

## SUMMARY

**MOFEP** represents major policy and financial commitments toward research on consumptive and non-consumptive resources of the Missouri Ozark forest ecosystems. The study areas are located exclusively on Missouri Department of Conservation lands, providing long-term stability in land use and a high degree of study integrity. Current study plans call for at least 50 years of forest management and plot remeasurement to establish consistent trends and to allow for the development of new forest stands following tree harvests.

Additional study objectives that are not addressed by current modules include research on forest soils, nutrient cycling and hydrology, forest tree genetics, and the effect of forest management practices on important health factors, such as oak decline or gypsy moth. Opportunities may also exist for applications of geographic information systems to be developed in conjunction with **MOFEP**. Principal investigators who are interested in contributing additional research modules to this project may contact the Missouri Department of Conservation at the address shown on this brochure.

For further information on the Missouri Ozark Forest Ecosystem Project, please contact:

**MOFEP** Coordinator  
The Missouri Department of Conservation  
Forestry Division  
P.O. Box 180  
Jefferson City, MO 65109-0180

Telephone 314/751-4115

**MISSOURI**

**OZARK**

**FOREST**

**ECOSYSTEM**

**PROJECT**



University  
of  
Missouri

## OVERVIEW

The Missouri Ozark Forest Ecosystem Project (**MOFEP**) is a long-term, cooperative research effort by the Missouri Department of Conservation and the University of Missouri. **MOFEP** is designed to provide resource managers with applied information on the effects of large-tract forest management in selected Missouri Ozark forests on certain plant and animal species.

State-owned forests in Missouri are managed in units called **compartments**, ranging from several hundred to over 1000 acres, with specific activities (e.g., tree cutting or seedling planting) applied to smaller **stands** of trees within compartments, ranging from several to over 100 acres. While much is known about the effects of various stand treatments on certain plants and animals within those stands, relatively little is known about the effects of forest management on the fauna and flora within whole compartments. One unique feature of **MOFEP** is that we will evaluate forest management effects at the compartment level, rather than the stand level.

## FOREST MANAGEMENT

Nine management compartments, ranging from 750 to over 1200 acres in size, were selected at Peck Ranch Wildlife Area, and Carrs Creek, Cardareva, Paint Rock and Deer Run State Forests in Carter, Shannon, and Reynolds Counties. The study areas have similar topography and tree-age classes, and are dominated by mature oaks, hickories and shortleaf pine. Logging has not occurred on

the sites for at least 20 years.

Even-aged (clearcutting), uneven-aged (selection system), and non-manipulative (control) forest management systems will be applied to three compartments each. In addition to providing the overall experimental framework for **MOFEP**, these management systems will be compared on the basis of tree species composition, timber quality, tree diameter and volume growth, and economic value. Pre-treatment data collection is in progress, with the first cutting treatments scheduled for October 1993.

## FOREST VEGETATION

The response of woody and herbaceous vegetation to the treatments will be measured on more than 600 permanent plots randomly located in the nine compartments. Data will be collected on the number of species, and on the number, size and spatial distribution of individuals within each species. In addition, measurements will be taken on the amount and distribution of dead woody material on each plot.

## FOREST INTERIOR BIRDS

A primary area of interest is the effect of different forest management regimes on forest interior songbirds, many of which are Neotropical migrants. Studies of these birds in central Missouri and elsewhere have shown that forest fragmentation negatively impacts these populations. This component of **MOFEP** will determine the impact of different levels of forest canopy disturbance on rates of nest

predation, nest parasitism, and reproductive success.

## SMALL MAMMALS

The effects of forest management on small mammal communities will be examined using small live traps. Species composition, species richness, and relative abundance of small mammals will be examined to determine the response of certain small mammals to forest management.

## REPTILES AND AMPHIBIANS

Herpetofauna play important roles in the function of forest ecosystems. Previous studies on herpetofaunal communities in Missouri have described the species composition and relative abundances in various ecological habitats. This **MOFEP** study will evaluate the same population attributes under specific forest management alternatives using pitfall and funnel live traps.

## INVERTEBRATES

Forest invertebrates contribute significantly to ecosystem biomass and nutrient cycling. Two separate invertebrate studies are underway. One study will determine the species composition and relative abundance of forest floor species and their responses to disturbance. Another study will focus on a portion of the oak canopy-dwelling insects. Both invertebrate studies will provide valuable baseline population information, as well as knowledge of population responses to different forest treatments.

## Using LTER to Help Ontario's Lakeshores

Long-term ecological research is complicated and expensive. As a result, LTER scientists and their university collaborators have chosen to focus on a single ecosystem type whose health directly impacts the biological, social and economic well-being of Ontario: **the inland forest-lake ecosystem.**

Researchers are investigating how changes in the forest, such as clearcutting trees or removing shoreline logs and brush, impacts this ecosystem. For example, does clearcutting around a lake raise the lake's temperature? How does that impact trout and other inhabitants of the ecosystem? Researchers will answer these questions and many more, through studies at the following sites:

- Swan Lake Research Reserve, Algonquin Provincial Park.
- Atikokan Coldwater Lakes Research Area, 200 km west of Thunder Bay.

The LTER program will produce interim results and recommendations through a series of 3-5 year research studies. However, scientists can detect crucial long-term patterns only through linking such studies together over 25 years or more. This information will help LTER researchers do the following:

- Develop sustainable forest practices, and help forest managers implement them.
- Advise government and industry leaders on setting policy to promote sustainable forestry and preserve the forest ecosystems of Ontario for its people to work in and enjoy forever.

### Scientists Use LTER to Reveal Ecological Events That ...

- *Occur rarely but have a dramatic impact, for example, the 1993 flood that engulfed the Mississippi River ecosystem. Research results including the flood year would differ sharply from those that do not.*
- *Occur slowly or gradually, over years or centuries, for example, a two-degree increase in average air temperature over 100 years.*
- *Vary greatly from year to year, like the amount of seed that trees produce.*
- *Are subtle, for example, tiny but dangerous increases in mercury in stream water.*
- *Are complex, with many interacting factors, like the clearing of fallen trees from a shoreline, eliminating habitat for insect larvae, in turn eliminating a major food source for trout.*

### For more information

Please contact the Long-Term Ecological Research (LTER) Program at the Ontario Forest Research Institute, 1235 Queen Street East, Sault Ste. Marie, Ontario, P6A 5N5 Telephone (705) 946-2981 Fax: (705) 946-2030

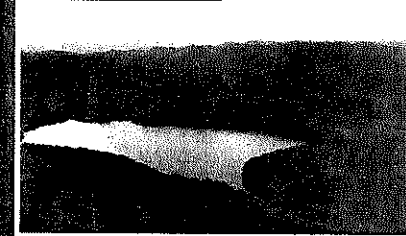
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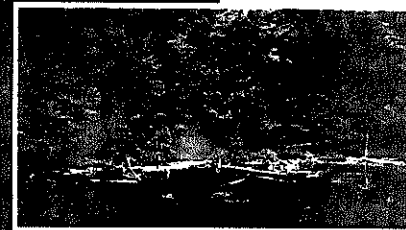


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# Long-Term



# Ecological



# Research



## SUSTAINING FOREST-LAKE ECOSYSTEMS



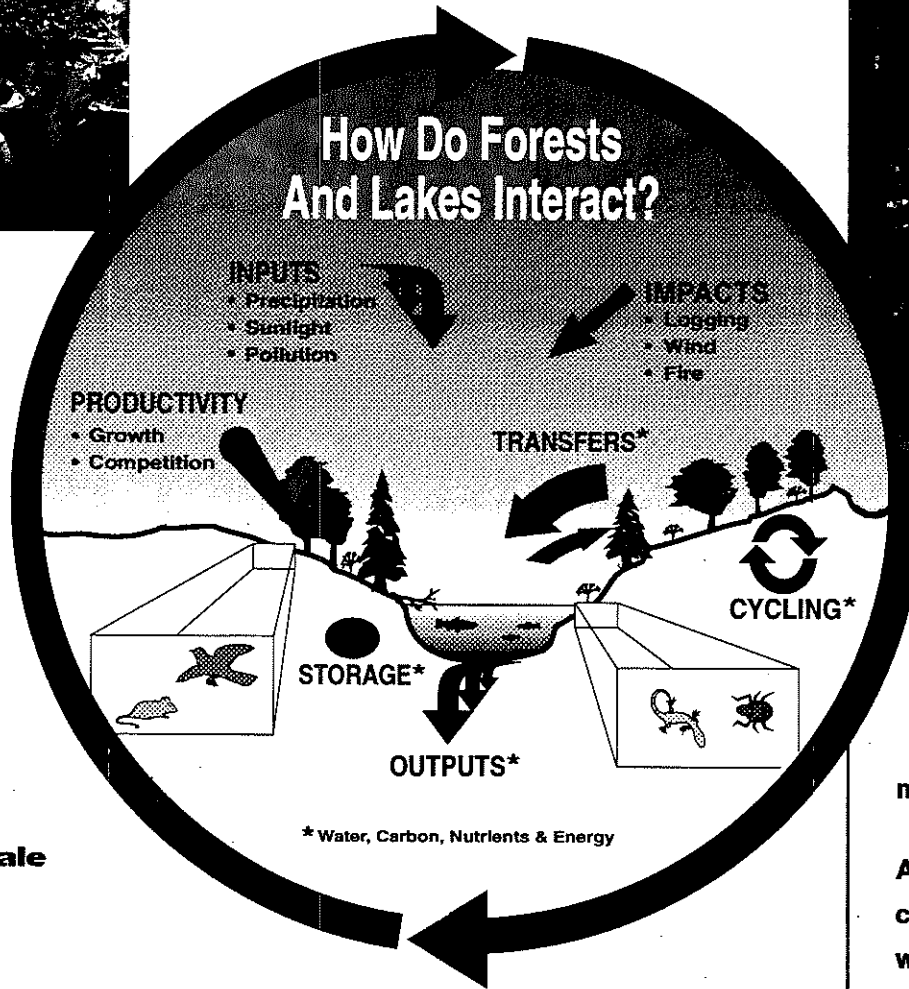
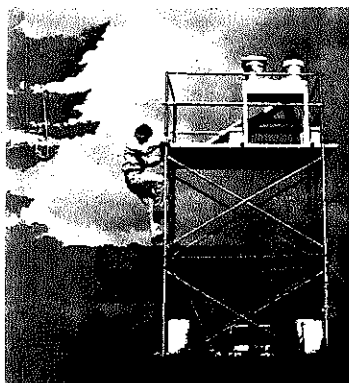
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Ministry of  
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**a**t the Ontario Forest Research Institute, scientists have developed an important new program for long-term ecological research, or LTER, to investigate Ontario's forest ecosystems. This research will help the Ministry of Natural Resources make and measure progress toward its goal of sustainable forestry.

**LTER: Research on a Grand Scale**

In long-term ecological research, scientists study the ecology of ecosystems over long periods of time. This research is ...

- **Complex.** LTER looks at how trees, other plants, wildlife, fish, fungi, insects and soil microbes coexist and interact in different climate and soil conditions and from year to year. It reveals how they compete for scarce resources, grow, change their surroundings, and die, releasing captured nutrients for others to use.
- **Relevant to sustainable forestry.** LTER helps scientists determine practical ways

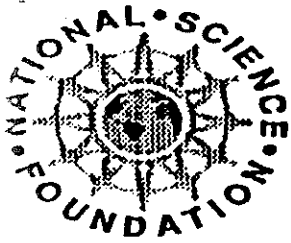
to evaluate which forest practices are indeed sustainable.

- **Enduring.** Although OFRI's LTER program is only a few years old, some of its core studies have been in place for over 30 years.
- **Long lived.** LTER occurs over years or decades, so its results include the effects of ecological processes that are rare, unusual or fleeting.

**Ecology** is the branch of science that deals with how organisms interact with their physical environment and with each other.

An **ecosystem** is a biological community of plants and animals, which interact in an environment that includes air, soil, nutrients and water.

**Sustainable forestry** is managing forest ecosystems in a way that perpetuates their biological, social and economic values. It involves trying to maintain whole ecosystems as well as all individual species of plants and animals.



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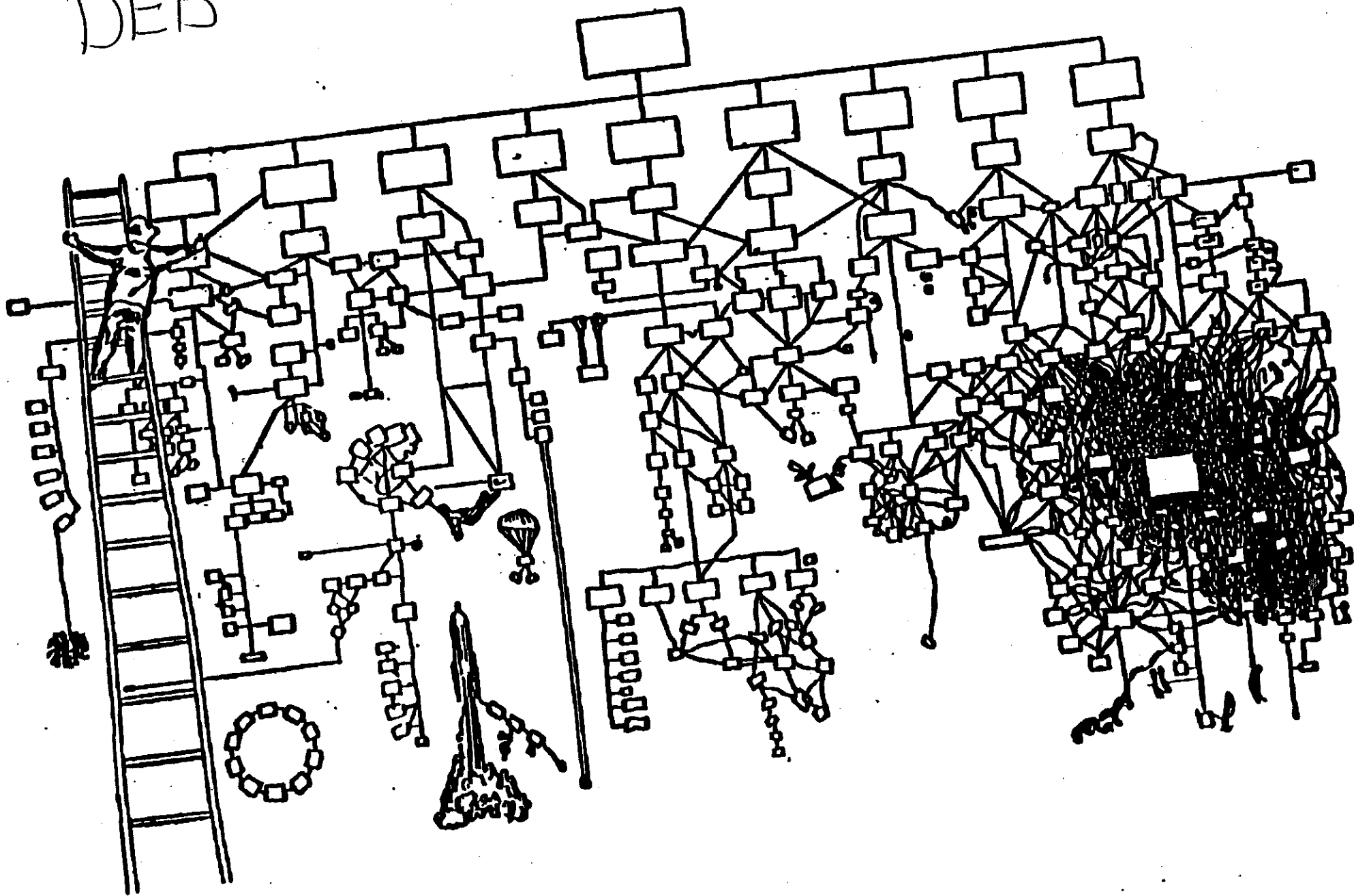
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# ORGANIZATION CHART



## ILTER ON-LINE DATA SETS

<i>H.J. Andrews</i>	Monthly streamflow at 10 gaging sites
<i>Arctic Tundra</i>	Climate (1988-1994); Plant growth and flowering (1976-94)
<i>Bonanza Creek</i>	Trees & Large Shrubs; Long-term vegetation plot data set
<i>Central Plains</i>	Long-term aboveground primary productivity data (1939-1994)
<i>Cedar Creek</i>	None reported
<i>Coweeta</i>	DOC concentrations in streamwater from reference and clearcut water sheds; climate/ met data 1980-->
<i>Hubbard Brook</i>	Streamwater discharge (1960-93)
<i>Harvard Forest</i>	Climate; permanent plots
<i>Jornada</i>	Soil moisture content along the LTER transect (1981-94)
<i>Kellogg</i>	Net Primary Production
<i>Konza Prairie</i>	Net Primary Production (1984-93)
<i>Luquillo</i>	Rainfall (1976-Present); List of tree species in a 16-ha plot
<i>McMurdo</i>	Biochemical data for 4 lakes in Taylor Valley (1993-94); climate/ met data (1993-94)
<i>Network Office</i>	Tree population and biomass data, 500-year-old forest stand at Wind River, WA (45 years)
<i>N. Temp. Lakes</i>	Fish length frequency and abundance (7 lakes 1982-1991); 39 species, 6 year types)
<i>Niwot Ridge</i>	19 datasets, from meteorological data to stream discharge data to snow chemistry and more!
<i>Palmer Station</i>	Spring and summer water column chlorophyll (1991-92)
<i>Sevilleta</i>	Lightning location data
<i>Virginia Coast</i>	Vegetation cover