DOE's National Environmental Research Parks

A POSITIVE LEGACY OF THE COLD WAR

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Los Alamos
NATIONAL LABORATORY
EST.1943

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Created when NEPA was new

"A National Environmental Research Park is an outdoor laboratory where research may be carried out to achieve national environmental goals, as articulated by the National Environmental Policy Act (NEPA) ...

The…parks are actually field laboratories set aside for ecological research, for study of the environmental impacts of energy developments, and for informing the public of the environmental and land use options open to them" ***NERP Charter***

1970s: DOE was AEC and then ERDA and the interest in a national system of “energy research preserves” was high

"The Parks, which are situated on DOE land holdings, are unique because they provide opportunities for research to study the compatibility of the environment with energy technology options."

The designation opens the site to scientists from other government agencies, universities, and private foundations for use as a protected outdoor laboratory where long-term projects can be set up to answer questions about man's impact on the natural environment."

AEC news release, Spring 1972

Notable NERP Developments

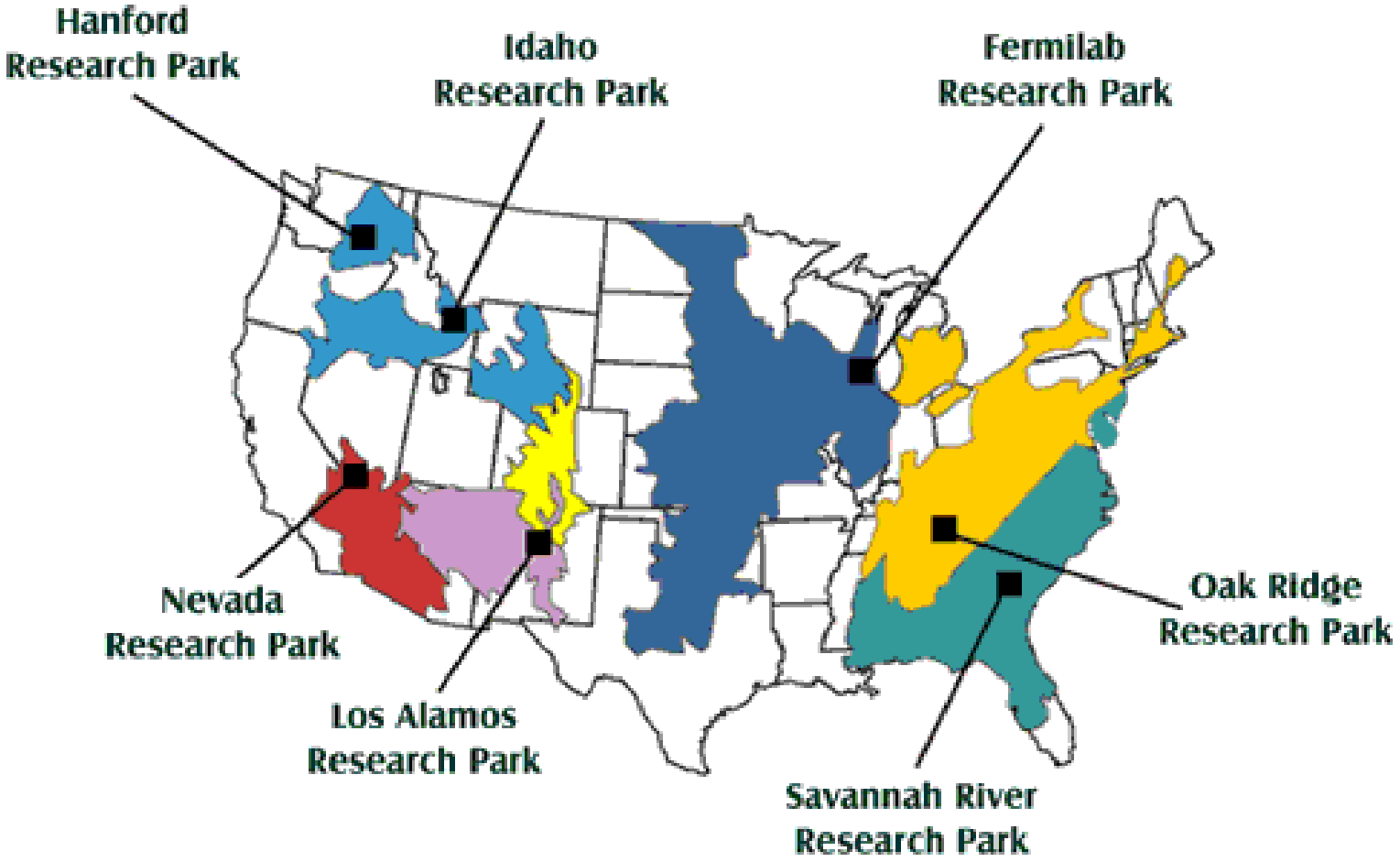
- 1970 - President Nixon implements ten recommendations after establishing CEQ - one is to “set aside representative locations for ecological research and wildlife preservation while there is still time.”
- 1972- Savannah River Site becomes first NERP designated by AEC
- 1992 - NTS is last NERP designated
- 1997 - DOE OIG proposes disposal of surplus lands including a quarter of the NERP holdings
- Secretary of Energy (Clinton) Bill Richardson declares new preserves at DOE sites
- 2008 – little or no direct funding but NERPs still remain and are active at all 7 sites!

NERP Program Directives

- Assessment and Monitoring
  - develop methods to assess and monitor the environmental impact of human activities
- Prediction
  - develop methods to estimate or predict environmental responses to human activities
- Demonstration
  - demonstrate the effects human activities have on the environment and evaluate methods to minimize any adverse effects

As a result of security measures and mission requirements, many of the DOE sites have become centers of biological diversity, with populations of endangered species and ecosystems that have recovered from past disturbances.

Seven “Parks” in Seven Bioregions

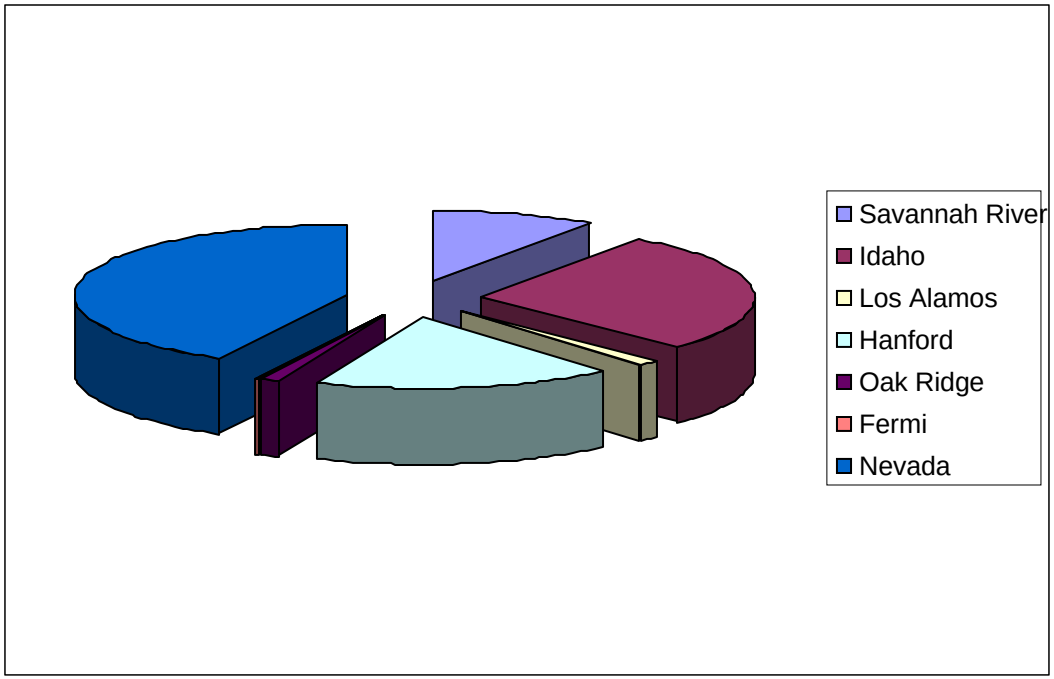


The United States Department of Energy's National Environmental Research Parks

More than 2 million acres (3200 square miles)

Site	Year Designated	Acres (approximate)	EcoRegion
Savannah River	1972	198,000	Southeastern Mixed Forest
Idaho	1975	568,000	Shrub-steppe
Los Alamos	1976	25,600	Juniper-Pinyon and Grassland
Hanford	1976	366,000	Shrub-steppe and riverine
Oak Ridge	1980	21,500	Eastern Deciduous Forest
Fermi Lab	1989	6,800	Tallgrass Prairie
Nevada	1992	865,000	Desert Shrub

NERPs by Area



The objectives of the research parks are to conduct research and education activities that will:

Develop methods for assessing and documenting the environmental consequences of human actions related to energy and weapons use.

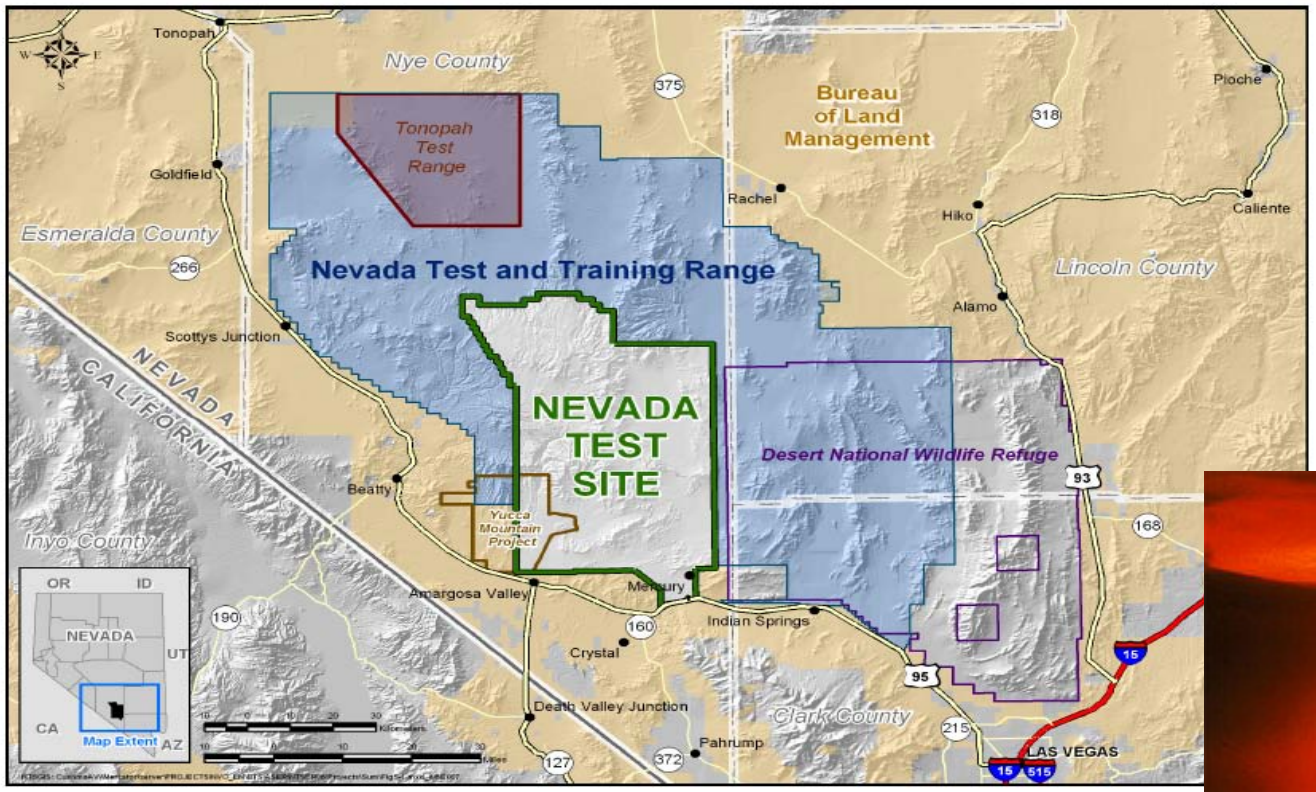
Develop methods for predicting the environmental consequences of ongoing and proposed energy development.

Explore methods for eliminating or minimizing predicted adverse effects of various energy and weapons activities on the environment.

Train people in ecological and environmental sciences.

Use the parks for educating the public on environmental and ecological issues.

Nevada Test Site (NTS)



NTS

- 1,375 square miles of Mohave Desert
- 45% of NTS unused or provides buffer zones
- only 7% of the site has been disturbed
- Remote but only about an hour from Las Vegas area
- Long-term desert eco-data has been collected

NTS Frenchman Flat –
Desert Tortoise habitat

The Hanford Site is 586 square miles. About 200 square miles of that is designated as the Hanford Reach National Monument and about 77 square miles of that is designated a research natural area - the Arid Land Ecology Reserve (ALE). It includes both shrub-steppe and riverine landscapes.

Hanford Site NERP

"A wealth of activities ongoing routinely":

Biology:

The Nature Conservancy through a grant from the DOE did a biodiversity inventory of the Site which is a very useful tool in our NEPA process. During the survey three plants new to science were discovered as well as over 100 new insect species.

Vegetation plots, point counts and avian studies are being conducted continuously. Much of the Hanford Site has been designated an Important Bird Area by the National Audubon Society. Research conducted on Ferruginous Hawks, Sage Sparrows, Burrowing owls, and Loggerhead Shrikes.

Amphibian, clam, and salmon studies are being conducted in and along the Columbia River which flows through the site.

Geology:

Research on the Missoula Floods is being conducted. Erratic, wave bars, and gravel depositional features are being studied as possible inclusion in the Missoula Floods National Trail. Other research is being conducted on mammoth remains, former river channels and seismic activities.

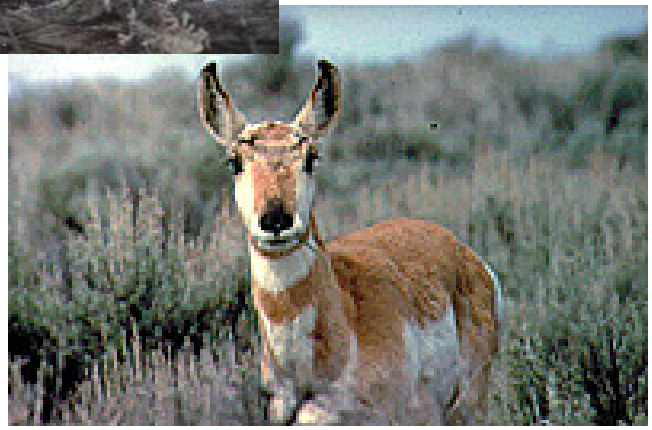
Physics:

The National Science Foundation placed a multimillion dollar Lazar Interferometer. Gravitational Wave Observatory at Hanford a few years ago due to the remoteness it needed. Also on the ALE there is a small underground facility that is working on the gravitational constant.

Idaho National Laboratory (INEL)

Elk in Grass

pygmy rabbit
ESA candidate

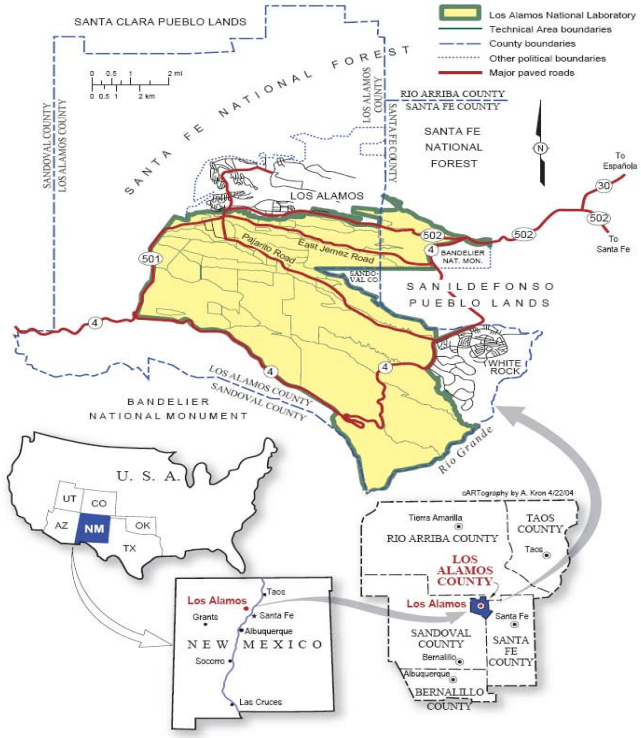


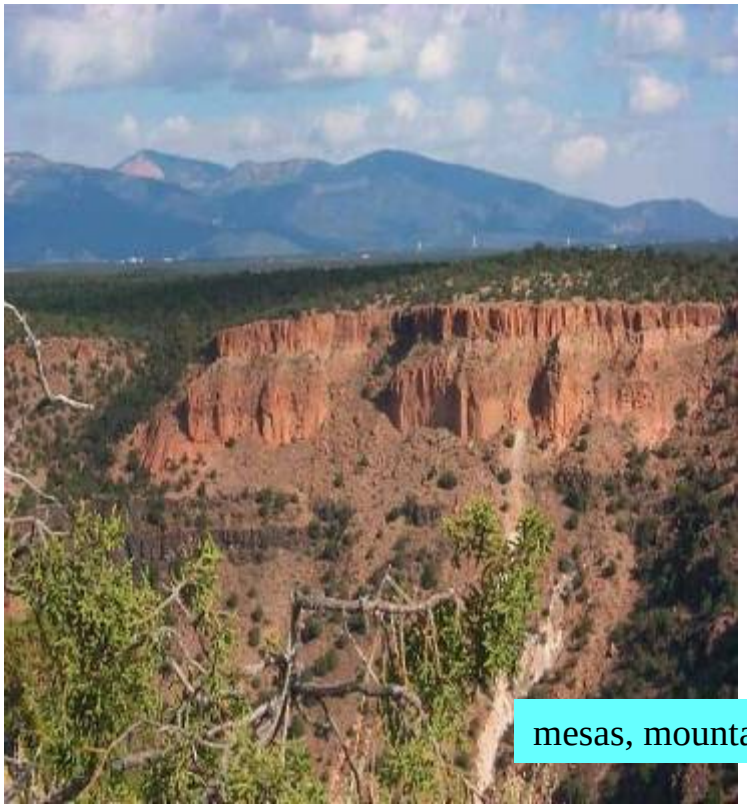
sage grouse – ESA candidate

INEL NERP

- The Idaho NERP covers the entire Idaho National Laboratory (about 890 sq mi)
- Very little of the INL is developed as laboratory facilities and the remainder is primarily undisturbed sagebrush steppe
- Strategy for bringing research to the Idaho NERP is to facilitate its use as an outdoor laboratory by university researchers.
- Management of the Idaho NERP is through the Environmental Surveillance and Research Program.

Los Alamos National Laboratory





mesas, mountains, canyons

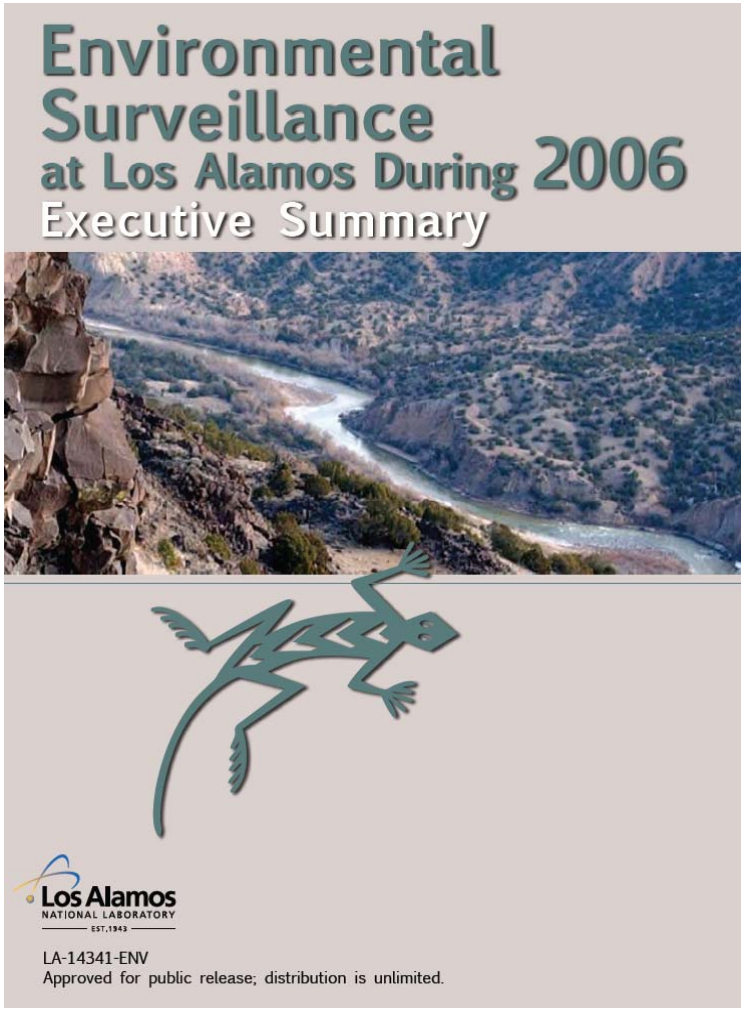
LANL NERP

- 40 square miles (entire site is included)
- 3 square miles conveyed to county and Pueblo in past few years – more not likely
- Landscape of canyons, mesas, mountains and Rio Grande provides diverse ecosystems – Pajarito Plateau was originally considered as national park
- Mostly off-limits to public for past 60 years

LANL

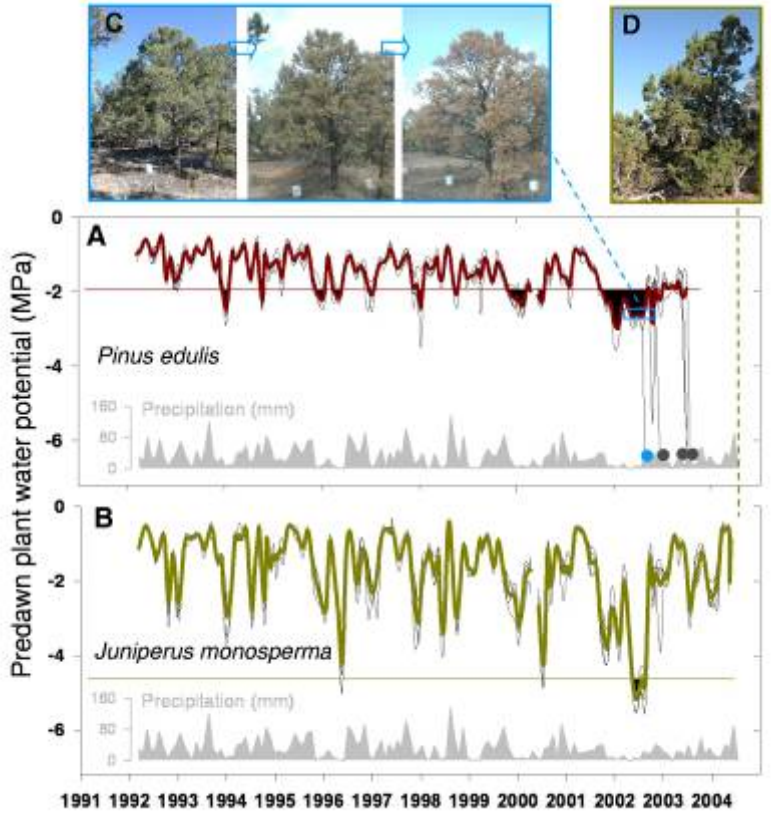
- Ongoing environmental monitoring and surveillance work includes:
  - Interaction of ecosystems and hydrologic cycle
  - Contaminant transport, soil moisture, effluent dispersion, landfill cap performance
  - Elk, deer and raptor population dynamics
  - Pinyon-juniper woodland productivity studies
  - Non-invasive ecological field testing (water vapor over vegetated terrain)
  - Long-term data sets and data bases developed for climate, soil moisture, fire ecology provide “baseline” reference

LANL NERP



At least 125 publications related to the ecology and the interaction of LANL operations and the environment have been written about Los Alamos and the Pajarito Plateau.

LANL NERP



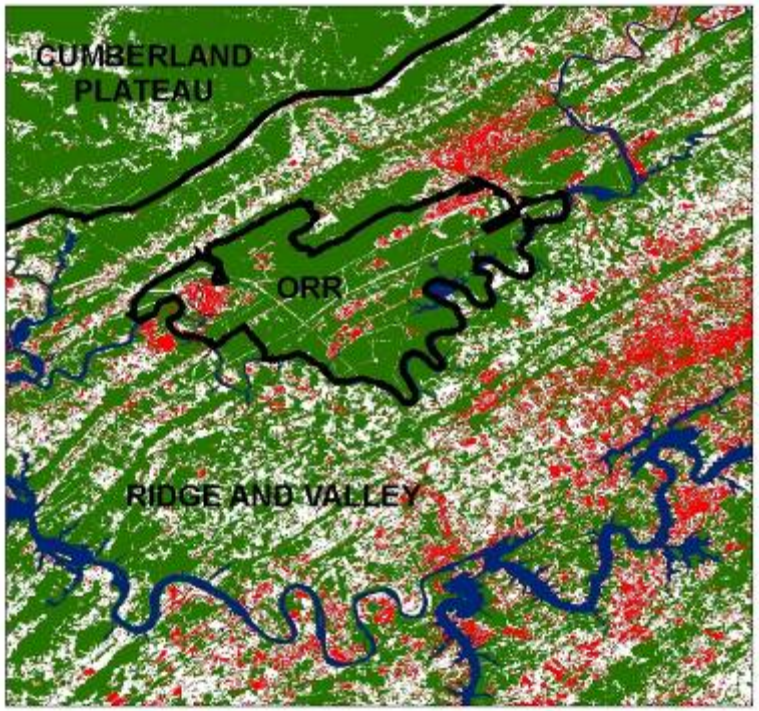
PIÑON PINE TREE MORTALITY, TREE THINNING, AND SUMMER AVIAN USE IN PIÑON-JUNIPER WOODLANDS IN NEW MEXICO.

Much of the Oak Ridge Reservation served as a buffer for the three primary facilities: the X-10 nuclear research facility (now known as Oak Ridge National Laboratory [ORNL]), the first uranium enrichment facility or Y-12 (now known as the Y-12 National Security Complex [Y-12 Complex]), and a gaseous diffusion enrichment facility (now known as the East Tennessee Technology Park [ETTP]).

- 20,000 acres out of 34,000
- AD Facilities and Operations (Natural Resources Manager)
- There have been over 1,200 users over the past five years. 227 users in 2007 from more than 50 different colleges, universities, organizations

New Zion forested headwater wetland at the Oak Ridge Reservation NERP –
an island of undisturbed and recovering ecosystems in a sea of disturbed habitats.

Oak Ridge Reservation



Regional land cover map prepared
from a July 3, 2006 Landsat Thematic Mapper image

The ORR lies in the Valley and Ridge Physiographic Province and is relatively pristine when compared with the surrounding region. From the air the ORR is clearly a large and nearly continuous island of forest within a landscape that is fragmented by urban development and agriculture. This distinctiveness is easily seen in a land-use/land-cover map of the ORR and surrounding lands that was developed based on satellite imagery from 2006.

Savannah River Site

A restored Carolina bay at the SRS

- **Designated first NERP by AEC in 1972**
- **300 square miles**
- **85% forested**
- **20% wetlands**
- **Advanced science of ecology while fulfilling its major defense missions**
- **Affiliation with University of Georgia**
- **DOE has set aside 30 research areas totaling 14,000 acres protected from routine site operations – provides baseline “control” for environmental research and monitoring efforts.**
- **Red Cockaded Woodpeckers, Wood Storks and Bald Eagles - endangered or species of concern – and world class populations of migratory waterfowl**

Fermilab

about Fermilab

- **6,800 acres**
- **High-energy physics site**
- **13 active NERP projects, including work for Argonne National Laboratory:**

Carbon and nutrient cycling in restored grasslands

Bioenergy Plots (evaluating various grasses for cellulosic ethanol production)

Investigation of carbon and nitrogen fluxes

Carbon sequestration in grassland ecosystems

Since 1985, approximately 1,000 acres of tall grass prairie have been restored in and outside the accelerator ring.

Tall Grass Prairie Restoration at Fermilab

first tall grass prairie restoration plot, 15 years after planting

Other NERP collaborators at Fermilab include:

- The Field Museum (Chicago)
- Morton Arboretum (Lisle, IL)
- Chicago Academy of Sciences
- University of Illinois (Chicago)
- Wheaton College
- Governor's State University
- Cornell University

What Does the Future Hold for the NERPs – “Paradox Lost”?

- They are more of a resource now than ever before - providing study of sensitive habitats that are being lost nearby and regionally
- Could play a role in each site’s EMS program
- None are directly funded but all have projects ongoing – lack of funding is a constant
- Some are threatened by DOE land conveyance
- Ready for new missions pending outcome of the DOE/NNSA Complex Transformation EIS for LANL, NTS, ORNL, and SRS.

Response of Dr. I. Lehr Brisbin in April 2008 (originator of the NERP idea in 1970's at SRS)

"I am not familiar with the term 'Complex Transformation.' If it is what I think it is, namely a change in the kinds of facilities/missions etc. at the site, my response would be that if the NERP program is indeed based on sound ecological principles, it should not change in the least WHAT the program does, but rather only WHERE (on the site etc.) it does it!

"We used this argument very effectively when we addressed the NERP process passing from the Atomic Energy Commission through to become the Department of Energy: WHAT we did continued to be good solid peer-reviewed NERP ecological experiments and baseline studies around various agency facilities – it's just that the emphasis shifted from all nuclear to include nuclear AND fossil fuel etc. facilities.

"In other words, the NERP idea was now ready to be applied to the Trans-Alaskan oil pipeline as well as radioactive waste burial cribs at Hanford…"

Innovations

"Fermilab Natural Areas"

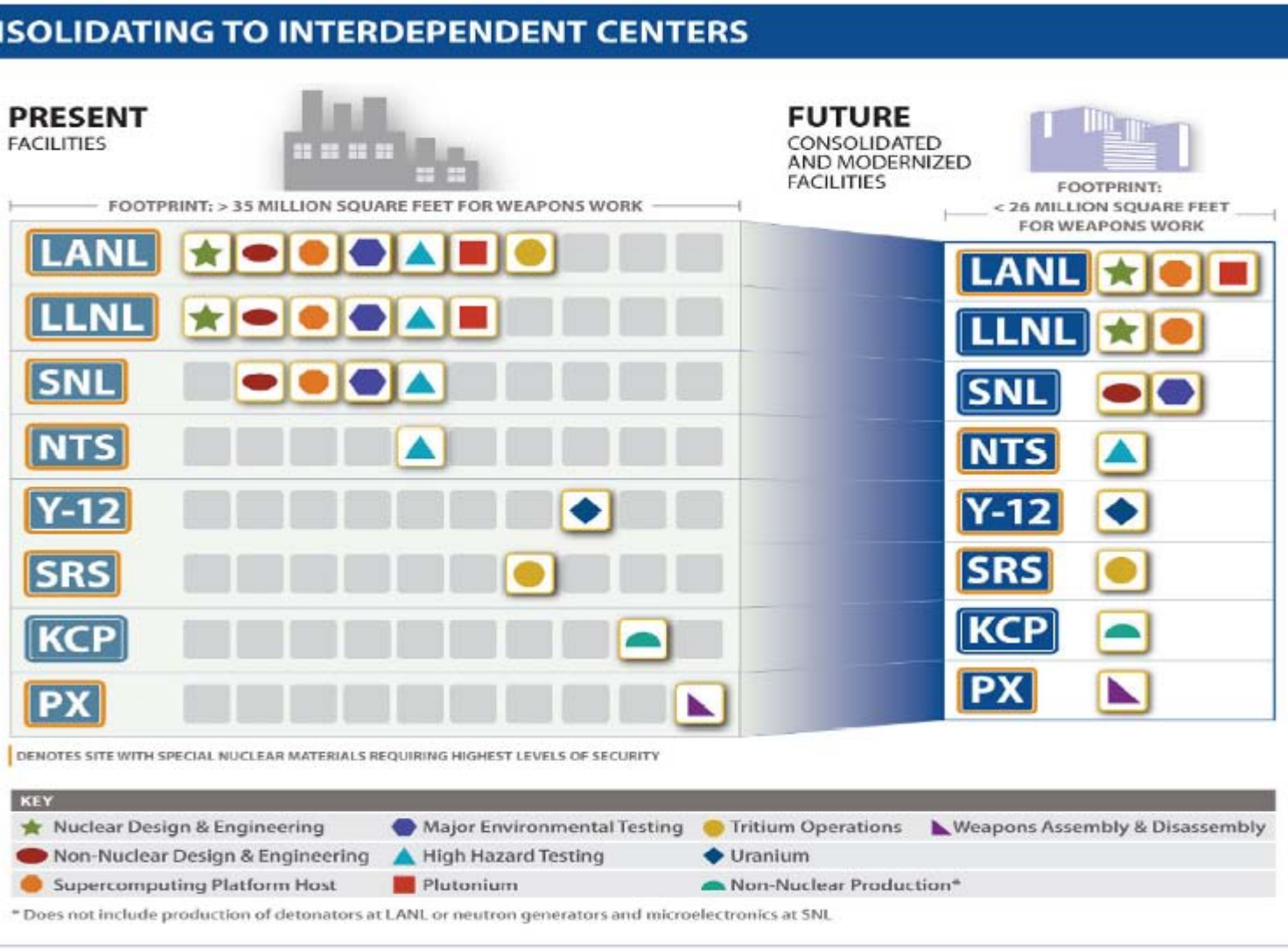
- Created under the auspices of the M&O contractor, Fermi Research Alliance, LLC.

- The mission of FNA is to continue restoration and conservation efforts that have been ongoing since the mid-70's, including an emphasis on research.

- Non-governmental, not-for-profit status allows FNA to seek funding from grants and donations that would not otherwise be available as a federal site.

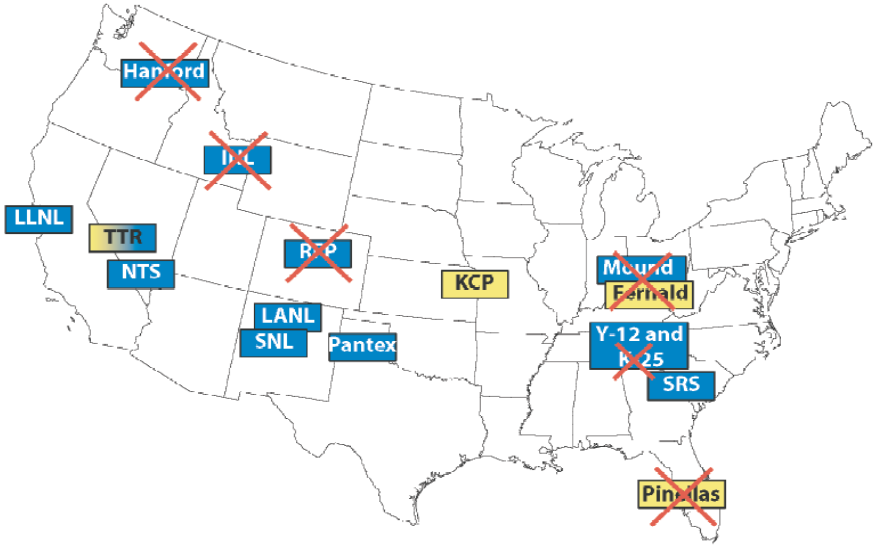
- www.fermilabnaturalareas.org.

CONSOLIDATING TO INTERDEPENDENT CENTERS

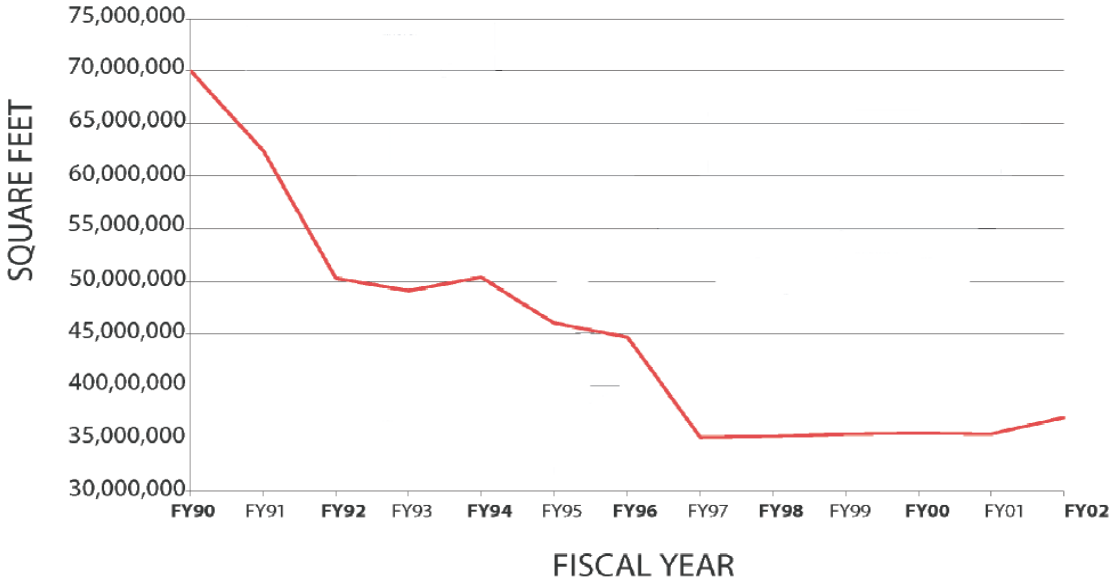


HISTORICAL CHANGE

Weapons Complex Site Reductions



Weapons Complex Footprint Reductions



For Further Information

- http://nerp.esd.ornl.gov/overview.html
- http://www.uga.edu/srel/ESSite/NERPhome.html

Links in these sites will take you to each installation's NERP web page(s)

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