

# Oak Ridge Reservation Planning: Integrating Multiple Land Use Needs

May 2008



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# **Oak Ridge Reservation Planning: Integrating Multiple Land Use Needs**

May 2008

Prepared by  
Oak Ridge Office  
U.S. Department of Energy

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# Acronyms and Abbreviations

AMSE	American Museum of Science and Energy
ATDD	Atmospheric Turbulence and Diffusion Division
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CIP	comprehensive integrated planning
CROET	Community Reuse Organization of East Tennessee
DECC	Distributed Energy Communications and Controls
DOE	U.S. Department of Energy
EM	Environmental Management Program (DOE)
EPA	U.S. Environmental Protection Agency
ERA	emergency response area
ETTP	East Tennessee Technology Park
FACE	free air CO <sub>2</sub> enrichment
FY	fiscal year
IFC	Integrated Field Challenge
LCAM	Life Cycle Asset Management
NEON	National Ecological Observatory Network
NNSA	National Nuclear Security Administration
NOAA	National Oceanic and Atmospheric Administration
NSF	National Science Foundation
ORAU	Oak Ridge Associated Universities
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Office (DOE)
ORR	Oak Ridge Reservation
ORRMT	Oak Ridge Reservation Management Team
OST	Office of Secure Transportation
R&D	research and development
ROD	Record of Decision
RPAM	Real Property Asset Management
SNS	Spallation Neutron Source
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
TWPC	Transuranic Waste Processing Center
TWRA	Tennessee Wildlife Resources Agency
TYSP	10-year site plan
UT	University of Tennessee
YSO	Y-12 Site Office



## Executive Summary

The Oak Ridge Reservation (ORR) is a unique resource for the U.S. Department of Energy (DOE) in addressing its technology and national science missions. DOE's Oak Ridge Office (ORO) is committed to protecting its land inventory to meet the requirements of existing and future DOE mission-related facilities and programs. Protection of the land, facilities, and environment is also necessary to ensure continuing benefits and economic growth for the region through enhanced DOE missions. Thus, land use decision making is a crucial factor in ensuring the viability and availability of land necessary to accomplish those missions (DOE 2003).

This document updates the 1999 *Comprehensive Integrated Planning Process for the Oak Ridge Operations Sites* (ORNL 1999), focusing on only the Oak Ridge site. It addresses reservation land outside developed site areas and facilities and the process used by DOE in making land-use-change decisions. This plan complements the ORR 10-year site plan (TYSP) (DOE 2007a) and will be updated as needed. Annual TYSPs for the facilities address site and facility needs within the developed areas.

The ORR is home to three major facility complexes: the East Tennessee Technology Park (ETTP), the National Nuclear Security Administration's Y-12 National Security Complex, and Oak Ridge National Laboratory (ORNL). Also located in the city of Oak Ridge are the Oak Ridge Institute for Science and Education (ORISE) and the American Museum of Science and Energy. ORO is responsible for programs at ETTP, ORISE, and ORNL. The 33,699-acre reservation is located in Roane and Anderson counties in East Tennessee, mostly within the corporate limits of Oak

Ridge. Satellite imagery shows that the ORR is a large and nearly continuous island of forest within a landscape that is fragmented by urban development and agriculture.

For more than 60 years, government missions and operations have been the primary factors in development of the ORR complex. From 1942 through 1948, the federal government acquired approximately 54,998 acres to build facilities for large-scale production of fissionable material for the world's first nuclear weapons. After 1948, an additional 3,584 acres were acquired for related mission needs. Of the original 58,582 acres, 24,883 have been transferred, with 33,699 acres remaining as the ORR.

The land on the ORR is intensively used for multiple purposes to meet the mission goals and objectives of DOE. Uses of the land area surrounding the developed sites include safety, security, and emergency planning; research, demonstration, and education; cleanup and remediation; environmental regulatory monitoring; wildlife management; biosolids land application; protection of cultural and historic resources; wildland fire prevention; land-stewardship activities; use and maintenance of reservation infrastructure; and activities in public areas.

The combination of a large land area with complex physical characteristics and diverse natural resources has provided a critical foundation for supporting DOE's environmental research mission, as well as the ability to build leading-edge facilities such as the Spallation Neutron Source.

Future uses of the ORR will, in most cases, expand and build on current land uses, not replace them. These uses will include field

research areas and facilities (environmental research, security, and monitoring systems), environmental management and long-term stewardship areas (remediated, restored, and protected contaminated areas), infrastructure improvements (communications, utilities), land-responsibility actions (emergency

response, wildland fire prevention and response, and conservation easements), integrated management of natural resources, and additional public and educational opportunities (greenways and stakeholder involvement). Current land and facility uses are also expected to continue.

# 1. Introduction

The Oak Ridge Reservation (ORR) is a unique and irreplaceable resource for the U.S. Department of Energy (DOE) in addressing its technology and national science missions. DOE's Oak Ridge Office (ORO) is committed to protecting its land inventory to meet the requirements of existing and future DOE mission-related facilities and programs. Protection of the land, facilities, and environment is also necessary to ensure continuing benefits and economic growth for the region through enhanced DOE missions. Consequently, land use decision making represents a crucial factor in ensuring the viability and availability of land necessary to meet DOE's needs (DOE 2003).

The ORR, encompassing 33,699 acres of federally owned land and three DOE installations, is located in Roane and Anderson counties in East Tennessee, mostly within the corporate limits of the city of Oak Ridge (population 27,387 according to the 2000 census). The ORR's boundary lies in the southern and southwestern quadrants of the city limits. Satellite imagery shows that the ORR is a large and nearly continuous island of forest within a landscape that is fragmented by urban development and agriculture (Fig. 1).

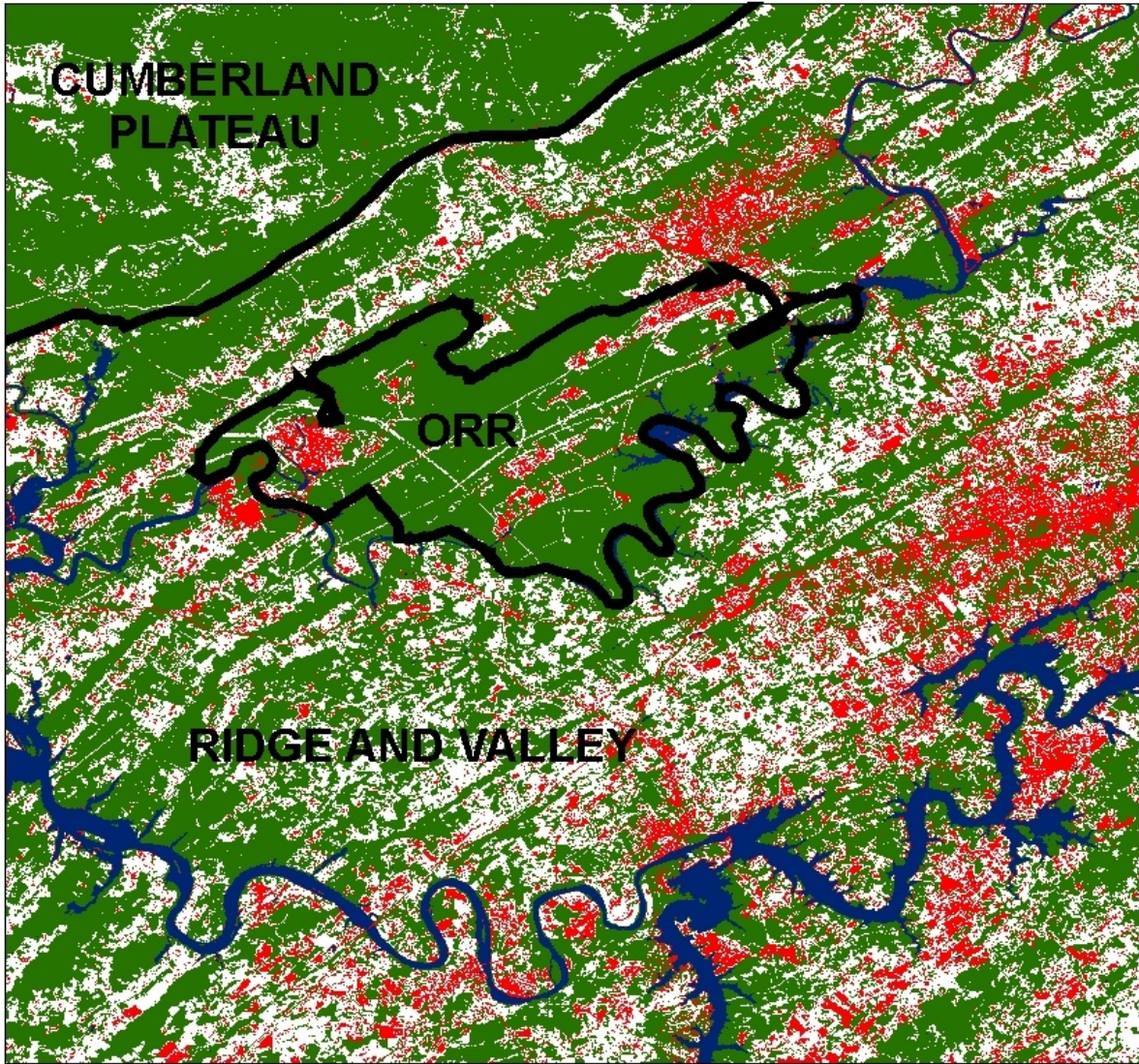
About 15 miles to the east of the reservation is the city of Knoxville (population 173,850 based on the 2000 census). While the largest number of ORR employees reside in these two cities, the entire area from which ORR facilities draw their total labor force of approximately 357,000 employees includes more than 15 counties. This labor force is

highly diverse and includes many people specially trained for production or high-technology-oriented industry.

The ORR is home to three major facility complexes: the East Tennessee Technology Park (ETTP), the National Nuclear Security Administration's (NNSA's) Y-12 National Security Complex, and Oak Ridge National Laboratory (ORNL). Also located in the city of Oak Ridge are the Oak Ridge Institute for Science and Education (ORISE) and the American Museum of Science and Energy (AMSE). ORO is responsible for programs at ETTP, ORISE, and ORNL.

## 1.1 DOE Land Use Planning Policy

DOE land use planning policy is set by DOE Policy 430.1, "Land and Facility Use Planning," dated July 9, 1996. This policy states, "It is Department of Energy policy to manage all of its land and facilities as valuable national resources. Our stewardship will be based on the principles of ecosystem management and sustainable development. We will integrate mission, economic, ecological, social and cultural factors, in a comprehensive plan for each site that will guide land and facility use decisions. Each comprehensive plan will consider the site's larger regional context and be developed with stakeholder participation. This policy will result in land and facility uses which support the Department's critical missions, stimulate the economy, and protect the environment."



**Class Names**

- Water
- Agricultural Land
- Urban Land
- Forest Land

**Scale**



**Fig. 1. Regional land-cover map prepared from a July 3, 2006, Landsat Thematic Mapper image.**

DOE Order 430.1B, “Real Property Asset Management” (RPAM), is the latest guidance in the DOE planning and asset-management effort. This order requires the development of 10-year site plans (TYSPs) to gather information on all aspects of DOE sites, including not only land use plans, but also facilities and maintenance issues (DOE 2007a; ORNL 2007). The information in the TYSPs enables managers at DOE headquarters to better understand the issues at each site within the DOE complex. The TYSPs are updated annually to support budget and activity proposals.

The DOE-ORO planning document, *Comprehensive Integrated Planning Process for the Oak Ridge Operations Sites* (ORNL 1999), will be updated to better reflect current conditions and plans. Much of the information in the 1999 plan has been updated and included in the annual TYSPs (DOE 2007a; ORNL 2007). This plan, however, will pull together updated information to provide a better perspective on current uses, land management actions, future use plans, and stakeholder inputs. The intent is for the land-planning-process document to be updated every 5 years, with changes in intervening years reflected in the shorter TYSP annual updates.

## 1.2 Oak Ridge Reservation Vision

Future uses of the ORR will, in most cases, expand and build on current land uses, not replace them. Future uses will include field research areas and facilities (environmental research, security and monitoring systems); environmental management and long-term stewardship areas (remediated, restored, and protected contaminated areas); infrastructure improvements (communications, utilities); land responsibility actions (emergency

response, wildland fire prevention and response, conservation easements); integrated management of natural resources; and additional public and educational opportunities (greenways, stakeholder involvement).

## 1.3 ORR Mission Activities

For more than 60 years, government missions and operations have been the primary factor in development of the ORR complex. From 1942 through 1948, the federal government acquired approximately 54,998 acres to build facilities for large-scale production of fissionable material for the world’s first nuclear weapons. After 1948, an additional 3,584 acres were acquired for related mission needs. Of the original 58,582 acres, 24,883 acres have been transferred, with 33,699 acres remaining as the ORR.

The land on the ORR is intensively used for multiple purposes to meet DOE’s mission goals and objectives. Uses of the land area surrounding the developed sites include safety, security, and emergency planning; research and education; cleanup and remediation; environmental regulatory monitoring; wildlife management; biosolids land application; protection of cultural and historic resources; wildland fire prevention; land-stewardship activities; use and maintenance of reservation infrastructure; and activities in public areas.

The combination of a large land area with complex physical characteristics and diverse natural resources has provided a critical foundation to support DOE’s environmental research mission, as well as the ability to build leading-edge facilities such as the Spallation Neutron Source (SNS).

## 1.4 ORR Users

As a result of the intensive multiple uses of the ORR, there are numerous users including DOE; DOE contractors and their subcontractors; researchers from many different state, federal, and academic affiliations; the Tennessee Wildlife Resources Agency (TWRA); permitted hunters; the Tennessee Department of Environment and Conservation (TDEC) Natural Heritage Program and DOE Oversight; the Tennessee Forestry Division; the city of Oak Ridge; the Tennessee Valley Authority (TVA) and other utility providers; public greenway users; and others.

## 1.5 Planning Assumptions

The ORR planning effort has been ongoing, with significant stakeholder involvement, for several years. It began in earnest in the mid-1990s with the Common Ground program, which looked at the interaction of DOE-ORO and its stakeholders in land use planning for the ORR. This effort provided significant data used in subsequent planning efforts.

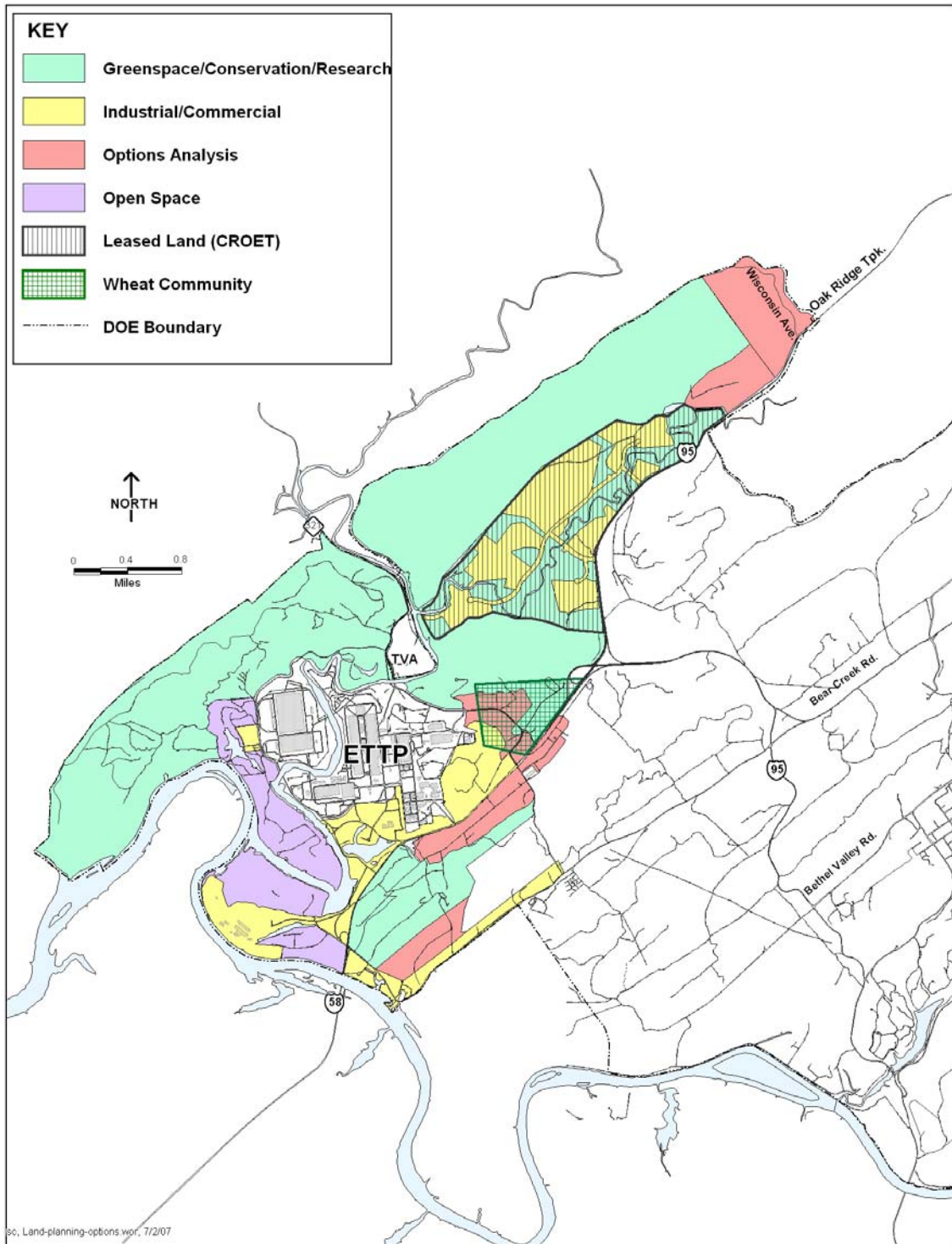
During this period all ORR planning was done by Lockheed Martin Central, which maintained a planning staff of 43 planners and support staff with a budget of a little more than \$2 million annually. This staff was dramatically reduced following the separation of the contracts for the three Oak Ridge installations (ORNL, the Y-12 Site, and ETTP).

The comprehensive integrated planning (CIP) document was created as a response to the requirements contained within DOE Order 430.1, "Life Cycle Asset

Management" (LCAM). LCAM also resulted in the secretarial policy statement, DOE Policy 430, clarifying the need for stakeholder involvement and input. The DOE-ORO planning document, *Comprehensive Integrated Planning: A Process for the Oak Ridge Reservation, Oak Ridge, Tennessee* (ORNL 1998), was given the Federal Planning Program Excellence Award for 1998 by the American Planning Association.

During 2002 DOE used a land use planning focus group and public input to seek recommendations in developing a set of possible scenarios for portions of the ORR that in the future might no longer be needed for DOE missions. The focus group, consisting of 20 individuals with expertise ranging from economic development to community needs to environmental quality and protection, took into consideration the input from participants at public meetings and agreed on potential land uses for 87% of the land under consideration (Fig. 2). Four different use options were considered for the remaining 13%, and a technical evaluation was performed to determine potential impacts on various resources if the area was used according to each of the four scenarios (ORNL 2002a, Focus Group 2002).

As already mentioned, RPAM (DOE Order 430.1B), the latest effort in the DOE planning and asset management effort, requires the development of a TYSP to gather information on all aspects of DOE sites, including both land use plans and facilities and maintenance issues. These TYSPs will enable DOE headquarters to better understand the issues at each site within the DOE complex. These documents will be updated annually to support budget and activity proposals.



**Fig. 2. Options analysis map for land use planning initiative.**

## 2. The ORR Planning Process

Each contractor on the ORR has a process in place to identify, plan, and implement land and facility use changes on the basis of programmatic needs. Each contractor is responsible for ensuring project review for various compliance requirements, with final approval from DOE. This section describes the objectives, land use priorities, and review process for proposed changes in approved land use outside immediate plant site boundaries.

### 2.1 Planning Goals

The review process for proposed major ORR activities and land use changes includes consideration of these goals:

- Incorporate the ORR vision for land use (see Sect. 1.2).
- Require safe and environmentally responsible evaluation and operation.
- Enhance regional economic development.
- Cluster uses and activities to achieve synergistic benefits, except where programmatic requirements dictate a specific location.
- Give priority and due consideration to reuse of disturbed areas, preserving clean or undisturbed areas.
- Optimize future use options.
- Minimize pollution or provide innovative approaches to cleaning up existing disturbed areas.
- Ensure that ORR activities are compatible with adjacent land uses.

### 2.2 Land Use Priorities

Decisions about proposed activities or land

use changes are made on a case-by-case basis to ensure compatibility with the following priorities:

- Priority 1: Preserve and protect land needed to meet the requirements of existing and future DOE mission-related facilities and programs that require large, biologically and physically diverse protected land areas so that DOE can continue to meet its local, regional, and national mission obligations.
- Priority 2: Maintain land and facilities to promote sustainable economic development for the region through enhanced DOE missions, as well as through technology transfer and reindustrialization.
- Priority 3: Protect the environment, meet the requirements of scientific and technical education, and support educational research opportunities on the ORR.

### 2.3 Review Process and Participants

When proposed changes in land use are outside plant site boundaries, a comprehensive and integrated process is used to ensure proper planning, coordination, and communication among DOE and the various contractor representatives. These proposed changes in land use are evaluated by subject matter experts, program managers, and senior managers (if potential impacts are significant). Land use decisions are made by senior management on the basis of these evaluations. Individuals and groups involved in the ORR land and facility use decision-making process include the following:

- ORR Manager (ORO Manager);
- senior ORO management;



- the DOE Reservation Management Coordinator;
- the ORO realty officer;
- the DOE Oak Ridge Reservation Management Team (ORRMT);
- the Contractor Interface Team;
- other DOE and contractor personnel; and
- public stakeholders, as appropriate.

### **The Oak Ridge Reservation Management Team**

The ORRMT, composed of DOE subject matter experts and program and support staff, reviews land use activities and proposed changes in land use designations. The ORRMT was formed in 1995 to review all activities occurring on the ORR outside of the fenced site boundaries. Requests for changes in land use are received by three primary means: from the program office, from the contractor, and from external sources. Most requests for changes in land use or activities come through the DOE Real Estate Office. All requests are reviewed by subject matter experts with input from program representatives and support staff (e.g., legal and finance). Recommendations or proposed actions are formulated and sent to DOE senior management for decisions on the appropriate disposition of the action or recommendation.

### **Reservation Management Coordinator**

A Reservation Management Coordinator, appointed by DOE-ORO in September 2004, facilitates communication among reservation land users and ensures comprehensive, integrated land use planning. The Reservation Management Coordinator represents the Oak Ridge Manager on all issues affecting the ORR.

### **Contractor Interface Team**

The Contractor Interface Team was established in May 2003 to provide integrated corporate oversight and decision making for activities affecting multiple sites and contractors on the ORR.

### **Stakeholder Involvement**

DOE recognizes a wide complement of interested stakeholders in the Oak Ridge community who evidence varying degrees of interest related to the actions affecting DOE land use. The involvement of those stakeholders in many DOE actions has been, and will continue to be, critical to the success of DOE. At the same time, it is understood that DOE reserves to itself certain aspects of land use planning and decision making, such as those related to mission requirements and Secretarial initiatives. DOE provides the opportunity for organizations and groups in the greater Oak Ridge community to participate in such discussions through an open process of public meetings and opportunities to comment on draft documents as appropriate. Stakeholder involvement for this planning process update will include public meetings; website information; and opportunities for electronic, written, and verbal comments.

## **2.4 Integration with Other Planning Processes**

Approval of activities and land use changes is considered within the context of other planning documents that have been prepared, such as the TYSPs (ORNL 2007; DOE 2007a), site documents and program plans (DOE 2007b). In addition, environmental, compliance, permitting, and other requirements must be addressed.

# 3. Regional Overview for the ORR

## 3.1 ORR and Surrounding Counties

The ORR is a unique and irreplaceable resource for DOE in addressing its technology and national science missions. DOE-ORO is committed to protecting its land inventory to meet the requirements of existing and future DOE mission-related facilities and programs. Protection of the land, facilities, and environment is also necessary to ensure continuing benefits and economic growth for the region through enhanced DOE missions. Consequently, land use decision making represents a crucial factor in ensuring the viability and availability of land necessary to meet DOE’s needs (DOE 2003).

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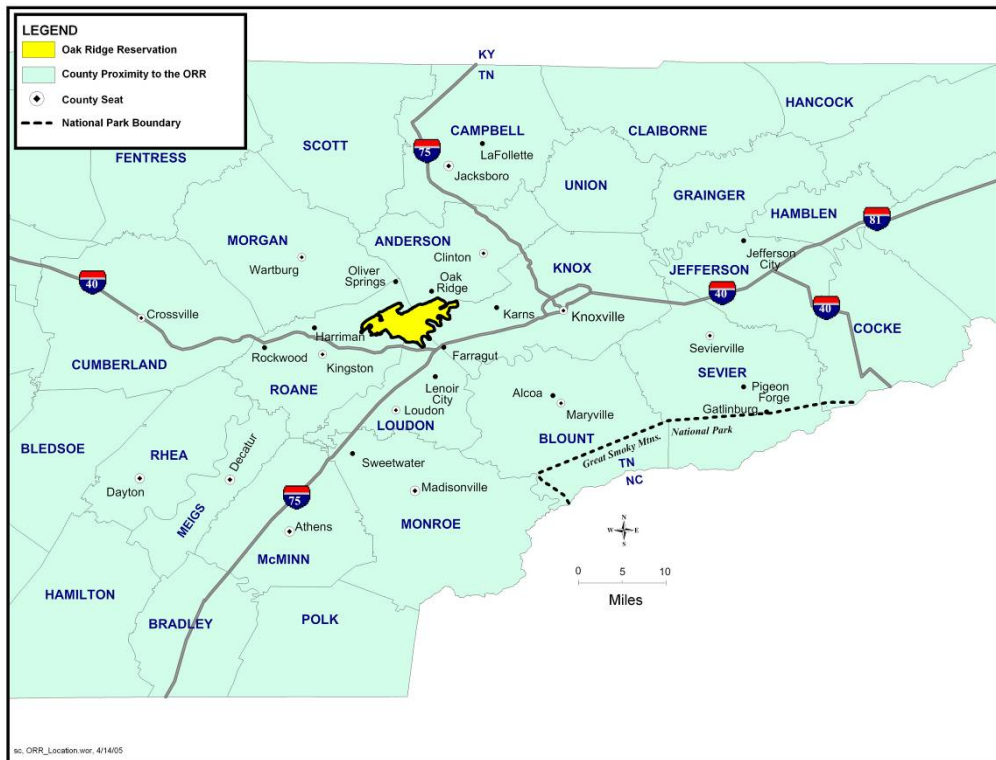


Fig. 3. Location of the Oak Ridge Reservation.

trained for production or high-technology-oriented industry. The location of the ORR is shown in Fig. 3.

### 3.2 Regional Socioeconomic Impact

The state of Tennessee, local residents, and local governments have seen some significant contributions resulting from DOE's presence in Oak Ridge. In 1999 the Center for Business and Economic Research at the University of Tennessee (UT) started conducting in-depth analyses of the annual economic benefits for Tennessee attributable to DOE operations (CBER 2007). Results of the study for fiscal year (FY) 2006 demonstrated the role of DOE as a major contributor to the Tennessee economy.

Key findings for FY 2006 included the following:

- Spending by DOE and its contractors led to an increase of nearly \$3.6 billion in Tennessee's gross domestic product in 2006.
- Total personal income generated in Tennessee by DOE-related activities was nearly \$2.0 billion in 2006. Each dollar of income directly paid by DOE in the state translates to a total of \$2.10 in personal income for Tennessee residents.
- DOE spending supported 44,889 full-time jobs in the state in 2006, meaning that for every DOE job, 3.8 additional jobs were supported in other sectors of the state economy.
- DOE-related spending generated \$76.9 million in state and local sales tax revenue in Tennessee in 2006.

- DOE operations continue to rely on a highly trained and educated workforce. In 2006, 999 employees held a doctorate; 1,757 held a master's degree; and 3,154 held a bachelor's degree.

DOE and its major contractors<sup>1</sup> provided 11,914 full-time jobs in Tennessee in 2006. The jobs are relatively high-wage jobs, with annual wages and salaries totaling \$763.2 million.

Total nonpayroll spending (or direct procurement spending) by DOE and its contractors totaled more than \$982 million in 2006. Nonpayroll spending generates millions of dollars in new income and supports thousands of jobs in a wide array of sectors in Tennessee's economy.

In 2006 the total state sales tax attributed to DOE was \$21.6 million. As a result of DOE and contractor purchases of goods and services in Tennessee, \$16 million and \$5.6 million were directly contributed to the public coffers of state and local governments, respectively.

Many of the benefits from DOE's presence in Tennessee are not easily quantified but have a broad and positive impact on the state, as demonstrated by the following examples:

- DOE, its contractors, and their employees made more than \$5.7 million in charitable contributions, community grants, and equipment bequests to organizations across Tennessee in 2006.

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<sup>1</sup> B&W Y-12; UT-Battelle, LLC; Oak Ridge Associated Universities; Bechtel Jacobs Company, LLC; Wackenhut Services, Inc.; DOE Office of Scientific and Technical Information; DOE Oak Ridge Office; DOE/National Nuclear Security Administration Site Office; and other DOE field offices.

- In FY 2006 more than 3,000 visits by guest researchers generated approximately 18,600 overnight stays in the Knoxville–Oak Ridge area.
- AMSE drew nearly 102,041 visitors during FY 2006.

### 3.3 Adjacent Land Use and Physical Characteristics

Land uses near the ORR are predominantly rural, with agricultural and forest land dominating. The residential areas of the city of Oak Ridge that abut the ORR are primarily along the northern and eastern boundaries of the reservation. Some Roane County residents have homes adjacent to the western boundary. The Clinch River forms a boundary between Knox County, Loudon County, and portions of Roane County. The topography, geology, hydrology, vegetation, and wildlife of the ORR provide a complex and intricate array of resources that directly impact land stewardship and land use decisions. The area's ridge-and-valley topography, with moderate to severe slopes, provides security and isolation for the ORR.

The hydrology of the ORR is complex. Highly fractured interbedded shale-limestone units are predominant, and karst

features are prevalent in some areas. Protecting groundwater quality on the ORR is extremely important to ensure that potential contamination does not spread to the surrounding region.

The ORR is mostly contiguous native eastern deciduous forest. This large, relatively unfragmented area of mature eastern deciduous hardwood forest (with many forest blocks larger than 100 acres) provides habitat for numerous wildlife species. Such blocks of forested area are increasingly uncommon in the Ridge and Valley Province. The resulting diversity of plant and wildlife species ranges from common species found in urban and suburban areas of eastern Tennessee to species with more restrictive requirements. Many species of wildlife and plants that are now uncommon in Tennessee can be found on the ORR.

Information on physical characteristics and natural resources constitutes critical data in land use decision making. *Oak Ridge Reservation Physical Characteristics and Natural Resources* (Parr and Hughes 2006) includes information on ORR topography, geology, hydrology, vegetation (including forest resources), wildlife, wetlands, cultural resources, and special designations.

## 4. Overview of the ORR

The DOE Oak Ridge facilities are rich in history, dating back to the 1940s, when the facilities played a major role in the production of materials as part of the World War II Manhattan Project.

### 4.1 History of the ORR

For more than 60 years, government missions and operations have been the primary factor in the development of the Oak Ridge installations. In the early 1940s, the U.S. government purchased approximately 58,575 acres to build facilities for large-scale production of fissionable material for the world's first nuclear weapons. In 1943 construction began on the X-10 nuclear research facility [now the multipurpose research and development (R&D) facility that is ORNL], the first uranium enrichment facility (now the Y-12 National Security Complex), and a gaseous diffusion enrichment facility (currently being reindustrialized as ETTP). By mid-1945, "the city behind the fence," so called because of the extensive use of security checkpoints and fences on the ORR, had a population of 75,000, and employment at the three installations had reached its peak of 82,000. With the end of World War II in September 1945, the population of Oak Ridge began to decline as people started returning to their prewar occupations.

A summary of management changes on the ORR from 1947 to 1999 is given in the 1999 CIP process report (ORNL 1999). From 1942 through 1948, the federal government acquired approximately 54,998 acres to build facilities for large-scale production of fissionable material for the world's first nuclear weapons. After 1948 an additional 3,584 acres were acquired for related mission needs.

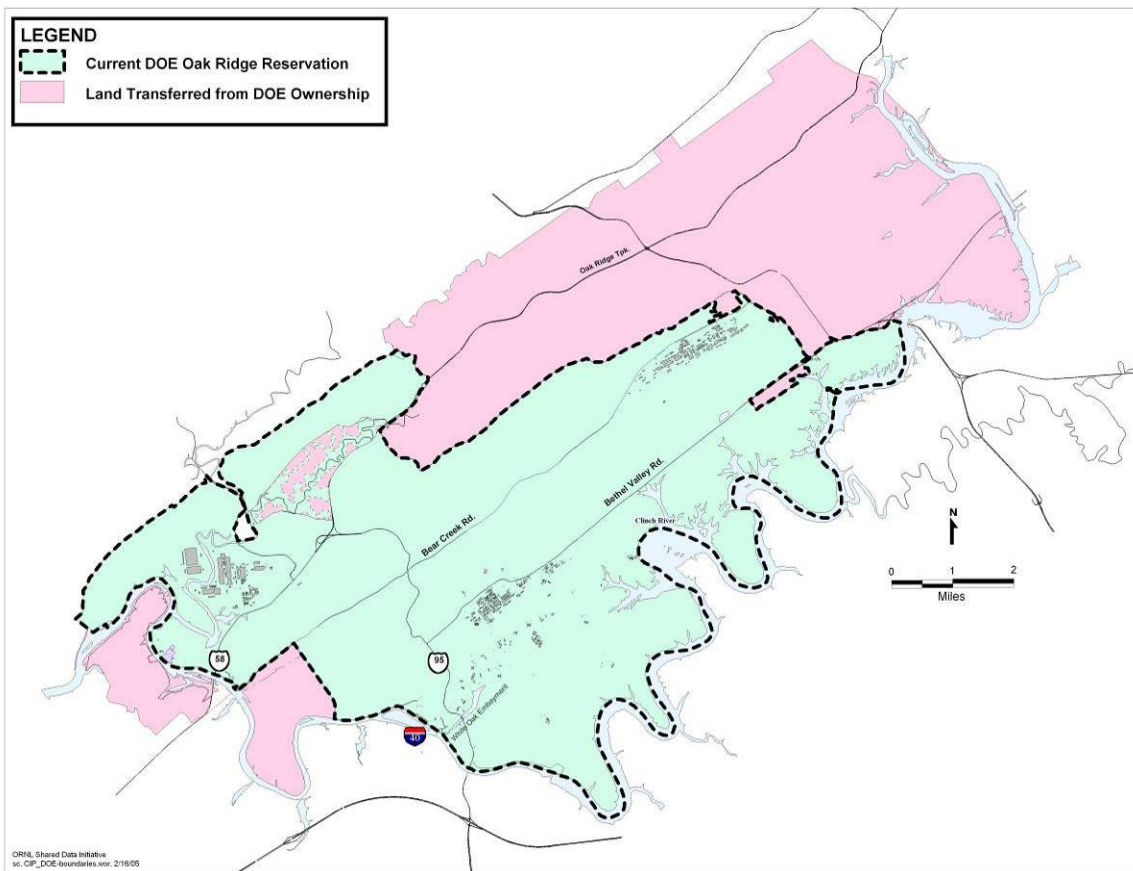
The ORR is located within Anderson and Roane counties in Tennessee. Most of the ORR is within the corporate limits of the city of Oak Ridge, Tennessee, and is located approximately 2 miles southwest of the population center of Oak Ridge. The ORR is bordered on the north and east by the population center of the city of Oak Ridge and on the south and west by the Clinch River/Melton Hill Lake impoundment.

### 4.2 Summary of Land Conveyances

DOE, its predecessor agencies (the Atomic Energy Commission and the Energy Research and Development Administration), and its major contractors have always worked closely with the city of Oak Ridge and organizations within Oak Ridge associated with economic development to assist in their attempt to attain self-sufficiency. This assistance has taken many forms, from direct and indirect land transfers to financial payments, facility and infrastructure transfers, and planning assistance.

Of the total 58,582 acres acquired for the ORR, 24,883 acres have been transferred, with 33,699 acres remaining as the reservation (Fig. 4). Of the 24,883 acres, approximately 6,049 acres were directly conveyed to the city of Oak Ridge. DOE's historical support has included the following land transfers:

- 16,855 acres for residential, commercial, and community development;
- 1,031 acres to federal agencies and for transportation easements;
- 9,626 acres for preservation and recreation;



**Fig. 4. Original and current ORR boundaries.**

- 4,247 acres for industrial development; and
- 11 acres for mission-related purposes.

The current land grants are

- 2,920 acres for the Three Bend permit,
- 2,966 acres for the Black Oak Ridge Conservation Easement, and
- 468 acres for the lease for the ED-1 Natural Areas.

In addition, in 1967 the Atomic Energy Commission transferred 778 acres to TVA at no cost. TVA in turn gave the land to the city of Oak Ridge to use for recreational or park development. In 1968 the same mechanism was used to transfer an

additional 1,364 acres to TVA at no cost with the stated purpose of industrial development in cooperation with the city of Oak Ridge, involving the city in marketing and developing the land.

DOE-ORO has long been aware of its responsibilities for maintaining a strong partnership with Oak Ridge city officials and with the public to meet the ongoing needs of the community and region both economically and environmentally. It has met this responsibility in part by using its real estate resources to support the community's needs in a multidimensional manner, such as by working directly with the city of Oak Ridge; the Community Reuse Organization of East Tennessee (CROET), which the city supports; community agencies such

as the Boys Club; the regional medical center in Oak Ridge; and the state of Tennessee for certain preservation and recreation initiatives. All of these actions are supportive of the overall well-being of the community, while at the same time ensuring a viable and strong DOE presence in the area.

Recent and current actions continue to underscore ORO's strong commitment to a community partnership. DOE's ongoing mission needs are carefully scrutinized and judiciously balanced before granting realty interests to the public and private sector that would either end or encumber DOE's rights for continued operations.

Current and recent initiatives have included the following:

- transfers to CROET for business development (Heritage Center, Horizon Center);
- land transfers to the city for residential development [Parcel A; shoreline property of O segment; Wisconsin Road area/Parcel ED-6 (ongoing)];
- conservation easement of 2,966 acres on Black Oak Ridge;
- recreational development (three public greenways; Clark Center Park);
- conservation easement of 2,920 acres for wildlife preservation (Three Bend Scenic and Wildlife Management Refuge Area);
- transfer of an excess 4 acres and facility on Vance Road to the Methodist Medical Center;
- transfer of property at 55 Jefferson Avenue to the Boys Club of Oak Ridge; and

- ongoing negotiations with the AMSE Foundation on the transfer of Parcel G, Parcels 279.01 and 483, and AMSE.

### 4.3 Profiles of Current DOE Facilities

DOE is present in Oak Ridge in three distinct capacities: (1) the ORO, which is one of DOE's major field offices; (2) the Y-12 Site Office (YSO) of NNSA, an independent agency of DOE; and (3) the Office of Scientific and Technical Information, which is part of the DOE Headquarters Office of Science.

DOE's 33,699-acre ORR is home to three major facility complexes: ETTP, the NNSA Y-12 National Security Complex, and ORNL. Also located in the city of Oak Ridge are ORISE and AMSE. ORO is responsible for programs at ETTP, ORISE, and ORNL. Figure 5 shows the locations of these DOE facilities.

#### East Tennessee Technology Park

ETTP, also known as the Heritage Center, is the home of the former gaseous diffusion plant known as K-25 and is a primary focus for DOE's Environmental Management and Reindustrialization Programs (Fig. 6). Cleanup of ETTP and conversion of a portion of the site to a private industrial park is an important mission for DOE. Under DOE's cleanup approach, the department will be demolishing most of the facilities at the site and ensuring that the soil and groundwater are remediated to safe levels for industrial use. The cleanup is being managed for DOE by Bechtel Jacobs Company, LLC, which both performs and subcontracts work.

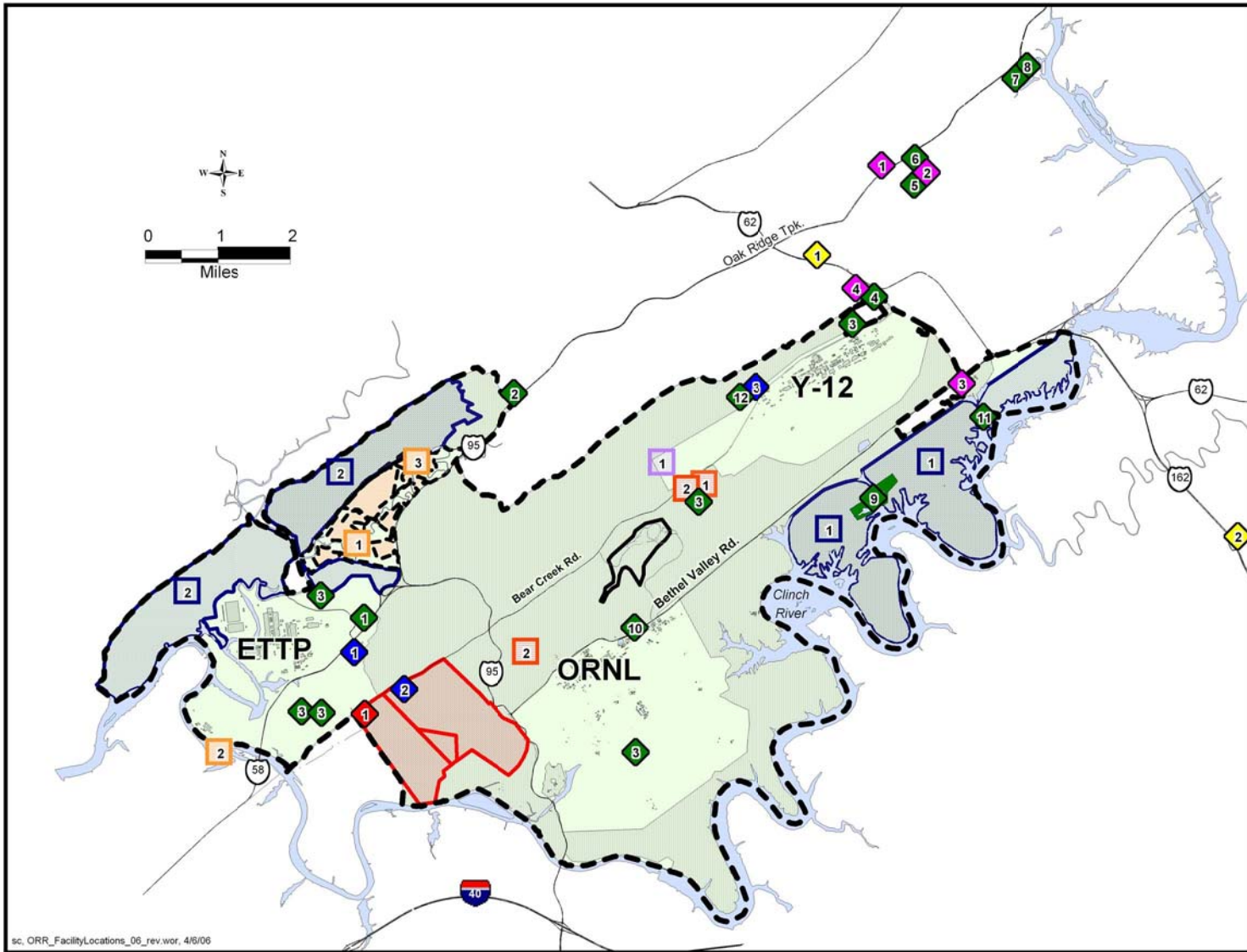
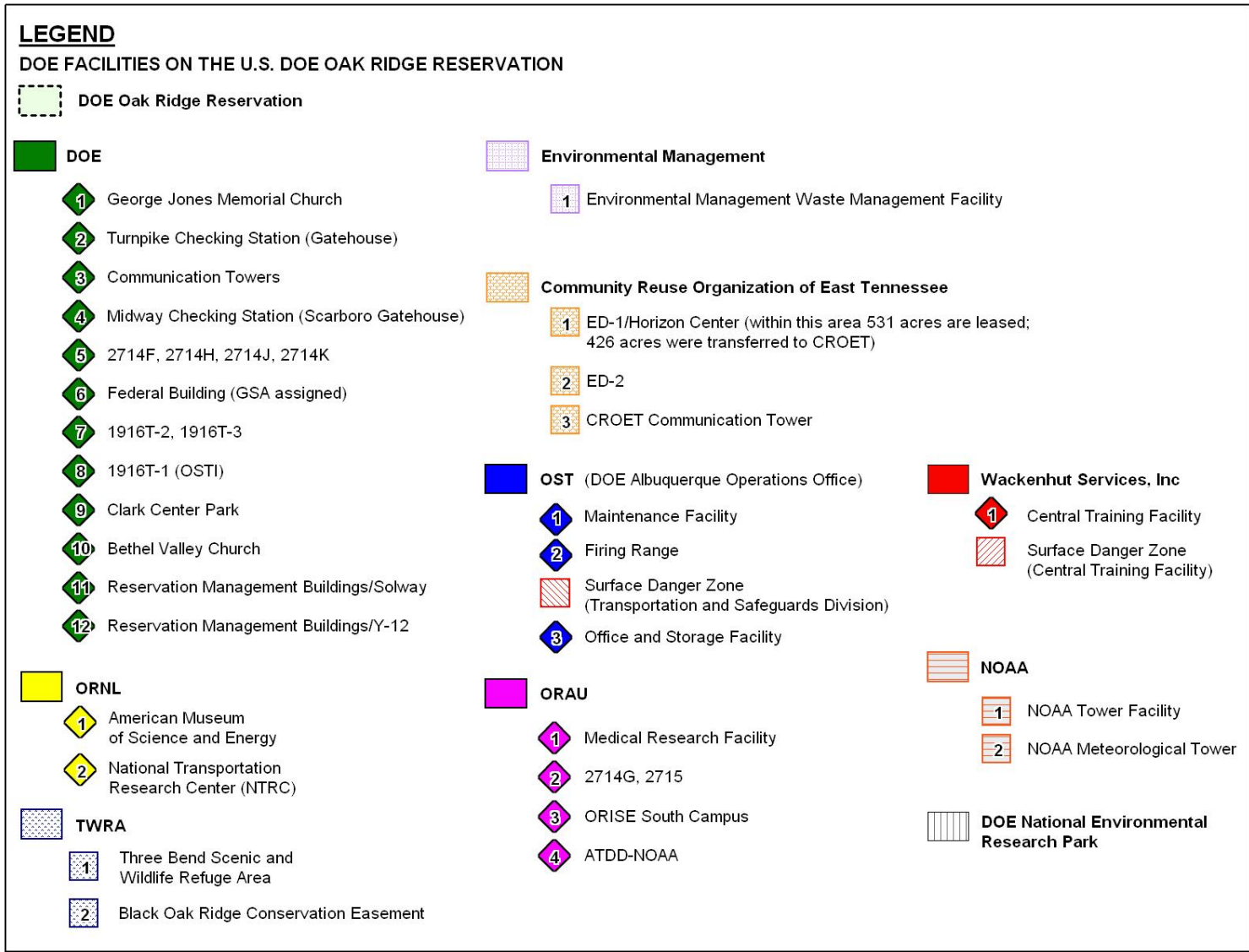


Fig. 5. Locations of DOE facilities on the ORR.





Legend for Fig. 5.



**Fig. 6. East Tennessee Technology Park.**

Reindustrialization is integral to DOE's strategy to meet cleanup goals at ETTP. The focus of the Reindustrialization Program is to transfer facilities and land to CROET. The transferred facilities will become integral to the Heritage Center—the industrial park being developed by the organization. Work is progressing on the establishment of Phase I of the Heritage Center. This phase includes the transfer of roughly 15 buildings and 250 acres of land. Selection of these facilities was based on their historical use, environmental conditions, and marketability. Transferring these facilities will save DOE tens of millions of dollars because the new property owner will be responsible for the ultimate demolition of the buildings.

### **National Nuclear Security Administration, Y-12 Site Office**

As required by the *National Defense Authorization Act for Fiscal Year 2000*, the national security functions and

activities performed by certain elements of DOE were transferred to NNSA. Management responsibility for operations at the Y-12 National Security Complex, formerly known as the Y-12 Plant, was transferred to YSO under NNSA (Fig. 7). The Y-12 Complex is managed by B&W Y-12.

Y-12 plays an important role in U.S. national security and is a one-of-a-kind facility in the NNSA nuclear weapons complex. Y-12's role includes providing critical elements of NNSA's missions that ensure the safety, reliability, and performance of the U.S. nuclear weapons deterrent; supplying the special nuclear material for use in naval reactors; promoting international nuclear safety and non-proliferation; reducing global dangers from weapons of mass destruction; and supporting U.S. leadership in science and technology. Y-12 also uses its unique capabilities to support the research reactor programs for U.S. and international



**Fig. 7. Y-12 National Security Complex.**

customers, other federal agencies such as the Department of Defense and Department of Homeland Security, state and local governments, and private-sector companies.

Another mission of long standing is the support of other federal agencies through a complementary work program. Y-12 applies unique abilities, initially developed for highly specialized military purposes, to a wide range of manufacturing problems to support the capabilities of the U.S. industrial base. Y-12's all-inclusive expertise encompasses proceeding from concept, through detailed design and specification, to building prototypes and configuring integrated manufacturing processes.

Every weapon in the U.S. stockpile has some components manufactured at Y-12.

### **Oak Ridge Institute for Science and Education**

Established as an official DOE institute in 1992, with programs dating back to 1946, ORISE is a national leader in science education and research. Through the management of ORISE, Oak Ridge Associated Universities (ORAU) directly supports DOE's national agenda. ORISE's mission objectives are as follows:

- strengthening our nation's R&D enterprise through education and research-participation programs;

- ensuring the readiness of our nation to respond to terrorist incidents and other emergencies; and
- protecting workers, the public, and the environment through research, outreach, and verification activities.

Figure 8 shows ORISE's South Campus, located on about 223 acres at the intersection of Bethel Valley and Scarboro roads.

### **Oak Ridge National Laboratory**

ORNL (Fig. 9) is DOE's largest science and energy laboratory. Managed since April 2000 by UT-Battelle, LLC, a partnership between UT and the Battelle Memorial Institute, ORNL was established in 1943 as a part of the Manhattan Project. During the 1950s and 1960s, ORNL became an international center for the study of nuclear energy and related research in the physical and life sciences. The 1970s led to an expansion of ORNL's research programs into the areas of energy production, transmission, and conservation. In recent years ORNL has found new opportunities to apply its distinctive capabilities to nonproliferation arms control and national and homeland security. Today, under DOE's Office of Science, ORNL's primary mission focus is conducting research in neutron science, energy, high-performance computing, systems biology, materials science, and national security that will lead to innovative solutions to complex problems. As a world leader in a range of scientific areas supporting DOE's basic research, energy, national security, and environmental missions, ORNL is actively engaged in a variety of national and international partnerships with industry and educational institutions. As a DOE steward of critical national research infrastructure, the laboratory provides access to university,

industry, and government researchers on a competitive basis. The laboratory is home to 3,900 facility users and visiting scientists every year. The \$1.4 billion SNS), completed in 2006, and the upgraded High Flux Isotope Reactor will make ORNL the world's foremost center for neutron scattering. The Leadership Computing Facility is DOE's most powerful computing complex for open scientific research. ORNL also manages the billion-dollar U.S. ITER project.

The laboratory has six core competencies underpinning its research activities:

- Neutron sciences, including neutron-scattering studies of the structure and dynamics of materials at nanometer-length scales and under extreme conditions
- Computing and computational sciences at extreme scales
- Comprehensive design, synthesis, and characterization of advanced materials and interfacial chemical processes
- Biological and environmental systems, including terrestrial ecosystems, climate sciences, microbial ecology, systems biology of plants, and bioconversion
- Engineering sciences, including the nuclear fuel cycle, plasma science, electric power systems, combustion and thermal engineering, and radiochemical process technology
- Counterterrorism and nonproliferation detection systems

Details on ORNL's 10-year planning effort are the subject of the 2007 ORNL TYSP (ORNL 2007).



**Fig. 8. Oak Ridge Institute for Science and Education, South Campus.**



**Fig. 9. Oak Ridge National Laboratory.**

## 4.4 Other DOE Properties

DOE operates a number of facilities in addition to ETP, ORAU, and ORNL. These are shown in Fig. 5 and described in the following sections. (These descriptions are taken from annual site environmental report for 2006 [DOE 2007c].)

### **American Museum of Science and Energy**

AMSE is located on about 17 acres contiguous to the ORAU campus on South Tulane Avenue in Oak Ridge. In addition to the main museum facility, the site contains the Energy House. The museum is managed by UT-Battelle, LLC.

### **Atmospheric Turbulence and Diffusion Division, National Oceanic and Atmospheric Administration Facility**

The Atmospheric Turbulence and Diffusion Division (ATDD), National Oceanic and Atmospheric Administration (NOAA) facility is housed in a 1940s wood-frame building and several smaller buildings at 456 South Illinois Avenue in Oak Ridge. ATDD conducts meteorological and atmospheric diffusion research that is jointly supported by DOE and NOAA. It provides services to other DOE contractors and operates the Weather Instrument Telemetry Monitoring System for DOE. Additionally, NOAA has a monitoring facility and tower within the Walker Branch Watershed research area on Chestnut Ridge and a second monitoring tower farther west on the ridge.

### **Buildings 2714 and 2715**

Buildings 2714 (the “Laboratory Road” facility) and 2715 are DOE-owned facilities that DOE shares with ORISE. The facilities are used for general offices.

Both buildings are located in Oak Ridge just south of the Federal Office Building.

### **Central Training Facility**

The Central Training Facility, primarily used by security forces, consists of a small office building, an indoor firing range, two classroom/storage trailers, on-site parking, fitness facilities (an outdoor track), and numerous outdoor firing ranges. The 150-acre site includes a safety buffer area and is south of Bear Creek Road.

### **Checking Stations**

Three historic checking stations (DOE-ORO properties) are included in the National Register of Historic Places: the Oak Ridge Turnpike Checking Station (Turnpike Checking Station), the Scarborough Road Checking Station (Midway Checking Station), and the Bethel Valley Road Checking Station. Although these structures are listed as checking stations in the National Register, they were originally called gatehouses. The main building of the Bethel Valley Road Checking Station is located on a parcel of land that was transferred to the city of Oak Ridge. However, the small associated block building just opposite the main structure is still owned by DOE-ORO.

### **Clark Center Recreation Park**

Clark Center Recreation Park, an area of about 80 acres, is currently used for recreational purposes by DOE, contractors, and the public on a limited basis. The area is managed by DOE.

### **DOE Information Center**

The DOE Information Center, located at 475 Oak Ridge Turnpike, provides centralized public access to DOE documents and information. The building is leased to DOE by R&R Rental Properties.

### **Federal Office Building**

The Federal Office Building, located in Oak Ridge and owned by the General Services Administration, is maintained by DOE.

### **National Transportation Research Center**

The National Transportation Research Center, an alliance among ORNL; UT; DOE; the National Transportation Research Center, Inc.; and the Development Corporation of Knox County, is the site of activities that span the whole range of transportation research. It is within a 6-acre site in the Pellissippi Corporate Center and is leased to ORNL and UT separately by Pellissippi Investors LLC.

### **Office of Scientific and Technical Information**

The Office of Scientific and Technical Information is located in Bldgs. 1916T-1 and 1916T-2, two masonry buildings constructed as warehouses in the 1940s. The two buildings are located on a tract (about 5.5 acres) parallel to the Oak Ridge Turnpike, east of the Federal Office Building.

### **The Horizon Center**

The Horizon Center (previously known as ED-1) was leased to CROET effective April 28, 1998. In April 2003 the developable portions of the parcel, about 490 acres, were transferred (by quitclaim deed) to CROET. The other portions (the natural area that surrounds the East Fork Poplar Creek floodplain and other locations) remain part of the CROET leasehold. CROET may lease or sell the land transferred to it. CROET is

responsible for the protection and maintenance of all portions of the property.

### **Parcel ED-2**

Parcel ED-2 includes the K-1252 barge facility and covers about 1.23 acres. It is located in the K-700 area west of the main ETTP site, and it has been leased to CROET.

### **Office of Secure Transportation Firing Range**

The Office of Secure Transportation (OST) Firing Range, located to the east of the Central Training Facility, is operated by the NNSA Albuquerque Service Center. The surface danger zones for the Central Training Facility and the OST Firing Range overlap and together comprise about 1,600 acres.

### **Office of Secure Transportation Vehicle Maintenance Facility**

The OST Vehicle Maintenance Facility is located on about 20 acres east of ETTP, on the south side of State Route 58 (Oak Ridge Turnpike), near the intersection with Blair Road. The total site area encompasses close to 100 acres. The facility is maintained by Y-12's Facilities, Infrastructure, and Services Organization, funded by the NNSA Albuquerque Service Center.

### **Transuranic Waste Processing Center**

The Transuranic Waste Processing Center (TWPC), formerly managed by Foster Wheeler Environmental Company, LLC, is at 100 Wipp Road, in Lenoir City, Tennessee. The site is located on 20 acres

adjacent to the Melton Valley Storage Tanks, along State Route 95 on the western boundary of ORNL. On

November 3, 2006, DOE took ownership of the TWPC from Foster Wheeler. EnergX is currently managing the site.



## 5. Current Uses and Activities on the ORR

The land on the ORR is intensively used for multiple purposes to meet DOE's mission goals and objectives. Uses of the land area surrounding the developed sites include safety, security, and emergency planning; research and education; cleanup and remediation; environmental regulatory monitoring; wildlife management; biosolids land application; protection of cultural and historic resources; wildland fire prevention; land-stewardship activities; use and maintenance of reservation infrastructure; and activities in public areas. Figure 10 provides an overview of land uses on the ORR.

### 5.1 Emergency Response

The map of the Oak Ridge emergency response areas (ERAs) (Fig. 11) identifies the site responsible for providing first response, incident command and control, and where applicable, the emergency director role for events occurring on the ORR. The map is designed to ensure that emergency response roles and responsibilities are clearly defined and well understood by all involved organizations. For clarity, all land areas within the city of Oak Ridge are addressed.

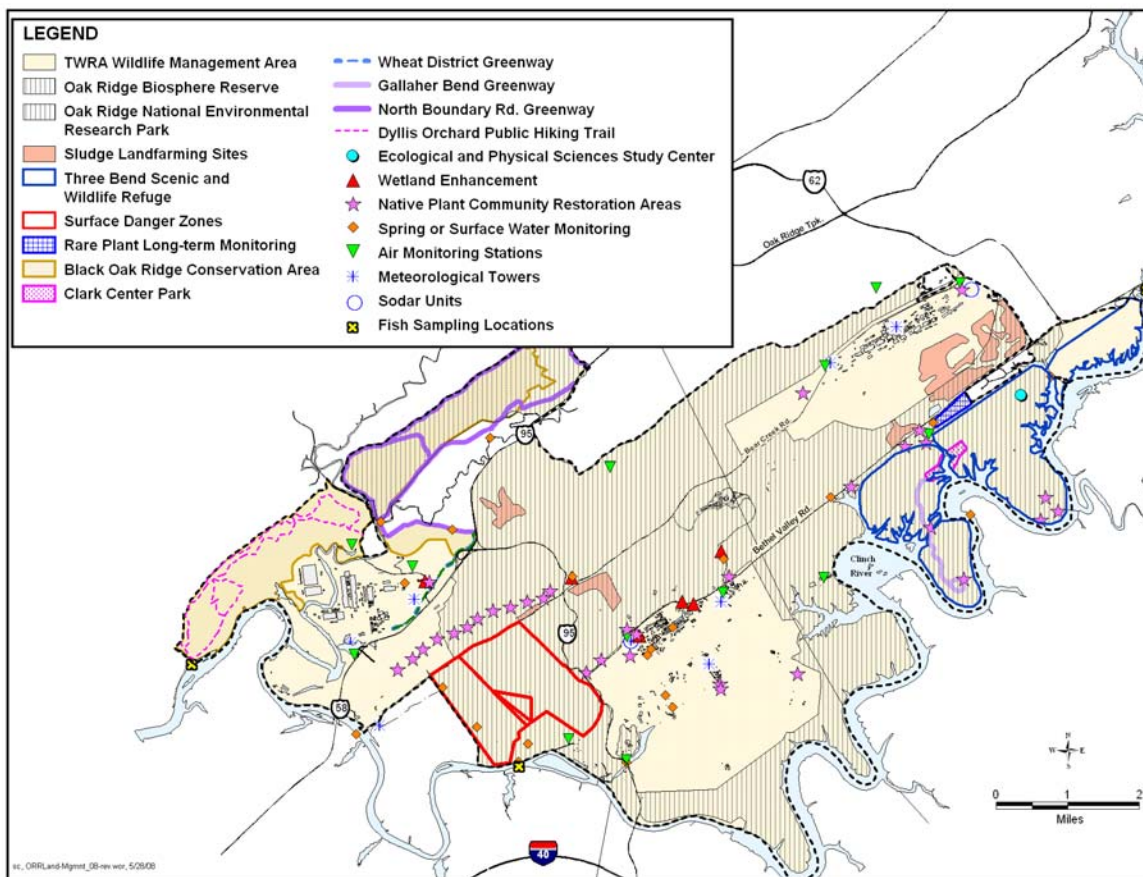
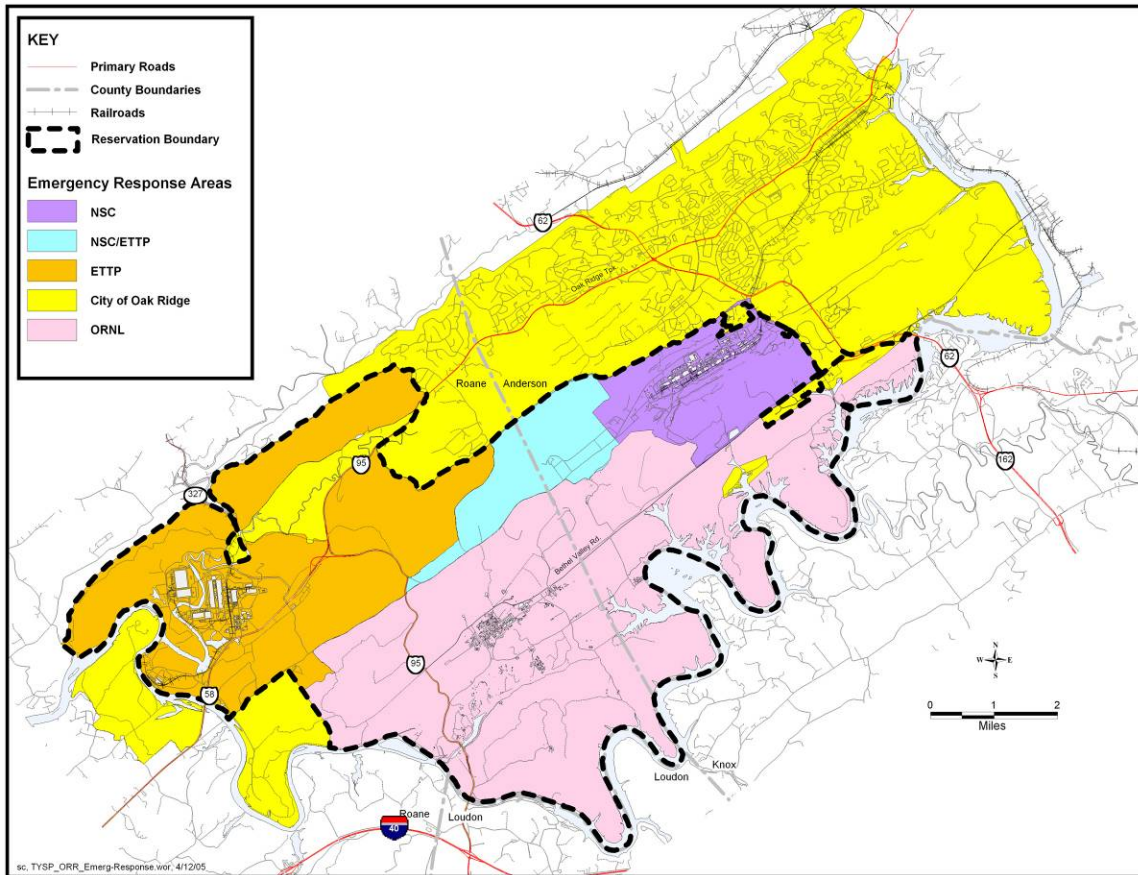


Fig. 10. ORR land management and operational uses.



**Fig. 11. ORR emergency response areas.**

## 5.2 National Environmental Research Park

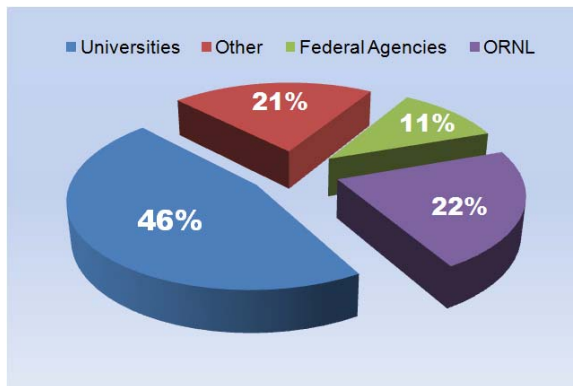
In 1980 DOE established the Oak Ridge National Environmental Research Park (Fig. 10). Consisting of approximately 20,000 acres, the research park serves as an outdoor laboratory for evaluating the environmental consequences of energy use and development as well as strategies for mitigating these effects. The combination of protected, undeveloped areas with disturbed, developed, or developing areas within the research park allows the demonstration and assessment of various environmental and land use options.

Major DOE Office of Science research programs use the ORR land to meet mission

objectives. In FY 2007 almost \$7 million was spent on DOE-supported environmental field-based research directly dependent on the ORR land base. This expenditure is independent of construction of new facilities such as the SNS. The Office of Science considers the research and science value of the ORR to be critical and provides primary operations funding. The Oak Ridge research park is one of the few sites in the nation where large-scale ecological research, environmental technology, and measurement science are integrated with more than 50 years of environmental monitoring and research.

The National Environmental Research Park is a DOE National User Facility that has attracted more than 1,200 users from ORNL

as well as from 150 colleges, universities, industries, and other state and federal government agencies over the past 5 years. The 268 users during 2007 represented 49 organizations, including educational institutions, state and federal agencies, and others (Fig. 12).



**Fig. 12. Categories of Oak Ridge National Environmental Research Park users in 2007.**

### 5.3 Field Research Areas

#### Environmental Research

Environmental field research on the ORR addresses major national issues and contributes to national and international collaborative initiatives on global climate change (temperature, carbon dioxide, precipitation), tropospheric air quality, remediation of contaminated land, sustainable development, biodiversity, and energy operations. These uses require protected blocks of land ranging from a few acres to more than 250 acres. Figure 13 shows the environmental research areas on the ORR.

#### ***Walker Branch Watershed***

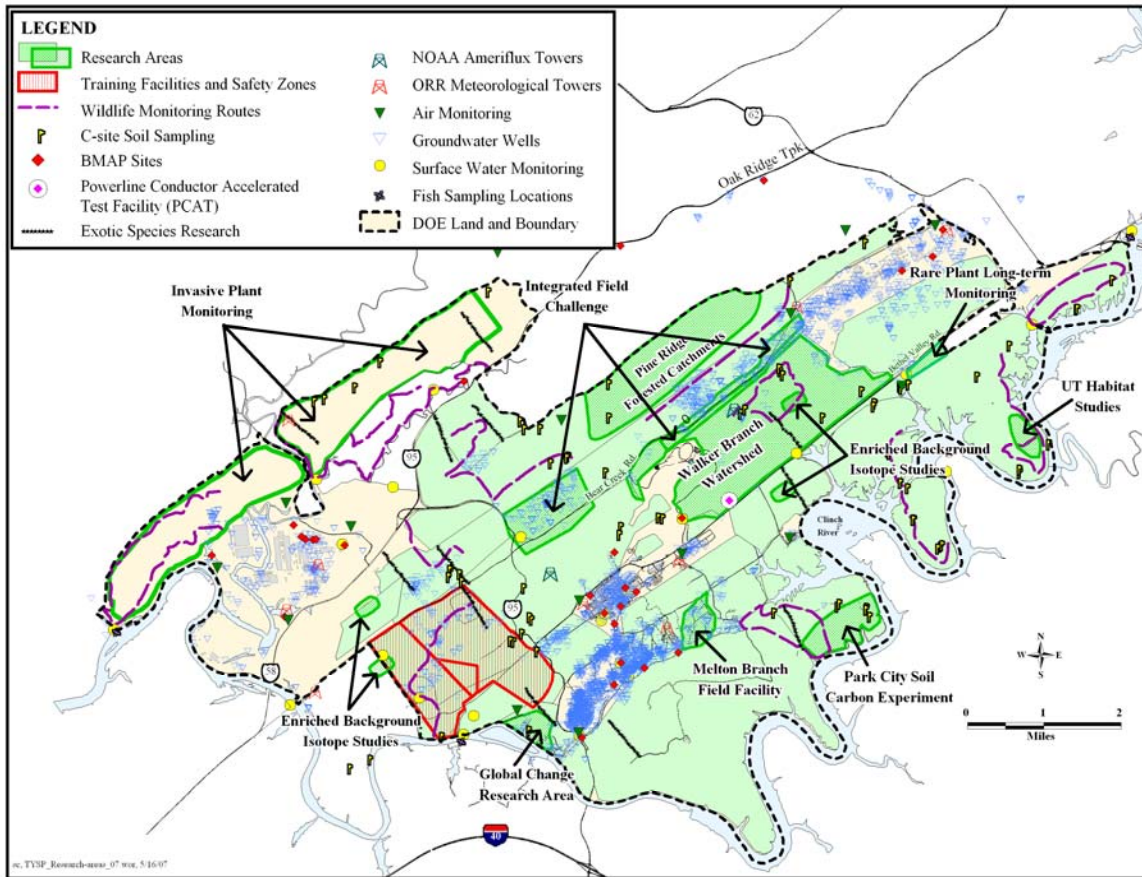
The Oak Ridge National Environmental Research Park contains intensive, long-term ecological research areas, most notably the Walker Branch Watershed, a gauged, 250-acre deciduous forest catchment with a

40-year record of forest and stream ecosystem experiments and monitoring. This research includes studies of hydrology, atmospheric chemical deposition, forest biogeochemical cycling, plant physiology and community dynamics, and stream ecology and nutrient cycling. Ongoing research includes (1) an experiment to determine the critical thresholds of acute responses of mature trees to water stress; (2) continuous measurements of trace gas fluxes between the forest and the atmosphere; (3) an experimental study of the rates and pathways of nitrogen cycling in the stream; and (4) NOAA/ATDD air pollutant dry-deposition monitoring.

**National Oceanographic Atmospheric Administration.** NOAA has the longest record of air pollutant dry-deposition measurements in the world at Walker Branch Watershed. NOAA/ATDD has a similar long record of measuring solar radiation in various wavelengths, and the Walker Branch Solar Station is part of the Integrated Surface Irradiance Study, NOAA's national solar radiation observing network. One of the two NOAA Ameriflux meteorological towers is located at Walker Branch. Walker Branch is also a site in several national research networks, including the National Atmospheric Deposition Program.

#### ***Melton Branch Watershed***

Three field facilities located at Source Area A in Waste Area Group 5, West Bear Creek Valley, and Melton Branch Subwatershed are extensively instrumented to monitor storm-driven unsaturated flow and saturated groundwater flow. The hydrologic and geochemical processes have been well characterized at each site, and instrumentation is available for performing sustained tracer-injection studies. Investigations at the



**Fig. 13. Environmental research areas on the ORR.**

various sites have focused on quantifying the mechanisms of preferential flow and matrix diffusion in fractured saprolites and shale bedrock. Research findings have significantly improved decision-making strategies with regard to contaminant remediation in complex heterogeneous subsurface media.

### ***Freels Bend Reference Area***

Freels Bend serves as an important reference area for multiple studies investigating the impact and recovery of contaminated systems on the ORR. Detailed studies of water quality, fish communities, bioaccumulation, and bird communities at Freels Bend have found that the site is unique on the ORR in being highly representative of

unindustrialized, uncontaminated habitat. Recent research in remediation and stewardship science on the ORR has focused on the use of large-scale ecological manipulations to reduce risk while leaving wastes in place and enhancing natural resources. Such an ecological management and enhancement strategy, which is being used for the first time nationally at a Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) site, is being implemented at contaminated ponds near ETTP, and Freels Bend is a key reference site for comparison in that long-term study. The Freels Bend area is a valuable reference site for nest-box studies of mercury uptake and effects in birds, an important reference area for reservoir sediment and biological comparisons upstream

and downstream of DOE facilities, and has nearby streams used as long-term reference sites for fish and benthic macroinvertebrate community monitoring (for the Biological Monitoring and Abatement Program). Freels Bend, along with Gallaher Bend and Solway Bend of the Three Bend area, is a rare example of riparian, mixed grassland and woodland community intersection and provides key sites for long-term community bird surveys (Partners-in-Flight routes).

### ***Integrated Field Challenge***

The Environmental Remediation Sciences Program Integrated Field Challenge (IFC) project, located in Bear Creek Valley, is conducting research that will lead to new methods of reducing and understanding risks associated with subsurface contamination from metals and radionuclides related to DOE's operations. The IFC includes field plots in a contaminated area near the Y-12 facility along with an instrumented background area to the west. In addition, several large lysimeters located nearby are the site of manipulative, ecosystem-level experiments that use genetically engineered microorganisms to investigate contaminant biodegradation in soil. While not currently in active use, these lysimeters provide a unique facility for safely evaluating the efficacy of such organisms.

### ***Pine Ridge Forested Catchments***

The Pine Ridge Forested Catchments consist of four adjacent first-order forested catchments underlain by shale and sandstone of the Rome formation. As such, they represent the second most common geology of the ORR—dominated by shale rather than the dolomite of the Knox formation (e.g., Chestnut Ridge). One of these catchments is being studied as part of the Walker Branch Watershed project because it offers a

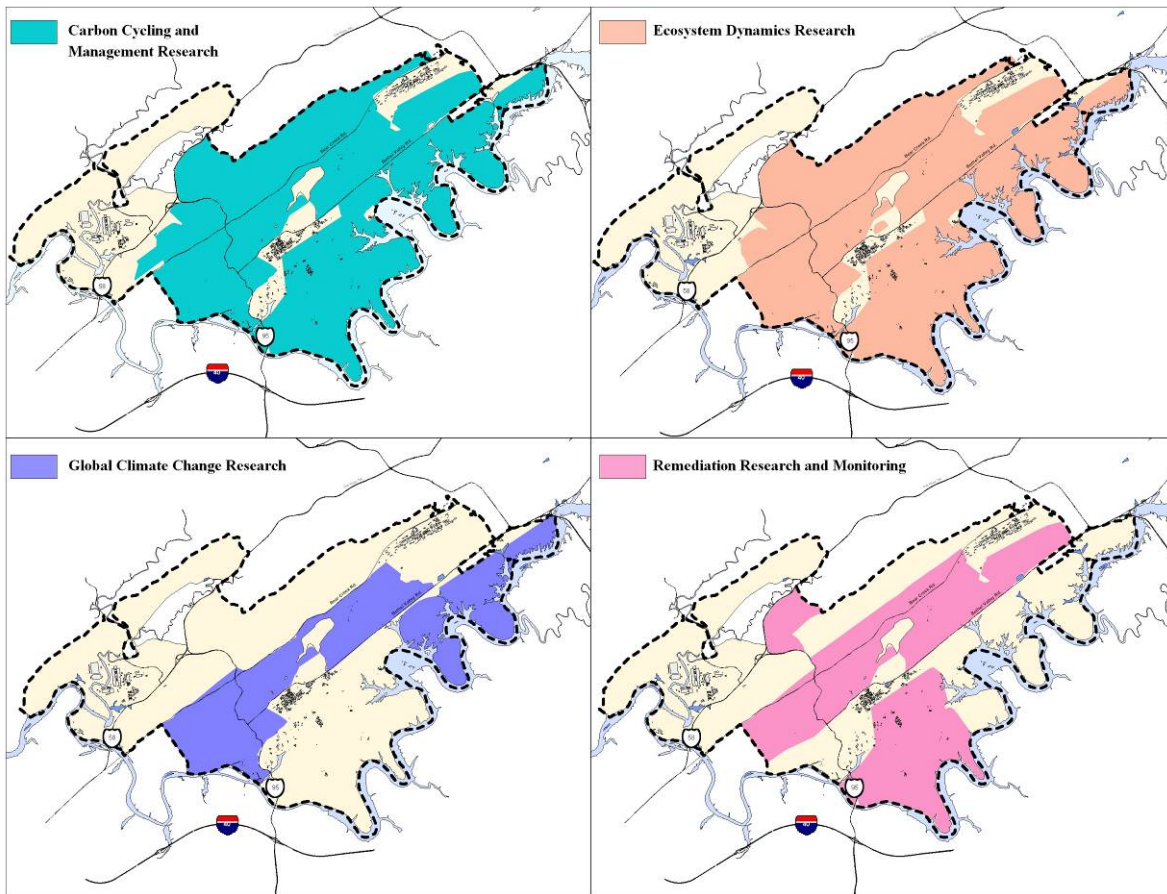
contrast in geology and hydrology while providing similar forest vegetation. Stream discharge and weekly stream-water chemistry are being monitored in this catchment.

### ***Free Air CO<sub>2</sub> Enrichment***

The thousands of acres of eastern hardwood forests on the ORR also support several large-scale ecological manipulation experiments that have established ORNL's national leadership role in research related to the impacts of global climate change. Diverse, complex, and large-scale experimental approaches are used to understand how forest ecosystems respond to the changes in temperature, precipitation, and atmospheric carbon dioxide (CO<sub>2</sub>) concentrations expected from global climate change. For example, the Free Air CO<sub>2</sub> Enrichment (FACE) Facility in the 0800 Area was completed in 1997 to investigate the response of a forest ecosystem to increased CO<sub>2</sub> concentrations. This unique global climate change research facility is providing an opportunity for researchers from all over the United States to increase collaborative research on the effects that changes in precipitation or CO<sub>2</sub> may have on the long-term development of these forest communities.

Environmental-research use on the reservation can be categorized into one of four main types. Figure 14 shows the ORR areas with active, proposed, and planned research in each of these research categories: carbon-cycling and -management research, ecosystem-dynamics research, global-climate-change research, and remediation research and monitoring.

More detailed information on environmental research may be found on the Environmental Sciences Division website at



**Fig. 14. Types of environmental research on the ORR.**

<http://www.esd.ornl.gov>. In addition to DOE, past and present sponsors of research on the site include the National Science Foundation (NSF), the U.S. Department of Defense, the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture, the U.S. Forest Service, the Nuclear Regulatory Commission, and the Electric Power Research Institute. Ongoing research collaborations also exist with NOAA and TVA.

### **Energy Research**

ORNL performs technology research, development, and demonstration in partnership with U.S. industry and universities in support of the DOE Office of Electricity Delivery & Energy Reliability mission to modernize the electric grid,

enhance the security and reliability of the energy infrastructure, and facilitate recovery from disruption to the energy supply.

As part of DOE's emphasis on modernizing the electric grid transmission and distribution system, ORNL is performing R&D on (1) visualization, modeling, and analysis; (2) tests of advanced technologies through the power delivery research center; (3) superconducting materials and applications; (4) energy storage and power electronics technologies; and (5) secure control systems.

### **SensorNet**

The objective of the SensorNet project is to develop and/or discover the technology, standards, and technical requirements for an integrated national warning and alert system.

The system is being designed to provide the Department of Homeland Security with an incident discovery, awareness, and response capability addressing local, regional, and national needs. The networking infrastructure will be a common data highway for the near-real-time intelligent collection, processing, and dissemination of sensor data that will include chemical, biological, radiation, nuclear, and explosives sensors; meteorological instruments; and other sensors (e.g., video cameras and air-quality, environmental, and disease tracking). A small area test bed has been established in the courtyard area between Bldgs. 5100 and 5200 on the ORNL site.

## 5.4 Contaminated Sites and Remediation

DOE facility operations dating from the Manhattan Project in 1942 have resulted in contamination of the environment. As a consequence, EPA listed the entire ORR on the National Priorities List in 1989. The DOE Environmental Management Program (EM) is responsible for environmental restoration of contaminated sites within the ORR. In 2002 DOE adopted a plan to accelerate completion of the EM mission for the ORR, with remediation of the highest-risk sites by 2006 and completion of the overall EM scope by 2015.

To facilitate and streamline decision making for remediation projects, the contaminated areas of the ORR have been divided into six areas roughly equivalent to the major hydrologic watersheds:

- ETPP,
- the Melton Valley portion of White Oak Creek at ORNL,
- the Bethel Valley portion of White Oak Creek at ORNL,

- Upper East Fork Poplar Creek at Y-12,
- Bear Creek Valley at Y-12, and
- Chestnut Ridge at Y-12.

Remedial actions on the ORR are regulated under CERCLA and a Federal Facility Agreement approved by DOE, EPA, and TDEC in 1992. Numerous remedial actions have been conducted for contaminated sites throughout the ORR. In recent years remediation decisions have evolved from narrowly focused actions designed to address individual contaminated sites to watershed-scale decisions designed to better address the cumulative impacts of multiple contaminated sites within a watershed. This larger-scale approach allows a decision on the end state to be made in concert with the decision on the series of remedial actions needed to protect human health and the environment for that end state. By considering the technical practicability and the cost of achieving a range of end states, decision makers can make informed, risk-based decisions consistent with the anticipated end use.

An End Use Working Group (part of the ORR Environmental Management Site-Specific Advisory Board) was formed in January 1997 to develop recommendations for end uses of contaminated areas on the ORR and identify community values that could be used to guide DOE's remedial action decision-making process. The End Use Working Group was composed of individuals with a broad range of public interests and included participation by TDEC and EPA. The group considered the contaminants, the contaminant pathways, a range of end uses, and the cost and technical implications of achieving various end uses. In July 1998 the working group published its recommendations to DOE on end uses for contaminated lands and on community values (End Use Working Group 1998).

Consistent with these recommendations, watershed Records of Decision (RODs) have been approved under CERCLA for Melton, Bethel, and Bear Creek valleys; part of Upper East Fork Poplar Creek; and part of ETTP and Upper East Fork Poplar Creek. In each case the remedial actions have been designed to support the desired end use for that property. Additional CERCLA decision documents are planned for Chestnut Ridge and for additional actions in Bear Creek Valley. The watershed-level RODs issued to date are interim decisions, designed to address specific contaminant source areas and mitigate the potential for release of contaminants. Sitewide response actions for groundwater protection and long-term institutional controls have been deferred to future decisions. Some other aspects of watershed-scale decision making have also been deferred, pending the successful implementation and application of current source-control measures. Among these deferred decisions is the determination of the effectiveness, both immediately and in the long term, of hydraulic isolation measures for long-lived contaminants. Figure 15 shows the current state of the ORR physical and surface interface. It includes areas of concern with respect to groundwater plumes; soil contamination and buried waste; and capped, closed waste sites.

## 5.5 Compliance and Monitoring

Operations at all facilities on the ORR must comply with all environmental requirements established by federal and state statutes and their implementing regulations, presidential executive orders, and DOE orders. TDEC and EPA are the principal agencies among the regulatory agencies that issue permits, inspect operations, and oversee environmental compliance on the ORR. Changes in land use have the potential to impact both opera-

tions and compliance activities at the Oak Ridge facilities. For instance, changes in unpopulated land areas could alter dose calculations required to meet radiological requirements, such as those made using guidance from the Clean Air Act's National Emission Standards for Hazardous Air Pollutants (40 *Code of Federal Regulations* 61, Subpart H). Therefore, future land use expansion and building projects will work in partnership with environmental compliance organizations on the ORR to ensure that programs are in place to maintain the ORR's compliance and minimize adverse environmental impacts and the potential for increased doses to bordering populations.

In many states such as Tennessee, regulatory agencies are transitioning to watershed-based load-allocation permitting for wastewater discharges. The presence of additional new facilities on the ORR, which need to discharge wastewaters to ORR streams under the National Pollutant Discharge Elimination System, could result in reallocation of wastewater constituent load allowances among the various ORR entities discharging wastewater as a means of controlling watershed loading in order to meet an acceptable standard.

Extensive monitoring and surveillance programs that collect thousands of environmental samples and measurements are conducted annually on the reservation and in the surrounding areas. Monitoring activities include sampling of air, surface water, groundwater, soil, terrestrial vegetation, milk, fish, and wildlife. The results of these monitoring activities show that the major facilities on the ORR are consistently in compliance with environmental regulations and permit limits and that the radiation dose to the public from all ORR pathways is well below the 100-millirem limit established by DOE from all pathways. Several years of the



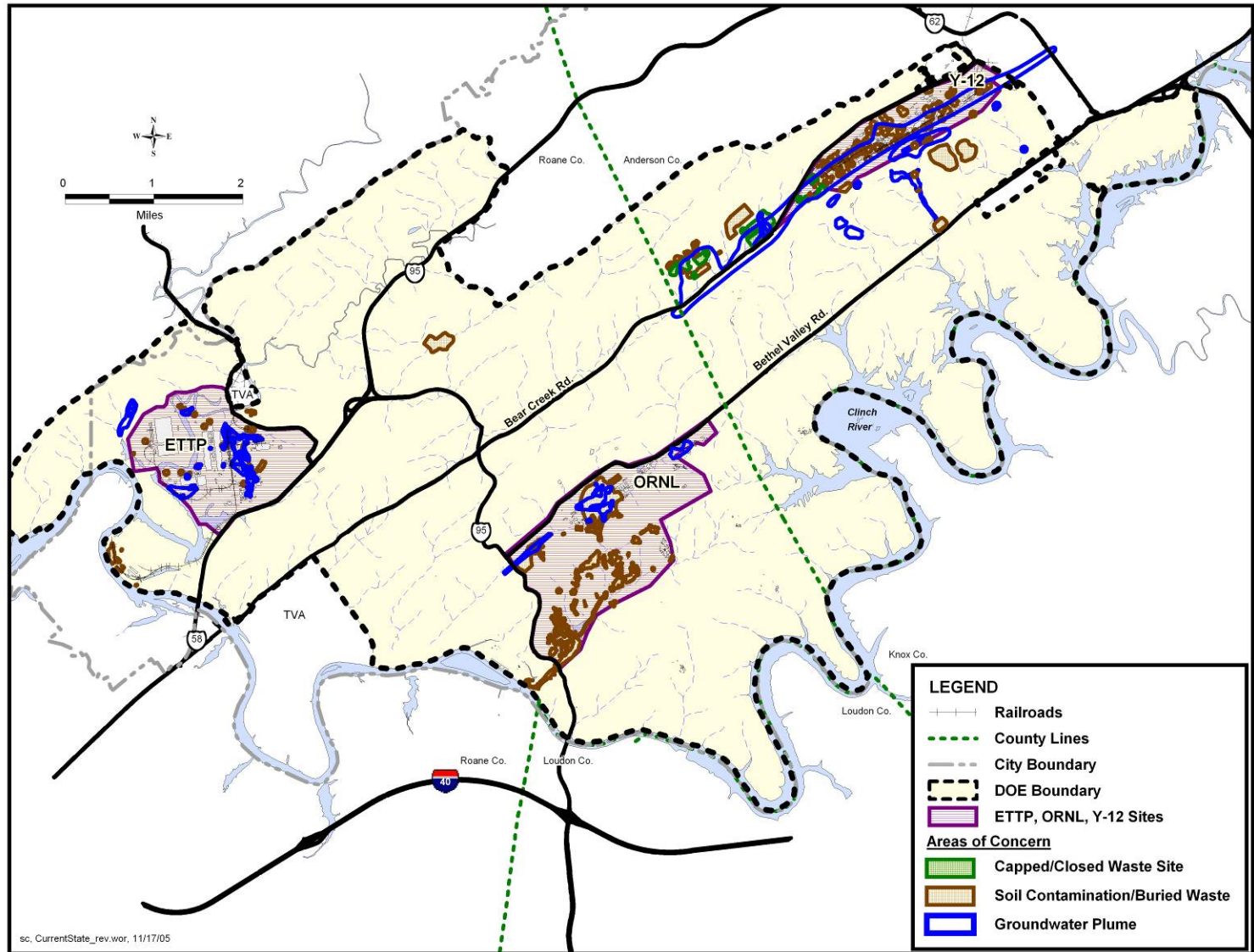


Fig. 15. Current interface of federal facilities and cleanup areas.

ORR annual site environmental report, an annual report presenting the results of environmental programs on the reservation, can be accessed on the World Wide Web at [http://www.ornl.gov/sci/env\\_rpt/](http://www.ornl.gov/sci/env_rpt/).

Maps of monitoring locations at the three major facilities on the ORR and in the surrounding areas are also available in the annual site environmental report. Locations of some of the types of monitoring performed on the ORR are shown in Fig. 10.

## **5.6 Conservation Areas**

Management of wildlife on an area as large as the ORR is necessary to ensure public safety and maximize wildlife health and diversity. The ORR was designated as the Oak Ridge Wildlife Management Area through an agreement between DOE and TWRA that gives wildlife management responsibility to TWRA (Fig. 10). Management includes wildlife population control through hunting, trapping, and removal; wildlife damage control; restoration of wildlife species; preservation, management, and enhancement of wildlife habitats; coordination of wildlife studies; and law enforcement. A wildlife management plan integrating TWRA and DOE wildlife management goals for the ORR has been prepared (Giffen, Evans, and Parr 2007). Deer hunts have been held annually since 1984 (with the exception of 2001). Turkey hunting began in 1997. A second full-time, on-site TWRA officer was added in 2003.

### **Three Bend Scenic and Wildlife Management Refuge Area**

The Three Bend Scenic and Wildlife Management Refuge Area consists of 2,920 acres set aside on June 23, 1999, through an agreement between DOE and TWRA as a conservation and wildlife management area to be cooperatively managed for preserva-

tion purposes. The agreement establishes general guidelines for managing the area to preserve and enhance its natural attributes. Recent activities have included conversion of fescue areas to restore native grasses (including prescribed burns), vegetative plantings to attract geese away from residential and facility areas, and public birding walks. Educational institutions use this area as an outdoor classroom for research ranging from bird habitat characterization to invasive plant impacts.

### **Black Oak Ridge Conservation Easement Area**

The Black Oak Ridge Conservation Easement Area was designated April 2005 through an agreement between DOE and the state of Tennessee. The agreement protects 2,966 acres at the northwest part of the ORR. TWRA will manage the land in accordance with a management plan developed jointly by TDEC and TWRA with input from the public. The easement is shown in Fig. 10.

### **Horizon Center Protected Area**

In April 2003 the developable portions (about 490 acres) of the Horizon Center (formerly parcel ED-1) were transferred to CROET. The remaining acreage along the East Fork Poplar Creek floodplain and other sensitive areas are managed by CROET for DOE.

### **Research Park Natural and Reference Areas**

Rare plant and animal species (state and/or federal candidate and/or listed) are provided protection through preservation of the habitat required for their survival. Such important habitat is established on the best available information about the need of the rare species and is protected through the Research Park Natural Area designation.

Areas that include more common or representative plant or animal communities that can serve as baseline areas for research and monitoring are identified as Research Park Reference Areas. These areas also provide protection to habitat with a high potential for rare plant or animal species, but not yet documented as containing such species.

## 5.7 Land Application of Biosolids

The city of Oak Ridge has been applying sanitary sewage sludge to approved sites on the ORR since 1983 under agreements with DOE and the state of Tennessee; these sites are shown in Fig. 10. The city of Oak Ridge is presently renovating its wastewater treatment plant's sludge-drying system.

## 5.8 Cultural and Historic Resources

The general locations of cemeteries, churches, national historic landmarks, and old home structures are shown in Fig. 16. Six properties on the ORR are included in the National Register of Historic Places: New Bethel Baptist Church and Cemetery (the church and two grave houses), George Jones Memorial Baptist Church, and Freels Cabin (a dwelling and one outbuilding).

The DOE-ORO Cultural Resources Management Plan ensures not only that DOE-ORO complies with cultural resources statutes, but also that cultural resources are addressed in the early planning stages of undertakings and that needed protection is provided or that the appropriate documentation is prepared before an undertaking is initiated (DOE 2001).

## 5.9 Wildland Fire Prevention and Response

Activities have been initiated to prevent wildfires and to plan, prepare, and provide wildland fire control response on the ORR. The ORR Wildland Fire Management Plan addresses applicable requirements of the "2001 Federal Wildland Fire Management Policy and Implementing Actions" as adopted by DOE on February 24, 2003. A DOE-ORO Wildland Fire Implementation Plan was issued October 11, 2006 (Appendix A). The plan serves as the fire-program-implementation planning tool and as a basis for use in the annual program planning and budgeting system. It provides for firefighter and public safety, consideration of values to be protected, and consistency with direction from the DOE-ORO land use planning and management process.

The hierarchy of management considerations for wildland fire on the ORR is prioritized as

1. the safety of firefighters, employees, and the public;
2. prevention of off-site release of radiological or other hazardous material;
3. protection of DOE structures, property, and programs;
4. protection of public and private property; and
5. protection of natural and cultural resources.

The primary goals of the ORR wildland fire management program are to

- contain wildland fires to manageable areas through compartmentalization and rapid response of fire-control resources;

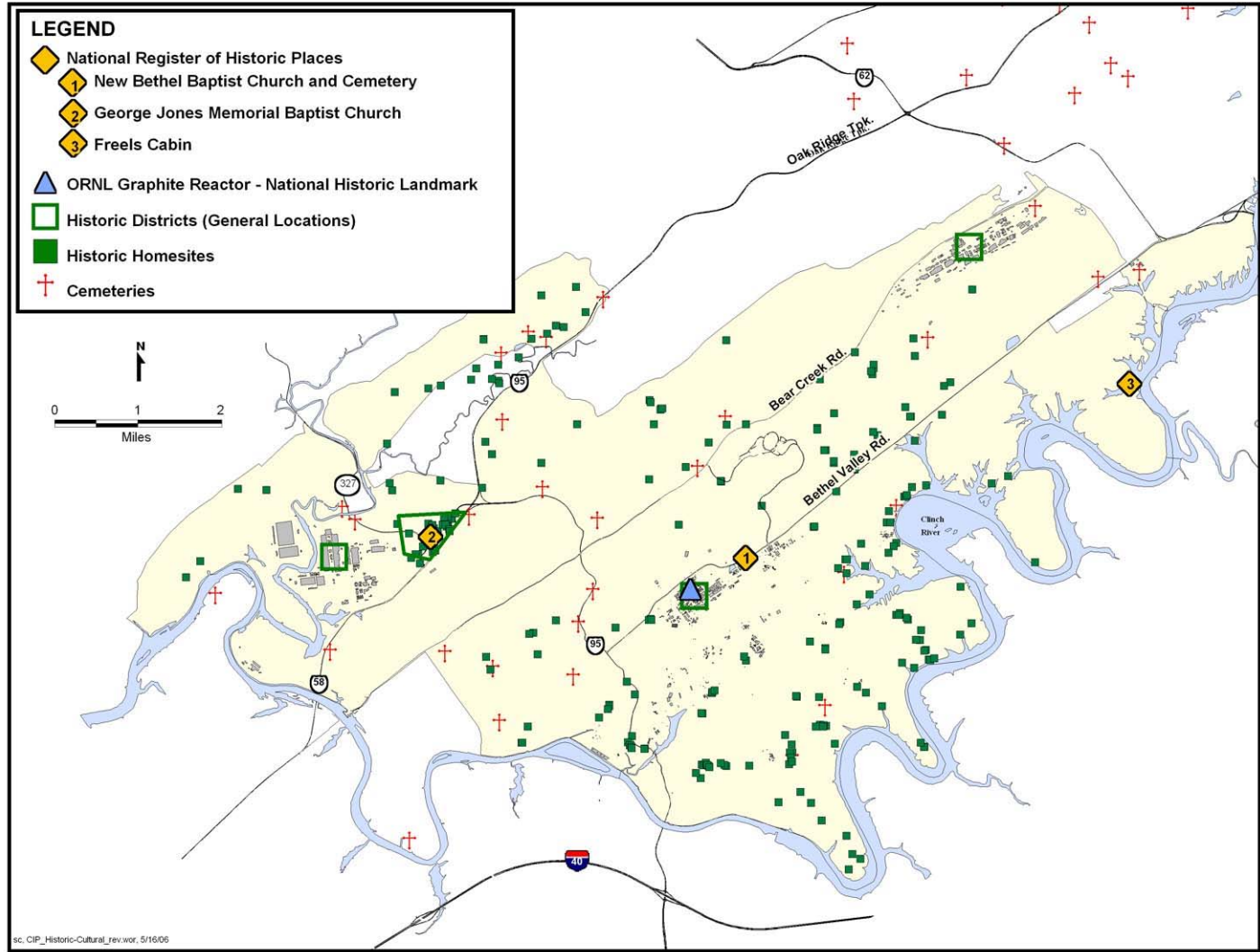


Fig. 16. Historic and cultural resources on the ORR.

- control access to “official use only” areas of the ORR, implementing fire-safe practices for industrial or research operations conducted in the wildland areas of the ORR;
- provide aggressive oversight of all open burn activities;
- consider wildland fire issues in the land use planning and management process;
- avoid damage to structures in DOE facilities and forest timber resources and prevent impacts to DOE programs from wildland fire events; and
- prevent and reduce the impact of wildland fires through controlling wildland fuels in high-access areas and minimizing fire risks to the public.

From a fire preparedness standpoint, the ORR has been divided into 45 separate compartments to facilitate access by a mechanized wildland firefighting force. The compartment boundary roads are shown in Fig. 17. The sizes of the compartments were driven by a desire to limit environmental damage and keep DOE maximum resource losses to \$1 million or less, as directed by DOE Orders 450.1 and 420.1. Based on timber values alone, the compartments are limited to a nominal size of 1,000 acres or fewer. Wildland fire compartment boundaries require a minimum road width of 20 feet with a vertical clearance of 13.5 feet. Widening and upgrading the secondary access roads to meet these standards was initiated during FY 2004.

## 5.10 ORR Infrastructure

Major utilities that cross the ORR include gas, power, water, and communication lines. For many of these services, DOE contractors are dependent on the supplier not only for

utility service to facilities within their developed areas, but also for support of more remote field sites.

### Communications Towers

Communications towers have been erected in seven locations across the reservation through permission granted by DOE realty licenses.

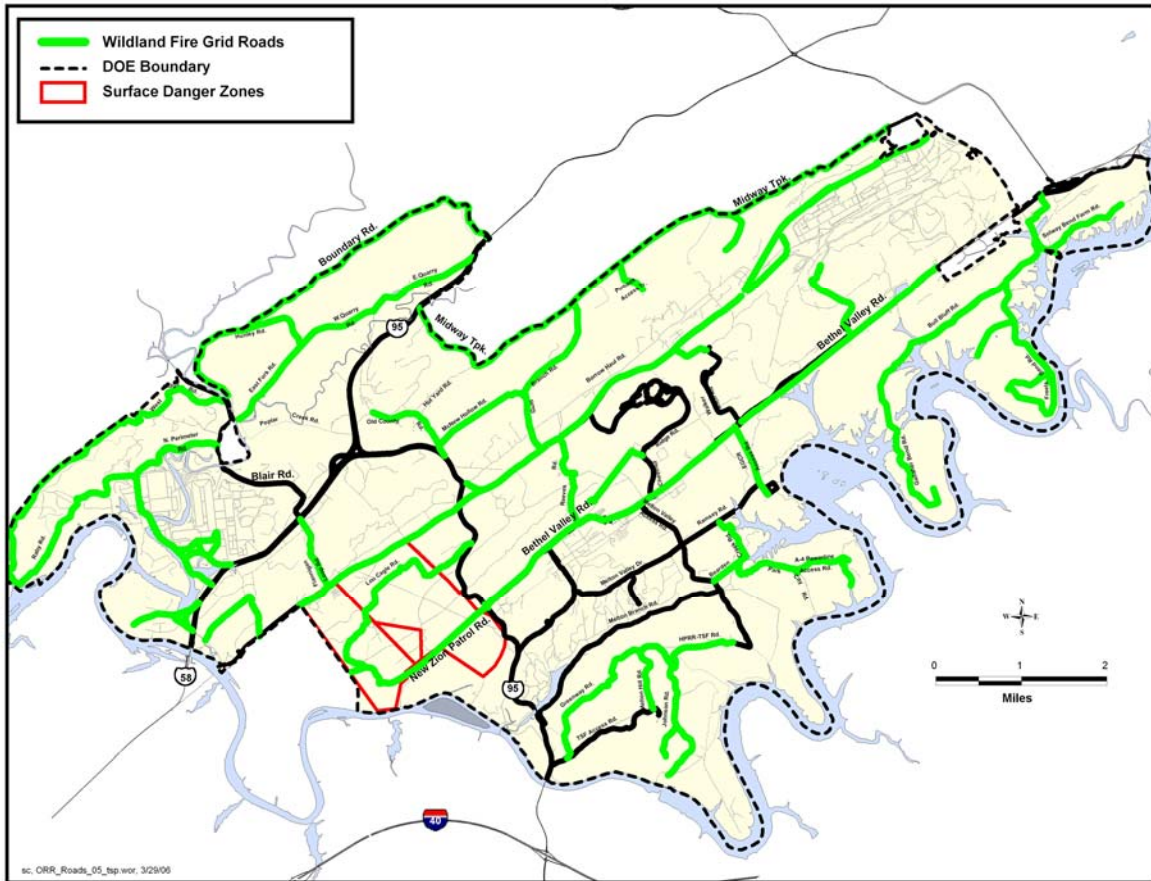
### Roads

Secondary reservation roads (Fig. 17) are used for multiples uses such as wildland fire control; utility maintenance; security; wild-life management; forest health activities; and access to facilities, research sites, monitoring locations, cemeteries, historic sites, and sensitive areas.

### Utilities

Electric power is supplied to and metered separately for each of the three major installations on the ORR (ORNL/SNS, Y-12, and ETTP) through a single contract with TVA containing two delivery points—one at ORNL/SNS and the other at Y-12. The contract with TVA contains two rate schedules, the direct-serve industrial schedule for ORNL/SNS and the direct-serve manufacture schedule for Y-12. ETTP will continue to be served through Y-12 until late summer or fall 2008, when it is scheduled to be transferred to the city of Oak Ridge.

The TVA contract was signed on May 1, 2007, and covers a 10-year period. For the first time in TVA history, the new contract was created as a one-contract, two-rate-schedule vehicle for supplying electrical power. The manufacture rate for Y-12 means an annual savings to the department of approximately \$2.7 million as a result of the reduced rate. This new contract also eliminates “provisional” billing. The



**Fig. 17. ORR road infrastructure**

previous TVA contract required a two-process mechanism for payment of the power bills. This system was created when ETPP was fully operational and, due to the cascade process used at the time, resulted in an average monthly bill for this one plant of \$20 to 25 million. The provisional bill allowed TVA to recoup 90% of the previous month's bill for operational needs. The plants on the ORR no longer require this massive amount of electrical power for operations; therefore, this billing procedure was eliminated. This approach results in savings by eliminating the redundancy within the budget process. Because of the increase in delivery points, DOE-ORO incurred an additional \$1,500 delivery-point charge and a reduction in the conjunctive-billing savings. The savings from conjunctive

billing for ORNL/SNS were diminishing because of the increased demand for power due to the increased computational abilities recently added to the ORNL computer system. TVA has completed the construction on a new substation for ORNL that replaces the antiquated one constructed in the 1940s. This construction, coupled with the transfer of the Kingston/ORNL 161 kV line to TVA and its subsequent upgrades, provides both adequate power-distribution capabilities in support of the new supercomputers at ORNL and the ability to expand and increase power if necessary should programs expand or new programs be created that require a stable electrical power source.

Natural gas delivery to ORNL, SNS, and Y-12 is accomplished through contracts with SEMPRA Energy Trading Corporation, Tennessee Gas Pipeline, and East Tennessee Natural Gas. SEMPRA Energy Trading Corporation, under contract through the Defense Energy Services Center of the Department of Defense, is the natural gas commodity supplier. Tennessee Gas Pipeline provides the pipeline capacity to bring natural gas to Tennessee from the Gulf of Mexico, and East Tennessee Gas Pipeline connects upstream and brings the gas to Pumping Stations B and C on the ORR. Station B supplies natural gas to ORNL, while Station C supplies gas to Y-12, allowing each site to be independent of the other from both delivery and management perspectives.

Because DOE operations at ETTP have ceased except for the environmental management cleanup program, and the site is undergoing reindustrialization by private industry, it is supplied separately from the rest of the ORR. Natural gas is delivered to ETTP through Station A, which is supplied and managed by the Oak Ridge Utility District. It is expected that the electrical system at ETTP will be transferred to the City of Oak Ridge Electrical Department, which will complete privatization of the ETTP utility system.

## 5.11 Public Areas/Recreation

Clark Center Park and four public greenways are the only areas within the

ORR that are open to the public without access control restrictions. DOE made improvements at Clark Center Park in 2005 to enhance access and enjoyment by individuals with mobility disabilities.

Gallaher Bend Greenway (within the Three Bend Scenic and Wildlife Management Refuge Area) was opened in December 1997. North Boundary Road Greenway, which follows East Ridge Road and Poplar Creek Road, was opened in 1999 and expanded in 2005. Wheat Historic District Greenway was established in 2004. Dyllis Orchard Public Hiking Trail was opened in the western section of the Black Oak Ridge Conservation Easement Area in 2007. The greenways are shown in Fig. 10.

Other areas on the ORR are open to the public with prior arrangement through registration (e.g., tours sponsored by AMSE, public walks, and Ecological and Physical Sciences Study Center classes) or special permitting (TWRA hunts). The New Bethel Baptist Church and Interpretive Center is one of the few remaining original structures of pre-Manhattan Project days and is listed on the National Register of Historic Places. This facility and the adjacent cemetery are accessible to the public through special tours from AMSE. Public walks (e.g., bird walks, wildflower hikes, and trips to field research sites) are offered annually on the ORR.

## 6. Integrated Ecosystem Management Actions

Ecosystem management activities for the ORR include the following:

- managing game and nongame wildlife;
- identifying and maintaining special or sensitive plant and wildlife communities;
- protecting wetlands, riparian areas, and aquatic resources;
- restoring native communities where possible;
- managing nonnative, invasive plant species; and
- maintaining a healthy forest.

### 6.1 Wildlife Management

Most of the ORR is a Wildlife Management Area managed by TWRA through an agreement with DOE. An updated wildlife management plan for the ORR was prepared and approved by DOE in August 2007 (Giffen, Evans, and Parr 2007).

The overall goals of wildlife management on the ORR are to

- minimize wildlife damage to property and threats to public safety;
- preserve healthy natural wildlife populations and habitat compatible with the DOE mission;
- maintain and enhance wildlife biodiversity on the ORR; and
- integrate research, recreation, forest stewardship, and other land use practices with wildlife management objectives under multiple-use objectives.

Management includes wildlife population control through hunting, trapping, removal,

and habitat manipulation; wildlife damage control; restoration of wildlife species; preservation, management, and enhancement of wildlife habitats; coordination of wildlife studies and characterization of areas; and law enforcement. Wildlife resources are divided into several categories, each with a specific set of objectives and procedures for attainment. These objectives are management of

- wildlife habitats to ensure that all resident wildlife species exist on the ORR in viable numbers;
- featured species to produce selected species in desired numbers on designated land units;
- game species for research, education, recreation, and public safety;
- the Three Bend Scenic and Wildlife Management Refuge Area;
- nuisance wildlife, including nonnative species, to achieve adequate population control for the maintenance of health and safety on the ORR;
- sensitive species (i.e., state or federally listed as endangered, threatened, of special concern, or in need of management) through preservation and protection of both the species and habitats critical to the survival of those species;
- nongame species for research, education, and recreation opportunities (e.g., bird walks, greenway enhancements); and
- wildlife disease.

Work toward achieving these objectives is the combined effort of DOE, TWRA, and ORNL and additional coordination with USDA, Animal and Plant Health Inspection



Service—Wildlife Services. Additional information about wildlife management on the ORR is available online at <http://www.esd.ornl.gov/facilities/nerp/wildlife.html>.

## 6.2 Sensitive Area Characterization and Rare Species Protection

The ORR has evolved into a biologically rich resource over the last 60 years. More than 270 occurrences of significant plant and animal species were recognized by The Nature Conservancy in its report of biodiversity on the ORR as part of the Common Ground DOE Future Land Use Initiative (The Nature Conservancy 1995). In addition, using a national ranking system, The Nature Conservancy identified more than 69 preliminary conservation sites with occurrences of rare species and communities and other important features (e.g., caves, springs). These sites generally had clusters of important species or communities, with special emphasis placed on those species and elements designated as globally imperiled, rare, or uncommon in The Nature Conservancy and Natural Heritage Network ranking system. Information on these sites is contained in Parr and Hughes 2006.

Special habitats on the ORR are referred to as Sensitive Areas and are identified with National Environmental Research Park designations (Parr and Pounds 1987).

Primary designations are as follows:

- NA: Natural area. These areas (primarily terrestrial, but may include aquatic aspects) contain listed species.
- ANA: Aquatic natural area. These aquatic systems contain listed species.
- RA: Reference area. These areas (primarily terrestrial, but may include aquatic aspects) include special habitats (e.g., wetlands, cedar barrens) or fea-

tures (caves) and may also serve as reference or control areas for biological monitoring, environmental remediation, characterization, and other ecological research activities.

- ARA: Aquatic reference area. These aquatic systems include special habitats (e.g. wetlands, cedar barrens) or feature (caves) and may also serve as reference or control areas for biological monitoring, environmental remediation, characterization, and other ecological research activities.
- PH: Potential habitat. These are areas that are likely to have state-listed species, though none have been recorded.

Although these sensitive areas are identified through National Environmental Research Park designations, they occur across the ORR, both within and outside of the Research Park boundaries (on DOE property).

## 6.3 Habitat Restoration

Primary habitat restoration activities have included native grass/prairie restoration and wetland/riparian area enhancement.

### Native Grass/Prairie Communities

Many of the natural prairies that once existed in east Tennessee have been lost or degraded as a result of suppression of fires and other disturbances, dumping of debris, development, conversion to fescue fields, or invasion by exotic species. The native grasses and wildflowers that grow in prairies provide habitats for wildlife that depend on those plants for cover, nesting, and food. Some prairie communities exist on the ORR and include both naturally occurring cedar barrens and actively managed grasslands.

Restoration of native warm-season grasses with native wildflowers throughout the ORR has been a focus over the past few years. Some of the many benefits of planting native grasses and forbs include improved habitat quality for wildlife, improved aesthetic values, lower long-term maintenance costs, and compliance with Executive Order 13112 on invasive plants and Executive Order 13148 on environmentally and economically beneficial practices on federal landscaped grounds. Challenges to restoring native grasses have included gaining hands-on experience in planting and maintaining these communities, treating and converting established fescue areas, and paying the higher upfront costs of getting native grasses established. The goals of restoring and maintaining native grass communities on the ORR are to provide grassland habitats; promote efficient management of open grass areas; and reduce, where possible, the costs associated with maintenance of grass areas. Although many native-grass-restoration projects focus on establishing large tracts of open grasslands, the goals for the ORR are shaped more by the nature of East Tennessee habitats and the constraints associated with the presence of federal facilities and missions. The ORR has grasslands that are small in size and often placed adjacent to manmade structures or as buffers for other natural features. Some larger-scale grasslands are being established in the Three Bend area, which is managed by TWRA. For the rest of the ORR, the primary sites for conversion to grasslands are road rights-of-way, utility rights-of-way, fallow hay or forage fields of nonnative grasses, select remediation sites, and facility buffer zones. Other sites that will be considered for conversion to grasslands include pine plantation areas damaged by southern pine beetles, spoil areas associated with construction activity, and areas treated for invasive

plants. A native grass community management plan was prepared, approved, and published in June 2007 (Ryon, Parr, and Cohen 2007). Since the initiation of native grass restoration on the ORR, about 250 acres have been planted. More details on the native grass restoration are available online at [http://www.esd.ornl.gov/facilities/nerp/habitat\\_management.html](http://www.esd.ornl.gov/facilities/nerp/habitat_management.html).

## **Wetlands**

The approximately 580 acres of wetlands on the ORR provide water-quality benefits, stormwater control, habitat for wildlife and rare species, and landscape and biological diversity. Wetlands occur across the ORR at low-elevation positions, primarily in the riparian zones of headwater streams and their receiving streams, as well as in Clinch River embayment areas. Wetlands range in size from several square yards at small seeps and springs to approximately 25 acres at White Oak Lake.

Management activities have recently created additional wetlands on the ORR. These wetlands resulted from activities such as development of a water detention basin during construction of new buildings, creation of artificial wetlands as mitigation for impacts to such areas, and reestablishment of wetlands by curtailing vegetation mowing. These developments provide important additions to the existing inventory of wetlands on the ORR and often reflect a return to the land use conditions that existed prior to the creation of the reservation during the Manhattan Project.

More details on the wetland/riparian area enhancements are available online at [http://www.esd.ornl.gov/facilities/nerp/habitat\\_management.html](http://www.esd.ornl.gov/facilities/nerp/habitat_management.html).

## 6.4 Invasive Plant Management

The occurrence of invasive plants on the ORR has been recognized for many years, especially in areas where they have impacted operations (e.g., maintenance, forestry, security, research, monitoring, remediation). However, documentation of the types and frequency of invasive plants in specific locations was begun only within the last 10 years. In 2004 an invasive plant management plan for the ORR was prepared, approved, and initiated (Parr et al. 2004). About 168 of the 1,100 vascular plants on the ORR are not native. Of these, 54 have been identified as aggressive. DOE and contractors identified priorities for invasive plant management that included

- early detection and removal of new invaders,
- protection of natural areas,
- integration of removal with other tasks,
- addressing corridors that encourage movement of invasive species,
- dealing with utility infrastructure,
- evaluating the potential for wildland fire due to accumulation,
- restricting transport of contaminants,
- protecting research areas,
- preventing establishment in restoration/remediation sites,
- eliminating potential safety problems (hiding hazards, breeding sites for mosquitoes, imminent safety hazards),
- discouraging encroachment on compliance and monitoring sites,
- dealing with security impacts,
- eliminating visual impacts,

- minimizing wildlife habitat impacts,
- preserving the integrity of cultural resources sites,
- preventing impact to neighbors at boundaries, and
- protecting wetlands and hydrologic regime impacts.

Three approaches have been implemented for invasive plant treatment. They target control to manage (1) an individual species regardless of where it occurs, (2) multiple species in specific areas, and (3) the corridors or routes of dispersal and invasion. Areas identified as needing treatment are assessed, ranked, and prioritized. Through the end of FY 2007, approximately 629 acres of the ORR had been treated to manage invasive plant species since the initiation of the management plan actions. Additional information about invasive plant management activities is available online at [http://www.esd.ornl.gov/facilities/nerp/invasive\\_species.html](http://www.esd.ornl.gov/facilities/nerp/invasive_species.html).

## 6.5 Forest Stewardship

The ORR is mostly contiguous native eastern deciduous forest (about 24,000 acres). This large, relatively unfragmented forest area provides important sites for work in support of DOE's mission research, particularly global climate change, as well as habitat for numerous wildlife species. Such blocks of forested area are increasingly uncommon in the Valley and Ridge Physiographic Province and nationwide. Additionally, these forests provide the framework for numerous other ecological communities such as grasslands, forest edges, cedar barrens, old-growth forests, bottomland hardwoods, wetlands, caves, and other areas. Information on significant interior forest resources as well as forest

cover is available in *Oak Ridge Reservation Physical Characteristics and National Resources* (Parr and Hughes 2006).

The forests of the ORR provide a safety and security buffer around major installations, an outdoor laboratory in support of research investigating the effects of various energy technologies on environmental processes, and resources for future mission needs, including space.

ORR timber is currently salvaged as a by-product of other activities (clearing for

projects, research needs, security considerations), but harvesting for marketing purposes is not a primary objective.

A DOE ORR Integrated Forest Management Plan, currently in development, will provide the framework within which forest resources will be managed in support of DOE missions, including environmental stewardship. The plan will provide an overview of past forest-management activities, present forest conditions, and future programmatic activities.

## 7. ORR Future Land and Facility Use Planning

Future uses of the ORR will, in most cases, expand and build on current land uses, not replace them. Future uses include field research areas and facilities (environmental research, security and monitoring systems); environmental management and long-term stewardship areas (remediated, restored, and protected contaminated areas); infrastructure improvements (communications, utilities); land-responsibility actions (emergency response, wildland fire prevention and response, conservation easements); integrated management of natural resources; and additional public and educational opportunities (greenways, stakeholder involvement). Current land and facility uses are also expected to continue.

### 7.1 Field Research Areas and Facilities

The ORR offers unparalleled resources for ecosystem-level and large-scale research within a 20,000-acre outdoor laboratory. Along with large blocks of forest and diverse vegetational communities, the Oak Ridge National Environmental Research Park offers the ability to use or establish highly equipped sites in a secure area. Existing roads and the utility infrastructure provide critical field research components. National recognition of the ORR as a resource has led to proposed uses that are components of both continental- and regional-scale projects.

Future environmental research is proposed and/or planned across the entire reservation (except for the ETPP area) in addition to areas in which research is in progress. The focus of future experimental research and monitoring activities is described in greater detail in the 2007 *Oak Ridge National*

*Laboratory Ten-Year Site Plan* (ORNL 2007). Future field research areas and facilities are

- aquatic–terrestrial interface studies,
- detection and simulation of ecosystem response,
- an ecological field station,
- the National Ecological Observatory Network (NEON),
- the Power Delivery Research Center,
- SensorNet nodes, and
- an old-field succession FACE experiment.

Figure 18 shows areas of future new research on the ORR.

#### Aquatic-Terrestrial Interface Studies

A number of small, essentially undisturbed watersheds that have high potential as environmental research sites are located along the southern boundary of the ORR.

Walker Branch Watershed is the best-known and most intensively studied watershed on the reservation (see <http://walkerbranch.ornl.gov/>), but it is not the only area worth attention. Bearden Creek and McCoy Branch on the west and east sides of the Walker Branch Watershed contain second- and third-order perennial streams. The embayments of Melton Hill Reservoir at the mouths of all three of these watersheds are relatively isolated and have good potential for aquatic research. There are also a number of other first- and second-order watersheds along the south shore of the reservation that could be used for replication studies; three of these are downstream of

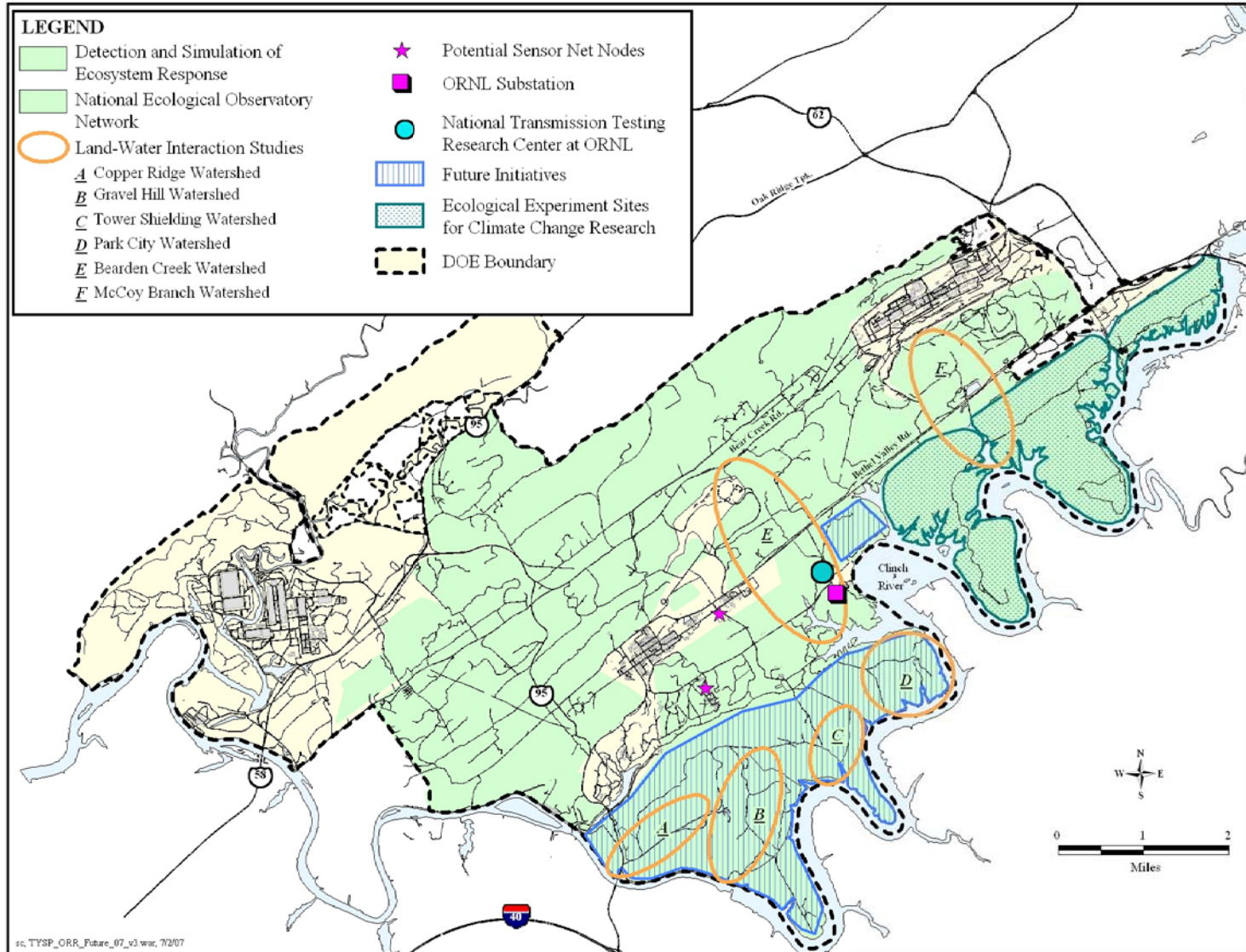


Fig. 18. Future new land uses and facilities on the ORR.

White Oak Creek, and four are between Melton Hill Dam and Walker Branch Watershed.

The aquatic research that could be done at these sites includes development and testing of new environmental tracers to measure ecological processes. The Pine Ridge Forested Catchments are four adjacent, relatively undisturbed first-order forested catchments that offer a large potential for watershed and stream research in a different major type of geological setting. Current efforts are focused on the refinement of the science plan and funding actions.

### **Detection and Simulation of Ecosystem Response**

The ORR will be an important component of the Detection and Simulation of Ecosystem Response initiative, which is also part of the ORNL agenda. Specific locations, from the Cumberland Plateau through the ORR and up to the Great Smoky Mountains, will be used for developing new methods to detect changes in ecosystems at the physiological and genomic levels brought on by natural events and human activities. This capability, linked to new ecosystem models, may provide insights into ways to detect potential changes early enough that mitigation plans can be implemented before permanent, irreversible, system-level changes occur.

### **Ecological Field Station**

UT–Knoxville is interested in locating an ecological field station in the vicinity of the ORR. The field station would address DOE missions in both research and education. UT–Knoxville is currently collaborating with ORNL on DOE research in terrestrial ecology. Future field-based efforts are being planned in response to the DOE mission research.

This facility would allow field research in both terrestrial and aquatic ecosystems on the ORR by local scientists, students, and visiting researchers from around the world. The facility would include classrooms, offices, laboratories, and perhaps even modest bunk and kitchen capabilities for visiting researchers.

The field station needs to be located in a protected and secure area, yet be accessible to students and guests. Proximity to the UT–Knoxville campus and to field research on the ORR is another important factor. Analyses of site needs and availability are under way.

### **National Ecological Observatory Network**

ORNL and university partners were selected by the NSF NEON to establish infrastructure for intensive monitoring of a wildland site. Such sites will be studied and made available to researchers for up to 30 years. Current plans are to include some portion of the ORR (perhaps Walker Branch Watershed) as the wildland site. In addition, manipulative experiments (primarily temperature) may be implemented, and the ORR is being considered as a possible node in that network as well.

### **Power Delivery Research Center**

The testing capabilities of the Power Delivery Research Center include accelerated testing of advanced overhead conductors, superconducting cables, distributed energy technologies, and power electronics.

Development of advanced transmission testing in Oak Ridge is a recommendation of DOE's National Grid Study. Steady load demand growth, new and increased power-flow patterns, new line siting difficulties

with long lead times, and a drop in transmission-network investment over the past 20 years have led to a critical R&D need. DOE recognizes the need for an emphasis on transmission and sensor R&D and is working with manufacturers (such as American Superconductor and Southwire) and utilities (such as TVA and American Electric Power) on proposals that would significantly expand the role of the Power Delivery Research Center at ORNL.

DOE is also focusing on distributed energy systems and their integration into the electric grid. Over the past 2 years, ORNL has developed the Distributed Energy Communications and Controls (DECC) testing facility for studying dynamic voltage and power-factor control supplied from distributed energy resources. Because ORNL owns and operates its own electricity-distribution utility for the laboratory campus, the distribution system can be configured to provide optimum opportunities for testing of nonactive power (including reactive power) injection effects from rotating and inverter-based distributed energy. The DECC laboratory is also unique in that the tests are designed by representatives from the electric-utility industry and distributed-energy manufacturers to address the actual challenges facing utilities and potential scenarios for the future.

### **SensorNet**

The objective of the SensorNet project is to develop an interoperable system that allows real-time analysis for sensor information. The system is being designed to provide the Department of Homeland Security with an incident-discovery, awareness, and response capability addressing local, regional, and national needs. The networking infrastructure will be a common data highway for the near-real-time intelligent collection, processing, and dissemination of sensor data that

will include chemical, biological, radiation, nuclear, and explosives sensors; meteorological instruments; and other sensors (e.g., video cameras and air-quality, environmental, and disease tracking).

SensorNet is transitioning a number of the test beds to operational prototypes sponsored under separate funding, including the Southeast Transportation Corridor Pilot, a Domestic Nuclear Detection Office–led effort to place a radiation sensor system in nine states; the Southeast Region Radiation Pilot Program, sponsored by the Open Geospatial Consortium, to deploy a sensor suite at the Port of Charleston; and the establishment of a Sensor Fusion Center for the state of Kentucky and the city of Memphis. The ORNL test bed will continue to be developed, and in 2007 IBM and Oracle agreed to support the test-bed activities (as they relate to development of an open-source implementation of INFO-d).

### **Old-Field Succession FACE Experiment**

A proposal is being developed for the DOE Office of Science to plan and initiate a new global change experiment. Forest regeneration and development contribute to the global carbon cycle, but an understanding of how the rates and patterns of woody tree establishment and growth under future atmospheric and climatic conditions will alter predictions of carbon cycling in natural ecosystems is still lacking. This shortcoming can be addressed by focusing on an intact, successional, old-field ecosystem. Because successional trajectories are well understood in these systems, and the process of succession occurs rapidly, the experiment can be conducted within a realistic timeframe.

ORNL has been conducting a multifactor manipulation (CO<sub>2</sub>, temperature, and soil moisture) of a constructed old-field ecosys-



tem using 4-meter-diameter open-top chambers in the 0800 area of the ORR. This approach has limited the ability to sample destructively and therefore the knowledge of key ecological interactions, such as above-ground and belowground herbivory. Hence, concepts are being developed to establish a FACE experiment that also includes precipitation manipulation (imposed drought) in an intact old-field system. A key component of the proposed experiment is the evaluation of simulated atmospheric and climatic change on woody plant establishment under realistic ecological field conditions.

The experiment will provide key data, such as the effects of elevated CO<sub>2</sub> on old-field productivity, soil carbon cycling, tree seed germination, and seedling mortality, and the modifying influence of drought on ecosystem and dynamic vegetation models used to address carbon and climate feedbacks.

The proposed experiment will require a protected and secure area, yet one that is accessible to local and visiting researchers. Sufficient acreage will be needed to establish long-term manipulative experiments, and proximity to infrastructure (roads, electricity, water, and Internet) is essential. The research requires access to sites with ecological characteristics such as replicated habitats; distinct aquatic, old-field, and forest interfaces; successional gradients; and microclimate gradients.

Analyses of possible locations on the ORR are currently under way. Preliminary screenings suggest that the Three Bend area offers unique characteristics for this research and that the proposed research is consistent with the current missions of the Three Bend area.

## 7.2 Future Initiatives

DOE's vision includes multiple uses of the land to meet its mission goals and objectives. In addition to the research, energy, and remediation uses already discussed, other potential future initiatives include

- transfer of additional parcels adjacent to ETTP to CROET;
- transfer of facility to NOAA;
- transfer of parcel ED-6 to city;
- transfer of parcel G to city;
- construction of the first Oak Ridge Science and Technology Park facility, and
- proposal of an area for a Global Nuclear Energy Partnership facility.

## 7.3 Environmental Management and Long-Term Stewardship

*U.S. Department of Energy Oak Ridge Reservation End State Vision, Rev. D2, (DOE 2004)* describes the long-term vision for the ORR in support of DOE Policy 455.1, "Use of Risk-Based End States," and the associated guidance document. The risk-based end state represents site conditions that reflect the planned future use of the property at the completion of the EM mission and is appropriately protective of human health and the environment consistent with that land use. The intent of this policy is to ensure that cleanup efforts throughout the DOE complex are driven by clearly defined, risk-based end states and to identify any potential variances between current cleanup plans and action required to attain the risk-based end state.

Each of the major facilities on the ORR has a different expected end use. ETTP has no continuing DOE mission and is being remediated to allow use of the site for a commercial industrial park without a significant DOE presence. ORNL will continue to be operated by the DOE Office of Science as a multidisciplinary R&D center (ORNL 2002b). The Y-12 National Security Complex will continue to be operated by NNSA for national defense operations (BWXT 2003).

The current life-cycle baseline supports the end uses contained in the RODs where available and is consistent with recommendations of the End Use Working Group for those areas for which decisions have not been made. The end uses assumed in the life-cycle baseline plan for the ORR areas are as follows:

- ETTP: Unrestricted industrial use (commercial industrial park);
- Melton Valley: Some restricted waste management areas; some DOE-controlled industrial use;
- Bethel Valley: Some DOE-controlled industrial use; some unrestricted industrial use;
- Upper East Fork Poplar Creek: DOE/NNSA-controlled industrial use;
- Bear Creek Valley: DOE/NNSA-controlled industrial use (with some restricted waste management areas); and
- Chestnut Ridge: DOE/NNSA-controlled industrial use (with some restricted waste management areas).

Following completion of the EM mission in 2015, the primary hazards remaining within the ORR are expected to primarily consist of areas dedicated to long-term management of radioactive and hazardous waste. These

areas include capped waste-disposal sites in Melton Valley, the Environmental Management Waste Management Facility and the Bear Creek Burial Ground in Bear Creek Valley, and capped waste-disposal sites on Chestnut Ridge and other locations. Additional hazards may include contaminated sediments in White Oak Creek and White Oak Lake in Melton Valley and miscellaneous smaller hazard areas.

Potential risks from each of these hazards will primarily be managed through the use of institutional controls to restrict access to them and ongoing monitoring. Figure 19 shows the ORR physical and surface interface for the risk-based end state plan.

## 7.4 Enhancement of Area Economic Development

Since its inception in 1996, the Reindustrialization Program has been responsible for leasing more than 80 properties and bringing more than 35 private companies to ETTP. Reindustrialization is an innovative method to accelerate cleanup of DOE facilities at a reduced cost. It allows for productive use of idle DOE facilities, offsets the negative effects of DOE downsizing, and helps to stimulate the regional economy.

The reindustrialization of ETTP is part of an overall development plan for the west end of Oak Ridge. The Horizon Center, a 1,000-acre industrial park located to the east, is targeted for “high-end industries” that would prefer to locate on a greenfield site (i.e., property that has never been used by DOE) rather than a brownfield one. Approximately 500 acres of the site have been transferred to CROET for development purposes. To date two facilities have been constructed, and discussions are under way for the construction of two additional buildings.

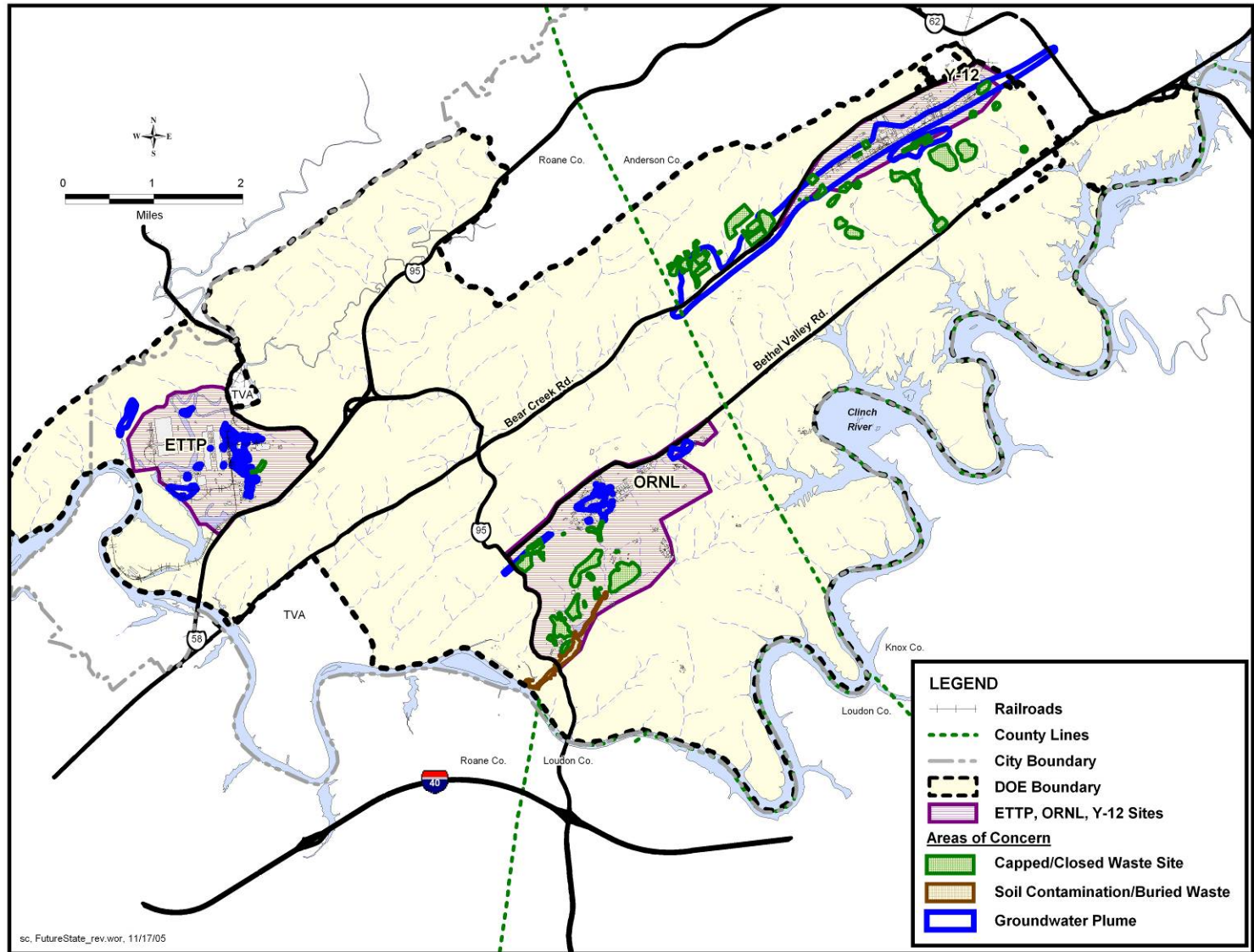


Fig. 19. ORR physical and surface interface for risk-based end state plan.

The types of industries targeted for Horizon Center include research and development companies, pharmaceutical companies, and computer and electronics manufacturers. In addition to the development at the Heritage and Horizon centers, DOE is considering the transfer of property in this vicinity for light industrial and/or commercial use. With the transfer of land for this purpose, CROET will have the full complement of properties that can meet the demands of all types of

businesses. The city of Oak Ridge is involved in the overall development plans for the west end of Oak Ridge and is working in conjunction with DOE and CROET on the transition of infrastructure at ETTP, development of the new infrastructure to meet the demands of the Heritage and Horizon centers, and other projects in the area such as Rarity Ridge, a residential/commercial area located across the Clinch River from ETTP.

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**APPENDIX A**

**WILDLAND FIRE RESPONSE**

United States Government

Department of Energy  
Oak Ridge Office

# memorandum

DATE: November 27, 2006

REPLY TO

ATTN OF: OS-204:LDuquella

SUBJECT:

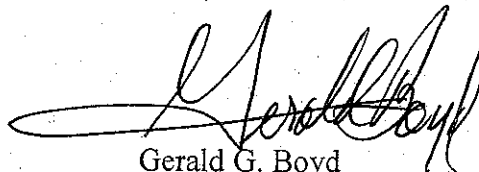
**WILDLAND FIRE MANAGEMENT PLAN AT THE OAK RIDGE  
RESERVATION (ORR)**

TO:

Stephen H. McCracken, Assistant Manager for Environmental Management, EM-90  
Johnny O. Moore, Acting Assistant Manager for Science, SC-10  
Daniel H. Wilken, Assistant Manager for Administration, AD-40  
Larry C. Kelly, Assistant Manager for Environment, Safety, and Health, SE-30  
Chuck A. Spoons, Chair, ORR Coordinator, AD-40

Attached is a revision to the Wildland Fire Implementation Plan signed by the Department of Energy and National Nuclear Security Administration on April 17, 2006. This revision incorporates a revised strategy for initial response to a wildland fire. The intent of this revised strategy is to first provide for initial containment of a wildland fire. This will be achieved by using the existing Common Response Plan and the Mutual Aid Agreement with the City of Oak Ridge. Responders will attack the fire from the access roads as a standard urban response tactic. This strategy is sufficient to address over 97 percent of the wildland fire situations that we have encountered in Oak Ridge. In the case of a wildland fire that is beyond initial response capability, the larger response will be coordinated and carried out by the Forestry Division of the State of Tennessee Department of Agriculture. The State is to provide wildland firefighting personnel, equipment, and air support if needed. The Oak Ridge National Laboratory Forestry Management Group will no longer have a wildland fire response function.

If you have any questions, please contact me at (865) 576-4444 or Leon Duquella of my staff at (865) 576-9755.



Gerald G. Boyd  
Manager

Attachment

cc w/attachment:

Robert J. Brown, M-3  
Mark Robinson, OS-204  
Don F. Thress, OS-20

Concur:



ORR Integrated Planning Process Manager  
Y-12 Site Office



# OAK RIDGE RESERVATION WILDLAND FIRE IMPLEMENTATION PLAN



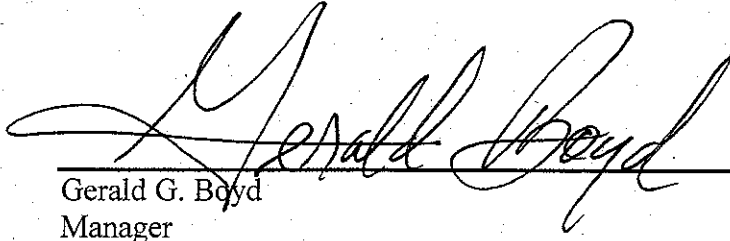
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*October 11, 2006*

*Rev. 1.*

**SIGNATURE PAGE**

APPROVED:



A handwritten signature in cursive script, reading "Gerald G. Boyd", is written over a solid horizontal line. The signature is positioned to the left of the line's end.

Gerald G. Boyd  
Manager

## 1. INTRODUCTION

This implementation plan was prompted by the June 29, 2005, issuance of the Department of Energy Oak Ridge Office (DOE ORO) Wildland Fire Management Plan, and the Secretarial Memorandum, "*Department of Energy Wildland Fire Management Policy*," dated February 24, 2003, which requires sites to have a wildland fire management plan consistent with Federal policy (2001 Federal Wildland Fire Management Policy). The Secretarial Memorandum also requires site fire management plans to be consistent with DOE O 450.1, *Environmental Protection Program*, Section 4.b(1)(e), which requires the protection of site resources from wildland and operational fires. This DOE ORO Wildland Fire Implementation Plan serves as the fire program implementation planning tool and as a basis for use in the annual program planning and budgeting system. It provides for firefighter and public safety, consideration of values to be protected, and consistency with direction from the ORO land-use planning and management process. A Needs Assessment for the Oak Ridge National Laboratory (ORNL) Fire Department was conducted in 2003. The Needs Assessment Team was reconstituted as the Needs Assessment Verification Team to address verification of the Wildland Fire issues. The comments from the Needs Assessment Verification Team have been integrated into this plan.

## 2. PROGRAM OVERVIEW

The intent of the Wildland Fire Implementation Plan is to first provide for initial containment of a wildland fire. This will be achieved by using the existing Common Response Plan (CRP) and the Mutual Aid Agreement (MAA) with the City of Oak Ridge. This will enable responders to quickly attack the fire from the access roads as a standard urban response tactic. This strategy is sufficient to address over 97 percent of the wildland fire situations that we have encountered in Oak Ridge. In the case of a wildland fire that is beyond initial response capability, the response will be coordinated and carried out by the Forestry Division of the State of Tennessee Department of Agriculture. The State is to provide wildland firefighting personnel, equipment, and air support if needed.

DOE ORO will accomplish the implementation of the Wildland Fire Management Plan by assigning responsibility of the program to the Reservation Management Coordinator who will coordinate program planning and budget. In support of this effort, East Tennessee Mechanical Contractors (ETMC) is responsible for the majority of reservation road maintenance, wildland fire grid, and access gates. The incident command structure is implemented under the site fire department(s). UT-B is responsible for support of the burn plan reviews for reservation controlled burns.

Safety is the top priority of all fire control efforts and is the top responsibility of all personnel on the ground and in the Emergency Operations Center.

### 3. RESPONSIBILITIES

#### **DOE ORO Reservation Management Coordinator**

The DOE Reservation Management Coordinator who reports in this functional capacity to the Reservation Manager (Manager, ORO) will with appropriate consultation (as required) with the respective contracting officers:

Coordinate wildland fire mitigation and response program planning and budget with the Contracting Officer's Representative (COR).

Provide ultimate approval of all burn plans on the ORR. These plans are also required to be concurred and recommended for approval by the responsible COR and the UTB.

Integrate consideration of fire management into the DOE land-use planning and management process, objectives, and practices. The Reservation Management Coordinator is the chair for the ORR Management Team, which includes National Nuclear Security Agency (NNSA) and Security and Emergency Management members. The integration is expected to be completed by DOE ORO within 6 months of the approval of this implementation plan.

Ensure that hard copy paper maps are available in the field to help identify concerns not obvious on the ground. Map copies will be generated in advance and be kept by the site fire departments along with forest compartment maps and others. Also, there are numerous hazardous or radioactive waste depots or areas throughout the ORR known as Hazardous Areas of Concern (HAC). These HAC have also been incorporated into the Emergency Management Mapping Application (EMMA) system and will also be included in the Reservation Management Coordinator's discussion about buffer zones.

Include local stakeholder participation in the planning and analysis process regarding wildland fire prevention programs through public meetings held on various topics including wildland fires. Other stakeholders, such as the Tennessee Valley Authority (TVA) and private property owners near the reservation, will be contacted and invited to participate in the planning and discussion meetings regarding the wildland fire program.

Ensure, through public meetings and information awareness bulletins, that the adjoining property owners and other community and citizen groups are aware of each others' fire prevention responsibilities and actions to minimize losses and damage to structures and lands.

Task a DOE ORO Federal official to approach residential areas that border the ORR to obtain permission to clear and remove wildland fuels. Request periodic inspections by the DOE ORO Fire Protection Engineer (FPE), which will ensure that these zones are maintained. This action is expected to be completed within 12 months of the approval of this implementation plan.

Be responsible for preparing a triennial risk and hazard rating analysis and wildland fire needs assessment, to be prepared by the ORO FPE. These documents will be used to determine the level of the wildland fire threat to life and values at risk at the ORR and the risk to residents and other neighbors. The risk and hazard ratings shall be the basis for the implementation of mitigation measures relative to vegetation, other combustibles, and construction criteria. As a minimum, the rating system shall contain the rating factors delineated in NFPA 1144.

Document wildland fire protection and suppression assistance in mutual aid agreements with all emergency response organizations (such as the City of Oak Ridge Fire Department, the Tennessee Department of Agriculture, Division of Forestry (TDA), etc.) engaged in such activities. The ORR Management Coordinator will also explore the partnering with the TDA to promote "firewise" principles.

Develop and conduct preparedness activities in conjunction with the Emergency Management Team.

Ensure that defensible space around ORR structures and operations, including remote facilities such as Waste Area Groups; weather; cell phone; warning towers; and critical power line posts and utilities. Also ensures that wildland fire exposure risk to structures and operations are evaluated through a "Wildfire Hazard Severity Analysis." This analysis and results are based on a process established in the NFPA Standard for Protection of Life and Property from Wildfire (NFPA 1144). The results of this analysis are sometimes published in facility Fire Hazards Analysis reports and Fire Protection Engineering Assessment reports.

Ensure that the findings relative to the wildfire hazard analysis are entered into a tracking system that prompts corrective action and routine evaluation of corrective action status.

Work with the appropriate COR to task and fund the preparation of a Wildland Fire Risk Report. There has not been a recent study conducted that would document the current wildland fire exposure risk on the ORR. This report shall be due 12 months after the approval of this implementation plan. The report will provide a historical perspective of the wildland fire incidents at the ORR, document the existing conditions, and provide an analysis of wildland fire risk.

Prepare a briefing for the DOE ORO Procurement and Contracts Division and the COR for the appropriate contractors to ensure that provisions regarding the upkeep of defensible spaces and buffer zones and the general maintenance of stakeholder land will be incorporated in the contract whenever ORR land is transferred.

Pursue further discussions and agreements with surrounding counties and agencies operating in close proximity, such as the Tennessee Valley Authority (TVA), the Horizon Center, Community Reuse Organization of East Tennessee (CROET), and the

National Nuclear Security Administration (NNSA) Office of Secure Transportation Facility for support in the case of a wildland fire.

Ensure that integration with the site land-use planning and management process and approved Integrated Safety Management Systems takes place and will be responsible for all preparedness planning activities.

Disseminate information regarding all ORR burns through notifications to the appropriate COR for each site and several relevant agencies prior to igniting a prescribed fire.

Evaluate those factors that may significantly affect national, regional, and site fire situations and individual fire response actions. Among the factors that will be considered are existing and potential fire severity; weather patterns and conditions lending themselves to wildland fires; suppression resource commitment and availability; prescribed fire activity; wildland fire use and mission; and interagency environmental, social, political factors or other pertinent factors.

Review and, as necessary, update all cooperative wildland fire agreements on an annual basis, or as otherwise required.

Ensure placement of fire danger rating signs at portals or at ORR access points along state roads during wildland fire season.

Ensure that the Emergency Management Team coordinate and practice wildland fire scenarios using their emergency drill program.

### **DOE ORO Cognizant COR**

The ORO COR for ORNL and for ETPP who reports to the Reservation Manager will:

Be responsible for providing concurrence and recommendation for approval of all burn plans within their respective area in the ORR.

Ensure that the clear buffer areas between the facilities and the wildland fuels are maintained to protect facilities, such as the High Flux Isotope Reactor (HFIR), the Spallation Neutron Source (SNS) Complex, hazardous or radioactive waste facilities, and the three Oak Ridge sites. The appropriate buffer zone size for each facility or complex will be discussed and agreed upon during a meeting between the Reservation Management Coordinator and affected ORR COR. There are also natural and cultural resources on the ORR, such as historic sites, cemeteries, etc., that will also need to be protected. These natural and cultural resources have been identified in the DOE ORO EMMA program. This information will be available to the site fire departments so that adequate protective action for these facilities can be implemented.

Clearly mark and identify the numerous hazardous or radioactive waste depots or areas

throughout the ORR known as Hazardous Areas of Concern on all maps that are to be used in wildland fire events and in the field. These facilities have also been incorporated into the EMMA system and will also be included in the Reservation Management Coordinator's discussion about buffer zones. These activities are expected to be completed within 6 months of the approval of this implementation plan.

### **ORNL-UTB**

ORNL-UTB will:

Be responsible for review of plans and concurrence of controlled burns.

Review all ORR burn plans and provides comments to the ORR Management Coordinator.

Prepare a prioritization of the hazardous materials areas of concern and cultural resources sites that will ensure that key top priority sites are rapidly protected.

Conduct routine operational controlled burns.

Provide ground fire control, water supply support, protection of structures from wildland fire, and personnel resources.

In the event of a wildland fire, the Laboratory Shift Superintendent's Office (LSS) is tasked with making the notification to the Oak Ridge Operations Center (OROC) and request OROC to contact the Forestry Division of the State Department of Agriculture to place them on standby and/or activate their response team, if needed.

### **Y-12-BWXT**

Y-12-BWXT will:

Provide ground fire control, water supply support, protection of structures from wildland fire, and personnel resources.

In the event of a wildland fire, the Plant Shift Superintendent's Office (PSS) is tasked with making the notification to the Oak Ridge Operations Center (OROC) and request OROC to contact the Forestry Division of the State Department of Agriculture to place them on standby and/or activate their response team, if needed.

### **ETTP Bechtel Jacobs**

ETTP-BJC will:

Provide ground fire control, water supply support, protection of structures from wildland fire, and personnel resources.

In the event of a wildland fire, the Park Shift Superintendent's Office (PSS) is tasked with making the notification to the Oak Ridge Operations Center (OROC) and request OROC to contact the Forestry Division of the State Department of Agriculture to place them on standby and/or activate their response team, if needed.

### **East Tennessee Mechanical Contractors Inc. (ETMC)**

The East Tennessee Mechanical Contractors will:

Implement the Wildland Fire Grid and Fire Road Repair and Maintenance. Road repair teams are responsible for the upgrading the majority main fire roads to appropriate code and the road maintenance.

Be responsible for implementing the wildfire prevention measures, such as brush clearing, dead tree removal, and other activities as needed.

Conduct maintenance on designated ORR secondary roads to ensure motor vehicle access to wildland areas and to maintain the compartmentalization structure.

Maintain barricades that control access to ORR secondary roads in workable condition.

Coordinate mapping efforts of forest maintenance and wildland fire control efforts.

### **City of Oak Ridge**

Per the Mutual Aid Agreement with the Department of Energy, dated October 18, 2000, the City of Oak Ridge Fire Department (FD) will:

Provide wildland fire control support within the capability of this primarily structural fire department.

Report to the incident commander upon arrival for assignment and direction.

Provide ground fire control, water supply support, protection of structures from wildland fire, and personnel resources.

### **Tennessee Department of Agriculture, Division of Forestry**

Per the Memorandum of Understanding with the Department of Energy dated October 11, 2002, the TDA Administrative District 2 will:

Respond to an assistance request on the ORR. An exception to immediate mobilization would be if all TDA resources are committed to other wildland fires.

Function as a Task Force within the ORR incident command structure when providing



assistance on the ORR. TDA capabilities and contributions include: (1) providing heavy equipment with fire plows for fire control, (2) providing wildland fire trained and equipped personnel, and (3) assisting with wildland fire control strategy decision making.