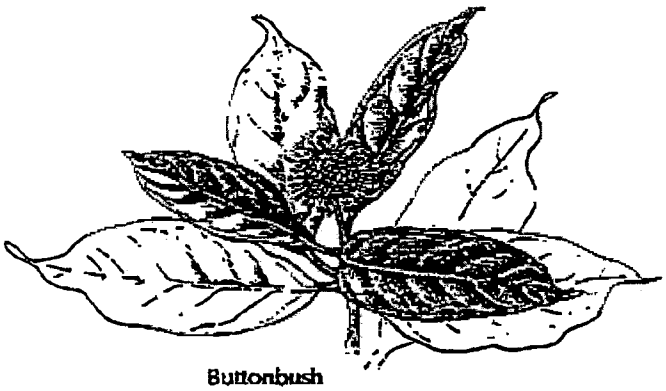
COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Chesnut Oak *Quercus prinus*	Light: partial to full sun Moisture: well-drained	Leaves similar to American Chestnut, orange-yellow fall color, slow to medium growth rate, height 60'-70'	same as White Oak
Red Oak *Quercus rubra*	Light: full sun Moisture: well-drained	Used extensively for landscaping, excellent red fall color, medium to fast growth rate, height 60'-75'	same as White Oak
Black Oak *Quercus velutina*	Light: full sun Moisture: well-drained	Similar and often hybridizes with Red Oak, medium to fast growth rate, height 50'-60'	same as White Oak
Black Willow *Salix nigra*	Light: partial to full sun Moisture: flooded to moist	Dense light green foliage, excellent streambank stabilizer, fast growth rate, height 40'-80'	Food: buds, twigs, foliage. Wildlife: grouse, beaver, deer
Sassafras *Sassafras albidum*	Light: partial to full sun Moisture: moist to well-drained	Dark green leaves of three different shapes, medium growth rate, height 30'-60'	Food: fruit. Wildlife: quail, catbird, flycatchers, mockingbird, pileated woodpecker
Bald Cypress *Taxodium distichum*	Light: partial to full sun Moisture: flooded to wet	Tall graceful tree with feathery light green foliage, deciduous conifer, medium growth rate, height 50'-70'	Food: seeds, foliage. Wildlife: ducks, marsh birds
SMALL TREES			
Juneberry, Shadbush, Serviceberry *Amelanchier arborea* *A. canadensis*	Light: shade to full sun Moisture: wet to well-drained	White flowers in early spring, blooms during shad run, edible berries in June, *A. arborea* small tree, *A. canadensis* more shrub-like, medium growth rate, height 15'-30'	Food: berries, twigs. Wildlife: thrushes, brown thrasher, catbird, woodpeckers orioles, tanagers, robin, junco, cardinal, beaver, squirrel, deer
Pawpaw *Asimina triloba*	Light: shade to full sun Moisture: wet to moist	Large leaves, unique flowers, edible fruit with banana-like taste, medium growth rate, height 6'-20'	Food: fruit. Wildlife: small mammals
Hornbeam, Ironwood, Musclewood *Carpinus caroliniana*	Light: shade to partial sun Moisture: wet to moist	Unique fluted gray bark, slow growth rate, height 20'-40'	Food: seeds, buds. Wildlife: wood duck, quail, beaver, squirrel, deer



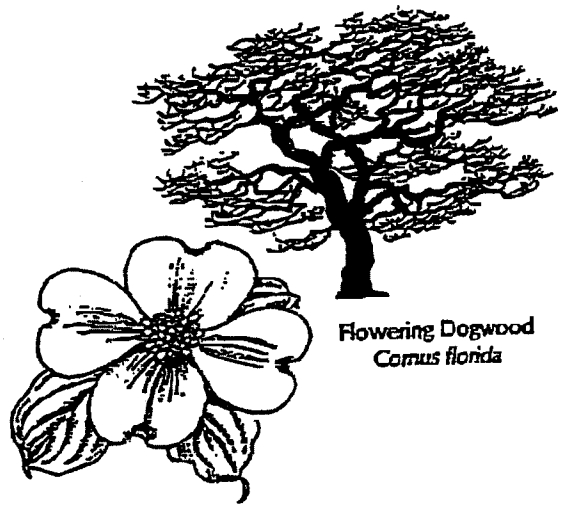
Shadbush
Amelanchier arborea

Chesnut Oak
Quercus prinus

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Fringetree *Chionanthus virginicus*	Light: shade to full sun Moisture: wet to well-drained	Beautiful white flowers, fragrant, blue fall berries, slow growth rate, height 8'-20'	Food: berries. Wildlife: rabbit, deer
Flowering Dogwood *Cornus florida*	Light: shade to partial sun Moisture: well-drained	Large white flowers symbolizing spring in the Eastern woodlands, red berries, slow to medium growth rate, height 15'-30'	Food: berries, foliage, twigs. Wildlife: quail, woodpeckers, cedar waxwing vireos, cardinal, squirrel, rabbit
Sweetbay Magnolia *Magnolia virginiana*	Light: partial to full sun Moisture: wet to well-drained	Almost evergreen waxy foliage, large white flowers, red berries, medium to fast growth rate, height 15'-40'	Food: seeds, twigs. Wildlife: red-eyed vireo, woodpeckers, towhee, squirrel, deer
Hop-Hornbeam *Ostrya virginiana*	Light: partial to full sun Moisture: moist to well-drained	Graceful, drooping branches, slow growth rate, height 20'-40'	Food: nuts, buds. Wildlife: wood duck, quail, rabbit, deer, squirrel
Common Chokecherry *Prunus virginiana*	Light: partial to full sun Moisture: moist to well-drained	Hardy, white flowers, purple berries, yellow fall color, medium growth rate, height 15'-30'	Food: berries, buds, foliage. Wildlife: quail, bluebird, catbird, orioles, thrasher, woodpeckers, rabbit, squirrel
SHRUBS			
Smooth Alder *Alnus serrulata*	Light: partial to full sun Moisture: wet	Tall with multiple trunks, small white flowers, good streambank stabilizer, height 10'-20'	Food: seeds, buds. Wildlife: ducks, quail, finches, mourning dove, deer
Devils Walking Stick, Hercules Club *Aralia spinosa*	Light: partial to full sun Moisture: moist to well-drained	Large thorns, large white flower clusters, red berries in fall, slow to medium growth rate, height 8'-15'	Food: berries, nectar. Wildlife: robin, woodpeckers, catbird, sparrows, chipmunk, butterflies
Red Chokeberry *Aronia arbutifolia*	Light: partial to full sun Moisture: wet to well-drained	Small white flowers, bright red fruit, more fruit in full sun, slow growth rate, height 6'-10'	Food: berries, buds. Wildlife: grouse, chickadees, cedar waxwing, meadowlark, squirrel
Black Chokeberry *Aronia melanocarpa*	Light: shade to full sun Moisture: wet to moist	More adapted to wetter areas than red chokeberry, dark purple berries, slow growth rate, height 3'-5'	Food: berries, buds. Wildlife: grouse, chickadees, cedar waxwing, meadowlark, squirrel
Buttonbush *Cephalanthus occidentalis*	Light: partial to full sun Moisture: flooded to wet	Unusual round white flowers June-July, medium growth rate, height 3'-6'	Food: seeds, nectar. Wildlife: hummingbirds, ducks, rails, beaver, butterflies, other insects



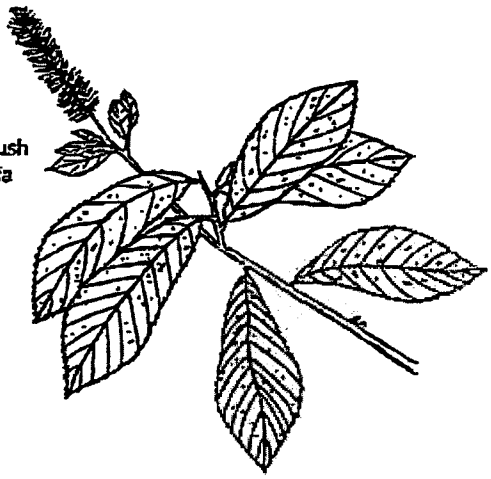
Buttonbush
Cephalanthus occidentalis



Flowering Dogwood
Cornus florida

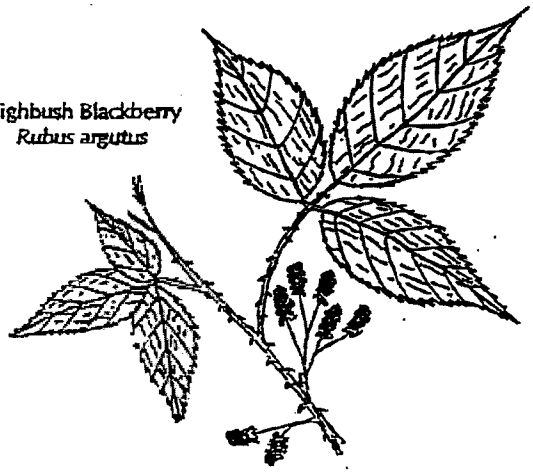
COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Sweet Pepperbush *Clethra alnifolia*	Light: partial to full sun Moisture: wet to moist	Showy white flower spikes July-Aug., slow to medium growth rate, height 3'-8'	Food: nectar. Wildlife: butterflies, other insects
Silky Dogwod *Cornus amomum*	Light: partial to full sun Moisture: wet to moist	White flowers, bluish fruit, medium growth rate, height 6'-10'	Food: berries, twigs. Wildlife: woodpeckers, vireos, cardinal, finches, pine warbler, deer
Gray Dogwood *Cornus racemosa*	Light: shade to full sun Moisture: wet to moist	White flowers, white berries, slow growth rate, height 10'-15'	Food: berries, twigs. Wildlife: woodpeckers, vireos, cardinal, finches, pine warbler, deer
Red Osier dogwood *Cornus stolonifera*	Light: partial to full sun Moisture: wet to moist	Good streambank stabilizer, red stems, white flowers and berries, fast growth rate, height 7'-9'	Food: berries, twigs. Wildlife: woodpeckers, vireos, cardinal, finches, pine warbler, deer
Strawberry Bush *Euonymus americanus*	Light: shade to partial sun Moisture: wet to dry	Green twigs, interesting red and orange fruit, medium growth rate, height 4'-7'	Food: foliage. Wildlife: deer, rabbit
Witchhazel *Hamamelis virginiana*	Light: partial to full sun Moisture: moist to well-drained	Small yellow flowers Oct.- Dec., medium growth rate, height 20'-25'	Food: seeds, twigs. Wildlife: grouse, deer
Inkberry *Ilex glabra*	Light: partial to full sun Moisture: wet to moist	Dioecious, evergreen, black berries, slow growth rate, height 6'-8'	Food: berries. Wildlife: woodpeckers, cedar waxwing, thrushes, finches, cardinal, chickadees, deer
Winterberry *Ilex verticillata*	Light: partial to full sun Moisture: wet to moist	Dioecious, bright red berries, slow growth rate, height 6'-10'	Food: berries. Wildlife: woodpeckers, cedar waxwing, thrushes, finches, cardinal, chickadees, deer
Virginia Sweetspire *Itea virginica*	Light: shade to full sun Moisture: moist to well-drained	Fragrant white flowers in mid-summer, slow to medium growth rate, height 3'-5'	Food: nectar. Wildlife: butterflies, other insects
Mountain Laurel *Kalmia latifolia*	Light: shade to full sun Moisture: moist to well-drained	Evergreen, showy white to pink flowers, slow growth rate, height 7'-15'	Food: nectar. Wildlife: butterflies, other insects
Spicebush *Lindera benzoin*	Light: shade to full sun Moisture: wet to well-drained	Fragrant twigs and leaves, red berries, yellow fall color, slow growth rate, height 6'-12'	Food: berries. Wildlife: thrushes, catbird, kingbird

Spicebush
Lindera benzoin



Sweet Pepperbush
Clethra alnifolia

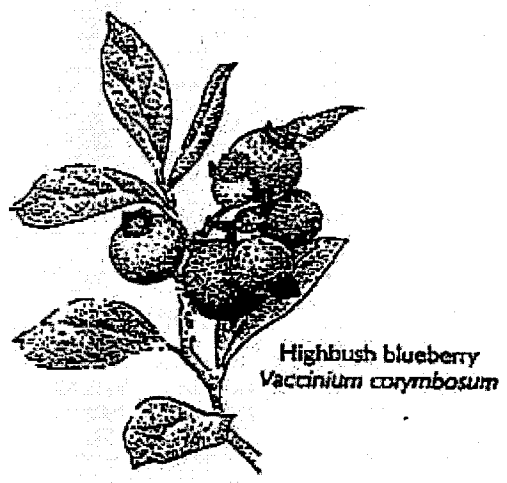
COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Wax Myrtle *Myrica cerifera*	Light: partial to full sun Moisture: wet to well-drained	Dioecious, evergreen, small waxy berries used in candle making, medium growth rate, height 5'-12'	Food: berries. Wildlife: quail, bluebird, catbird, tree swallow, yellow-rumped warbler
Bayberry *Myrica pensylvanica*	Light: partial to full sun Moisture: wet to well-drained	Dioecious, small waxy berries used in candle making, medium growth rate, height 5'-12'	Food: berries. Wildlife: quail, bluebird, catbird, tree swallow, yellow-rumped warbler
Flame Azalea *Rhododendron calendulaceum*	Light: partial to full Moisture: well-drained to dry	Deciduous, showy yellow to red-orange flowers, slow growth rate, height 4'-6'	Food: leaves, nectar. Wildlife: hummingbird, deer, butterflies, other insects
Pink Azalea *Rhododendron periclymenoides*	Light: partial to full sun Moisture: moist to well-drained	Deciduous, pink flowers, slow growth rate, height 4'-7'	Food: leaves, nectar. Wildlife: hummingbird, deer, butterflies, other insects
Swamp Azalea *Rhododendron viscosum*	Light: shade to partial sun Moisture: wet to moist	Deciduous, white flowers, slow growth rate, height 3'-8'	Food: leaves, nectar. Wildlife: hummingbird, deer, butterflies, other insects
Pasture Rose *Rosa carolina*	Light: full sun Moisture: well-drained to dry	Pink flowers with a subtle fragrance, forms dense thickets, medium growth rate, height 3'-6'	Food: fruit, buds, foliage. Wildlife: grouse, rabbit, deer
Swamp Rose *Rosa palustris*	Light: full sun Moisture: wet to moist	Pink flowers, forms thickets, medium growth rate, height 4'-7'	Food: fruit, buds. Wildlife: mockingbird, catbird, robin, bluebird, quail
Highbush Blackberry *Rubus argutus*	Light: partial to full sun Moisture: well-drained to dry	Small white flowers, forms thickets, edible berries, medium growth rate, height 3'-5'	Food: fruit, foliage. Wildlife: grouse, quail, catbird, cardinal, chat, orioles, robin, sparrows, tanagers, thrushes, rabbit, deer
Flowering Raspberry *Rubus odoratus*	Light: partial to full sun Moisture: well-drained to dry	Pink flowers, forms thickets, edible berries, medium growth rate, height 5'-6'	Food: fruit, foliage. Wildlife: grouse, quail, catbird, cardinal, chat, orioles, robin, sparrows, tanagers, thrushes, rabbit, deer
Shining sumac *Rhus copallinum*	Light: full sun Moisture: well-drained to dry	Dioecious, greenish flower spikes, crimson fall color, fast growth rate, height 20'-30'	Food: fruit, twigs, foliage. Wildlife: quail, bluebird, catbird, robin, mockingbird, rabbit, deer



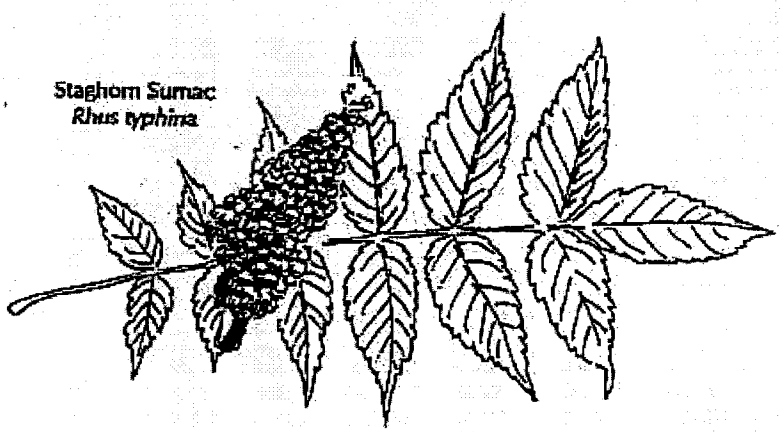
Highbush Blackberry
Rubus argutus

Elderberry
Sambucus canadensis

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Smooth sumac *Rhus glabra*	Light: full sun Moisture: well-drained to dry	Dioecious, forms groves, greenish crimson-colored fruit, bright red fall color, fast growth rate, height 9'-15'	Food: fruit, twigs, foliage. Wildlife: quail, bluebird, catbird, robin, mockingbird, rabbit, deer
Staghorn sumac *Rhus typhina*	Light: full sun Moisture: well-drained to dry	Dioecious, forms groves, greenish crimson colored fruit, variable fall color, fast growth rate, height 20'-30'	Food: fruit, twigs, foliage. Wildlife: quail, bluebird, catbird, robin, mockingbird, rabbit, deer
Elderberry, American Elder *Sambucus canadensis*	Light: partial to full sun Moisture: wet to moist	Large, upright, large clusters of white flowers, purple berries, fast growth rate, height 5'-12'	Food: berries, nectar. Wildlife: woodpeckers, blue jay, thrushes, grosbeaks, rabbit, squirrel
Highbush blueberry *Vaccinium corymbosum*	Light: partial to full sun Moisture: wet to well-drained	Small urn-shaped white flowers, blue berries, slow growth rate, height 6'-12'	Food: berries, foliage, twigs. Wildlife: grouse, woodpeckers, kingbird, blue jay, robin, orioles, tanagers, squirrel
Lowbush blueberry *Vaccinium vacillans* *V. angustifolium*	Light: partial to full sun Moisture: well-drained to dry	Low-growing, small white flowers, slow growth rate, height 1'-2'	Food: berries, foliage, twigs. Wildlife: grouse, woodpeckers, kingbird, blue jay, robin, orioles, tanagers, squirrel
Arrowwood *Viburnum dentatum* *V. recognitum*	Light: partial to full sun Moisture: moist to well-drained	Dense foliage, white flowers, small blue-black berries, wood used to make arrows, medium growth rate, height 6'-10'	Food: berries, foliage. Wildlife: grouse, cedar waxwing, brown thrasher, squirrel, deer
Witherod *Viburnum nudum*	Light: partial to full sun Moisture: moist to well-drained	Large leaves, creamy white flower clusters, red berries, red fall color, medium growth rate, height 10'-15'	Food: berries, foliage. Wildlife: grouse, cedar waxwing, brown thrasher, squirrel, deer
Blackhaw *Viburnum prunifolium*	Light: partial to full sun Moisture: moist to well-drained	White flower clusters, blue berries, red fall color, slow to medium growth rate, height 12'-15'	Food: berries, foliage. Wildlife: grouse, cedar waxwing, brown thrasher, squirrel, deer
American Cranberry Bush *Viburnum trilobum*	Light: partial to full sun Moisture: well-drained	White flower clusters, bright red berries, yellow to red fall color, medium growth rate, height 8'-12'	Food: berries, foliage. Wildlife: grouse, cedar waxwing, brown thrasher, squirrel, deer

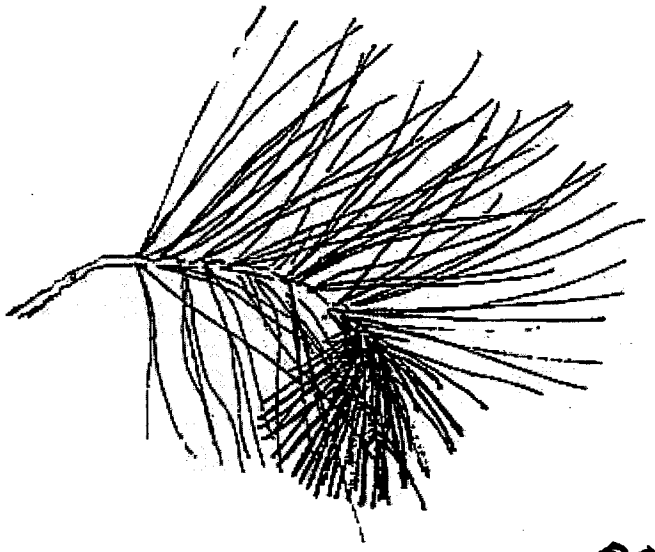


Highbush blueberry
Vaccinium corymbosum



Staghorn Sumac
Rhus typhina

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
EVERGREEN TREES			
American Holly *Ilex opaca*	Light: partial to full sun Moisture: moist to well-drained	Dioecious, shiny green leaves, red berries on female plant, medium growth rate, height 20'-40'	Food: berries, sap. Wildlife: thrushes, woodpeckers, catbird, mockingbird, mourning dove, squirrel, deer
Eastern Red Cedar *Juniperus virginiana*	Light: full sun Moisture: well-drained to dry	Narrow shape, thick foliage, many blue berries, medium growth rate, height 30'-50'	Food: berries. Wildlife: quail, woodpeckers, robin, bluebird, warblers, grosbeaks, cedar waxwing, deer
White Pine *Pinus strobus*	Light: partial to full sun Moisture: moist to dry	Large beautiful evergreen with soft needles, fast growth rate, height 50'-80'	Food: seeds, sap. Wildlife: doves, woodpeckers, nuthatches, brown creeper, finches, squirrels
Loblolly Pine *Pinus taeda*	Light: full sun Moisture: wet to moist	Long needles, open branches, fast growth rate, height 70'-90'	Food: seeds, sap. Wildlife: doves, woodpeckers, nuthatches, brown creeper, finches, squirrels
Virginia Pine *Pinus virginiana*	Light: full sun Moisture: well drained to dry	Colonizer of dry sites, 1" to 3" needles, medium growth rate, height 50'-80'	Food: seeds, needles. Wildlife: doves, chickadees, nuthatches, beaver, squirrel, deer
Eastern Hemlock *Tsuga canadensis*	Light: shade to full sun Moisture: moist to well-drained	Short soft needles, pyramid shaped, prefers cooler climates, medium growth rate, height 40'-70'	Food: seeds, foliage, twigs. Wildlife: chickadees, crossbills, porcupine, squirrel, deer

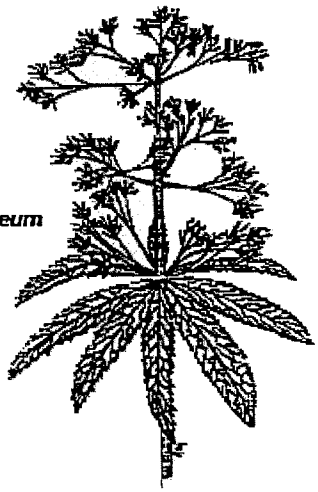


White Pine
Pinus strobus

American Holly
Ilex opaca

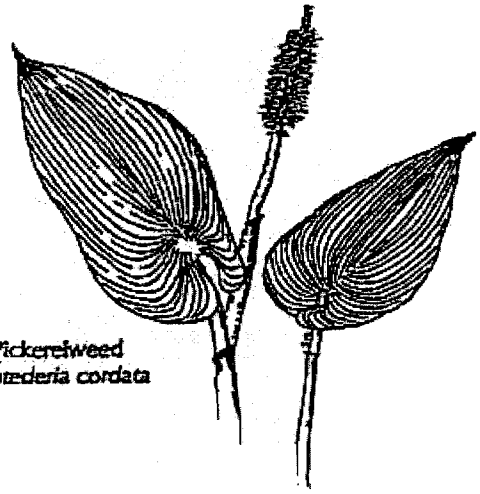
COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
HERBACEOUS WETLAND PLANTS			
Sweet Flag *Acorus calamus*	Light: partial to full sun Moisture: flooded 0'-0.5' Salinity: fresh to 10ppt	Upright flat leaf blade, yellow-brown flower, spreads moderately, height 1'-4'	Food: roots. Wildlife: ducks, muskrat
Swamp Milkweed *Asclepias incarnata*	Light: partial to full sun Moisture: wet to moist Salinity: fresh	Pink flower clusters July-Aug., height 2'-4'	Food: nectar. Wildlife: butterflies, other insects, Monarch butterfly host plant
New England Aster *Aster novae-angliae*	Light: partial to full sun Moisture: wet to moist Salinity: fresh	Lavender/blue flowers Aug.-Oct., height 3'-5'	Food: nectar. Wildlife: butterflies, other insects
Tussock Sedge *Carex stricta*	Light: full sun Moisture: flooded 0'-0.5' Salinity: fresh	Grows in clumps or tussocks, grasslike, soft weeping leaves, spreads moderately, height 1'-3'	Food: seeds, leaves. Wildlife: tree and field sparrows, finches, deer
Boneset *Eupatorium perfoliatum*	Light: partial to full sun Moisture: wet to moist Salinity: fresh	White flower clusters July-Aug., height 3'-5'	Food: nectar. Wildlife: butterflies, other insects
Joe Pye Weed *Eupatorium purpureum* *Eupatorium dubium*	Light: partial to full sun Moisture: wet to moist Salinity: fresh	Large purple/white flower clusters July-Aug., height 5'-10'	Food: nectar. Wildlife: butterflies, other insects
Marsh Hibiscus *Hibiscus moscheutos*	Light: partial to full sun Moisture: flooded 0"-3" Salinity: fresh to 15ppt	Dense, shrub like, large showy pink or white flowers, spreads slowly, height 3'-7"	Food: nectar. Wildlife: hummingbird
Yellow Water Iris *Iris pseudacorus*	Light: full sun to produce flower Moisture: flooded 0'-0.5' Salinity: fresh	Long flat leave blades, yellow flowers, spreads slowly, height 1'-2'	Food: nectar, shoots. Wildlife: muskrat, butterflies, other insects
Blue Water Iris, Blue flag *Iris versicolor*	Light: full sun to produce flower Moisture: flooded 0'-0.5' Salinity: fresh	Long flat leave blades, showy blue flowers, spreads slowly, height 1'-2'	Food: nectar, shoots. Wildlife: muskrat, butterflies, other insects
Soft Rush *Juncus effusus*	Light: full sun Moisture: wet Salinity: fresh	Upright round stems, grows in clumps, spreads slowly, height 2'-3'	Food: roots. Wildlife: marshbirds

New England Aster
Aster novae-angliae



Joe Pye Weed
Eupatorium purpureum
E. dubium

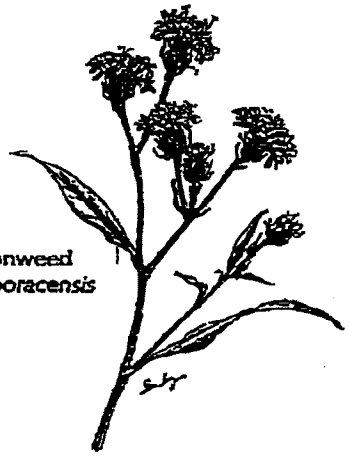
COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Cardinal Flower *Lobelia cardinalis*	Light: partial to full sun Moisture: wet to moist Salinity: fresh	Brilliant red tubular shaped flowers July-Sept., height 2'-3'	Food: nectar. Wildlife: hummingbird, butterflies, other insects
Spatterdock, Yellow Water Lily *Nymphaea luteum*	Light: partial to full sun Moisture: flooded 1'-3' Salinity: fresh	Large round leaves float on water surface, large yellow flowers May-Oct., spreads slowly, height 0'-1'	Food: seeds, stems. Wildlife: some ducks, beaver, muskrat
Fragrant Water Lily *Nymphaea odorata*	Light: partial to full sun Moisture: flooded 1'-3' Salinity: fresh	White or rose-colored flower, otherwise same as above	Food: seeds, stems. Wildlife: some ducks, beaver, muskrat
Arrow Arum, Duck Corn *Peltandra virginica*	Light: partial to full sun Moisture: flooded 0.5'-2' Salinity: fresh to 2ppt	Large triangular-shaped leaves, large seeds, spreads slowly, height 1'-2'	Food: seeds. Wildlife: wood duck, king rail
Pickerelweed *Pontederia cordata*	Light: partial to full sun Moisture: flooded 0'-1' Salinity: fresh to 3ppt	Heart-shaped leaves, showy purple flower spikes, spreads moderately, height 2'-4'	Food: seeds, nectar, roots. Wildlife: waterfowl, butterflies
Duck Potato, Arrowhead *Sagittaria latifolia*	Light: partial to full sun Moisture: flooded 0'-2' Salinity: fresh	Large leaves shaped liked arrow-heads, edible tubers, spreads rapidly, height 2'-3'	Food: tubers, seeds, Wildlife: several duck species, swans, muskrat
Lizards Tail *Saururus cernuus*	Light: partial to full sun Moisture: flooded 0'-1' Salinity: fresh	Heart-shaped leaves, long slender flower spikes, spreads rapidly, height 3'-4'	Minimal food value
Common Three Square *Scirpus pungens* *S. americanus*	Light: full sun Moisture: flooded 0'-0.5' Salinity: fresh to 15ppt	Upright stout triangular-shaped stems, slender leaves, spreads rapidly, height 3'-4'	Food: seeds, roots. Wildlife: many duck species, marsh and shore birds, blackbird, muskrat
Soft Stem Bulrush *Scirpus validus*	Light: full sun Moisture: flooded 0'-1' Salinity: fresh to 5ppt	Tall upright stems, spreads rapidly, height 4'-10'	Food: seeds, roots. Wildlife: many duck species, marsh and shore birds, blackbird, muskrat
Salt Marsh Cordgrass *Spartina alterniflora*	Light: full sun Moisture: flooded 0'-1' Salinity: brackish to 35ppt	Dominant plant of the lower salt marsh zone, upright flat leaf blades, spreads rapidly, height 2'-7'	Food: seeds, roots. Wildlife: black duck, Canada goose, snow goose, rails, seaside and sharp-tailed sparrows, muskrat



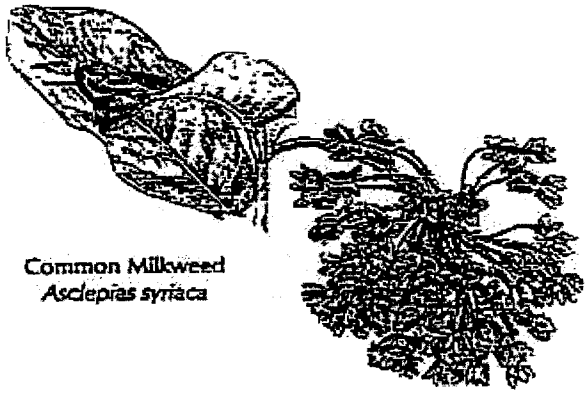
Pickerelweed
Pontederia cordata

Duck Potato
Sagittaria latifolia

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Salt Meadow Hay *Spartina patens*	Light: full sun Moisture: wet to moist Salinity: brackish to 35ppt	Dominant plant in the higher salt marsh zone, soft hay-like texture, spreads moderately, height 1'-3'	Food: seeds, roots. Wildlife: black duck, Canada goose, snow goose, rails, seaside and sharp-tailed sparrows, muskrat
New York Ironweed *Vernonia noveboracensis*	Light: full sun Moisture: wet to moist Salinity: fresh	Large deep-purple flower cluster Aug-Sept., height 5'-8'	Food: nectar. Wildlife: butterflies, other insects
Wild Rice *Zizania aquatica*	Light: full sun Moisture: flooded 0'-3' Salinity: fresh	Tall, slender, grasslike, prized gourmet food, height 6'-10'	Food: seeds. Wildlife: ducks, rails, blackbirds, sparrows, bobolink
HERBACEOUS MEADOW PLANTS			
Wild Columbine *Aquilegia canadensis*	Light: full sun Moisture: well-drained to dry	Unusual scarlet/yellow tubular flowers March-May, height 1'-2'	Food: nectar. Wildlife: hummingbirds, butterflies, other insects
Common Milkweed *Asclepias syriaca*	Light: full sun Moisture: well-drained to dry	Pinkish flower clusters June-July, unique seed pod, height 2'-5'	Food: nectar. Wildlife: butterflies (Monarch host plant), other insects
Butterflyweed *Asclepias tuberosa*	Light: full sun Moisture: well-drained to dry	Brilliant orange flowers June-July, height 1'-2'	Food: nectar. Wildlife: butterflies (Monarch host plant), other insects
Great Aster *Aster grandiflorus*	Light: partial to full sun Moisture: wet to moist	Purple/violet flowers Sept.–Nov., height 2'-5'	Food: nectar, seeds, leaves. Wildlife: butterflies, other insects, limited use by birds and small mammals
Smooth Aster *Aster laevis*	Light: partial to full sun Moisture: moist	Purple/violet flowers Sept.–Nov., height 2'-5'	Food: nectar, seeds, leaves. Wildlife: butterflies, other insects, limited use by birds and small mammals
New England Aster *Aster novae-anlgiae*	Light: partial to full sun Moisture: wet to moist	Purple/violet flowers Sept.–Nov., height 2'-5'	Food: nectar, seeds, leaves. Wildlife: butterflies, other insects, limited use by birds and small mammals
Showy Aster *Aster spectabilis*	Light: partial to full sun Moisture: well-drained to dry	Purple/violet flowers Sept.–Nov., height 2'-5'	Food: nectar, seeds, leaves. Wildlife: butterflies, other insects, limited use by birds and small mammals
Wild Blue Indigo *Baptisia australis*	Light: full sun Moisture: well-drained to dry	Indigo/blue flowers May-June, height 3'-5'	Food: nectar. Wildlife: butterflies, other insects



New York Ironweed
Vernonia noveboracensis



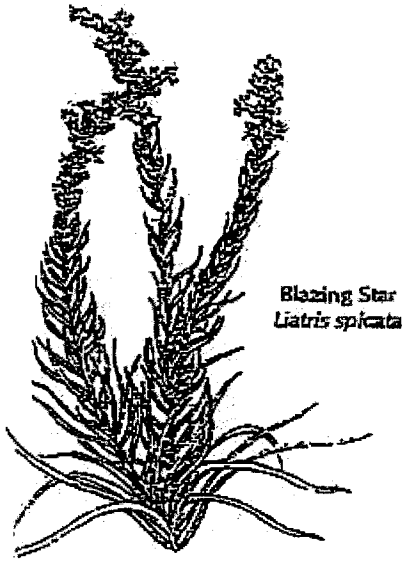
Common Milkweed
Asclepias syriaca

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Maryland Goldenaster *Heterotheca mariana*	Light: full sun Moisture: well-drained to dry	Member of the daisy family, yellow flowers Aug.-Oct., height 1'-2'	Food: nectar. Wildlife: butterflies, other insects
Lance-leaved Coreopsis *Coreopsis lanceolata*	Light: full sun Moisture: moist to well-drained	Yellow flowers May-July, height 2'-3'	Food: nectar. Wildlife: butterflies, other insects
Tickseed *Coreopsis tinctoria*	Light: full sun Moisture: well-drained to dry	Indigenous to prairie states, naturalized in east, similar to above species	Food: nectar. Wildlife: butterflies, other insects
Whorled Coreopsis *Coreopsis verticillata*	Light: full sun Moisture: moist to dry	Yellow flowers June-July, height 1'-3'	Food: nectar. Wildlife: butterflies, other insects
Purple Coneflower *Echinacea purpurea*	Light: full sun Moisture: moist to well-drained	Large daisy-like purple flowers June-July, height 3'-4'	Food: nectar, seeds. Wildlife: butterflies, other insects, goldfinch
Sneezeweed *Helenium flexuosum*	Light: partial to full sun Moisture: wet to moist	Member of the daisy family, yellow flowers June-Sept., height 2'-5'	Food: nectar. Wildlife: butterflies, other insects
Narrow Leaved Sunflower *Helianthus angustifolius*	Light: partial to full sun Moisture: moist to well-drained	Yellow flower Aug. to Oct., height 2'-5'	Food: nectar, seeds. Wildlife: mourning dove, quail, sparrows, blackbirds, butterflies, other insects
Common Sunflower *Helianthus annuus*	Light: partial to full sun Moisture: wet to well-drained	Annual, indigenous to prairie states, naturalized in east, yellow flowers July-Oct., height 2'-10'	Food: nectar, seeds. Wildlife: mourning dove, quail, sparrows, blackbirds, butterflies, other insects
Blazing Star *Liatris spicata*	Light: partial to full sun Moisture: wet to well-drained	Pinkish to lavender flower spikes June-Sept., height 2'-5'	Food: nectar. Wildlife: butterflies, other insects
Downy lobelia *Lobelia puberula*	Light: partial to full sun Moisture: wet to moist	Blue tubular-shaped flowers July-Oct., height 2'-3'	Food: nectar. Wildlife: butterflies, other insects
Monkey Flower *Mimulus alatus* *Mimulus ringens*	Light: full sun Moisture: moist to well-drained	Violet pink or white flowers June-Oct., height 1'	Food: nectar. Wildlife: butterflies. other insects
Bee Balm *Monarda didyma*	Light: full sun Moisture: moist to well-drained	Scarlet colored tubular-shaped flowers June-Aug., height 2'-4'	Food: nectar. Wildlife: hummingbirds, butterflies, other insects
Wild Bergamont *Monarda fistulosa*	Light: partial to full sun Moisture: moist to well-drained	Lavender or white tubular-shaped flowers July-Aug., height 2'-4'	Food: nectar. Wildlife: hummingbirds, butterflies, other insects

Maryland Goldenaster
Chryopsis mariana

Wild Bergamont
Monarda fistulosa

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Beardtongue *Penstemon laevigatus* *P. digitalis*	Light: partial sun Moisture: moist	White flowers May-June, height 1'-2'	Food: nectar. Wildlife: butterflies, other insects
Summer or Blue Phlox *Phlox divaricata*	Light: partial to full sun Moisture: moist to dry	Pink flowers April-May, height .5'-1.5'	Food: nectar. Wildlife: hummingbird, butterflies, other insects
Fall Phlox *Phlox paniculata*	Light: partial to full sun Moisture: wet to moist	Lavender flowers July-Sept., height 2'-7'	Food: nectar. Wildlife: hummingbird, butterflies, other insects
Black-eyed Susan *Rudbeckia hirta*	Light: partial to full sun Moisture: moist to well-drained	Yellow flowers with dark center June-Aug., height 2'-3'	Food: nectar. Wildlife: butterflies, other insects
Green Coneflower *Rudbeckia lanciniata*	Light: partial to full sun Moisture: wet to moist	Greenish yellow flowers Aug.-Oct., height 2'-8'	Food: nectar. Wildlife: butterflies, other insects
Three-lobed Coneflower *Rudbeckia triloba*	Light: partial to full sun Moisture: moist to well-drained	Deep yellow flowers June-Oct., height 2'-5'	Food: nectar. Wildlife: butterflies, other insects
Rough Goldenrod *Solidago rugosa*	Light: partial to full sun	More than 100 goldenrod species in North America, wispy yellow flowers, height 3'-5'	Food: seeds, nectar. Wildlife: goldfinch, junco, sparrows, butterflies, other insects



Blazing Star
Liatris spicata

Black-eyed Susan
Rudbeckia hirta

INVASIVE EXOTIC PLANTS

The following is a partial list of exotic plants known to be invasive in parts of the Mid-Atlantic region. None of the following should be planted. We recommend consulting an expert about removing any of the following from your site.

Trees

Norway maple *(Acer platanoides)*
Sycamore maple *(Acer pseudoplatanus)*
Tree of heaven *(Ailanthus altissima)*
Russian olive *(Elaeagnus angustifolia)*
Autumn olive *(Elaeagnus umbellata)*
White mulberry *(Morus alba)*
Empress tree *(Paulownia tomentosa)*
Sweet cherry *(Prunus avium)*
White cottonwood *(Populus alba)*

Shrubs

Japanese barberry *(Berberis thunbergii)*
Winged euonymus *(Euonymus alatus)*
Privet *(Ligustrum obtusifolium)*
Bush honeysuckles *(Lonicera spp.)*
Common buckthorn *(Rhamnus cathartica)*
European buckthorn *(Rhamnus frangula)*
Multiflora rose *(Rosa multiflora)*
Japanese spirea *(Spiraea japonica)*

Vines

Porcelain berry *(Ampelopsis brevipedunculata)*
Oriental bittersweet *(Celastrus orbiculata)*
Climbing euonymus *(Euonymus fortunei)*
English ivy *(Hedera helix)*
Japanese honeysuckle *(Lonicera japonica)*
Mile a minute vine *(Polygonum perfoliatum)*
Kudzu *(Pueraria lobata)*
Periwinkle *(Vinca minor)*
Japanese wisteria *(Wisteria floribunda)*

Herbaceous Plants

Five leaf Akebia *(Akebia quinata)*
Garlic mustard *(Alliaria petiolata)*
Giant reed *(Arundo donax)*
Asiatic sound sedge *(Carex frutescens)*
Spotted knapweed *(Centaurea maculosa)*
Canada thistle *(Cirsium arvense)*
Bull thistle *(Cirsium vulgare)*
Crown vetch *(Coronilla varia)*
Chinese yam *(Dioscorea batatas)*
Chinese lespedeza *(Lespedeza cuneata)*
Purple loosestrife *(Lythrum salicaria)*
Eulalia *(Microstegium vimineum)*
Aneilimia *(Murdannia keisak)*
Beafsteak plant *(Perilla frutescens)*
Common reed *(Phragmites australis)*
Japanese knotweed *(Polygonum cuspidatum)*
Johnson grass *(Sorgum halepense)*

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