



## **Oak Ridge Barrens Natural Area: History, Significance, and Management**

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**Tennessee Citizens for Wilderness Planning** (TCWP) is dedicated to achieving and perpetuating protection of natural lands and waters by means of public ownership, legislation, or cooperation of the private sector. While our first focus is on the Cumberland and Appalachian regions of East Tennessee, our efforts may extend to the rest of the state and the nation. TCWP's strength lies in researching information pertinent to an issue, informing and educating our membership and the public, interacting with groups having similar objectives, and working through the legislative, administrative, and judicial branches of government on the federal, state, and local levels.

Tennessee Citizens for Wilderness Planning, founded in 1966 and based in Oak Ridge, issues a bimonthly newsletter on environmental issues, which is included in the membership cost. For more information, visit our website: [www.tcwp.org](http://www.tcwp.org) or call (865) 481-0286.

TCWP welcomes comments on this report and all other projects undertaken to meet its mission.

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# OAK RIDGE BARRENS NATURAL AREA: HISTORY, SIGNIFICANCE, AND MANAGEMENT

## 1. Introduction

Oak Ridge Barrens is a natural area preserved in 1988 by agreement of City of Oak Ridge, State of Tennessee, and Tennessee Citizens for Wilderness Planning (TCWP). Native grasses and other perennials that dominate two pockets of prairie vegetation are typical of species, such as big bluestem grass (*Andropogon gerardii*), found in prairies north and west of Tennessee. The natural forces of plant succession in these pockets, called the ellipse and the triangle (Figure 1), were arrested historically by drought, browsing, and fire, thus preserving their prairie characteristics on this gentle south-facing slope over shallow, limestone-derived soil. Oak Ridge Barrens supports at least two rare or endangered plant species in Tennessee, prairie goldenrod (*Solidago ptarmicoides*) and Torrey's mountain mint (*Pycnanthemum torrei*).

This report describes how Oak Ridge Barrens became a natural area, its educational and scientific values, and the steps necessary to enhance the ecological integrity of the plant communities and to provide continuing legal protection for the entire integrated site. Persons associated with the barrens are named in various sections to underscore their importance. Governments and private organizations can lend support for a natural area, but nothing is accomplished without the intellectual, political, and physical efforts of individuals.

## 2. Natural History of Cedar Barrens

Barrens are small woodland openings distributed across the southeastern United States in which the vegetation is similar to that of the Tall Grass Prairie in the Midwest and Great Plains. The term "cedar barrens" can be misleading because it suggests to the public that cedar trees are of primary interest. Eastern red cedars (*Juniperus virginiana*), which botanically are junipers rather than cedars, are common trees that often dominate the landscape surrounding the areas of prairie vegetation. As they encroach onto these areas, they exclude the shade-intolerant prairie species. These small and isolated plant communities are sometimes called prairie relicts or remnants, but these terms, while less ambiguous than cedar barrens, also can be deceiving because the prairie pockets might not represent large prairies once found in the region.

Cedar barrens are successional in that their species composition is subject to the natural transition of plant succession by which shade-tolerant woody species come to dominate the landscape. Barrens have been maintained historically by periodic drought, especially on shallow or rocky soils; browsing of woody vegetation by large animals; and by fire, both naturally occurring and intentionally set for a variety of reasons.

Without natural forces or artificial efforts to arrest plant succession, the grasses and forbs in the ellipse and the triangle would give way to woody species, and the entire Oak Ridge

Barrens eventually would support an oak-pine canopy like the one that dominates the southeastern quadrant of the tract today. For ecological and aesthetic reasons, fire is the preferred medium to control succession, and its use might be possible here in consultation and cooperation with the Oak Ridge Fire Department.

DeSelm, Whitford, and Olson (1969) briefly described the soil and vegetation of what is now Oak Ridge Barrens as site 4 in their survey of cedar barrens in the Oak Ridge area. DeSelm (1989) later summarized the wealth of literature on Tennessee cedar barrens, including the findings of his extensive investigations and research.

### **3. Preservation History of Oak Ridge Barrens**

Unfortunately, we cannot ascertain how long this cedar barrens has existed, but early settlers described similar prairie-like vegetation patterns throughout eastern Tennessee. Although the site has been disturbed by human activities, as noted below, the official Oak Ridge town map of September 1944 shows the site to be undeveloped, as does a November 1950 aerial photograph.

In 1987, the Oak Ridge Environmental Quality Advisory Board (EQAB) recommended that City Council rezone this city-owned tract to Greenbelt District in response to a purchase offer by Crown American Corp., which planned to construct a mall immediately west of it. EQAB emphasized that (a) greenbelt would provide an effective buffer between the proposed mall and the school now called Jefferson Middle School and nearby residential areas, (b) Oak Ridge at large would benefit from the balance of natural woodlands and commercial development, (c) the school's science classes could continue to use the site as an outdoor laboratory, and (d) greenbelt zoning would protect one of Tennessee's cedar barrens, which are recognized worldwide as unique plant communities but are vanishing in the face of widespread development. EQAB also noted that these acres, even if purchased by the developer, would not be included in the mall, which, in fact, never was built.

EQAB's recommendation to City Council led to a call for public hearings, and a Cedar Barrens Rally on January 30, 1988, provided an opportunity to inform the public of the site's long-term value and to mobilize support for its preservation. The volunteers most active in undertaking this initiative included Stanley Auerbach, Charles Coutant, Maureen Cunningham, Virginia Dale, Larry Pounds, and Lee and William Russell.

Their campaign succeeded. Oak Ridge Barrens was preserved in 1988 by agreement among City of Oak Ridge, owner of the site; Tennessee Department of Conservation, now Tennessee Department of Environment and Conservation (TDEC), which registered the site under the Tennessee Natural Areas Preservation Act of 1971; and TCWP, a well recognized, not-for-profit conservation organization that assumed lead responsibility for managing the barrens. A copy of the agreement appears as Attachment A to this report.

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Tennessee's legislature enacted the Tennessee Natural Areas Preservation Act of 1971 to protect "areas possessing scenic, scientific, including biological, geological, and/or recreational values, and which are in prospect and peril of being destroyed or substantially diminished" (TCA

11-14-102). There are currently 62 natural areas of varying size in state ownership following legislative designations over the years. In addition, the 1971 statute wisely provided for a “registry of scenic or natural-scientific areas that are not in state ownership and whose owners have agreed to maintain them in a natural state, in accordance with such rules and regulations promulgated by the commissioner” (TCA 11-14-112). Oak Ridge Barrens is one of about 50 natural areas on this registry. Governor Sundquist affirmed the administration’s commitment to preservation of natural areas by declaring the week of April 8-14, 2002, as the first State Natural Areas Week. The attributes and benefits of Oak Ridge Barrens to future generations clearly qualify it as a natural area (Moir, 1972).

City Council included the tract within the Greenbelt District that preserves publicly-owned property as nearly as practicable in its natural state “to enhance the atmosphere, beauty, and well-being of the community.” Oak Ridge encourages walking and hiking in greenbelts and limits other uses primarily to accepted forestry practices necessary to maintain public safety (City of Oak Ridge Zoning Ordinance 6-700-G). TCWP and TDEC agreed to maintain the favorable environment of Oak Ridge Barrens for the rare and significant plant species found there.

This three-party agreement is a remarkable achievement made possible by the diligent efforts of many individuals, and all parties to it have met their agreed-upon responsibilities. Still, persons concerned about the long-term preservation of Oak Ridge Barrens should keep in mind that the three parties can modify the agreement and that any party can cancel it with only 30 days notice to the other two.

#### **4. Progress Since 1988**

Hundreds of interested persons of all ages have visited Oak Ridge Barrens in the past 15 years. Science teachers at Oak Ridge High School and Jefferson Middle School conduct classes on the site (Fred Holtzclaw and Pat DeRoos, respectively), instructors at Roane State Community College explore the area with their biology and ecology classes (Linda Edwards and Melissa Weaver), students at Oak Ridge Institute for Continued Learning toured the barrens on an ecological field trip (Tom Thomas), and TCWP has sponsored nature walks through the barrens (Larry Pounds). These and similar demonstrations of the site’s value should be documented, as suggested below.

The 1987 management plan, which TCWP prepared even before Tennessee recognized the site as a natural area, set out three related short-term and four specific long-term goals.

*Short-term:* Protection, fencing, and clean-up. The area had been used for years as an informal dump for construction and landscaping debris, and off-road vehicles had damaged pathways and surrounding areas. The plan called for marking the boundaries, posting signs, and if necessary constructing vehicle barriers. TCWP wanted to delineate the area and have a fence between the site and the proposed mall, while at the same time encouraging public access. The plan included a schedule for removing accumulated trash and inspecting the area for subsequent illegal dumping.

TCWP, with the cooperation of Oak Ridge, markedly improved the area by working forthrightly to meet these goals. A split-rail fence now runs the width of the site along Fairbanks Road, and a rustic sign at the triangle prominently identifies OAK RIDGE BARRENS as a REGISTERED STATE NATURAL AREA. Another split-rail fence, not in as good repair, demarcates about one-half of the site’s eastern boundary north of the ball field, and a chain-link fence separates the entire western edge of the site from the area available for commercial development.

A chain-link fence also runs east-west across the site where it narrows west of the school, evidently marking the northern end of parcel 585.03, as discussed in section 5 below. The ball field is separated from the barrens by a separate chain-link fence. The site now is free of trash, although scattered pieces of glass mark former dump sites, and there is no evidence of recent use by off-road vehicles. Litter in the interior of the site is not a problem, but it can be at times near the ball field.

*Long-term:* (a) Develop foot trails with informative signs posted at two entry points; (b) maintain the site, trails, and fencing on semiannual work days; (c) conduct a detailed vegetation survey of the site for scientific, management, and educational purposes; and (d) identify and control non-native species that threaten the existence of native cedar barrens species.

(a & b) One main trail crosses the site, starting at an opening in the fence at the triangle (Figure 1), proceeding to and along the southeastern edge of the ellipse, and ending in two places just north of the ball field. It apparently is used primarily by students walking and biking between home and school. The shallow soil has been eroded to underlying rock through the triangle, and the trail is eroded to a lesser degree on slopes immediately north of the triangle and between the ellipse and ball field. Because parking is limited along Fairbanks Road, most visitors use the parking lot by the school and enter the barrens from the east. This trail is not along any routes envisioned by Oak Ridge Greenways, but it might be extended through the length of the site and adjacent greenbelt to connect with a nature trail recently developed in the woods north of the school. Semiannual workdays have not been scheduled in recent years.

(c) This goal remains open and is discussed in the following section.

(d) Decaying 3-6 cm stumps of severed Eastern red cedars provide evidence of prior vegetation management, perhaps by volunteers when the area first was set aside or during a late 1997 work session organized by Maureen Cunningham and Fred Holtzclaw for Oak Ridge High School students. Tom Thomas in autumn 2002 removed 196 invading plants 0.25 to 2 m tall from the ellipse (131 Eastern red cedars, 57 Virginia pines, 4 persimmons, 2 privets, and 2 multiflora roses) and 239 from the triangle (97 Eastern red cedars, 58 Virginia pines, 44 persimmons, 31 privets, and 9 multiflora roses).

## **5. Management Strategies**

The entire Oak Ridge Barrens cannot be maintained in its pristine condition, with little or no human influence, but its prairie pockets can be managed to retain their historical characteristics (Povilitus, 2002), with the surrounding landscape being managed as a buffer zone. This strategy substitutes cultural controls for the fire and other forces that arrested plant succession in earlier centuries. The prairie pockets will be maintained and perhaps enlarged by removing invasive species and encroaching native species, and invasive species will be controlled, if not eliminated, in the surrounding buffer zone. Isolated prairie plants scattered throughout the buffer also must be preserved.

Invasive species are introduced or escaped exotic species that displace native ones as they spread without natural biological controls across the landscape. The ones of greatest concern in Oak Ridge Barrens are autumn olive (*Elaeagnus umbrellata*), bicolor lespedeza (*Lespedeza bicolor*), bush honeysuckle (*Lonicera* spp.), mimosa (*Albizia julibrissin*), multiflora rose (*Rosa multiflora*), privet (*Ligustrum* spp.), and sericea lespedeza (*Lespedeza cuneata*). The three encroaching native species in the ellipse and triangle that produce the most shade are Eastern redcedar, persimmon (*Diospyros virginiana*), and Virginia pine (*Pinus virginiana*). Prolific seed-producing individuals of the two conifers abound on the site.

Hand tools, including a woody-plant wrench to uproot multiflora rose, shrubs, and small deciduous trees, are adequate. Conifers do not sprout and can be severed near ground level. *Sericea lespedeza* recently has become well established in Oak Ridge Barrens, especially immediately south of the ellipse and along the eastern edge by the ball field, and its control will require periodic use of herbicides. Tennessee Valley Authority has demonstrated success in using herbicides containing triclopyr to control this aggressively invasive species on the Worthington Cemetery Cedar Barren Ecological Study Area, which it manages in cooperation with the City of Oak Ridge and with active participation by TCWP. A state-certified pesticide applicator should oversee any use of pesticides on Oak Ridge Barrens.

***Action Items:***

(a) Initiate a program of work sessions to meet the primary objectives of protecting rare plants and eliminating invasive and encroaching native species in and near the two prairie pockets and controlling invasive species in the surrounding buffer zone. Trampling by too many volunteers in the ellipse and triangle can offset their efforts to protect the native species. If students are to be encouraged to participate, the work sessions could be scheduled for Wednesday afternoons, which also would make it easier than on weekends to obtain any needed assistance in chipping and hauling shrubs and trees removed from the site.

(b) Publish a paper, *Vegetation of Oak Ridge Barrens Natural Area* or similar title, in a peer-reviewed botanical journal to serve as a benchmark for conducting scientific investigations (including those of the site's value as a gene reservoir) and a resource for educating members of present and future generations. It also would recognize the deserved standing of Oak Ridge Barrens among cedar barrens in the Southeast.

(c) Establish and mark firm boundaries for the barrens. The boundaries and acreage of the site are uncertain. City correspondence in 1987 and the 1988 agreement specifically state that parcel 585.03 would be designated the Oak Ridge Barrens. A map attached to the agreement states that parcel 585.03 consists of 5.76 acres, the agreement itself describes the area as "approximately seven acres," and the 1988 management plan says it "occupies 7.9 acres."

(d) Prepare a one-page document or brochure to educate students and others who visit Oak Ridge Barrens and an information packet for teachers, which could include a copy of DeSelm's 1989 review article and, later, a copy of the published vegetation survey.

(e) Establish a permanent archive for all documents associated with the Oak Ridge Barrens and initiate a registry of work performed, including detailed records of the "what, when, and where" of vegetation controls.

(f) Install a sign by the ball field where the trail enters the site that identifies it as a protected natural area.

**6. Responsibilities**

The TCWP president with advice from the board will appoint a TCWP member as volunteer site steward with overall responsibility to implement the action items. Other volunteers can be assigned responsibilities for individual action items. The steward will (a) submit periodic

written reports to the TCWP board that provide a continuous chronological record of all actions taken to address the action items, (b) suggest modifications or additional action items, and (c) work with state and city officials to secure the financial and other resources needed to satisfy the action items and to provide legal protection for the site.

The steward should notify the City of Oak Ridge and TDEC of plans to perform other than routine work in the barrens: Josh Collins, Director of Recreation and Parks Department, [jcollins@ci.oak-ridge.tn.us](mailto:jcollins@ci.oak-ridge.tn.us), and Brian Bowen, Natural Areas Coordinator, [bbowen@mail.state.tn.us](mailto:bbowen@mail.state.tn.us).

## 7. Conclusions

Future generations will not enjoy or benefit from Oak Ridge Barrens unless preceding generations protect the site legally and the species composition physically. Plant succession in the ellipse and triangle must be arrested through cultural activities to prevent the incursion of species that will displace forever the native barrens grasses and forbs through shading and overcrowding. The areas of the tract surrounding these prairie pockets must be managed in conjunction with them as a buffer zone into which they might be encouraged to expand.

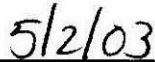
The tripartite agreement that preserves the barrens can be negated with only 30 days notice, and Oak Ridge through rezoning can remove the site from greenbelt protection. Persons who realize that Oak Ridge Barrens is not a mere botanical curiosity will experience no shortage of opportunities to answer the simplistic and politically charged question, "Well, what use is it?"

## Literature Cited

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APPROVED:

  
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Cynthia M. Kendrick, President

  
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Date

## Oak Ridge Barrens Natural Area



Figure 1. This autumn 2000 aerial photograph of Oak Ridge Barrens Natural Area shows Jefferson Middle School and a ball field on the east, Fairbanks Road to the southeast, Briarcliff Avenue and a parking lot for Roane State Community College on the west, and Home Depot under construction to the northwest. The two prairie pockets--triangle and ellipse--display the shapes for which they are named. Deciduous trees had lost much of their foliage, including the mature oaks found on the southeastern portion of the tract. The area between the barrens and Briarcliff Avenue is zoned for general commercial use. A power line traverses the southwestern corner. Note the conical shadows cast by Eastern red cedars. TCWP thanks Kahla Gentry of the Oak Ridge Community Development Department for use of this photograph.