

# IEc

## Oak Ridge Reservation Natural Resource Damage Assessment

### Watts Bar Reservoir

Prepared for:

Oak Ridge Natural Resource  
Trustee Council

Prepared by:

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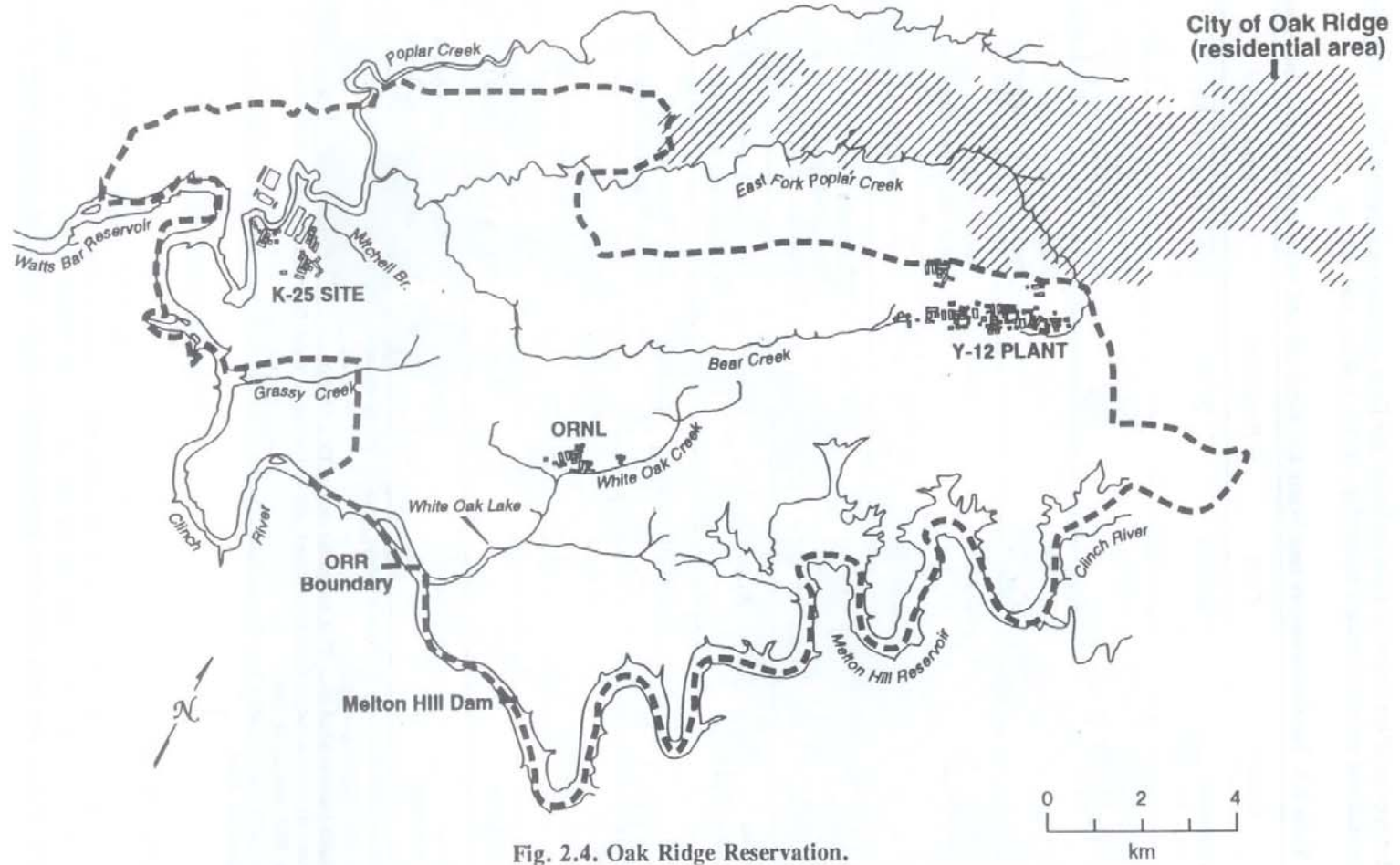
# Overview

- Under CERCLA, natural resource damage assessments are conducted by government officials designated to act as “trustees” to bring claims on behalf of the public for the restoration of injured natural resources.
- For the Oak Ridge Reservation (ORR), several Federal and state agencies serve as Trustees.
  - State of Tennessee Department of Environment and Conservation (TDEC).
  - Tennessee Valley Authority (TVA).
  - U.S. Department of the Interior (DOI), Fish and Wildlife Service (FWS).
  - U.S. Department of Energy (DOE).

# Site History

- Oak Ridge Reservation (ORR).
  - ~37,000 acres.
  - Owned by DOE.
  - Located along the Clinch River near Oak Ridge, Tennessee.
  - Three facilities constructed in the early 1940s.
    - Oak Ridge National Laboratory.
    - Oak Ridge Y-12 National Security Complex.
    - East Tennessee Technology Park.
  - Operated for research, development, and processes in support of the Manhattan project.

# Site Map



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Fig. 2.4. Oak Ridge Reservation.

# Objective of Watts Bar NRDA

- Implement restoration projects that provide ecological and human use services of sufficient type and quality to compensate for resource services lost due to DOE-related contamination in Watts Bar Reservoir.

# Ecological Losses

- Calculate present value of losses (acre-year equivalents).
- Present value losses range from ~148,000 to ~181,500 acre-years.

# Recreational Fishing Losses

- A recreational fishing advisory is in place on Watts Bar due to PCB contamination in fish.
- The Trustees applied an existing model of the behavior of anglers in response to this advisory to establish the magnitude of recreational fishing loss (Jakus 1997).
- In previous work, PriceWaterhouseCoopers LLP (2000) calculated recreational fishing losses of approximately \$6.64-\$9.96 million.

# Commercial Fishing Losses

SPECIES	LOST HARVEST (LBS)	WHOLESALE PRICE (PER LB)	LOST PRODUCER SURPLUS (PER LB)	ANNUAL VALUE	TOTAL PRESENT VALUE 2008-PERPETUITY
Catfish	109,000	\$0.44	\$0.09	\$9,553	\$191,058
Buffalo	4,500	\$0.24	\$0.05	\$219	\$4,382
Drum	2,000	\$0.15	\$0.03	\$58	\$1,169
Carp	3,500	\$0.15	\$0.03	\$102	\$2,045
<b>Total</b>				<b>\$9,933</b>	<b>\$198,654</b>

# Restoration Goals

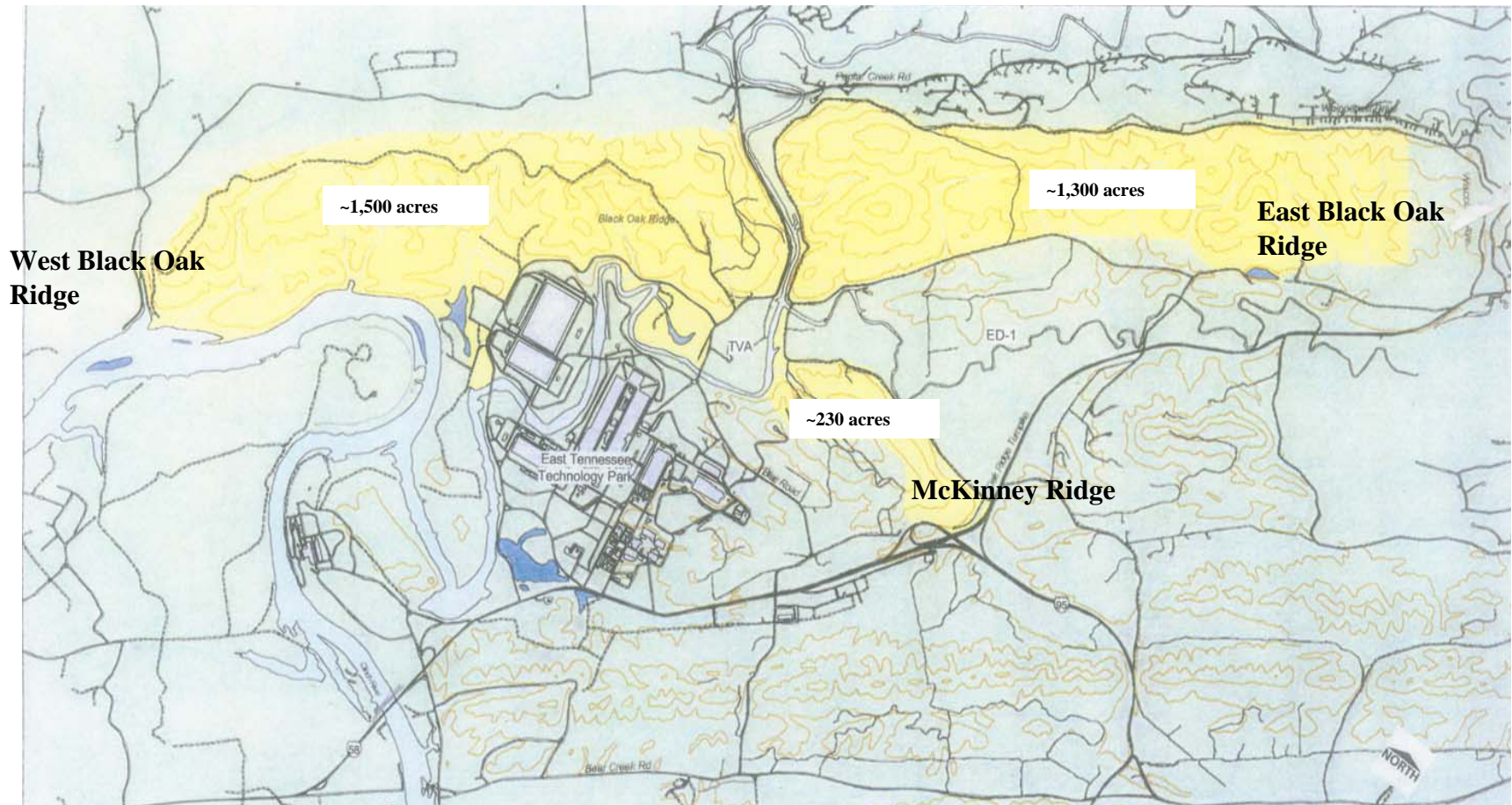
- Implement restoration that:
  - Provides sufficient compensation for ecological and human use service losses.
  - Is consistent with local and regional resource management goals.
  - Satisfies the DOI criteria for restoration.
  - Is timely.

# Restoration Projects

- Conservation easement on Black Oak Ridge (BORCE).
  - Initiated in 2005 between DOE and State of Tennessee as an indefinite easement.
- Recreational fishing improvements.

# BORCE Geographic Scope

- Includes ~3,000 acres on East BOR, West BOR, and McKinney Ridge.



# BORCE Temporal Scope

- Timeframe of benefits:
  - Begin in 2006 (first full year after initiation of BORCE).
  - Continue in perpetuity (in accordance with terms of BORCE).

# BORCE Baseline

- Available information indicates that BORCE would be under development pressure.
  - Population increasing, number of building permits increasing.
  - Timing and extent of development uncertain.
- Development would interfere with ecological and human use services.
  - Ecological services of large, contiguous forested habitat (songbirds).
  - Human use services measured based on public access/use.
- Trustees analysis assumes that BORCE would provide no ecological services or public use services without easement.

# BORCE Habitat

- Upland habitat provides full suite of ecological services.
- Focused on suite of upland habitat types on BOR.

UPLAND HABITAT TYPE	CHARACTERISTICS	ACRES
Interior Forest	>70% canopy cover, >50 acres, >200m buffer.	271
Sensitive	Supports T&E species.	1,111
Basic	Provides upland ecological services but is not interior forest or sensitive habitat.	1,584

# BORCE Human Use Gains

- Benefits quantified based on services provided under the BORCE.
  - Easement management and operations.
  - Hunting.
  - Trail use recreation.

# BORCE Easement Management and Operations Gains

- Annual funding provided to State of Tennessee by DOE:
  - \$20,500 for management.
  - \$16,000 for maintenance and operations.
- Present value of \$730,000.

# BORCE Hunting Gains

- Value expected to be generated by white-tailed deer and turkey hunting.
- Based on harvest data (TWRA) and literature values.

SPECIES	ANNUAL HUNTING TRIPS	PER TRIP VALUE	ANNUAL VALUE	TOTAL PRESENT VALUE 2006 - PERPETUITY
White-Tailed Deer	267	\$46	\$12,400	\$247,400
Turkey	34	\$46	\$1,600	\$31,600
<b>Total</b>	<b>301</b>	<b>-</b>	<b>\$14,000</b>	<b>\$279,000</b>

# BORCE Trail Use Recreation Gains

- Gains estimated from 2006 in perpetuity.

ACTIVITY	ANNUAL VALUE (2006)	TOTAL PRESENT VALUE (2006 - PERPETUITY)
Walking	\$46,000	\$2,044,500
Hiking	\$38,100	\$864,300
Biking	\$20,300	\$735,400
Bird Watching	\$60,100	\$798,600
Wildlife Viewing	\$86,400	\$1,144,800
<b>Total</b>	<b>\$249,000</b>	<b>\$5,587,600</b>

# BORCE Human Use Gains

- Summary.

HUMAN USE SERVICE	PRESENT VALUE
Management	\$410,000
Maintenance	\$320,000
Hunting	\$279,000
Trail Use	\$5,588,00
<b>Total</b>	<b>\$6,597,000</b>

# Comparison of WBR Losses and BORCE Gains

- Trustees conclude that BORCE provides sufficient compensation for natural resource damages in WBR due to ORR-related contamination.

	PRESENT VALUE OF ECOLOGICAL SERVICES (ACRE-YEARS)		PRESENT VALUE OF HUMAN USE SERVICES (MILLION)	
	Loss Due to ORR-Related Contamination in WBR	Aquatic Habitat	148,000 -181,500	Recreational Fishing
Commercial Fishing				\$0.20
Gains Under BORCE	Upland Forested Habitat	441,000	Management Maintenance Hunting Trail Use	\$6.60

# Additional Projects to Address Recreational Fishing

- Trustees concerned that BORCE does not provide sufficient benefits directly to recreational fishers.
- DOE has agreed to fund relevant projects, as determined by the State of Tennessee, to improve existing recreational fishing access and opportunities.