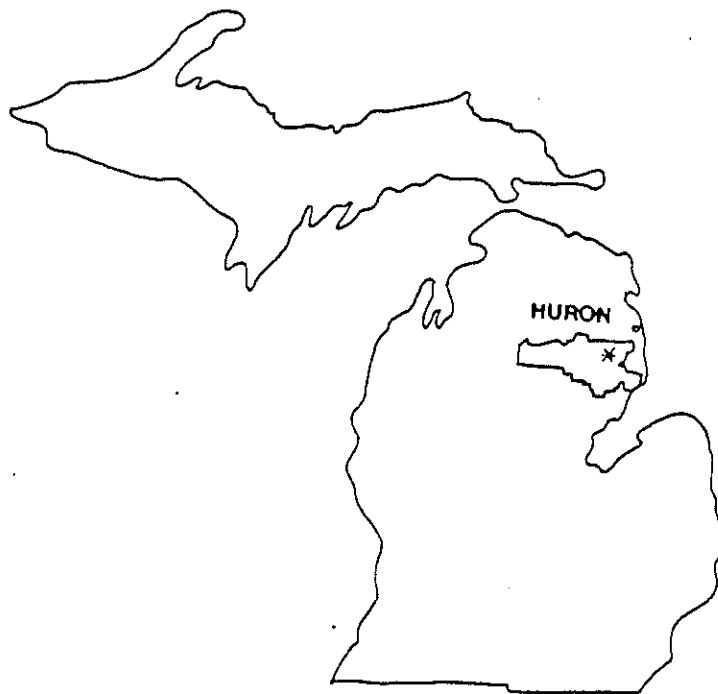


ESTABLISHMENT RECORD FOR THE  
LITTLE TROUT LAKE RESEARCH NATURAL AREA  
WITHIN THE HURON-MANISTEE NATIONAL FORESTS,  
ALCONA COUNTY, MICHIGAN



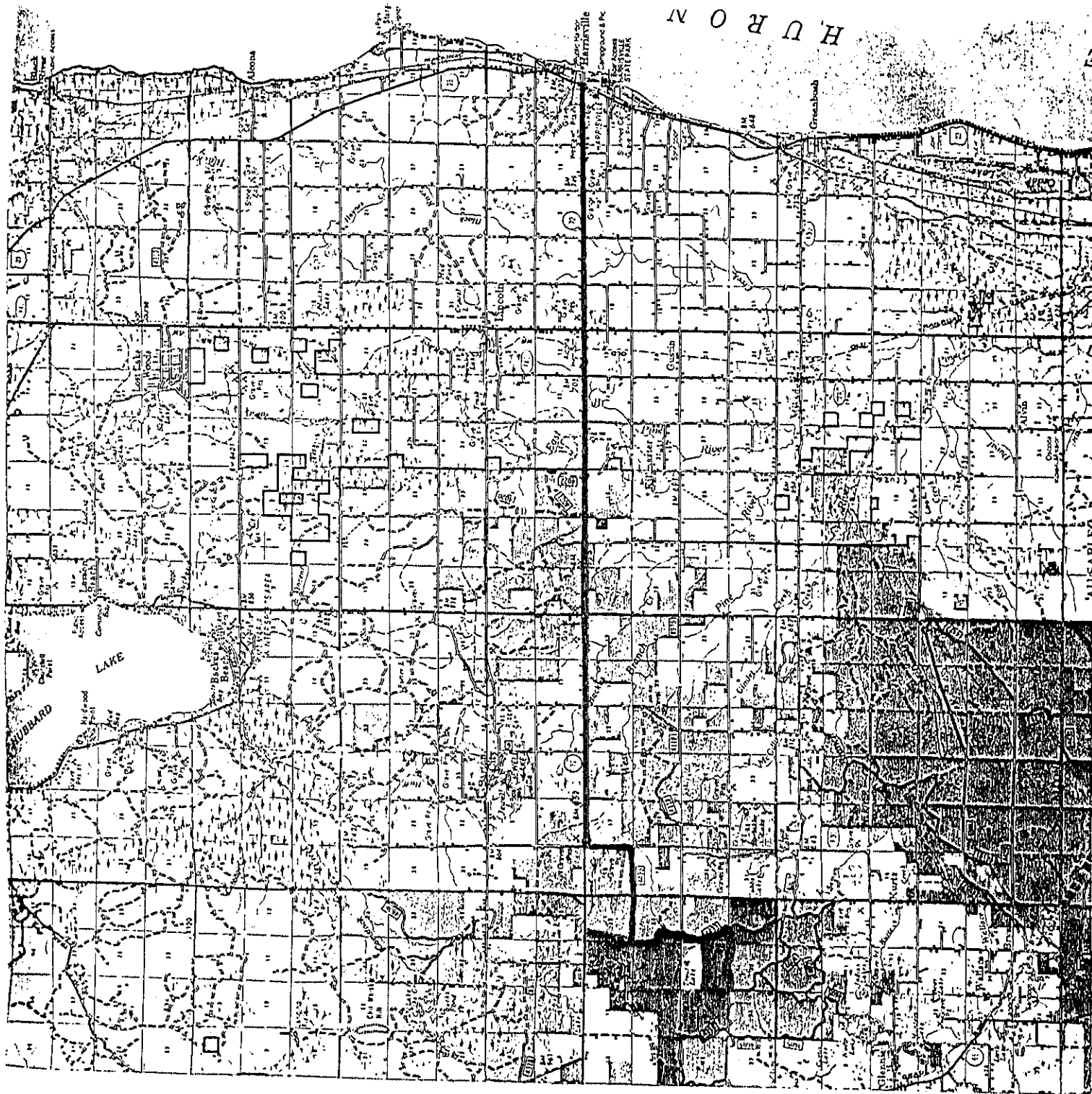
prepared by,

Patrick Comer  
Assistant Ecologist  
Michigan Natural Features Inventory  
Michigan Department of Natural Resources  
Wildlife Division  
Box 30028 Mason Building  
Lansing, MI 48909

1992

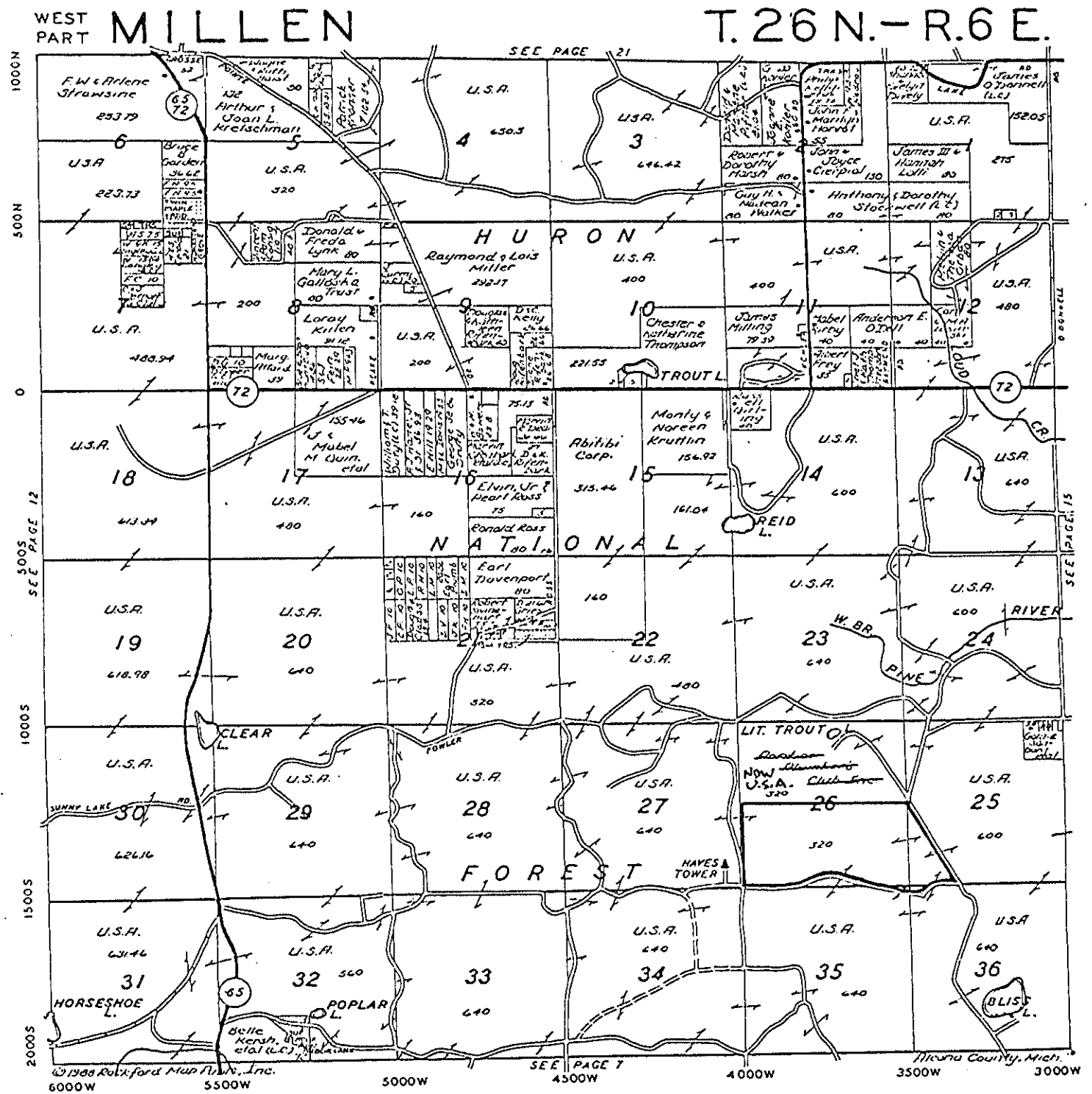
A. Road map indicating directions from Harrisville, Michigan to the Little Trout Lake RNA. Scale: 1 inch = 3 miles

← NORTH



B. Map indicating ownership boundaries within Township including the Little Trout Lake RNA. Scale 1:52,000

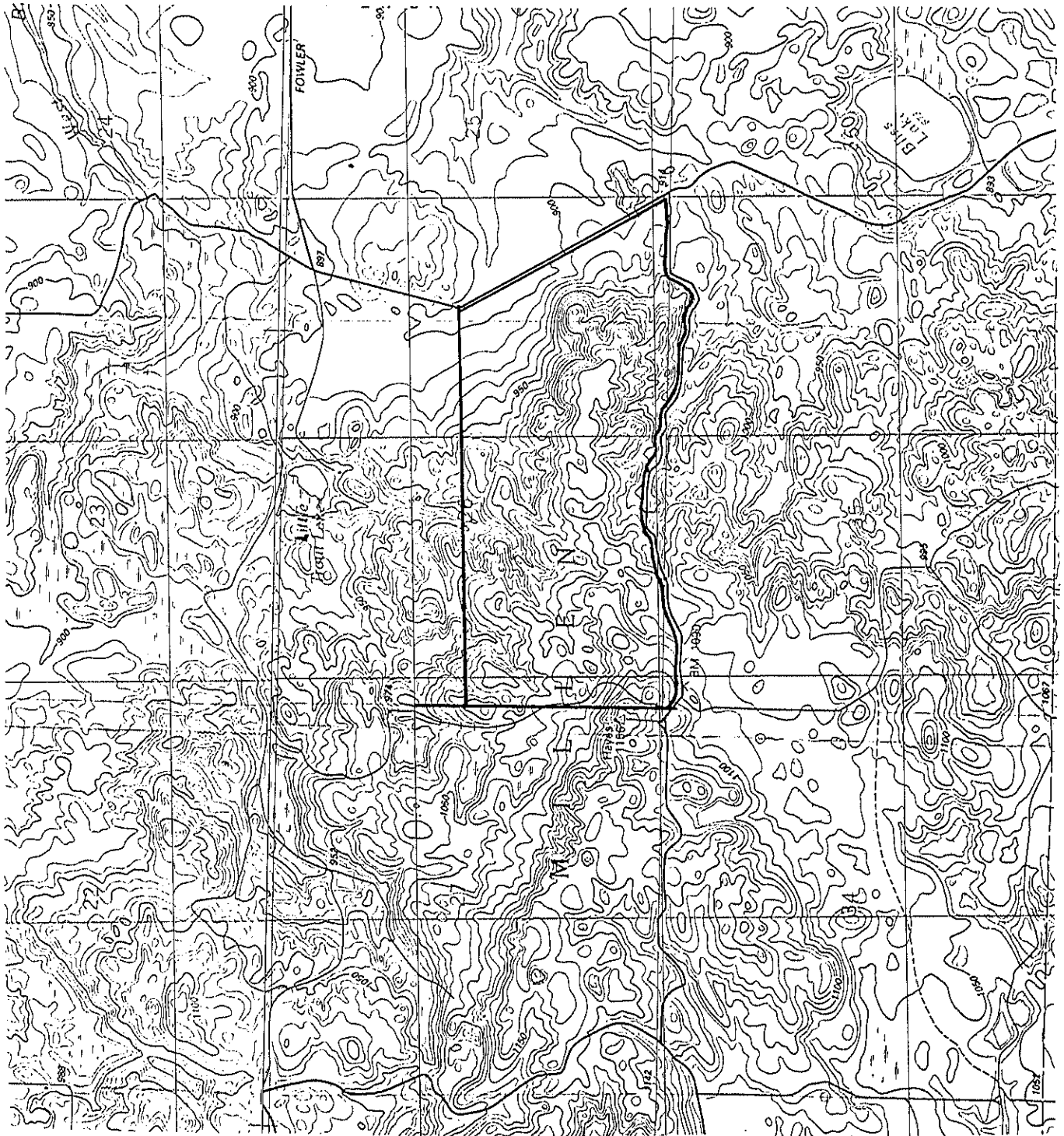
NORTH



© 1988 Rockford Map & Plan, Inc. 6000W 5500W 5000W 4500W 4000W 3500W 3000W

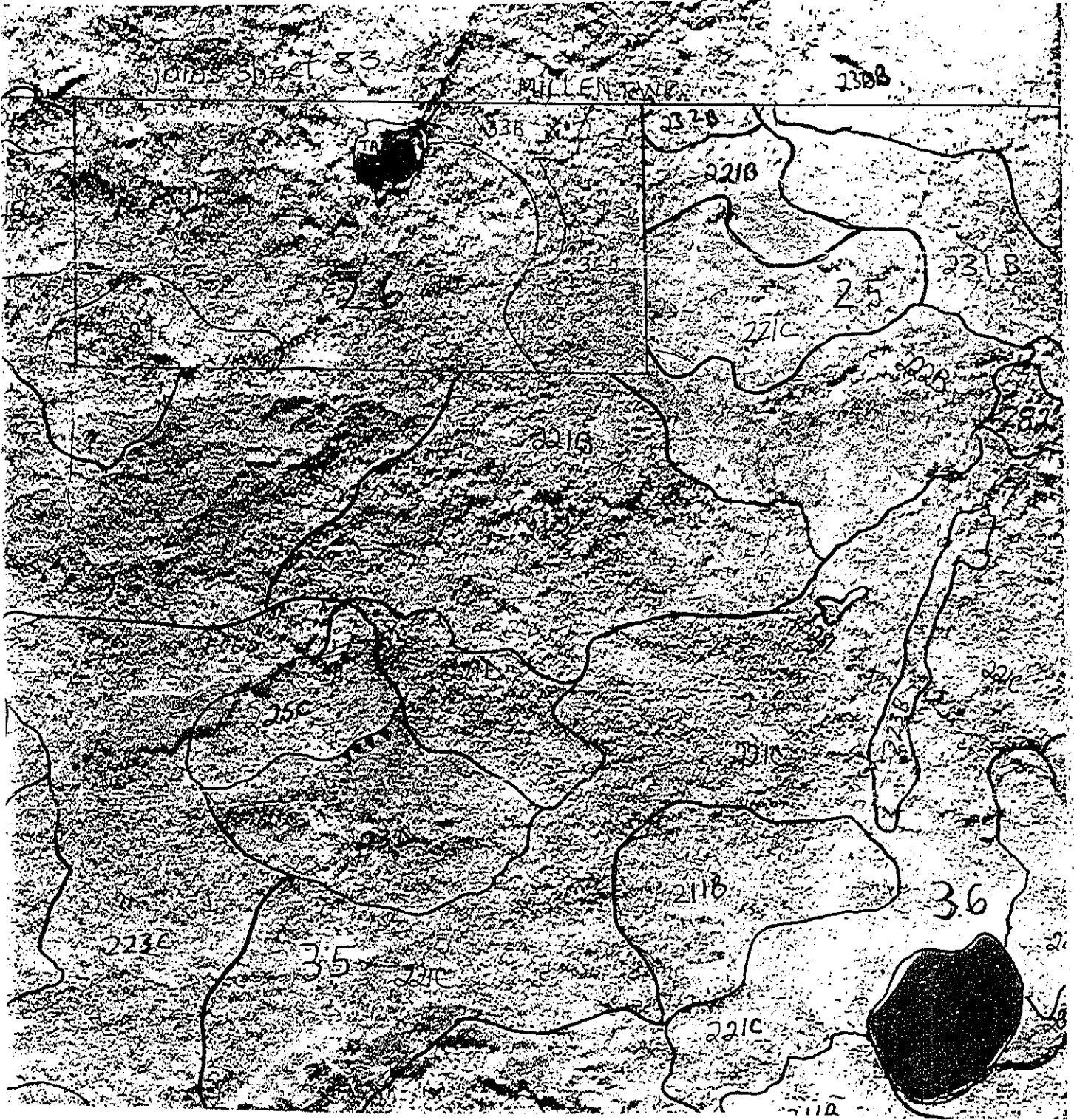
C. USGS topographic map of area including the Little Trout Lake RNA; 7.5 minute series, Glennie Quadrangle and Bucks Pond Quadrangle; scale 1:24,000, contour interval: 10 feet.

← NORTH



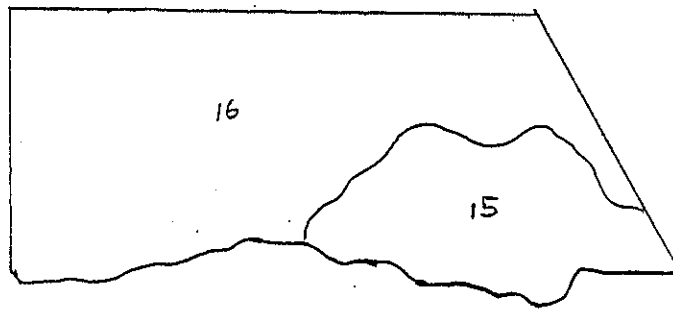
D. Map of Ecological Land Type Phase (ELTP) units associated with the Little Trout Lake RNA; Scale 1:15,840.

NORTH



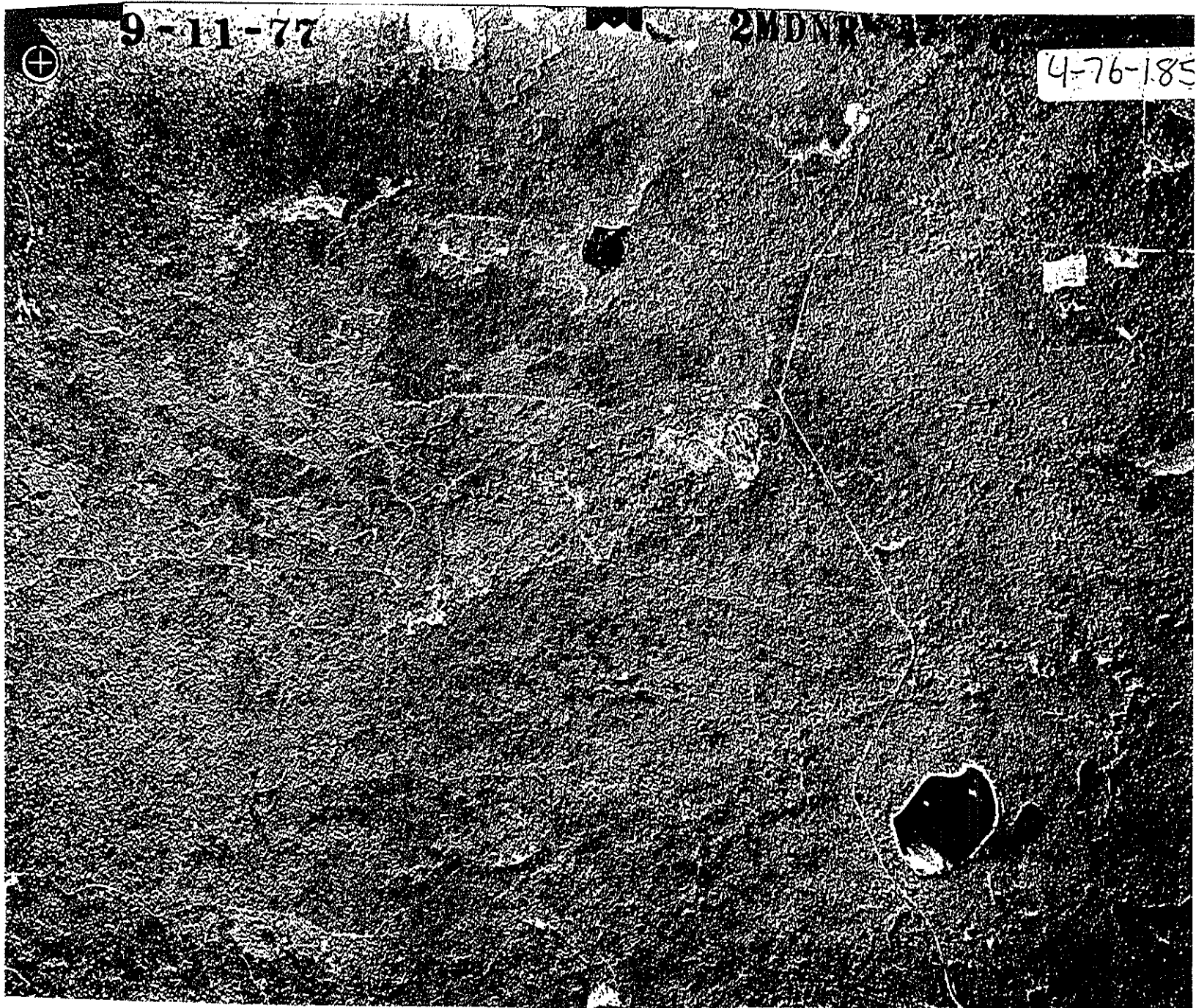
E. Vegetation map of the Little Trout Lake RNA indicating SAF cover types. Scale 1:24,000

NORTH



F. Aerial photograph (Black and white, infrared) of area including the Little Trout Lake RNA taken in 1977; Scale 1:24,000.

NORTH



## Introduction

The pine-oak forest of the Little Trout Lake candidate Research Natural Area (RNA) is located on rolling to steeply sloping topography characteristic of much of the Harrisville District on the Huron National Forest. The 370 acre area proposed for designation includes approximately 130 acres of old growth forest, with the remaining portion representing earlier successional stages due to tornado impacts (approx. 150 acres where some salvage removals have occurred), and intensive management (approx. 90 acres).

The old growth portion provides an excellent example of the species composition and structural characteristics of this representative forest type. The inclusion of adjacent early-successional portions provides a forested buffer and opportunities for the study of plant succession in this forest type.

The entire area proposed for RNA designation lies within current Huron National Forest boundaries. The 320 acre portion immediately north of the candidate area, which includes Little Trout Lake, has recently been acquired for inclusion within the Huron National Forest.

Maps A through F provide information on the location, current ownership, topography, vegetation types, and Ecological Land Type Phases for the Little Trout Lake candidate RNA.

## Land Management Planning

The candidate RNA lies within an area with management prescription 6.2, which calls for the provision of semiprimitive non-motorized recreational experiences with equal consideration for solitude-seeking wildlife species, and for limited production of high quality hardwood and softwood sawlogs. Designation of this area as RNA would necessitate changing management prescriptions from 6.2 to 8.0.

More recently, this entire area was included for consideration as part of the forest's "old growth" forest base. This designation would not be at all be in conflict with RNA status.  
(need reference for forest plan amendments)

## Objectives

1. Preserve a functioning pine-oak forest ecosystem which is characteristic of large portions of the Huron-Manistee National Forest and adjacent lands in the Upper Great Lakes region.
2. Provide baseline information for monitoring species composition and forest structural characteristics in old growth forests of this

type and region.

3. Provide habitat for the flora and fauna associated with this forest type, including wide ranging wildlife species such as black bear (*Ursus americanus*) and neotropical migrant birds.

4. Provide information for the study of successional processes of this Land Type Association which would be applicable to forest management elsewhere in the Huron-Manistee National Forest and to other public and private forests in Michigan, Wisconsin, and Minnesota.

5. Provide information for the development of indices associated with species common to this Land Type Association.

Establishment of this Research Natural Area, which is intended for non-manipulative research and observation, may also assist in National Forest compliance with the Endangered Species Act and the National Forest Management Act.

#### Justification Statement for Establishment of the Area

This RNA includes a functioning pine-oak forest ecosystem which is characteristic of large portions of the Huron-Manistee National Forest. Its establishment offers opportunities for the study of successional processes, "old growth" forest structure, and species composition in this common forest type.

No other RNA currently exists, or has been proposed, that is of such high quality nature, representing this forest type in the Huron-Manistee National Forest.

#### Principle Distinguishing Features

Approximately 130 acres of this tract have not been cut or significantly altered since European settlement. The relative composition of red pine (*Pinus resinosa*) white pine (*Pinus strobus*), red oak (*Quercus rubra*), and northern pin oak (*Quercus ellipsoidalis*) is probably quite characteristic of the pre-settlement condition of this fire-prone forest type. This represents the only known "old growth" tract of this forest type on the Huron-Manistee National Forest, and provides an important example for the study of late successional characteristics.

West of the undisturbed parcel lies an area with many windthrows caused by a tornado. Further west, there is a 90 acre parcel which has been clearcut within the past 25 years. These two areas, found on similar topography and soils to the "old growth" portion, provide opportunities for the study of forest succession following these two types of disturbance.

### Location

The Little Trout Lake RNA is located in the Harrisville Ranger District of the Huron National Forest in Alcona County, Michigan, and is centered at 44 degrees, 36 minutes north latitude, and 83 degrees, 40 minutes west longitude.

The RNA is located in Millen Township (T26N R6E) in the southern half of section 26. It also includes the southwest 1/2 of the west 1/2 of the southwest 1/4 of section 25, the northwest 1/4 of the northwest 1/4 of the northwest 1/4 of section 36, and the northeast 1/4 of the northeast 1/4 of the northeast 1/4 of section 35.

Boundaries for the RNA tract were established in coordination with the USFS Regional Ecologist and Huron-Manistee National Forest staff. The half section line of section 26 forms the north boundary of the RNA. The west boundary is formed by the section line between sections 26 and 27. The east boundary lies 100 feet west of Forest Highway 4433 oriented parallel the highway. A line parallel to Forest Highway 4503 located 50 feet north of the road forms the southern boundary of the RNA.

A total of 370 acres (148 hectares) is included in this RNA. It lies at an elevation between 930 and 1060 feet (305 and 347 meters) above sea level.

The area can be easily accessed from the rest of the state via US 23 at Harrisville in the east, or by I-75 at Grayling to the west. From either city, take M-72 to Stout Road (16.5 miles west of Harrisville). Follow Stout Road south 1 mile to Forest Highway 4433. Take Forest Highway west 2 miles, then south 2.5 miles. The Little Trout Lake RNA is located northwest of the corner of Forest Highway 4433 and Forest Highway 4503 (see map A).

### Area by Cover Types

The Little Trout Lake RNA occupies a portion of rolling end moraine and steeply sloping ice contact topography with well drained sandy soils. The following SAF Cover Types (Eyre, F.H. ed., 1980), Kuchler Types (Kuchler, 1966), and USFS Ecological Land Type Phases (ELTPs) (Krejcarek, pers. comm., 1991) and corresponding acreages best characterize this RNA (see maps D and E).

SAF Cover Types	acres	hectares
15 Red Pine	130	52
16 Aspen	240	96
<u>Total</u>	<u>370</u>	<u>148</u>

Kuchler Type	acres	hectares
86 Great Lakes Pine Forest	370	148

**USFS Ecological Classification System**

Ecological Land Type Phase (ELTP)	acres	hectares
221B (0-6% slopes)	210	84
221C (6-18% slopes)	115	46
223C (6-18% slopes)	20	8
235C (6-18% slopes)	10	4
222B (0-6% slopes)	15	6
<u>Total</u>	<u>370</u>	<u>148</u>

**Physical and Climatic Conditions**

The rolling end moraine ridges and ice contact topography where the Little Trout Lake RNA is located connect the high plateau of sandy outwash plains to the west with lower elevation ground moraines to the east and north.

This area experiences very severe weather, due to its inland location, northern latitude, and somewhat high elevation. The growing season is quite variable, averaging 115 days. Temperatures are somewhat unpredictable in spring and fall, with a high probability of late spring freezes. Winters are generally cold, with an average annual extreme temperature of -29 degrees F. There is considerable snowfall (Albert, et.al., 1986).

The following climatic information was derived from the closest weather station located at the Loud Dam in Iosco County, 10 miles south of the RNA. Calculations were made from readings taken between 1951 and 1980 (Nurnberger, pers. comm., 1992).

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<u>Temperature</u>	<u>Fahrenheit</u>	<u>Celsius</u>
Average daily maximum	54.8 degrees	12.6 degrees
Average daily minimum	32.3 degrees	0.2 degrees
Overall mean	43.6 degrees	6.4 degrees
Record high	99.0 degrees	37.2 degrees
Record low	-40.0 degrees	-40.0 degrees

<u>Precipitation</u>	<u>English</u>	<u>Metric</u>
Average annual rainfall	28.05 inches	712.47 mm
Average annual snowfall	50.80 inches	129.03 cm

### Description of Values

#### Flora

In the mature portion of the Little Trout Lake RNA, overstory trees form a partial to complete canopy. Mature red pine (*Pinus resinosa*)<sup>1</sup>, and less frequently, white pine (*Pinus strobus*) are dominant, often extending above other canopy trees. Overstory co-dominants also include red oak (*Quercus rubra*), northern pin oak (*Quercus ellipsoidalis*), quaking aspen (*Populus tremuloides*), and bigtooth aspen (*Populus grandidentata*). A partial sub-canopy includes aspens, red maple (*Acer rubrum*), white oak (*Quercus alba*), black cherry (*Prunus serotina*) and an occasional jack pine (*Pinus banksiana*). Less mature portions of the tract are dominated by aspens, and by red oak, which was regenerated from stump sprouting.

Paper birch (*Betula papyrifera*) and Juneberry (*Amelanchier arborea*) are occasionally found in the understory. A scattered shrub layer includes velvetleaf-blueberry (*Vaccinium myrtilloides*)<sup>2</sup>, maple-leaved arrow-wood (*Viburnum acerifolium*), highbush cranberry (*Viburnum trilobum*), common lowbush-blueberry (*Vaccinium angustifolium*), and sweet fern (*Comptonia perigrina*).

Common groundflora include bracken fern (*Pteridium aquilinum*), wintergreen (*Gaultheria procumbens*), Pennsylvania sedge (*Carex pensylvanica*), wood betony (*Pedicularis canadensis*), rough-leaved rice grass (*Oryzopsis asperifolia*), and wild sarsaparilla (*Aralia nudicaulis*) (see Appendix A for complete flora list).

No endangered, threatened, or unique plant species have been recorded in the Little Trout Lake RNA.

Surveyors from the General Land Office (General Land Office, 1938) established the section lines in and around the tract in April,

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<sup>1</sup> For tree species names, see Little, E.L. 1979. Checklist of United States Trees (Native and Naturalized). Agricultural Handbook No. 541. Washington, DC: U.S. Department of Agriculture. 375p.

<sup>2</sup> For for non-tree scientific/common names, see Gleason, A., and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada, second edition. The New York Botanical Garden, Bronx, New York. 910p.

1846. They indicated that the southern half of the tract, along what is now Forest Highway 4503, was a "burnt pine plain" with very few trees suitable for use as corner markers or witness trees. Trees that were used were red pine ("yellow pine") and white pine which ranged from 8 to 20 inches in diameter. In the northwest corner of the tract, "black oak" (probably red oak) 15 and 24 inches in diameter were noted along the section line, along with another red pine 50 inches in diameter (see Appendix B).

The burned area, approximately 600 acres in size, was oriented east-west. Another smaller burned area with identical east-west orientation was noted two miles directly to the west of the RNA in sections 28 and 33, starting at the edge of an open wetland. Given the fact that these areas were commonly used as encampments for Native Americans, the fire that burned through the RNA area may have been caused by their activity, rather than by lightning.

The fact that the RNA tract was so heavily burned in 1846 suggests that there may have been little timber of merchantable size in the 1890's, when much of the early logging activity occurred here. Review of aerial photos of 1938 and 1978 indicate that mature forest has covered eastern portion of the tract throughout the twentieth century. This, and the lack of large white/red pine stumps support the conclusion that this area has never been cut, but has been disturbed by periodic fires and windthrows throughout its history. It is likely that fires were quite frequent during the logging era at turn of the century when many slash fires from adjacent lands could have impacted the RNA tract. Several mature red pines on the tract were cored, indicating ages of 80 to 90 years.

The surveyors noted significantly more sugar maple (*Acer saccharum*), eastern hemlock (*Tsuga canadensis*), and American beech (*Fagus grandifolia*) on the morainal hills two miles to the south and to the north of the RNA tract than one would find today. The impacts of logging and associated fires have significantly altered species composition in the surrounding forests, but perhaps because of soil moisture conditions, and wildfires, the species composition of the RNA tract has probably not been significantly altered from pre-settlement conditions.

Within the mature portion of the tract, cultural practices have been limited to the removal of shrubs of *Ribes* spp. to limit potential for the development of white pine blister rust (Krejcarek, pers. comm., 1992). This took place in 1964. In a few cases (10-15 trees), young red oaks were girdled to limit competition with red pine. This practice probably also occurred in the mid 1970's.

West of the mature tract, approximately 150 acres were impacted by a tornado which passed through the area in 1976. Following the tornado, limited amounts of red oak, red maple, and red pine were

removed in salvage cuts. Also in the mid 1970's, at the western extreme of the tract, 110 acres were clearcut for aspen regeneration. All roads used for access to these timber harvests have been closed for more than ten years, as of 1992.

### Fauna

A thorough inventory of the fauna of the Little Trout RNA has not been completed. However, porcupines (*Erethizon dorsatum*)<sup>3</sup> and a variety of songbirds were noted during site visits. Signs of white tail deer (*Odocoileus virginianus*) and black bear were also noted. It is apparent that the tract provides habitat for a wide variety of game/non-game wildlife.

No endangered, threatened, or unique fauna has been identified at the Little Trout Lake RNA. Of the listed species known to exist within Alcona County by the Michigan Natural Features Inventory, only bald eagles (*Haliaeetus leucocephalus*) would likely utilize this tract for nesting habitat (see Appendix C for Alcona County list, MNFI, 1992).

### Geology

Underlying the unconsolidated glacial drift which forms the surface of the RNA tract is the Coldwater Shale of the Lower Mississippian Period. This area lies over a magnetic anomaly (Lindwall, 1992).

The surface geology was mostly formed by the Huron Lobe during the Port Bruce and Port Huron substages of Wisconsin glaciation approximately 12,500 years before present (Burgis, 1981). The RNA tract is located at the eastern end of the Glennie Moraine, adjacent to the Loud Creek Outwash Channel (1-2 miles northeast). Burgis (1981) and Farrand (1982) mapped the area as end moraine of fine textured till with pockets of fine textured ground moraine and sandy outwash. This glacial drift is quite variable in thickness; between 90-275 feet (27-84 meters) thick over bedrock (Farrand, 1982; Lindwall, 1992).

The Glennie Moraine is generally reddish brown, loamy textured till which has been reworked in places by locally ponded water, or overridden by localized outwash. Kettle depressions are common throughout this morainal surface. Dune-like formations are also commonly found, as some surficial sands were reworked by wind following glacial retreat. Padley (1989), in studying the relationships between landforms, soils, and vegetation in this area found many sites of predominantly outwash sands, outwash with ice

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<sup>3</sup> For mammal scientific/common names, see Baker, R. 1983. Michigan Mammals. Michigan State University Press. distributed by Wayne State University Press, Detroit, MI 48202.

rafted inclusions, as well as till throughout the surface of the Glennie Moraine.

The landforms and soils of the RNA tract are mostly characteristic of ice contact topography, with generally coarse textured soils, which should be expected, considering the proximity of the Loud Creek Outwash Channel. Moderate to steep slopes in irregular topography are characteristic of this tract.

### Soils

Soil types are indicated on the Ecological Land Type Phase (ELTP) map (see map D, the last two digits of the ELTP number indicates soil series). The following soil types are found within the Little Trout Lake tract (Gates, pers. comm. 1992; Bruggink, pers. comm. 1992):

<b>Sandy Mixed Frigid Entic Haplorthods</b>	21B	weak Rubicon sand
	21C	weak Rubicon sand
	22B	weak Rubicon sand
	23C	weak Rubicon sand
<b>Mixed Frigid Alfic Haplorthods, Sand Over Loam/Sand Complex</b>	35C	Manistee sand over loam

These soils are common on northern ice contact and morainal landscapes. They are primarily medium sands with coarse banding occurring between 5 and 15 feet. Thin banding (less than 3 inches thick) of very fine sands, fine sands, sandy loam, coarse sandy loam, and gravelly textures occur below 60 inches. The 21, 22, 23, and 35 series soils all contain a spodic horizon. The 22 series, with flat to gentle slopes, may have a perched water table from 6 to 15 feet during the growing season. The 35 series is characteristic where outwash sands overlay fine textured till. Upper materials are generally medium sands, which overlay sandy clay loam and finer substratums.

### Lands

Apart from the mineral rights mentioned below, all rights for lands included within the Little Trout Lake RNA are held by the U.S. government.

### Cultural

There have been no cultural surveys of the Little Trout Lake RNA.

## Impacts and Possible Conflicts

### **Mineral Resources**

Mineral, gas, and oil rights for lands within the Little Trout Lake RNA are divided between the Huron National Forest and the State of Michigan. The following table provides a breakdown of those rights pertaining to the State of Michigan (Joe Gates pers. comm., 1992):

---

T26N R6E:      Section 25: north half of southwest 1/4  
                  Section 26: southwest 1/4; northeast of southeast 1/4

---

Mineral, gas, and oil rights for all other portions of the RNA tract are held by the United States of America. The oil and gas rights to the southern 1/2 of the southwest 1/4 of section 25, owned by the U.S. government, are leased in MIES 39162 issued effective 2/1/89 for 5 years (Lindwall, 1992).

Lance Linwall, [Geologist, Huron-Manistee National Forest, Cadillac, Michigan] provided the following comments related to mineral resources on the RNA tract:

"There are no known gravel pits on the proposed RNA or in the immediate area. There has been almost no past exploratory drilling in the area. Seismic surveys have been run through and around the proposed RNA. The nearest established hydrocarbon production is the Mio Prairie du Chien Gas Field with 6 wells approximately 17 miles to the west/southwest. No other potentially economic minerals are known to occur in the mineral estate. The geology of the area, indications of structure, and past activity tend to indicate low to moderate possibilities for the discovery of oil and/or gas reserves in the mineral estate, particularly in the deeper formations. There is undoubtedly gas in the Antrim Shale. Whether it is producible and economic is the question."

### **Grazing**

There is not currently, nor are there indications of past grazing on this tract.

### **Timber**

This tract has been included in areas proposed for inclusion within the Forest's "old growth" forest base. If this proposal is approved, there would be no conflict related to removing the 370 acre (148 hectare) area from the timber base if designated as a RNA.

## **Watershed Values**

The Little Trout Lake RNA lies in the highest portions of the watershed for both McGillis Creek and the west branch of the Pine River. Both of these small rivers flow east into the main portion of the Pine River, which empties into the Au Sable River near it's mouth in Iosco County, 22 miles southeast of the RNA. The majority of Pine River watershed is federal, state, and private forest land, managed at varying levels intensity.

## **Recreation Values**

Current recreational activities associated with this tract and adjacent areas are limited to hiking and hunting. The tract is probably quite infrequently used for recreational activities. Conflicts between current recreational demands and RNA designation would be minimal.

## **Wildlife and Plant Values**

Listed species utilizing this tract would likely be limited to bald eagles, which could use the large red and white pines as nest trees. Management of the tract as an RNA, being generally non-manipulative, would allow for the protection of existing large trees, and the development of additional mature trees.

## **Special Management Area Values**

There is no conflict related to the designation of this tract as an RNA and any other congressional designation or designated area.

## **Transportation Plans**

The use of the trail (to be numbered) at the western end of the RNA is for non-motorized vehicles only, and would not be in conflict with RNA designation. Use and maintenance of Forest Highways 4503 and 4433 would not be in conflict with the RNA. The access roads at the north end of the tract have been closed for more than ten years, and their future closure poses no conflict to any forest uses.

## **Management Prescription**

### **Vegetation Management**

It is clear from the literature, and from physical evidence in the field, that this pine-oak ecosystem experienced periodic fires and windthrows in it's pre-settlement condition (Braun, 1950; Curtis, 1959; General Land Office, 1938). Therefore, the primary issue in the management of this area should be the maintenance of a disturbance regime which mimics the frequency and intensity of the

pre-settlement conditions.

A schedule should be established for prescribed burning within this RNA tract. However, prior to the establishment of a schedule for prescribed burning in the RNA, investigations must be completed on and around the tract to develop a better understanding of the frequency and intensity of pre-settlement wildfires. Techniques used to gather this type of information may include corings or cross-sections of trees or stumps greater than 150 years old and/or sediment cores from adjacent water bodies, such as Little Trout Lake or Bliss Lake. These investigations, as well as the subsequent prescribed burns, should be carried out in coordination with the North Central Forest Experiment Station.

Forest Highways 4503 and 4433 provide excellent fire breaks along the east and south boundaries of RNA. Existing trails and closed access roads along the north and west sides of the tract could provide access in emergency fire-control circumstances.

All forest areas on the west, north, and east sides of the RNA tract have been proposed for inclusion within the Forest's "old growth" forest base. If this designation is approved for these adjacent tracts, no timber resources of the Forest's timber base would be put at risk in these areas by a burning prescription on the RNA tract.

The area along the southern border of the RNA tract, south of Forest Highway 4503 will remain a part of the Forest's timber base. In the interest of protection of the values associated with the RNA, and the risks to the timber base posed by prescribed burning in the RNA, management planning for this area (Section 35, north 1/2; Section 36 northwest 1/4) should take into account the existence of the RNA.

#### Administration and Records Protection

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(517) 335-4581

Regional Ecologist

USDA Forest Service  
Milwaukee, WI

### Archiving

Data will be maintained by the Forest Planner and Ecologist in the Supervisor's office of the Huron-Manistee National Forest in Cadillac, Michigan. Copies of reports produced on the RNA or any monitoring reports produced by the Michigan Natural Features Inventory will be required to be submitted to the Forest for inclusion in the long-term, comprehensive database on the proposed Little Trout Lake RNA.

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## APPENDIX A

### FLORA LIST FOR LITTLE TROUT LAKE RESEARCH NATURAL AREA

Compiled by Lawrence Brewer, August 22, 1991, and Patrick Comer, June 30, 1992.

#### Species in mature Pine-oak forest:

##### Scientific name

##### Common name

##### Trees

<i>Abies balsamea</i>	balsam fir
<i>Acer rubrum</i>	red maple
<i>Amelanchier arborea</i>	juneberry
<i>Betula papyrifera</i>	paper birch
<i>Fraxinus americana</i>	white ash
<i>Pinus banksiana</i>	jack pine
<i>Pinus resinosa</i>	red pine
<i>Pinus strobus</i>	white pine
<i>Populus grandidentata</i>	bigtooth aspen
<i>Populus tremuloides</i>	quaking aspen
<i>Prunus pensylvanica</i>	pin cherry
<i>Prunus serotina</i>	black cherry
<i>Quercus alba</i>	white oak
<i>Quercus ellipsoidalis</i>	northern pin oak
<i>Quercus rubra</i>	red oak

##### Shrubs

<i>Comptonia perigrina</i>	sweet fern
<i>Epigaea repens</i>	trailing arbutus
<i>Hamamelis virginiana</i>	witch hazel
<i>Ilex verticillata</i>	winterberry
<i>Rubus occidentalis</i>	black raspberry
<i>Rubus pubescens</i>	dwarf raspberry
<i>Vaccinium angustifolium</i>	common lowbush-blueberry
<i>Vaccinium myrtilloides</i>	velvetleaf-blueberry
<i>Viburnum acerifolium</i>	maple-leaved arrow-wood
<i>Viburnum trilobum</i>	highbush cranberry

##### Groundcover

<i>Anemone quinquefolia</i>	wood anemone
<i>Andropogon scoparius</i>	little bluestem grass
<i>Antennaria neglecta</i>	cat's foot
<i>Apocynum cannabinum</i>	indian hemp
<i>Arabis divaricarpa</i>	rock cress
<i>Aralia nudicaulis</i>	wild sarsaparilla
<i>Carex arctata</i>	bear sedge
<i>Carex brunnescens</i>	sedge
<i>Carex pensylvanica</i>	Pennsylvania sedge

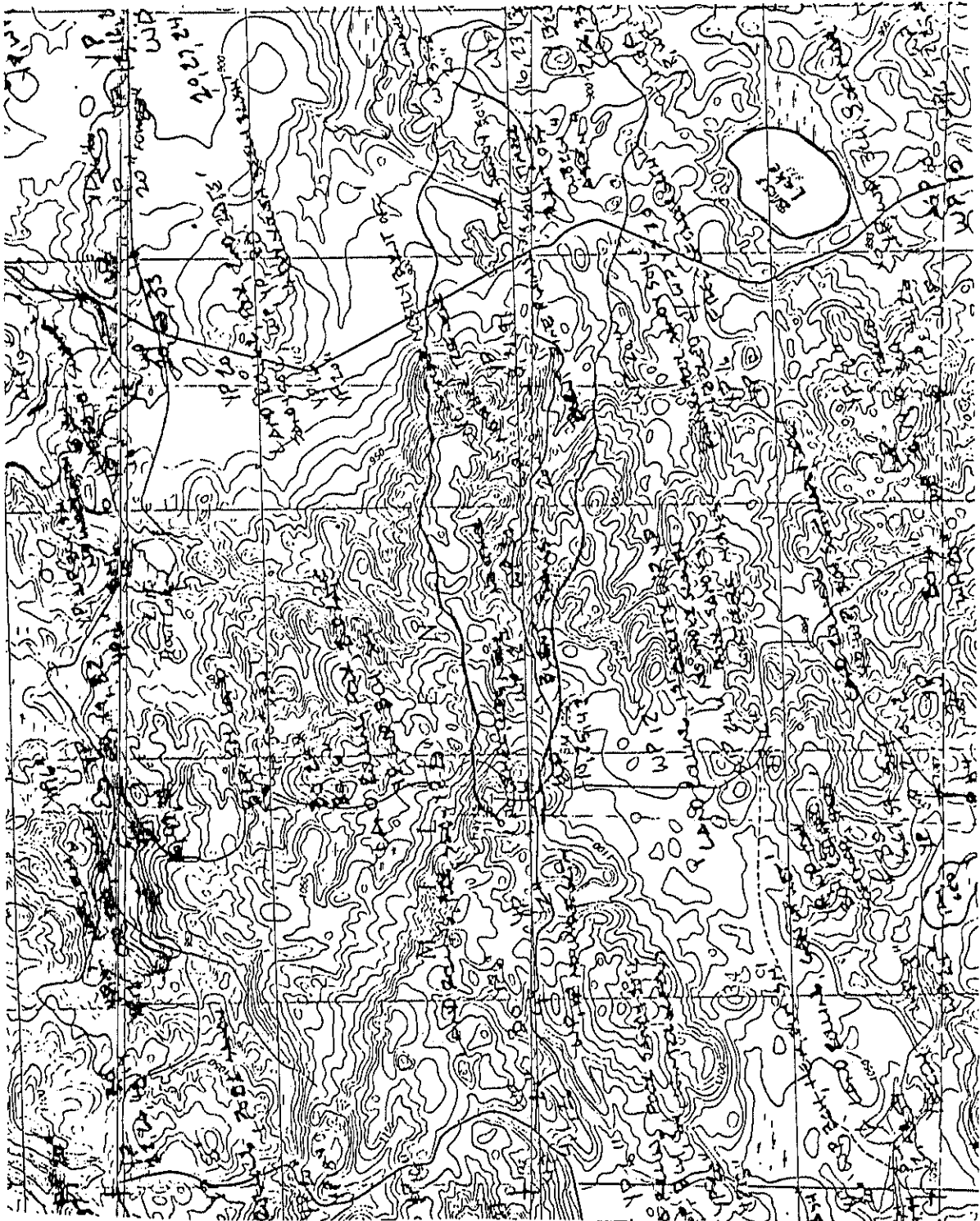
Chimaphila umbellata	prince's pine
Comandra umbellata	bastard toad-flax
Cornus canadensis	bunchberry
Cypripedium acaule	moccasin flower
Danthonia spicata	poverty oat grass
Fragaria virginiana	wild strawberry
Galium circaezans	bedstraw
Hieracium venosum	veiny hawkweed
Houstonia longifolia	Long-leaved bluets
Gaultheria procumbens	wintergreen
Lycopodium clavatum	running ground pine
Lycopodium obscurum	ground pine
Lycopodium tristachyum	ground cedar
Lycopus uniflorus	northern bugle weed
Lysimachia quadrifolia	whorled loostrife
Maianthemum canadensis	Canada mayflower
Melampyrum lineare	cowheat
Moneses uniflora	one-flowered shinleaf
Oryzopsis asperifolia	rough-leaved rice grass
Osmunda cinnamomea	cinnamon fern
Panicum latifolium	broad-leaved panic grass
Panicum linearifolium	narrow-leaved panic grass
Pedicularis canadensis	wood betony
Poa compressa	Canada blue grass
Polygala pauciflora	fringed polygala
Polytrichum juniperinum	moss
Pteridium aquilinum	bracken fern
Pyrola elliptica	large-leaved shinleaf
Smilacina racemosa	feathery false Solomon's seal
Trientalis borealis	starflower
Viola conspersa	dog violet

**Additional shrubs/groundcover early successional area:**

Achillea millefolium	yarrow
Aster macrophyllus	big-leaved aster
Bromus pubescens	brome-grass
Chrysanthemum leucanthemum	ox-eye daisy
Cornus rugosa	round-leaved dogwood
Hieracium aurantiacum	orange hawkweed
Krigia virginica	dwarf dandelion
Linnaea borealis	twinflower
Onoclea sensibilis	sensitive fern
Potentilla simplex	common cinquefoil
Prenanthes alba	white lettuce
Pyrola rotundifolia	round-leaved shinleaf

*Rhynchospora AMORPHOSA*  
*GALEREA FLAVA*

**APPENDIX B** Topographic map of the Little Trout Lake area including notes from 1846 surveys completed by the General Land Office. Scale: 1:24,000. ← NORTH



**APPENDIX C** Endangered, threatened, and special concern species known to occur in Alcona County, Michigan (MNFI, 1992).

ALCONA COUNTY ELEMENT LIST  
MICHIGAN NATURAL FEATURES INVENTORY  
(517) 373-1599  
JUNE, 1992

Type Codes: A = Vertebrate Animal; C = Plant Community; G = Geological Feature; I = Invertebrate Animal; N = Non-Vascular Plant; O = Other Feature (Champion Tree, Rookery); P = Vascular Plant.  
Status Codes: E = Endangered; T = Threatened; SC = Special Concern (rare, may become E or T in future); C1 = E or T considered appropriate but not yet officially proposed; C2 = E or I may be appropriate but more information is needed; 3C = Not currently being considered for listing; P = Proposed status; X = Probably extirpated.

TYPE	NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
I	APPALACHIA ARCANA	SECRETIVE LOCUST	C2	SC
P	CALYPSO BULBOSA	CALYPSO OR FAIRY-SLIPPER		T
P	CAREX ALBOLUTESCENS	GREENISH-WHITE SEDGE		SC
P	CAREX ARCTA	SEDEGE		SC
P	CAREX FRANKII	FRANK'S SEDGE		SC
P	CAREX NIGRA	BLACK SEDGE		E
P	CIRSIIUM HILLII	HILL'S THISTLE	C2	SC
P	CIRSIIUM PITCHERI	PITCHER'S THISTLE	LT	T
A	CLEMMYS INSCULPTA	WOOD TURTLE		SC
P	CYPRIPEDIUM ARIETINUM	RAM'S HEAD LADY'S-SLIPPER	3C	SC
A	DENDROICA KIRTLANDII	KIRTLAND'S WARBLER	LE	E
C	DRY NORTHERN FOREST	DRY WOODLAND, UPPER MIDWEST TYPE		
C	DRY-MESIC NORTHERN FOREST			
A	GAVIA IMMER	COMMON LOON		T
O	GREAT BLUE HERON ROOKERY	GREAT BLUE HERON ROOKERY		
A	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	LELT	T
C	HARDWOOD-CONIFER SWAMP			
I	MESODON SAYANUS	SPIKE-LIPPED CRATER		SC
A	PERCINA COPELANDI	CHANNEL DARTER		T
A	PHALACROCORAX AURITUS	DOUBLE-CRESTED CORMORANT		
I	PLANOGYRA ASTERISCUS	EASTERN FLAT-WHORL		SC
C	POOR FEN	POOR SHRUB/HERB FEN, UPPER MIDWEST TYPE		
P	PTEROSPORA ANDROMEDEA	PINE-DROPS		T
C	RICH CONIFER SWAMP			
A	SISTRURUS CATENATUS CATENATUS	MASSASAUGA	C2	SC
A	STERNA CASPIA	CASPIAN TERN		T
I	TRIMEROTROPIS HURONIANA	LAKE HURON LOCUST	C2	T
C	WOODED DUNE AND SWALE COMPLEX			