



**A Description of the Oak Ridge Reservation
Designated State Natural Area**

Prepared by

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Purpose Statement for the Protection of Oak Ridge Reservation under T.C.A. 11-14-108 as Oak Ridge Reservation Designated State Natural Area

The Oak Ridge Reservation (ORR) has been recognized for more than two decades for its ecological significance. As early as 1985 the U.S. Department of Energy (DOE) and the State of Tennessee (State) entered into a cooperative agreement that recognized eight ORR Registered State Natural Areas. In 1987, the Oak Ridge National Laboratory (ORNL) published a report that identified 80 significant terrestrial and aquatic ecological areas at the Reservation. The following year ORR received international recognition by being designated as an International Biosphere Reserve by the United Nations. More recently, in 1995, The Nature Conservancy performed an ecological assessment at ORR as part of the "Common Ground" process. The "Common Ground" assessment was a comprehensive effort that methodically collected data and mapped rare elements occurring at ORR. A purpose of the assessment was to help provide DOE with the information for future planning to preserve the ecological integrity of the Reservation.

Significant strides have been made to locate and document ecologically significant sites at ORR since the inception of the 1985 ORR Natural Areas Registry Agreement. The original agreement represented a preliminary assessment based largely on a few rare plant records. Since then it has been documented through field studies and research that ORR supports more than 1,100 vascular plant species. This represents approximately 42% of the 2,600 species that are known for Tennessee. This includes 21 state-listed species, 20 state or federally listed rare animal species, and 270 occurrences of significant species and communities identified in the "Common Ground" report. The importance of ORR is furthermore recognized because of its vast size, with more than 75% of ORR still in relatively unfragmented forest. ORR provides significant faunal habitat, especially for nesting migrant birds. It is a refugia, or biological island, in a region that has been converted to urban and agricultural use.

This laudable history combined with our present knowledge of the ecological significance of ORR warrants protection under T.C.A. 11-114-108. The Oak Ridge Reservation Designated State Natural Area (ORR DSNA) preservation builds on the "Common Ground" recommendation to protect the ecological integrity of the ORR at the landscape scale. Protecting species and communities at the landscape scale is a paradigm shift in conservation biology that was not understood in 1985. Hence, the TDEC recognizes five natural area subunits that contain 30 ecological sites that comprises approximately 20,000 acres of the ORR. These five natural area subunits represent the most contiguous ecological core areas that can be preserved at a landscape level at ORR. Furthermore, ORR contains many other relatively small disjunct areas that are not included within the ORR DSNA. These are areas that contain isolated, rare species and/or significant species assemblages and deserve special consideration for protection as State Botanical or Zoological Sites.

The protection of the ORR DSNA is complimentary to and compatible with the DOE's mission as published in ORNL Land and Facilities Plan (ORNL, TM-2000/237, p. 2-2), which states that land use priorities for the Reservation include:

- "Preserv[ing] and protect[ing] land for meeting the requirements of existing and future scientific facilities and research programs so that DOE can continue to address its national science and technology missions."
- "Preserv[ing] and protect[ing] land to meet the requirements of environmental research by ensuring that adequate areas within the ORR are protected and preserved for their biological and physical diversity."
- "Preserv[ing] and protect[ing] land to meet the requirements of scientific and technical education by ensuring that suitable land is available for facilities and research areas needed to support educational opportunities on the ORR."

The ORR DSNA recognition carefully and intentionally excludes areas of the ORR that are currently developed, or planned for development. The designation is consistent with, and does not affect the above stated priorities. The designation actually assists the DOE in fulfilling the second priority. In addition, the "Rules for Management of Tennessee Natural Resource Areas" (Rule 0400-2-8) provides ample opportunities for research, restoration, and monitoring. Many of these same management objectives are included in the ORR Management Plan (ORNL, M-6614, 1999, pp. 18, 19).

This designation provides DOE and the State the ability to collaborate on significant natural resource initiatives. This collaboration provides opportunities for ecological restoration within the five natural area subunits. This includes barrens restoration, the establishment of warm season grass production fields for barrens restoration, and collaboration to assist in the control and management of invasive species. This last objective is identified as a priority on federal lands under Executive Order 13112. The State will provide technical assistance and resources as available for the management of the ORR DSNA.

The protection of ORR DSNA under T.C.A 114-11-108 is the culmination of past and present efforts that recognizes the state, regional, and global ecological significance of ORR. This designation recognizes the irreplaceable significance of this resource and the need for its protection in perpetuity. The following document, entitled "A Description of the Oak Ridge Reservation Designated State Natural Area" provides the scientific data and supporting documentation that establishes the ORR's ecological significance and its justification for its preservation as an ORR Designated State Natural Area.

Please see table 1 in Appendix A that shows the rare species occurrences within the five natural areas subunits. The natural area subunits are depicted on the map in Appendix B.

A Description of the Oak Ridge Reservation State Natural Area

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Subunit 1: Walker Branch_Three Bend

Location and Boundaries

Walker Branch-Three Bend comprises 6,059 acres in the southeast corner of the Oak Ridge Reservation (ORR). The Clinch River is the southern boundary of this subunit. The eastern terminus of the southern boundary is at the Solway Bridge and the western terminus is at a point near the X-10 Robotic Facility. The western boundary of this subunit runs along Melton Valley Drive to Lagoon Road where it goes around the base of Haw Ridge continues east following the base of the ridge. It turns north along a stream just west of the Roane/Anderson County line, and then turns east along a power line on Chestnut Ridge to Walker Branch Road. It then turns north along Walker Branch Road to Bear Creek Road and heads east to a point near the Y-12 facility where the boundary swings up around Fanny Knob. It then goes south along Mount Vernon Road to Bethel Valley Road and follows Bethel Valley Road where it turns south along the reservation boundary to the base of Haw Ridge and follows the base of the ridge to the Oak Ridge Highway (Hwy 62).

Prominent Features of Walker Branch-Three Bend Natural Area:

- § Haw Ridge
- § wetlands draining into or associated with the embayments of Walker Branch McCoy Branch, and Scarboro Creek
- § Bearden Creek
- § three river bends (Bull Bluff, Freels, and Solway)
- § Bethel Valley
- § diverse forest land
- § barrens.

Some of these features occur within a disturbed landscape context that includes pine plantings, road rights-of-way, and power lines. However, the large barrens-wetland complex associated with these features could be restored and/or maintained through proper management. Many of the barrens are contiguous to large pine plantings where substantial mortality has been caused by the southern pine beetle. These pine plantings likely could be restored to barrens under a prescribed management regime that might include annual mowing and/or prescribed burning.

Sites of Ecological Importance within the Walker Branch-Three Bend Natural Area:

1. Lower Walker Branch Ledges,
2. Walker Branch Embayment Barrens,
3. Walker Branch Watershed Research Area,
4. McCoy Branch Embayment Barrens,
5. Chestnut Ridge Barrens and Wetland,
6. Bethel Valley Small-Head Rush Wetland,
7. Middle Haw Ridge Mesic Forest,
8. Bearden Creek Water Gap and Wetland,
9. Rainy Knob,
10. Bull Bluff and Shore Outcrop,
11. Freels Bend warm season grass production fields (proposed)
12. Solway Bend Bluff.

Site 1: Lower Walker Branch Ledges

Lower Walker Branch Ledges is located on the slope overlooking the west branch of Walker Branch north of Bethel Valley Road. Tall larkspur (*Delphinium exaltatum*) occurs in limestone outcrops in a power line right-of-way, upslope of the west branch of Walker Branch. The limestone outcrops continue in the adjacent forest to the west of the power line, then to an area of barrens where another population of tall larkspur occurs.

Site 2: Walker Branch Embayment Barrens

Walker Branch Embayment Barrens is located south of Bethel Valley Road and west of Walker Branch Embayment. Tall larkspur is located at this site. This is a large area with a variety of forest types. It also supports barrens where mowing occurs along a pipeline and a power line right-of-way. The slopes mostly face northwest and have some limestone outcropping. A concentrated population of tall larkspur is found in one area, but this species also occurs as scattered individuals throughout the site. This site was one of eight original Registered State Natural Areas established in 1985 on the ORR.

Site 3: Walker Branch Watershed Research Area

Walker Branch Watershed Research Area is located on Chestnut Ridge and is a world-renowned research area. The forest type in this area is a northern red oak-tuliptree-chestnut oak-white oak type, of excellent quality, and largely unfragmented. This forest provides excellent habitat for cerulean warblers (*Dendroica caerulescens*), which have been observed nesting in the area in the past. The cerulean warbler is currently

under consideration for federal listing. This research area also contains the only colony of mountain witch-alder (*Fothergilla major*) known to occur on the ORR. The colony grows on a west-facing slope above Walker Branch along with azalea and blueberry.

Site 4: McCoy Branch Embayment Barrens

McCoy Branch Embayment Barrens is located south of Bethel Valley Road and east of McCoy Branch Embayment. Tall larkspur is found at this site. This site encompasses a large area containing a variety of forest types including a tuliptree-red cedar-white oak-hickory forest community and an oak-hickory-ash limestone woodland community. The slopes are mostly northwest facing with some limestone outcropping. A large population of tall larkspur occurs in the right-of-way and smaller populations that rarely flower are found in the forested areas. This site was also one of eight original Registered State Natural Areas established in 1985 on the ORR.

Site 5: Chestnut Ridge Barrens and Wetland

Chestnut Ridge Barrens and Wetland is located at the intersection of Roane and Anderson Counties, extending east about 0.2 miles and west about 0.4 miles (under and near a power line that runs north over a hill to this area just east of the fork of Old Bethel Valley Road and New Bethel Valley Road). Rare species found here include tall larkspur and Canada lily (*Lilium canadense*). East of the power line is a cedar barrens that extends into the power line corridor. Tall larkspur occurs in that portion of the barrens outside the power line corridor. Just down slope from the barrens within the power line corridor is a wet meadow. Tall larkspur is found in the wet meadow. North of the larkspur area, another small stream and associated riparian wetland crosses the power line corridor. Carolina quillwort (*Isoetes caroliniana*) is found on this stream in a shaded area upstream of the right-of-way. The uncommon robust variety of featherbells (*Stenanthium gramineum* var. *robustum*) is found at the edge of the wetland in the right-of-way. Downstream of the right-of-way and adjacent to the stream, is a forested wetland where Canada lily and Carolina quillwort grow.

Site 6: Bethel Valley Small-head Rush Wetland

Bethel Valley Small-head Rush Wetland is located on the south side of Bethel Valley Road, just west of the split of Old Bethel Valley Road and New Bethel Valley Road. It is adjacent to a Bearden Creek tributary, and extends southeast to a natural gas pipeline right-of-way. Small-head rush (*Juncus*

brachycephalus) is located here. Hembree Marsh is the only other area on the ORR in which small-head rush has been found. There are low, emergent or scrub-shrub wetlands immediately adjacent to the stream, but otherwise a white pine plantation dominates. This pine plantation could be restored to barrens.

Site 7: Middle Haw Ridge Mesic Forest

Middle Haw Ridge Mesic Forest is a part of Haw Ridge south of Bethel Valley Road. On the east side, it extends from McCoy Branch Embayment of Melton Hill Lake to the next large embayment on the west. Rare species include American ginseng (*Panax quinquefolius*) and Canada lily. This site supports oak-hickory-ash limestone woodland, oak-hickory forest, bottomland hardwoods, mesic hardwoods, and xeric hardwoods. Landscape features include steep slopes, forested rock outcrops, and mature forest.

Site 8: Bearden Creek Water Gap and Wetland

Bearden Creek Water Gap and Wetland is located at the narrow gap in Haw Ridge, through which Bearden Creek passes and the upper portion of the Bearden Creek Embayment, southeast of the gap. Canada lily is located at this site. Bearden Creek flows through a narrow, forested gap in Haw Ridge immediately upstream of the point where the stream widens into the Bearden Creek Embayment of Melton Hill Lake (Clinch River). The narrow, forested, floodplain wetland in the gap is flanked by steep slopes. On the southern end of the gap, the stream widens and forms the upper portion of the Bearden Creek Embayment. On the margin of the embayment, a narrow fringe of scrub-shrub wetland grades abruptly into an emergent wetland community. The spike rush (*Eleocharis acicularis*) grows in the emergent wetland. This species is rare in East Tennessee. A tuliptree-oak-hickory forest community type also occurs here.

Site 9: Rainy Knob

Rainy Knob is located along Melton Lake on the north and east side of Freels Bend. The rare plants, golden seal (*Hydrastis canadensis*) and Carey saxifrage (*Saxifraga careyana*), occur in this area. This area contains a scenic, rocky limestone sinkhole with a cave entrance in an area of bluffs near an embayment. This forested sinkhole provides habitat for Carey saxifrage. A small population of golden seal has been seen on the bluffs, but it has not been found recently.

0: Bull Bluff

Bluff is a steep, north- and east-facing sheer limestone cliff overlooking Melton Hill Lake. The forest communities include tuliptree-red cedar-white oak-hickory forest and Ridge and Valley calcareous mixed mesophytic forest. Rare plants occurring on Bull Bluff include Appalachian bugbane (*Cimicifuga racemosa*), northern bush honeysuckle (*Diervilla lonicera*), Carey saxifrage, goldenseal and spreading dogwood (*Aureolaria patula*). The remainder of the peninsula is largely forested and includes some open areas. The area mostly south of Bull Bluff Road supports Canada lily. The peninsula has an area in need of *Pueraria lobata* management.

1: Old Bend

Old Bend contains large hay fields that could be converted to warm season grasses harvested from ORR. This area is a nesting area for the grasshopper sparrow (*Ammodramus savannarum*). Loggerhead shrike (*Ludovicianus migrans*) and the southeastern shrew (*Sorex longirostris*) have historically occurred in this area. The tiger salamander (*Ambystoma tigrinum*), which is rare in east Tennessee, has been reported here. Wetlands occur in this area but a wetland survey has not been completed.

2: West Bluff

West Bluff is an east-facing, steep, rocky slope. There is a small cedar glade here on the top of the limestone adder's tongue fern (*Ophiglossum engelmannii*) grows. Limestone adder's tongue fern is native to east Tennessee. Carey saxifrage grows on vertical rock faces. Cancer root is known to occur here. The ORR. Appalachian bugbane is found here in mesic forest.

Subunit 2: New Zion

Location and Boundaries

New Zion comprises 2,891 acres located in the western portion of the ORR. The east boundary starts at the junction of Highway 95 and the 0800 Road. It turns east along the base of Haw Ridge to Lagoon Road and then around Haw Ridge it follows the base of the ridge while returning to Highway 95. It then follows Highway 95 north to Bethel Valley Road and then goes east on Bethel Valley Road just west of the rifle range. It then turns north across Chestnut Ridge to Bear Creek Road where it goes west along Bear Creek Road to where Grassy Creek crosses. It then follows Grassy Creek west to the reservation boundary, and then south to the Clinch River and along the river to river mile 20. It then passes north of the 0800 Research Area and back to Highway 95.

Prominent Features within New Zion Natural Area include:

- § Haw Ridge
- § Bethel Valley
- § Chestnut Ridge
- § Ish Creek
- § an unnamed sinking creek (karst feature; the creek disappears into sink hole and reappears as a spring)
- § barrens
- § forest
- § embayment and headwater wetlands

Ecological Sites of Importance include:

1. New Zion Boggy Bottoms
2. Haw Ridge Uplands and Raccoon Creek Embayment
3. Clinch Floodplain Swamp
4. Ish Creek
5. Raccoon Creek Barrens

Site 1: New Zion Boggy Bottoms

New Zion Boggy Bottoms is a headwater area of an unnamed Clinch River tributary flowing from Chestnut Ridge. Ground water seeps maintain a wetland hydrology in the boggy bottoms where various species of sphagnum moss and ferns are dominant. Pooled water can be found in parts of the area during most of the year. Rare plants associated with this area include Canada lily (*Lilium canadense*), heavy sedge (*Carex gravida*), and pink lady's-slipper (*Cypripedium acuale*).

lands and Raccoon Creek Embayment

Raccoon Creek Embayment are found along the northwest-facing slope of Haw
stone outcrops extending from Raccoon Creek to the ridge top, and the Raccoon
s across the ridge adjacent to Jones Island Road and takes in the embayment
ated to the northwest of the developed part of the 0800 Area. This site
canadensis) and Canada lily along the lower slopes near Raccoon Creek,
ve, and the Nuttall's water-weed (*Elodea nuttallii*). Other species
re monk's hood (*Aconitum uncinatum*) and fly poison (*Amianthium*
les a well-developed embayment wetland. Emergent and scrub-
e Raccoon Creek Embayment and in the nearby, unnamed stream
rub-shrub wetlands are located in the bottomland of Raccoon

long a stream that enters the floodplain of the Clinch
dwater wetland on the south slopes of Haw Ridge,
5. Canada lily occurs in a headwater wetland in a
is also present. Wetlands occur in the level areas

fish species richness including the state-
cts and drains much of the New Zion
ed hardwood forest where golden seal
with the Ish Creek flood plain. Club-
along Ish Creek.

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is a cedar-post oak barrens where open canopy and shallow limestone soils
and ecosystems dominated by little bluestem grass (*Schizachyrium scoparium*). Side-oats

grama (*Bouteloua curtipendula*) is also found here. Other species of interest include a milk vetch (*Astragalus canadensis*) and limestone adder's tongue fern (*Ophioglossum engelmannii*). This grassland barrens remnant extends into adjacent forest and a nearby loblolly pine stand. This ecosystem could be expanded to restore the barrens community to where it once occurred.

Subunit 3: Copper Ridge

Location and Boundaries

Copper Ridge comprises 3,908 acres located in the southwest area of the Oak Ridge Reservation (ORR).

The area is bounded by Melton Hill Lake from Bearden Creek Embayment along the shore to Highway 95, and then north along Highway 95 to the base of Copper Ridge. It goes around the TRU waste processing facility (HFIR facility) and then east along Melton Branch Road crossing the HPRR Access Road. It then follows the base of Copper Ridge to Bearden Creek Embayment.

Prominent Features of Copper Ridge Natural Area include:

- § Copper Ridge
- § diverse forest community types
- § numerous river bluffs associated with Melton Hill Lake
- § the highest elevation within the Reservation – 1,356 feet on Melton Hill
- § two caves and several sink holes
- § moist ravines
- § springs and seeps
- § forested wetlands.

Sites of Ecological Importance within the Copper Ridge Natural Area include:

1. Copper Ridge Cave
2. Dry River Bluffs and Caves
3. Hickory Creek Bend Bluffs
4. Melton Lake Bluffs
5. Flashlight Heaven Cave
6. Tower Shielding Bluffs

Site 1: Copper Ridge Cave

Copper Ridge Cave is an area near the Tower Shielding Facility and includes the largest known cave on the ORR. The surrounding forest is an oak-hickory-tuliptree forest type. This forest and cave provide habitat requirements for species such as the six-lined racerunner (*Cnemidophorus sexlineatus*). The microhabitat of the cave entrance could provide recovery habitat for the federally threatened Hart's-tongue fern (*Asplenium scolopendrium* var. *americanum*). The layers of sediments in the cave are noted as preserving an outstanding record of changes in the Earth's magnetic field.

Site 2: Dry River Bluffs and Caves

Dry River Bluffs and Caves support rare plants that include heavy sedge (*Carex gravida*), American ginseng (*Panax quinquefolius*), Pursh's wild-petunia (*Ruellia purshiana*), and three-parted violet (*Viola tripartita* var. *tripartita*). Forest community types found in this area include oak-hickory-ash limestone woodland, oak-hickory forest, mature white pine, mixed pine and hardwoods, and cedar forest. The landscape features in this area include caves, limestone sinkholes, steep slopes, outcrops, calcareous cliffs, moist ravines, springs, seeps, and forested wetlands.

Sites 3 and 4: Hickory Creek Bend Bluffs and Melton Lake Bluffs

Hickory Creek Bend Bluffs and Melton Lake Bluffs support many rare species including golden seal (*Hydrastis canadensis*), lesser ladies'-tresses orchid (*Spiranthes ovalis*), Carey saxifrage (*Saxifraga careyana*), Appalachian bugbane (*Cimicifuga rubifolia*), and spreading false-foxglove (*Aureolaria putula*).

The forest communities types found here include tuliptree-mixed hardwood forest with pine, Ridge and Valley calcareous mixed mesophytic forest, chestnut oak-tuliptree-northern red oak-hickory forest, chestnut oak-tuliptree-northern red oak-hickory-white oak, and hickory-red cedar-Virginia pine forest.

Site 5: Flashlight Heaven Cave

Flashlight Heaven Cave is located on the western slope of Copper Ridge between State Highway 95, White Oak Lake, and the Tower Shielding Facility access road. Two rare plants are found nearby _ American ginseng and Pursh's wild-petunia. The forest found here includes oak-hickory-ash limestone woodland and oak-hickory communities. Landscape features include the cave, steep slopes, forested rock outcrops, and mature forests. Flashlight Heaven Cave is believed to connect to Copper Ridge Cave.

Site 6: Tower Shielding Bluffs

Tower Shielding Bluffs is located along the shore of Melton Lake southeast of the Tower Shielding Facility. Rare species occurring here include spreading false-foxglove and Carey saxifrage. This is a steep east-facing slope overlooking Melton Hill Lake. The overstory consists primarily of oaks and hickories with some mesic species such as sugar maple (*Acer saccharum*).

Subunit 4: Blackoak Ridge

Location and Boundaries

Blackoak Ridge comprises 2,929 acres located in the northern part of the Oak Ridge Reservation. The Blackoak Ridge natural area has two sections: East Blackoak Ridge and West Blackoak Ridge. The east and west sections are separated by the Poplar Creek water gap and Blair Road.

East Blackoak Ridge Section

The boundary for the southern part of the East Blackoak Ridge section includes the floodplain "exclusion area" as described in the Parcel ED-1 Mitigation Action Plan. This section is roughly bounded by Highway 95 along its south border. The east, north, and west sides are bounded by the ORR boundary, but only to the flood plain of Poplar Creek along the west side. The boundary then follows the exclusion area boundary along Poplar Creek to the base of McKinney Ridge where it goes west along the base of the ridge just east of a quarry. It then goes east along the top of the ridge to the east side of the power lines where it then goes south along the east side of the power lines. It follows one of the power lines where it turns east to the base of McKinney Ridge. It then goes back to the flood plain exclusion area.

West Blackoak Ridge Section

Blair Road, starting near the confluence of Poplar Creek and East Poplar Creek bounds this section on the east. The north boundary is the ORR boundary running to the power lines on the west side, then it runs southeast along the power line corridor to the first power line intersection. It then turns northeast along the power line and then east along the power line to Dyllis Orchard Road. It then follows Dyllis Orchard Road southeast to Blair Road.

Blackoak Ridge Natural Area includes the following forest types:

- § southern red oak-tuliptree-white oak-pine-hickory;
- § tuliptree-southern red oak-white oak; and
- § northern red oak-tuliptree-white oak.

The east and west sections of the Blackoak Ridge natural area include some pine plantations that will eventually be replaced natural communities, either through forest management or natural succession. Some invasive species exist within the natural area, including kudzu in the west portion and privet in the forested wetlands of the east section. Control and management of these invasive species is recommended.

Prominent Features of Blackoak Ridge Natural Area include:

- § East Fork Poplar Creek Flood Plain
- § Blackoak Ridge
- § McKinney Ridge
- § a mixed hardwood-native pine forest
- § a large forested wetland
- § river bluffs

Sites of Ecological Importance within Blackoak Ridge Natural Area include:

1. Poplar Creek Bluff
2. McKinney Ridge Hemlock-Rhododendron Forest
3. East Fork Poplar Creek Floodplain
4. Blackoak Ridge Forest
5. Leatherwood Bluff

Site 1: Poplar Creek Bluff

Poplar Creek Bluff is a steep, southwest-facing slope in the Poplar Creek Water Gap that bisects Blackoak Ridge. It is located a short distance upstream from the East Fork Poplar Creek confluence with Poplar Creek. Small limestone cliffs occur near the stream. Many species that are unusual within the ORR occur here, including hemlock (*Tsuga canadensis*), rhododendron (*Rhododendron maximum*), fringe tree (*Chionanthus virginicus*), spider lily (*Hymenocallis occidentalis*), and mock orange (*Philadelphus hirsutus*). Pink lady's-slipper (*Cypripedium acaule*) and spreading false-foxglove (*Aureolaria patula*) also occur at this site. This site was one of the eight original Registered State Natural Areas established in 1985 at the ORR.

Site 2: McKinney Ridge Hemlocks

McKinney Ridge Hemlocks is found northeast of the East Tennessee Technology Park (ETTP) facilities on the slopes of McKinney Ridge overlooking Poplar Creek. Spreading false-foxglove and whorled horse-

balm (*Collinsonia verticillata*) are found here. This site is the most extensive area of hemlocks and rhododendrons on the ORR and represents a rare forest community type in the Ridge and Valley Province. Additionally, two small cave entrances are found near Poplar Creek. This also was one of eight original Registered State Natural Areas established at ORR in 1985.

Site 3: East Fork Poplar Creek Floodplain

East Fork Poplar Creek Floodplain is included in the east section of the Blackoak Ridge natural area and extends along the creek parallel to Highway 95 to the confluence with Poplar Creek. The floodplain is an exclusion from the Horizon Center development. This floodplain also serves as a connector between McKinney Ridge and the main body of the east section of the natural area. Rare species that occur here include golden seal (*Hydrastis canadensis*), American ginseng (*Panax quinquefolius*), the southeastern shrew (*Sorex longirostris*), and pink lady's-slipper. This area includes floodplain hardwood forest (sycamore, ash, box elder) with an abundant understory of giant cane (*Arundinaria gigantea*) in places. Floodplain forests with canebreaks are rapidly disappearing in the southeastern U.S. because of development. A sycamore grove that includes specimens of very large, hollow trees is also found within the floodplain. This site includes rare plant communities in adjacent upland areas. Among these rare communities are cedar barrens and beech-maple forest. Small tributaries in the floodplain contain the Tennessee dace (*Phoxinus tennesseensis*).

Site 4: Blackoak Ridge Forest

Blackoak Ridge Forest is northwest of Lambert's Quarry and is a large forested area of mature mixed hardwoods and pines. Much of the forest is oak-hickory-tuliptree, but native pine forests of shortleaf pine (*Pinus echinata*) and white pine (*Pinus strobus*) dominate some areas. This large forested area includes commercially exploited pink lady's-slipper. The white-topped sedge (*Rhynchospora colorata*) occurs at the edge of the pond in a quarry located within the site. This is the only confirmed site for this sedge in Tennessee.

Site 5: Leatherwood Bluff

Leatherwood Bluff is a site west of Blair Road and the Poplar Creek Water Gap through the ridge and extending southwest along the ORR boundary on top of Blackoak. This is a largely mature forest of hardwoods and hemlocks with an understory of rhododendron, maple-leaf viburnum (*Viburnum*

acerifolium), buffalo-nut (*Pyrularia pubera*), and leatherwood (*Dirca palustris*). This understory assemblage is not found elsewhere on the ORR and, indeed, is rare within the Ridge and Valley physiographic province. The site is on a steep north-facing slope overlooking Poplar Creek in an area of limestone outcrops and three cave entrances. At least four plant species are found here, but nowhere else on the ORR. These are a milkweed (*Asclepias quadrifolia*), purple sedge (*Carex purpurifera*), buffalo-nut, and Vasey's trillium (*Trillium vaseyi*).

Subunit 5: Pine Ridge-Bear Creek Valley

y comprises 4,584 acres. This natural area is bounded on the west side by change with Highway 58. It then goes south to the power line at the base of the power line to the crest of Pine Ridge. It then goes east along the crest of ten south along the highway where it bears left at the first intersection and Bear Creek Road going east to the north entrance of the Spallation Neutron t goes south along the SNS entrance road, and then follows the north Roane/Anderson county line. It then goes north to the crest of Pine Ridge, s along the crest of the ridge, and then south to the power line. It then he power lines that run north-to-south across Pine Ridge, where it then Pine Ridge to the ORR boundary. It then follows the ORR boundary west

Oak Ridge State

Pine Ridge-Bear Creek Valley Natural Area include:

Fork Ridge
is, marshes, and forested wetlands
orest

within the Pine Ridge-Bear Creek Valley Natural Area include:

nd
loodplain
est

nd

ted in the Bear Creek floodplain immediately downstream of the Pine
; a large forested wetland that contains abandoned stream channels or
e species include the tubercled rein-orchid (*Plantanthera flava* var.
tium aquaticum), which is an uncommon wetland plant of the Ridge

- a. This site is one of eight original Registered State Natural Areas

floodplain

in extends eastward about 0.6 miles from State Highway 95 at an
are plants at this site include the tubercled rein-orchid and Canada lily
ty types found on this site include oak-hickory forest, red maple-
rdwood forest, a limestone sinkhole, forested wetland, scrub-shrub
brakes.

north slope of Chestnut Ridge extending from slightly east of the
o approximately one mile west of the county line. Rare plants that
id, American ginseng (*Panax quinquefolius*), and whorled horse-
mmunity types found on this site include mesic hardwoods, mixed
t, and meadows. Landscape features include forested wetlands,
ature forests, and rock outcrops. Tennessee dace (*Phoxinus*
ciated section of Bear Creek.

on of East Fork Ridge that is bounded on the east by Midway
oad. Rare plants here include golden seal (*Hydrastis canadensis*)
l into three parts:

ek tributary and its watershed: Most of this section is a moist,
y species, including American beech (*Fagus grandifolia*), sugar
n basswood (*Tilia americana*) on north- and east-facing slopes.
oodland sedges and spring wildflowers. A large population of
lily has been seen here, but not recently. Tennessee dace is also

in the Bear Creek East Tributary 3 watershed are found on the
ed wetlands in the sub-tributary bottomlands. One of these
turbed and the other has a small population of Canada lily.

is on the west side of the site. There are non-calcareous (sandstone) This is the largest area of this type of habitat on the ORR.

upper reaches of eight headwater tributaries of Bear Creek. Much land where red maple, green ash, and ironwood are common. This five exotic Nepal grass (*Microstegium vimineum*). In the tributary stream of the power line right-of-way and emergent or scrub-shrub lily occurs in this area. Purple fringeless orchid is found in two lines. Northern tubercled rein-orchid is found in one emergent lands, one of which is east of the waste burial ground. Nodding and only at this site on the ORR.

f the Oak Ridge State

highway 95 and Old County Road. Rare species at this location small-head rush (*Juncus brachycephalus*), four-toed salamander and the southeastern shrew (*Sorex longirostris*). This wetland sub, and forested wetland located in a wide level area on the tributary 3. It is a unique wetland on the ORR because of the site, and rare species. The water source appears to be perennial water, no hydrological studies have been done in this area to verify the year standing water can be found in the herbaceous portions these wetlands do not appear to be influenced by stream flow. Water flag (*Acorus americanus*) is one of the dominant species in the edges of the marsh under shrubs while small-head rush occurs, land. This site was also one of eight original Registered State

Appendix A

State Listed Species in the Five Subunits of the Oak Ridge State Natural Area

Table 1. State Listed Species in the Five Subunits of the Oak Ridge State Natural Area

Species / Subunit	Subunit 1 Walker	Subunit 2 Zion	Subunit 3 Copper	Subunit 4 Blackoak	Subunit 5 Pine
Spreading false-foxglove		+	+	+	
Heavy sedge		+	+		
Appalachian bugbane	+		+		
Pink lady's-slipper		+		+	+
Tall larkspur	+				
Northern bush-honeysuckle	+				
Nuttall's waterweed		+			
Mountain witch-alder	+				
Golden seal	+	+		+	+
Canada lily	+				+
Fen orchid					+
American ginseng	+		+	+	+
Tuberculed rein-orchid					+
Pursh's wild-petunia			+		
Three-parted violet			+		
Four-toed salamander					+
Small-head rush	+				+
Southeastern shrew	+			?	+
Tennessee Dace		+		+	+

Appendix B

Map of the Oak Ridge Reservation State Natural Area