

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 415

Article 415. Use and Occupancy.

(a)

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 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 use 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 Project No. 2210-169 - 61 - 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, such action includes, as 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 water for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) piers, landings, boat docks, or similar structures and facilities, as determined under the Commission-approved Shoreline Management Plan; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. 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, the use 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 modification 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 or roads where 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. Project No. 2210-169 - 62 - 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 certification 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, as determined under the Commission-approved Shoreline Management Plan; (6) recreational development consistent with an 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, measured horizontally, from project waters at normal 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 60 days before conveying any interest in project lands under this paragraph (d), the licensee must submit a letter to the Director, Office of Energy Projects, 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 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 Historic 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 report on recreational resources of an exhibit E; or, if the project does not have an approved report on recreational resources, that the lands to be conveyed do not have recreational value; (3) the instrument of conveyance must include the following

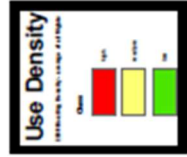
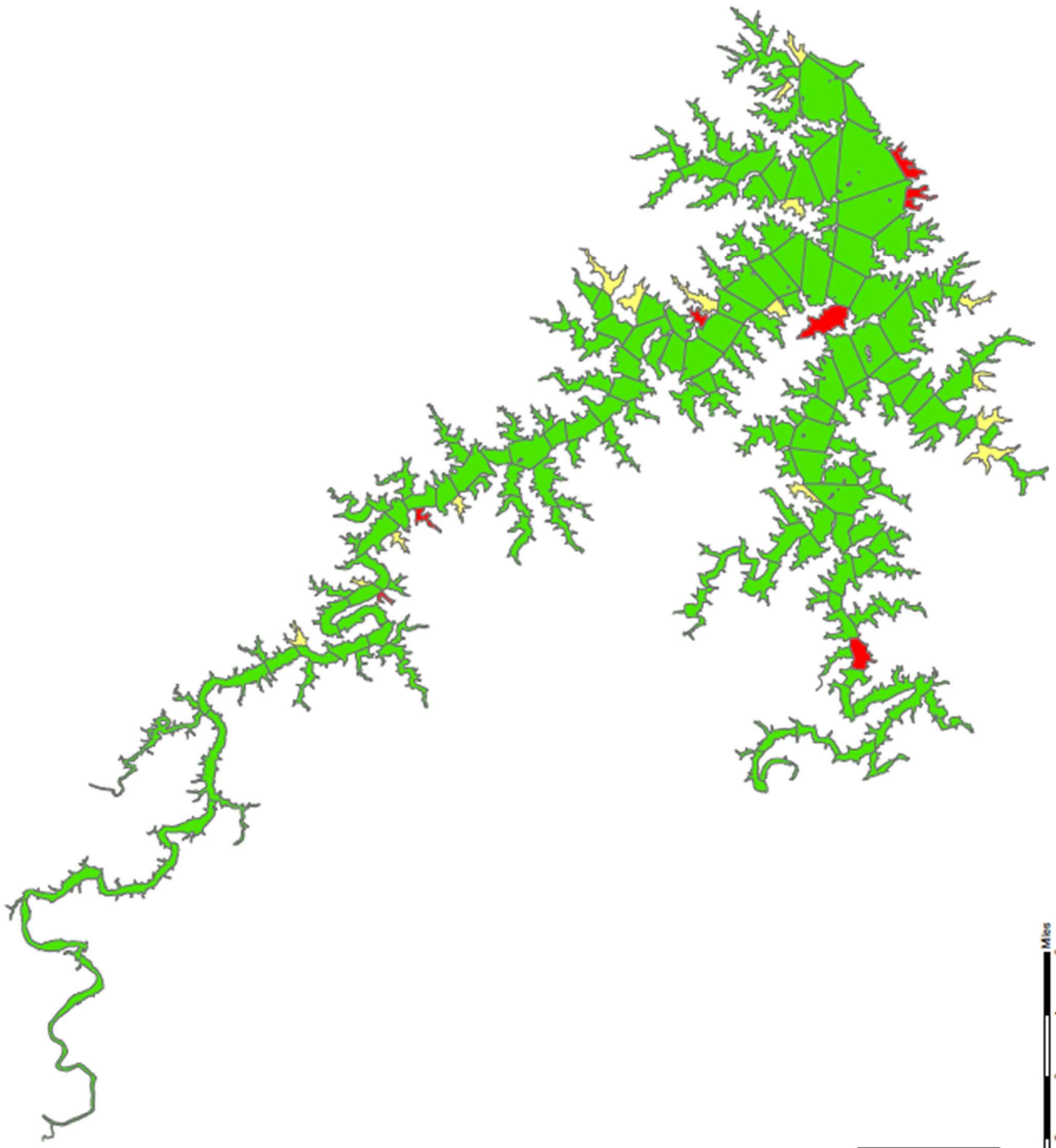
covenants running with the land: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee shall take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the Project No. 2210-169 - 63 - project; and (iii) the grantee shall not unduly restrict public access to project waters; and (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 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 drawings would be filed for approval for other purposes.

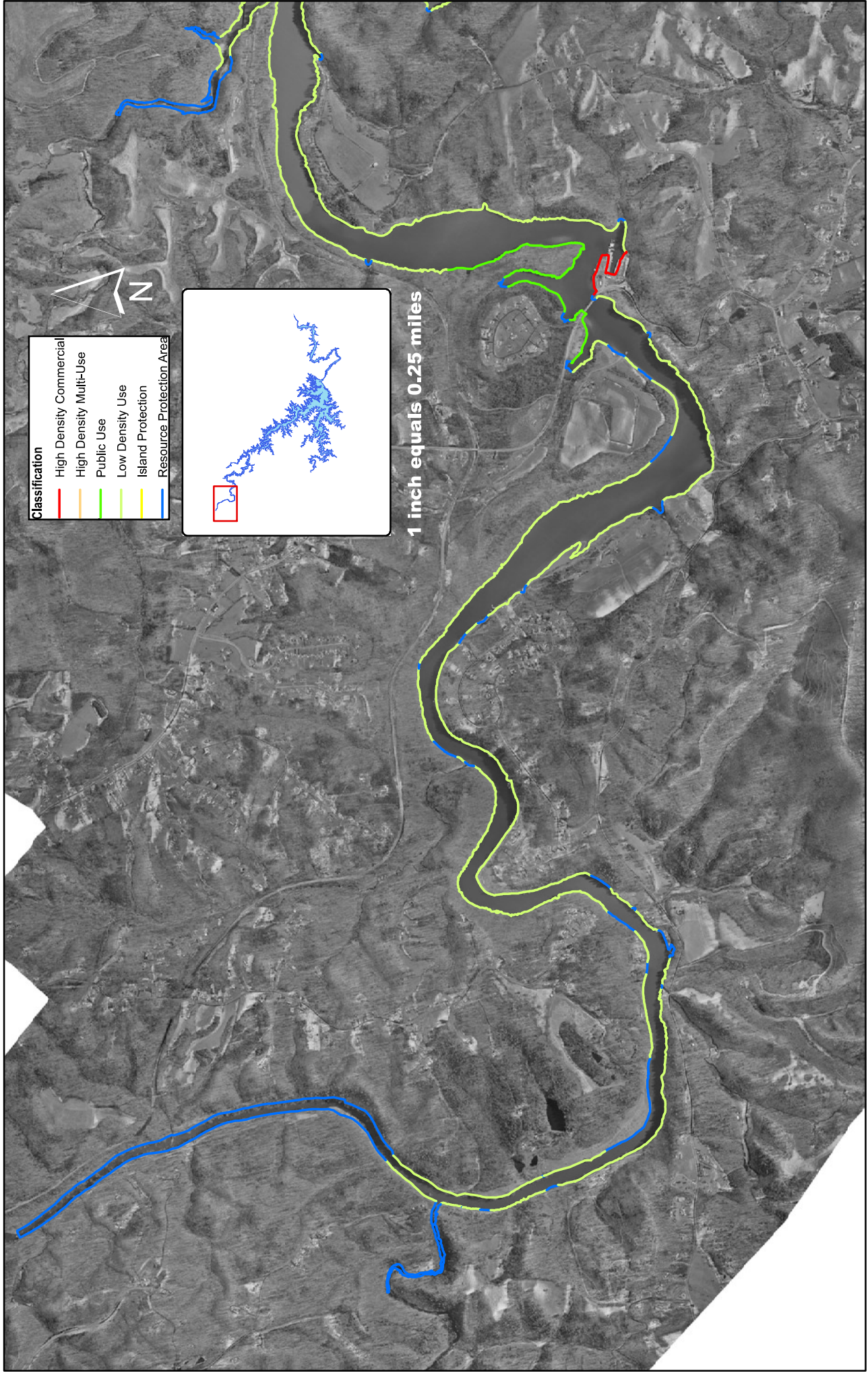
(g) The authority granted to the licensee under this article shall not apply to any part of the public lands and reservations of the United States included within the project boundary.

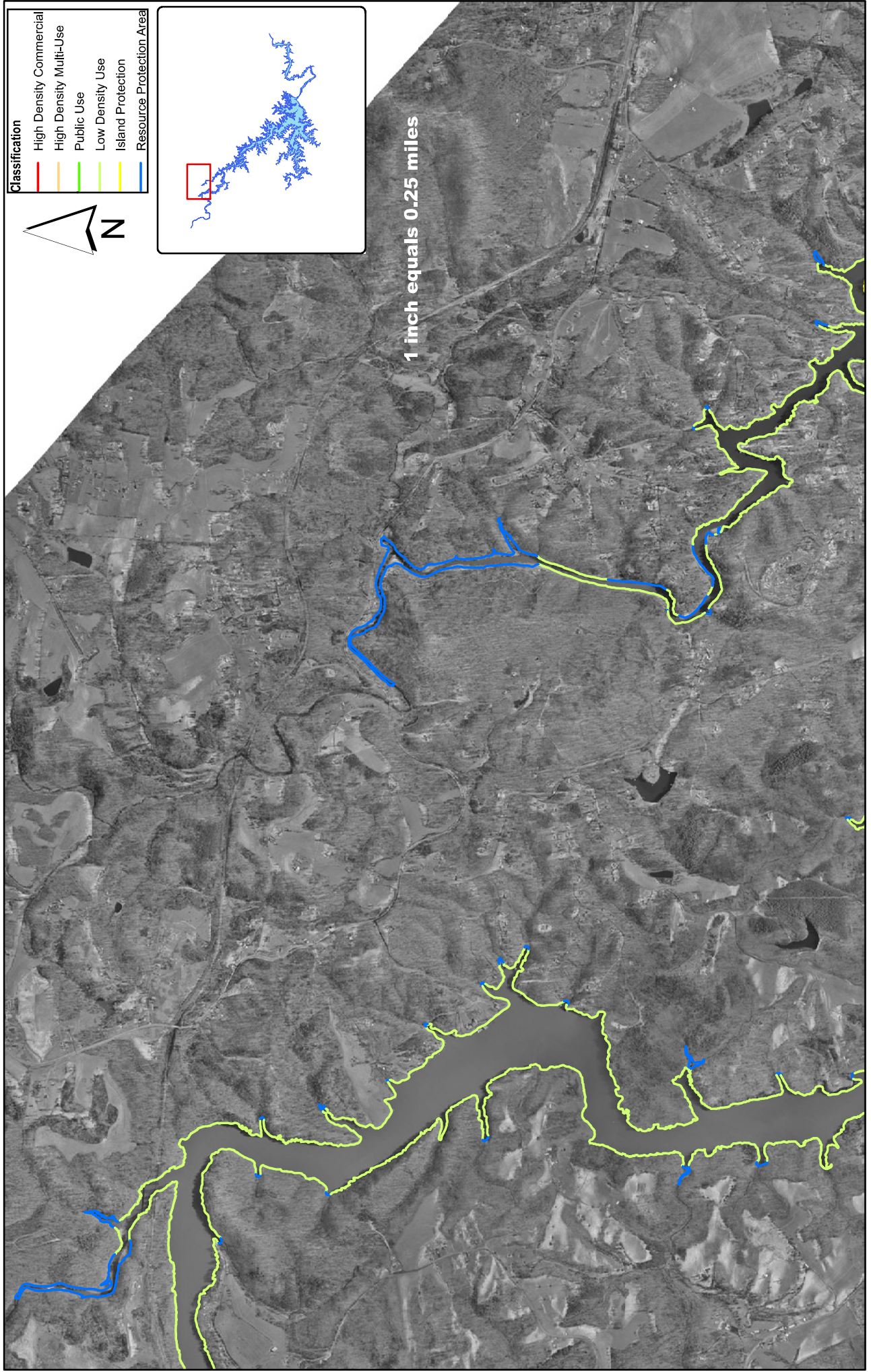
Appendix C

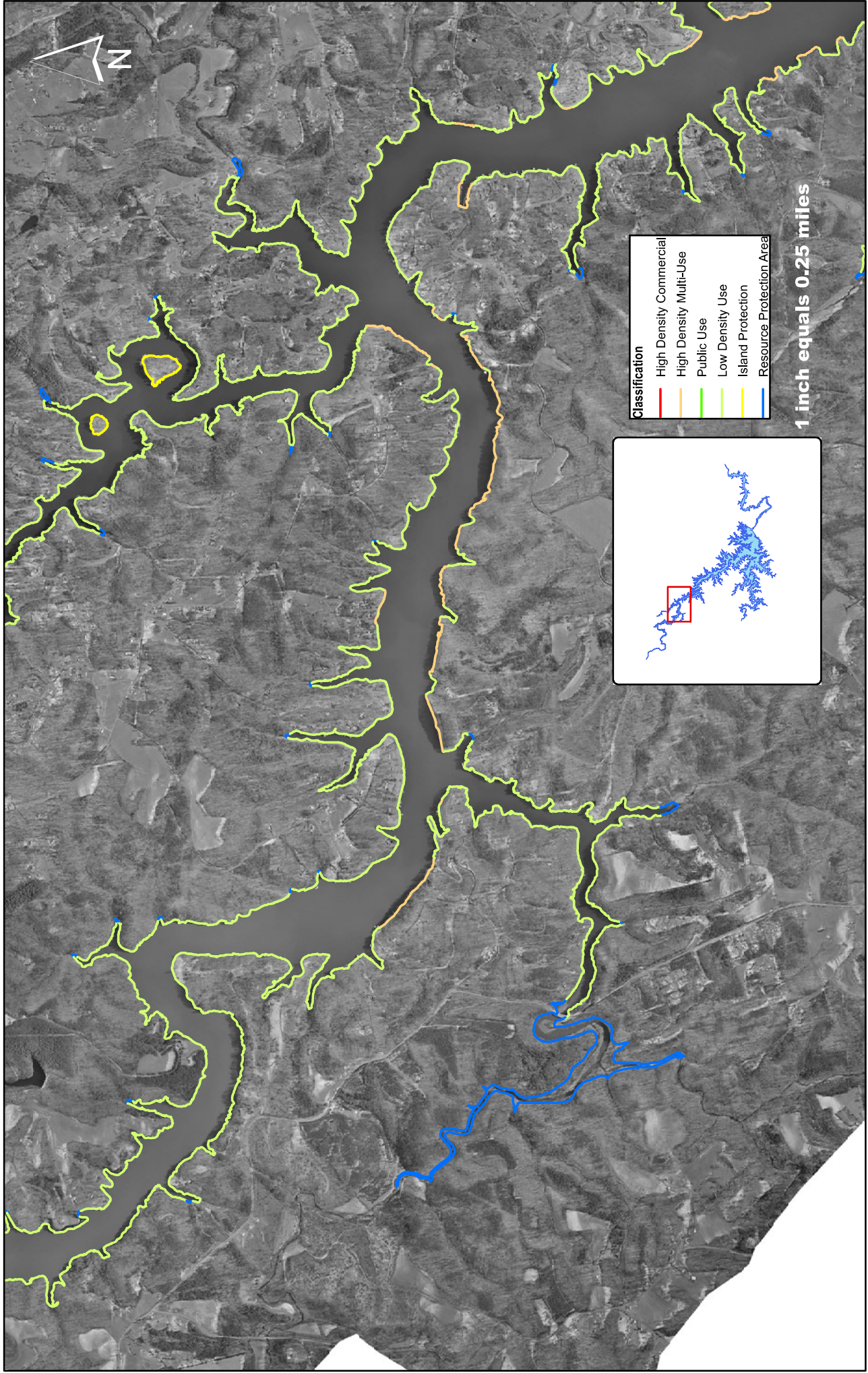
Boating Density



Appendix D
Shoreline Classification Mapping

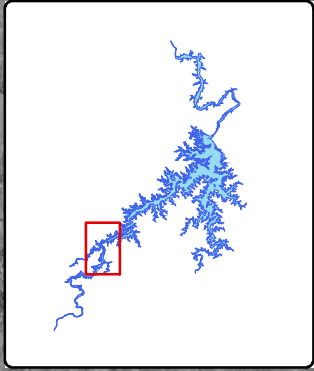


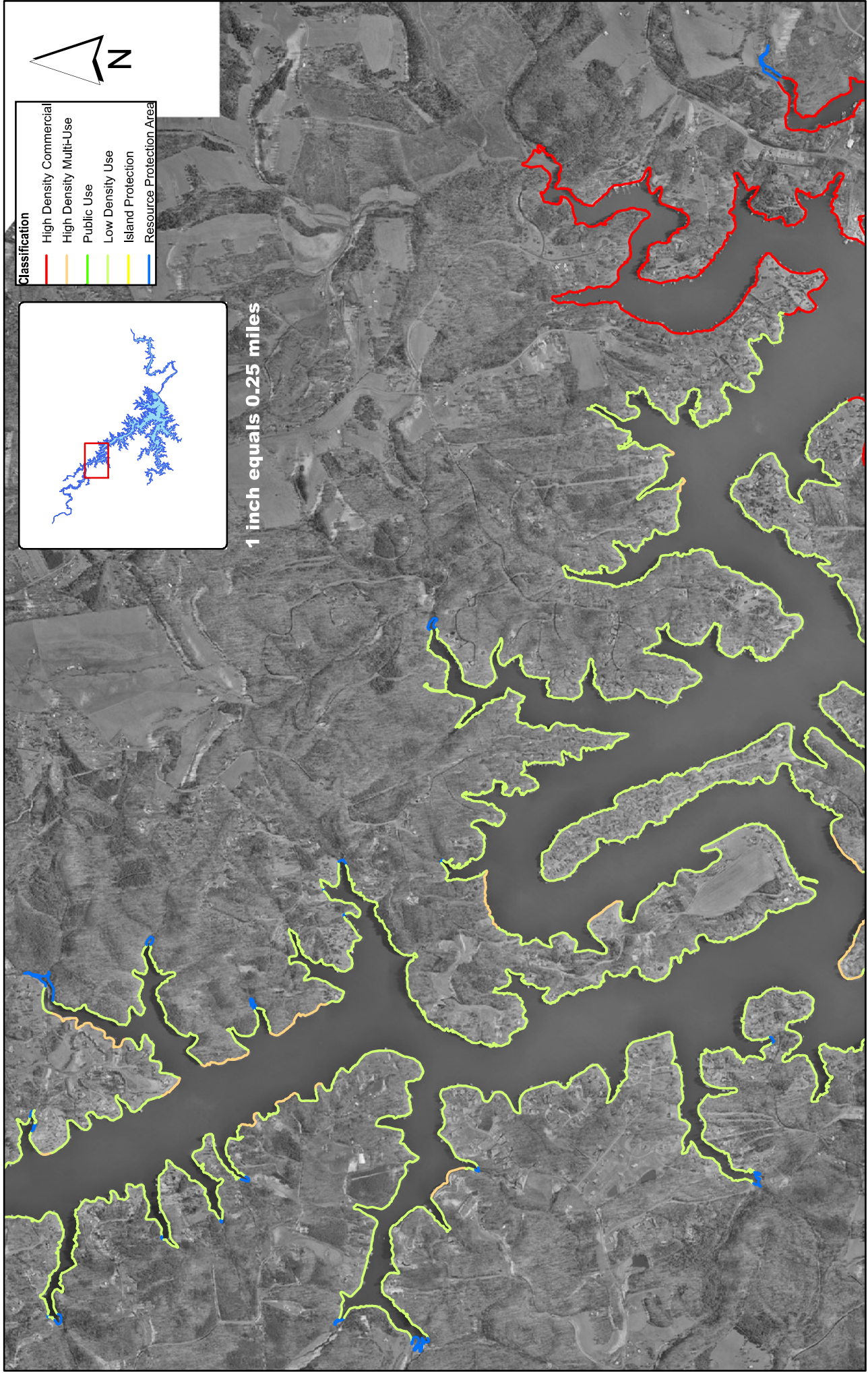




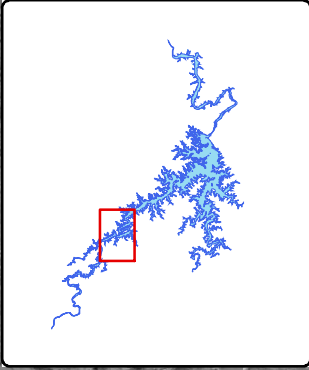
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- High Density Commercial
 - High Density Multi-Use
 - Public Use
 - Low Density Use
 - Island Protection
 - Resource Protection Area

1 inch equals 0.25 miles

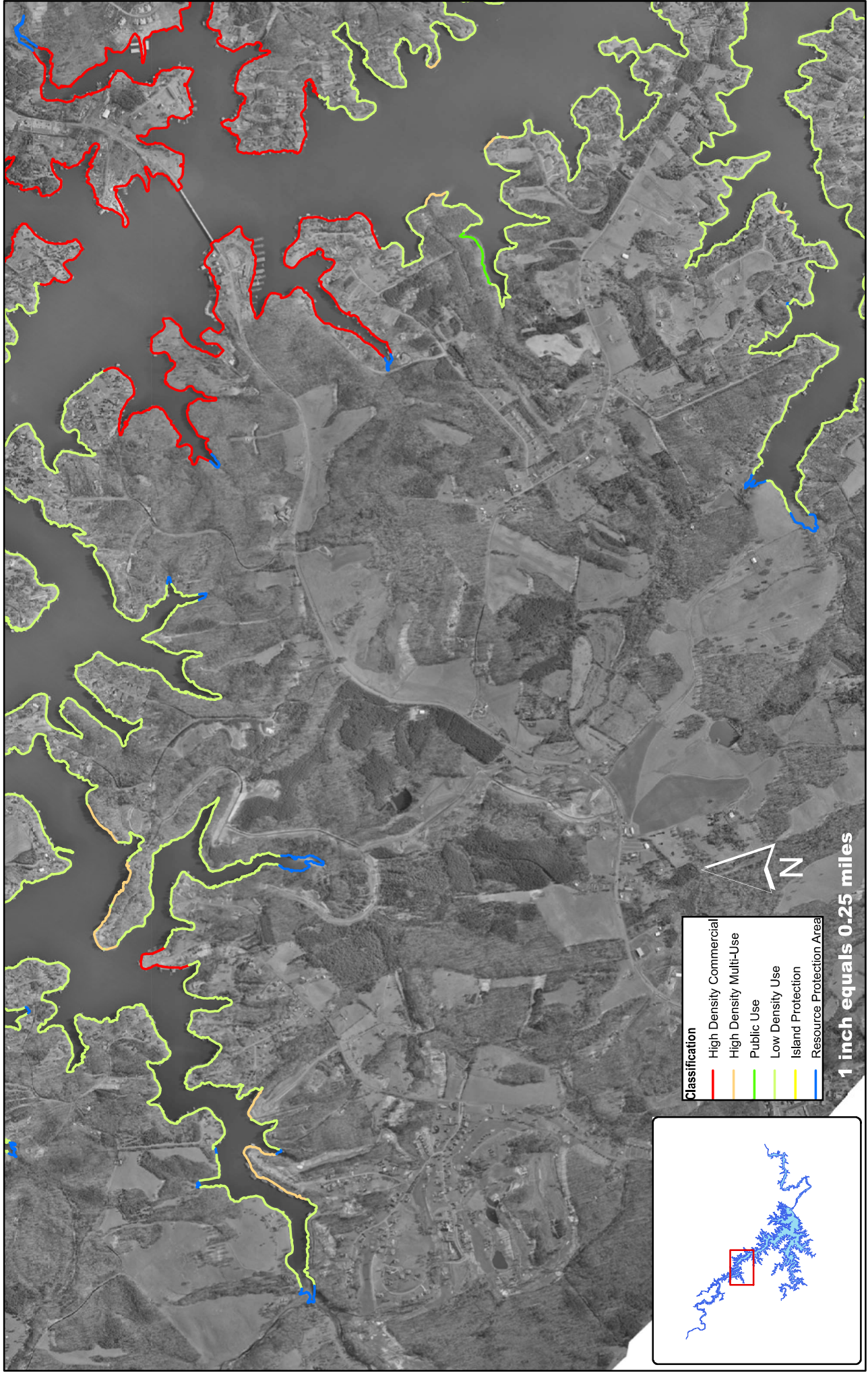


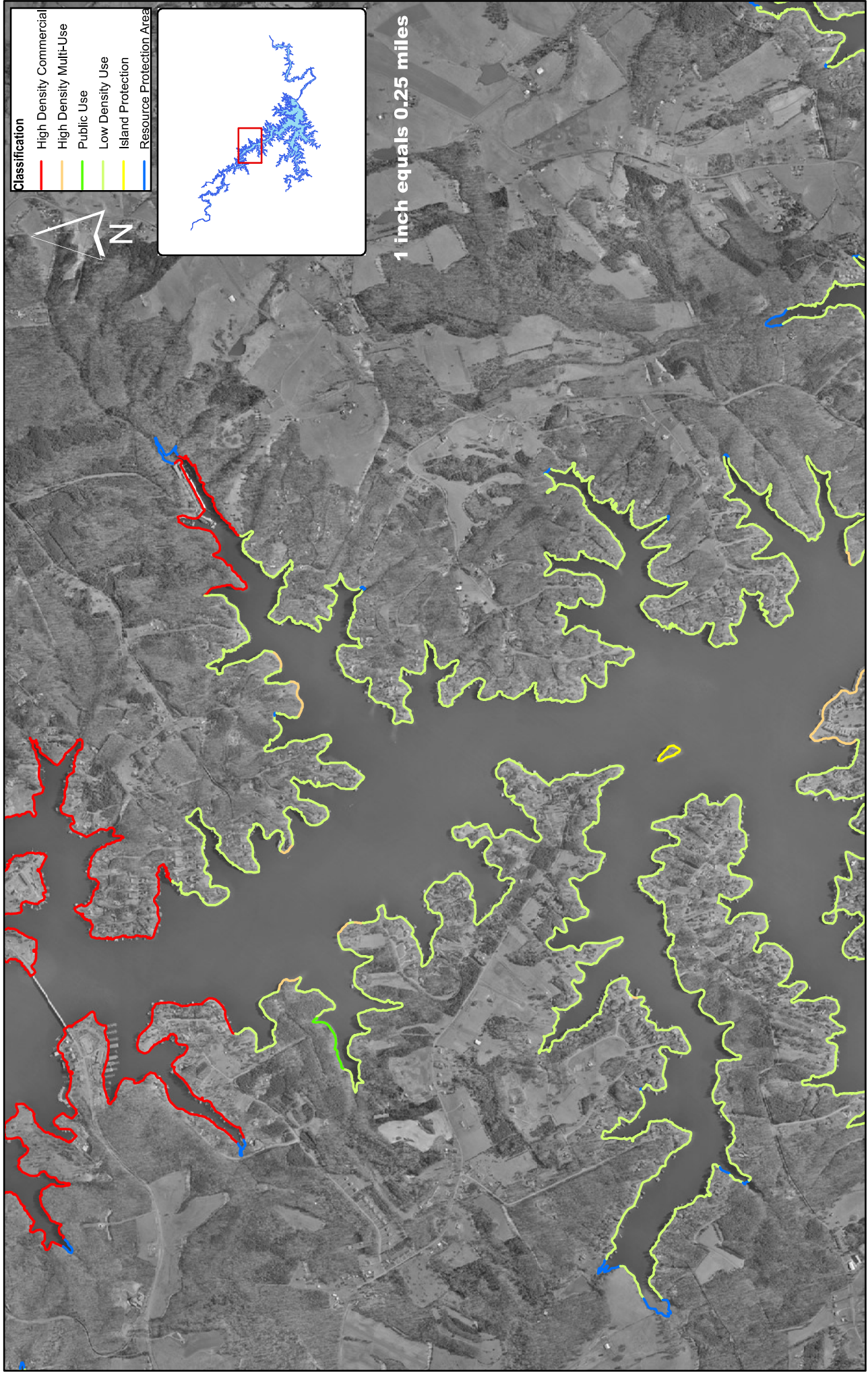


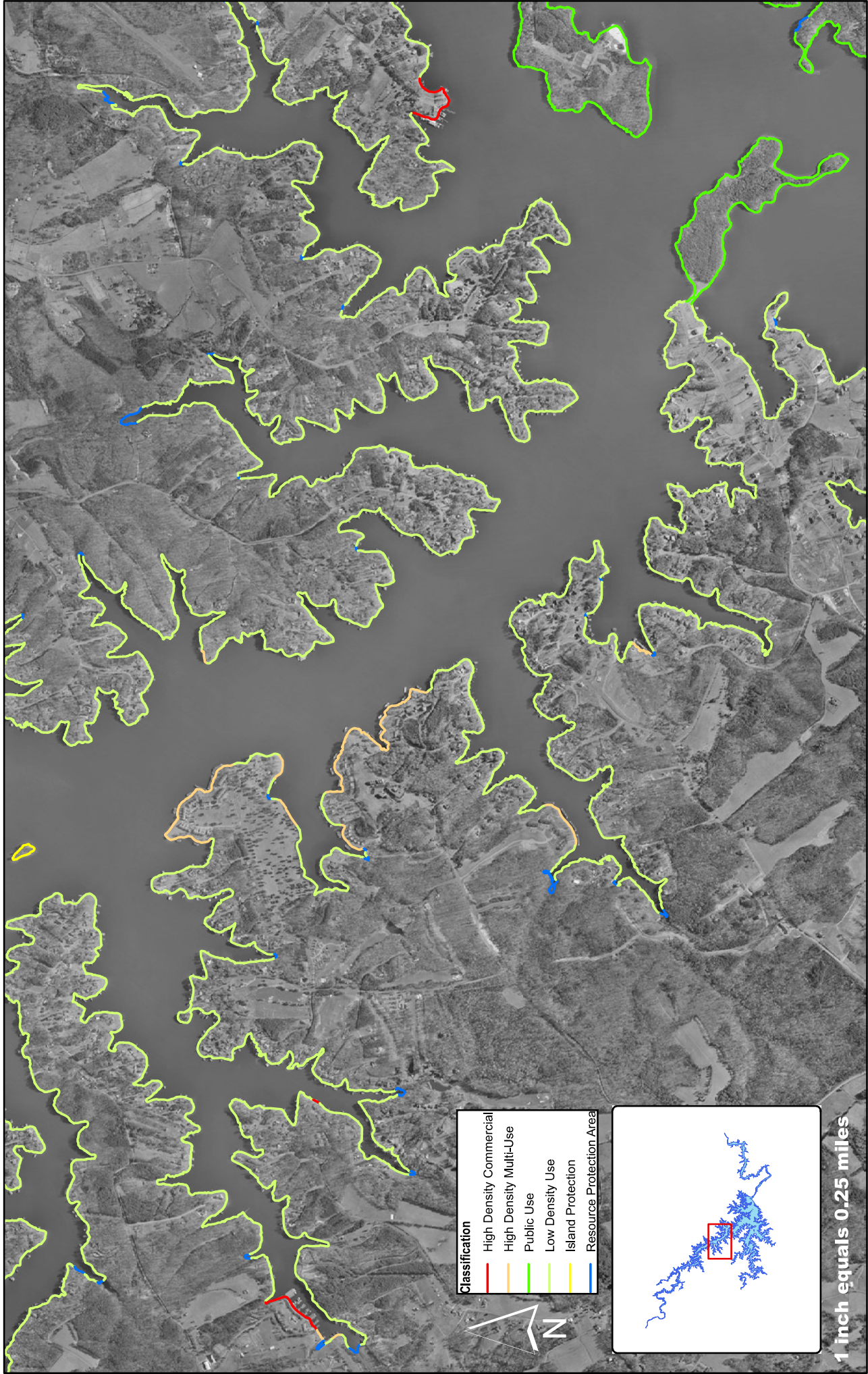
- Classification**
- High Density Commercial
 - High Density Multi-Use
 - Public Use
 - Low Density Use
 - Island Protection
 - Resource Protection Area



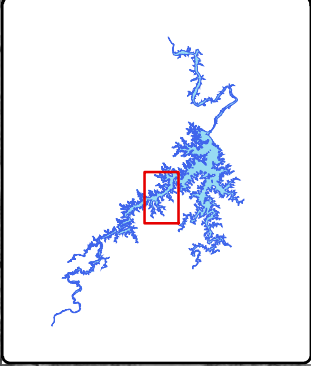
1 inch equals 0.25 miles





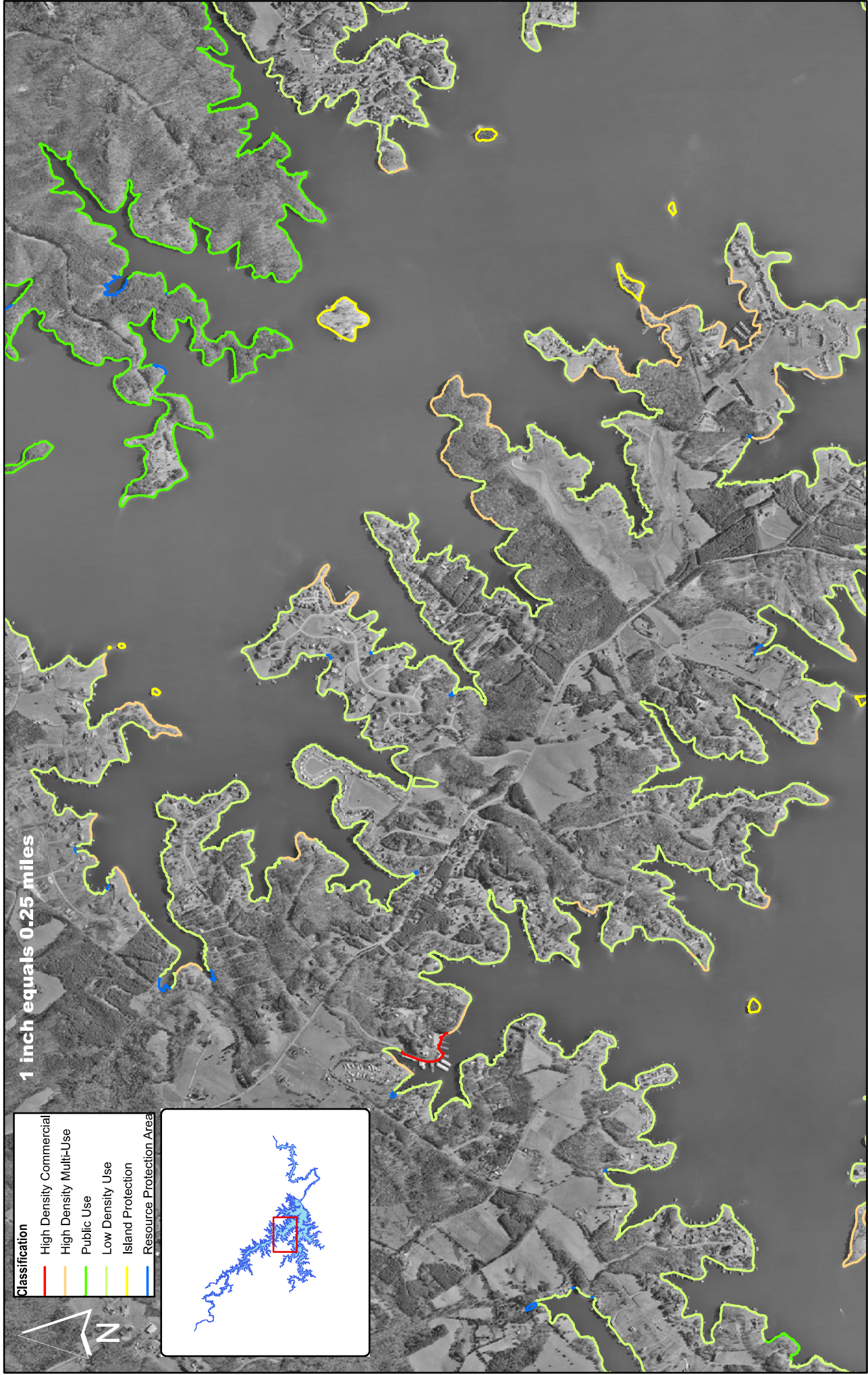


Classification	Color
High Density Commercial	Red
High Density Multi-Use	Orange
Public Use	Green
Low Density Use	Yellow
Island Protection	Light Green
Resource Protection Area	Blue



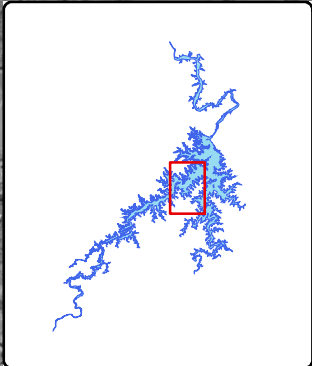
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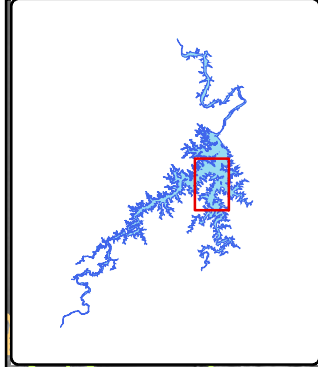




1 inch equals 0.25 miles

- | Classification | Color |
|--------------------------|-------------|
| High Density Commercial | Red |
| High Density Multi-Use | Orange |
| Public Use | Green |
| Low Density Use | Yellow |
| Island Protection | Light Green |
| Resource Protection Area | Blue |

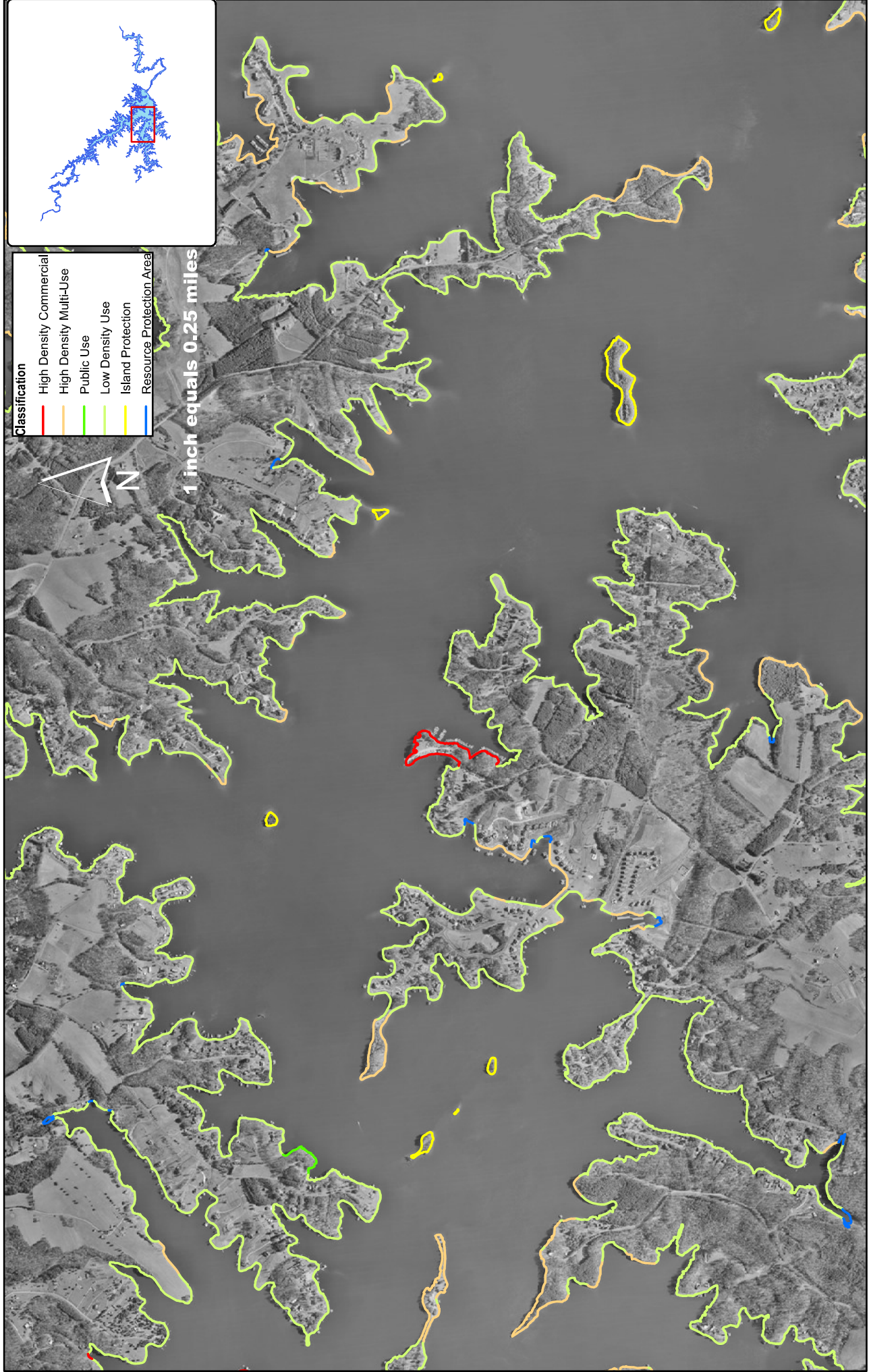


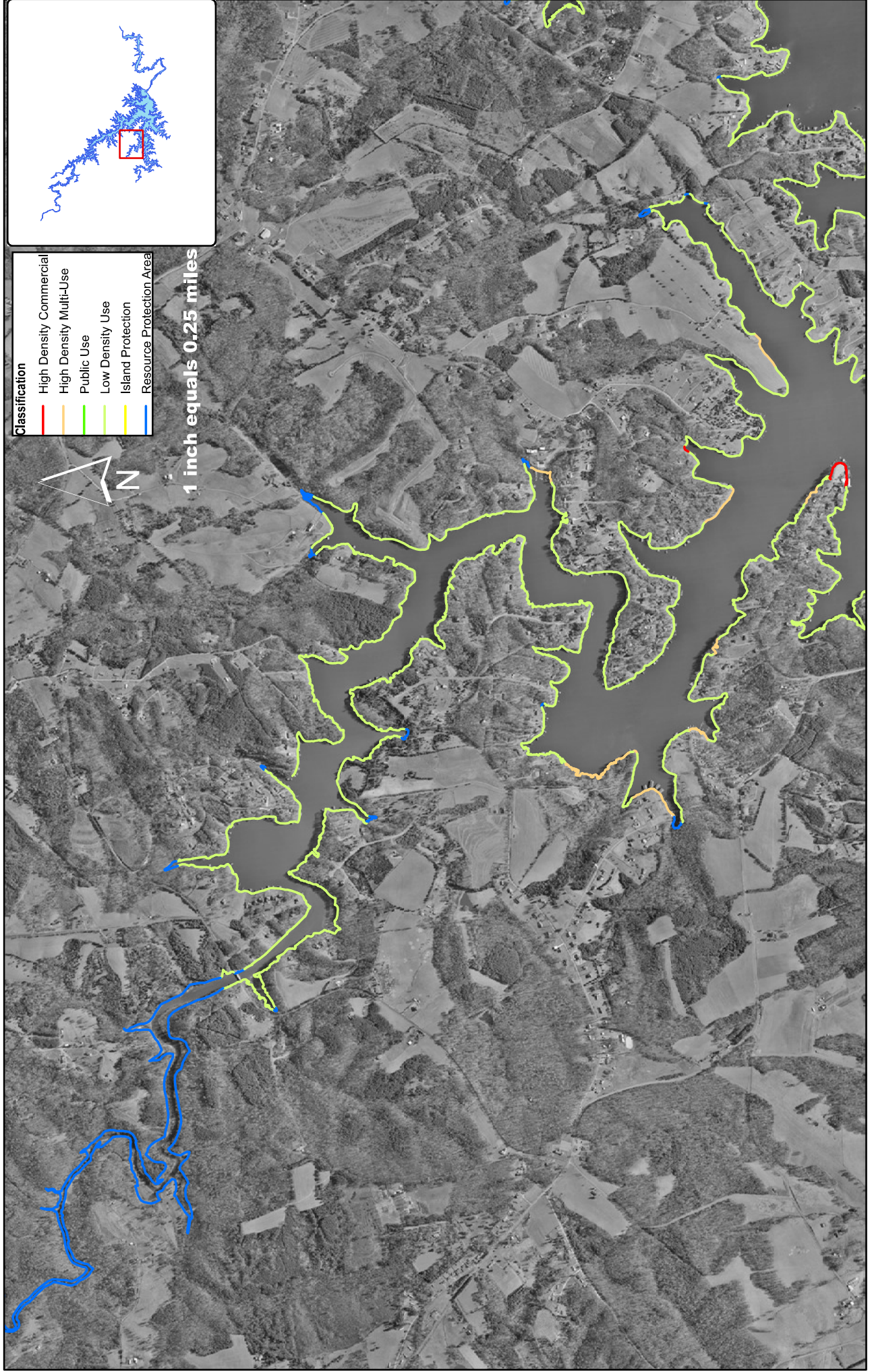


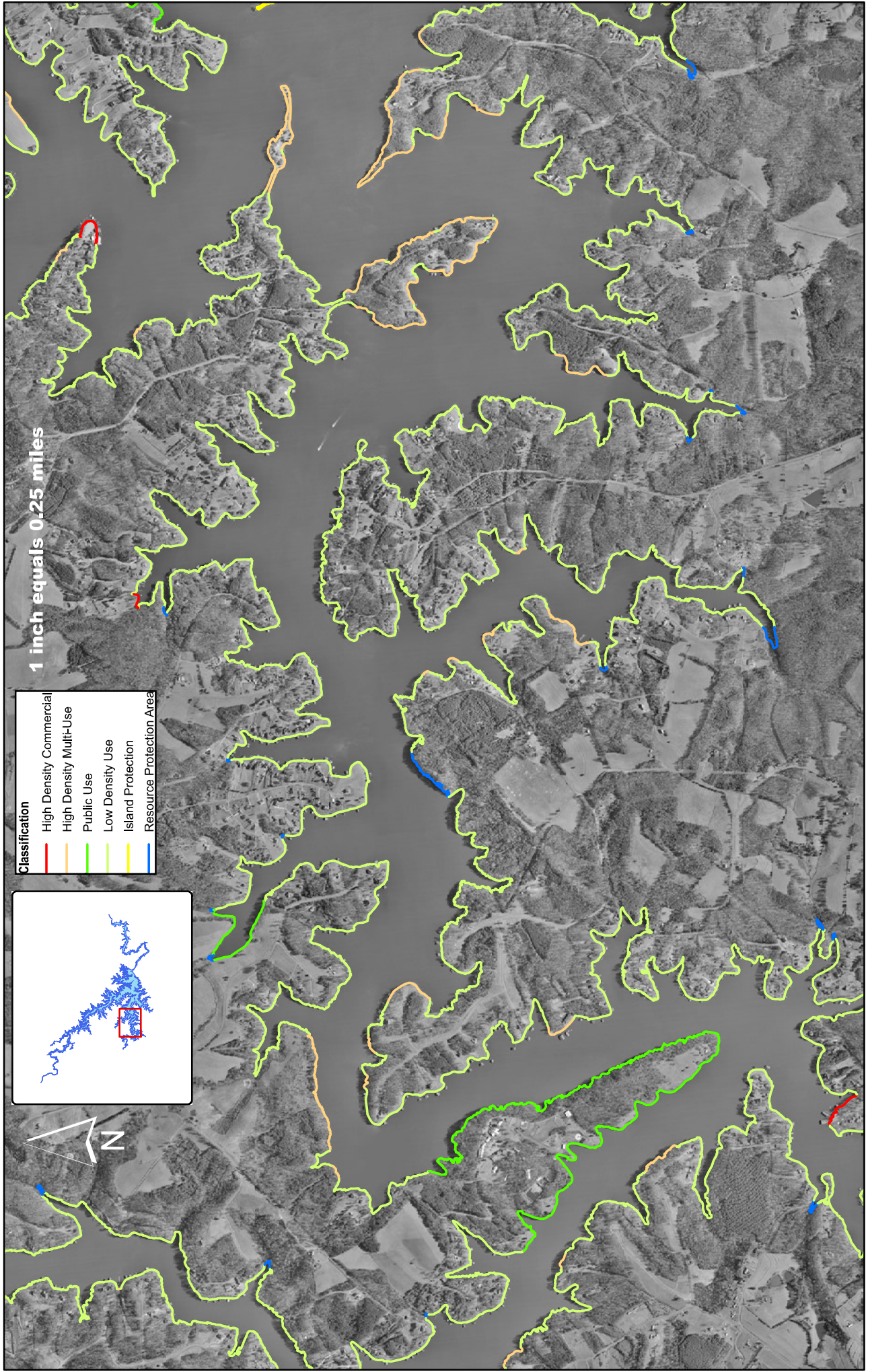
- Classification**
- High Density Commercial
 - High Density Multi-Use
 - Public Use
 - Low Density Use
 - Island Protection
 - Resource Protection Area



1 inch equals 0.25 miles

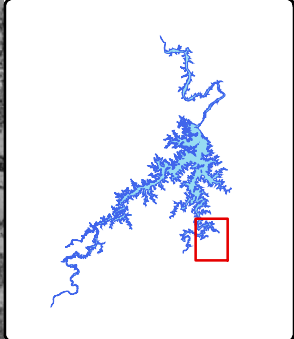




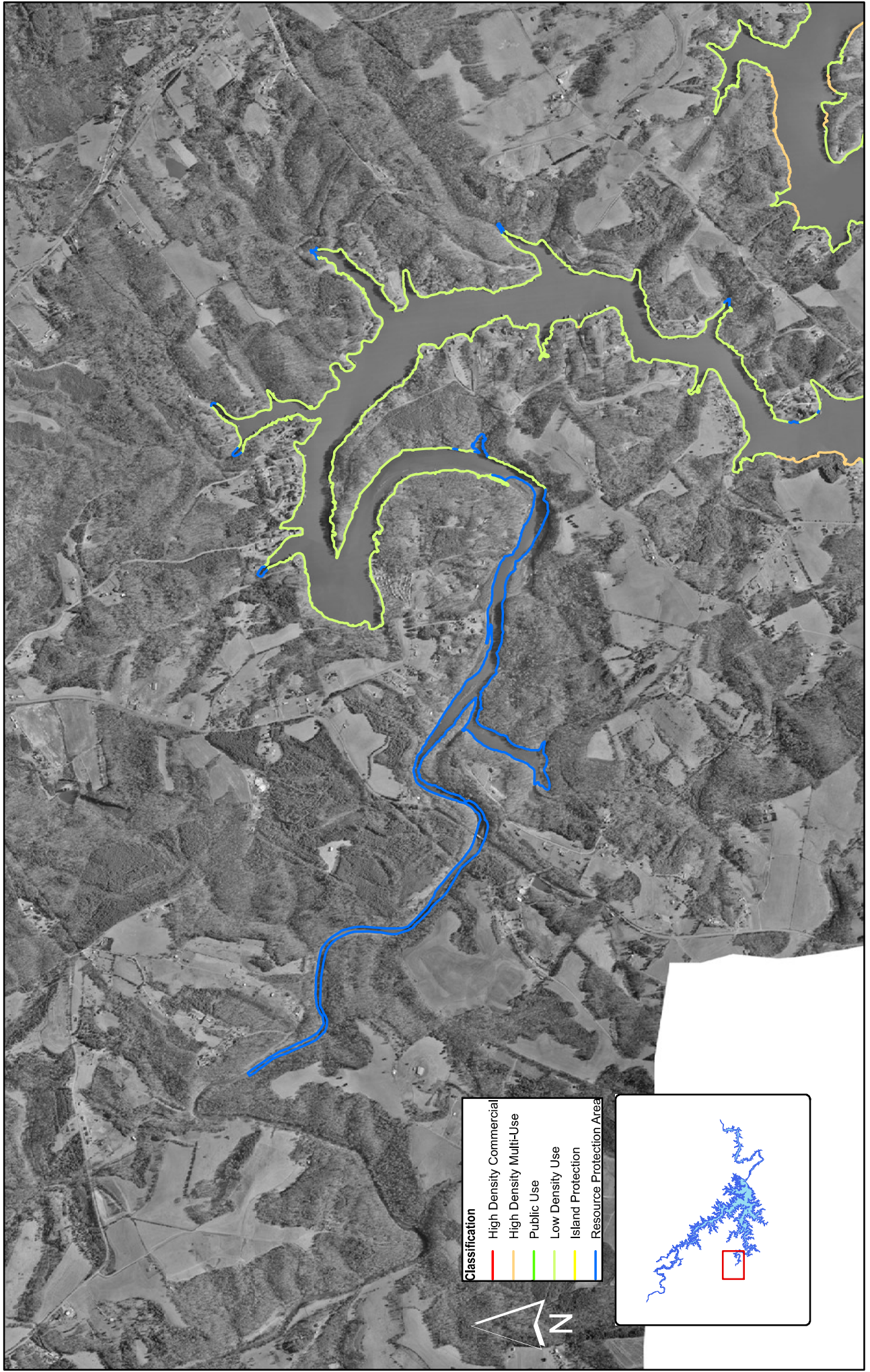


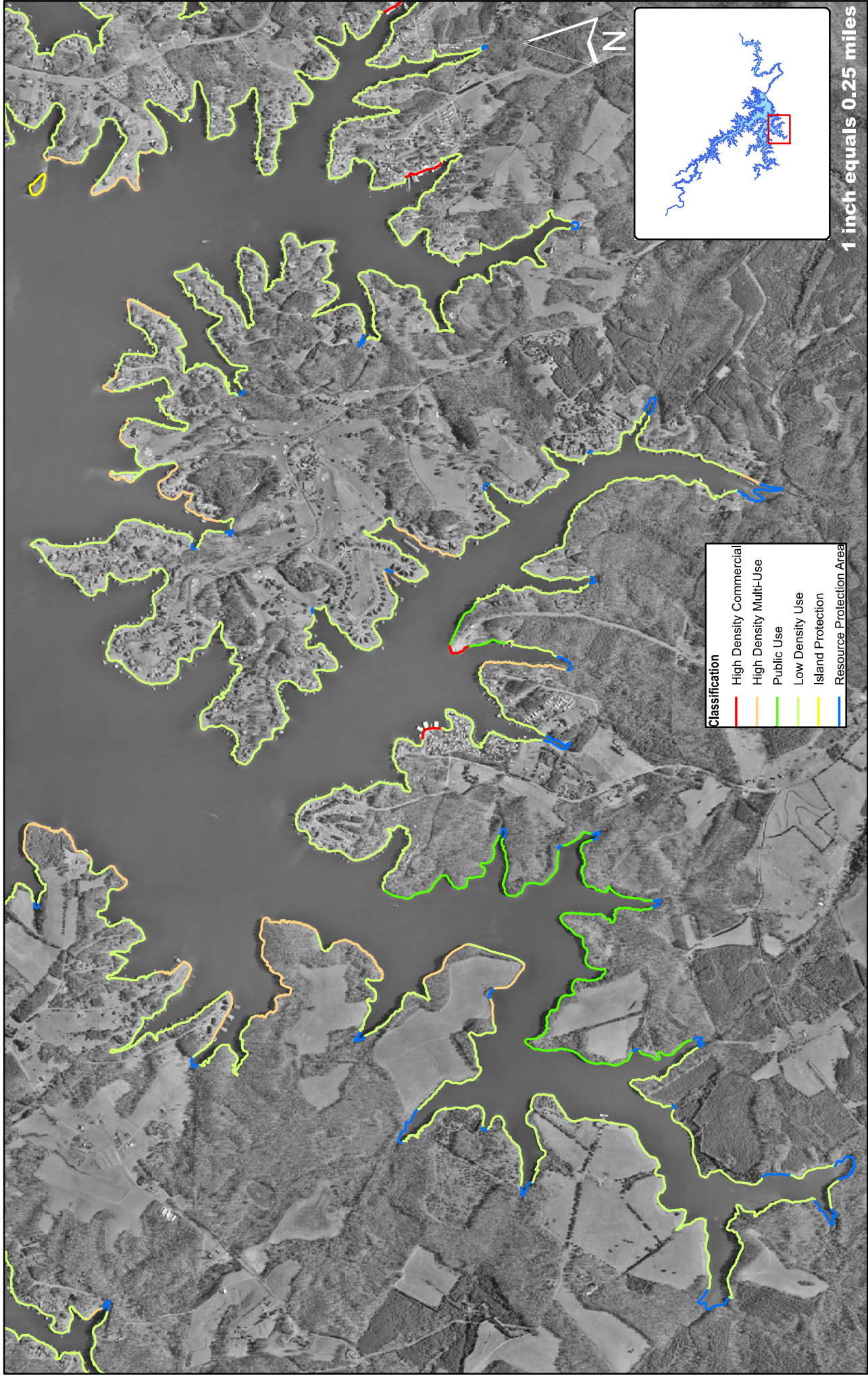


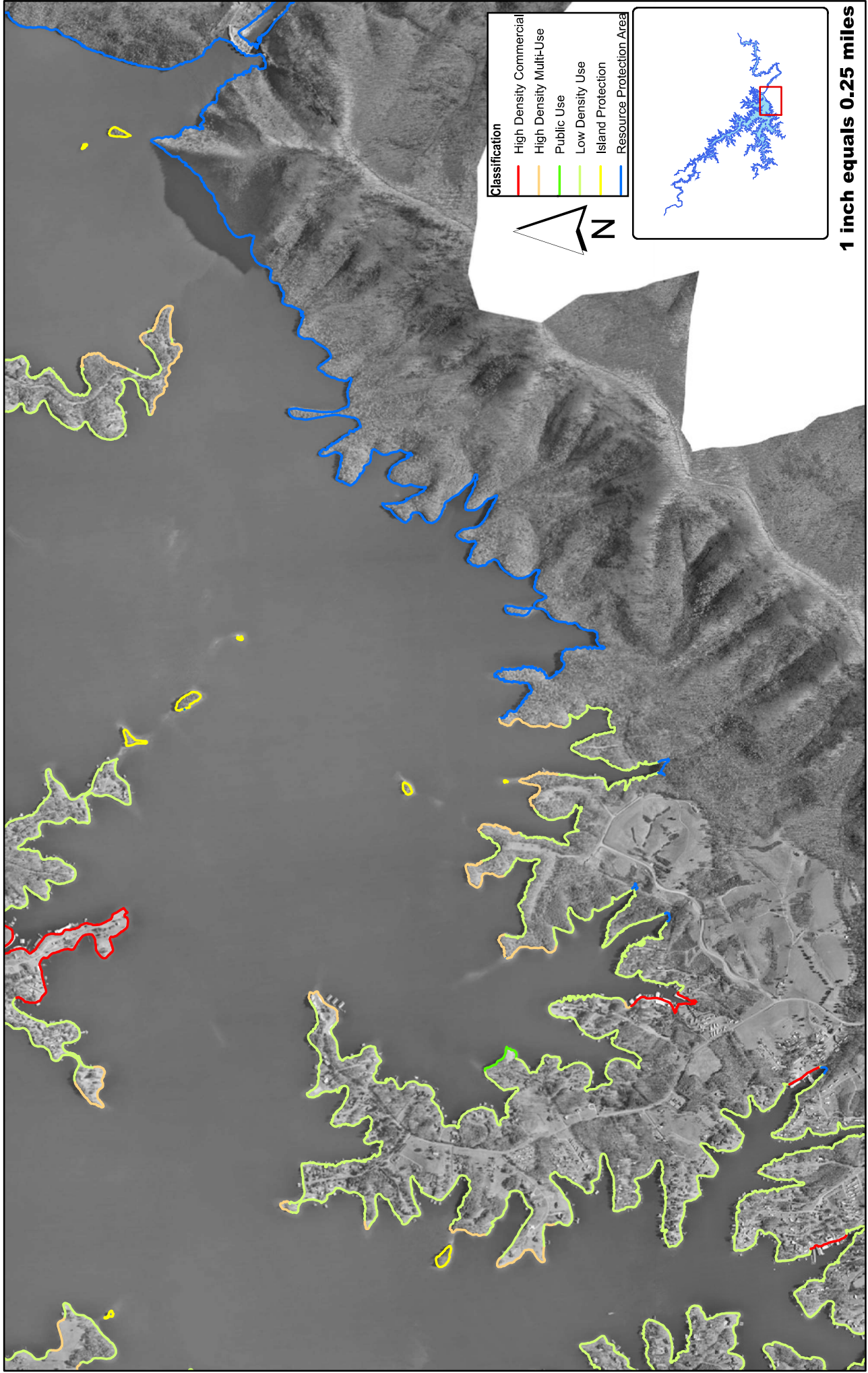
- Classification**
- High Density Commercial
 - High Density Multi-Use
 - Public Use
 - Low Density Use
 - Island Protection
 - Resource Protection Area

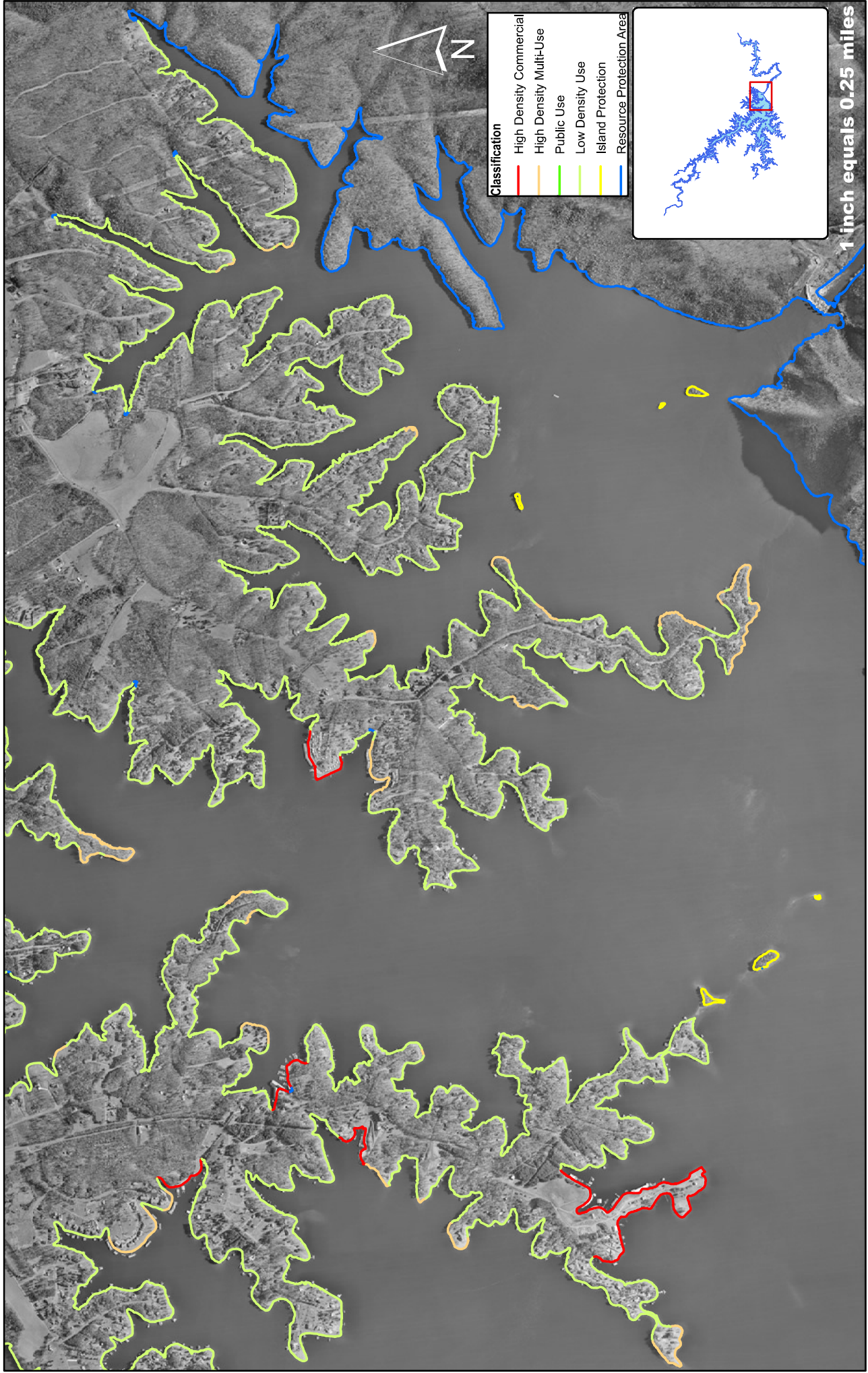


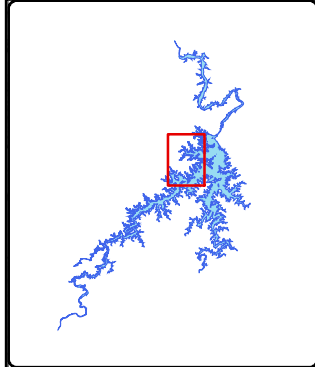
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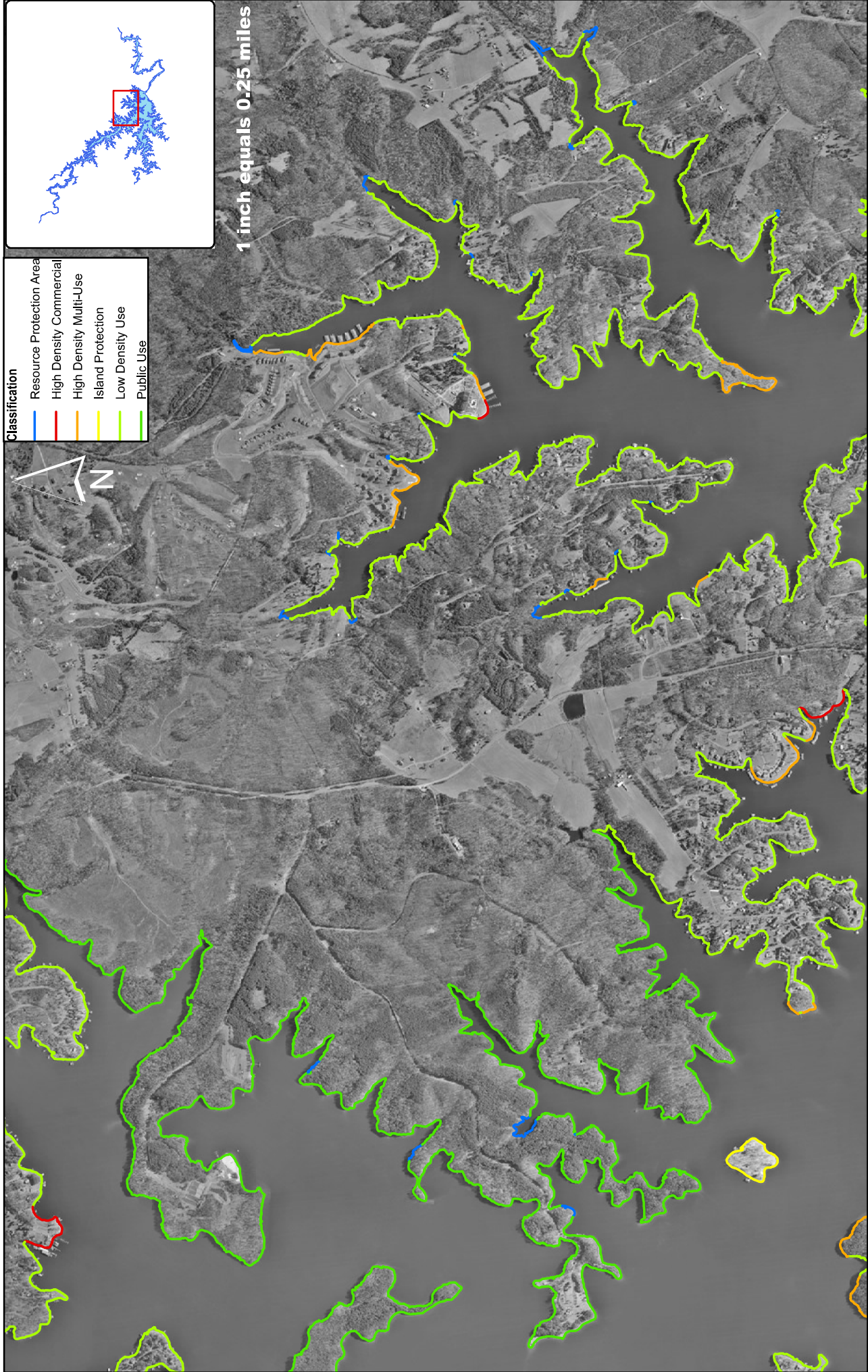


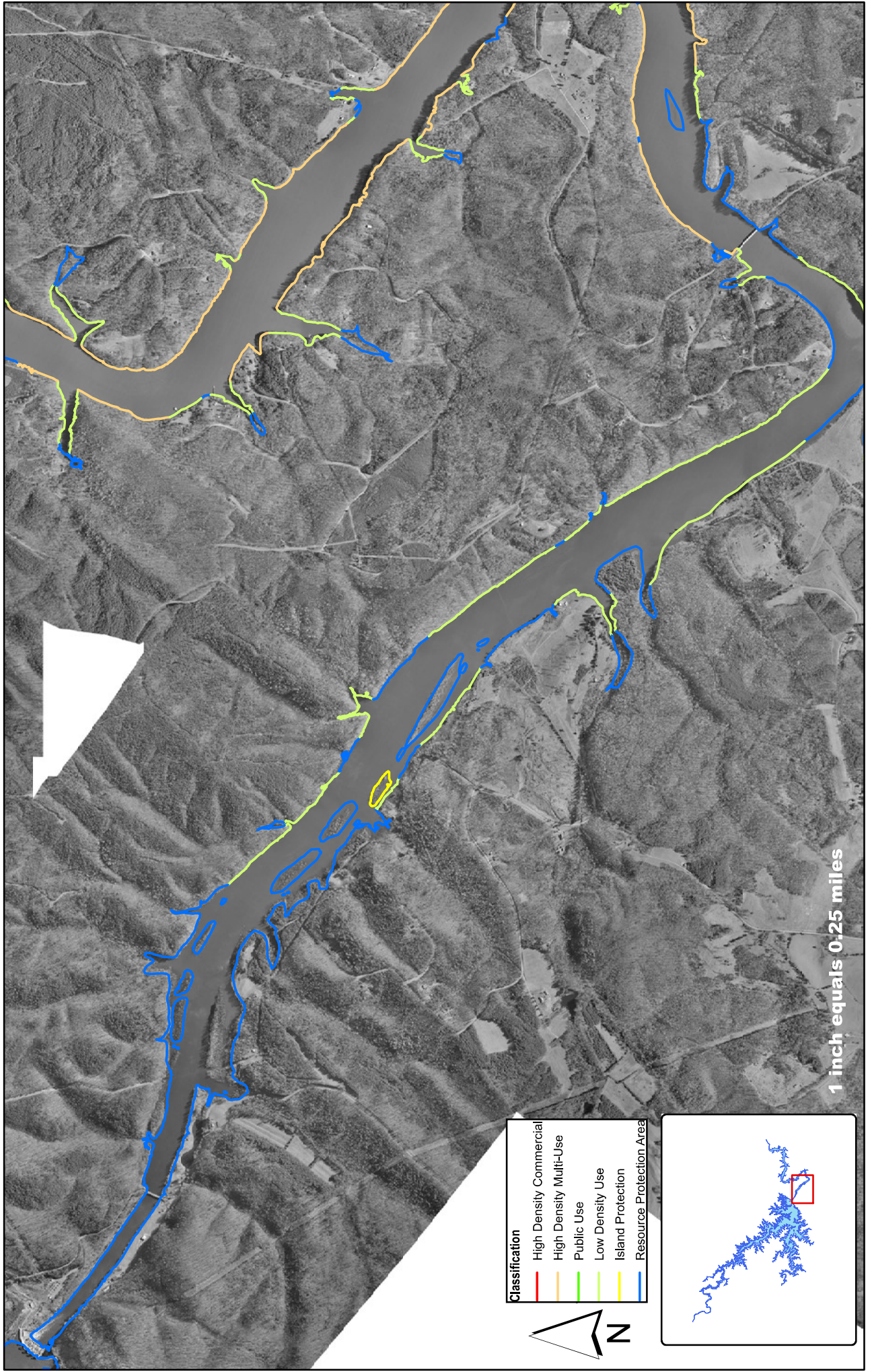


- Classification**
- Resource Protection Area
 - High Density Commercial
 - High Density Multi-Use
 - Island Protection
 - Low Density Use
 - Public Use



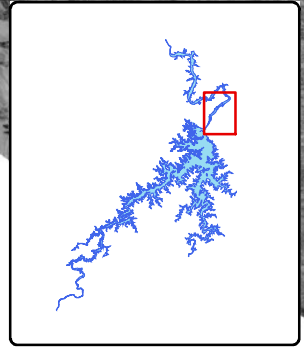
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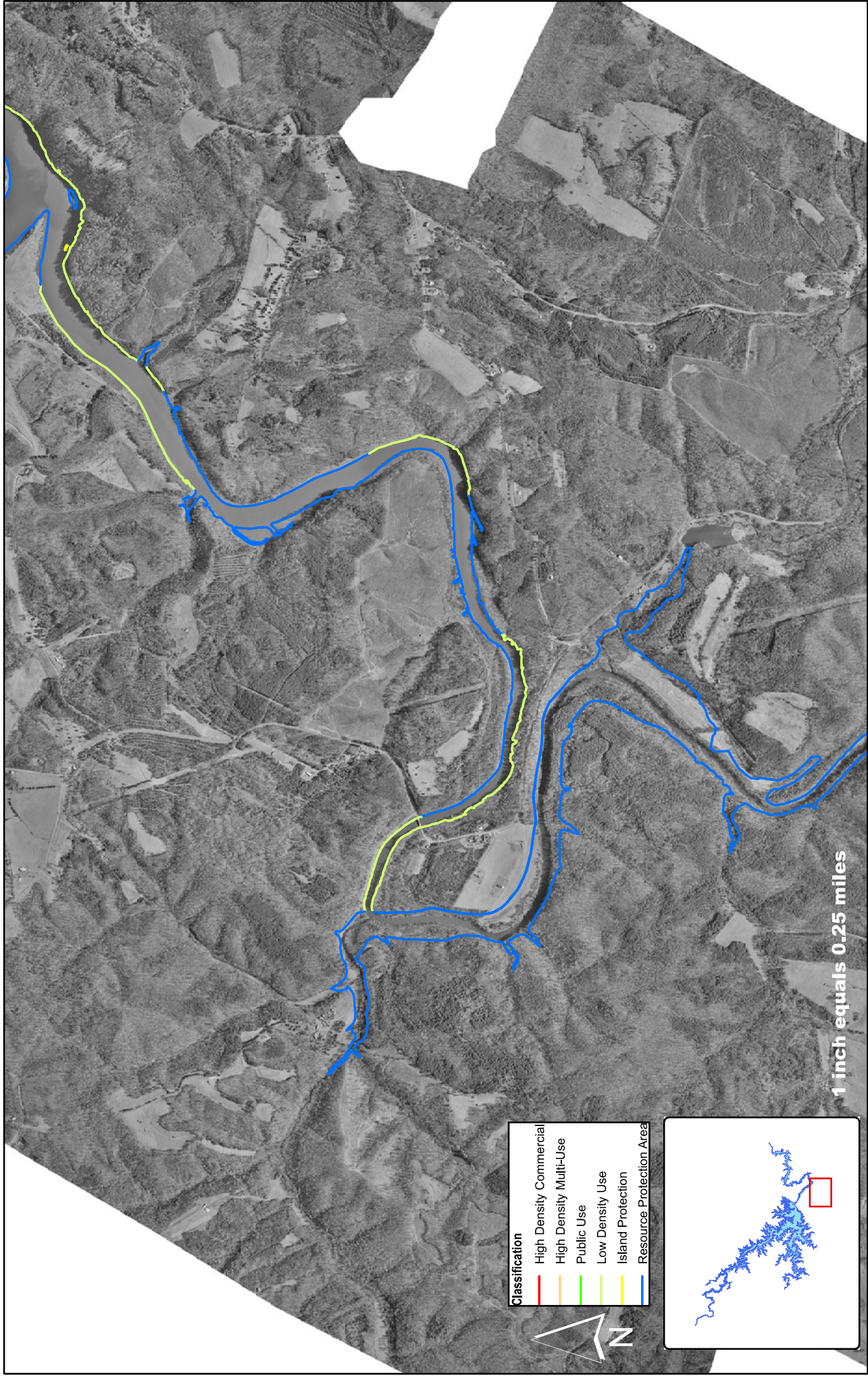




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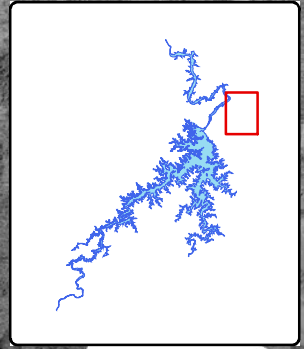
- Classification**
- High Density Commercial
 - High Density Multi-Use
 - Public Use
 - Low Density Use
 - Island Protection
 - Resource Protection Area

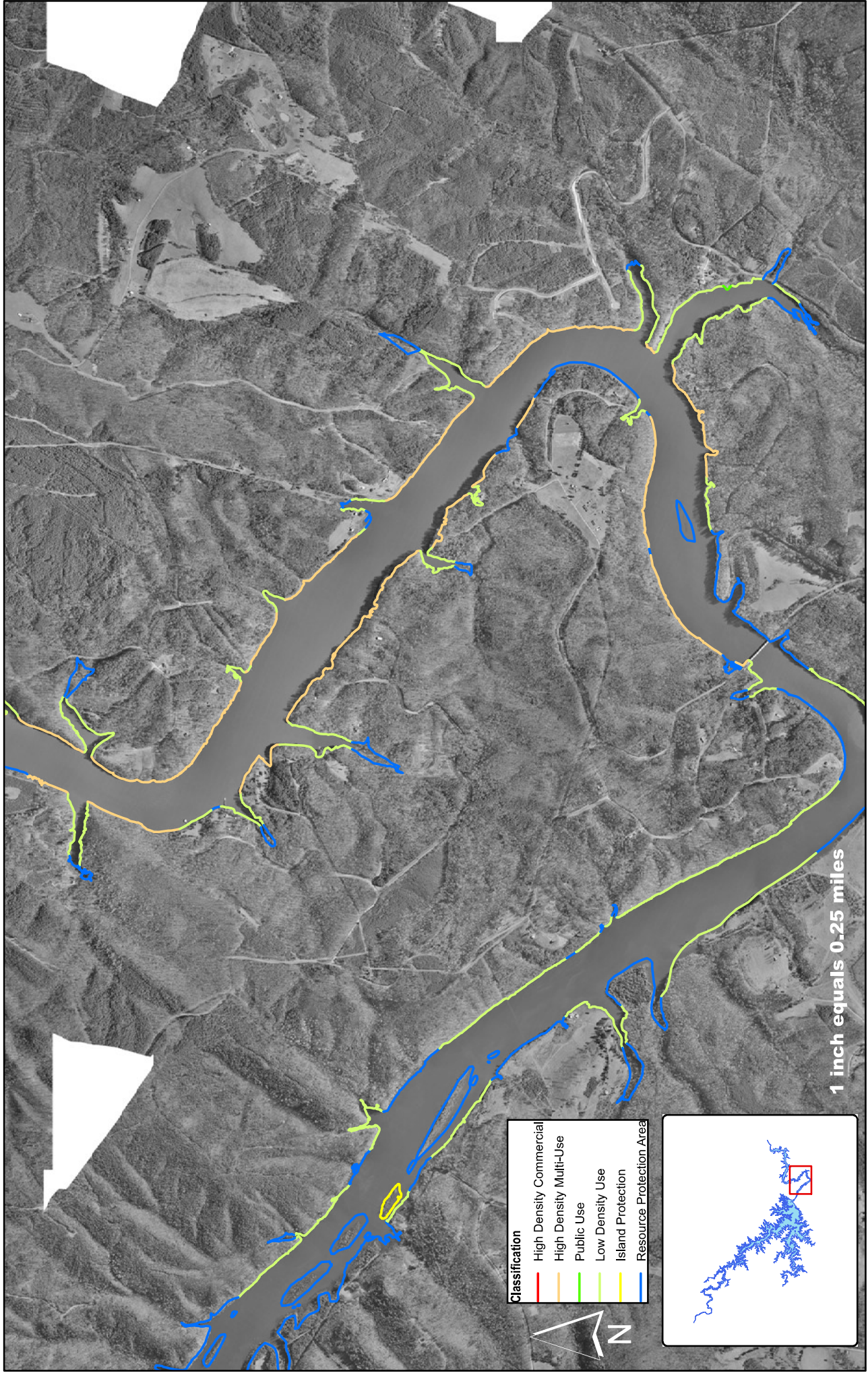




- Classification**
- High Density Commercial
 - High Density Multi-Use
 - Public Use
 - Low Density Use
 - Island Protection
 - Resource Protection Area

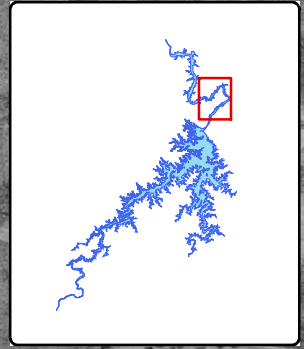
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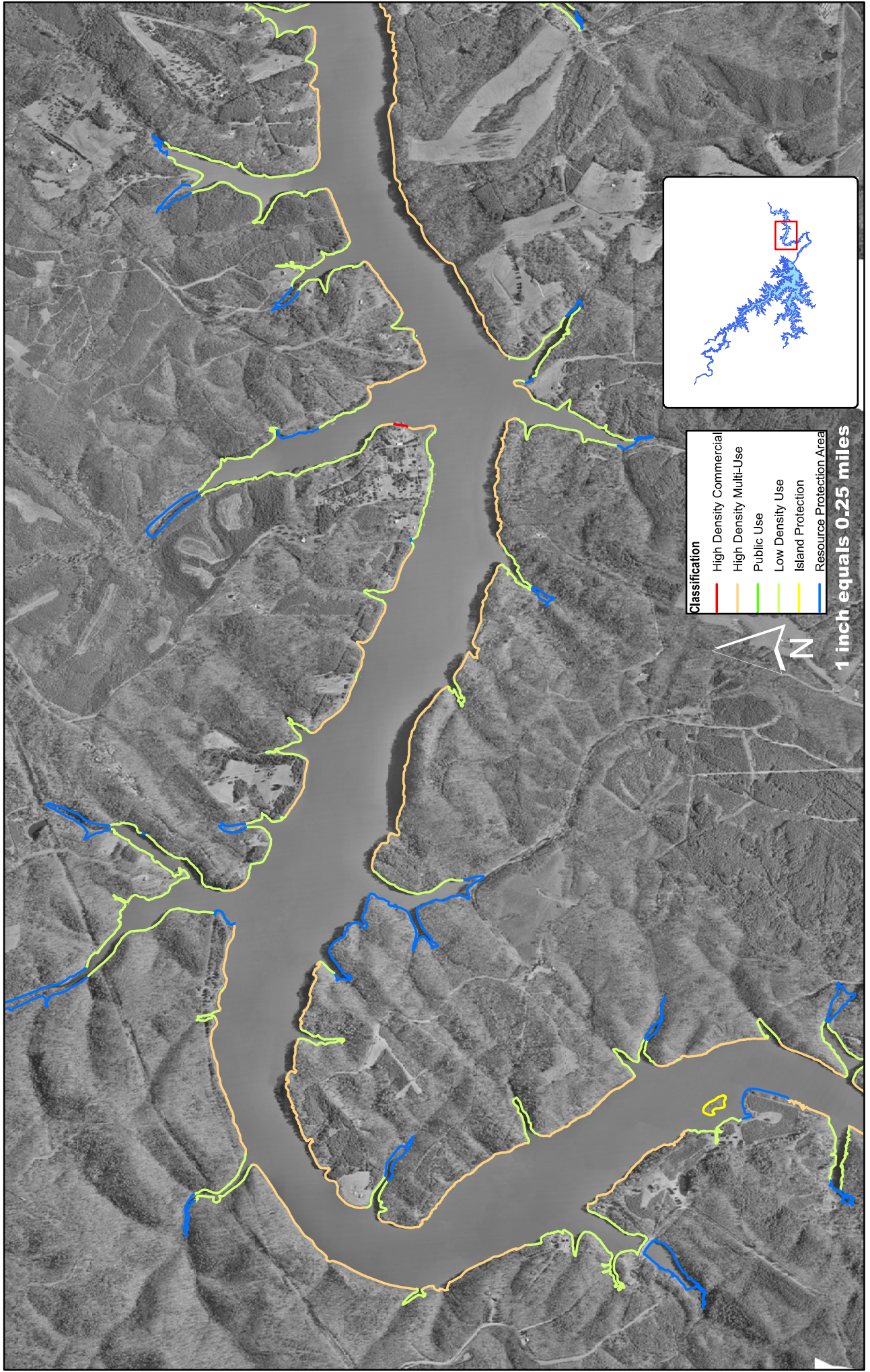


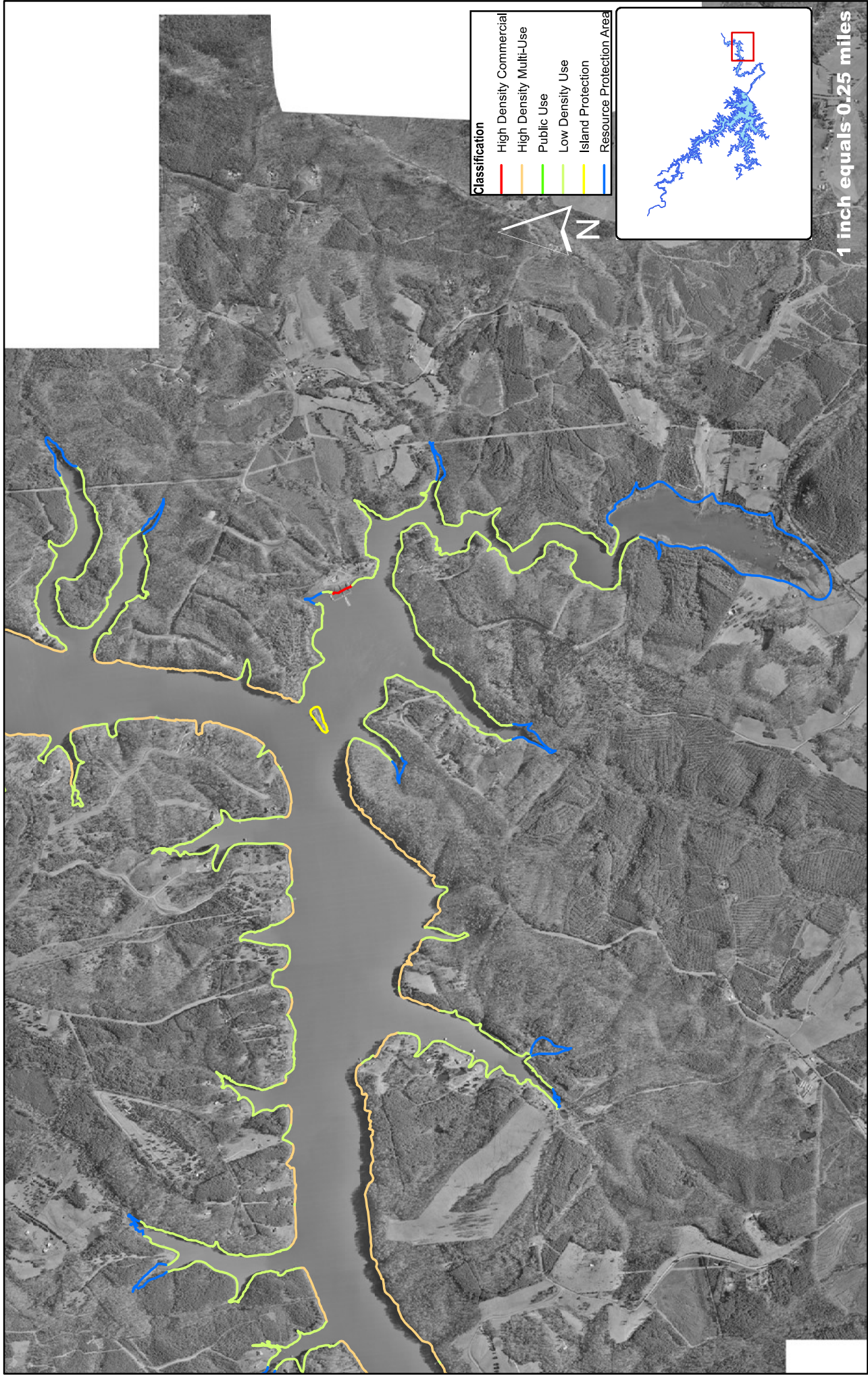


1 inch equals 0.25 miles

- | Classification | |
|------------------|--------------------------|
| Red line | High Density Commercial |
| Orange line | High Density Multi-Use |
| Green line | Public Use |
| Light Green line | Low Density Use |
| Yellow line | Island Protection |
| Blue line | Resource Protection Area |

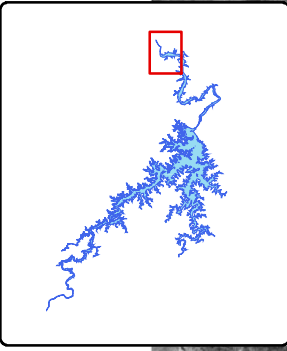








- Classification**
- High Density Commercial
 - High Density Multi-Use
 - Public Use
 - Low Density Use
 - Island Protection
 - Resource Protection Area



1 inch equals 0.25 m

Appendix E
One-Third of the Cove
Methodology

**APPALACHIAN POWER COMPANY
SMITH MOUNTAIN PROJECT NO. 2210
SHORELINE MANAGEMENT PLAN
DETERMINATION OF 1/3 COVE**

Introduction

To determine whether the length of a proposed structure exceeds 1/3 of the cove and to ensure that all stakeholders are given fair consideration when proportioning waterways for recreational use, the following described methodology is to be utilized to establish an allowable building area within the project boundaries for the Smith Mountain Project.

Establishment of the Allowable Building Area

The allowable building area methodology as described below takes into consideration the extended property lines for the site that the structure is to be permitted while meeting the 1/3 cove conditions. The steps to determine the allowable building area are as follows:

a. Step One – Determination of Setbacks (Figure 1 to Appendix E)

The allowable locations for structures within the project boundary for the Smith Mountain Project are described in the SMP for the different shoreline classifications. In general, the minimum setback distances are measured from established dock delineation lines or extended lot lines as shown in Figure 3 of the SMP. It is these setback limits that establish the points along the shoreline whereby construction of a structure would be allowed.

b. Step Two – Determination of Waterway Centerline (Figure 2 to Appendix E)

The centerline of the waterway within a cove is represented by a polyline that is equidistant from the base elevation (795-foot elevation contour at Smith Mountain Lake; 600-foot elevation contour at Leesville Lake) on either side of the cove. In order to locate the centerline of the waterway, it will be necessary to depict sufficient lengths of the base elevation on both sides of the cove (i.e. along the shoreline adjacent to the subject property, and along the opposite shoreline). Upon review of any 1/3 cove submittal, Appalachian may require that additional lengths of the base elevation be evaluated in order to adequately represent the centerline of the waterway.

Once the base elevation has been located on both sides of the cove, a series of offset calculations must be performed simultaneously along the subject shoreline and the opposite shoreline, until such offsets intersect in the middle of the cove. Begin by offsetting the polyline that represent the base elevation on each side of the cove by a distance of ten (10) feet in the direction of the center of the waterway. Repeat this offset calculation in 10-foot increments, with each incremental offset polyline considered to be an “interval.” Where opposing offset polylines of the same interval intersect at a point in the waterway, such

point shall constitute a point along the centerline of the waterway. Where opposing offset polylines of the same interval “pass” each other in the waterway, the centerline of the waterway shall be determined by averaging the distance between passing offsets of the same interval. Connect all intersection points and averaged polylines to establish the centerline of the waterway.

To demonstrate the accuracy of the centerline, Appalachian may require additional information as depicted in Figure 2A of Appendix E. If required by Appalachian, extend the subject property’s dock delineation lines (or extended property lines) to the centerline of the waterway. At each point where the dock delineation line (or extended property line) intersects the centerline, draw a circle with the shortest possible radius so that the circle is tangent to the base elevation on both sides of the cove. If the circle is not tangent to the base elevation on both sides of the cove, the centerline may be incorrect.

c. Step Three – Determination of One-Third Points (Figure 3 to Appendix E)

From the centerline determined in Step Two, draw perpendicular lines extending from shoreline to shoreline at intervals along the centerline at an interval of no greater than ten (10) feet and that encompass the shoreline where the structure is to be permitted from setback to setback. Measure each of the lines perpendicular to the centerline from shoreline to shoreline and divide the line into three equal segments. Those points result in the one-third points for determining the allowable building area.

d. Establishment of Allowable Building Area (Figure 4 to Appendix E)

The area encompassed by the one-third points from the shoreline where the structure to be permitted is to be constructed and the setback lines establishes the “Allowable Building Area”. Structures that meet the other requirements of the SMP and are within the “Allowable Building Area” could then be approved for construction upon review by Appalachian.

Conclusion

As with any methodology, there may be instances in which the above described methodology does not adequately proportion the waterway and some modifications may be required to address the particular situation. However, this methodology does result in equal consideration for future installations and public use of the waterway within the 1/3 cove limits.

The information and data used to determine the buildable area shall be forwarded to Appalachian along with the permit application for the proposed dock.

FIGURE 1
STEP ONE – DETERMINATION OF SETBACKS

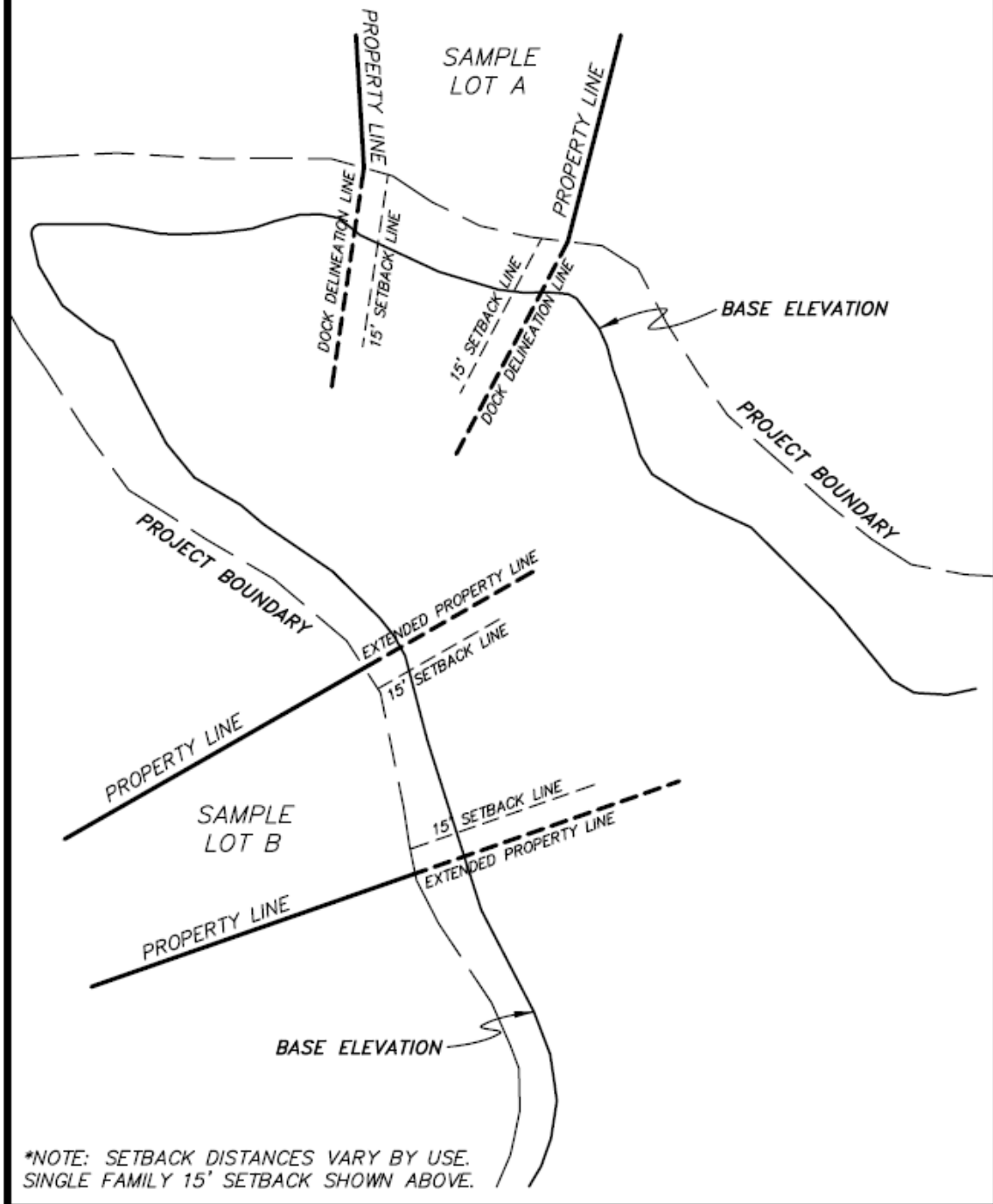


FIGURE 2
STEP TWO – DETERMINATION OF WATERWAY CENTERLINE

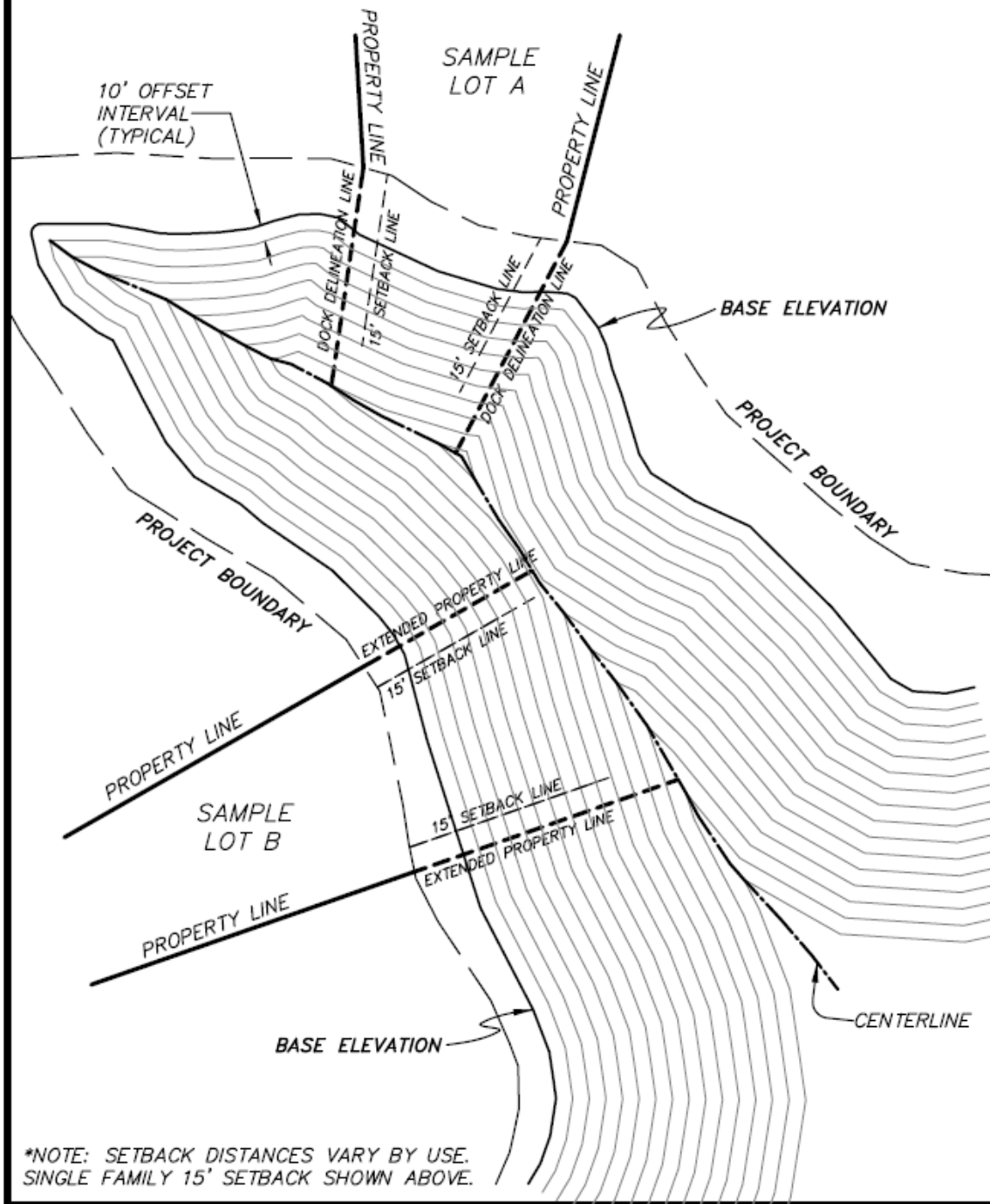


FIGURE 2A
STEP TWO – DETERMINATION OF WATERWAY CENTERLINE
(ACCURACY CHECK)

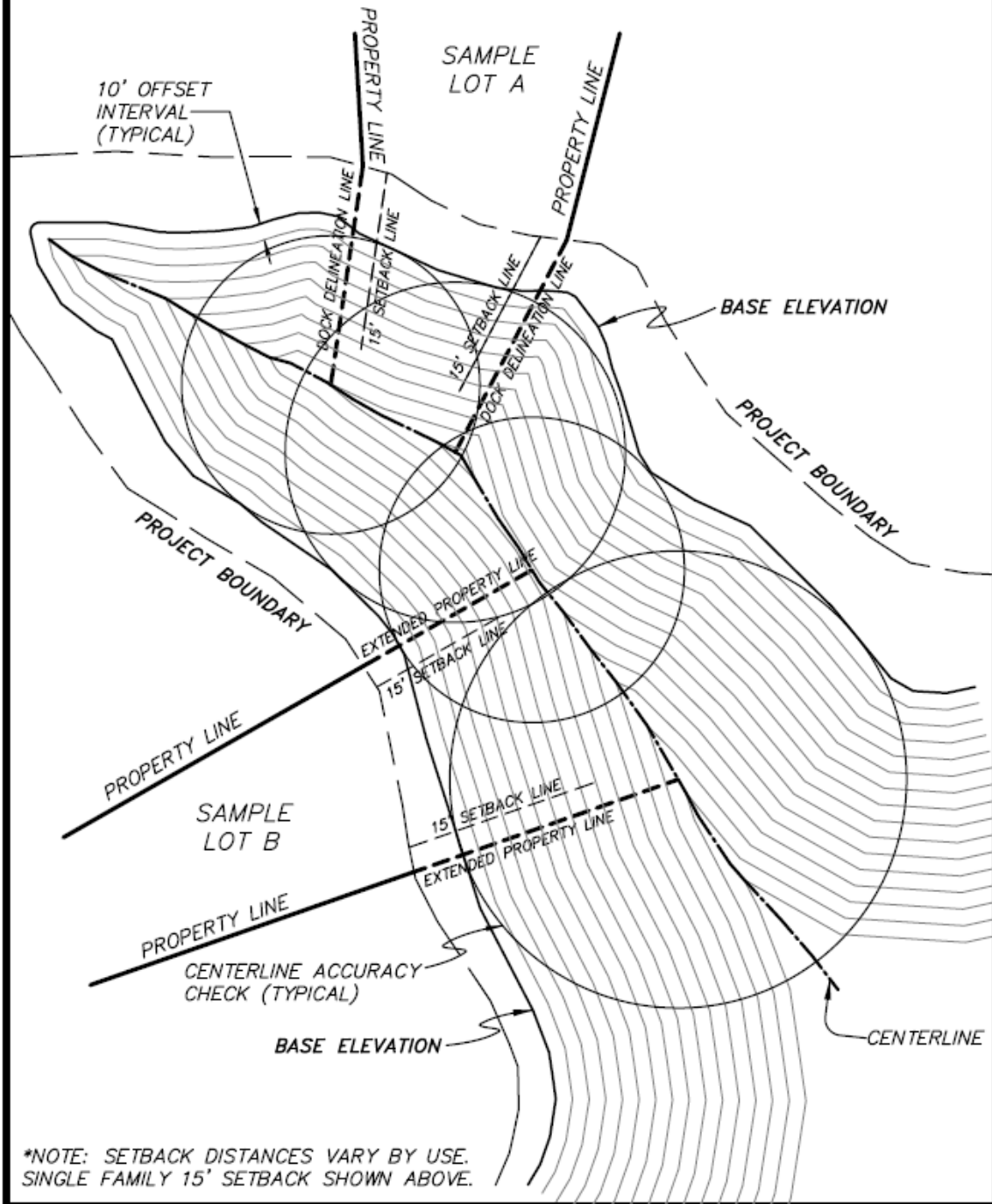


FIGURE 3
STEP THREE – DETERMINATION OF ONE-THIRD POINTS

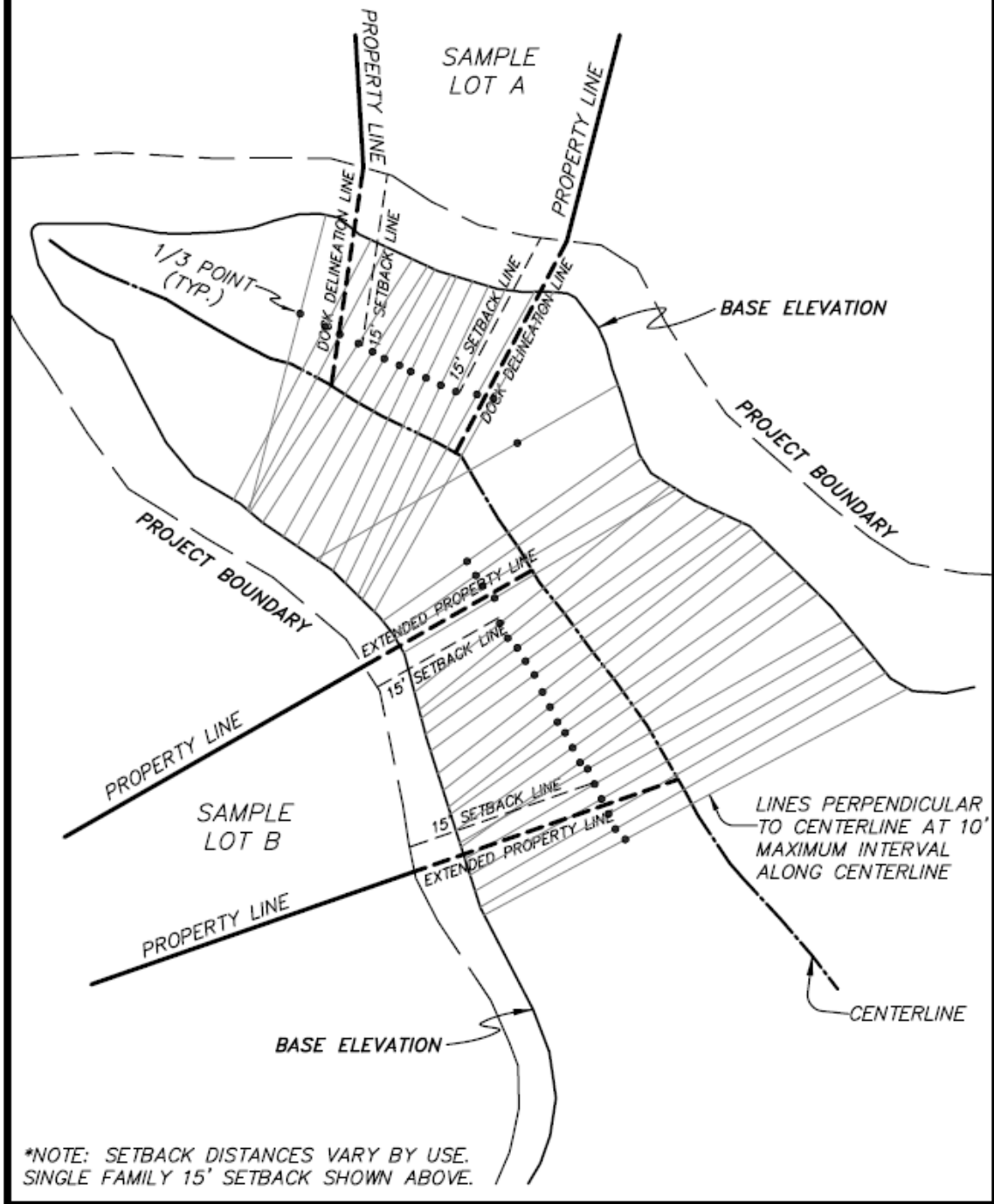
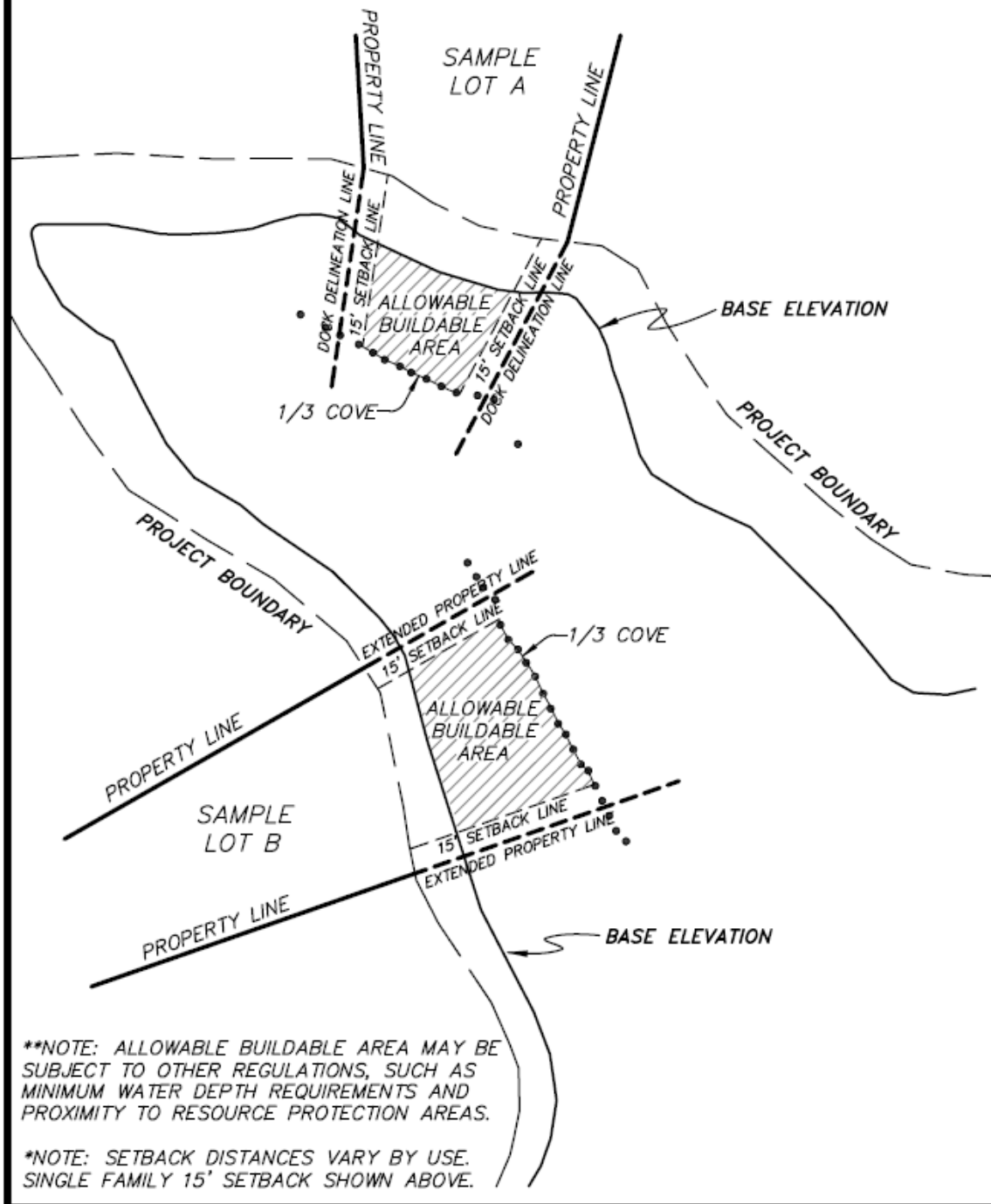


FIGURE 4

STEP FOUR – DETERMINATION OF ALLOWABLE BUILDABLE AREA**



Appendix F

**U.S. Fish and Wildlife Service
Native Plants for Wildlife Habitat**

**Virginia Department of
Conservation and Recreation
Native Plant List**

**Smith Mountain Lake Association
Recommended Plant List**



SMITH MOUNTAIN LAKE ASSOCIATION

Buffer Landscaping Program

Recommended

PLANT LIST



For riparian buffers and other landscaping in Bedford, Franklin, Pittsylvania, and Roanoke counties

August 2010

Introduction: Information presented here is compiled from multiple sources and is meant to be a guide. Weather, soil, moisture and other environmental conditions play a major role in the size of plants and bloom time.

Plants identified as “deer resistant” are just that – “resistant”. Deer are known to eat everything and anything if they are hungry. Readers are encouraged to consider using deer repellent products if they have problems. We have found that products such as Milorganite and Liquid Fence may be helpful in keeping browsing deer away. This is by no means an endorsement of any product – and serves only to pass along information that local lake residents have found to be useful in addressing the deer problem.

Information provided about sources of plant material is based on reviews by a randomly selected group of plant providers. Many nurseries and landscapers can special order items; however, big box stores may or may not carry various items in a given year. Most plant materials are available from catalogs or on-line sources; however, residents are encouraged to obtain plant materials locally.

New cultivars/hybrids that improve selected features of plants are developed each year. Therefore, these lists are expected to grow and/or change over time to reflect the latest science in the plant world.

Reviewers: This list was reviewed for appropriateness to location and availability by a number of people. Many of our committee members are Master Gardeners from the Franklin County chapter and Master Naturalists from the Blue Ridge Foothills and Lakes chapter. The primary credit for compilation of this list goes to De English, a Master Gardener and Master Naturalist, and Bill Pappa, a Master Gardener with a special interest in riparian buffers.

Special thanks go to Alex Niemiera, Associate Professor in Horticulture at Virginia Tech; Lynn Crump, Environmental Programs Planner at DCR; and Alice Baird, DCR Division of National Heritage for reviewing and making helpful suggestions.

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DEER RESISTANT PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Yarrow*	Achillea species	S	M-WD	spring	white, pink, yellow to orange to red with yellow center	3-4 ft high x 1-1.5 ft wide		medium-size perennial; fern-like appearance; may produce runners - can become invasive; divide every 2-3 years in early fall or spring; drought tolerant; easy to maintain; flowers may be dried for decorative purposes	C, N, BB
Monkshood	Aconitum species	S to PS	M-WD	mid-summer to fall	deep blue-purple; cultivars may be white, pink, yellow	2-5 ft high x 1 ft wide		prefers night temps below 70; all parts highly toxic if ingested; contact with foliage may cause skin irritation	C, N
Chives, Garlic Chives, Nodding Onion*	Allium species	S to PS	M-WD	spring to fall	pink, rose, white, violet	0.5-3 ft high	butterflies	globe-shaped flowers; good around vegetables and perennials to repel pesky insects; good in salads and cooked dishes	BB, C, L, N, C
Eastern Blue Star*	Amsonia tabernaemontana	PS	W-WD	spring to summer	blue, purple	1-3 ft high x 2 feet wide		somewhat drought tolerant; tolerates poor soil; can cut back to half size to encourage denser growth	C, N
Anemone	Anemone species	S to PS	M-WD	spring to fall depending on species	white, pink, coral, blue, purple	1.5-4 ft high		medium-size perennial; good in mixed borders and at edge of woodlands; plant tubers in summer/early fall; divide rhizomes in spring	C, N

DEER RESISTANT PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Columbine*	Aquilegia species	S to PS - PS best	M/W-WD	Apr-Jul	white, red, pink, magenta, red, blue,	1-3 ft high x 1-2 ft wide	butterflies hummingbirds beneficial insects	hardy; commonly cultivated, self-seed; good for borders; good cut flower; contact with sap may cause skin irritation; may be difficult to maintain - some may need to be replaced every 3-4 years; some species can be good ground cover	BB, L, N, C
Jack-in-the Pulpit*	Arisaema triphillum	PS to SH	M-WD	Mar-Jun	striped purple, green	0.5-2 ft high x 1-1.5 ft wide	songbirds mammals	interesting spring blooms followed by clusters of red berries in fall, spreads rapidly from seed	C, N
Goatsbeard*	Aruncus dioicus	S to SH	M-WD	May-Jul	white	5-6.5 ft high x 3-5 ft wide	butterflies	large perennial, easy to grow; flower clusters 6-24 inches long; tolerates seasonal flooding; no serious pests; good in the back of border - plant in groups of 2-3 for best impact; good cut flower	C
Wild Ginger or Canadian Snakeroot*	Asarum species	PS to SH	M	Apr-May	inconspicuous brownish- purple	up to 6 inches high		low growing; good in rock gardens and along building foundations; attractive leaves, will spread, semi-evergreen; tolerates dry conditions	C, N
Common Milkweed*	Asclepias syriaca	S	D-WD	May-Aug	pale purple	3-6.5 ft high x 3 ft wide	butterflies (Monarch host plant); beneficial insects	milky sap toxic in large amounts; interesting seed pods; fragrant flowers;	C

DEER RESISTANT PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Butterfly Weed*	Asclepias tuberosa	S to PS	D/M	early to late summer	orange	1-3 ft high x 1-1.5 ft wide	butterflies (Monarch host plant); beneficial insects	medium-size perennial; easy to grow, but does not transplant well; Monarch butterfly host plant; no serious pests; milky sap may cause skin irritation	BB, C, L, N
New England Aster*	Aster species	S to PS	D/M/W-WD	Aug-Oct	violet, pink, white	1-3 ft high x 1-1.5 ft	butterflies small mammals	medium size perennial; showy flowers; frequently cultivated; tolerates drier soils and seasonal flooding; Japanese beetles can be a problem; divide every 2-3 years in spring	BB, L, N, C
False Spirea*	Astilbe species	PS to SH	M	Jun-Jul	pink, lavender, white, red	1-2.5 ft high x 1-2.5 ft wide		medium-size perennial; easy to maintain but Japanese beetles, slugs and snails can be a problem; divide every 3-4 years to maintain healthy plant	C, N
False Indigo or Wild Blue Indigo*	Baptisia australis	S to PS	D/M-WD	early summer	blue-purple	2-5 ft high x 2-3 ft wide	butterflies beneficial insects	large perennial, easy to maintain, tolerates poor soils, showy flower; shrub-like form; no serious pests; not invasive; deep taproot	BB, C, L, N
False Aster or False Chamomile *	Boltonia asteroides	S to SH	M-WD	mid-Aug to early Oct	white, purple, blue with yellow center	up to 6 ft high x 3 ft wide		large perennial with daisy-like flowers that is easy to grow; best to divide every 3 years; good at back of a border; no serious pests	C, N

DEER RESISTANT PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Bellflower*	Campanulastrum species	PS	M	Jun-Aug	light blue, purple	3-6 ft high x 1.5-2 ft wide	hummingbirds	medium size perennial, easy to maintain; no serious pest; works best in middle of border planting; not invasive	C, N
Turtlehead	Chelone lyonii	S to PS	M/W	late summer to fall	pink	2-4 ft high	butterflies	pinch back in early spring to keep compact size	BB, C, L, N
Lily of the Valley*	Convallaria majalis	PS to SH	M	mid-late spring	white	6-12 inches high	bees butterflies birds	excellent woodland groundcover; spreads and can be invasive after 4-5 years; cardiotoxic plant - can be poisonous to cats, dogs and other animals; sensitive to heat and humidity; fragrant flower	C, N
Tickseed*	Coreopsis lanceolata	S to PS	D/M-WD	Jun-Sept	yellow	1-2 ft high x 1-1.5 ft wide	butterflies hummingbirds	small size perennial; fairly easy to grow, but requires care; may take 2 years to become established; deadheading beneficial for more flowers; not invasive; tolerates dry conditions; watch for crown or stem rot	C, BB, N, L
Tall Tickseed, Tall Coreopsis*	Coreopsis tripteris	S to PS	D/M- WD	spring-summer	yellow	3-5 ft high	songbirds hummingbirds beneficial insects	tough durable plant with casual appearance; crown rot may occur in poorly drained soil; flowers have anise scented leaves	C, BB, N, L
Threadleaf Tickseed	Coreopsis verticillata	S	WD-D	spring -mid-summer	yellow	1-3 ft high x 1.5 ft wide	birds butterflies beneficial insects	drought tolerant once established; self-sows readily	C, BB, N, L

DEER RESISTANT PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Larkspur	Delphinium species	S	WD	spring to early summer	white, pink, yellow, blue, purple	2-6 ft high x 1-2 ft wide		contact with foliage may cause skin irritation; may cause severe discomfort if ingested	C, N
Pinks - Carnations - Sweet Williams	Dianthus species	S	WD	spring - mid summer	white, pink, red	0.5-2 ft high x 1-1.5 ft wide	beneficial insects	easy to grow and maintain; over 300 species and large number of hybrids; not invasive; may be subject of leaf spot and powdery mildew; divide every 2-3 years to keep healthy plants	BB, L, N, C
Bleeding Heart*	Dicentra eximia	PS to SH	M-WD	spring-summer	pink, white	1.5-2 ft high x 1.5-2 ft wide	butterflies songbirds beneficial insects	deadhead for more blooms; contact with foliage may cause skin irritation; sometimes cultivated; self sows freely	C, N
Shooting Star*	Dodecatheon meadia	S to PS	D/M	Apr-Jun	white with yellow, lilac	0.5-2 ft high	beneficial insects	good understory plant; excellent cut flower	C, N
Purple Coneflower*	Echinacea purpurea	S to PS	WD	Jun-Oct	purple, pink	2-4 ft high x 1-2 ft wide	butterflies songbirds beneficial insects	medium to large size perennial; relatively easy to grow; favorite of goldfinch; Japanese beetles can be a problem; excellent cut flower; divide every 3-4 years	BB, L, N, C
Globe Thistle - "Veitch's Blue"	Echinops ritro	S	WD	mid-summer to fall	blue	3-4 ft high		good in mixed borders; good cut flower	C,
Bishop's Hat or Barrenwort	Epimedium species	PS to SH	M-WD	spring	yellow, white, pink, red, purple	1 ft high		evergreen; good groundcover under trees/shrubs	C, N

DEER RESISTANT PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Little Joe-Pye Weed*	Eupatorium dubium	S to PS	M/W	Jul-Oct	purple, lavender	2-5 ft high	butterflies songbirds beneficial insects	smaller than Joe-Pye Weed, good for smaller area/borders	C, N
Joe Pye Weed, Trumpet Weed*	Eupatorium fistulosum	S to PS	M/W	Jul-Oct	pink- purple	3-10 ft high	butterflies songbirds beneficial insects	prune back in late spring for blooms at lower height	C
Spotted Joe-Pye Weed*	Eupatorium maculatum	S to PS	M	Jul-Sept	pink, pale lavender	2-6 ft high x 2-4 ft wide	butterflies songbirds beneficial insects	dark purple spots on stem; tolerates wet areas; good at back of borders	C
Purple Joe-Pye Weed*	Eupatorium purpureum	S to SH	M	Jul-Nov	pale pink, lavender	5-7 ft high	butterflies	tolerates wet areas; showy flowers; attractive seed-heads persist into winter	C
Cushion Spurge	Euphorbia species (E. epithymoides)	S to SH	M-WD	Spring- Summer	bright yellow	1-3 ft high x 1-3 ft wide		evergreen/semi-evergreen; milky sap can cause skin irritation; good fall color changing from yellow to orange or red	C, N
Blanket Flower	Gaillardia species	S	D/M-WD	summer to frost	yellow to red with orange to red borders	2-4 ft high x 1.5-2 ft wide	butterflies songbirds	easy to grow - thrives on neglect; good cut flower; deadhead for rebloom	BB, L, N, C
Wood Geranium or Wild Cranesbill*	Geranium maculatum	PS to SH	D/M	spring to early summer	lavender, pink	1-2 ft high	butterflies songbirds beneficial insects	adaptable plant; long bloom time; spreader; herbal uses; explosive seed capsule; may go dormant in hot weather	C, N
Narrow Leaved Sunflower*	Helianthus angustifolius	S to PS	M-WD	Aug-Oct	yellow	2-5 ft high	mourning dove, quail, sparrows, blackbirds, butterflies, other insects	also known as Swamp Sunflower	C, N

DEER RESISTANT PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Yellow or Common Sneezeweed*	Helenium autumnale	S to SH	M	Jul-Nov	yellow	2-5 ft high	butterflies	herbal uses, but toxic if ingested in large amounts; not to be confused with ragweed causing an allergic reaction; usually covered with many flowers and may need to be staked; deadhead for continuing blooms	C, N
Lenten Rose	Helleborus species	PS	WD	late winter	white, yellow, pink, purple, light green	1-2 ft high		some are evergreen; groundcover; may bloom through the snow; low maintenance; grows well among trees and shrubs	BB, L, N, C
Common Rose Mallow	Hibiscus moscheutos	S-PS	M-WD	June-frost	red, pink, rose, white	4-8 ft high x 3 ft wide	butterflies songbirds beneficial insects	cold hardy; blooms can be 12 inches across; no serious pests	C,
Candytuft	Iberis sempervirens	S	M-WD	spring to early summer	white	0.5-1.5 ft high x 1.5 ft wide		good edge plant; will stop blooming if it dries out; trim back after flowering	BB, L, N, C
Iris	Iris species	S-PS	M-WD	late spring to early summer	purple, white, yellow, pink, burgundy	2-4 ft high x 1-3 ft wide		200-300 different species; 3 categories - bearded, beardless, crested; showy fragrant flowers	BB, L, N, C
Red Hot Poker	Kniphofia uvaria	S to PS	WD	spring to fall	red-orange then yellow	2-4 ft high		benefits from deadheading	C, N
Spotted Dead Nettle	Lamium maculatum	PS to SH	M-WD	early summer	white, mauve	6-8 inches high		semi-evergreen; good mat-forming groundcover; good on steep banks	C, N

DEER RESISTANT PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Lavender	Lavandula species	S	WD	summer	blue, purple, pink	up to 3 ft high x 2 ft wide		evergreen; fragrant; prune to maintain shape; flowers can be dried for sachets and potpourri; many species and cultivars	BB, L, N, C
Shasta Daisy	Leucanthemum x superbum	S-PS	WD	June-Oct	white	2-4 ft x 2 ft wide	butterflies beneficial insects	easy to grow daisy-like perennial; cut back in fall; divide every 2-3 years in spring to keep healthy; good cut flower	BB, L, N, C
Blazing Star or Gayfeather*	Liatris spicata	S to PS	M-WD	summer	rose, purple, white	2-5 ft high x 1.5-2 ft wide	butterflies hummingbirds songbirds beneficial insects	easy to grow and maintain; prolific seed-sower - quick spreading; showy flower cluster on tall upright spikes; no serious pest problems	C, N
Cardinal Flower*	Lobelia cardinalis	S to PS	M/W	summer to mid-fall	red	2-5 ft high x 1 foot wide	butterflies hummingbirds songbirds beneficial insects	long bloom time; biennial, must reseed; hardy plant	BB, L, N, C
Great Blue Lobelia*	Lobelia siphilitica	S to SH	M/W-WD	Aug-Oct	blue violet	2-3 ft high x 1 foot wide	butterflies hummingbirds songbirds beneficial insects	long bloom time; white cultivars available	C, N
Lupine	Lupinus species	S to PS	D/M- WD	spring to summer	blue, purple, pink or white	1-2 ft high	butterflies	good along stream banks	C, N
Virginia Bluebells*	Mertensia virginica	S to PS	M-WD	early spring	blue	1-2 ft high x 1-1.5 ft wide		elegant spring perennial; dies down in summer	C
Partridge Berry*	Mitchella repens	PS to SH	D/M	spring	white to pink	1-2 inches high	songbirds small mammals	evergreen groundcover; red berry edible; slow creeper, forms mats under trees	C

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Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Bee Balm Tea, Bergamont* Oswego*	Monarda species	S to PS	M/W-WD	Jul-Sept	red, pink, lavender, white	2-5 ft high	butterflies hummingbirds beneficial insects	medium size perennial, easy to grow; no serious pest problems, but can be subject to powdery mildew if planted too close together with poor circulation; aromatic; showy flowers, herbal use	BB, L, N, C
Daffodil - Jonquil	Narcissus species	S	M-WD	spring	yellow, white, pink, orange, bicolor	1-2 ft high x 1-2 ft wide	beneficial insects	about 50 different species with hundreds of cultivars; easy to grow bulbs that will multiply and spread	BB, L, N, C
Catmint	Nepeta species	S to PS	WD	spring-fall	blue, purple	2-3 ft high x 2 ft wide	beneficial insects	easy to grow and maintain; cut back after flowering for continued growth and bloom; not invasive; no serious pest problems	BB, L, N, C
Evening Primrose*	Oenothera species	S	WD	spring-late summer	yellow, pink, white	1-4 ft high x 1-3 ft wide	butterflies hummingbirds beneficial insects	fragrant flowers attract night-pollinating moths; long blooming perennial	BB, L, N, C
Beardtongue*	Penstemon digitalis	S to PS	D/M-WD	spring-summer	white, pink to light purple	2-5 ft high x 1-3 ft wide	hummingbirds beneficial insects	semi-evergreen; variety of cultivars	BB, L, N, C
Blue Woodland Phlox; Wild Phlox, Sweet William*	Phlox divaricata	PS to SH	M-WD	Apr-Jun	blue, lavender, white	1-1.5 ft high x 1 ft wide	songbirds butterflies hummingbirds	semi-evergreen; dormant in summer; many cultivars; roots may be consumed by rabbits and voles	L, N, C
Garden Phlox*	Phlox paniculata	S to PS	M-WD	late summer to early fall	pink, red, pale-blue, violet, purple, white	2-3 ft high	songbirds butterflies hummingbirds	many cultivars; easy to grow; fragrant flowers; prone to powdery mildew and spider mites	BB, L, N, C

DEER RESISTANT PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Creeping Phlox*	Phlox stolonifera	S to PS	D/M	Apr-Jun	lavender, blue, white, purple with eye of red-purple	0.5-1 ft high	songbirds butterflies hummingbirds	evergreen; groundcover; good in rock gardens	L, N, C
Obedient Plant or False Dragonhead*	Physostegia virginiana	S to PS	M-WD	Jun-Sept	pink-purple	3-4 ft high x 2 ft wide	butterflies songbirds beneficial insects	showy flowers; best in full sun; drought tolerant; easy to establish and maintain	C
Mayapple*	Podophyllum peltatum	PS to SH	M	spring	white to rose	1-1.5 ft high x 1 ft wide		woodland plant; highly toxic if ingested; spreads quickly in rich; yellow fruit ripens over summer; dies back in late summer; good woodland plant grows under deciduous trees, but not under pines	C,
Lungwort	Pulmonaria species	PS to SH	M-WD	mid-spring	purple-pink changing to purple and blue-violet	0.5-1.5 ft high x 2 ft wide	butterflies beneficial insects	some are semi-evergreen; historically, spotted oval leaves used to treat pulmonary infections; creeping roots - can be used as groundcover; divide every few years; easy to grow	C, N
Rosemary	Rosmarinus officinalis	S	WD	spring	blue, purple	up to 5 ft high x 5 ft wide		herb good for cooking; cut back frost damaged plants in spring; benefits from hardy pruning in spring - can be shaped by pruning; evergreen	BB, L, N, C

DEER RESISTANT PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Coneflower, Black-eyed Susan*	<i>Rudbeckia fulgida</i>	S to PS	D/M	Jul-Oct	yellow-orange, black eye	1.5-3 ft high x 2 to wide	butterflies songbirds beneficial insects	hardy perennial; flowers last long time; good cut flower; deadhead to encourage additional flowers; seeds favorite of goldfinch in winter	BB, L, N, C
Black-eyed Susan*	<i>Rudbeckia hirta</i>	S to PS	D/M W-D	Jul-Oct	yellow-orange, black eye	1-3 ft high x 1-1.5 ft wide	butterflies songbirds beneficial insects	hardy perennial; flowers last long time; good cut flower; deadhead to encourage additional flowers; drought tolerant; spreads readily by seeds	BB, L, N, C
Three-lobed Coneflower*	<i>Rudbeckia triloba</i>	S to PS	D/M	Jun-Oct	yellow-orange, black eye	1.5-3.5 ft high x 1-2 ft wide	butterflies songbirds beneficial insects	hardy perennial; flowers last long time; good cut flower; deadhead to encourage additional flowers; drought tolerant	BB, L, N, C
Sage	<i>Salvia</i> species	S to PS	WD	late Jun-Jul	red, pink, blue, purple, white	2-4 ft high x 1-2 ft wide		many species; easy to maintain; no serious pests; deadhead to encourage additional flowers	BB, L, N, C
Lavender Cotton	<i>Santolina</i> species	S	WD	spring-summer	white, yellow	1-2 ft high		leaves are soft gray-green and woolly in appearance; can tolerate dry spells; strong fragrance - used in moth-repellent potpourris; cut back hard in spring to prevent it from becoming straggly	C, N
Rock Soapwort	<i>Saponaria ocymoides</i>	S	D	late spring to summer	pink	6 to 10 inches high x 12-24 inches wide	bees, butterflies	Blooms repeatedly; showy and fragrant; flops in rich soil; seed is poisonous if ingested; may be noxious or invasive	N,L,C

DEER RESISTANT PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes	Source
Skullcap or Helmet Flower*	Scutellaria integrifolia	S to PS	W	May-Jul	blue, pink, white	1-2.5 ft high	butterflies songbirds beneficial insects	can tolerate dry to moist conditions	C,
Goldenrod*	Solidage hybrids	S to PS	D/M	Jul-Oct	yellow	1.5-6 ft high x 1-1.5 ft wide	butterflies songbirds small mammals	does not cause hay fever; easy to maintain; no serious pest problems; not invasive	C, N
Foamflower	Tiarella cordifolia	PS	M-WD	mid-spring to early summer	white, pink	0.5-1 ft high x 1ft wide		excellent groundcover; evergreen; leaves rise directly from spreading rhizomes	C, N
Vervain*	Verbena species	S	M-WD	summer-fall	pink, rose, purple, white	0.5 to 4 ft high x up to 3 ft wide	butterflies beneficial insects	colorful and easy to grow; low growing verbenas make good groundcover	C, N
Ironweed/New York Ironweed*	Veronia noveboracensis	S to PS	M/W	Aug-Oct	purple	2-4 ft high x 2-3 ft wide	butterflies songbirds	brilliant flowers; tall upright form adds structure to garden; spreads; drought tolerant	C
* Native - some species may not be native									
Light Codes: S = sun; PS = partial shade; SH = shade									
Moisture Codes: D = dry; M = moist; W = wet; WD = well-drained									
Source: BB = big box store, L = landscape contractors; N = nurseries; C = catalog, including on-line									

OTHER PERENNIALS

Common Name (*=native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Wildlife	Notes	Source
Snow-On-The-Mountain, Bishop's Weed, Goutweed	Aegopodium podagraria	PS to SH	M	late spring to early summer	white to near-white	0.5 to 2 feet high x 1 to 2 feet wide	bees, butterflies, birds	do not let dry out between waterings; may cause skin irritation or allergic reaction; very difficult to eradicate; can be invasive	N,L,C
Rock Cress, Sicklepod	Arabis species	S	WD	Early spring	White, purple, violet	8 in to 3 ft high x 3 ft wide	butterflies	many varieties; useful in rock gardens; clump formation	N,L,C
Sandwort, Irish Moss,	Arenaria species	S to PS	WD	May-June	white	under 6 inches		hardy evergreen groundcover; tolerates light foot traffic; dense slow-spreading mat; excellent as interplanting between patio stones and in rock gardens; sources vary on light requirements	N,L,C
Common Thrift, Sea Pink, Sea Thrift	Armeria maritima	S	M, WD	late spring to early summer	white, near-white, pink	6 to 14 inches tall x 9 to 12 inches wide	birds, butterflies	all parts of plant are poisonous if ingested; pollen may cause allergic reaction; plant has spines and sharp edges;	N,L

OTHER PERENNIALS

Common Name (*=native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Wildlife	Notes	Source
Wormwood, Absinthe, Green Ginger	Artemisia species	S	D, WD	late summer to fall	yellow, but flowers are rare	6- to 8 inches high x 12 to 18 inches wide		Mediterranean herb; lemon scented feathery silver green foliage; extremely bitter; used in absinthe	N,L
Arum, Cuckoopint, Lords and Ladies	Arum italicum	PS to SH	WD	April -May	creamy white, pale yellow	1 to 1.5 feet high x 1 to 18 inches wide	bees, butterflies, birds, and hummingbird s	resembles Jack-in-the- Pulpit; bright orange berries after blooming; all parts of plant are toxic especially root stock and berries; water regularly; do not overwater	N,L
Aubrieta, Rock Cress	Aubrieta species	S to PS	WD	April -May	white, rose, purple, mauve, lilac, blue	6 to 12 inches high x 6 to 18 inches wide	butterflies	excellent in rock gardens; may not tolerate high heat and humidity	N,L
Blackberry Lily, Leopard Lily	Belamcanda chinensis	S to PS	M, WD	July- August	red, orange, red- orange, bright yellow	2-3 ft high x 1.5 ft wide		seeds are poisonous if ingested; water during dry periods	N,L

OTHER PERENNIALS

Common Name (*=native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Wildlife	Notes	Source
Daisy / Mums	Chrysanthemum species	S	WD	late summer to late fall	white, yellow, pink, bronze, red and all hues of these colors	2 to 3 ft high by 2-3 ft wide	bees, butterflies	many species and cultivars; hardy and durable; pinch back to mid-summer to get larger fall blooms	N,L,C,BB
Bugbane, Black Cohosh, Black Snakeroot	Cimicifuga racemosa	PS to SH	M, WD	June-August	white, near-white	4 to 7 feet high x 2 to 4 feet wide	butterflies, bees, and song birds	drought tolerant but provide some water to help plant look its best; no need to stake in spite of plants' height	N,L,C
Montbretia, Copper Tip, Falling Star	Crocsmia species	S to PS	WD	Mid-summer	red, coral, apricot, orange, red-orange, bright yellow	4 to 6 feet high x 15 to 18 inches wide	bees, birds, and butterflies	water regularly, but do not overwater; half-hardy bulbs - damaged by temperatures below 28 degrees F	N,L,C

OTHER PERENNIALS

Common Name (*=native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Wildlife	Notes	Source
Lady's Slipper, Moccasin Flower	Cypripedium species	S	M, WD	spring	pink, yellow	0.5 to 1.5 feet high	butterflies, bees, and birds	long lived, reaching 40 years of age; forms clumps of 25 to 30 plants, member of the orchid family; valuable as a medicinal plant; handling may cause skin irritation or allergic reaction; morning sun; can be expensive and difficult to find	C
Gas Plant	Dictamnus albus	S to PS	WD	late May- mid- August	white, near- white, pink, purplish brown	2-3 feet high x 2-3 feet wide	butterflies, bees, and birds	drought resistant when established; leaves give off strong aromatic vapor; handling may cause skin irritation or allergic reaction; does not transplant well; thrives in same spot once established	C
Hardy Ageratum	Eupatorium coelestinum	S to PS	M, WD	June to frost	lavender, purple, blue, white, pink	6 to 18 inches high x 6 to 18 inches wide		all parts of plant are poisonous if ingested; sharp edges and spines	C

OTHER PERENNIALS

Common Name (*=native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Wildlife	Notes	Source
Coral Bells, Alum Root	Heuchera species	S to PS	M, WD	July-August	white, near-white, pink, red	1 to 2 feet high x 2 to 3 feet wide	hummingbirds	light dappled shade preferred in afternoons; many varieties and cultivars; good companion to ferns; not deer resistant	N,L,C,BB
Crested Iris*	Iris cristata	S to PS	M, WD	April-May	white, near-white, violet, lavender, pale blue with gold crested falls	6 to 9 inches high x 6 to 12 inches wide	excellent shelter for small animals	parts of plant are poisonous if ingested; may cause skin irritation or allergic reaction; effective dense ground cover; best in part shade; do not let dry out	L,C
Galax, Wandplant, Wandflower*	Galax urceolata	S to PS	M, WD	late spring to late summer	Milky white	2 to 6 inches high x 18 inches wide	butterflies	slow growing groundcover; foliage of more interest than flowers; reddish bronze fall color from foliage; cover; clay or loam soil; blooms on single spike; slugs can be a problem	C
Sweet Woodruff, Our Lady's Lace, Sweet Scented Bedstraw	Galium odoratum	PS to SH	M	Late spring to early summer	White, near-white	6 to 12 inches high to 9 to 12 inches wide		Can be aggressive or invasive; mat forming ground cover; strong aroma for potpourris; useful in herb gardens; very fragrant	N,L,C

OTHER PERENNIALS

Common Name (*=native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Wildlife	Notes	Source
Wintergreen, Wishbone Flower	Gaultheria procumbens	PS to SH	M	June-July	White	4 to 6 inches high x 10 to 14 inches wide	pheasant, grouse, squirrels, and deer	spreads to form attractive groundcover; will tolerate dry spells; performs best in climates with cool summers; edible red berries attract wildlife	I,,C
Gaura, Appleblossom grass, Beeblossom	Gaura species	S to PS	M, WD	August-October	Pink, pale pink, white	3 to 5 feet high x 2 to 3 feet wide	butterflies	tall and leggy in rich soil; cut back to 1/2 in late spring to control height; drought tolerant; good in native plant and wildflower gardens	N,L,C
Daylily	Hemerocallis species	S to PS	M-WD	spring to fall	yellow, red, orange, pink, purple, melon, cream-pink, lavender, blue, near white	1 to 3 feet high x 1 to 3 feet wide	butterflies, hummingbirds, bees	thousands of cultivars; flowers last only 1 day; vigorous growers - divide every 3-4 years;	N,L,C,BB

OTHER PERENNIALS

Common Name (*=native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Wildlife	Notes	Source
Yellow Archangel	<i>Lamium galeobdolon</i>	S to SH	D, WD	late spring to early summer	bright yellow with brown markings	1 to 2 feet high x 1.5 to 2 feet wide	bees, hummingbirds, butterflies; may attract slugs and snails	blooms on 24 inch spikes; too aggressive for shaded areas of perennial borders; may be very invasive	N,L,C,BB
Gay Feather, Blazing Star, Snakeroot*	<i>Liatris spicata</i>	S to PS	M	summer	pink, blue white	2 to 4 feet high	butterflies, birds, especially goldfinch	blooms on tall spike; good cut flower	N,L,C,BB
Gooseneck Loosestrife	<i>Lysimachia clethroides</i>	S to PS	M, WD	late spring to early summer	white, near white	2 to 3 feet high x 1.5 to 2 feet wide	bees and butterflies	arching flowering spikes, good cut flower; can become weedy by seed dispersal and should be carefully kept under control	N,L,C,BB
Creeping Jenny, Moneywort	<i>Lysimachia nummularia</i>	S to PS	M	late spring to early summer	bright yellow	6 to 12 inches high x 12 to 18 inches wide		groundcover, grown for foliage; color best in full sun; medium to wet soil; tolerates wet soil better than other ground covers; intolerant of dry soils; tolerates limited foot traffic	N,L,C,BB

OTHER PERENNIALS

Common Name (*=native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Wildlife	Notes	Source
Forget-Me-Not, Siberian Bugloss	Myosotis species	PS to SH	M	April-May	blue - violet	12 to 36 inches high x 12 to 36 inches wide	butterflies	do not let dry out; slow spreading, excellent ground cover; hardy	N,C
Mondo Grass, Black lily Turf	Ophiopogon Japonicus	S to SH	WD	July- August	pink, violet, lavender	6 to 12 inches high x 6 to 12 inches wide		Bell-shaped blooms; do not allow to dry out; do not overwater; drought tolerant once established; pest resistant	N,L,C,BB
Pachysandra, Spurge	Pachysandra procumbens	PS to SH	See Notes	spring	greenish white, near- white	6 to 12 inches high x 15 to 18 inches wide		Average water; do not overwater; leaves will yellow in full sun; blooms followed by red berries	N,L,C,BB
Balloon Flower, Chinese bellflower, Japanese bellflower	Platycondon species	S to PS	WD	late spring to summer	medium blue, pink, white, near- white	1 to 3 feet high x 1 to 1.5 feet wide	butterflies	buds puff up like balloons before blooming; flower opens to 5-point star-shaped form; snail	N,L,C,BB
Solomon's Seal*	Polygonatum species	PS to SH	M	April-May	Pale yellow, whitish- green	1 to 3 feet high x 1 to 1.5 feet wide	bees, hummingbird s, birds, deer	blooms followed by blue black berries; native wildflower; good with astilbe and ferns; perennial herb; bell shaped flowers are inconspicuous	N,L,C,BB

OTHER PERENNIALS

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Wildlife	Notes	Source
Rue	Ruta graveolens	S to PS	WD	summer	yellow, yellowish green	1 to 3 feet high x 1 to 2 feet wide	bees, butterflies	evergreen herb used medicinally for centuries; may cause skin irritation or allergic reaction; may become invasive; drought tolerant; self-sows seeds freely	N,C
Pincushion Flower	Scabiosa species	S to PS	WD	late spring to frost	lavender, blue, pink, white	1 to 2 feet high x 1 to 1.5 feet wide	bees, butterflies and birds	poor drainage in winter may result in root rot; prolific bloomer; divide every few years to rejuvenate plant	N,L,C
Sedum, Stonecrop	Sedum species	S to PS	D/M-WD	mid-spring to late fall	yellow, pink, rose, white, red	1 to 2 feet high x 1 to 2 feet wide	bees, butterflies, hummingbirds and bees	around 400 species, succulent; plant on flat to moderate grades; drought tolerant; groundcover type known as Stonecrop; easy to grow	N,L,C,BB
Stokes' Aster, Cornflower Aster*	Stokesia laevis	S to PS	WD	summer	blue, lavender, pink, white, near white	6 to 24 inches high x 12 to 15 inches wide	bees, butterflies, and birds	Fragrant blooms; full sun for maximum blooms; drought tolerant; many cultivars; can be invasive	N,L,C

OTHER PERENNIALS

Common Name (*=native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Wildlife	Notes	Source
Carolina Lupine*	<i>Thermopsis caroliniana</i>	S	M-WD	summer	yellow	3 to 4 feet high x 2 to 3 feet wide	bees, hummingbirds, birds	heat and drought tolerant; best in mass plantings; cut back foliage about 1 month after blooming	C
Virginia Spiderwort*	<i>Tradescantia virginiana</i>	S to SH	M	spring to fall	pale to deep blue-purple, occasionally white	1 to 3 feet high	bees	flowers open in morning and close by mid-day; cut back in mid-summer for second bloom; spreads quickly	N,L,C
Trillium, Wakerobin, WoodLily, Trinity Flower*	<i>Trillium grandiflorum</i>	PS to SH	M, WD	spring	white, near-white turning pale pink	1 to 2 feet high x 1 to 1.5 inches wide	bees, ants	favorite food of white tailed deer; ants disperse seed; slow growing; easy to cultivate	C
Globeflower, Golden Queen	<i>Trollius chinensis</i>	S to PS	M	Late-spring to early summer	Bright yellow, orange	12 to 36 inches high x 15 to 18 inches wide	bees, birds, hummingbirds	Ball-shaped blooms; best in consistently moist soil; do not let dry out; parts of plant are poisonous if ingested; prone to powdery mildew	L, c

Light Codes: S = sun; PS = partial shade; SH = shade

Moisture Codes: D = dry; M = moist; W = wet; WD = well-drained

Source: N = nurseries; L = landscape contractors; C = catalog; BB = big box store

GROUNDCOVER

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes
Columbine*	Aquilegia species	S to PS -PS best	M/W-WD	Apr-Jul	white, red, pink, magenta, red, blue,	1-3 ft high x 1-2 ft wide	butterflies hummingbirds beneficial insects	hardy; commonly cultivated, self-seed; good for borders; good cut flower; contact with sap may cause skin irritation; may be difficult to maintain - some may need to be replaced every 3-4 years; some species can be good ground cover; tends to be deer resistant
Sandwort, Irish Moss,	Arenaria species	S to PS	WD	May-June	white	under 6 inches		hardy evergreen groundcover; tolerates light foot traffic; dense slow-spreading mat; excellent as interplanting between patio stones and in rock gardens; sources vary on light requirements
Lily of the Valley*	Convallaria majalis	PS to SH	M	mid-late spring	white	6-12 inches high	bees butterflies birds	excellent woodland groundcover; spreads and can be invasive after 4-5 years; cardiotoxic plant - can be poisonous to cats, dogs and other animals; sensitive to heat and humidity; fragrant flower; tends to be deer resistant
Bishop's Hat or Barrenwort	Epimedium species	PS to SH	M-WD	spring	yellow, white, pink, red, purple	1 ft high		evergreen; good groundcover under trees/shrubs
Galax, Wandplant, Wandflower*	Galax urceolata	S to PS	M, WD	late spring to late summer	Milky white	2 to 6 inches high x18 inches wide	butterflies	slow growing groundcover; foliage of more interest than flowers; reddish bronze fall color from foliage; cover; clay or loam soil; blooms on single spike; slugs can be a problem

GROUNDCOVER

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes
Sweet Woodruff, Our Lady's Lace, Sweet Scented Bedstraw	Galium odoratum	PS to SH	M	Late spring to early summer	White, near- white	6 to 12 inches high to 9 to 12 inches wide		Can be aggressive or invasive; mat forming ground cover; strong aroma for potpourris; useful in herb gardens; very fragrant
Wintergreen, Wishbone Flower	Gaultheria procumbens	PS to SH	M	June-July	White	inches high x 10 to 14 inches wide	pheasant, grouse, squirrels, and deer	spreads to form attractive groundcover; will tolerate dry spells; performs best in climates with cool summers; edible red berries attract wildlife
Wood Geranium or Wild Cranesbill*	Geranium maculatum	PS to SH	D/M	spring to early summer	lavender, pink	1-2 ft high	butterflies songbirds beneficial insects	adaptable plant; long bloom time; spreader; herbal uses; explosive seed capsule; may go dormant in hot weather ; useful groundcover
Lenten Rose	Helleborus species	PS	WD	late winter	white, yellow, pink, purple, light green	1-2 ft high		some are evergreen; groundcover; may bloom through the snow; low maintenance; grows well among trees and shrubs; tends to be deer resistant
Crested Iris*	Iris cristata	S to PS	M, WD	April-May	white, near- white, violet, lavender, pale blue with gold crested falls	6 to 9 inches high x 6 to 12 inches wide	excellent shelter for small animals	parts of plant are poisonous if ingested; may cause skin irritation or allergic reaction; effective dense ground cover; best in part shade; do not let dry out

GROUNDCOVER

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes
Spotted Dead Nettle	<i>Lamium maculatum</i>	PS to SH	M-WD	early summer	white, mauve	6-8 inches high		semi-evergreen; good mat-forming groundcover; good on steep banks
Partridge Berry*	<i>Mitchella repens</i>	PS to SH	D/M	spring	white to pink	1-2 inches high	songbirds small mammals	evergreen groundcover; red berry edible; slow creeper, forms mats under trees
Creeping Phlox*	<i>Phlox stolonifera</i>	S to PS	D/M	Apr-Jun	lavender, blue, white, purple with eye of red-purple	0.5-1 ft high	songbirds butterflies hummingbirds	evergreen; groundcover; good in rock gardens; tends to be deer resistant
Lungwort	<i>Pulmonaria</i> species	PS to SH	M-WD	mid-spring	purple-pink changing to purple and blue-violet	0.5-1.5 ft high x 2 ft wide	butterflies beneficial insects	some are semi-evergreen; historically, spotted oval leaves used to treat pulmonary infections; creeping roots - can be used as groundcover; divide every few years; easy to grow; tends to be deer resistant
Rock Soapwort	<i>Saponaria ocymoides</i>	S	D	late spring to summer	pink	6 to 10 inches high x 12-24 inches wide	bees, butterflies	Blooms repeatedly; showy and fragrant; flops in rich soil; seed is poisonous if ingested; may be noxious or invasive; can be good groundcover

GROUNDCOVER

Common Name (* = native)	Scientific Name	Light	Moisture	Bloom Time	Flower Color	Size Range	Attracts Wildlife	Notes
Sedum, Stonecrop	Sedum species	S to PS	D/M-WD	mid- spring to late fall	yellow, pink, rose, white, red	1 to 2 feet high x 1 to 2 feet wide	bees, butterflies, hummingbirds and bees	around 400 species, succulent; plant on flat to moderate grades; drought tolerant; groundcover type known as Stonecrop; easy to grow
Foamflower	Tiarella cordifolia	PS	M-WD	mid- spring to early summer	white, pink	0.5-1 ft high x 1ft wide		excellent groundcover; evergreen; leaves rise directly from spreading rhizomes; tends to be deer resistnt
Vervain*	Verbena species	S	M-WD	summer- fall	pink, rose, purple, white	0.5 to 4 ft high x up to 3 ft wide	butterflies beneficial insects	colorful and easy to grow; low growing verbenas make good groundcover; tends to be deer resistant

Large Trees for the Virginia Piedmont

Latin name	Common name	Native	E/D	Size	GR.	Light	Soil	Bloom Time	Color	Wild life	Fall color	Diseases	Other
Abies concolor	Concolor/white fir		E	30 to 50	S-M	Fs-Ps	Mwd					none serious	Not for Hvy clay
Acer rubrum	Red maple	x	D	40 to 60	M-F	Fs-Ps	moist	Mr-Ap	Red	X	X	several	Flood tolerant
Acer saccharinum	Silver maple	x	D	50 to 70	F	Fs-Ps	moist					several	troublesome roots
Acer saccharum	Sugar maple	x	D	60 to 75	Sl	Fs-Ps	Mwd	Ap	Gn-Yw		X	leaf scorch	
Aesculus flava	Yellow buckeye	x	D	60 to 75	Sl-M	Fs-ps	Mwd				X	leaf blotch	
Betula lenta	Sweet/Black birch	x	D	40 to 55	F	Fs-Ps	Mwd	Ap				many	
Betula nigra	River birch	x	D	40 to 70	M-F	Fs-Ps	moist			X		leaf spot	Peeling bark
Cupressocyparis leylandii	Leyland cypress		E	65	F	Fs	Any					bagworms, cankers	
Diospyros virginiana	Persimmon	x	D	35 to 60	S-M	Fs	Mwd	My-Jn		X		none serious	Edible fruit
Fagus grandifolia	American beech	x	D	50 to 70	S	PF	Mwd	Ap-My		X		none serious	Silver bark, Shade
Ginkgo biloba	Ginkgo		D	50 to 80	S-M	Fs	Any	Mr-Ap	Gn		X	none	
Ilex opaca	American holly	x	E	45	S-M	Fs-Ps	Mwd	My	Wh			many	Protect from wind
Juniperus virginiana	Eastern red cedar	x	E	45	M	Fs	Mwd	Mr	Yw-Gn			rust, bagworms	
Liquidambar styraciflua	Sweet gum	x	D	60 to 75	M-F	Fs	moist	Ap-My		X	X	several	
Liriodendron tulipifera	Tulip/yellow poplar	x	D	70 to 90	F	Fs	Mwd	My	Yw	X	X	several	Slightly messy
Magnolia acuminata	Cucumber magnolia	x	D	50 to 80	M-F	Fs-Ps	Mwd	My-Jn	Yw		X	none	
Magnolia grandiflora	Southern magnolia		E	60 to 80	S-M	Fs-Ps	Wd	My-Jn	Wh			none	
Nyssa sylvatica	Black gum	x	D	30 to 50	S-M	Fs-Ps	Mwd	Ap-My	Gn-Yw		X	Cankers, leaf spot	
Ostrya virginiana	Eastern hornbeam	x	D	25 to 40	S	Fs-Ps	Mwd	Ap				none serious	
Parrotia persica	Persian parrotia		D	20 to 40	M	Fs-Ps	Wd	Mr-Ap				none	
Picea pungens	Colorado spruce		E	30 to 60	S-M	Fs	moist					a few	
Pinus strobus	White pine	x	E	50 to 80	F	Fs-Ps	mwd					rust, weevil	
Pinus sylvestris	Scotch pine		E	30 to 60	M	Fs	Wd					several serious	
Pinus taeda	Loblolly pine	x	E	60 to 90	F	Fs-Ps	moist					none serious	
Pinus virginiana	Virginia pine	x	E	15 to 40	S	Fs	any					several	
Platanus occidentalis	Sycamore	x	D	75-100	M-F	Fs-Ps	moist					several	
Quercus alba	White oak	x	D	50 to 80	S-M	Fs	Mwd				X	several	durable tree
Quercus bicolor	Swamp oak	x	D	50 to 60	S-M	Fs-Ps	moist				X		
Quercus Coccinea	Scarlet oak	x	D	70 to 75	M	Fs	Mwd			X	X		Scarlet fall
Quercus falcata	Southern red oak	x	D	70 to 80	M-F	Fs-Ps	Dry			X	X		orange fall
Quercus lyrata	overcup oak	x	D	50 to 60	F	Fs-Ps	Any			X	X		flood tolerant
Quercus montana	Swamp chestnut oak	x	D	60 to 70	M	Fs-Ps	Mwd			X	X		easy to transplant
Quercus muehlenberghii	Chinkapin oak	x	D	40 to 50	M	Fs	Mwd			X	X	none serious	easy to transplant
Quercus palustris	Pin oak	x	D	60 to 70	M	Fs	moist			X	X	Galls, chlorosis	easy to transplant
Quercus phellos	Willow oak	x	D	50 to 60	M	Fs	Mwd			X	X	none serious	easy to transplant
Quercus prinus	Chestnut oak	x	D	60 to 70	S-M	Fs-Ps	Mwd			X	X		easy to transplant
Quercus rubra	Red oak	x	D	60 to 75	M-F	Fs	Mwd			X	X		easy to transplant
Quercus velutina	Black oak	x	D	50 to 60	M-F	Fs	Mwd			X	X		easy to transplant
Robinia pseudoacacia	Black locust	x	D	30 to 50	F	Fs-Ps	Any	My-Jn	Wh		X	several	easy to transplant
Salix nigra	Black willow	x	D	40 to 80	F	Fs-Ps	Moist	Ap	Wh		X	several	easy to transplant
Sassafras albidum	Sassafras	x	D	30 to 60	M-F	Fs-Ps	Mwd	Ap	Yw		X	several	easy to transplant

Large Trees for the Virginia Piedmont

Latin name	Common name	Native	E/D	Size	GR.	Light	Soil	Bloom Time	Color	Wild life	Fall color	Diseases	Other
<i>Styphnolobium japonicum</i>	Japanese pagoda		D	50 to 75	M-F	Fs	Mwd	Jl-Aug	Wh		X	several	easy to transplant
<i>Taxodium distichum</i>	Bald cypress	x	D	50 to 70	M	Fs	Moist					several	easy to transplant
<i>Thuja occidentalis</i>	White cedar/arborvitae	x	E	40 to 60	S-M	Fs	Mwd				X	several	easy to transplant
<i>Tilia americana</i>	American basswood	x	D	60 to 80	M	Fs	Mwd	Jn	Yw		X	several	easy to transplant
<i>Tsuga canadensis</i>	Eastern hemlock	x	E	40 to 70	M	Fs	Mwd				X	Many	easy to transplant
<i>Tsuga caroliniana</i>	Carolina hemlock	x	E	45 to 60	S-M	Ps	Mwd				X	few	easy to transplant
<i>Ulmus americana</i>	American elm	x	D	60 to 80	M-F	Fs	Mwd	Mr	Gr/Rd	X		Many-many	easy to transplant
<i>Ulmus parvifolia</i>	Lacebark elm		D	40 to 50	M-F	Fs	Mwd				X	Several	easy to transplant
<i>Ulmus rubra</i>	Red elm	x	D	40 to 60	M-F	Fs	Mwd					Many	easy to transplant

Ornamental Grasses

Common Name (*=native)	Scientific Name	Light	Moisture	Bloom Time	Inflorescence (Flower Color)	Size Range	Attracts Wildlife	Notes	Source
Sweet Flag*	Acorus species	S-SH	W	late spring to early summer	yellowish-green to brown	2 to 6 ft high x 2 to 3 ft wide	waterfowl; muskrats	evergreen; leaves have tangerine-like scent; may become invasive; good at water edges; spreading habitat	N,L,C
Big Blue Stem*	Andropogon gerardii	S	D-M	late summer to early fall	purplish-red	3 to 8 ft high x 1 to 3 ft wide	birds, butterflies	grows in clumps; extensive root system that can extend down more than 10 feet; drought tolerant once established; showy seed heads; good for screening; fall and winter interest	N,L,C
Feather Reed Grass*	Calamagrostis species	S-PS	M-W	summer	pink, brown	3 to 6 ft high x 1 to 3 ft wide	birds	grows in clumps; showy seed heads; approximately 230 species	N,L,C
Sedge	Carex species	S-PS	M-W	spring to summer	light green, bronze	1 to 3 ft high x 1 to 3 ft wide	birds, butterflies, hummingbirds, amphibians, reptiles, small mammals	over 100 different types of sedges; grows in thick clusters or tussocks; some varieties are evergreen; grass-like; good groundcover; deer resistant; winter interest	N,L,C,BB
Pampas Grass	Cortaderia selloana	S	D-M, WD	late summer	pink, white	6 to 10 ft high x 3 to 6 ft wide	reptiles, bugs, small mammals	grows in clumps; best to cut back occasionally; Pumila is dwarf variety with clumps 3-6 ft high x 4 ft wide; grass blades have sharp edges; prune in spring; fast growing and can get out of control	N,L,C,BB
Tufted Hair Grass*	Deschampsia caespitosa	S-PS	M	late spring to early summer	green to gold turning to light golden straw	1 to 3 ft high	birds	cloud-like inflorescence; densely tufted; fine dark green leaves; moderate grower; showy flowers, foliage and seed heads; good dried/cut for arrangements	L,C
Sand Lovegrass*	Eragrostis trichodes	S	D-M,WD	summer	pink, white	3 to 4 ft high x 3 to 4 ft wide		easy to grow; tolerates hot, dry area; showy flowers; good dried or cut flower; leaves turn bronze in fall; winter interest; self sows manageably; deep, dense root system	L,C
Ravena Grass	Erianthus ravennae	S	M, WD	late summer to early fall	silvery white to beige	10 to 20 ft high x 3 to 6 ft wide	birds	upright habit; self sows - deadhead to prevent seeding; showy flowers and foliage; effective screen; sometimes called northern pampas grass; brown-orange-purple winter color	L,C

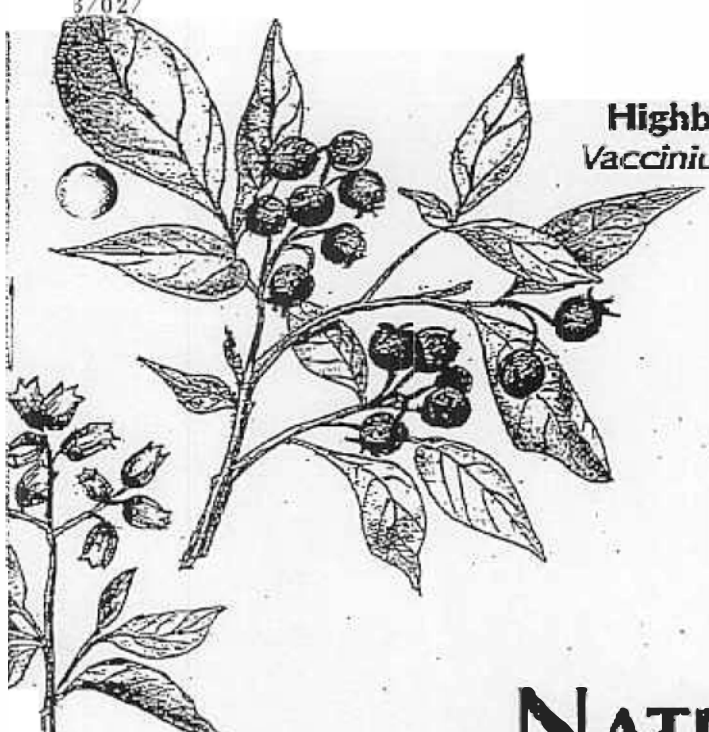
Ornamental Grasses

Common Name (*=native)	Scientific Name	Light	Moisture	Bloom Time	Inflorescence (Flower Color)	Size Range	Attracts Wildlife	Notes	Source
Blue Fescue	<i>Festuca ovina glauca</i>	S-PS	M,WD	early summer	Light blue-green inflorescence in spring, changing to blue-green in summer, dark green in fall and green-brown in winter	6 to 12 inches high x 12 inches wide	birds	grows in clumps; semi-evergreen	L,C
Blue Oat Grass	<i>Helictotrichon sempervirens</i>	S	D-M	late spring to early summer	cream, tan	3 to 6 ft high x 1 to 3 ft wide		summer and fall interest; clump forming spikey shafts, porcupine-like dome; low maintenance; evergreen	L,C
Maiden Grass	<i>Miscanthus sinensis</i>	S	D-M, WD	mid-summer to frost	silver, gold, pinkish, purplish, reddish	4 to 8 ft high x 3 to 6 ft wide; dwarf cultivar 3 ft high; giant cultivar 9 to 15 ft high	birds	clump forming; showy flowers and foliage; cut back in spring; divide every 3 to 4 years	N,L,C,
Switch Grass*	<i>Panicum virgatum</i>	S	M	fall	pink to burgundy	3 to 6 ft high x 1 to 3 ft wide	birds, pheasant, quail, rabbits	excellent for erosion control; divide every three years; cut back to ground in late winter; deer resistant; fibrous root system can penetrate 10 ft into ground; low maintenance	N,L,C,
Fountain Grass	<i>Pennisetum</i> species	S-PS	M-WD	late spring to fall	tan, red, purple, pink	1 to 3 ft high x 3 to 4 ft wide	birds	dense clump forming plant; easy to grow; many species self-sow and may become invasive in warmer regions; drought tolerant	N,L,C,
Cord Grass*	<i>Spartina pectinata</i>	S-PS	M-W	late summer	yellow-beige	4 to 6 ft high	birds	spreads rapidly by rhizomes, and is best suited to large areas. It can become invasive	L,C,

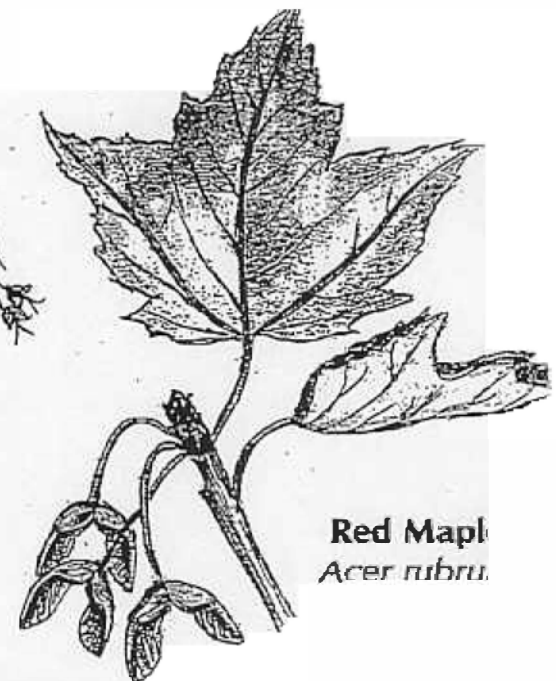
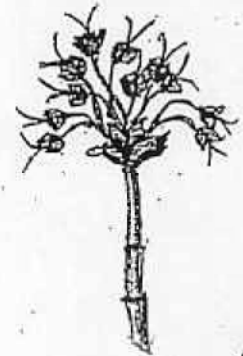
Light Codes: S = full sun; PS = partial shade; SH = shade

Moisture Codes: D = dry; M = moist; W = wet; WD = well-drained

Source: BB = big box store, L = landscape contractors; N = nurseries; C = catalog



Highbush Blueberry
Vaccinium corymbosum

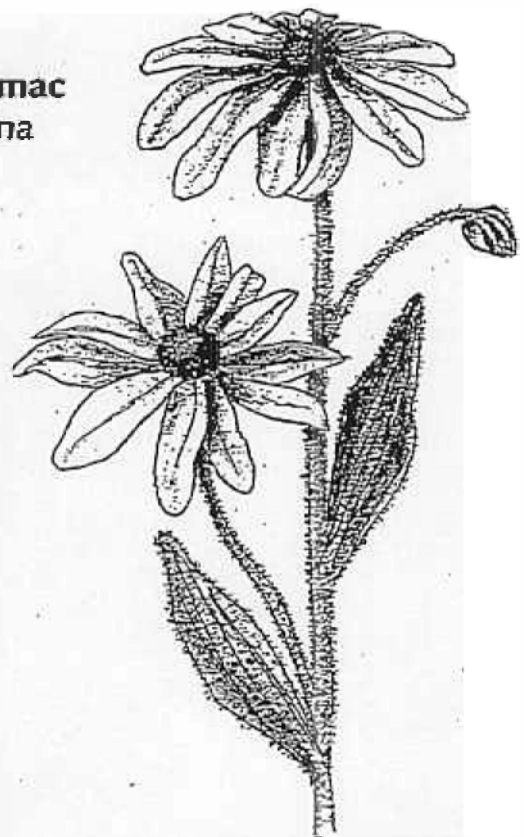


Red Maple
Acer rubrum

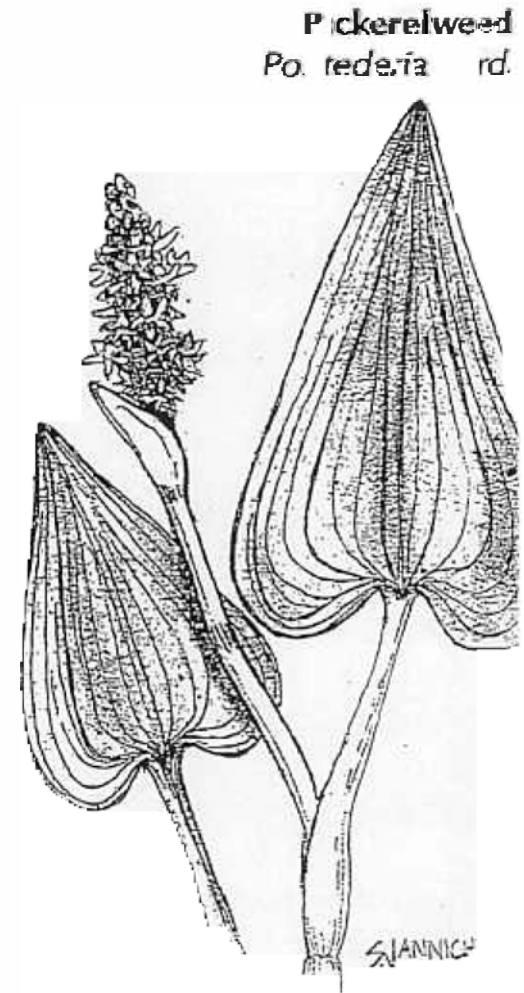
NATIVE PLANTS OR WILDLIFE HABITAT



Staghorn Sumac
Rhus typhina



Black-Eyed Susan
Rudbeckia hirta



Pickerelweed
Potamogeton zosterifolius

SIANNICK



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.



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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 than 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 range 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.

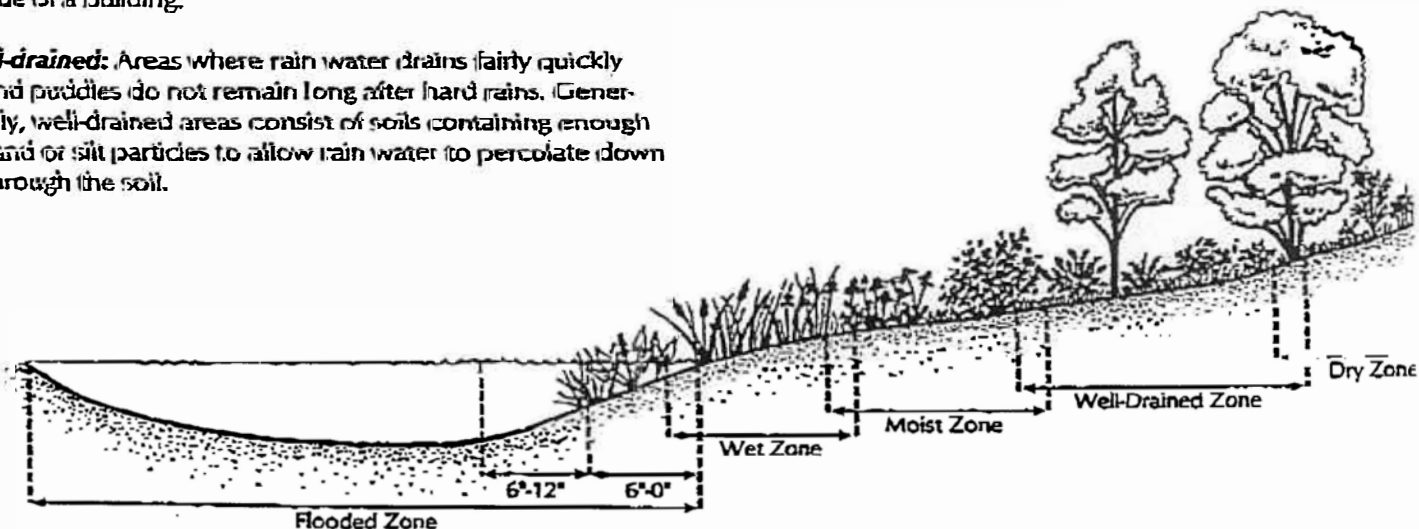


Diagram of moisture zones



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

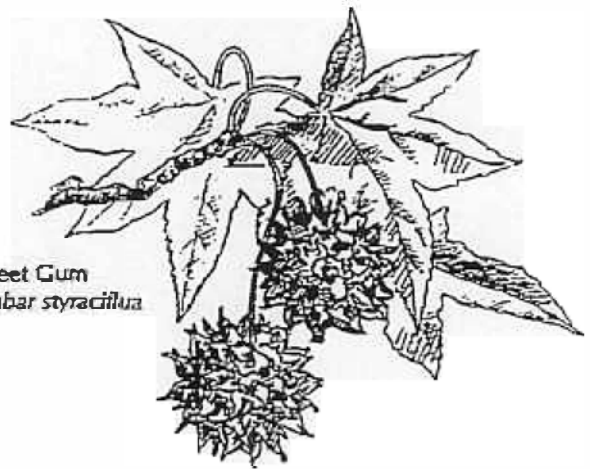
6. Larger areas usually provide habitat for more species than smaller areas.
7. A diversity of plants will attract more wildlife.
8. Provide water if possible. Bird baths or shallow dishes work well. A small temporary puddle or pool may provide a place for frogs and salamanders to lay eggs.
9. Incorporate 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 <i>Acer rubrum</i>	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 <i>Betula nigra</i>	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 <i>Carya cordiformis</i>	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 <i>Celtis occidentalis</i>	Light: partial to full sun Moisture: wet to well-drained	Adapted to a wide range of condi- tions, medium to fast growth rate, height 40'-60'	Food: fruit, twigs. Wildlife: mourning dove, quail, bluebird, catbird, thrushes, sparrows, squirrel, deer
Persimmon <i>Diospyros virginiana</i>	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 <i>Fagus grandifolia</i>	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 <i>Fraxinus americana</i>	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 <i>Fraxinus pennsylvanica</i>	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 <i>Juglans nigra</i>	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 <i>Liquidambar styraciflua</i>	Light: partial to full sun Moisture: wet to well-drained	Adapted to a wide range of condi- tions, 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



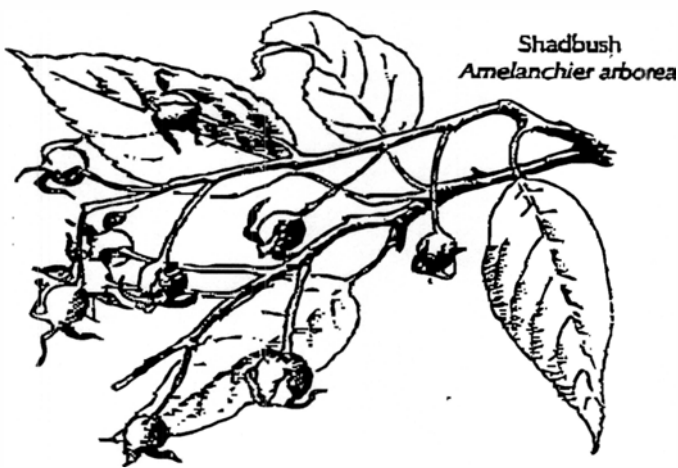
Sweet Gum
Liquidambar styraciflua



COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Tulip Poplar <i>Liriodendron tulipifera</i>	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 <i>Nyssa sylvatica</i>	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 <i>Oxydendrum arboreum</i>	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 <i>Platanus occidentalis</i>	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 <i>Prunus serotina</i>	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 <i>Quercus alba</i>	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 <i>Quercus bicolor</i>	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 <i>Quercus coccinea</i>	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 <i>Quercus falcata</i>	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 <i>Quercus palustris</i>	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 <i>Quercus phellos</i>	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



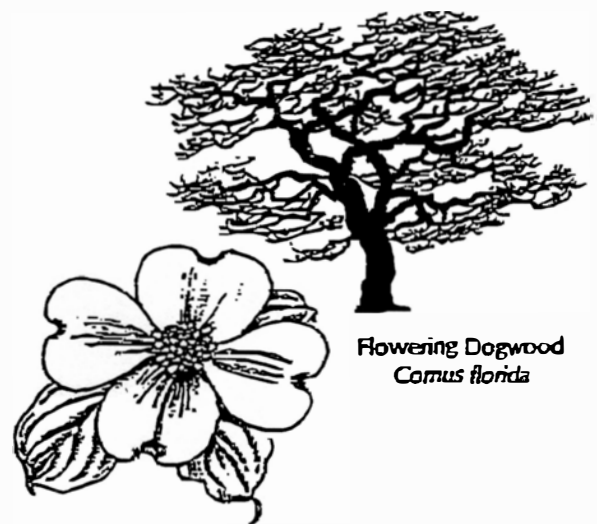
COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Chestnut Oak <i>Quercus prinus</i>	Light: partial to full sun Moisture: well-drained	Leaves similar to American Chestnut, orange-yellow fall color, slow to medium growth rate, height 60'-70'	same as White Oak
Red Oak <i>Quercus rubra</i>	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 <i>Quercus velutina</i>	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 <i>Salix nigra</i>	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 <i>Sassafras albidum</i>	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 <i>Taxodium distichum</i>	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 <i>Amelanchier arborea</i> <i>A. canadensis</i>	Light: shade to full sun Moisture: wet to well-drained	White flowers in early spring, blooms during shad run, edible berries in June, <i>A. arborea</i> small tree, <i>A. canadensis</i> 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 <i>Asimina triloba</i>	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, Muscadeweed <i>Carpinus caroliniana</i>	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



COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Fringetree <i>Chionanthus virginicus</i>	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 <i>Cornus florida</i>	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 <i>Magnolia virginiana</i>	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 <i>Ostrya virginiana</i>	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 <i>Prunus virginiana</i>	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 <i>Alnus serrulata</i>	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
Devil's Walking Stick, Hercules Club <i>Aralia spinosa</i>	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 <i>Aronia arbutifolia</i>	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, meadow-lark, squirrel
Black Chokeberry <i>Aronia melanocarpa</i>	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, meadow-lark, squirrel
Buttonbush <i>Cephalanthus occidentalis</i>	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

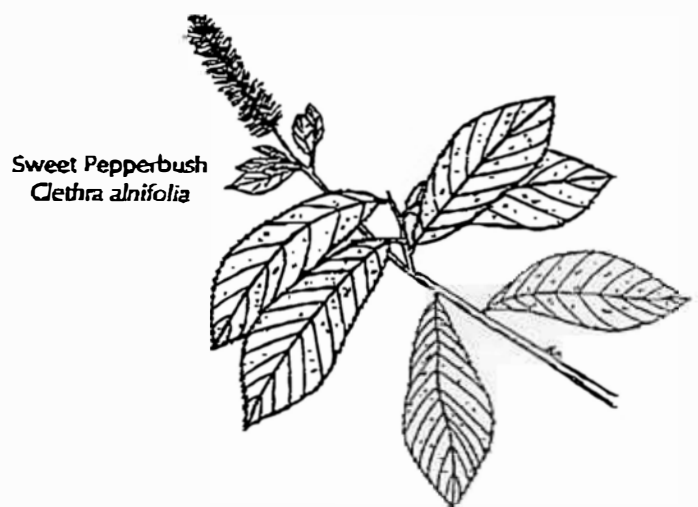


Buttonbush
Cephalanthus occidentalis



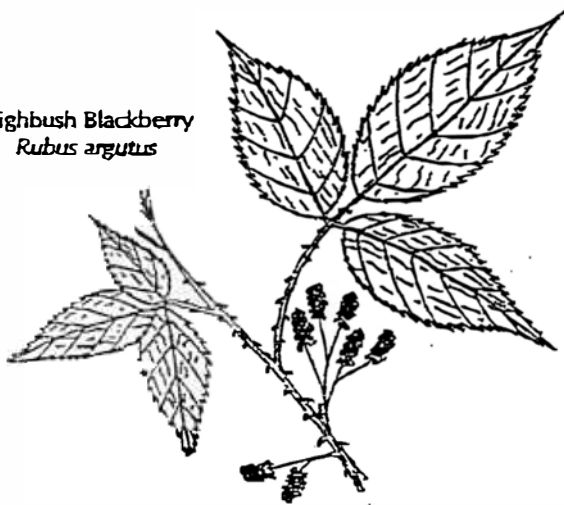
Flowering Dogwood
Cornus florida

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Sweet Pepperbush <i>Clethra alnifolia</i>	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 Dogwood <i>Cornus amomum</i>	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 <i>Cornus racemosa</i>	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 <i>Cornus stolonifera</i>	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 <i>Euonymus americanus</i>	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 <i>Hamamelis virginiana</i>	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 <i>Ilex glabra</i>	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 <i>Ilex verticillata</i>	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 Sweetpire <i>Itea virginica</i>	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 <i>Kalmia latifolia</i>	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 <i>Lindera benzoin</i>	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



COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Wax Myrtle <i>Myrica cerifera</i>	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 <i>Myrica pensylvanica</i>	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 <i>Rhododendron calendulacum</i>	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 <i>Rhododendron perichymenoides</i>	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 <i>Rhododendron viscosum</i>	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 <i>Rosa carolina</i>	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 <i>Rosa palustris</i>	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 <i>Rubus argutus</i>	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 <i>Rubus odoratus</i>	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 <i>Rhus copallinum</i>	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

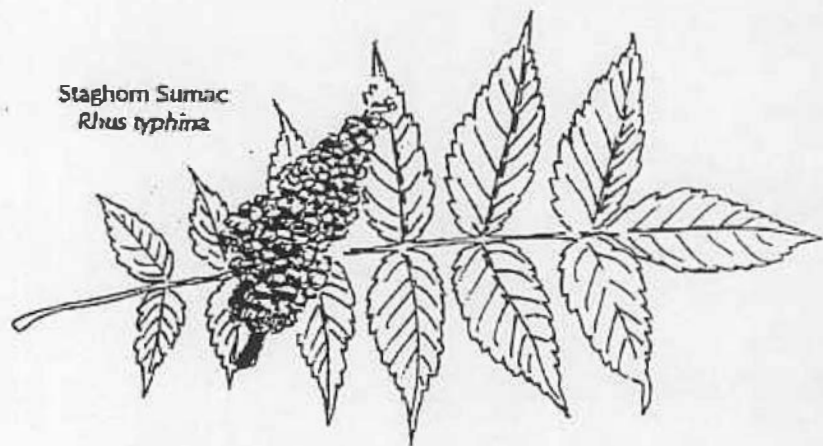
Highbush Blackberry
Rubus argutus



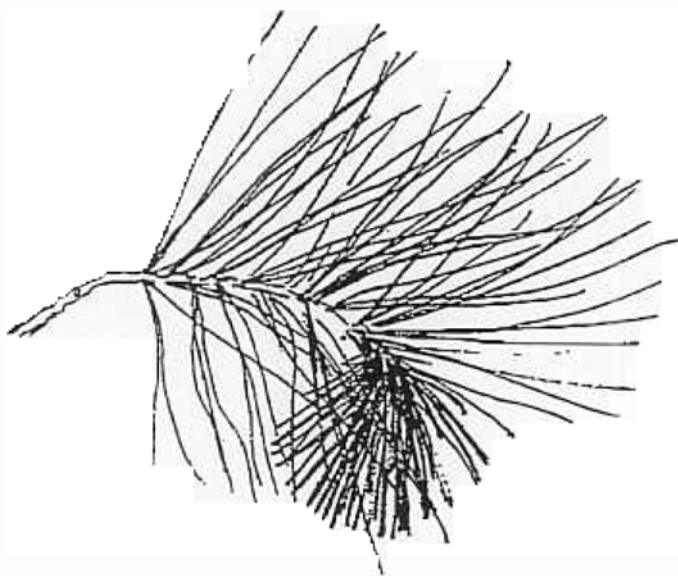
Elderberry
Sambucus canadensis



COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Smooth sumac <i>Rhus glabra</i>	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 <i>Rhus typhina</i>	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 <i>Sambucus canadensis</i>	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 <i>Vaccinium corymbosum</i>	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 <i>Vaccinium vacillans</i> <i>V. angustifolium</i>	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 <i>Viburnum dentatum</i> <i>V. recognitum</i>	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 <i>Viburnum nudum</i>	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 <i>Viburnum prunifolium</i>	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 <i>Viburnum trilobum</i>	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



COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
EVERGREEN TREES			
American Holly <i>Ilex opaca</i>	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 <i>Juniperus virginiana</i>	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 <i>Pinus strobus</i>	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 <i>Pinus taeda</i>	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 <i>Pinus virginiana</i>	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 <i>Tsuga canadensis</i>	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 <i>Acorus calamus</i>	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 <i>Asclepias incarnata</i>	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 <i>Aster novae-angliae</i>	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 <i>Carex stricta</i>	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 <i>Eupatorium perfoliatum</i>	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 <i>Eupatorium purpureum</i> <i>Eupatorium dubium</i>	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 <i>Hibiscus moscheutos</i>	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 <i>Iris pseudacorus</i>	Light: full sun to produce flower Moisture: flooded 0'-0.5' Salinity: fresh	Long flat leaf blades, yellow flowers, spreads slowly, height 1'-2'	Food: nectar, shoots. Wildlife: muskrat, butterflies, other insects
Blue Water Iris, Blue flag <i>Iris versicolor</i>	Light: full sun to produce flower Moisture: flooded 0'-0.5' Salinity: fresh	Long flat leaf blades, showy blue flowers, spreads slowly, height 1'-2'	Food: nectar, shoots. Wildlife: muskrat, butterflies, other insects
Soft Rush <i>Juncus effusus</i>	Light: full sun Moisture: wet Salinity: fresh	Upright round stems, grows in clumps, spreads slowly, height 2'-3'	Food: roots. Wildlife: marshbirds

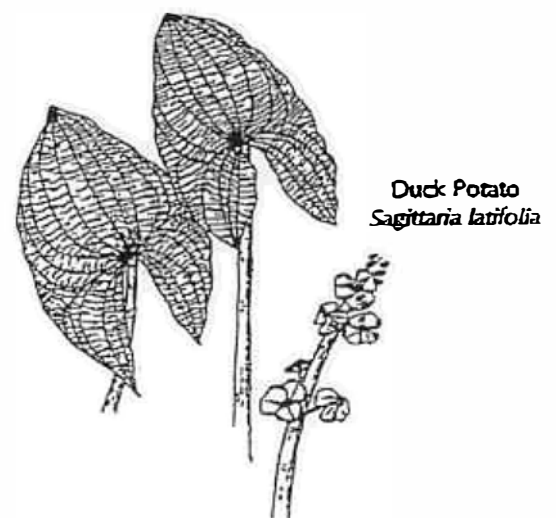
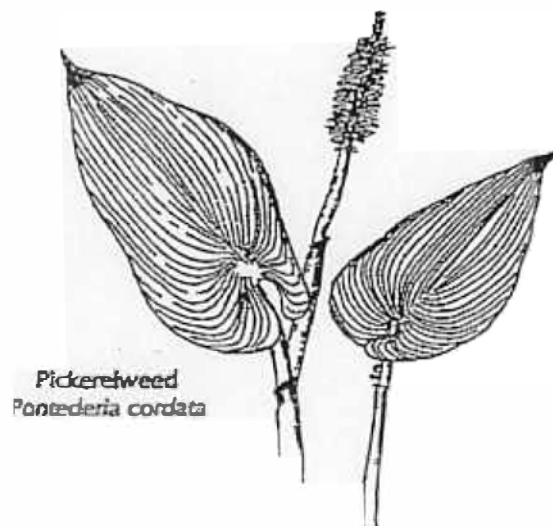


New England Aster
Aster novae-angliae

Joe Pye Weed
Eupatorium purpureum
E. dubium



COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Cardinal Flower <i>Lobelia cardinalis</i>	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 <i>Nymphaea luteum</i>	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 <i>Nymphaea odorata</i>	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 <i>Peltandra virginica</i>	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
Pickereelweed <i>Pontederia cordata</i>	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 <i>Sagittaria latifolia</i>	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 <i>Saururus cernuus</i>	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 <i>Scirpus pungens</i> <i>S. americanus</i>	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 <i>Scirpus validus</i>	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 <i>Spartina alterniflora</i>	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

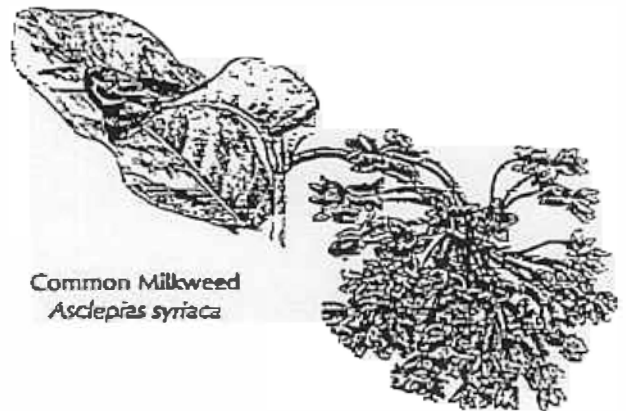


COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Salt Meadow Hay <i>Spartina patens</i>	Light: full sun Moisture: wet to moist Salinity: brackish to 35ppt	Dominant plant in the higher salt marsh zone, soft hay-like texture, spreads moderately, height 1'-3'	Food: seeds, roots. Wildlife: black duck, Canada goose, snow goose, rails, seaside and sharp-tailed sparrows, muskrat
New York Ironweed <i>Vernonia noveboracensis</i>	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 <i>Zizania aquatica</i>	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 <i>Aquilegia canadensis</i>	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 <i>Asclepias syriaca</i>	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 <i>Asclepias tuberosa</i>	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 <i>Aster grandiflorus</i>	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 <i>Aster laevis</i>	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 <i>Aster novae-angliae</i>	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 <i>Aster spectabilis</i>	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 <i>Baptisia australis</i>	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 <i>Heterotheca mariana</i>	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 <i>Coreopsis lanceolata</i>	Light: full sun Moisture: moist to well-drained	Yellow flowers May-July, height 2'-3'	Food: nectar. Wildlife: butterflies, other insects
Tickseed <i>Coreopsis tinctoria</i>	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 <i>Coreopsis verticillata</i>	Light: full sun Moisture: moist to dry	Yellow flowers June-July, height 1'-3'	Food: nectar. Wildlife: butterflies, other insects
Purple Coneflower <i>Echinacea purpurea</i>	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 <i>Helenium flexuosum</i>	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 <i>Helianthus angustifolius</i>	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 <i>Helianthus annuus</i>	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 <i>Liatris spicata</i>	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 <i>Lobelia puberula</i>	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 <i>Mimulus alatus</i> <i>Mimulus ringens</i>	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 <i>Monarda didyma</i>	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 <i>Monarda fistulosa</i>	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

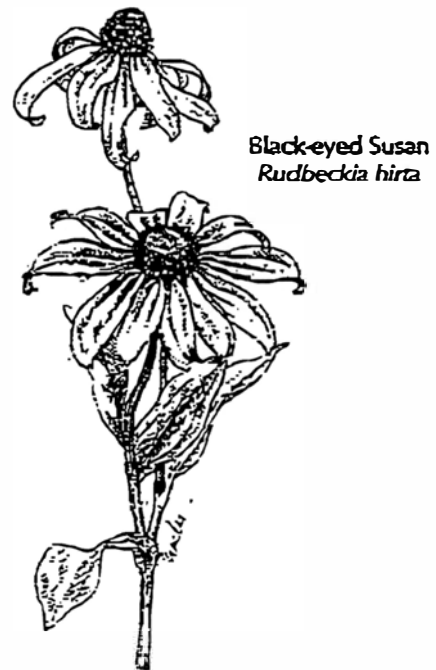


Maryland Goldenaster
Chrysopsis mariana

Wild Bergamont
Monarda fistulosa



COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	WILDLIFE BENEFITS
Beardtongue <i>Penstemon laevigatus</i> <i>P. digitalis</i>	Light: partial sun Moisture: moist	White flowers May-June, height 1'-2'	Food: nectar. Wildlife: butterflies, other insects
Summer or Blue Phlox <i>Phlox divaricata</i>	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 <i>Phlox paniculata</i>	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 <i>Rudbeckia hirta</i>	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 <i>Rudbeckia laciniata</i>	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 <i>Rudbeckia triloba</i>	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 <i>Solidago rugosa</i>	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



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 (*Sorghum halepense*)

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- **Do not collect plants from the wild**
- **Buy nursery-propagated plant material**
- **Help prevent establishment of non-native species in natural communities**

FOR MORE INFORMATION ON NATIVE PLANTS:

Virginia Department of Conservation and Recreation
 Natural Heritage Program
 217 Governor Street
 Richmond, VA 23219
 (804) 786-7951
www.dcr.state.va.us/dnh/

For a list of nurseries that propagate native plants:

Virginia Native Plant Society
 400 Blandy Farm Lane, Unit 2
 Boyce, VA 22620
 (540) 568-8679
vnpsoc@shentel.net
www.vnps.org

For a list of nurseries in a particular region of Virginia contact:

The Virginia Nurseryman's Association*
 383 Coal Hollow Road
 Christiansburg, VA 24062-0278
 (540) 382-0943
vna@swva.net

*List includes association members only.

ABOUT THE PROJECT

This project is the result of a collaboration between the Virginia Department of Conservation and Recreation and the Virginia Native Plant Society and was made possible by a grant from the National Fish and Wildlife Foundation. Funds were also contributed by the Virginia Nurseryman's Association, the Virginia Chapter of the American Society of Landscape Architects and the Lewis Ginter Botanical Garden. In addition to those three organizations, the sponsors extend their considerable appreciation to the other collaborators who provided valuable advice and assistance throughout the life of the project:

The Nature Conservancy-Virginia Chapter
 Virginia Polytechnic Institute and State University,
 Department of Horticulture
 Virginia Department of Agriculture and Consumer Services
 Virginia Department of Forestry
 Virginia Department of Game and Inland Fisheries
 Virginia Department of Transportation

Project participants share a commitment to protect native plant habitats, especially those that support rare, threatened or endangered species. The use of native plant species, especially plants propagated from local populations, in land management, conservation, restoration and horticultural projects will help maintain the ecological integrity of natural areas and preserve native biodiversity.

12/01



Native Plants for Conservation, Restoration and Landscaping

Celebrate and Preserve Our Natural Heritage

CENTRAL VIRGINIA



Piedmont Plateau

OUR NATURAL HERITAGE

Native wildflowers, shrubs and trees are natural heirlooms, handed down to us from a time before recorded history. Using native plants in even the smallest garden can create miniature landscapes possessing the charm and character unique to a region's natural history. With some simple changes, our traditional lawns and gardens can expand to include these local heirlooms, providing us with beauty, solace and conversation, as well as contributing to the conservation of native species.

Indeed, landscaping with native plants, whether in a private garden, on commercial property or in public parks, will help to preserve species. Natural habitats for some of our native plants are rapidly being lost. But there are other reasons for planting native wildflowers, grasses, ferns, shrubs and trees: They can match the finest cultivated plants in beauty and may surpass them in ruggedness and resistance to insects and diseases.

Native: species naturally occurring in the region in which they evolved (indigenous)

Alien: species introduced to a new region by humans, either deliberately or accidentally (exotic, non-native)

WHAT ARE NATIVES?

Native species are those that occur in the region in which they have evolved. Plants and animals evolve in specific habitats over extended periods of time in response to physical and biotic processes that are characteristic of that place: the climate; the soils; the seasonal rainfall, drought, and frost; and interactions with other species occupying those habitats. They thus possess certain traits that make them uniquely adapted to local conditions.

In North America, plants are considered to be native if they occurred here prior to European settlement. This distinction is made because of the many changes in the flora that have occurred since the arrival of European settlers. Since then many more plants have been deliberately and accidentally introduced to North America from distant shores.

But alien species do not come only from distant countries. They may be introduced from a different region of the same country. For instance, a species native to the forests of the west coast of North America would be considered alien if found on the east coast where it was not a constituent of the regional flora.

NATIVES VS. ALIENS

While many alien plants are beneficial and have little or no effect on the natural environment, a few invasive alien species pose serious threats to both natural communities and rare species. Because of a lack of natural controls like insect pests and competitors, some alien plants are able to escape our gardens, establish in a new area, then displace the native plant species growing there. What was a finely woven and diverse natural community may become a monoculture dominated by the invasive alien plant. Along with the displacement of native plant species from these natural habitats comes the loss of many flying, crawling and burrowing creatures that relied on native plants for food, cover and shelter.

Scientific Name	Common Name	Uses				Light			Moisture			
		W	H	C	D	S	P	F	L	M	H	
<i>Castanea pumila</i>	Allegheny chinkapin	*	*	*		*	*	*	*			
<i>Ceanothus americanus</i>	New Jersey tea	*	*	*		*	*	*	*			
<i>Cephalanthus occidentalis</i>	buttonbush	*	*	*		*	*	*	*			*
<i>Gaultheria procumbens</i>	wintergreen	*	*	*		*	*	*	*			*
<i>Gaylussacia baccata</i>	black huckleberry	*	*	*		*	*	*	*			*
<i>Hamamelis virginiana</i>	witch hazel	*	*	*		*	*	*	*			*
<i>Ilex decidua</i>	deciduous holly	*	*	*		*	*	*	*			*
<i>Ilex verticillata</i>	winterberry	*	*	*		*	*	*	*			*
<i>Kalmia latifolia</i>	mountain laurel	*	*	*		*	*	*	*			*
<i>Leucothoe racemosa</i>	fetterbush, sweetbells	*	*	*		*	*	*	*			*
<i>Lindera benzoin</i>	spicebush	*	*	*		*	*	*	*			*
<i>Rhododendron maximum</i>	great rhododendron	*	*	*		*	*	*	*			*
<i>Rhododendron periclymenoides</i>	pinxter flower	*	*	*		*	*	*	*			*
<i>Rhododendron viscosum</i>	swamp azalea	*	*	*		*	*	*	*			*
<i>Rhus copallinum</i>	winged sumac	*	*	*		*	*	*	*			*
<i>Rosa carolina</i>	pasture rose	*	*	*		*	*	*	*			*
<i>Salix humilis</i>	prairie willow	*	*	*		*	*	*	*			*
<i>Salix sericea</i>	silky willow	*	*	*		*	*	*	*			*
<i>Sambucus canadensis</i>	common elderberry	*	*	*		*	*	*	*			*
<i>Vaccinium corymbosum</i>	highbush blueberry	*	*	*		*	*	*	*			*
<i>Viburnum dentatum</i>	arrow-wood viburnum	*	*	*		*	*	*	*			*
<i>Viburnum prunifolium</i>	black-haw viburnum	*	*	*		*	*	*	*			*
Small trees												
<i>Amelanchier arborea</i>	downy serviceberry	*	*	*		*	*	*	*			*
<i>Amelanchier canadensis</i>	Canada serviceberry	*	*	*		*	*	*	*			*
<i>Asimina triloba</i>	paw paw	*	*	*		*	*	*	*			*
<i>Cercis canadensis</i>	redbud (Eastern)	*	*	*		*	*	*	*			*
<i>Chionanthus virginicus</i>	fringetree	*	*	*		*	*	*	*			*
<i>Cornus alternifolia</i>	alternate-leaf dogwood	*	*	*		*	*	*	*			*
<i>Cornus amomum</i>	silky dogwood	*	*	*		*	*	*	*			*
<i>Cornus florida</i>	flowering dogwood	*	*	*		*	*	*	*			*
<i>Crataegus crus-galli</i>	cockspur hawthorn	*	*	*		*	*	*	*			*
<i>Euonymus atropurpureus</i>	wahoo	*	*	*		*	*	*	*			*
<i>Ilex opaca</i>	American holly	*	*	*		*	*	*	*			*
<i>Magnolia virginiana</i>	sweetbay magnolia	*	*	*		*	*	*	*			*
<i>Morus rubra</i>	red mulberry	*	*	*		*	*	*	*			*
<i>Ostrya virginiana</i>	Eastern hop-hornbeam	*	*	*		*	*	*	*			*
<i>Rhus glabra</i>	smooth sumac	*	*	*		*	*	*	*			*
<i>Rhus hirta (R. typhina)</i>	staghorn sumac	*	*	*		*	*	*	*			*
<i>Salix nigra</i>	black willow	*	*	*		*	*	*	*			*
Medium to Large Trees												
<i>Acer rubrum</i>	red maple	*	*	*		*	*	*	*			*
<i>Betula nigra</i>	river birch	*	*	*		*	*	*	*			*
<i>Carya glabra</i>	pignut hickory	*	*	*		*	*	*	*			*
<i>Diospyros virginiana</i>	persimmon	*	*	*		*	*	*	*			*
<i>Fagus grandifolia</i>	American beech	*	*	*		*	*	*	*			*
<i>Fraxinus americana</i>	white ash	*	*	*		*	*	*	*			*
<i>Fraxinus pennsylvanica</i>	green ash	*	*	*		*	*	*	*			*
<i>Juglans nigra</i>	black walnut	*	*	*		*	*	*	*			*
<i>Juniperus virginiana</i>	red cedar (Eastern)	*	*	*		*	*	*	*			*
<i>Liquidambar styraciflua</i>	sweetgum	*	*	*		*	*	*	*			*
<i>Liriodendron tulipifera</i>	tulip-tree	*	*	*		*	*	*	*			*
<i>Nyssa sylvatica</i>	black gum	*	*	*		*	*	*	*			*
<i>Oxydendrum arboreum</i>	sourwood	*	*	*		*	*	*	*			*
<i>Pinus echinata</i>	shortleaf pine	*	*	*		*	*	*	*			*
<i>Pinus virginiana</i>	Virginia pine	*	*	*		*	*	*	*			*
<i>Platanus occidentalis</i>	sycamore	*	*	*		*	*	*	*			*
<i>Prunus serotina</i>	wild black cherry	*	*	*		*	*	*	*			*
<i>Quercus alba</i>	white oak	*	*	*		*	*	*	*			*
<i>Quercus bicolor</i>	swamp white oak	*	*	*		*	*	*	*			*
<i>Quercus coccinea</i>	scarlet oak	*	*	*		*	*	*	*			*
<i>Quercus falcata</i>	Southern red oak	*	*	*		*	*	*	*			*
<i>Quercus montana</i>	chestnut oak	*	*	*		*	*	*	*			*
<i>Quercus palustris</i>	pin oak	*	*	*		*	*	*	*			*
<i>Quercus phellos</i>	willow oak	*	*	*		*	*	*	*			*
<i>Quercus rubra</i>	Northern red oak	*	*	*		*	*	*	*			*
<i>Quercus stellata</i>	post oak	*	*	*		*	*	*	*			*
<i>Quercus velutina</i>	black oak	*	*	*		*	*	*	*			*
<i>Sassafras albidum</i>	sassafras	*	*	*		*	*	*	*			*
<i>Tilia americana</i>	American basswood	*	*	*		*	*	*	*			*
<i>Tsuga canadensis</i>	Eastern hemlock	*	*	*		*	*	*	*			*

* May be aggressive in garden setting.

* Due to the rarity and sensitivity of habitat in Virginia, these species are recommended for horticultural use only.

Planting these species in natural areas could be detrimental to the survival of native populations.

Scientific Name	Common Name	Uses				Light			Moisture		
		W	H	C	D	S	P	F	L	M	H
<i>Pycnanthemum incanum</i>	hoary mountain mint	•	•	•		•		•		•	
<i>Pycnanthemum tenuifolium</i>	narrow-leaved mtn. mint	•	•	•				•		•	
<i>Rhexia virginica</i>	Virginia meadow-beauty	•	•	•				•			•
<i>Rudbeckia fulgida</i>	early coneflower	•	•	•				•		•	
<i>Sagittaria latifolia</i>	broadleaf arrowhead	•	•	•				•			•
<i>Sanguinaria canadensis</i>	bloodroot	•	•	•		•				•	
<i>Saururus cernuus</i>	lizard's tail	•	•	•				•			•
<i>Saxifraga virginensis</i>	early saxifrage	•	•	•		•		•		•	
<i>Sedum ternatum</i>	wild stonecrop	•	•	•		•		•		•	
<i>Silene virginica</i>	fire pink	•	•	•				•		•	
<i>Solidago caesia</i>	bluestem goldenrod	•	•	•		•		•		•	
<i>Solidago odora</i>	sweet goldenrod	•	•	•		•		•		•	
<i>Solidago pinetorum+</i>	pineywoods goldenrod	•	•	•		•		•		•	
<i>Solidago puberula</i>	downy goldenrod	•	•	•		•		•		•	
<i>Solidago rugosa+</i>	rough-stemmed goldenrod	•	•	•		•		•		•	
<i>Tiarella cordifolia var. collina</i>	clumping foamflower	•	•	•		•		•		•	
<i>Tradescantia virginiana</i>	Virginia spiderwort	•	•	•		•		•		•	
<i>Trillium grandiflorum</i>	white trillium	•	•	•		•		•		•	
<i>Verbena hastata</i>	blue vervain	•	•	•		•		•		•	
<i>Vernonia noveboracensis</i>	New York ironweed	•	•	•		•		•		•	
<i>Viola pedata</i>	bird's foot violet	•	•	•		•		•		•	
<i>Viola pubescens</i>	yellow violet	•	•	•		•		•		•	
<i>Yucca filamentosa</i>	common yucca	•	•	•				•		•	
Ferns and fern allies											
<i>Adiantum pedatum</i>	maidenhair fern	•	•	•		•		•		•	
<i>Asplenium platyneuron</i>	ebony spleenwort	•	•	•		•		•		•	
<i>Athyrium asplenoides</i>	Southern ladyfern	•	•	•		•		•		•	
<i>Dryopteris intermedia</i>	evergreen wood-fern	•	•	•		•		•		•	
<i>Dryopteris marginalis</i>	marginal shield-fern	•	•	•		•		•		•	
<i>Onclea sensibilis+</i>	sensitive fern	•	•	•		•		•		•	
<i>Osmunda cinnamomea</i>	cinnamon fern	•	•	•		•		•		•	
<i>Osmunda regalis</i>	royal fern	•	•	•		•		•		•	
<i>Polystichum acrostichoides</i>	Christmas fern	•	•	•		•		•		•	
Grasses, sedges, & rushes											
<i>Agrostis perennans</i>	autumn bentgrass	•	•	•		•		•		•	
<i>Andropogon gerardii</i>	big bluestem	•	•	•		•		•		•	
<i>Andropogon glomeratus</i>	bushy bluestem	•	•	•		•		•		•	
<i>Andropogon virginicus</i>	broomsedge	•	•	•		•		•		•	
<i>Carex crinita var. crinita</i>	long hair sedge	•	•	•		•		•		•	
<i>Carex lurida</i>	sallow sedge	•	•	•		•		•		•	
<i>Carex pensylvanica</i>	Pennsylvania sedge	•	•	•		•		•		•	
<i>Carex stricta</i>	tussock sedge	•	•	•		•		•		•	
<i>Chasmanthium latifolium</i>	river oats	•	•	•		•		•		•	
<i>Danthonia sericea</i>	silky oatgrass	•	•	•		•		•		•	
<i>Danthonia spicata</i>	poverty oatgrass	•	•	•		•		•		•	
<i>Dichanthelium clandestinum</i>	deer-tongue	•	•	•		•		•		•	
<i>Dichanthelium commutatum</i>	variable panicgrass	•	•	•		•		•		•	
<i>Dulichium arundinaceum</i>	dwarf bamboo	•	•	•		•		•		•	
<i>Elymus hystrix (Hystrix patula)</i>	bottlebrush grass	•	•	•		•		•		•	
<i>Elymus virginicus</i>	Virginia wild rye	•	•	•		•		•		•	
<i>Juncus canadensis</i>	Canada rush	•	•	•		•		•		•	
<i>Juncus effusus</i>	soft rush	•	•	•		•		•		•	
<i>Leersia oryzoides</i>	rice cutgrass	•	•	•		•		•		•	
<i>Panicum virgatum</i>	switch grass	•	•	•		•		•		•	
<i>Saccharum giganteum</i>	giant plume grass	•	•	•		•		•		•	
<i>Schizachyrium scoparium</i>	little bluestem	•	•	•		•		•		•	
<i>Scirpus cyperinus</i>	woolgrass bulrush	•	•	•		•		•		•	
<i>Sorghastrum nutans</i>	Indian grass	•	•	•		•		•		•	
<i>Sparganium americanum</i>	American bur-reed	•	•	•		•		•		•	
<i>Tridens flavus</i>	redtop	•	•	•		•		•		•	
<i>Tripsacum dactyloides</i>	gama grass	•	•	•		•		•		•	
<i>Typha latifolia</i>	broad-leaved cattail	•	•	•		•		•		•	
Vines											
<i>Celastrus scandens</i>	climbing bittersweet	•	•	•		•		•		•	
<i>Lonicera sempervirens</i>	trumpet honeysuckle	•	•	•		•		•		•	
<i>Parthenocissus quinquefolia</i>	Virginia creeper	•	•	•		•		•		•	
Shrubs											
<i>Alnus serrulata</i>	common alder	•	•	•		•		•		•	
<i>Aronia arbutifolia</i>	red chokeberry	•	•	•		•		•		•	

In contrast to invasive alien species, other non-native plants are unable to thrive without extra effort by gardeners. For instance, they may originate in regions with abundant rainfall and soils rich in nutrients. If then introduced into a drier region with less fertile soils, they may require additional watering and fertilizer. The natural defenses that plants evolve in their original habitats may not protect them in a new environment, requiring the application of pesticides to aid their growth. The benefit of growing plants within the region in which they evolved is that they are more likely to thrive under the local conditions requiring less attention, labor and expensive additives.

BASICS ABOUT LANDSCAPING WITH NATIVES

When landscaping with natives, match the plants to the correct region, moisture and light conditions. Start with this brochure and study the names of the plants native to your region, and the sunlight and moisture regimes they prefer. Refer to field guides and books of natural history to learn which plants will fit within your planting scheme and provide specific benefits to the wildlife in your area. Plan to texture your landscape with a combination of flowers, shrubs and trees that would occur together naturally. Visit a natural area in your region and observe common plant associations, spatial groupings and habitat conditions. Whether you start small or go all out, always purchase your native plants and seeds from reputable sources that propagate their own plants, preferably from local sources.

NATIVES FOR WILDLIFE

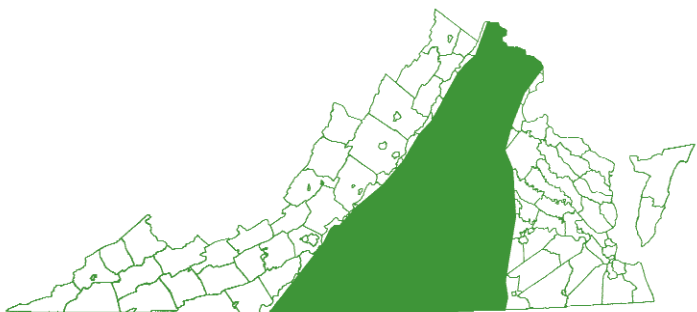
Plants and animals evolve together to create unique natural communities, weaving a complex web of interrelationships. Flowers often bloom and fruits ripen in synchrony with the needs of the animals that pollinate the flowers and disperse the seeds. A butterfly feeds on the nectar of a certain flower and in turn pollinates the plant. To reap the greatest benefit, the flower must bloom and the butterfly emerge simultaneously. Later the flower goes to seed, coincidentally when songbirds are fattening for the autumn migration. Gorging themselves, the birds scatter much of what they fail to eat, thus helping disperse the plant's seed.

Alien plant species rarely keep time according to the internal clocks of our native wildlife. Their flowers may bloom too early or late, their fruits grow too large for resident birds to carry, their petals too long for a local nectar feeder to probe, and their smell and texture unrecognizable to a butterfly in search of a host plant on which to lay her eggs.

The greater the variety of plants, the more likely uncommon species will be attracted to your yard. Certain butterflies will hatch and feed only on one type of host plant. When you plant a variety of host and nectar plants, you may see the entire life cycle of several species of butterflies. Keep in mind butterflies and hummingbirds prefer different flowers. Songbirds, too, will visit wildflowers during the spring and summer nesting season to feed on insects and spiders and carry them back to their young. Later they will visit for the dried seeds to fuel them for long journeys to

southern wintering grounds. Trees for nesting, shrubs for shelter and water for bathing will further enhance a backyard wildlife preserve.

PIEDMONT



Virginia is divided into several physiographic provinces based on geologic history. Each province has characteristic topography, soil pH, soil depth, elevation and hydrology. These characteristics combine to influence the species of plants and animals found there. Virginia is unique, encompassing parts of five of these provinces, and thus has a greater variety of natural landscapes than any other eastern state.

Virginia's Piedmont province is a gently rolling upland bounded on the east by the fall line and the on west by the Blue Ridge Mountains. The western boundary of the Piedmont is characterized by low peaks and ridges, comprising the foothills of the Blue Ridge Mountains. To the east, the Piedmont continues to slope more gently toward the fall line. The fall line marks the zone of transition from the hard, resistant bedrock underlying the Piedmont to the softer sediments of the Coastal Plain and is sharply delineated by falls and rapids in rivers crossing the boundary. Streams are able to cut more easily through the sands, gravels and clays of the Coastal Plain, and rivers widen as the topography flattens. From foothills to river rapids, varying Piedmont site conditions support a mosaic of plant communities.

Recommended Uses

- W = wildlife
- H = horticulture
- C = conservation
- D = domestic livestock forage

Minimum Light Requirements

- S = shade
- P = partial sun
- F = full sun

Native Regions

- C = Coastal Plain
- P = Piedmont
- M = Mountains and Valley

Moisture Requirements

- L = low
- M = medium
- H = high

Scientific Name	Common Name	Uses				Light			Moisture		
		W	H	C	D	S	P	F	L	M	H
Forbs											
<i>Acorus americanus</i>	sweet flag		•	•			•	•			•
<i>Amsonia tabernaemontana</i>	blue star		•			•	•			•	•
<i>Anemone quinquefolia</i>	wood anemone		•			•	•	•		•	
<i>Antennaria neglecta</i>	field pussytoes		•	•			•	•		•	
<i>Aquilegia canadensis</i>	wild columbine	•					•	•	•	•	
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit		•				•			•	
<i>Aruncus dioicus</i>	goatsbeard		•				•	•		•	
<i>Asclepias incarnata</i>	swamp milkweed	•	•	•			•	•		•	•
<i>Asclepias tuberosa</i>	butterfly weed	•	•	•				•		•	
<i>Aster concolor</i>	Eastern silvery aster	•	•	•				•		•	
<i>Aster divaricatus</i>	white wood aster	•	•	•				•		•	
<i>Aster novae-angliae</i>	New England aster		•	•				•	•	•	
<i>Aster pilosus</i>	white heath aster	•	•	•					•	•	
<i>Aster umbellatus</i>	flat-top white aster		•	•				•	•	•	•
<i>Baptisia tinctoria</i>	yellow wild-indigo	•	•					•	•	•	
<i>Chamaecrista fasciculata+</i>	partridge pea			•					•	•	•
<i>Chelone glabra</i>	white turtlehead		•	•				•	•		•
<i>Chrysogonum virginianum</i>	green and gold		•	•				•		•	
<i>Chrysopsis mariana</i>	Maryland golden aster	•	•	•				•	•	•	
<i>Cimicifuga racemosa</i>	black snakeroot		•					•		•	
<i>Coreopsis tripteris</i>	tall coreopsis		•	•				•		•	
<i>Coreopsis verticillata</i>	threadleaf coreopsis		•	•				•		•	
<i>Delphinium tricornis</i>	dwarf larkspur		•					•	•	•	
<i>Desmodium paniculatum</i>	narrow-leaf tick trefoil	•		•				•		•	
<i>Dicentra cucullaria</i>	Dutchman's breeches		•					•		•	
<i>Dicentra eximia</i>	wild bleeding heart		•					•	•	•	
<i>Eupatorium coelestinum</i>	mistflower	•	•	•				•	•	•	
<i>Eupatorium fistulosum</i>	Joe Pye weed	•	•	•				•	•	•	
<i>Eupatorium perfoliatum</i>	common boneset		•	•				•	•	•	•
<i>Geranium maculatum</i>	wild geranium		•					•	•	•	
<i>Helenium autumnale</i>	sneezeweed	•	•	•				•	•	•	
<i>Helianthus angustifolius</i>	narrow-leaf sunflower	•	•	•				•	•	•	•
<i>Helianthus decapetalus</i>	ten-petaled sunflower	•	•	•				•	•	•	
<i>Helianthus divaricatus</i>	woodland sunflower	•	•	•				•		•	
<i>Heliopsis helianthoides</i>	oxeye sunflower	•	•	•				•	•	•	
<i>Hepatica acutiloba</i>	sharp-lobed hepatica		•					•		•	•
<i>Hibiscus moscheutos</i>	Eastern rosemallow	•	•	•				•		•	•
<i>Iris cristata</i>	dwarf crested iris		•					•	•	•	•
<i>Iris virginica</i>	Virginia blue flag		•	•				•	•	•	•
<i>Lespedeza capitata</i>	round-head bush clover	•	•	•				•	•	•	•
<i>Liatris squarrosa</i>	plains blazing star	•	•	•				•		•	
<i>Lilium canadense</i>	Canada lily		•					•	•	•	•
<i>Lilium superbum</i>	Turk's cap lily		•					•	•	•	•
<i>Lobelia cardinalis</i>	cardinal flower	•	•	•				•	•	•	
<i>Lobelia siphilitica</i>	great blue lobelia	•	•	•				•	•	•	
<i>Maianthemum racemosum</i>	false Solomon's seal		•	•				•	•	•	
<i>Mertensia virginica</i>	Virginia bluebells		•	•				•	•	•	
<i>Mimulus ringens</i>	monkeyflower		•	•				•	•	•	•
<i>Monarda fistulosa</i>	wild bergamot	•	•	•				•	•	•	•
<i>Nymphaea odorata</i>	American water lily	•	•	•				•		•	•
<i>Oenothera fruticosa</i>	sundrops	•	•	•				•	•	•	•
<i>Opuntia humifusa</i>	Eastern prickly-pear	•	•	•				•		•	
<i>Peltandra virginica</i>	arrow arum	•	•	•				•	•	•	•
<i>Phlox carolina</i>	thick-leaved phlox	•	•	•				•	•	•	•
<i>Phlox divaricata</i>	woodland phlox		•	•				•	•	•	
<i>Phlox subulata</i>	moss phlox		•	•				•		•	
<i>Physostegia virginiana</i>	obedient plant		•	•				•	•	•	
<i>Podophyllum peltatum+</i>	mayapple	•	•	•				•	•	•	
<i>Polygonatum biflorum</i>	Solomon's seal		•					•	•	•	
<i>Pontederia cordata</i>	pickerel weed	•	•	•				•		•	•
<i>Porteranthus trifoliatum</i>	Bowman's root		•					•	•	•	

Appendix G
Guidance for Preparing Shoreline Development
Applications

INTRODUCTION

The Federal Energy Regulatory Commission (FERC or the Commission) issues licenses for the construction, operation, and maintenance of non-federal hydropower projects. Licensees are responsible for operating and maintaining these projects in accordance with license requirements. Under its license, a licensee may file an application with the FERC seeking approval to grant permission for specific uses and occupancies of the project reservoir and lands that are not associated with project operations and purposes (non-project uses). Examples of non-project uses that would require prior FERC approval include most commercial marinas, large boat docks, and significant shoreline development. The purpose of this document is to provide guidance to developers, homeowners, and others on the contents of a non-project use application and the FERC's review process. If a licensee finds that a proposed non-project use or facility is consistent with the license and the purpose of protecting and enhancing the scenic, recreational, and environmental values of the project, it may file an application seeking FERC authorization. Typically, a licensee requires the proponent of the proposal to prepare most of the necessary application material. The licensee will file the complete application with the Commission. If the Commission approves the application, it will issue an order that gives the licensee authority to grant permission for the specific non-project use. The licensee is responsible for ensuring that the authorized non-project use or facility is constructed, operated, and maintained in accordance with the FERC's approval order and other applicable requirements of the project license through the term of the license.

SUGGESTED CONTENTS OF PROPOSED NON-PROJECT USE APPLICATIONS

The following is a general list of the information that should be included in applications for proposed non-project uses or facilities. The Commission needs specific information to prepare the necessary environmental analysis.



While the information below applies to most applications, it is not an all inclusive list and not all the individual items may apply to every proposed facility or use. As necessary, please contact the licensee if you have questions about the application contents or consultation needs for your specific proposal.

1) **Description of proposed facility or use**

- location, size, type of conveyance (i.e. lease, right-of-way, easement, fee-title, etc.)
- major components, materials, and layout or design
- construction and operation methods, construction duration and approximate start and completion dates
- purpose of proposed use
- description of any Federal, state, and local permits or approvals required or obtained for proposed use
- if available, copies of any government agency permits or agency review documents obtained for the proposed use
- maps showing the location and layout of the proposed facility in relation to the project boundary

2) **Description of affected environment (the immediate area surrounding the site of the proposed facility or use)**

- common fish and wildlife species
- threatened and endangered species
- wetlands, critical habitats, or significant features

- cultural resources
- common vegetation and trees
- water quality and approximate depth
- scenic quality
- existing land and water uses and structures



3) **Evaluation of how the proposed use is compatible with (the licensee may provide this information):**

- Commission approved management plans (i.e. recreation, shoreline or land use, dredging, cultural resource, wildlife protection, etc.)
- project operations and purposes and applicable license requirements
- licensee's own project management guidelines or requirements

4) **A description of the proposed use's potential impact on the affected environment. For example, impacts may include:**

- vegetation removal
- shoreline erosion or turbidity
- dredging and lakebed disturbance
- disturbance of significant resources, species, or habitats
- specific impacts on existing land uses or structures
- potential for discharge of pollutants

5) ***A description of any proposed construction, design, and/or operation practices or measures to minimize or mitigate for any specific impacts identified under item (4) above. For example, measures may include:***

- erosion control measures
- avoidance of affected resources
- changes in design or location of a proposed facility
- close oversight to ensure compliance with licensee mandated permitting programs or land use regulations, Commission approved plans, or agency permit requirements
- a statement by the proponent that it fully intends to adhere to all permit conditions

6) ***Documentation of consultation (copies of correspondence) with appropriate Federal, state, and local government agencies including:***

- government agencies that own or manage lands or facilities in the immediate area
- government agencies that would likely need to authorize or approve the proposed use
- government agencies that have jurisdiction over resources that may be affected by the proposed use

In addition, please note the following:

- a minimum of 30 days should be provided for consulted parties to reply to requests for comments on a proposed use
- if no reply is received, the filing should include a copy of written request for comments
- filing should include responses to any specific agency comments or recommendations. If recommendations are rejected, include site-specific reasons for the rejection.
- if it is generally known that local property owners or entities are opposed to the proposed use, the filing should identify the nature of this opposition and include general responses to the concerns raised.

TO LEARN MORE ABOUT SHORELINE DEVELOPMENT...

For information about shoreline development requirements at a specific FERC licensed hydropower project, please contact the licensee of that project.

Information about the Commission and the Office of Energy Projects is available online at <http://www.ferc.gov>



This document was prepared by the staff of the Office of Energy Projects and does not necessarily reflect the views of the Federal Energy Regulatory Commission.

GUIDANCE FOR PREPARING SHORELINE DEVELOPMENT APPLICATIONS



Federal Energy Regulatory Commission
Office of Energy Projects
888 First Street NE
Washington, DC 20426

Appendix H

Fish Habitat

*Protecting our precious
water resources is
essential for the survival
of sport fishing.
Every angler must be
responsible for his or
her impact on the
environment.*

WHEN YOU RESPOOL, RECYCLE WITH THE BERKLEY CONSERVATION INSTITUTE.

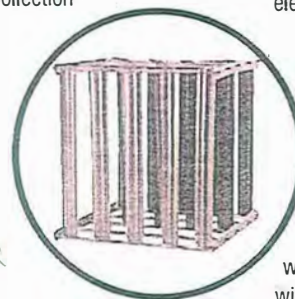
The BCI has recycled more than 9 million miles worth of fishing line since 1990. That's enough to fill two reels for every angler in the U.S. We thank each of you who participated in this effort with us and encourage your continued support.

Please pick up discarded fishing line, and recycle your used nylon monofilament line by dropping it off in your local store's recycling bin, or mail it directly to our collection center at:

Berkley Recycling
1900 18th Street
Spirit Lake, Iowa 51360

THE BCI TURNS RECYCLED LINE INTO ARTIFICIAL UNDERWATER HABITAT STRUCTURES.

What can you do with used fishing line? Recycle it and the BCI will put it back into the water, in the form of Berkley Fish-Hab™ structures.



Berkley Fish-Hab is an artificial, underwater habitat structure made of used and recycled monofilament fishing line and spools, along with other post-consumer materials like milk cartons and soft drink bottles.

Fish-Hab attracts fish and encourages plant growth almost immediately. It is the perfect solution for rejuvenating older reservoirs, ponds and streams devoid of the natural cover essential to the growth and development of a healthy fish population. It attracts baitfish, which live and feed in and around it. The small fish, in turn, attract larger fish and the Fish-Hab soon becomes a viable element of structure.

Field research and development of the Fish-Hab began in 1993. With the help of fisheries management and recycling professionals, the first prototypes were designed and tested in Spirit Lake, IA. Today, fish are still found near these initial structures. In 2001, the BCI cooperated with North Carolina State University and others to evaluate Berkley Fish-Habs' ability to increase fish populations in reservoirs. Piers fitted with Fish-Habs held four times as many fish as those without. Landowners and anglers were delighted.

The Berkley Conservation Institute has worked with members of the American Fisheries Society and staff from the Bureau of Land Management and U.S. Fish &

DEDICATED TO THE FUTURE OF FISHING.

The Berkley Conservation Institute (BCI) was founded upon the tradition started at

Berkley over 60 years ago to respect the outdoors and foster a passion for fishing.

Times have changed. Fishing is now more sophisticated, and the environment needs our attention. Also, children from increasingly urbanized areas need help learning to fish.

The BCI is committed to revitalizing the fishing environment, and with your help, we can enhance fishing, improve fisheries, and protect our fishable waters. The BCI is devoted to helping kids and adults learn the joys of fishing and to teach conservation and angler ethics.

By reading about the conservation efforts at the Berkley Conservation Institute, we hope you will feel a greater desire to take part in the effort to clean up the earth, the air and the waterways, that we may together preserve our precious natural resources. We also hope you will identify kids and friends that need to learn the joy of fishing.





Wildlife service to determine the optimum color and design of the Fish-Hab, which can be found today in lakes across the U.S.

If left in the environment, discarded fishing line can be a potential hazard to wildlife. The BCI has turned it into a real benefit for fish and fishing. The used line you drop at your local tackle dealer is recycled and turned into Fish-Hab, a non-degradable structure that is completely safe in the aquatic environment.

We designed the 4-foot cube Fish-Hab structure so you can easily assemble it within minutes at the placement site. It weighs around 30 pounds. Fish-Habs can be attached to each other to make various shapes and complement different structures and needs. The complete assembly is lightweight and easy to anchor under water.

To order a Fish-Hab, mail 75 Berkley® FireLine® and/or Trilene® UPC codes, or \$75 (includes shipping), to:

Berkley Fish-Hab
1900 18th Street
Spirit Lake, Iowa 51360



THE PROMISE OF TOMORROW

The Berkley Conservation Institute's commitment to sportfishing doesn't end with recycling. For years, we've been working to ensure that there will continue to be abundant outdoor resources – and a bright future for the great family sport of fishing.

Throughout this new millennium, restoring and caring for the environment is as critical as ever. Let us join together to take action and fulfill the stewardship we've been given to responsibly protect the earth.

The Berkley Conservation Institute was established to facilitate this goal. Our children and grandchildren are counting on us to use science and technology to ensure the health and well-being of the worldwide fish population. The future of fishing depends on it.

REJUVENATE YOUR FISHERY WITH FISH-HAB

Fish-Hab is available to everyone – pond owners, anglers, communities or anyone interested in improving the aquatic habitat. The Fish-Hab is free with 75 UPC codes from Berkley lines. Simply cut the UPC codes from line spools and collect them for yourself or local aquatic rejuvenation projects.

For a retailer to participate, contact the Berkley Conservation Institute and request a Recycle Collection Bin. Participating retailers receive recycling materials and shipping at no charge. Interested groups or individuals can participate by displaying our recycling poster, collecting used fishing line and returning it prepaid to:

Berkley Recycling
1900 18th Street
Spirit Lake, Iowa 51360

To learn more, visit us online at
www.berkley-fishing.com



Dedicated to the Future of Fishing™

