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2.6 TERRESTRIAL ECOLOGY

The terrestrial ecology sampling program was designed to identify and describe the major terrestrial communities in the Crandon Project environmental study area and site area, and to provide a basis for evaluating potential environmental impacts resulting from development. This program included the following:

- Describing the soils in the area;
- Identifying "important" floral and faunal species, including those considered to be threatened and endangered;
- Documenting the distribution and relative abundance of "important" biota;
- Mapping principal plant communities and selected wildlife resources; and
- Describing the regional importance of the site area's flora and faunal populations based on a comparison of site data with regional data.

Species or communities were considered "important" in this study if one or more of the following criteria applied:

- 1) The species or community is commercially or recreationally valuable;
- 2) The species is threatened, endangered, or rare;
- 3) The species or community affects the well-being of some important species within criteria 1 or 2; and
- 4) The species, population or community is critical to the structure and function of the ecosystem.

Listed in Table 2.6-1 are the major biotic components that were studied and the seasonal sampling schedule during 1977 and 1978.

The environmental study area and the site area are heavily forested. Northern Hardwood, Aspen-Birch, and Swamp Conifer are the most prevalent plant

TABLE 2.6-1
SAMPLING FREQUENCIES FOR TERRESTRIAL ECOLOGY STUDIES

TASK	1977												1978						
	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
<u>GENERAL RECONNAISSANCE</u>	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S	E S
<u>VEGETATION</u>																			E
Mapping																			S
Quantitative Sampling					S													S	
Seasonal Collections			E S	E S	E S		E S								S	S	S		S
Tissue Analysis							E										E		
<u>AMPHIBIANS AND REPTILES</u>																			
General Survey				S			S								S	S			S
<u>BIRDS</u>																			
Avian Survey	S			S	S							S			S	S			
Migrating Waterfowl Survey			S						S					S					
Waterfowl Brood Survey																	S		
Grouse Survey			S											S					
<u>MAMMALS</u>																			
Snap Trapping							S												S
Deer Trail Counts				S					S										

NOTE: E = Environmental study area.
 S = Site area.

communities. The lands within the site area that will be potentially directly affected by the Project are the waste disposal site, the mine/mill site, and the corridors for the railroad spur and access road (see chapter 1.0 for location and discussion). The prevalent plant communities in these potentially affected areas are also Northern Hardwood, Aspen-Birch and Swamp Conifer.

At the time the ecological baseline surveys were initiated, there were very few existing vegetation or wildlife surveys that pertained to the specific site area. However, the DNR had conducted several regional surveys that were pertinent to the environmental study area. These surveys included deeryard management reports, annual bald eagle (Haliaeetus leucocephalus) and osprey (Pandion haliaetus) nest surveys, game and furbearer harvest reports, and censuses for ruffed grouse (Bonasa umbellus) and American woodcock (Philohela minor). These surveys are mentioned and referenced appropriately in the following text. In addition to the studies reported herein, more recent vegetation and wildlife surveys that have been conducted in the site area are a timber survey by Steigerwaldt and Sons (1982) and a wetlands study by Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982). Information from these two surveys is also referenced throughout the following text.

Common names for plants and animals are used throughout the text and the corresponding scientific name is cited when the species is first mentioned. Nomenclature for plants follows that of Gleason and Cronquist (1963). The nomenclature for animals follows three principal sources: Jones et al. (1973) for mammals, the American Ornithologists' Union (1957, 1973, 1976) for birds, and Conant (1975) for reptiles and amphibians.

2.6.1 Field and Laboratory Methods

2.6.1.1 Soils

Soil types in the site area were mapped by personnel of the Soil Conservation Service office at Rhinelander, Wisconsin. The area mapped corresponded to those lands that in 1977 were believed to be most likely directly affected by the proposed Project. Soil mapping and classification were completed according to the Soil Conservation Service's current method for conducting modern soil surveys (Ludwig, 1978). This method involved extensive field investigation of the soil types in the site area combined with interpretation of aerial photographs.

2.6.1.2 Vegetation

Spencer and Thorne (1972) list Aspen-Birch, Maple-Basswood (Northern Hardwood), and Spruce-Fir as the most prevalent forest types in Forest County. A reconnaissance of the environmental study area indicated that the major plant communities in the environmental study area were also Northern Hardwood, Aspen-Birch, and Swamp Conifer. These communities were sampled using quantitative methods. Other less extensive plant communities/vegetation types such as bog, deciduous swamp, shrub swamp and marsh were qualitatively surveyed because they represented a very small portion of the environmental study area and site area.

Vegetation Mapping

Vegetation in the environmental study area and site area were mapped using color aerial photographs (dated April 1976; scale of 1:15,840) and color infrared aerial photographs (dated June 1978; scale of 1:24,000). Interpretation of aerial photographs was checked through on-site reconnaissance. Vegetation was classified into the following types; Northern Hardwood (including Aspen-Birch), Swamp Conifer, Shrub Swamp, Bog, Marsh, Old Field and Clearcut, and Agriculture. Areas of open water and urban or developed lands were also delineated. The relationship between these vegetation types and the classification of plant communities by Curtis (1959) is described in the text.

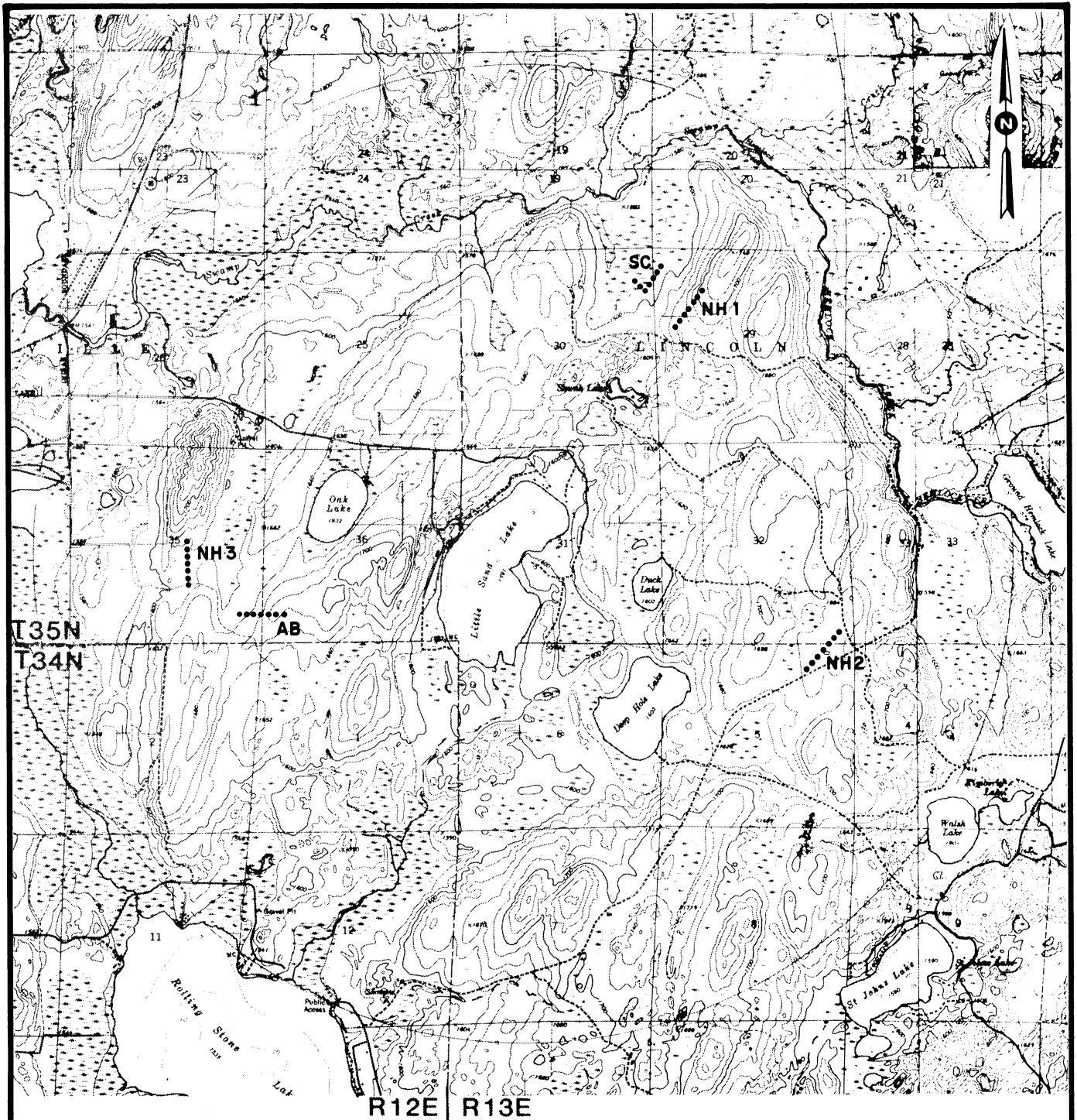
The minimum type size delineated on the vegetation map of the environmental study area was 16.2 ha (40 acres). The minimum type size delineated on the more detailed map of the site area was 4.0 ha (10 acres) for upland areas and 1.0 ha (2.5 acres) for wetlands.

Vegetation Sampling

Quantitative vegetation sampling was conducted in mid-June 1977 and 1978. Five transects were located in the three major vegetation types of the site area (Figure 2.6-1). Thirty sample points were established along each transect at 15-m (50-foot) intervals.

The vegetation was divided into four strata and each stratum was sampled separately. The four strata were:

- 1) Overstory: > 100 mm (4 inches) in diameter at breast height (dbh);
- 2) Upper understory: > 25 mm (1 inch), \leq 100 mm (4 inches) dbh;



KEY:

..... VEGETATION TRANSECT

NOTE: VEGETATION TYPE ALONG TRANSECT

AB ASPEN / BIRCH

NH NORTHERN HARDWOOD

SC SWAMP CONIFER

1 0 1 MILE

1 0 1 KILOMETER

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VEGETATION SAMPLING LOCATIONS
IN THE SITE AREA

BASE MAP REFERENCE:
PORTIONS OF THE FOLLOWING U.S.G.S. 7.5 MINUTE SERIES:
CRANDON, WISCONSIN, 1965; LAKE LUCERNE, WISCONSIN, 1973;
AND ROBERTS LAKE, WISCONSIN, 1973.

DAMES & MOORE

FIGURE 2.6-1

- 3) Lower understory: > 0.5 m (20 inches) in height, ≤ 25 mm (1 inch) dbh; and
- 4) Ground layer: woody plants ≤ 0.5 m (20 inches) in height and all herbaceous plants.

The overstory and upper understory were sampled at all 30 points using the Point-centered Quarter Method (Cottam and Curtis, 1956; Ashby, 1972). At every other point (that is, 15 of the 30 points), the lower understory and ground layer were sampled. The lower understory was sampled by estimating the percent aerial coverage of each species within a circular plot 28 m^2 (307 square feet) in size. The ground layer vegetation was sampled by estimating the percent aerial coverage of each species within a 1-m^2 (9-square-foot) quadrat. Descriptions of the above-mentioned methods can be found in Oosting (1956) and Daubenmire (1968).

An importance value was calculated for each of the species encountered in the sampling according to the method of Curtis and McIntosh (1951).

Qualitative Surveys

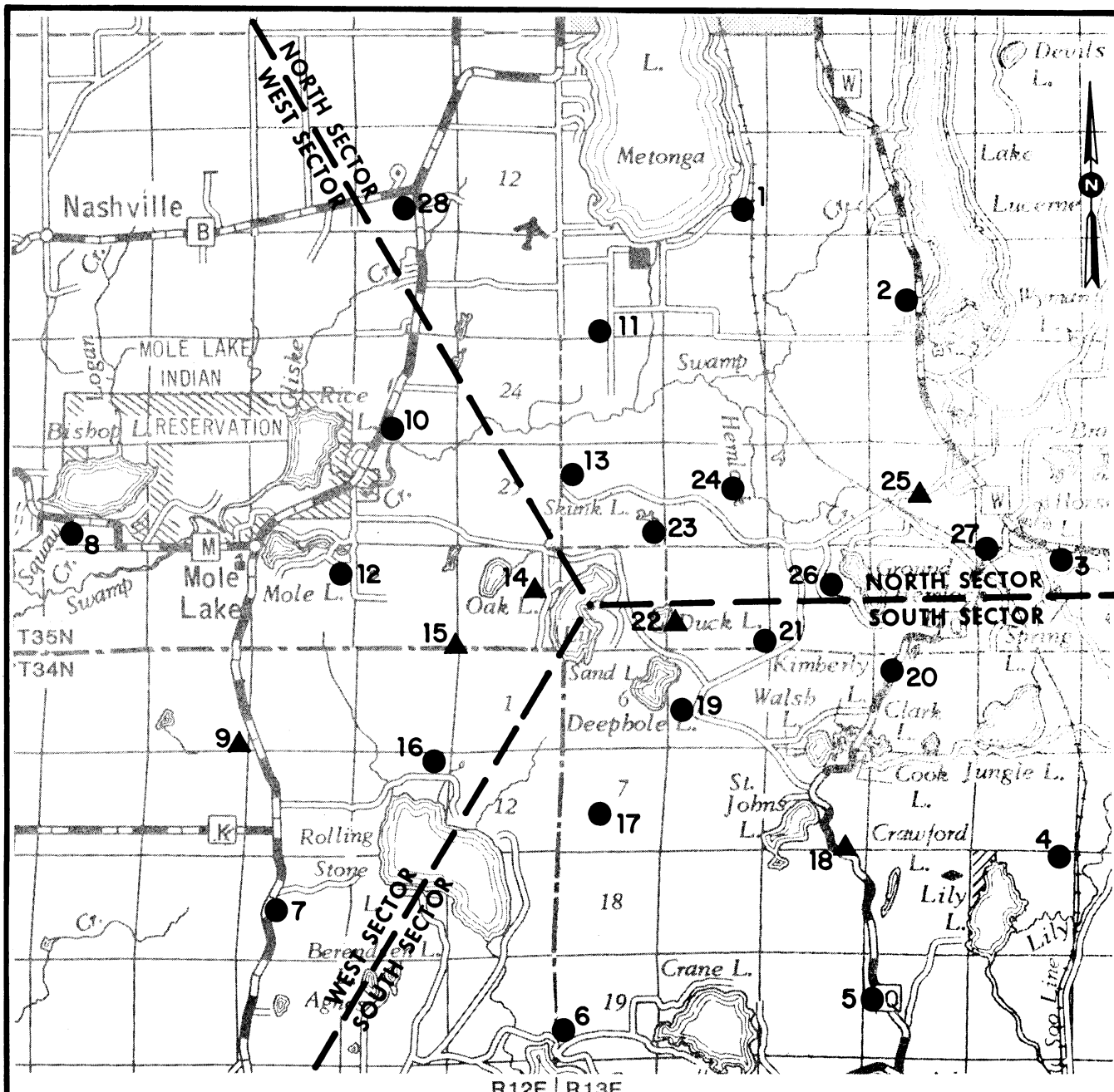
In addition to the quantitative sampling of the vegetation, qualitative observations and plant collecting were made throughout the site area. Many plants in a terrestrial community are not commonly encountered with various sampling methods because they are confined to special habitats or have limited local distribution. Because these species can be aesthetically important, are considered to be threatened or endangered, and/or serve as wildlife food, their presence was noted in the site area during searches of various habitats. These qualitative surveys and plant collections were

conducted during April, May, June, and August of 1977 and 1978 and were concentrated primarily in those areas believed to be directly affected by the proposed Project.

Heavy Metal Analysis in Vegetation

Vegetation samples were collected in June 1978 at 27 of 28 locations in the environmental study area for heavy metal analysis (Figure 2.6-2). Heavy metal analyses were conducted on the basis of potential concern for possible contamination from fugitive dust and the anticipated prevailing wind conditions. The nine metals selected for analysis were those generally found in base metal sulfide ores. These metals were manganese, zinc, cadmium, copper, arsenic, lead, mercury, cobalt, and total chromium.

The absorption, accumulation, and release of heavy metals are known to vary from species to species (Gerloff et al., 1966). To reduce the bias that might be introduced if only one plant species had been sampled, three species, one from each of the three major taxonomic groups of vascular plants (Gymnosperms, Monocotyledons, and Dicotyledons), were collected from each sampling location. Balsam fir (Abies balsamea) was selected as the gymnosperm because it is a widely distributed conifer in the environmental study area. Red raspberry (Rubus idaeus), the dicotyledon selected, grows commonly throughout the environmental study area. Pennsylvania sedge (Carex pennsylvanica) was selected as the monocotyledon because it is also common in the area. The new foliage (current summer's growth) was collected from plants of the above three species found near each of the sampling locations.



KEY:

- MATERIAL COLLECTED USED FOR COMPOSITE SAMPLE
- ▲ MATERIAL COLLECTED USED FOR INDIVIDUAL AND COMPOSITE SAMPLE
- COMPOSITE SECTOR BOUNDARY

NOTE: NO SAMPLES WERE COLLECTED AT LOCATION 17 DUE TO INACCESSIBILITY.



BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION, JANUARY, 1978. FOREST CO. AND LANGLADE CO. HIGHWAY MAPS.

EXXON MINERALS COMPANY CRANDON PROJECT	
LOCATIONS OF VEGETATION SAMPLED FOR HEAVY METAL ANALYSIS IN THE ENVIRONMENTAL STUDY AREA	
DAMES & MOORE	FIGURE 2.6-2

Plant tissue samples were placed in airtight polyethylene bags and shipped to Aqualab, Inc. for analysis. In the laboratory, the foliage collected was processed as follows. The foliage was washed in deionized water, dried at 105°C (221°F) for 24 hours, and ground to a fine powder in a food mill. The concentrations of manganese, zinc, cadmium, copper, lead, cobalt, and chromium in vegetation were analyzed as follows. Samples of ground vegetation were redried to a constant weight and then ashed in a muffle furnace at 500°C (932°F) for a minimum of 4 hours. After ashing, metals were dissolved in a 1+1 hydrochloric acid solution and warmed to facilitate complete dissolution. Samples were then diluted to a known volume and analyzed by atomic absorption spectrophotometry (U.S. EPA, 1974). Separate wet-ashed samples were analyzed for arsenic and mercury. Mercury was analyzed by a flameless atomic absorption method and arsenic by a gaseous hydrate generation atomic absorption method (U.S. EPA, 1974). The unused portions of these samples were placed in individual glass containers and retained for future reference. Approximately 0.5 g of processed tissue was used for each chemical analysis.

The processed tissue samples were subsampled in two ways prior to chemical analysis. For each species, samples were taken from the plant material collected at six of the sampling locations (Numbers 9, 14, 15, 18, 22, and 25; Figure 2.6-2) and analyzed separately. The environmental study area was then divided into three sectors: north, south, and west, with respect to the predominant wind directions. Equal-sized subsamples were then taken from the prepared material from each location and combined into composite samples for each of the three species by sector. The north sector

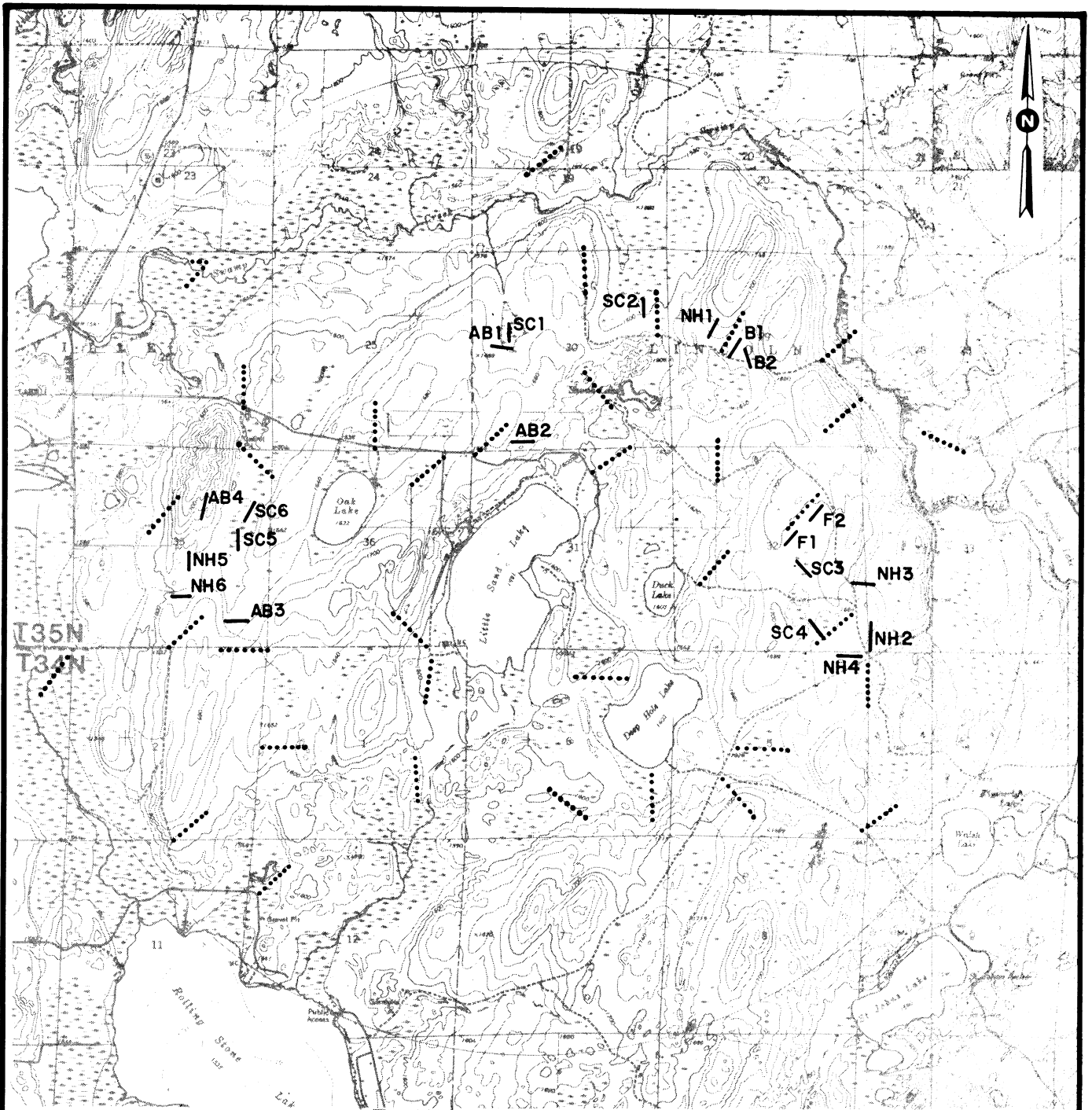
composite consisted of material from locations 1, 2, 3, 11, 13, 23, 24, 25, 26, 27, and 28; the south sector composite from locations 4, 5, 6, 18, 19, 20, 21, and 22; and the west sector composite from locations 7, 8, 9, 10, 12, 14, 15, and 16. These composite samples were then thoroughly mixed and a sample was removed for chemical analysis.

2.6.1.3 Wildlife

Mammals

Selection of the mammal species to be studied and the methodologies to be employed were finalized during discussions with the DNR in February 1977. It was concluded that data available from the DNR on white-tailed deer (Odocoileus virginianus), black bear (Ursus americanus), and medium-sized mammals, such as beaver (Castor canadensis), otter (Lontra canadensis), bobcat (Lynx rufus), marten (Martes americana), and squirrel, would generally be adequate to describe mammal populations of the environmental study area. Censusing to determine the densities of these medium-sized mammals in an area the size of the site area and with the population densities expected there, was not considered practical in light of the reliability of the data that could be obtained.

Of the mammals present in the site area the white-tailed deer was given special consideration because of its recreational value. During the spring and autumn of 1977 white-tailed deer were censused in the site area using the deer trail count method of McCaffery (1976) (Table 2.6-1; Figure 2.6-3). The method consisted of counting the number of deer trails encountered on a series of 0.4-km (0.25-mile) transects. Thirty-six transects



KEY:

..... DEER TRAIL TRANSECT

—— SMALL MAMMAL TRAPLINE IN SITE AREA

NOTE: HABITAT TYPE ALONG SMALL MAMMAL TRAPLINE:

- NH NORTHERN HARDWOOD
- AB ASPEN / BIRCH
- SC SWAMP CONIFER
- F OLD FIELD
- B BOG

BASE MAP REFERENCE:
 PORTIONS OF THE FOLLOWING U.S.G.S. 7.5 MINUTE SERIES:
 CRANDON, WISCONSIN, 1965; LAKE LUCERNE, WISCONSIN, 1973;
 AND ROBERTS LAKE, WISCONSIN, 1973.

0 .5 1 MILE

0 .5 1 KILOMETER

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MAMMAL SURVEY LOCATIONS
 IN THE SITE AREA

DAMES & MOORE

FIGURE 2.6-3

were used in the site area. This method was selected because the data collected can be compared with the results of similar surveys performed by the DNR.

The small mammals (mice, shrews, voles) are inconspicuous and only infrequently observed. Therefore, small mammals were qualitatively sampled using snap traps during August of 1977 and 1978 (Table 2.6-1) to collect data on relative abundance and species composition for the major habitats. At least four traplines were set in each of the three major plant communities. Two traplines were also set in an old field and bog (Figure 2.6-3). Traplines contained 15 stations approximately 10 m (30 feet) apart with two mouse traps and one rat trap at each station (Golley et al., 1965). Traplines were set for three consecutive days and checked each morning and rebaited with a mixture of peanut butter and dry rolled oats. Results of the snap-trapping effort were expressed as trap success (total number of captures of each species divided by total number of trapnights). One trapnight is defined as one trap set for 24 hours. All mammals collected were identified, sexed, weighed, measured, and examined for breeding condition. Voucher specimens have been preserved and are on file in the Environmental Laboratory of Dames & Moore's Park Ridge office.

Observations or signs of any mammals not previously observed in the environmental study area or site area were also noted.

Birds

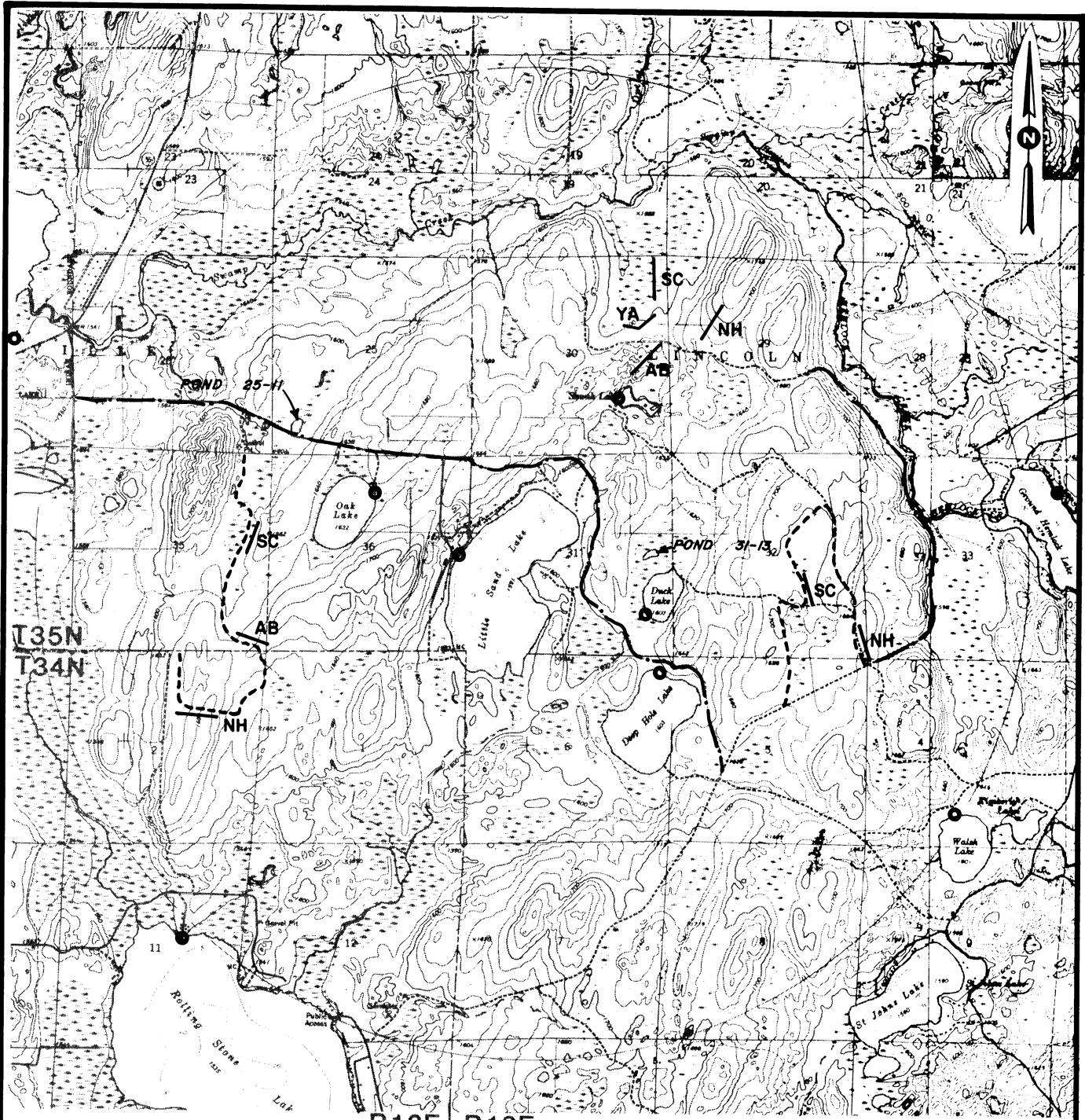
Bird censuses were conducted seasonally during 1977 and 1978 (Table 2.6-1). Special consideration was given to monitoring waterfowl and upland

game birds because of their recreational importance. The locations of bald eagle and osprey nests in the site area were obtained from DNR annual surveys.

Counts of drumming ruffed grouse were conducted during the spring of 1977 and 1978 along roads in the site area. The 1977 survey was qualitative to establish the relative abundance of ruffed grouse. The 1978 survey was designed to estimate ruffed grouse densities in the site area. Ruffed grouse surveys were conducted in a manner similar to that used by the DNR (Gullion, 1966; Vanderschaegen, 1977). Stops on DNR surveys are located 1.6 km (1 mile) apart, whereas the distance between stops on surveys used in these studies was 0.8 km (0.5 mile). The grouse surveys were conducted from April 27 through 29, 1977, and from April 26 through 28, 1978; the location of the route is shown on Figure 2.6-4.

Surveys of migrating waterfowl were conducted for 0.5 hour on each of 3 days during the late evening or early morning on Skunk, Duck, Little Sand, Rice, Ground Hemlock, Walsh, Oak, Deep Hole, and Rolling Stone lakes. Observations were made during both spring and autumn migratory seasons at each lake (Table 2.6-1). Locations of observation points are shown on Figure 2.6-4. Specific dates for these observations were between April 26 and 29, 1977; September 26 and 28, 1977; and April 26 and 28, 1978. Migrating waterfowl counts were also taken at several local ponds.

Waterfowl brood counts were conducted for a period of 0.5 hour once on the same 10 lakes as described above during the early morning or late evening. The observation points were the same as those used during surveys of migrating waterfowl. Observations were made during the period June 13 through 16, 1978 (Table 2.6-1).



KEY:

- WATERFOWL OBSERVATION POINT
- EMLÉN BIRD CENSUS ROUTE
- - - RUFFED GROUSE SURVEY ROUTE
- SEASONAL BIRD TRANSECT IN SITE AREA

NOTE: HABITAT TYPE ALONG BIRD TRANSECTS:

- NH NORTHERN HARDWOOD
- AB ASPEN / BIRCH
- SC SWAMP CONIFER
- YA YOUNG ASPEN

BASE MAP REFERENCE:

PORTIONS OF THE FOLLOWING U.S.G.S. 7.5 MINUTE SERIES:
 CRANDON, WISCONSIN, 1965; LAKE LUCERNE, WISCONSIN, 1973;
 AND ROBERTS LAKE, WISCONSIN, 1973.



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BIRD SURVEY LOCATIONS
 IN THE SITE AREA

DAMES & MOORE

FIGURE 2.6-4

Songbirds were surveyed using two different methods during the winter, spring, and summer of 1977 and 1978 in the site area (Table 2.6-1). One type of survey was conducted to determine relative abundance and seasonal distribution of songbirds along nine transects located in the major habitats of the site area (Figure 2.6-4). The spring survey was conducted in May at or near the peak of spring migration. Surveys consisted of walking a transect 0.4 km (0.25 mile) long and recording all birds identified by sight or song. Five stops for 3 minutes each were made at even intervals along the transects to observe and listen for birds. Transect locations are shown on Figure 2.6-4.

During the spring and summer of 1978, songbirds were censused using the method described by Emlen (1971, 1977). This method is a variable width strip census whereby a single observer slowly walks a transect and records the perpendicular distance from the transect to all birds observed or heard. Two 3.2-km (2-mile) long transects were censused (Figure 2.6-4).

Amphibians and Reptiles

The presence and relative abundances of amphibian and reptile species in the site area were noted during qualitative surveys during May and August 1977 and April, May and August 1978 (Table 2.6-1). Numerous microhabitats were searched for amphibians and reptiles including pond banks, and beneath logs, pieces of bark, debris, and leaf litter. Care was taken to replace upturned material in order to preserve this habitat. During the spring surveys, "singing" amphibians were identified and their presence recorded. Searches were concentrated primarily in those areas believed to be

directly affected by the proposed Project, and adjacent ponds or wetlands. Observations of amphibians and reptiles not previously recorded in the site area were also noted during other seasonal vegetation and wildlife surveys.

2.6.1.4 Threatened and Endangered Species

The potential occurrence of threatened or endangered plant and animal species in the site area was investigated through literature searches and contacts with the DNR. From the literature search, preferred habitat types of threatened or endangered species were identified for the environmental study area. Subsequent field reconnaissances and previously mentioned qualitative surveys were conducted for threatened or endangered species in the site area. Evidence of threatened or endangered species was searched for during all terrestrial field work. Approximately 540 manhours of field time were spent in the site area and roughly 25 percent of this time was reconnaissance principally for threatened or endangered species. A discussion of each threatened or endangered species expected to occur in the environmental study area is presented in the following text, including their preferred habitat and reported sightings.

2.6.1.5 Quality Control Procedures

Quality control procedures were utilized by field and laboratory personnel as a means of assuring that the study was completed according to currently accepted standards and methods.

Field Procedures

A daily record of field activities was maintained by individual field personnel in the terrestrial ecology project journal. Included in this field journal were notes and maps used to describe:

- 1) Areas where sampling transects were located;
- 2) Areas covered during reconnaissance surveys;
- 3) Records of unusual observations;
- 4) Observation by DNR personnel regarding field investigations;
and
- 5) Other miscellaneous information pertinent to the field studies.

Personnel from the DNR accompanied Dames & Moore investigators on at least one occasion during each phase of reconnaissance and during specific sampling operations to observe and verify field methodologies and techniques. The timing of critical seasonal surveys, such as ruffed grouse drumming and migrating waterfowl, was coordinated through the DNR to verify that sampling would be conducted at or near the breeding and migration peaks.

Voucher specimens were collected for plants, mammals, amphibians, and reptiles whenever practical.

Data sheets were used during all formal field surveys. The data sheets were used for point-centered-quarter vegetation sampling, deer-trail transects, nongame mammal trapping, ruffed grouse drumming counts, migrating waterfowl surveys, waterfowl brood counts, and songbird surveys.

Laboratory Procedures

Chemical laboratory analyses for heavy metals in plant material were conducted by Aqualab, Inc. All laboratory analyses were completed by Aqualab, Inc. and were subject to review and verification procedures.

Plant voucher specimens collected were dried and mounted, and are on file in the Environmental Laboratory in Dames & Moore's Park Ridge office. Specimens collected during this study were annotated by Dr. Hugh H. Iltis and Dr. Theodore S. Cochran of the Botany Department, University of Wisconsin-Madison.

Mammal, amphibian, and reptile voucher specimens have been preserved and are on file in the Environmental Laboratory in Dames & Moore's Park Ridge office. Dr. Phillip W. Smith of the Illinois Natural History Survey and Dr. Ronald A. Brandon of Southern Illinois University annotated amphibian and reptile specimens. Mammal specimens were not annotated since no unusually difficult identifications were encountered.

Data Analyses

Data from the point-centered-quarter vegetation surveys were reduced using a verified computer program. Input data to the program were checked for accuracy by an investigator other than the original investigator.

Data from all other surveys conducted as part of the terrestrial ecology baseline study were reduced with the aid of a desk top calculator. All results were checked for accuracy by an investigator other than the original investigator.

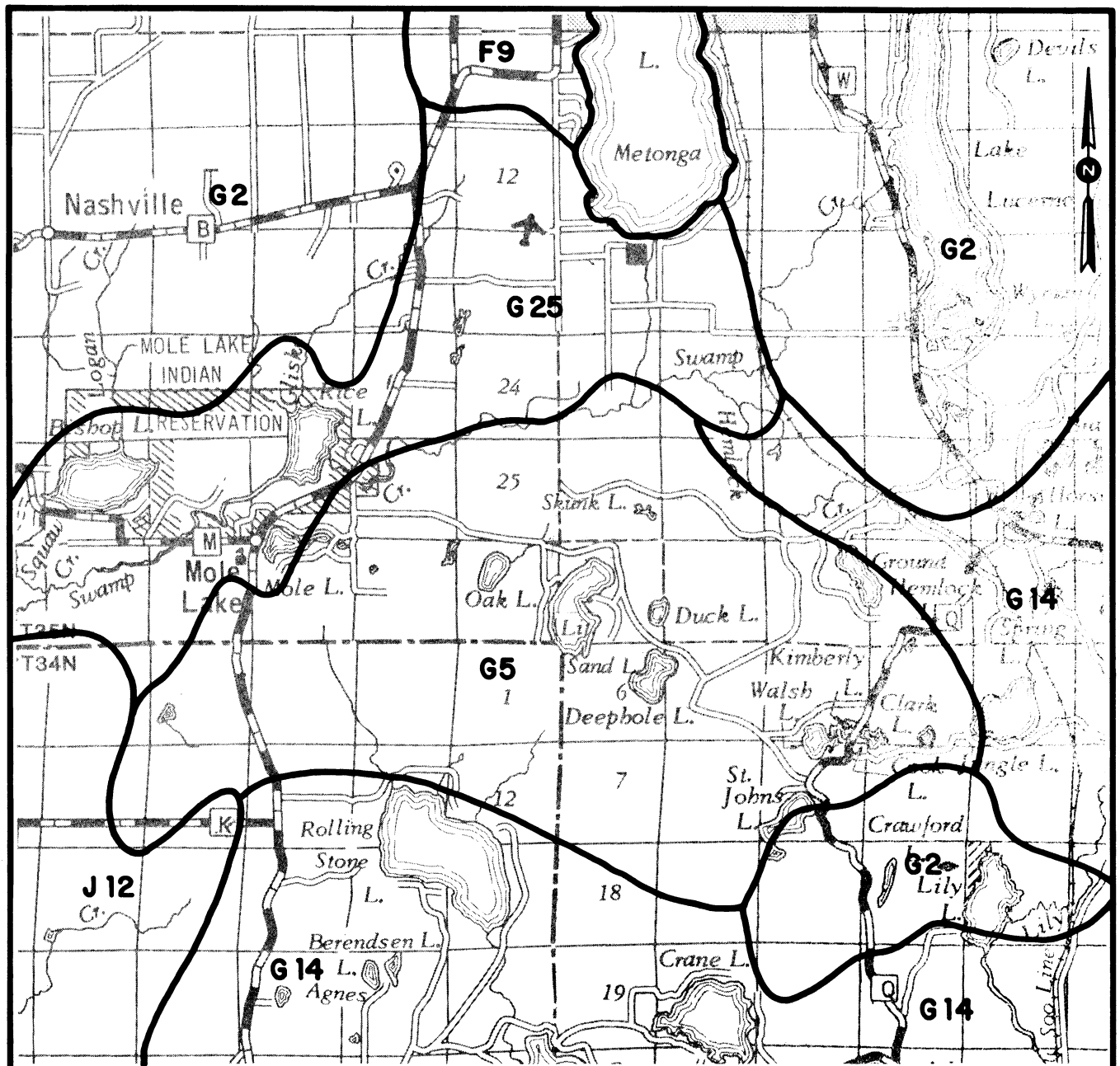
2.6.2 Soils

Three major soil regions occur in the environmental study area: (1) soils of the northern silty uplands and plains; (2) soils of the northern loamy uplands and plains; and (3) soils of the stream bottoms and major wetlands (Hole et al., 1968). The northern loamy soils of the uplands and plains represent the most common of the three soil regions in the environmental study area (Figure 2.6-5).

The site area is located within the Kennan, Iron River, Pence, Vilas Association (G5) (Figure 2.6-5), and the major soils are the Kennan, Iron River, and Pence loams; Vilas sands; and peat soils.

The most common soil type in the site area is the Iron River Variant Stony Loam (#21) (Figure 2.6-6), which is characterized as a moderately well-drained, nearly level to steep silt loam, 508 to 1,016 mm (20 to 40 inches) deep, over sandy loam glacial till. Monico Stony Loam is the second most common soil in the site area and is characterized as a somewhat poorly drained, nearly level to gently sloping loamy soil, 508 to 1,016 mm (20 to 40 inches) thick, over sandy loam glacial till. This moderately permeable soil has a high available water capacity.

Soils in the wetlands are primarily peats and mucks (700 Series). A detailed map of the soils of the site area is presented on Figure 2.6-6, and soil descriptions are presented in Table 2.6-2.



R12E | R13E

KEY:

SOILS OF THE NORTHERN SILTY UPLANDS AND PLAINS

F9 CLIFFORD AND AUBURDALE SILT LOAM; AND PEAT SOILS

SOILS OF THE NORTHERN LOAMY UPLANDS AND PLAINS

G2 IRON RIVER AND PENCE LOAMS; GOODMAN, MONICO AND STAMBAUGH SILT LOAM; PEAT SOILS; SOME AREAS ARE STONY

G5 KENNAH, IRON RIVER AND PENCE LOAMS; VILAS SAND; AND PEAT SOILS

G14 KENNAH, IRON RIVER AND PENCE LOAMS; AND PEAT SOILS

G25 PENCE AND PADUS LOAMS; STAMBAUGH SILT LOAM; VILAS AND OMEGA SAND

SOILS OF STREAM BOTTOMS AND MAJOR WETLANDS

J12 MOSS PEAT OVER ACID SEDGE AND WOODY PEAT SOILS; AU GRES SAND; AND CABLE LOAMS



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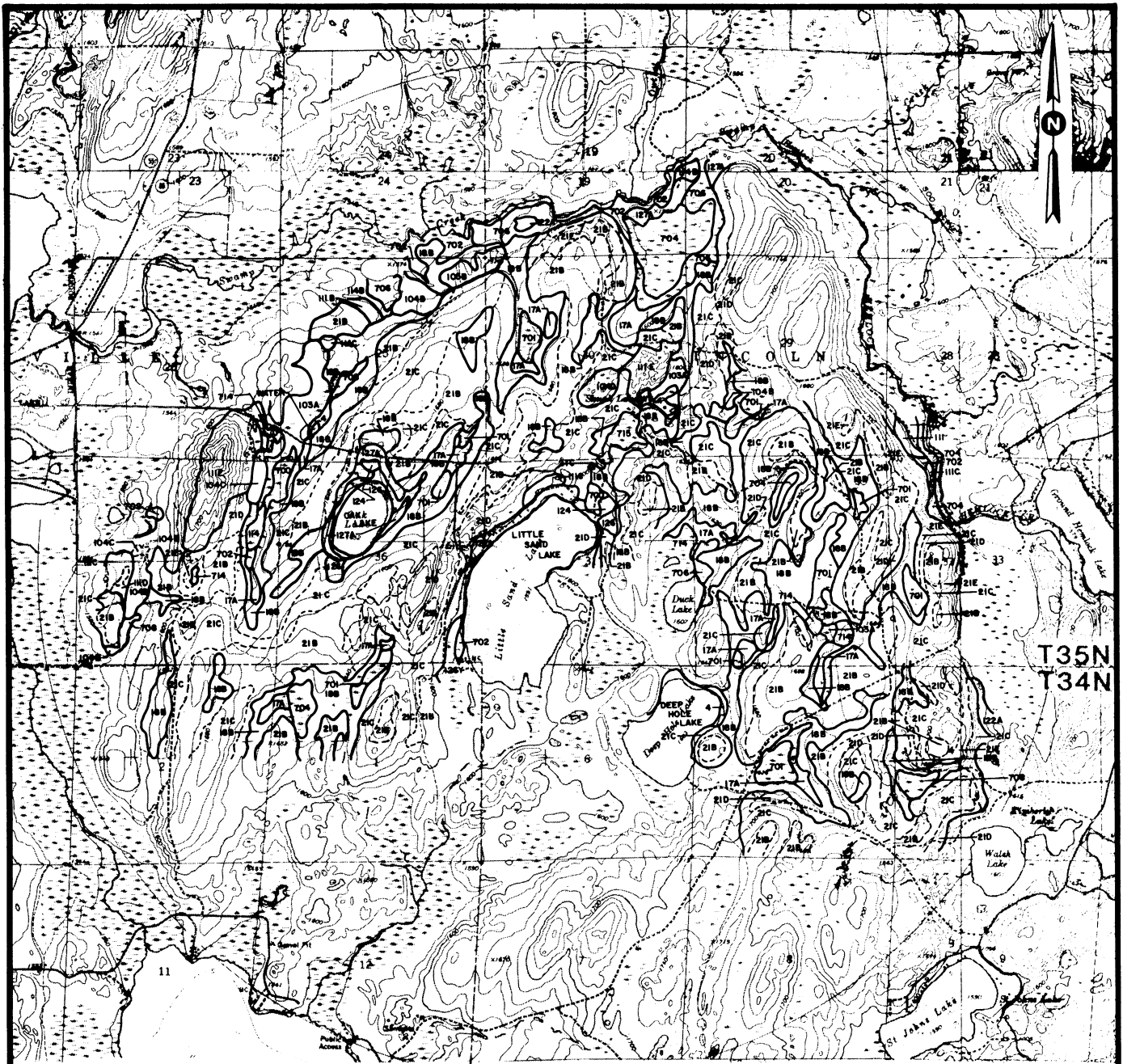
**SOIL ASSOCIATIONS OF
THE ENVIRONMENTAL STUDY AREA**

SOURCE: HOLE et al, 1968.

BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION, JANUARY, 1978. FOREST CO. AND LANGLADE CO. HIGHWAY MAPS.

DAMES & MOORE

FIGURE 2.6-5



KEY:

SOIL NUMBER	SOIL TYPE	SOIL NUMBER	SOIL TYPE
4	PONDED HISTOSOL	700	SEELYVILLE MUCK
17	CABLE STONY SILT LOAM	701	CATHRO MUCK
18	MONICO STONY LOAM	702	MARKEY MUCK
21	IRON RIVER VARIANT STONY LOAM	704	LUPTON MUCK
103	WORCESTER LOAM	706	TAMAS MUCK
104	PADUS LOAM	708	LOXLEY MUCK
105	PADUS SANDY LOAM	709	DAWSON MUCKY PEAT
111	PENCE SANDY LOAM	714	GREENWOOD PEAT
114	SAYNER LOAMY SAND	715	MERWIN PEAT
122	WORCESTER SANDY LOAM		
124	KINROSS LOAMY SAND		
126	AU GRES LOAMY SAND		
126Y	AU GRES VARIANT LOAMY SAND		
127	CROSMELL LOAMY SAND		

SLOPE CLASS	
A	0 TO 2 PERCENT
B	2 TO 6 PERCENT
C	6 TO 12 PERCENT
D	12 TO 20 PERCENT
E	20 TO 30 PERCENT

SOURCE: LUDWIG, 1978.

BASE MAP REFERENCE:

PORTIONS OF THE FOLLOWING U.S.G.S. 7.5 MINUTE SERIES:
 CRANDON, WISCONSIN, 1965; LAKE LUCERNE, WISCONSIN, 1973;
 AND ROBERTS LAKE, WISCONSIN, 1973.

0 .5 1 MILE

0 .5 1 KILOMETER

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SOILS OF THE SITE AREA

DAMES & MOORE

FIGURE 2.6-6

DESCRIPTIONS OF SOILS IN THE SITE AREA

SOIL NUMBER	SOIL TYPE	DESCRIPTION	SLOPES
4	Ponded Histosol	Miscellaneous land areas that are inundated most of the year.	0 - 2%
17	Cable Stony Silt Loam	Poorly drained nearly level loamy soil, 15 to 30 inches thick, over sandy loam glacial till. These moderately permeable soils have a high available water capacity.	0 - 3%
18	Monico Stony Loam	Somewhat poorly drained nearly level and gently sloping loamy soil, 20 to 40 inches thick, over sandy loam glacial till. These moderately permeable soils have a high available water capacity.	1 - 3%
21	Iron River Variant Stony Loam	Moderately well drained nearly level to steep silt loam, 20 to 40 inches thick, over sandy loam glacial till.	1 - 45%
103	Worcester Loam	Somewhat poorly drained gently sloping loamy soil, 20 to 35 inches thick, over sand and gravel glacial till. These moderately permeable soils have a medium available water capacity.	0 - 3%
104	Padus Loam	Well drained nearly level to steep loamy soil, 20 to 40 inches thick, over sand and gravel glacial till. These moderately permeable soils have a medium available water capacity.	0 - 25%
105	Padus Sandy Loam	Well drained nearly level sandy loam, 20 to 40 inches thick, over sand and gravel glacial till. These moderately permeable soils have a medium available water capacity.	0 - 6%
111	Pence Sandy Loam	Well drained nearly level to steep sandy loam, 20 to 40 inches thick, over sand and gravel glacial till.	0 - 45%
114	Sayner Loamy Sand	Excessively drained nearly level to steep loamy sand, 15 to 30 inches thick, over sand and gravel glacial till.	0 - 25%
122	Worcester Sandy Loam	Somewhat poorly drained, gently sloping loamy soil, 20 to 40 inches thick, over sand and gravel glacial till. These moderately permeable soils have a medium available water capacity.	0 - 3%
124	Kinross Loamy Sand	Poorly drained nearly level loamy sand, 10 to 35 inches thick, over sandy glacial till.	0 - 2%
126	AuGres Loamy Sand	Somewhat poorly drained nearly level loamy sand, 20 to 40 inches thick, over sandy glacial till.	0 - 6%

SOIL NUMBER	SOIL TYPE	DESCRIPTION	SLOPES
126Y	AuGres Variant Loamy Sand	Somewhat poorly drained nearly level sandy soil, 40 to 60 inches thick, over loamy glacial till. These rapidly permeable soils have a low available water capacity.	0 - 3%
127	Croswell Loamy Sand	Moderately well drained nearly level to gently sloping sandy soil, 20 to 40 inches thick, over sandy glacial till.	0 - 12%
700	Seelyeville Muck	Very poorly drained level organic soil, 40 to 60 inches thick, over loamy glacial till.	< 2%
701	Cathro Muck	Very poorly drained level organic soil, 16 to 50 inches thick, over loamy glacial till.	< 2%
702	Markey Muck	Very poorly drained level organic soils, 16 to 50 inches thick, over sandy loam glacial till.	< 2%
704	Lupton Muck	Very poorly drained level organic soils, 20 to 65 inches thick, over loamy glacial till.	< 2%
706	Tawas Muck	Very poorly drained nearly level organic, mucky peat soils, 16 to 50 inches thick, over sand or loamy sand glacial till. These moderately rapid permeable soils have a high available water capacity.	0 - 2%
708	Loxley Muck	Very poorly drained level acid organic soils, 15 to 50 inches thick, over loamy glacial till.	< 1%
709	Dawson Mucky Peat	Very poorly drained level organic soils, 40 to 60 inches thick, over sandy glacial till.	< 2%
714	Greenwood Peat	Very poorly drained level organic soil, 10 to 60 inches thick, over glacial till.	0 - 2%
715	Merwin Peat	Very poorly drained level organic soil, 40 to 60 inches thick, over glacial till.	0 - 1%

Source: Ludwig, 1978.

2.6.3 Vegetation

2.6.3.1 Regional Study Area

A vegetational transition zone crosses Wisconsin from the northwest to the southeast (roughly, from Eau Claire to Wausau to Milwaukee), separating two major vegetational provinces (Curtis, 1959). North of this zone, the species are primarily of northern distribution and adapted to short, wet summers and long, cold winters (Bailey, 1978). South of this zone, the species are adapted to longer, drier summers and shorter, milder winters and have primarily a southern distribution (Bailey, 1978). The northern province is primarily forest communities, while the southern is primarily prairie-forest border communities. The regional study area lies north of this transition zone in the area of northern forest communities.

Finley (1976) indicates that the original vegetation cover of the regional study area consisted primarily of two major forest types, mixed Coniferous-Deciduous Forest and Wetland vegetation. The Mixed Forest type that was most frequent in the regional study area was dominated by eastern hemlock (Tsuga canadensis), sugar maple (Acer saccharum), yellow birch (Betula lutea), white pine (Pinus strobus), and red pine (Pinus resinosa). The wetland vegetation type that was most frequent in the regional study area was dominated by swamp conifers that include white cedar (Thuja occidentalis), black spruce (Picea mariana), tamarack (Larix laricina), and eastern hemlock. Very few areas of original forest remain in northern Wisconsin since most were logged, burned, and/or cleared for agriculture around the turn of the century. Consequently, most of Wisconsin's forests currently are 50- to 100-year-old

second-growth forests. The most prevalent forest types in the region today are Northern Hardwood, Aspen-Birch, and Spruce-Fir (Swamp Conifer) (Spencer and Thorne, 1972).

Several uncommon plants that are listed as endangered or threatened in Wisconsin can be expected to occur in the region. These plants are discussed in subsection 2.6.5.1. The nearest uncommon plant community within the State Scientific Areas system is the Scott Lake-Shelp Lake Natural Area, located approximately 24 km (15 miles) north-northwest of Crandon. Staff members of the State Scientific Area Preservation Council have recently completed an inventory of Forest County for additional uncommon and rare plant communities; none were found in the environmental study area (Smith, 1982). During a field reconnaissance, Mr. Robert Read of the DNR stated that a small stand of bur oak (Quercus macrocarpa) in the site area (NW 1/4 of the SW 1/4, Section 29, T35N, R13E) was unusual but not worthy of inclusion into the State Scientific Area system.

2.6.3.2 Project Area

Environmental Study Area

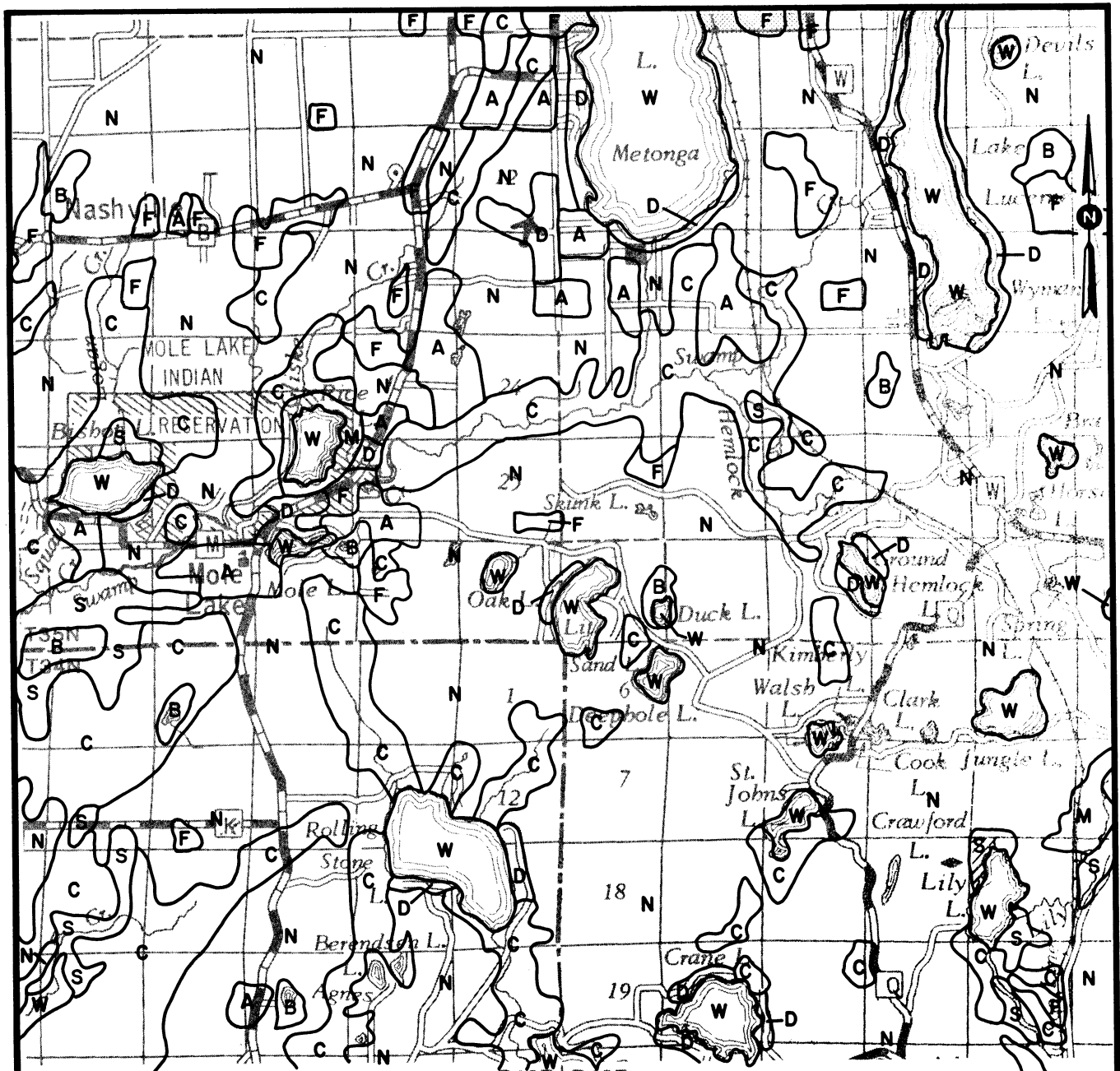
The environmental study area consists of heavily forested upland areas interspersed with forested lowlands and is typical of this region of Wisconsin. The two most abundant vegetation types in the environmental study area are Northern Hardwood (including Aspen-Birch) and Swamp Conifer, comprising approximately 79 percent of the total area. The remainder of the area consists primarily of shrub swamp, bog, marsh, urban or developed areas, old field and clearcut, agriculture and water (Table 2.6-3 and Figure 2.6-7). A brief description of each vegetation type is given below.

TABLE 2.6-3

VEGETATION TYPES OF THE ENVIRONMENTAL STUDY AREA AND SITE AREA

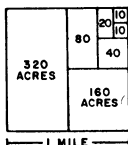
TYPE*	ENVIRONMENTAL STUDY AREA			SITE AREA		
	APPROXIMATE AREA		PERCENT OF TOTAL	APPROXIMATE AREA		PERCENT OF TOTAL
	HECTARES	ACRES		HECTARES	ACRES	
Northern Hardwood (including Aspen-Birch)	16,965	41,888	65	4,654	11,490	59
Swamp Conifer	3,620	8,937	14	1,565	3,865	20
Shrub Swamp	672	1,660	3	220	544	3
Bog	213	525	1	85	211	1
Marsh	93	229	<0.5	155	383	2
Urban or Developed	592	1,461	2	40	98	<0.5
Old Field and Clearcut	661	1,631	3	340	839	4
Agriculture	966	2,389	4	333	823	4
Water	2,138	5,280	8	546	1,347	7
TOTALS	25,920	64,000	100	7,938	19,600	100

*See Figures 2.6-7 and 2.6-8 for location.



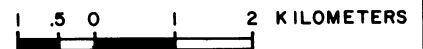
KEY:

- N NORTHERN HARDWOOD (INCLUDING ASPEN/BIRCH)
- C SWAMP CONIFER
- S SHRUB SWAMP
- B BOG
- M MARSH
- D URBAN OR DEVELOPED
- F OLD FIELD AND CLEARCUT
- A AGRICULTURE
- W WATER



NOTE: MINIMUM SIZE DELINEATED IS 16.2 HECTARES (40 ACRES)

BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION, JANUARY, 1978, FOREST CO. AND LANGLADE CO., HIGHWAY MAPS.



EXXON MINERALS COMPANY
CRANDON PROJECT

VEGETATION OF THE
ENVIRONMENTAL STUDY AREA

DAMES & MOORE

FIGURE 2.6-7

Northern Hardwood, as described by Curtis (1959), can be subdivided into three communities: Mesic Northern Hardwood, Dry-Mesic Northern Hardwood, and Xeric Northern Hardwood. The dominant species of mesic sites in the environmental study area are sugar maple, eastern hemlock, yellow birch or basswood (Tilia americana). White pine, red maple (Acer rubrum), or northern red oak (Quercus borealis) are dominant in the Dry-Mesic Northern Hardwoods; jack pine (Pinus banksiana), red pine or Hill's oak (Quercus ellipsoidalis) are dominant in the Xeric Northern Hardwoods. Most of the Northern Hardwoods in the environmental study area are Mesic or Dry-Mesic Northern Hardwoods.

The Northern Hardwood forests in the environmental study area also include stands of Aspen-Birch. The Aspen-Birch forest type is an early successional stage of Northern Hardwood that commonly becomes established following logging and fires. The dominant species in Aspen-Birch are large-toothed aspen (Populus grandidentata), quaking aspen (Populus tremuloides), balsam poplar (Populus balsamifera) or white birch (Betula papyrifera) (Spencer and Thorne, 1972). Stands of Aspen-Birch are common in the environmental study area.

Shrubs and herbaceous plants of Northern Hardwood communities typically include the following:

leatherwood	<u>Dirca palustris</u>
ironwood	<u>Ostrya virginiana</u>
beaked hazel	<u>Corylus cornuta</u>
honeysuckle	<u>Lonicera spp.</u>
Pennsylvania sedge	<u>Carex pensylvanica</u>
downy yellow violet	<u>Viola pubescens</u>
Carolina spring-beauty	<u>Claytonia caroliniana</u>
wild lily-of-the-valley	<u>Maianthemum canadense</u>
large-flowered trillium	<u>Trillium grandiflorum</u>
wild sarsaparilla	<u>Aralia nudicaulis</u>
clintonia	<u>Clintonia borealis</u>
large-leaved aster	<u>Aster macrophyllus</u>

Swamp Conifer can consist of two plant communities: Wet-Northern Forest, dominated by tamarack and black spruce, or Wet-Mesic Northern Forest, dominated by white cedar, balsam fir or black ash (Fraxinus nigra) (Curtis, 1959). Both Wet-Mesic Northern Forest and Wet Northern Forest are abundant in this region of Wisconsin. As in upland forests, the species composition of these types varies in response to available moisture. Wet-Mesic Northern Forests are often located along streams, whereas Wet Northern Forests are usually located in upland depressions, old lake basins and around bogs. Shrub and herbaceous plants of Swamp Conifer communities typically include the following:

clintonia	<u>Clintonia borealis</u>
false Solomon's-seal	<u>Smilacina trifolia</u>
pink lady's-slipper	<u>Cypripedium acaule</u>
yellow lady's-slipper	<u>Cypripedium calceolus</u>
willow	<u>Salix</u> spp.
speckled alder	<u>Alnus rugosa</u>
shrub birch	<u>Betula glandulosa</u>
starflower	<u>Trientalis borealis</u>
common wood sorrel	<u>Oxalis montana</u>
miterwort	<u>Mitella diphylla</u>
currant	<u>Ribes</u> spp.
narrowleaf meadowsweet	<u>Spiraea alba</u>
mountain holly	<u>Nemopanthus mucronata</u>
blueberry	<u>Vaccinium</u> spp.
twinflower	<u>Linnaea borealis</u>
bunchberry	<u>Cornus canadensis</u>
red-osier dogwood	<u>Cornus stolonifera</u>

Nonforested wetlands, which occupy less than 5 percent of the environmental study area, are usually small in size, frequently less than 16.2 ha (40 acres) (Figure 2.6-7).

Bogs occur fairly frequently in depressions throughout the environmental study area (Figure 2.6-7). Bogs are communities of plants and animals typically northern in distribution and uncommon south of the tension

zone. Bogs are typically dominated by low, evergreen, ericaceous shrubs such as leatherleaf (Chamaedaphne calyculata), blueberry, Labrador-tea (Ledum groenlandicum), bog rosemary (Andromeda glaucophylla) and pale laurel (Kalmia polifolia) (Curtis, 1959).

Shrub swamps comprise approximately 3 percent of the environmental study area and occur primarily along stream banks and in other lowland situations. Speckled alder is the dominant species in this type; other common species include red-osier dogwood, chokeberry (Aronia melanocarpa), shrub birch, wintergreen (Ilex verticillata), mountain holly, and willow. Curtis (1959) classifies this community as Alder Thicket.

Two marshes larger than 16.2 ha (40 acres) occur within the environmental study area. One is located in Rice Lake and the other is located approximately 1.6 km (1 mile) southeast of Jungle Lake (Figure 2.6-7). The marsh in Rice Lake is an uncommon vegetational community that contains wild rice (Zizania aquatica) as well as a variety of other emergent aquatic plants.

The remainder of the environmental study area consists primarily of lakes, abandoned agricultural fields, clearcuts, active farmland and developed land. These nonforested types occupy less than 20 percent of the environmental study area (Table 2.6-3 and Figure 2.6-7).

Site Area

The areal coverage of the vegetation types in the site area is listed in Table 2.6-3 and is shown on Figure 2.6-8. Quantitative vegetation sampling during this study was conducted only in the three major vegetation

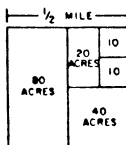


KEY:

- N NORTHERN HARDWOOD (INCLUDING ASPEN/BIRCH)
- C SWAMP CONIFER
- S SHRUB SWAMP
- B BOG
- M MARSH
- D URBAN OR DEVELOPED
- F OLD FIELD AND CLEARCUT
- A AGRICULTURE
- W WATER

NOTE:
 MINIMUM TYPE SIZE DELINEATED IS APPROXIMATELY 4 HECTARES (10 ACRES) EXCEPT FOR WETLANDS WHICH ARE DELINEATED TO APPROXIMATELY 1 HECTARE (2.5 ACRES).

BASE MAP REFERENCE:
 PORTIONS OF THE FOLLOWING U.S.G.S. 7.5 MINUTE SERIES:
 CRANDON, WISCONSIN, 1965; LAKE LUCERNE, WISCONSIN, 1973;
 AND ROBERTS LAKE, WISCONSIN, 1973.



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 CRANDON PROJECT

**VEGETATION MAP
 OF THE SITE AREA**

DAMES & MOORE

FIGURE 2.6-8

types of the site area, Northern Hardwoods, Aspen-Birch and Swamp Conifer. Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982) have quantitatively sampled wetlands in the site area and Steigerwaldt and Sons (1982) have conducted a forest inventory and timber appraisal of those lands being considered for development. Presented below is a description of each vegetation type in the site area and the results of vegetation sampling.

Northern Hardwood - The Northern Hardwood communities are the most prevalent vegetation type in the site area. Three stands of Northern Hardwoods were sampled in the site area (Figure 2.6-1). Using Curtis' (1959) method of computing compositional indices, the three stands sampled were categorized into two groups: Stands 1 and 2 as Mesic Northern Hardwood, and Stand 3 as Dry-Mesic Northern Hardwood.

The two Mesic Northern Hardwood stands sampled were very similar (Tables 2.6-4, 2.6-5, and 2.6-6). In both stands, sugar maple was dominant in all three tree and shrub strata (Tables 2.6-5 and 2.6-6). The total density of trees and the average tree size were greater in Stand 1 than in Stand 2 (Table 2.6-4).

In the overstory stratum of Northern Hardwood Stand 1, sugar maple was the dominant species, with an importance value of 182.0 (Table 2.6-5). Sugar maple had the highest relative frequency, density, and dominance of any species and comprised 61 percent of the overstory stratum's total importance value. Basswood was the other dominant species of the overstory with an importance value of 89.2, or 30 percent of the total importance value. These two species were the community dominants with a combined importance value of

TABLE 2.6-4

SUMMARY OF THE OVERSTORY OF FOREST VEGETATION SAMPLED IN THE SITE AREA

STAND	SPECIES*																TOTAL
	SUGAR MAPLE	RED MAPLE	BASSWOOD	WHITE CEDAR	ASPEN	PAPER BIRCH	YELLOW BIRCH	WHITE PINE	NORTHERN OAK	BALSAM FIR	RED PINE	EASTERN HEMLOCK	BLACK CHERRY	IRON- WOOD	ASH	ELM	
Northern Hardwoods																	
Stand 1 (Mesic)																	
Relative Frequency	53.7	0	33.3	0	0	0	0	0	0	0	0	0	1.9	0	1.9	9.3	100.1
Relative Density	65.8	0	27.5	0	0	0	0	0	0	0	0	0	0.8	0	0.8	5.0	99.9
Relative Dominance	62.5	0	28.4	0	0	0	0	0	0	0	0	0	0.9	0	1.5	6.6	99.9
Importance Value	182.0	0	89.3	0	0	0	0	0	0	0	0	0	3.6	0	4.2	20.9	300.0
Density (trees/ha)	684.7	0	286.0	0	0	0	0	0	0	0	0	0	8.7	0	8.7	52.0	1,040.1
Basal Area (cm ² /ha)	192,542.0	0	87,512.0	0	0	0	0	0	0	0	0	0	2,825.0	0	4,751.0	20,314.0	307,944.0
Stand 2 (Mesic)																	
Relative Frequency	44.4	0	27.0	0	1.6	1.6	1.6	0	0	0	0	0	0	0	12.7	11.1	100.0
Relative Density	59.2	0	21.7	0	0.8	0.8	0.8	0	0	0	0	0	0	0	10.8	5.8	99.9
Relative Dominance	46.6	0	30.0	0	1.6	1.0	1.0	0	0	0	0	0	0	0	12.1	7.9	100.2
Importance Value	150.2	0	78.7	0	4.0	3.4	3.4	0	0	0	0	0	0	0	35.6	24.8	300.1
Density (trees/ha)	499.7	0	183.0	0	7.0	7.0	7.0	0	0	0	0	0	0	0	91.5	49.3	844.5
Basal Area (cm ² /ha)	97,895.0	0	63,016.0	0	3,321.0	2,016.0	2,016.0	0	0	0	0	0	0	0	25,428.0	16,600.0	210,292.0
Stand 3 (Dry-Mesic)																	
Relative Frequency	7.5	21.2	0	0	21.2	15.0	0	5.0	7.5	8.7	5.0	5.0	0	0	0	3.7	99.8
Relative Density	5.8	24.2	0	0	20.0	20.8	0	5.0	5.8	6.7	3.3	5.8	0	0	0	2.5	99.9
Relative Dominance	3.4	24.1	0	0	24.2	13.9	0	10.7	5.3	2.5	8.5	5.4	0	0	0	1.9	99.9
Importance Value	16.7	69.5	0	0	65.4	49.7	0	20.7	18.6	17.9	16.8	16.2	0	0	0	8.1	299.6
Density (trees/ha)	52.2	216.4	0	0	179.1	186.6	0	44.8	52.2	59.7	29.9	52.2	0	0	0	22.4	895.5
Basal Area (cm ² /ha)	10,936.0	78,354.0	0	0	78,783.0	45,305.0	0	34,930.0	17,279.0	8,255.0	27,630.0	17,692.0	0	0	0	6,083.0	325,247.0

Note: Average tree size can be determined through dividing the basal area (cm²/ha) by the density (trees/ha); to convert from ha to acres divide by 2.47.

*Scientific names are listed in Appendix 2.6A.

TABLE 2.6-4 (continued)

STAND	SPECIES*																TOTAL
	SUGAR MAPLE	RED MAPLE	BASSWOOD	WHITE CEDAR	ASPEN	PAPER BIRCH	YELLOW BIRCH	WHITE PINE	NORTHERN OAK	BALSAM FIR	RED PINE	EASTERN HEMLOCK	BLACK CHERRY	IRON- WOOD	ASH	ELM	
<u>Aspen/Birch</u>																	
Relative Frequency	27.1	0	7.1	0	22.9	35.7	0	0	0	5.7	0	0	0	1.4	0	0	99.9
Relative Density	25.0	0	4.2	0	19.2	47.5	0	0	0	3.3	0	0	0	0.8	0	0	100.0
Relative Dominance	14.6	0	4.2	0	34.1	43.7	0	0	0	3.1	0	0	0	0.3	0	0	100.0
Importance Value	66.7	0	15.5	0	76.2	126.9	0	0	0	12.1	0	0	0	2.5	0	0	299.9
Density (trees/ha)	201.2	0	33.5	0	154.5	382.3	0	0	0	26.8	0	0	0	6.7	0	0	805.0
Basal Area (cm ² /ha)	31,170.0	0	9,002.0	0	73,116.0	93,503.0	0	0	0	6,699.0	0	0	0	617.0	0	0	214,107.0
<u>Swamp Conifer</u>																	
Relative Frequency	0	0	0	52.1	0	6.3	0	0	0	35.4	0	4.2	0	0	2.1	0	100.1
Relative Density	0	0	0	60.0	0	2.5	0	0	0	32.5	0	4.2	0	0	0.8	0	100.0
Relative Dominance	0	0	0	70.3	0	2.3	0	0	0	17.1	0	9.6	0	0	0.8	0	100.1
Importance Value	0	0	0	182.4	0	11.1	0	0	0	85.0	0	18.0	0	0	3.7	0	300.2
Density (trees/ha)	0	0	0	553.2	0	23.0	0	0	0	299.6	0	38.4	0	0	7.7	0	921.9
Basal Area (cm ² /ha)	0	0	0	219,691.0	0	7,107.0	0	0	0	53,341.0	0	30,063.0	0	0	2,504.0	0	312,706.0

TABLE 2.6-5
RESULTS OF VEGETATION SAMPLING IN SITE AREA
NORTHERN HARDWOOD - STAND 1

SPECIES ^a	NUMBER OF POINTS	NUMBER OF TREES	PERCENT				IMPORTANCE VALUE ^b
			MEAN COVER	RELATIVE FREQUENCY	RELATIVE DENSITY	RELATIVE DOMINANCE	
OVERSTORY							
Sugar Maple	29	79	--	53.7	65.8	62.5	182.0
Basswood	18	33	--	33.3	27.5	28.4	89.2
Elm	5	6	--	9.3	5.0	6.6	20.9
Ash	1	1	--	1.9	0.8	1.5	4.2
Black Cherry	1	1	--	1.9	0.8	0.9	3.6
Total	54	120	--	100.1	99.9	99.9	299.9
UPPER UNDERSTORY							
Sugar Maple	30	118	--	93.7	98.3	97.5	289.5
Basswood	2	2	--	6.3	1.7	2.5	10.5
Total	32	120	--	100.0	100.0	100.0	300.0
LOWER UNDERSTORY							
Sugar Maple	10	--	4.2	66.7	--	86.3	153.0
Basswood	2	--	0.3	13.3	--	5.5	18.8
Leatherwood	1	--	0.2	6.7	--	4.1	10.8
Elm	1	--	0.1	6.7	--	2.7	9.4
Bristly Black Currant	1	--	0.1	6.7	--	1.4	8.1
Total	15	--	4.9	100.1	--	100.0	200.1
GROUND LAYER							
Sugar Maple	14	--	17.2	19.7	--	45.8	65.5
Pennsylvania Sedge	7	--	5.3	9.9	--	14.2	24.1
Downy Yellow Violet	7	--	2.6	9.9	--	7.0	16.9
Wild Lily-of-the-Valley	6	--	2.3	8.5	--	6.0	14.5
Hairy Solomon's-Seal	6	--	1.7	8.5	--	4.4	12.9
Sweet Cicely	7	--	0.7	9.9	--	1.8	11.7
Maidenhair Fern	3	--	1.7	4.2	--	4.6	8.8
Fragrant Bedstraw	3	--	1.7	4.2	--	4.6	8.8
Ash	4	--	0.3	5.6	--	0.7	6.3
Large-Flowered Bellwort	2	--	0.7	2.8	--	2.0	4.8
Zigzag Golednrod	1	--	1.0	1.4	--	2.6	4.0
Jack-in-the-Pulpit	2	--	0.3	2.8	--	0.9	3.7
Basswood	2	--	0.3	2.8	--	0.7	3.5
Miterwort	2	--	0.1	2.8	--	0.4	3.2
Ironwood	1	--	0.5	1.4	--	1.4	2.8
Bloodroot	1	--	0.4	1.4	--	1.1	2.5
Rose Twisted Stalk	1	--	0.4	1.4	--	1.1	2.5
Large Flowered Trillium	1	--	0.2	1.4	--	0.5	1.9
Elm	1	--	0.1	1.4	--	0.2	1.6
Total	71	--	37.5	100.0	--	100.0	200.0

Note: -- indicates no data.

^aScientific names are listed in Appendix 2.6A.

^bFor Overstory and Upper Understory, the Importance Value equals the total of Relative Frequency, Relative Density, and Relative Dominance; for Lower Understory and Ground Layer, the Importance Value equals the total of Relative Frequency and Relative Dominance.

TABLE 2.6-6

RESULTS OF VEGETATION SAMPLING IN SITE AREA
NORTHERN HARDWOOD - STAND 2

SPECIES ^a	NUMBER OF POINTS	NUMBER OF TREES	MEAN COVER	PERCENT			IMPORTANCE VALUE ^b
				RELATIVE FREQUENCY	RELATIVE DENSITY	RELATIVE DOMINANCE	
OVERSTORY							
Sugar Maple	28	71	--	44.4	59.2	46.6	150.2
Basswood	17	26	--	27.0	21.7	30.0	78.7
Ash	8	13	--	12.7	10.8	12.1	35.6
Elm	7	7	--	11.1	5.8	7.9	24.8
Aspen	1	1	--	1.6	0.8	1.6	4.0
Paper Birch	1	1	--	1.6	0.8	1.0	3.4
Yellow Birch	1	1	--	1.6	0.8	1.0	3.4
Total	63	120	--	100.0	99.9	100.2	300.1
UPPER UNDERSTORY							
Sugar Maple	30	117	--	90.9	97.5	97.2	285.6
Ash	1	1	--	3.0	0.8	1.4	5.2
Yellow Birch	1	1	--	3.0	0.8	1.2	5.0
Basswood	1	1	--	3.0	0.8	0.2	4.0
Total	33	120	--	99.9	99.9	100.0	299.8
LOWER UNDERSTORY							
Sugar Maple	12	--	5.1	38.7	--	62.9	101.6
Ash	5	--	0.9	16.1	--	10.6	26.7
Currant	3	--	1.3	9.7	--	16.3	26.0
Leatherwood	4	--	0.5	12.9	--	5.7	18.6
Serviceberry	1	--	0.1	3.2	--	0.8	4.0
Beaked Hazelnut	1	--	0.1	3.2	--	0.8	4.0
Canada Honeysuckle	1	--	0.1	3.2	--	0.8	4.0
Red Maple	1	--	0.1	3.2	--	0.8	4.0
Basswood	1	--	0.0	3.2	--	0.4	3.6
Ironwood	1	--	0.0	3.2	--	0.4	3.6
Elm	1	--	0.0	3.2	--	0.4	3.6
Total	31	--	8.2	99.8	--	99.9	199.7
GROUND LAYER							
Pennsylvania Sedge	12	--	11.7	10.8	--	32.3	43.1
Rose Twisted Stalk	11	--	4.3	9.9	--	11.7	21.6
Downy Yellow Violet	9	--	2.8	8.1	--	7.7	15.8
Sugar Maple	13	--	1.1	11.7	--	3.1	14.8
Wild Lily-of-the-Valley	6	--	1.6	5.4	--	4.5	9.9
Large-Leaved Aster	6	--	1.6	5.4	--	4.5	9.9
Hairy Solomon's-Seal	4	--	1.9	3.6	--	5.3	8.9
Large-Flowered Trillium	6	--	1.1	5.4	--	3.0	8.4
Northern White Violet	6	--	1.0	5.4	--	2.7	8.1
Ash	4	--	1.6	3.6	--	4.4	8.0
Sweet Cicely	6	--	0.6	5.4	--	1.7	7.1
Maidenhair Fern	1	--	2.0	0.9	--	5.5	6.4
Fragrant Bedstraw	4	--	0.8	3.6	--	2.1	5.7

NOTE: -- indicates no data.

^aScientific names are listed in Appendix 2.6A.

^bFor Overstory and Upper Understory, the Importance Value equals the total of Relative Frequency, Relative Density, and Relative Dominance; for Lower Understory and Ground Layer, the Importance Value equals the total of Relative Frequency and Relative Dominance.

TABLE 2.6-6 (continued)

SPECIES ^a	NUMBER OF POINTS	NUMBER OF TREES	PERCENT				IMPORTANCE VALUE ^b
			MEAN COVER	RELATIVE FREQUENCY	RELATIVE DENSITY	RELATIVE DOMINANCE	
Bladder Sedge	3	--	0.9	2.7	--	2.4	5.1
Starflower	4	--	0.3	3.6	--	0.7	4.3
Ironwood	1	--	0.7	0.9	--	1.8	2.7
<u>Schizanche purpurascens</u>	1	--	0.7	0.9	--	1.8	2.7
White Baneberry	2	--	0.1	1.8	--	0.4	2.2
<u>Poa saltuensis</u>	2	--	0.1	1.8	--	0.2	2.0
Serviceberry	1	--	0.3	0.9	--	0.9	1.8
Currant	1	--	0.3	0.9	--	0.9	1.8
Common Elderberry	1	--	0.2	0.9	--	0.6	1.5
Clintonia	1	--	0.2	0.9	--	0.6	1.5
Large-Flowered Bellwort	1	--	0.1	0.9	--	0.4	1.3
Leatherwood	1	--	0.1	0.9	--	0.4	1.3
Wild Sarsaparilla	1	--	0.1	0.9	--	0.2	1.1
Round-Lobed Hepatica	1	--	0.0	0.9	--	0.1	1.0
Wood Anemone	1	--	0.0	0.9	--	0.1	1.0
Miterwort	1	--	0.0	0.9	--	0.1	1.0
Total	111	--	36.2	99.9	--	100.1	200.0

271.2. Elm (Ulmus spp.), ash, and black cherry (Prunus serotina) were also found in this community, and were less important to the community structure.

In Northern Hardwood Stand 1, only two species were encountered in the upper understory: sugar maple and basswood (Table 2.6-5). Of these two, sugar maple was by far the most dominant species comprising 96.5 percent of the total importance value of the upper understory stratum.

In the lower understory stratum of Northern Hardwood Stand 1, sugar maple was again the most dominant species, comprising 76.5 percent of the importance value for this stratum (Table 2.6-5). Sugar maple had a mean cover value of 4.2 percent in the lower understory of Stand 1. Basswood was the only other tree species occurring in the lower understory stratum. It comprised 9.4 percent of the lower understory stratum's importance value.

The ground layer of Northern Hardwood communities such as those in the site area generally supports herbaceous communities of lower density and diversity than many other communities (Curtis, 1959). Curtis listed wild lily-of-the-valley, hairy Solomon's-seal (Polygonatum pubescens), and rose twisted stalk (Streptopus roseus) as the three species most frequently encountered in Northern Hardwoods. The mean cover values for wild lily-of-the-valley, hairy Solomon's-seal and rose twisted stalk in Northern Hardwood Stand 1 were 2.3, 1.7, and 0.4 percent, respectively (Table 2.6-5). The five species with the highest mean cover values were sugar maple, Pennsylvania sedge, downy yellow violet, wild lily-of-the-valley, and hairy Solomon's-seal (Table 2.6-5).

In Northern Hardwood Stand 2, sugar maple was the dominant species in the overstory stratum, with an importance value of 150.2; 50.0 percent of

the total overstory importance value (Table 2.6-6). Basswood was also a major species. Sugar maple and basswood comprised 76.3 percent of the overstory stratum's total importance value. Ash and elm had higher importance values in this community than in Northern Hardwood Stand 1. Paper birch and yellow birch were also found in the overstory stratum.

Sugar maple, comprising 95.2 percent of the stratum's total importance value, was the dominant species in the upper understory stratum of Northern Hardwood Stand 2 (Table 2.6-6). Ash, yellow birch, and basswood also occurred.

In the lower understory stratum of Northern Hardwood Stand 2, sugar maple was the most prevalent species, with an importance value of 101.6 (Table 2.6-6), or 50.8 percent of the lower understory stratum's total importance value. Sugar maple had a mean cover value of 5.1 percent in this lower understory. Ash was the next most abundant species in the lower understory. The lower understory stratum of Northern Hardwood Stand 2 also had a moderate number of shrub species and several tree species: currant, leatherwood, serviceberry (Amelanchier spp.), beaked hazel, Canada honeysuckle (Lonicera canadensis), red maple, basswood, ironwood, and elm.

The ground layer stratum of Northern Hardwood Stand 2 contained the common species reported by Curtis (1959) as occurring in Mesic Northern Hardwood communities (Table 2.6-6). The five species with the highest mean cover values were Pennsylvania sedge, rose twisted stalk, downy yellow violet, maidenhair fern (Adiantum pedatum), and hairy Solomon's-seal. The mean cover values for wild lily-of-the-valley, hairy Solomon's-seal, and rose twisted stalk were 1.6, 1.9, and 4.3 percent, respectively.

The Dry-Mesic Northern Hardwood sampled (Stand 3) was the most diverse of any vegetative community sampled in the site area (Table 2.6-7).

Dominance in the overstory stratum of Northern Hardwood Stand 3 was evenly distributed among red maple, aspen, and paper birch (Table 2.6-7). Red maple had the highest importance value (69.5), and red maple, aspen, and paper birch comprised 61.5 percent of the overstory stratum's total importance value. The next group of six species all had importance values of 5 to 7 percent of the total. Collectively, they comprised 35.8 percent of the overstory stratum's total importance value. These six species were white pine, northern red oak, balsam fir, red pine, sugar maple, and eastern hemlock.

Red maple was the most abundant species in the upper understory stratum of Northern Hardwood Stand 3, comprising 35.6 percent of the total importance value (Table 2.6-7). Sugar maple comprised 26.0 percent of the total upper understory stratum importance value. These two species were the most dominant species of the upper understory, comprising 61.6 percent of the total importance value. Three other species moderately important to the upper understory stratum were balsam fir, northern red oak, and paper birch. Collectively, these three species comprised 25.8 percent of the total importance value for the upper understory stratum.

The dominant shrub in the lower understory stratum of Northern Hardwood Stand 3 was beaked hazel. This shrub had an importance value of 77.1; 38.5 percent of the stratum's total. The mean cover values for beaked hazel and sugar maple were 4.6 and 1.2 percent, respectively. Forty-one percent of the total importance value for the lower understory stratum

TABLE 2.6-7

RESULTS OF VEGETATION SAMPLING IN SITE AREA
NORTHERN HARDWOOD - STAND 3

SPECIES ^a	NUMBER OF POINTS	NUMBER OF TREES	MEAN COVER	PERCENT			IMPORTANCE VALUE ^b
				RELATIVE FREQUENCY	RELATIVE DENSITY	RELATIVE DOMINANCE	
OVERSTORY							
Red Maple	17	29	--	21.2	24.2	24.1	69.5
Aspen	17	24	--	21.2	20.0	24.2	65.4
Paper Birch	12	25	--	15.0	20.8	13.9	49.7
White Pine	4	6	--	5.0	5.0	10.7	20.7
Northern Red Oak	6	7	--	7.5	5.8	5.3	18.6
Balsam Fir	7	8	--	8.7	6.7	2.5	17.9
Red Pine	4	4	--	5.0	3.3	8.5	16.8
Sugar Maple	6	7	--	7.5	5.8	3.4	16.7
Eastern Hemlock	4	7	--	5.0	5.8	5.4	16.2
Elm	3	3	--	3.7	2.5	1.9	8.1
Total	80	120	--	99.8	99.9	99.9	299.6
UPPER UNDERSTORY							
Red Maple	24	46	--	32.9	38.3	35.5	106.7
Sugar Maple	17	33	--	23.3	27.5	27.2	78.0
Balsam Fir	9	14	--	12.3	11.7	13.6	37.6
Northern Red Oak	9	11	--	12.3	9.2	5.9	27.4
Paper Birch	3	4	--	4.1	3.3	5.2	12.6
White Pine	3	3	--	4.1	2.5	2.3	8.9
Basswood	2	3	--	2.7	2.5	2.5	7.7
Aspen	2	2	--	2.7	1.7	3.2	7.6
Elm	1	1	--	1.4	0.8	1.9	4.1
Eastern Hemlock	1	1	--	1.4	0.8	1.3	3.5
Black Cherry	1	1	--	1.4	0.8	0.8	3.0
White Spruce	1	1	--	1.4	0.8	0.6	2.8
Total	73	120	--	100.0	99.9	100.0	299.9
LOWER UNDERSTORY							
Beaked Hazelnut	7	--	4.6	26.9	--	50.2	77.1
Sugar Maple	4	--	1.2	15.4	--	13.5	28.9
Red Maple	3	--	1.1	11.5	--	12.5	24.0
Northern Red Oak	3	--	0.5	11.5	--	5.5	17.0
Quaking Aspen	2	--	0.5	7.7	--	5.1	12.8
Mountain Maple	1	--	0.5	3.9	--	5.9	9.8
Chokecherry	2	--	0.1	7.7	--	0.7	8.4
Balsam Fir	1	--	0.3	3.9	--	2.9	6.8
Round-Leaved Serviceberry	1	--	0.1	3.9	--	1.5	5.4
Canada Honeysuckle	1	--	0.1	3.9	--	1.5	5.4
White Spruce	1	--	0.1	3.9	--	0.7	4.6
Total	26	--	9.1	100.2	--	100.0	200.2

Note: -- indicates no data.

^aScientific names are listed in Appendix 2.6A.

^bFor Overstory and Upper Understory, the Importance Value equals the total of Relative Frequency, Relative Density, and Relative Dominance; for Lower Understory and Ground Layer, the Importance Value equals the total of Relative Frequency and Relative Dominance.

TABLE 2.6-7 (continued)

SPECIES ^a	NUMBER OF POINTS	NUMBER OF TREES	PERCENT				IMPORTANCE VALUE ^b
			MEAN COVER	RELATIVE FREQUENCY	RELATIVE DENSITY	RELATIVE DOMINANCE	
GROUND LAYER							
Pennsylvania Sedge	9	--	16.1	6.7	--	24.1	30.8
Lady Fern	6	--	8.0	4.5	--	11.9	16.4
Wild Sarsaparilla	7	--	6.3	5.2	--	9.4	14.6
Wild Lily-of-the-Valley	14	--	2.4	10.4	--	3.6	14.0
Bracken Fern	6	--	5.9	4.5	--	8.8	13.3
Large-Leaved Aster	6	--	4.2	4.5	--	6.3	10.8
Clintonia	7	--	2.6	5.2	--	3.9	9.1
Northern White Violet	7	--	2.5	5.2	--	3.7	8.9
<u>Poa saltuensis</u>	7	--	2.3	5.2	--	3.5	8.7
Rose Twisted Stalk	7	--	1.7	5.2	--	2.6	7.8
Red Maple	9	--	0.6	6.7	--	0.8	7.5
Wood Anemone	6	--	1.1	4.5	--	1.7	6.2
Large-Flowered Trillium	5	--	1.3	3.7	--	1.9	5.6
Ground Pine	4	--	1.6	2.3	--	2.3	4.6
Canada Honeysuckle	4	--	1.4	2.3	--	2.1	4.4
Early Meadow Rue	4	--	1.2	2.3	--	1.7	4.0
Interrupted Fern	1	--	2.0	0.7	--	3.0	3.7
Round-Lobed Hepatica	3	--	0.7	2.3	--	1.0	3.3
Bladder Sedge	2	--	1.2	1.5	--	1.8	3.3
Ironwood	3	--	0.6	2.3	--	0.9	3.2
White Baneberry	3	--	0.6	2.3	--	0.9	3.2
Slender Panic Grass	2	--	0.5	1.5	--	0.7	2.2
Aspen	2	--	0.2	1.5	--	0.3	1.8
Starflower	2	--	0.1	1.5	--	0.2	1.7
Eastern Hemlock	2	--	0.1	1.5	--	0.1	1.6
Club Moss	1	--	0.5	0.7	--	0.7	1.4
Sugar Maple	1	--	0.3	0.7	--	0.5	1.2
Common Wood Sorrel	1	--	0.3	0.7	--	0.5	1.2
Bristly Greenbrier	1	--	0.3	0.7	--	0.4	1.1
Northern Red Oak	1	--	0.1	0.7	--	0.2	0.9
Downy Yellow Violet	1	--	0.1	0.7	--	0.1	0.8
Raspberry	1	--	0.1	0.7	--	0.1	0.8
Northern Bush Honeysuckle	1	--	0.0	0.7	--	0.0	0.7
Balsam Fir	1	--	0.0	0.7	--	0.0	0.7
Total	137	--	66.9	99.8	--	99.7	199.5

consisted of sugar maple, red maple, northern red oak, and aspen. Six other shrub and tree species comprised the remainder of the lower understory stratum: mountain maple (Acer spicatum), chokecherry (Prunus virginiana), balsam fir, round-leaved serviceberry (Amelanchier sanguinea), Canada honeysuckle, and white spruce (Picea glauca).

The ground layer of Northern Hardwood Stand 3 was the most diverse of the three Northern Hardwood stands sampled. Frequency and dominance were fairly evenly spread among the six species in the ground layer vegetation with the highest importance value. These species were Pennsylvania sedge, lady fern (Athyrium felix-femina), wild sarsaparilla, wild lily-of-the-valley, bracken fern, and large-leaved aster. The five species with the highest mean cover values were Pennsylvania sedge, lady fern, wild sarsaparilla, bracken fern, and large-leaved aster (Table 2.6-7).

A recent forest inventory indicated that well stocked poletimber-size Northern Hardwoods was the most abundant forest type in the site area. This cover type was described as second-growth poles, approximately 35-45 years old, that originated from the original clear cutting of the virgin hardwood timber. This type contained an average volume of 39 cords and 2841 board feet per hectare (16 cords and 1,150 board feet per acre) (Steigerwaldt and Sons, 1982).

Aspen-Birch - The Aspen-Birch stand sampled in the site area was an example of a mature Aspen-Birch community, in a successional stage between the Aspen-Birch and young Mesic Northern Hardwood vegetation types. The dominance of sugar maple in the upper understory and lower understory, contrasted to that of paper birch and aspen in the overstory, illustrated this transition.

Paper birch, aspen, and sugar maple comprised 89.9 percent of the total importance value for the overstory. Paper birch was the major dominant overstory species; it had an importance value of 126.9, and comprised 42.3 percent of the overstory stratum's total importance value (Table 2.6-8). Aspen, the next most prevalent species, comprised 25.4 percent of the overstory stratum's total importance value. Sugar maple comprised 22.2 percent of the total overstory stratum importance value. Basswood, balsam fir, and ironwood also occurred in the overstory stratum.

Sugar maple, the dominant species in the upper understory (Table 2.6-8), comprised 72.8 percent of the total importance value for this stratum. Paper birch was the only other species in this stratum with a high importance value, comprising 17.6 percent of the total importance value.

The lower understory was almost exclusively sugar maple. This species had an importance value of 160.1, which was 80.0 percent of the lower understory stratum's total importance value (Table 2.6-8). The mean cover value for sugar maple was 6.6 percent.

The ground layer was typical of those sampled in upland forests. The four species with the highest importance values and highest mean cover values were Pennsylvania sedge, wild lily-of-the-valley, large-leaved aster, and violet (Viola spp.).

The majority of the Aspen-Birch forest type in the site area is medium or well stocked poletimber. The well stocked stands of Aspen-Birch averaged 51 years in age and volume averaged about 42 cords and 939 board feet per hectare (17 cords and 380 board feet per acre). The medium stocked stands of Aspen-Birch averaged 36 years in age and volume averaged 22 cords

TABLE 2.6-8

RESULTS OF VEGETATION SAMPLING IN SITE AREA
ASPEN/BIRCH

SPECIES ^a	NUMBER OF POINTS	NUMBER OF TREES	PERCENT			IMPORTANCE VALUE ^b	
			MEAN COVER	RELATIVE FREQUENCY	RELATIVE DENSITY		RELATIVE DOMINANCE
OVERSTORY							
Paper Birch	25	57	--	35.7	47.5	43.7	126.9
Aspen	16	23	--	22.9	19.2	34.1	76.2
Sugar Maple	19	30	--	27.1	25.0	14.6	66.7
Basswood	5	5	--	7.1	4.2	4.2	15.5
Balsam Fir	4	4	--	5.7	3.3	3.1	12.1
Ironwood	1	1	--	1.4	0.8	0.3	2.5
Total	70	120	--	99.9	100.0	100.0	299.9
UPPER UNDERSTORY							
Sugar Maple	30	100	--	62.5	83.3	72.7	218.5
Paper Birch	11	13	--	22.9	10.8	19.1	52.8
Basswood	2	2	--	4.2	1.7	3.2	9.1
Northern Red Oak	2	2	--	4.2	1.7	2.1	8.0
White Spruce	1	1	--	2.1	0.8	1.8	4.7
Ironwood	1	1	--	2.1	0.8	0.6	3.5
Balsam Fir	1	1	--	2.1	0.8	0.5	3.4
Total	48	120	--	100.1	99.9	100.0	300.0
LOWER UNDERSTORY							
Sugar Maple	12	--	6.6	66.7	--	93.4	160.1
Aspen	3	--	0.2	16.7	--	2.8	19.5
Basswood	2	--	0.1	11.1	--	1.9	13.0
Ironwood	1	--	0.1	5.6	--	1.9	7.5
Total	18	--	7.0	100.1	--	100.0	200.1
GROUND LAYER							
Pennsylvania Sedge	10	--	22.9	7.0	--	30.8	37.8
Wild Lily-of-the-Valley	14	--	9.8	9.8	--	13.2	23.0
Large-Leaved Aster	10	--	7.2	7.0	--	9.7	16.7
Violet	9	--	4.3	6.3	--	5.8	12.1
<u>Schizachne purpurascens</u>	8	--	3.8	5.6	--	5.1	10.7
Sugar Maple	13	--	0.9	9.1	--	1.3	10.4
Large-Flowered Trillium	8	--	2.6	5.6	--	3.5	9.1
Sweet Cicely	7	--	2.9	4.9	--	4.0	8.9
Starflower	10	--	1.1	7.0	--	1.4	8.4
False Spikenard	8	--	1.9	5.6	--	2.5	8.1
Wild Sarsaparilla	5	--	2.7	3.5	--	3.1	6.6
Clintonia	3	--	2.1	2.1	--	2.9	5.0
Clubmoss	3	--	0.9	2.1	--	1.2	3.3
Large-Flowered Bellwort	3	--	0.9	2.1	--	1.2	3.3
Black Snakeroot	4	--	0.3	2.8	--	0.4	3.2

Note: -- indicates no data.

^aScientific names are listed in Appendix 2.6A.

^bFor Overstory and Upper Understory, the Importance Value equals the total of Relative Frequency, Relative Density, and Relative Dominance; for Lower Understory and Ground Layer, the Importance Value equals the total of Relative Frequency and Relative Dominance.

TABLE 2.6-8 (continued)

SPECIES ^a	NUMBER OF POINTS	NUMBER OF TREES	PERCENT				IMPORTANCE VALUE ^b
			MEAN COVER	RELATIVE FREQUENCY	RELATIVE DENSITY	RELATIVE DOMINANCE	
Zigzag Goldenrod	2	--	1.1	1.4	--	1.5	2.9
Lady Fern	2	--	1.1	1.4	--	1.4	2.8
Shield Fern	1	--	1.3	0.7	--	1.8	2.5
Bracken Fern	1	--	1.3	0.7	--	1.8	2.5
Wood Rush	1	--	1.3	0.7	--	1.8	2.5
Downy Yellow Violet	2	--	0.8	1.4	--	1.1	2.5
Hairy Solomon's-Seal	3	--	0.2	2.1	--	0.3	2.4
Fringed Polygala	1	--	1.0	0.7	--	1.4	2.1
Alternate-Leaved Dogwood	2	--	0.5	1.4	--	0.6	2.0
<u>Carex deweyana</u>	1	--	0.3	0.7	--	0.4	1.1
Black Cherry	1	--	0.3	0.7	--	0.4	1.1
Bristly Greenbrier	1	--	0.3	0.7	--	0.4	1.1
Dandelion	1	--	0.1	0.7	--	0.2	0.9
<u>Carex arctata</u>	1	--	0.1	0.7	--	0.1	0.8
<u>Poa saltuensis</u>	1	--	0.1	0.7	--	0.1	0.8
Miterwort	1	--	0.1	0.7	--	0.1	0.8
Slender Panic Grass	1	--	0.1	0.7	--	0.1	0.8
Interrupted Fern	1	--	0.1	0.7	--	0.1	0.8
Clayton's Bedstraw	1	--	0.1	0.7	--	0.1	0.8
Ground Pine	1	--	0.1	0.7	--	0.1	0.8
Raspberry	1	--	0.1	0.7	--	0.1	0.8
Aspen	1	--	0.1	0.7	--	0.1	0.8
Total	143	--	74.8	100.1	--	100.1	200.2

and 395 board feet per hectare (9 cords and 160 board feet per acre) (Steigerwaldt and Sons, 1982).

Swamp Conifer - The stand sampled in the site area was an example of Wet-Mesic Northern Forest. In the overstory, white cedar was the dominant species with an importance value of 182.4 (Table 2.6-9). It comprised 60.8 percent of the total importance value for the overstory stratum. Balsam fir, with an importance value of 85.0, was the second most important species in the overstory stratum.

The dominant species in the upper understory stratum were balsam fir, speckled alder, and white cedar (Table 2.6-9). These three species have a combined importance value that comprised 79.8 percent of the total for the upper understory stratum. The remaining 20.2 percent was distributed among at least six species.

Red maple, balsam fir, and speckled alder were the important species of the lower understory (Table 2.6-9), comprising 76.8 percent of the total importance value for this stratum. Seven other species comprised the remaining 23.2 percent of the total importance value. Red maple, balsam fir, and speckled alder had mean cover values of 8.2, 8.0, and 5.9 percent, respectively (Table 2.6-9).

This community had the most diverse ground layer of any sampled; a wide variety of herbaceous and woody plants were common (Table 2.6-9). The five species with the highest mean cover values were dwarf blackberry (Rubus pubescens), bunch-berry, clintonia, spotted touch-me-not (Impatiens biflora), and Pennsylvania sedge (Table 2.6-9). A rare orchid of the Great Lakes region, the calypso orchid (Calypso bulbosa), was found near the Swamp Conifer

TABLE 2.6-9

RESULTS OF VEGETATION SAMPLING IN SITE AREA
SWAMP CONIFER

SPECIES ^a	NUMBER OF POINTS	NUMBER OF TREES	PERCENT			IMPORTANCE VALUE ^b	
			MEAN COVER	RELATIVE FREQUENCY	RELATIVE DENSITY		RELATIVE DOMINANCE
OVERSTORY							
White Cedar	25	72	--	52.1	60.0	70.3	182.4
Balsam Fir	17	39	--	35.4	32.5	17.1	85.0
Eastern Hemlock	2	5	--	4.2	4.2	9.6	18.0
Paper Birch	3	3	--	6.3	2.5	2.3	11.1
Ash	1	1	--	2.1	0.8	0.8	3.7
Total	48	120	--	100.1	100.0	100.1	300.2
UPPER UNDERSTORY							
Balsam Fir	18	36	--	29.5	30.0	30.4	89.9
Speckled Alder	18	40	--	29.5	33.3	21.8	84.6
White Cedar	12	22	--	19.7	18.3	27.1	65.1
Ash	5	11	--	8.2	9.2	12.5	29.9
Paper Birch	3	6	--	4.9	5.0	4.7	14.6
Yellow Birch	2	2	--	3.3	1.7	1.5	6.5
Northern Red Oak	1	1	--	1.6	0.8	0.9	3.3
Red Maple	1	1	--	1.6	0.8	0.6	3.0
Willow	1	1	--	1.6	0.8	0.4	2.8
Total	61	120	--	99.9	99.9	99.9	299.7
UNDERSTORY							
Red Maple	12	--	8.2	27.3	--	31.8	59.1
Balsam Fir	10	--	8.0	22.7	--	31.0	53.7
Speckled Alder	8	--	5.9	18.2	--	22.7	40.9
Ash	4	--	1.0	9.1	--	3.9	13.0
Willow	2	--	1.3	4.5	--	4.9	9.4
Pin Cherry	2	--	0.7	4.5	--	2.8	7.3
Yellow Birch	2	--	0.1	4.5	--	0.5	5.0
Ironwood	2	--	0.1	4.5	--	0.5	5.0
Honeysuckle	1	--	0.3	2.3	--	1.0	3.3
Black Spruce	1	--	0.2	2.3	--	0.8	3.1
Total	44		25.8	99.9	--	99.9	199.8
GROUND LAYER							
Dwarf Blackberry	13	--	6.1	7.0	--	9.5	16.5
Bunchberry	10	--	5.9	5.4	--	9.3	14.7
Clintonia	9	--	5.8	4.8	--	9.1	13.9
Gold Thread	12	--	2.9	6.4	--	4.6	11.0
Pennsylvania Sedge	10	--	3.5	5.4	--	5.5	10.9

Note: -- indicates no data.

^aScientific names are listed in Appendix 2.6A.

^bFor Overstory and Upper Understory, the Importance Value equals the total of Relative Frequency, Relative Density, and Relative Dominance; for Lower Understory and Ground Layer, the Importance Value equals the total of Relative Frequency and Relative Dominance.

TABLE 2.6-9 (continued)

SPECIES ^a	NUMBER OF POINTS	NUMBER OF TREES	PERCENT			IMPORTANCE VALUE ^b	
			MEAN COVER	RELATIVE FREQUENCY	RELATIVE DENSITY		RELATIVE DOMINANCE
Brownish Sedge	12	--	2.5	6.4	--	3.9	10.3
Miterwort	10	--	3.1	5.4	--	4.9	10.3
Oak Fern	9	--	2.9	4.8	--	4.5	9.3
Sugar Maple	6	--	3.3	3.2	--	5.2	8.4
Shield Fern	7	--	2.6	3.7	--	4.1	7.8
Violet	6	--	2.8	3.2	--	4.4	7.6
Spotted Touch-Me-Not	1	--	4.3	0.5	--	6.8	7.3
Sensitive Fern	2	--	3.4	1.1	--	5.3	6.4
Balsam Fir	7	--	1.0	3.7	--	1.5	5.2
Wild-Lily-of-the-Valley	6	--	1.2	3.2	--	1.9	5.1
Star Flower	7	--	0.5	3.7	--	0.7	4.4
Common Wood-Sorrel	5	--	0.7	2.7	--	1.1	3.8
Wood Rush	5	--	0.5	2.7	--	0.7	3.4
Speckled Alder	3	--	0.3	1.6	--	1.7	3.3
Rough Bedstraw	2	--	1.3	1.1	--	2.0	3.1
Fragrant Bedstraw	4	--	0.3	2.1	--	0.5	2.6
Bristly Black Currant	4	--	0.3	2.1	--	0.4	2.5
Unidentified Grass	3	--	0.6	1.6	--	0.9	2.5
Twin Flower	3	--	0.5	1.6	--	0.7	2.3
Smaller Enchanter's Nightshade	2	--	0.8	1.1	--	1.2	2.3
Paper Birch	3	--	0.3	1.6	--	0.4	2.0
Long Beech Fern	2	--	0.6	1.1	--	0.9	2.0
Creeping Snowberry	3	--	0.2	1.6	--	0.3	1.9
White Cedar	3	--	0.2	1.6	--	0.3	1.9
Bladder Sedge	2	--	0.5	1.1	--	0.7	1.8
Strawberry	1	--	0.8	0.5	--	1.3	1.8
Marsh Thistle	2	--	0.4	1.1	--	0.6	1.7
Horsetail	1	--	0.7	0.5	--	1.0	1.5
Ironwood	1	--	0.7	0.5	--	1.0	1.5
Mad-Dog Skullcap	1	--	0.6	0.5	--	0.9	1.4
Zigzag Goldenrod	2	--	0.1	1.1	--	0.2	1.3
Wild Sarsaparilla	1	--	0.3	0.5	--	0.5	1.0
Ash	1	--	0.3	0.5	--	0.4	0.9
Red Raspberry	1	--	0.1	0.5	--	0.2	0.7
Panic Grass	1	--	0.1	0.5	--	0.2	0.7
Flat-Topped White Aster	1	--	0.1	0.5	--	0.2	0.7
Leatherwood	1	--	0.1	0.5	--	0.1	0.6
American Mountain Ash	1	--	0.1	0.5	--	0.1	0.6
Yellow Lady's-Slipper	1	--	0.1	0.5	--	0.1	0.6
Total	187	--	63.4	99.7	--	99.8	199.5

sampling transect (Figure 2.6-1). This plant is designated by the state as "advisory only" and receives no legislative protection (Wisconsin DNR, 1976b).

The forest inventory by Steigerwaldt and Sons (1982) indicated that the Swamp Conifer type in the site area likely to be affected by the Project consisted primarily of black spruce and tamarack. Four size-and-density classes were recognized in this type; poorly and medium stocked saplings or poorly and medium stocked poletimber. The average volume per hectare in the medium stocked poletimber was 22 cords and 1520 board feet (9 cords and 615 board feet per acre). Volume in the poorly stocked stands of poletimber averaged 10 cords and 445 board feet per hectare (4.2 cords and 180 cords per acre) (Steigerwaldt and Sons, 1982).

Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982) also sampled stands of Swamp Conifer in the site area dominated by black spruce and tamarack. Their results indicated that these stands closely conformed to Curtis's (1959) description of Wet-Northern Forest. Species of secondary importance in the overstory in their sampling included eastern hemlock, balsam fir, and white cedar. Labrador tea, leatherleaf, and large cranberry (Vaccinium macrocarpon) were abundant in the shrub layer. The ground surface was largely covered by sphagnum. Vegetation in the ground layer was sparse and included wild lily-of-the-valley (Maianthemum canadense), cinnamon fern (Osmunda cinnamomea), sedges, goldthread (Coptis trifolia) and bunchberry.

Deciduous Swamp - Several deciduous swamps occurred in the site area. These swamps were quantitatively sampled by Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982) and were found

to be dominated by quaking aspen, American elm and red maple. The most abundant species in the shrub layer were speckled alder, green ash (Fraxinus pennsylvanica) and red maple. The flora in the herbaceous layer was sparse and consisted primarily of sedges and wild lily-of-the-valley. Steigerwaldt and Sons (1982) did not estimate timber volumes for these swamps or identify them in their forest type map of the site area.

One of the small swamps sampled by Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982) included the unusual bur oak swamp approximately 1.6 km (1 mile) east-northeast of the ore body. In decreasing order of importance value, the overstory of this swamp consisted of bur oak, American elm, green ash, quaking aspen, red maple, and paper birch. This swamp is considered unusual because bur oak is an important tree south of the transition zone in Wisconsin and only scattered occurrences of it are known in the north (Curtis, 1959).

Shrub Swamp - The shrub swamp communities in the site area were dominated by speckled alder and would be designated as Alder Thicket by the vegetation classification system of Curtis (1959). The herbaceous layer in this type was sparse and was dominated by sedges and blue-joint grass (Calamagrostis canadensis) (Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc., 1982). The shrub swamp type comprised approximately 3 percent of the site area (Figure 2.6-8 and Table 2.6-3).

Bog - The bogs in the site area were dominated by ericaceous shrubs, including leatherleaf and Labrador tea, and are typical of bog communities described by Curtis (1959). Sedges, cotton grass (Eriophorum spissum), and

clintonia were the most abundant plants encountered in the herbaceous layer by Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982). Bogs comprised approximately 1 percent of the site area.

Marsh - Marshes in the site area were dominated by dense stands of sedges (59 percent cover) and blue-joint grass (28 percent cover). Other species encountered included steplebush (Spirea tomentosa), wood bullrush (Scirpus cypernius), manna grass (Glyceria borealis) and goldenrod (Solidago sp.) (Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc., 1982).

2.6.3.3 Heavy Metals in Vegetation of the Environmental Study Area

The new foliage of balsam fir, red raspberry, and Pennsylvania sedge was collected in 1977 and 1978 and analyzed for heavy metal content. The quality control program detected inconsistencies in the results from the 1977 analyses that arose because insufficient amounts of plant material were analyzed. Results of the 1977 collections have therefore not been cited in this discussion.

There was little difference in heavy metal concentrations within and among the plant species sampled (Table 2.6-10). Small portions of the vegetation collected at each sampling location were combined to form composite samples for each of the three sectors. The values for the composite samples compared favorably with those of the individually analyzed samples (Table 2.6-10). The mean values for all composite and individual samples, combining the three species, compared favorably with values reported in the literature for baseline levels of these elements (Table 2.6-11).

TABLE 2.6-10

SUMMARY OF HEAVY METAL ANALYSIS OF VEGETATION SAMPLES*

SPECIES/SAMPLE	MANGANESE	ZINC	CADMIUM	COPPER	ARSENIC	LEAD	MERCURY	COBALT	CHROMIUM, TOTAL
Sedge									
Location 9	173	27	0.37	7.2	<0.01	1.1	<0.01	1.1	0.96
Location 14	243	62	0.28	12.4	<0.01	2.8	<0.01	1.4	1.08
Location 15	125	29	0.40	7.7	<0.01	3.5	<0.01	0.5	0.05
Location 18	367	40	0.32	11.1	<0.01	2.1	<0.01	1.6	<0.01
Location 22	70	37	0.36	6.2	<0.01	2.1	<0.01	1.5	0.52
Location 25	171	36	0.67	10.0	<0.01	4.1	<0.01	0.5	0.61
North Composite	253	48	0.32	6.7	<0.01	1.4	<0.01	1.2	0.49
South Composite	207	41	2.13	6.1	<0.01	1.2	<0.01	1.0	0.35
West Composite	258	32	0.25	7.0	<0.01	1.0	<0.01	0.6	0.31
Raspberry									
Location 9	315	39	0.59	12.5	<0.01	1.6	<0.01	1.6	0.69
Location 14	435	30	0.57	9.6	<0.01	2.1	<0.01	0.5	0.31
Location 15	928	72	0.53	12.6	<0.01	3.5	<0.01	2.4	0.95
Location 18	161	78	1.07	11.8	<0.01	2.7	<0.01	0.5	2.31
Location 22	117	117	0.63	20.8	<0.01	6.3	<0.01	3.1	3.47
Location 25	157	38	0.48	8.3	<0.01	2.7	<0.01	0.5	0.21
North Composite	429	69	0.43	11.7	<0.01	2.0	<0.01	1.3	1.31
South Composite	260	59	0.38	10.9	<0.01	2.2	<0.01	1.4	2.89
West Composite	429	44	0.38	18.3	<0.01	1.8	<0.01	0.6	0.61
Fir									
Location 9	291	39	0.69	12.6	<0.01	2.7	<0.01	1.6	0.11
Location 14	145	52	0.41	8.1	<0.01	1.5	<0.01	0.5	0.26
Location 15	613	75	0.46	9.6	<0.01	3.5	<0.01	0.5	0.10
Location 18	557	52	0.64	7.1	<0.01	2.1	<0.01	1.6	0.27
Location 22	326	72	0.42	10.7	<0.01	3.1	<0.01	1.0	0.16
Location 25	393	59	0.46	9.1	<0.01	2.1	<0.01	0.5	0.31
North Composite	337	58	0.31	7.2	<0.01	1.2	<0.01	0.7	0.32
South Composite	512	62	0.26	7.7	<0.01	1.5	<0.01	0.7	0.68
West Composite	528	59	0.39	7.4	<0.01	2.0	<0.01	0.7	0.24

*Results are given as mg/kg (parts per million, ppm) on a dry weight basis. Sampling locations and sector areas are shown on Figure 2.6-2.

TABLE 2.6-11

COMPARISON OF HEAVY METAL ANALYSIS WITH RESULTS REPORTED BY OTHERS

METAL ^a	ENVIRONMENTAL STUDY AREA		BOWEN ^d MEAN	SMITH ^e RANGE	GERLOFF ^f RANGE	CANNON ^g		
	INDIVIDUAL ^b MEAN	COMPOSITE ^c MEAN				GRASSES (ABOVE GROUND)	FORBS (ABOVE GROUND)	CONIFER NEEDLES
Manganese	310	357	630	136 - 347	38 - 1225	-	-	-
Zinc	53	52	100	19 - 73	15 - 86	850	666	1127
Cadmium	0.52	0.54	0.6	0 - 5	-	-	-	-
Copper	10.4	9.2	14	5 - 17	2.7 - 8.5	119	118	133
Arsenic	<0.01	<0.01	0.2	-	-	-	-	-
Lead	2.7	1.6	2.7	0 - 20	-	33	44	75
Mercury	<0.01	<0.01	0.1	-	-	-	-	-
Cobalt	1.1	0.9	0.5	N/D ^h	-	10	11	<7
Chromium, Total	0.69	0.80	0.23	0.3 - 11	-	19	10	8

^aAll values given in mg/kg (parts per million, ppm) on a dry weight basis.

^bMean of all individual analyses irrespective of plant species, N = 18.

^cMean of all composite analyses irrespective of plant species or sector, N = 9.

^dBowen, 1966.

^eSmith, 1973. Values listed are "normal" levels reported as occurring in sugar maple in New Hampshire and Vermont.

^fGerloff et al., 1966. Values listed are from various species sampled throughout Wisconsin.

^gCannon, 1960. Average metal content of vegetation growing in unmineralized ground.

^hNot detected.

2.6.4 Wildlife

2.6.4.1 Mammals

Regional Mammal Populations

Sixty-seven species of mammals occur in Wisconsin (Jackson, 1961). Fifty-five of these mammals could occur in the environmental study area: 2 big game species, 4 small game species, 15 furbearers, and 34 nongame species (Appendix 2.6B). Long (1974) reported that 36 species of mammals occur in Forest County. During this study, 29 species of mammals were observed in the environmental study area, three of which were not listed by Long (1974).

For the purpose of discussion, the mammals have been grouped into the categories of big game, small game, furbearers and nongame.

Big Game - The big game of the environmental study area are white-tailed deer and black bear. These species are important recreationally, aesthetically, and economically.

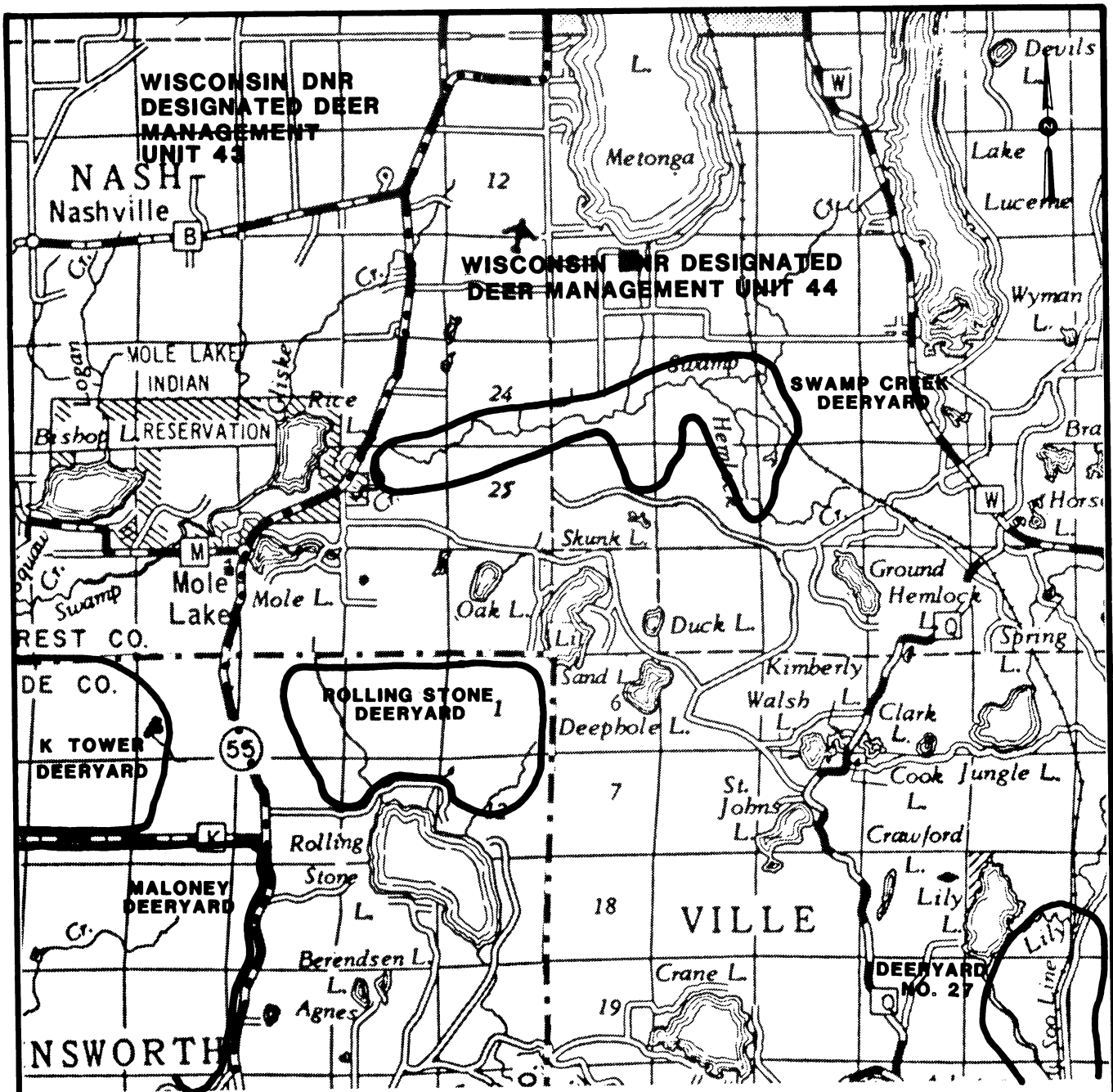
The DNR estimates of regional white-tailed deer populations vary between 8 and 19 per 259 ha (1 square mile) of deer range (McIlquam, 1982). These population levels are similar to those for other areas in northern Wisconsin but low when compared to prime areas in west-central Wisconsin. Historically, deer populations in the environmental study area have fluctuated considerably, which is similar to population levels in most of Wisconsin's northern counties. One hundred years ago, mature forests covered the environmental study area, and deer were scarce due to the lack of suitable habitat. Extensive logging increased the amount of their preferred habitat

(young aspen stands and openings) and the deer population increased sharply in the early 1900's. The population then declined as their preferred habitat was gradually replaced by pole-sized (dbh 130-280 mm [5-11 inches]) Northern Hardwood (Bersing, 1956).

The environmental study area lies within DNR Deer Management Units 43 and 44 that cover an area approximately 56 km (35 miles) long and 40 km (25 miles) wide (Figure 2.6-9). The management goal for these two units is 15 deer per 259 ha (1 square mile) after hunting harvest. Deer population densities in these two areas were high in 1967 and then declined until 1972, mostly from a series of severe winters (McIlquam, 1982). Populations have been generally increasing since 1972 with moderate winters being an important factor (McIlquam, 1982). Population estimates by the sex-age-kill method and annual harvests for these two units are presented in Table 2.6-12.

The density estimates presented in Table 2.6-12 are somewhat lower than expected from other methods such as the deer trail count and pellet group count methods. The sex-age-kill method is known to underestimate due to low hunting pressure, a situation that exists in Management Units 43 and 44 (McIlquam, 1982). In the next 20 years deer populations are expected to decrease in the environmental study area due to the maturing of the forests (McIlquam, 1982).

Deer populations in northern Wisconsin can be limited by the quantity and quality of winter habitat. In winters of deep snow and severe temperatures, deer often congregate in deeryards. Deeryards are usually lowland areas of Swamp Conifer, which provide food and shelter during severe winters. Five DNR-designated deeryards are located within the environmental



KEY:

- DEER MANAGEMENT UNIT BOUNDARY
- WISCONSIN DNR DESIGNATED DEERYARD

SOURCES: ECKSTEIN, 1977 AND 1982.

NOTE: K TOWER, MALONEY AND NO. 27 DEERYARDS EXTEND OUTSIDE OF ENVIRONMENTAL STUDY AREA.

BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION, JANUARY, 1978. FOREST CO. AND LANGLADE CO. HIGHWAY MAPS.

EXXON MINERALS COMPANY
CRANDON PROJECT

SELECTED WILDLIFE RESOURCES IN THE ENVIRONMENTAL STUDY AREA

DAMES & MOORE **FIGURE 2.6-9**

TABLE 2.6-12

WHITE-TAILED DEER DENSITIES
AND HARVEST IN THE REGION*

YEAR	DEER PER 259 ha (1 square mile)		TOTAL GUN HARVEST	
	UNIT 43	UNIT 44	UNIT 43	UNIT 44
1974	9	8	242	288
1975	7	9	216	330
1976	8	10	274	434
1977	12	16	408	723
1978	17	19	524	857
1979	14	12	487	563
1980	15	13	539	540
1981	20	17	902	873

*See Figure 2.6-9 for location of deer management units.

Source: McIlquam, 1982.

study area (Figure 2.6-9). Of the 11 deeryards on public lands in northern and western Langlade County, K Tower Deeryard and Maloney Deeryard are considered major yards, and Rolling Stone Deeryard is considered minor (Eckstein, 1982).

Forest County's annual black bear harvest is about average for the 18 counties in the state that allow black bear hunting (Kohn, 1982). The black bear harvest figures for Forest, Langlade and Oneida counties for the last eight hunting seasons are given in Table 2.6-13.

The preferred habitat of black bear is heavily forested areas containing a mixture of brushlands, swamps, and scattered openings, all of which are well distributed in the environmental study area. The black bear population in the environmental study area, based on approximate countywide densities (1 per 1,000 ha [4 square miles]) (Kohn, 1982) and available habitat, is approximately 30 to 40 black bear. Black bear sign was observed frequently in the environmental study area.

Small Game - In Wisconsin, small game constitute an important recreational and aesthetic resource. In the environmental study area, small game hunting is an important fall recreational activity.

Three small game mammal species occur in the environmental study area (Appendix 2.6B): snowshoe hare (Lepus americana), eastern cottontail (Sylvilagus floridanus), and gray squirrel (Sciurus carolinensis). These species all have high reproduction rates, and their population levels change readily in response to habitat changes. These three species are of varying importance and will be discussed separately. The fox squirrel (Sciurus niger) might occur on rare occasion in the environmental study area; however, none were observed.

TABLE 2.6-13

BLACK BEAR AND FURBEARER HARVEST IN THE REGION

COUNTY/SPECIES	YEAR							
	1974	1975	1976	1977	1978	1979	1980	1981
<u>Forest County</u>								
Black Bear	37	47	24	42	53	39	51	41
Bobcat	18	25	16	10	1	9	3	12
River Otter	39	67	19	33	36	29	51	42
Beaver	388	649	280	518	227	269	1016	469
<u>Langlade County</u>								
Black Bear	6	7	9	11	22	20	18	33
Bobcat	24	21	27	10	10	7	6	8
River Otter	23	30	30	48	23	31	52	30
Beaver	286	440	319	589	257	176	1086	444
<u>Oneida County</u>								
Black Bear	20	22	36	37	38	35	38	48
Bobcat	37	18	16	6	3	6	6	14
River Otter	91	76	77	71	54	55	77	78
Beaver	746	1020	586	898	549	398	1123	771

Source: Kohn, 1978 and 1982.

The snowshoe hare is one of the most abundant and commonly hunted small game animals in the environmental study area. It is native to Wisconsin and occurs throughout the northern third of the state. Snowshoe hare populations vary cyclicly with peaks every 7 to 12 years (Kieth, 1963). The habitat preferred by snowshoe hares is lowland areas including alder swamp, conifer swamp, and bog. There is substantial acreage of these habitats in the environmental study area.

The cottontail rabbit is less abundant in the environmental study area than the snowshoe hare. Cottontails did not occur in northern Wisconsin until the late 1800's when forest clearing created suitable habitat and allowed range expansion northward (Jackson, 1961). The cottontail's preferred habitat, an interspersion of fields, brushy areas and forest edges, is limited in the environmental study area.

The gray squirrel is a common small game species throughout Wisconsin. It is probably more abundant now in northern Wisconsin than during any time in the last century (Jackson, 1961). The gray squirrel's preferred habitat is hardwood forests with good mast producing capabilities. The environmental study area contains a moderate amount of this type of habitat.

Furbearers - Furbearers are "important" in the environmental study area, both ecologically and economically. The furbearers that occur in Forest County and the environmental study area are listed in Appendix 2.6-B. The "important" furbearers of the region are bobcat, river otter, red fox (Vulpes vulpes), coyote (Canis latrans), beaver, raccoon (Procyon lotor), muskrat (Ondatra zibethicus), mink (Mustela vison) and fisher (Martes pennanti).

The bobcat occurs in moderate densities, 1 per 1,295 to 5,180 ha (5 to 20 square miles) throughout the northern half of Wisconsin (Creed and Ashbrenner, 1976), and is listed in the "watch" category by the Wisconsin DNR (1979). The bobcat harvest for Forest, Langlade and Oneida counties between 1974 and 1981 is listed in Table 2.6-13.

The environmental study area contains excellent habitat for bobcat. Although no actual observations of bobcats were made, tracks were observed on several occasions during field surveys. Seventeen percent of the environmental study area is forested wetland that, according to Creed and Ashbrenner (1976), is a favorable habitat component for maintenance of bobcat populations in Wisconsin.

The river otter and beaver are more abundant in Wisconsin than the bobcat. The harvest of these two furbearers for Forest, Langlade and Oneida counties between 1974 and 1981 is presented in Table 2.6-13. The preferred habitat of river otters and beavers is primarily lakes, rivers and streams. Individuals or signs of these two furbearers were observed frequently in the environmental study area.

The red fox, coyote, raccoon, muskrat and mink are all important in the regional fur harvest, but no county harvest statistics are available. All are expected to be fairly common or common in the region (Appendix 2.6B) and all but the red fox was observed in the environmental study area.

The fisher is an important furbearer in the region that is currently on the "watch" list of the Wisconsin DNR (1979). The fisher was once common in the heavily forested areas of Wisconsin but the state population declined to the point of extirpation by 1932, due to extensive logging and fur

trapping. Fishers were successfully introduced into the Nicolet National Forest in Forest County in the 1950's and 1960's and the populations have been steadily increasing and expanding outside of the release sites. Captures of fishers have been reported in the environmental study area (Pils, 1982) but none were observed during this study.

Nongame - Thirty-four species of nongame mammals have been reported to occur throughout northeastern Wisconsin (Jackson, 1961) (Appendix 2.6B). Twenty-one species of nongame mammals occur in a wide variety of habitats in either Forest County or the environmental study area (Appendix 2.6B). Their abundance varies from "rare" to "abundant" and is a result of available preferred habitat and state-wide range. Two of the nongame species that could occur in the environmental study area, the wolf (Canis lupus) and marten, are listed as endangered by the Wisconsin DNR (1982b) and are discussed in subsection 2.6.5.

Site Area Mammal Populations

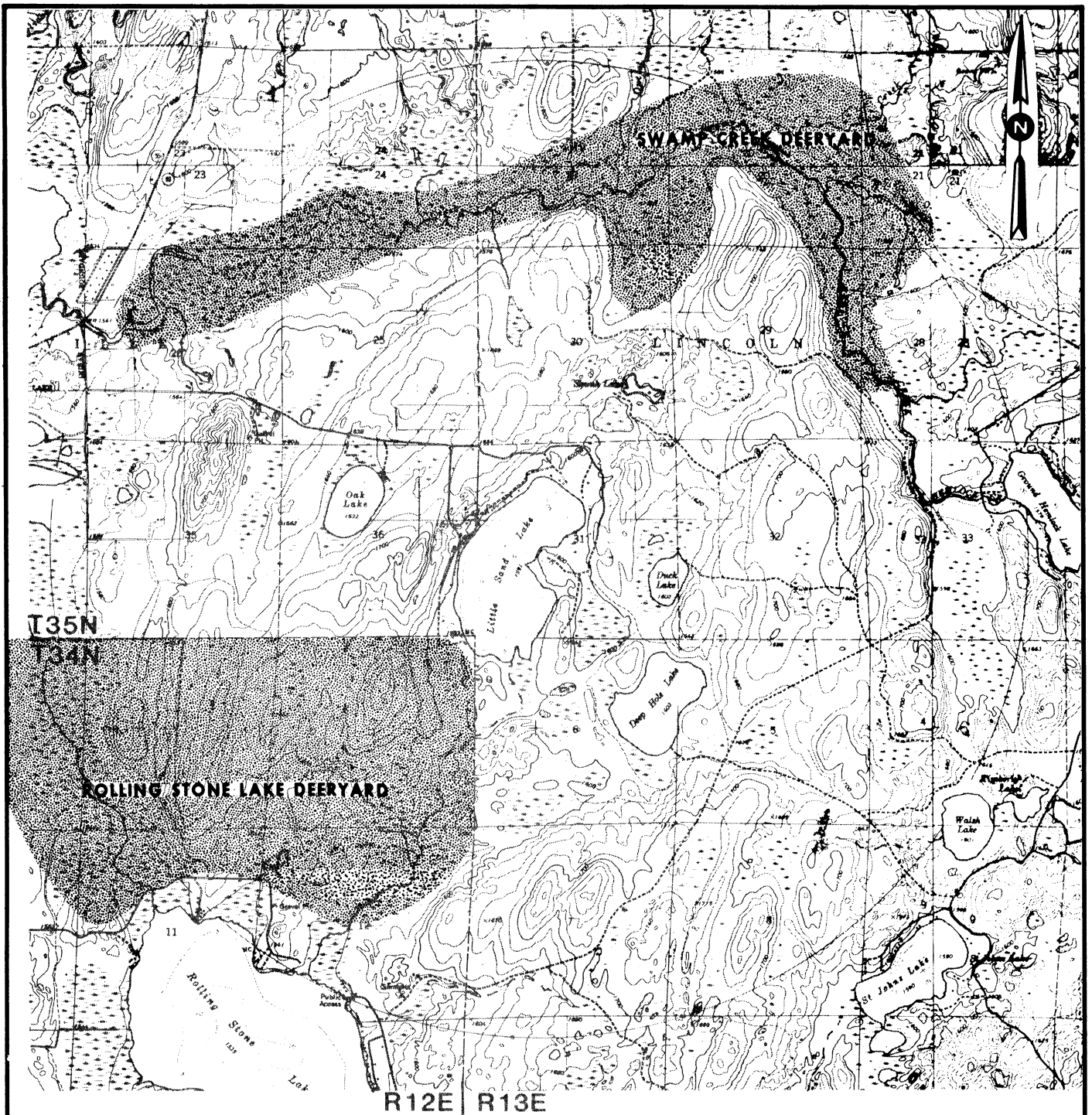
Mammals of the site area are similar in distribution and abundance to those of the environmental study area. Twenty-nine species of mammals were observed in the site area (Appendix 2.6B) during the course of all vegetation and wildlife field work. Given below are the results of the white-tailed deer survey and small mammal trapping survey.

White-tailed deer - The deer trail count results indicate that the 1977 pre hunting-season population density of white-tailed deer in the site area was 6.9 deer per 259 ha (1 square mile) of deer range with 95 percent

confidence limits of 6.1 to 7.8. The mean number of deer trails observed per transect was 1.19 ± 0.45 . Population levels estimated in this study were approximately one-half of the management goal (15 per 259 ha [1 square mile] of deer range) for deer management units in the vicinity of the environmental study area. The difference between the deer population estimate of this study and those of the DNR from the sex-age-kill method was most likely due to the distribution of habitat types in the site area and the deer management units. In general, the site area is not high quality habitat for deer because of the large acreage of pole-sized Northern Hardwood. There are few stands of young aspen in the site area, a preferred summer habitat for deer. There are two deeryards in the site area (Figure 2.6-10).

Nongame - Thirteen species of nongame mammals were captured during the small mammal trapping surveys (Table 2.6-14). The five most abundant species, in decreasing order, were the deer mouse (Peromyscus maniculatus), Gapper's red-backed mouse (Clethrionomys gapperi), masked shrew (Sorex cinereus), short-tailed shrew (Blarina brevicauda), and eastern chipmunk (Tamias striatus). Two species of Peromyscus occur in the Crandon area. The taxonomy is difficult, particularly with immature specimens, and those individuals listed under Peromyscus spp. in Table 2.6-14 were predominantly deer mice but may include an occasional white-footed mouse (Peromyscus leucopus). In these studies the capture rate (captures per 1,000 trap nights) was used as a measure of the relative abundance of a nongame mammal species.

Of the five habitats sampled, the Northern Hardwood type had the highest capture rate (127.1 per 1,000 trap nights) (Table 2.6-14). The capture rates in Swamp Conifer and Aspen-Birch were 72.7 and 57.4 per 1,000



KEY:
 WISCONSIN DNR DESIGNATED DEERYARD

1 0.5 0 1 MILE

1 0.5 0 1 KILOMETER

EXXON MINERALS COMPANY
 CRANDON PROJECT

DEERYARDS IN THE SITE AREA

SOURCE: ECKSTEIN, 1977 AND 1982.

BASE MAP REFERENCE:
 PORTIONS OF THE FOLLOWING U.S.G.S. 7.5 MINUTE SERIES:
 CRANDON, WISCONSIN, 1966; LAKE LUCERNE, WISCONSIN, 1973;
 AND ROBERTS LAKE, WISCONSIN, 1973.

DAMES & MOORE

FIGURE 2.6-10

TABLE 2.6-14

NONGAME MAMMAL TRAPLINE RESULTS IN THE SITE AREA

SPECIES ^a	NORTHERN HARDWOOD				ASPEN/BIRCH				SWAMP CONIFER				OLD FIELD			BOG			TOTAL CAPTURED		
	TRAP- LINES 1 & 2 (1977)	TRAP- LINES 3 & 4 (1978)	TRAP- LINES 5 & 6 (1978)	TOTAL CAPTURED	CAPTURE RATE ^b	TRAP- LINES 1 & 2 (1977)	TRAP- LINES 3 & 4 (1978)	TOTAL CAPTURED	CAPTURE RATE ^b	TRAP- LINES 1 & 2 (1977)	TRAP- LINES 3 & 4 (1978)	TRAP- LINES 5 & 6 (1978)	TOTAL CAPTURED	CAPTURE RATE ^b	TRAP- LINES 1 & 2 (1978)	TOTAL CAPTURED	CAPTURE RATE ^b	TRAP- LINES 1 & 2 (1977)		TOTAL CAPTURED	CAPTURE RATE ^b
Deer Mouse																					
Total Captured	31	17	11	59	4	16	20		1	3	1	5		0	0	0	0	0	0	0	84
Capture rate	114.8	62.9	40.7	72.8	14.8	59.2	37.0		3.7	11.1	3.7	7.4		0	0	0	0	0	0	0	
White-footed Mouse																					
Total Captured	0	0	2	2	0	0	0		0	0	0	0		0	0	0	0	0	0	0	2
Capture rate	0	0	7.4	2.5	0	0	0		0	0	0	0		0	0	0	0	0	0	0	
Peromyscus spp.																					
Total Captured	5	1	5	11	0	7	7		0	3	0	3		0	0	0	0	0	0	0	21
Capture rate	18.5	3.7	18.5	13.6	0	25.9	13.0		0	11.1	0	4.4		0	0	0	0	0	0	0	
Gapper's Red-Backed Mouse																					
Total Captured	4	4	6	14	0	0	0		10	11	12	33		0	0	0	0	0	0	0	47
Capture rate	14.8	14.8	22.2	17.3	0	0	0		37.0	81.5	44.4	48.8		0	0	0	0	0	0	0	
Masked Shrew																					
Total Captured	0	0	0	0	1	0	1		1	2	1	4		3	3	3	3	3	3	3	11
Capture rate	0	0	0	0	3.7	0	1.8		3.7	7.4	3.7	5.9		11.1	11.1	11.1	11.1	11.1	11.1	11.1	
Short-Tailed Shrew																					
Total Captured	0	7	1	8	0	0	0		0	0	0	0		0	0	0	0	0	0	0	8
Capture rate	0	25.9	3.7	9.9	0	0	0		0	0	0	0		0	0	0	0	0	0	0	
Snowshoe Hare																					
Total Captured	0	0	0	0	0	0	0		0	2	0	2		0	0	0	0	0	0	0	2
Capture rate	0	0	0	0	0	0	0		0	7.4	0	3.0		0	0	0	0	0	0	0	
Least Chipmunk																					
Total Captured	0	0	0	0	1	0	1		1	0	0	1		0	0	0	0	0	0	0	2
Capture rate	0	0	0	0	3.7	0	1.8		3.7	0	0	1.5		0	0	0	0	0	0	0	
Eastern Chipmunk																					
Total Captured	0	1	3	4	1	0	1		0	0	0	0		0	0	0	0	0	0	0	5
Capture rate	0	3.7	11.1	4.9	3.7	0	1.8		0	0	0	0		0	0	0	0	0	0	0	
Red Squirrel																					
Total Captured	0	0	0	0	1	0	1		0	0	0	0		0	0	0	0	0	0	0	1
Capture rate	0	0	0	0	3.7	0	1.8		0	0	0	0		0	0	0	0	0	0	0	
Southern Flying Squirrel																					
Total Captured	0	0	2	2	0	0	0		0	0	0	0		0	0	0	0	0	0	0	2
Capture rate	0	0	7.4	2.5	0	0	0		0	0	0	0		0	0	0	0	0	0	0	
Northern Flying Squirrel																					
Total Captured	0	0	1	1	0	0	0		0	0	1	1		0	0	0	0	0	0	0	2
Capture rate	0	0	3.7	1.2	0	0	0		0	0	3.7	1.5		0	0	0	0	0	0	0	
Meadow Jumping Mouse																					
Total Captured	0	0	1	1	0	0	0		0	0	0	0		0	0	0	0	0	0	0	1
Capture rate	0	0	3.7	1.2	0	0	0		0	0	0	0		0	0	0	0	0	0	0	
Woodland Jumping Mouse																					
Total Captured	0	1	0	1	0	0	0		0	0	0	0		0	0	0	0	0	0	0	1
Capture rate	0	3.7	0	1.2	0	0	0		0	0	0	0		0	0	0	0	0	0	0	
Meadow Vole																					
Total Captured	0	0	0	0	0	0	0		0	0	0	0		2	2	2	2	2	2	2	2
Capture rate	0	0	0	0	0	0	0		0	0	0	0		7.4	7.4	7.4	7.4	7.4	7.4	7.4	
Total Captured	40	31	32	103	--	8	23	31	--	13	21	15	49	--	5	5	--	3	3	--	91
Total Captures Per 1,000 Trap Nights	148.1	114.7	118.4	--	127.1	29.6	85.1	--	57.4	48.1	77.7	55.5	--	72.7	18.5	--	18.5	11.1	--	11.1	--
Number of Species	2+	5+	8	9	--	5	1+	5+	--	4	4+	4	6+	--	2	2	--	1	1	--	14

^aScientific names are listed in Appendix 2.6B.^bCapture rate = captures per 1,000 trap nights.

trap nights, respectively, and the lowest capture rates were in old field and bog habitats (Table 2.6-14). The nongame mammal survey results generally indicate that in the site area, Northern Hardwood communities have a higher density and diversity (number of species) of nongame mammals than Swamp Conifer or Aspen-Birch communities (Table 2.6-14). Trapline numbers 5 and 6 were located in Dry-Mesic Northern Hardwood (Figure 2.6-3). The vegetation in this stand was diverse, and this diversity was reflected in the high diversity of nongame mammal species (Table 2.6-14). The old field habitats sampled were small and thus may be the reason for the low density and diversity of nongame mammals found in this habitat type. Few nongame mammal species were found in bogs.

The capture of two southern flying squirrels (Glaucomys volans) was considered unusual since the northern limit of the southern flying squirrel generally coincides with the vegetational transition zone. Southern flying squirrels have not previously been reported in Forest County (McCabe, 1972; Long, 1974).

Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982) also conducted small mammal trapping in the site area. Four wetland types were sampled; deciduous swamp, coniferous swamp, shrub swamp and bog. Eleven species were captured and the deciduous swamp had the greatest species richness with a total of seven species trapped. The fewest number of species was captured in the bog habitat. With the exception of a striped skunk, all of the species captured by Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982) were also captured during this study. The most abundant species captured by Normandeau

Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982) were the meadow jumping mouse (Zapus hudsonius), masked shrew, Gapper's red-backed mouse, deer mouse and meadow vole (Microtus pennsylvanicus).

2.6.4.2 Birds

Regional Bird Populations

Approximately 332 species of birds occur in Wisconsin (Barger et al., 1975). Vanderschaegen (1981) has documented 244 species of birds in Forest, Oneida and Vilas counties, most of which could be expected to occur regularly in the environmental study area (Appendix 2.6C). Birds that have been observed in Forest County or in the environmental study area include those recorded on the U.S. Fish and Wildlife Service Breeding Bird Survey transect near Crandon from 1966-1976; observations by Robbins (co-author of Wisconsin Birds [Barger et al., 1975]), near Crandon in 1970; observations by Phil Vanderschaegen of the DNR; and sightings along specific bird survey routes and general observations during this study.

The environmental study area lies within the mixed hardwood-coniferous forests. The bird species diversities in this mixed forest type are among the highest of any of the forests in North America (Temple et al., 1979). Bird populations in this forest type in summer can range from 300 to 500 individuals per 40.5 ha (100 acres) and normally decline to less than 100 individuals during the winter (Back, 1979; Temple et al., 1979).

Because of their widely fluctuating seasonal populations, the discussion of birds in the following subsections is presented according to their residency status: permanent resident, summer resident, winter resident,

or migrant. Approximately 11 percent of the regional bird population are permanent residents, 66 percent are summer residents, 4 percent are winter residents and 19 percent area regular migrants (Vanderschaegen, 1981). Within each of these groups, emphasis is placed on the raptors (vultures, eagles, hawks, and owls), upland game birds (grouse), waterfowl, marsh and shore birds, and those whose occurrence in the study area might be considered unusual. Other birds, such as songbirds, are treated as a group in less detail.

Permanent Residents - The permanent residents include birds that occur in the environmental study area throughout the year. This does not necessarily mean that the same individuals remain in the region year-round but that the species is found continuously.

Four raptor species that are permanent residents were observed in the environmental study area: the great horned owl (Bubo virginianus), barred owl (Strix varia), saw-whet owl (Aegolius acadicus), and goshawk (Accipiter gentilis). Due to their large size and restrictive feeding habits, goshawks are the least common of the permanent resident raptors in Wisconsin. Goshawks prefer habitats such as maturing Aspen-Birch and Northern Hardwood (Bent, 1937). According to Bent (1938), barred owls prefer lowland/wetland edge habitats. Forested wetlands are quite common in the environmental study area and barred owls were frequently heard calling during late evening and early morning. Great horned owls prefer upland habitats (Bent, 1938) and based on the number of calls heard are less common than barred owls in the environmental study area. They generally prefer areas with more habitat variety as opposed to the heavily forested habitats of the environmental study area.

The only nonmigratory species of upland game bird occurring in the environmental study area and Forest County is the ruffed grouse. Ruffed grouse are an important game bird in Wisconsin, and the annual harvest averages near 700,000 (Eckstein, 1982). Forest County is frequently one of the top 10 counties for ruffed grouse harvested in Wisconsin. Generally, the environmental study area is not high quality habitat for ruffed grouse. Favorable habitats of young aspen, brush and creek bottoms exist but only comprise approximately 6 percent of the environmental study area.

In addition to the raptor and upland game bird species, 23 other species of birds that are permanent residents were observed during this study (Appendix 2.6C). Familiar species included the blue jay (Cyanocitta cristata), common crow (Corvus brachyrhynchos), common raven (Corvus corax), black-capped chickadee (Parus atricapillus), and downy woodpecker (Picoides pubescens).

Six species that occur in the environmental study area are "rare" permanent residents; these include the spruce grouse (Canachites canadensis), screech owl (Otus asio), great gray owl (Strix nebulosa), black-backed three-toed woodpecker (Picoides arcticus), northern three-toed woodpecker (Picoides tridactylus), golden-crowned kinglet (Regulus satrapa), and red crossbill (Loxia curvirostra). Some of these species, such as the golden-crowned kinglet and red crossbill, are more commonly observed as migrants or winter residents in the area.

The spruce grouse, which is nonmigratory, has been observed in the environmental study area by the DNR and Langlade County Forest Department staff (Hallisy, 1978; Hauge, 1978; McIlquam, 1978). The spruce

grouse is listed in a "watch" category by the Wisconsin DNR (1979). The favored habitat of this species is large Conifer Swamp communities, which are common in the region. The spruce grouse is "rare" in Wisconsin according to Robbins (1977), who suggested that there may be only a few hundred left in the state. None was observed during this study. Of the other "rare" birds listed above only the golden-crowned kinglet and red crossbill were observed in the environmental study area.

Summer Residents - Summer residents are the birds that breed in the environmental study area and migrate south to wintering areas. This group is by far the largest of the four avian residency groups and is an important part of the regional avifauna. There are four subdivisions: raptors, waterfowl, marsh birds and shorebirds, and other birds.

Eleven species of raptors occur as summer residents in northeastern Wisconsin, nine of these were observed during this study (Appendix 2.6C). The broad-winged hawk (Buteo platypterus) and sharp-shinned hawk (Accipiter striatus) are the most abundant breeding raptors in the environmental study area (Erdman, 1978). Uncommon or rare raptors are the red-tailed hawk (Buteo jamaicensis), red-shouldered hawk (Buteo lineatus), Cooper's hawk (Accipiter cooperii), marsh hawk (Circus cyaneus), osprey, bald eagle, and short-eared owl (Asio flammeus). All but the short-eared owl were observed in the environmental study area. The Cooper's hawk, osprey, bald eagle, and red-shouldered hawk are listed as endangered or threatened species and are discussed in subsection 2.6.5.

There are nine species of waterfowl that are summer residents in northeastern Wisconsin (Appendix 2.6C), all of which, except the red-breasted

merganser (Mergus serrator), were observed in the environmental study area (Appendix 2.6C).

The environmental study area is not a major waterfowl breeding area. Most waterfowl require meadow or marsh type wetlands for nesting, with open water nearby for courtship and brood rearing. Less than 1 percent of the environmental study area is meadow or marsh type wetlands, which is a factor limiting waterfowl production in the environmental study area. Waterfowl reported to nest in Forest County include: blue-winged teal (Anas discors), mallard (Anas platyrhynchos), wood duck (Aix sponsa), black duck (Anas rubripes), ring-necked duck (Athya collaris), and hooded merganser (Vanderschaegen, 1981). The Canada goose (Branta canadensis), common goldeneye (Bucephala clangula), common merganser (Mergus merganser), and red-breasted merganser have been recorded nesting in adjacent counties (Jahn and Hunt, 1964).

The best waterfowl habitat in the environmental study area supports low density waterfowl breeding populations. These areas are Rice, Bishop, Rolling Stone and Lily lakes, the small cluster of lakes southeast of Lake Lucerne, and the Swamp Creek and Hemlock Creek bottomlands (Jahn and Hunt, 1964).

The black duck and red-breasted merganser are listed in a "watch" category by the Wisconsin DNR (1979). Of these two species, only the black duck is known to nest in the environmental study area. Black ducks nest in a variety of habitat types including small lakes and some of the wetland types common in the environmental study area. During breeding waterfowl surveys conducted in 1978, black ducks were only observed at one location.

There are 24 species of marsh birds and shorebirds, excluding waterfowl and the marsh hawk, that nest in the wetlands or near lakes in the environmental study area (Appendix 2.6C). Sixteen of these species were observed during this study (Appendix 2.6C). They include the pied-billed grebe (Podilymbus podiceps), killdeer (Charadrius vociferus), great blue heron (Ardea herodias), red-winged blackbird (Agelaius phoeniceus), American woodcock and common snipe (Capella gallinago).

The American woodcock is a migratory game bird. The population levels of American woodcock in Forest County and the environmental study area are average for northern Wisconsin. The DNR spring population indices for American woodcock have varied only slightly in the last few years (Eckstein, 1982). The preferred habitat of woodcock is young aspen stands, shrub swamps, and openings.

The common loon (Gavia immer), great blue heron, upland sandpiper (Bartramia longicauda), and black tern (Chlidonias niger), which are listed by the Wisconsin DNR (1979) in a "watch" category, occur in the environmental study area (Appendix 2.6C). A pair of common loons nested on Deep Hole Lake during the summer of 1978. Black terns were frequently observed on Rice Lake and probably nest there. Upland sandpipers have been observed in Forest County during U.S. Fish and Wildlife Service Breeding Bird Surveys (Robbins, 1977).

The last group of summer resident birds (other birds) contains 89 species, approximately one-third of all the species expected in the environmental study area (Appendix 2.6C). Some of the most abundant summer residents in the region are the ovenbird (Sieurus aurocapillus), red-eyed

vireo (Vireo olivaceus), American robin (Turdus migratorius), chestnut-sided warbler (Dendroica pennsylvanica), chipping sparrow (Spizella passerina) and song sparrow (Melospiza melodia) (Vanderschaegen, 1981). Eighty-four species were observed in the environmental study area during this study (Appendix 2.6C).

The common flicker, eastern bluebird (Sialia sialias), grasshopper sparrow (Ammodramus savannarum), vesper sparrow (Pooectes gramineus), and field sparrow (Spizella pusilla) are listed in a "watch" category by the Wisconsin DNR (1979). All have been observed in the environmental study area.

Twelve species occur rarely in the environmental study area during the summer (Appendix 2.6C). They are the yellow-billed cuckoo (Coccyzus americanus), Swainson's thrush (Catharus ustalatus), blue-gray gnatcatcher (Polioptila caerulea), blue-winged warbler (Vermivora pinus), Cape May warbler (Dendroica tigrina), palm warbler (Dendroica palmarum), western meadowlark (Sturnella neglecta), cardinal (Cardinalis cardinalis), dickcissel (Spiza americana), grasshopper sparrow (Ammodramus savannarum), LeConte's sparrow (Ammodramus leconteii), and field sparrow (Spizella pusilla). All but four of these species were observed in the environmental study area (Appendix 2.6C).

Winter Residents - Winter residents are those whose main breeding range occurs outside the environmental study area, primarily further north. Three species of winter resident birds, the pine grosbeak (Pinicola enucleator), common redpoll (Carduelis flammea), and snow bunting (Plectrophenax nivalis), were observed in the environmental study area (Appendix 2.6C).

Migrants - During spring and autumn migrations, a wide variety of birds occurs in the environmental study area as migrants.

All of the waterfowl species discussed under the heading "Summer Residents," as well as the 15 species of migrant waterfowl listed in Appendix 2.6C, may occur in the environmental study area during migration. Eight species of migrant waterfowl were observed in the environmental study area (Appendix 2.6C). Bishop Lake, Lake Metonga, Pickerel Lake, and the Wolf River, all within the environmental study area, are of moderate importance to migrating waterfowl (Jahn and Hunt, 1964). Rice Lake and Rolling Stone Lake are other lakes in the environmental study area that receive substantial use by migrating waterfowl. The DNR has documented flocks of waterfowl numbering in the several hundreds on Rolling Stone, Duck, Deep Hole, Rice, Bishop, and Crane lakes (Ramharter, 1981).

Migrating waterfowl surveys were conducted at the following lakes within the environmental study area: Skunk, Duck, Little Sand, Ground Hemlock, Walsh, Oak, Deep Hole, Rolling Stone, and Rice (Figure 2.6-4). The results of these surveys are presented in Table 2.6-15. Few migrating waterfowl were attracted to the environmental study area during the migrating waterfowl surveys of 1977 and 1978. Rice Lake received the heaviest use of any of the lakes surveyed, comprising 79 percent of the total waterfowl use observed. The next most important lake in the site area was Rolling Stone Lake, receiving 9 percent of the total waterfowl use observed. Skunk Lake comprised 6 percent of the total waterfowl use observed. The other six lakes received very low levels of use. The most numerous species was the ring-necked duck (Table 2.6-15). Other common species were the American coot

TABLE 2.6-15

MIGRATING WATERFOWL SURVEY RESULTS IN THE ENVIRONMENTAL STUDY AREA

SPECIES ^a	RICE LAKE		SKUNK LAKE		DUCK LAKE		LITTLE SAND LAKE		OAK LAKE		ROLLING STONE LAKE		GROUND HEMLOCK LAKE		WALSH LAKE		DEEP HOLE LAKE		TOTAL	RELATIVE ABUNDANCE
	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F	S	F		
	1977	1977	1977	1977	1977	1977	1977	1977	1977	1977	1978	1977	1978	1977	1978	1977	1978	1977		
Ring-Necked Duck	621	29	4	0	2	2	1	0	0	0	17	0	0	0	2	0	8	0	686	52.93
American Coot	98	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	8.64
Scaup ^b	0	38	0	0	0	0	0	0	0	0	67	0	2	0	0	0	4	0	111	8.56
Blue-Winged Teal	79	7	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	87	6.71
Wood Duck	8	0	0	66	0	0	0	0	0	0	0	0	0	0	3	0	0	0	77	5.94
Unidentified Ducks	0	58	0	0	0	0	0	0	0	0	12	1	0	0	0	0	0	0	71	5.48
Mallard	28	0	6	1	4	0	4	0	2	0	2	0	2	0	3	0	4	0	56	4.32
Bufflehead	9	0	0	0	0	0	2	0	0	0	5	0	3	0	9	0	0	0	28	2.16
American Wigeon	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	27	2.08
Whistling Swan	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0.69
Black Duck	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	7	0.54
Canvasback	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0.46
Canada Goose	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5	0.38
Common Merganser	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	3	0	5	0.38
Redhead	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0.31
Pintail	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.23
Hooded Merganser	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0.15
Subtotal Individuals	861	165	10	67	6	2	7	0	2	0	116	1	8	0	17	1	19	14	1,296	99.66
Subtotal Species	9	6	2	2	2	1	3	0	1	0	10	1	4	0	4	1	4	1	17	-
Miscellaneous																				
Common Loon	0	0	0	0	0	0	1	1	0	0	3	0	0	0	2	0	0	0	7	
Pied-Billed Grebe	11	12	0	0	0	0	0	0	0	1	2	73	0	0	2	1	0	0	102	
Great Blue Heron	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6	
Canada Goose ^c	0	220	0	0	0	0	0	48	0	0	0	0	519	0	236	26	15	0	1,064	
Solitary Sandpiper	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Ring-Billed Gull	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	6	
Total Individuals	877	398	12	67	6	2	8	50	2	1	121	80	527	0	257	29	34	14	2,483	
Total Species	11	9	3	2	2	1	4	3	1	1	12	3	5	0	7	4	5	1	24	

NOTES:

S = Spring 1977 or 1978
F = Autumn 1977

^aScientific names are listed in Appendix 2.6C.

^bBoth lesser and greater scaup have been identified in the environmental study area. However, frequently it was not possible to differentiate between the two species.

^cFlying high overhead.

(Fulica americana), greater scaup (Aythya marila), lesser scaup (Aythya affinis), blue-winged teal, wood duck, mallard, and bufflehead (Bucephala albeola). Waterfowl were also observed several times on Pond 25-11 northwest of Oak Lake and Pond 31-13 north of Duck Lake (Figure 2.6-4). At Pond 25-11, 11 ring-necked ducks, 4 wood ducks, 3 buffleheads, 1 mallard, 1 black duck, and 2 pied-billed grebes were observed on two separate occasions. At Pond 31-13, 4 ring-necked ducks and 1 mallard were observed on one occasion during the migrating waterfowl surveys.

The migrant marsh birds and shorebirds group consists of 36 species, primarily shorebirds (Appendix 2.6C). Four of these species were observed during this study in the environmental study area (Table 2.6-15). They were the cattle egret (Bubulcus ibis), solitary sandpiper (Tringa solitaria), herring gull (Larus argentatus) and ring-billed gull (Larus delawarensis).

Site Area Bird Populations

Approximately 80 percent of the bird species breeding in the site area migrate to milder climates for the winter period (Barger et al., 1975). Temple et al. (1979) considered 17 bird species to be frequent winter residents in mixed hardwood/conifer forests of northern Wisconsin. During this study, 24 different species were observed during winter periods, compared to 110 additional species observed during spring and summer periods. On surveys conducted to establish the seasonal and habitat distribution of bird species, four species were observed during winter and 55 species during the spring or summer. A total of 150 species of birds were observed in the site area (Appendix 2.6C).

Raptors - Twelve species of raptors were observed in the site area, 11 of which are permanent or summer residents that could nest in the site area. Raptor nests found in the site area included 1 goshawk nest, 3 bald eagle nests, 3 osprey nests, and 3 broad-winged hawk nests. The location and productivity of the bald eagle and osprey nests are presented in subsection 2.6.5. The goshawk, an uncommon permanent resident, was found nesting near Rolling Stone Lake. The broad-winged hawk is the most common breeding raptor in the area, and nests were found near Rolling Stone Lake, Pond 25-11, and northwest of Exxon's field office (former Vollmar house).

Ruffed Grouse - Ruffed grouse drumming surveys were conducted in the site area during the spring of 1978. The ruffed grouse population density was estimated at 2.8 ± 1.3 per 40.5 ha (100 acres) at the 95 percent confidence level. Ruffed grouse populations undergo cyclical fluctuations approximately every 7 to 10 years. Wisconsin populations appear to have reached a high cyclical peak in 1981 after recovering from low levels in the early 1970's (Eckstein, 1982). The DNR spring survey of 1982 indicates that the grouse population has started its cyclical downward trend (Eckstein, 1982). In Wisconsin, density classes are assigned to population estimates based on the number of males drumming per 40.5 ha (100 acres). These classes are low (less than 1.56), moderate (1.56 to 2.66), and excellent (greater than 2.66) (Moulton, 1977). Estimates of males per 40.5 ha (100 acres) in the site area averaged 1.4 ± 0.65 at the 95 percent confidence level, indicating low or moderate population levels. These results, when compared to densities estimated by Moulton (1977) for other areas in northern Wisconsin, suggest that the habitats of the site area are of low value to ruffed grouse.

Waterfowl Brood Counts - Waterfowl brood counts were conducted during the summer of 1978 at the following lakes within the site area: Skunk, Duck, Little Sand, Ground Hemlock, Walsh, Oak, Deep Hole, Rolling Stone, and Rice. In addition, one pond (25-11) was inspected for the presence of waterfowl broods.

Brood count survey results indicate low and scattered waterfowl production among the various water bodies (Table 2.6-16). Rice Lake produced at least four broods, whereas no more than one or two broods were observed on the other lakes and ponds surveyed in 1978. Five species were observed during the brood counts (Table 2.6-16). The most commonly encountered species was the mallard, although wood ducks were also observed on several lakes. One pair of wood ducks with a brood of five young, one pair of ring-necked ducks, and one pair of mallards were observed on the small pond (25-11) northwest of Oak Lake in Section 25 (Figure 2.6-4). The extent to which other small ponds in the area contribute to waterfowl production is unknown. This region of Wisconsin is not noted for its waterfowl production, and these results tend to support this.

Songbirds by Habitat Type - Surveys were conducted during the spring and summer of 1977, and the winter of 1977-78 in the major habitats of the site area to establish relative abundances for songbirds. The habitats surveyed were Aspen-Birch, Swamp Conifer, Northern Hardwood, and Young Aspen. These survey results are summarized in Table 2.6-17. Species importance values were calculated by adding the relative abundances for the winter, spring, and summer surveys. Species are listed in decreasing order of importance. Permanent residents are of greatest importance because they are

TABLE 2.6-16

WATERFOWL BROOD COUNT RESULTS IN THE SITE AREA DURING THE SUMMER OF 1978

SPECIES ^a	RICE LAKE		SKUNK LAKE		DUCK LAKE		LITTLE SAND LAKE		OAK LAKE		ROLLING STONE LAKE		GROUND HEMLOCK LAKE		WALSH LAKE		DEEP HOLE LAKE		TOTAL		TOTAL NUMBER OF BROODS SEEN
	A	Y	A	Y	A	Y	A	Y	A	Y	A	Y	A	Y	A	Y	A	Y	A	Y	
	Mallard	10	0	0	0	0	0	1	9	0	0	0	0	0	0	0	0	1	5	12	
Black Duck	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	0	0	0	1	5	1
Blue-Winged Teal	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Unidentified Teal	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1
Wood Duck	7	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	9	0	0
Ring-Necked Duck	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Unidentified Ducks	3	19 ^b	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	19	3
Subtotal Individuals	23	22	2	0	0	0	1	9	1	0	0	0	1	5	0	0	1	5	29	41	7
Subtotal Species	3+	1+	2	0	0	0	1	1	1	0	0	0	1	1	0	0	1	1	5+	2+	0
Miscellaneous																					
Common Loon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	1	
Pied-Billed Grebe	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
Great Blue Heron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	
Sora Rail	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	
Total Individuals	24	22	2	0	0	0	1	9	2	0	0	0	1	5	0	0	4	6	34	42	
Total Species	4+	1+	2	0	0	0	1	1	2	0	0	0	1	1	0	0	3	2	9+	3+	

NOTES:

A = Adults

Y = Young

^aScientific names are listed in Appendix 2.6C.^bConsisted of three broods.

TABLE 2.6-17

DISTRIBUTIONAL SONGBIRD SURVEY RESULTS IN THE SITE AREA

SPECIES ^a	FEBRUARY 1978					PERCENT RELATIVE ABUNDANCE	MAY 1977					PERCENT RELATIVE ABUNDANCE	JUNE 1977					PERCENT RELATIVE ABUNDANCE	IMPORTANCE VALUE ^b
	ENCOUNTERS						ENCOUNTERS						ENCOUNTERS						
	ASPEN/ BIRCH (6)	SWAMP CONIFER (9)	NORTHERN HARDWOOD (9)	YOUNG ASPEN (3)	TOTAL		ASPEN/ BIRCH (3)	SWAMP CONIFER (3)	NORTHERN HARDWOOD (3)	YOUNG ASPEN (3)	TOTAL		ASPEN/ BIRCH (3)	SWAMP CONIFER (3)	NORTHERN HARDWOOD (3)	YOUNG ASPEN (3)	TOTAL		
Black-Capped Chickadee	2	1	1	0	4	50.00	0	1	1	0	2	0.55	0	6	1	0	7	1.74	52.29
Blue Jay	0	0	1	0	1	12.50	10	25	8	12	55	15.19	10	7	5	16	38	9.48	37.17
Common Raven	0	0	1	0	2	25.00	0	0	0	2	2	0.55	0	0	0	1	1	0.25	25.80
Rose-Breasted Grosbeak	0	0	0	0	0	0	11	15	16	16	58	16.02	12	1	11	9	33	8.23	24.25
Ovenbird	0	0	0	0	0	0	10	3	19	6	38	10.50	16	4	22	6	48	11.97	22.47
Common Crow	1	0	0	0	1	12.50	5	4	0	0	9	2.49	0	4	3	1	8	2.00	16.99
Red-Eyed Vireo	0	0	0	0	0	0	4	1	6	0	11	3.04	17	6	19	13	55	13.72	16.76
White-Throated Sparrow	0	0	0	0	0	0	6	12	3	5	26	7.18	1	26	0	3	30	7.48	14.66
Chestnut-Sided Warbler	0	0	0	0	0	0	7	7	5	10	29	8.01	3	2	3	9	17	4.24	12.25
Great Crested Flycatcher	0	0	0	0	0	0	6	1	0	5	12	3.31	0	22	1	12	35	8.73	12.04
Wood Thrush	0	0	0	0	0	0	16	3	3	1	23	6.35	5	0	1	0	6	1.50	7.85
Least Flycatcher	0	0	0	0	0	0	0	5	2	0	7	1.93	5	4	3	1	13	3.24	5.17
Indigo Bunting	0	0	0	0	0	0	0	0	1	7	8	2.21	3	0	1	7	11	2.74	4.95
Nashville Warbler	0	0	0	0	0	0	0	1	0	1	2	0.55	1	14	0	0	15	3.74	4.29
Black-and-White Warbler	0	0	0	0	0	0	1	6	1	0	8	2.21	0	2	2	5	9	1.74	3.95
Veery	0	0	0	0	0	0	1	0	0	0	1	0.28	3	0	6	4	13	3.24	3.52
American Robin	0	0	0	0	0	0	1	0	3	0	4	1.10	5	0	4	0	9	2.24	3.34
Northern Parula	0	0	0	0	0	0	0	3	0	0	3	0.83	1	9	0	0	10	2.49	3.32
Common Flicker	0	0	0	0	0	0	0	0	0	1	1	0.28	2	2	5	0	9	2.24	2.52
Golden-Winged Warbler	0	0	0	0	0	0	1	1	0	3	5	1.38	1	0	1	2	4	1.00	2.38
Ruffed Grouse	0	0	0	0	0	0	1	3	0	2	6	1.66	0	0	0	1	1	0.25	1.91
Brown-Headed Cowbird	0	0	0	0	0	0	2	1	1	2	6	1.66	1	0	0	0	1	0.25	1.91
Rufous-Sided Towhee	0	0	0	0	0	0	0	0	0	6	6	1.66	0	0	0	0	0	0	1.66
Black-Throated Green Warbler	0	0	0	0	0	0	0	1	3	0	4	1.10	1	0	0	0	1	0.25	1.35
Scarlet Tanager	0	0	0	0	0	0	3	0	0	1	4	1.10	0	0	0	1	1	0.25	1.35
Mourning Warbler	0	0	0	0	0	0	0	0	0	4	4	1.10	0	0	1	0	1	0.25	1.35
Great Blue Heron	0	0	0	0	0	0	0	2	0	0	2	0.55	0	0	0	3	3	0.75	1.30
Yellow-Bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	5	1.25	1.25
Osprey	0	0	0	0	0	0	0	2	0	0	2	0.55	0	2	0	0	2	0.50	1.05
Chimney Swift	0	0	0	0	0	0	0	0	0	3	3	0.83	0	0	0	0	0	0	0.83
Song Sparrow	0	0	0	0	0	0	0	0	0	1	1	0.28	1	1	0	0	2	0.50	0.78
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	1	1	0.28	2	0	0	0	2	0.50	0.78
Pileated Woodpecker	0	0	0	0	0	0	0	1	1	0	2	0.55	0	0	0	0	0	0	0.55
Yellow-Bellied Flycatcher	0	0	0	0	0	0	0	2	0	0	2	0.55	0	0	0	0	0	0	0.55
Canada Goose	0	0	0	0	0	0	0	0	0	2	2	0.55	0	0	0	0	0	0	0.55
Common Yellowthroat	0	0	0	0	0	0	0	1	0	0	1	0.28	0	1	0	0	1	0.25	0.53
Killdeer	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0.50	0.50
Olive-Sided Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0.50	0.50
Cedar Waxwing	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	0.50	0.50
Mourning Dove	0	0	0	0	0	0	0	1	0	0	1	0.28	0	0	0	0	0	0	0.28
Red-Breasted Nuthatch	0	0	0	0	0	0	0	0	0	1	1	0.28	0	0	0	0	0	0	0.28
American Woodcock	0	0	0	0	0	0	0	0	0	1	1	0.28	0	0	0	0	0	0	0.28
Canada Warbler	0	0	0	0	0	0	0	0	1	0	1	0.28	0	0	0	0	0	0	0.28
Eastern Wood Pewee	0	0	0	0	0	0	0	1	0	0	1	0.28	0	0	0	0	0	0	0.28
Gray Catbird	0	0	0	0	0	0	0	0	1	0	1	0.28	0	0	0	0	0	0	0.28
Chipping Sparrow	0	0	0	0	0	0	0	1	0	0	1	0.28	0	0	0	0	0	0	0.28
Barn Swallow	0	0	0	0	0	0	0	0	1	0	1	0.28	0	0	0	0	0	0	0.28
Black-Billed Cuckoo	0	0	0	0	0	0	0	0	1	0	1	0.28	0	0	0	0	0	0	0.28
Green Heron	0	0	0	0	0	0	0	0	1	0	1	0.28	0	0	0	0	0	0	0.28
Common Grackle	0	0	0	0	0	0	0	0	1	0	1	0.28	0	0	0	0	0	0	0.28
Yellow-Rumped Warbler	0	0	0	0	0	0	0	0	0	1	1	0.28	0	0	0	0	0	0	0.28
Red-Headed Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.25	0.25
Brown Creeper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.25	0.25
Red-Winged Blackbird	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0.25	0.25
Tree Swallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.25	0.25
Total	3	2	3	0	8	100.00	85	104	80	93	362	100.02	94	17	91	99	01	99.51	299.53
Number of Species	2	2	3	0	4	-	16	26	21	24	47	-	23	20	19	20	38	-	55

Note: Figure in parentheses indicates number of transects surveyed times the number of survey days.

^aScientific names are listed in Appendix 2.6C.

^bImportance Value equals the total of Relative Abundance for winter, spring, and summer.

present in all seasons, and migrants are of least importance because they are only observed for a short time during the migration.

Results of the summer songbird surveys were used to identify the most frequently observed breeding songbirds. A summary of the five most abundant species in each habitat and the overall top five species is presented in Table 2.6-18.

Overall the most abundant songbirds in the site area were the red-eyed vireo, blue jay, ovenbird, rose-breasted grosbeak (Pheucticus ludovicianus), great crested flycatcher (Myiarchus crinitus), and white-throated sparrow (Zonotrichia albicollis).

A total of 38 species were encountered during summer surveys (Table 2.6-17). The number of species found in each habitat was approximately the same. Aspen-Birch was the highest with 23 species and Northern Hardwood the lowest with 19 species (Table 2.6-17). Swamp Conifer had the greatest number of individuals encountered (117) and Northern Hardwood the lowest (91).

The bird species/habitat associations found in the site area are similar to those reported by other investigators for Northern Hardwood forests. Temple et al. (1979) demonstrated that bird communities in mixed conifer/ hardwood forests are dominated by a relatively consistent group of species, the ovenbird, red-eyed vireo, black-throated green warbler (Dendroica virens), blackburnian warbler (Dendroica fusca) black-throated blue warbler (Dendroica caerulescens), veery (Atharus fuscescens), and white-throated sparrow. Three of these species, ovenbird, red-eyed vireo, and white-throated sparrow, were important components of songbird communities in the site area. Bird species diversity is generally higher in mixed conifer/hardwood forests than in hardwood forests (Temple et al., 1979).

TABLE 2.6-18

FIVE MOST ABUNDANT BREEDING BIRDS BY HABITAT TYPE

SPECIES	ASPEN/ BIRCH	NORTHERN HARDWOOD	SWAMP CONIFER	YOUNG ASPEN	OVERALL
Red-eyed vireo	1	2	-	2	1
Blue jay	4	5	5	1	2
Ovenbird	2	1	-	-	2
Rose-breasted grosbeak	3	3	-	4	3
Great crested flycatcher	-	-	2	3	4
White-throated sparrow	-	-	1	-	5
Nashville warbler	-	-	3	-	-
Chestnut-sided warbler	-	-	-	4	-
Northern parula	-	-	4	-	-
Veery	-	4	-	-	-
Wood thrush	5	-	-	-	-
Least flycatcher	5	-	-	-	-
American robin	5	-	-	-	-
Common flicker	-	5	-	-	-
Indigo bunting	-	-	-	5	-

NOTE: Numbers represent a ranking of the most frequently observed species during the summer surveys (Table 2.6-17). Scientific names are listed in Appendix 2.6C.

Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982) also conducted bird surveys in the site area in May and June 1981. Six wetland types were sampled: aquatic bed, bog, coniferous swamp, deciduous swamp, shrub swamp and marsh. The total number of species observed was 49 in May and 55 in June. Five species were observed by Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. that were not observed in the site area during this study: Cooper's hawk, solitary sandpiper, yellow-billed cuckoo (Coccyzus americanus), chimney swift (Chaetura pelagica) and purple finch (Carpodacus purpureus). Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc.'s studies indicated that in each of the six wetland types, values for species diversity, species richness and bird density were similar.

Songbird Densities - Sampling was conducted along two transects in two different portions of the site area during the spring and summer of 1978 to determine densities for the more abundant songbird species. Surveys were conducted according to the method described by Emlen (1971, 1977). The locations of these two transects are presented on Figure 2.6-4. The habitat types along the two transects were different. The western transect was approximately 41 percent Aspen-Birch, 30 percent Northern Hardwood, 17 percent Swamp Conifer, 7 percent young clearcut, and 5 percent marsh. The eastern transect was approximately 72 percent Northern Hardwood, 13 percent old field, 7 percent Swamp Conifer, and 6 percent shrub swamp. The habitats along the western transect were generally more diverse in vegetative species composition and stratification (layers) than those along the eastern transect. A total of 63 species were observed on these surveys.

A summary of the most abundant songbirds from the Emlen surveys is presented in Table 2.6-19. Many of these species were also common on the habitat surveys (Table 2.6-18).

The diversity and total density of the two songbird communities sampled were different reflecting the differences in habitat diversity (Table 2.6-20). The density per 40.5 ha (100 acres) (378 ± 98 [95 percent confidence interval]) on the west transect was higher than on the east transect (193 ± 62) during the summer. The same trend was apparent for the spring survey period (Table 2.6-20). Because many of the species were observed so infrequently, it was not practical to estimate densities. The lowest mean densities estimated during the breeding season (summer) were for the blue jay on the eastern transect and the red-winged blackbird and eastern wood peewee (Contopus virens) on the western transect (Table 2.6-20). The highest mean density estimated during the breeding season was for the ovenbird on the western transect at 66 ± 16 .

Densities for these two transects in the site area were similar to those reported by others in northern forests. Back (1979) reported an average density of 408 individuals per 40.5 ha (100 acres). In two stands sampled by Mossman in Wisconsin, densities in mixed conifer/hardwood forests were 414 and 620 (Temple et al., 1979).

2.6.4.3 Amphibians and Reptiles

Fifty-nine species of amphibians and reptiles are known to be indigenous in Wisconsin (Vogt, 1981). Approximately 29 of these could be expected to occur in the environmental study area, including 7 salamanders,

TABLE 2.6-19

FIVE MOST ABUNDANT BIRDS IN SPRING AND SUMMER
FROM EMLN SURVEYS

SPECIES	SPRING		SUMMER		OVERALL
	WEST TRANSECT	EAST TRANSECT	WEST TRANSECT	EAST TRANSECT	
Ovenbird	1	2	2	1	1
Red-eyed vireo	3	1	1	2	2
Chestnut-sided warbler	2	-	3	-	3
Rose-breasted grosbeak	5	3	-	3	4
Brown-headed cowbird	-	5	5	-	5
Blue jay	-	-	-	4	6
Black-throated green warbler	-	4	-	-	7
Black-capped chickadee	4	-	4	-	8
Wood thrush	-	-	-	-	9
Least flycatcher	-	-	-	-	10
Common crow	-	-	-	5	-

NOTE: Numbers represent a ranking of the most frequently observed species (Table 2.6-20). Scientific names are listed in Appendix 2.6C.

TABLE 2.6-20

SONGBIRD DENSITIES IN THE SITE AREA

SPECIES ^a	SPRING 1978				SUMMER 1978				OVERALL RELATIVE ABUNDANCE
	WEST TRANSECT ^b		EAST TRANSECT ^b		WEST TRANSECT ^b		EAST TRANSECT ^b		
	MEAN DENSITY ^c	RELATIVE ABUNDANCE	MEAN DENSITY ^c	RELATIVE ABUNDANCE	MEAN DENSITY ^c	RELATIVE ABUNDANCE	MEAN DENSITY ^c	RELATIVE ABUNDANCE	
Ovenbird	51 ± 47	14.99	57 ± 23	19.03	66 ± 16	17.35	60 ± 14	23.86	75.23
Red-Eyed Vireo	46 ± 26	9.81	71 ± 38	19.78	65 ± 74 ^e	17.65	54 ± 10	19.80	67.04
Chestnut-Sided Warbler	71 ± 58	14.44	0	0	49 ± 6	11.18	0	0	25.62
Rose-Breasted Grosbeak	20 ± 32 ^e	4.63	14 ± 23	7.46	12 ± 10	2.64	10 ± 3	9.14	23.87
Brown-Headed Cowbird	11 ± 6	3.54	20 ± 30 ^e	4.48	24 ± 20	5.29	5 ± 12 ^e	4.06	17.37
Blue Jay	7 ± 14 ^e	2.45	6 ± 5	4.10	8 ± 13 ^e	2.35	4 ± 8 ^e	7.61	16.51
Black-Throated Green Warbler	7 ± 17 ^e	1.63	24 ± 6	6.72	14 ± 17 ^e	3.53	6 ± 7 ^e	4.06	15.94
Black-Capped Chickadee	11 ± 6	4.90	d	1.87	24 ± 25 ^e	5.88	8 ± 23 ^e	3.05	15.70
Wood Thrush	10 ± 15 ^e	3.54	7 ± 3	3.36	16 ± 22 ^e	4.41	d	2.03	13.34
Least Flycatcher	10 ± 6	2.18	28 ± 60 ^e	4.10	16 ± 17 ^e	4.11	6 ± 17 ^e	2.03	12.42
Common Crow	1 ± 3 ^e	2.18	d	2.61	d	2.35	d	5.08	12.22
Veery	d	0.27	d	1.49	16 ± 6	4.41	11 ± 15 ^e	5.58	11.75
Golden-Winged Warbler	20 ± 37 ^e	3.81	d	0.75	12 ± 10	2.64	d	1.02	8.22
Great Crested Flycatcher	d	0.27	11 ± 6	2.99	17 ± 47 ^e	2.35	6 ± 26 ^e	2.03	7.64
White-Throated Sparrow	d	0.82	20 ± 11	4.10	0	0	d	1.52	6.44
Common Yellowthroat	14 ± 6	2.99	0	0	7 ± 3	2.35	0	0	5.34
Nashville Warbler	11 ± 27 ^e	1.63	d	0.37	d	0.29	10 ± 10	3.05	5.34
Black-and-White Warbler	4 ± 20 ^e	0.82	20 ± 32 ^e	2.99	8 ± 11 ^e	1.47	0	0	5.28
Red-Winged Blackbird	3 ± 6 ^e	2.72	d	0.75	4 ± 10 ^e	1.47	0	0	4.94
Connecticut Warbler	12 ± 33 ^e	2.18	d	1.12	0	0	10 ± 0	1.52	4.82
Eastern Wood Peewee	2 ± 5 ^e	0.82	6 ± 17 ^e	1.12	4 ± 7 ^e	2.06	0	0	4.00
Tennessee Warbler	16 ± 25 ^e	3.54	0	0	0	0	0	0	3.54
Cedar Waxwing	0	0	d	1.12	d	1.47	0	0	2.59
American Robin	6 ± 15 ^e	1.63	0	0	d	0.29	d	0.51	2.43
Song Sparrow	d	0.82	0	0	d	0.29	d	1.02	2.13
Ruffed Grouse	d	1.36	d	0.75	0	0	0	0	2.11
Black-Throated Blue Warbler	6 ± 17 ^e	1.09	0	0	6 ± 0	0.88	0	0	1.97
Yellow-Rumped Warbler	9 ± 20 ^e	1.91	0	0	0	0	0	0	1.91
Evening Grosbeak	d	1.36	d	0.37	0	0	0	0	1.73
Gray Catbird	d	0.54	d	1.12	0	0	0	0	1.66

^aScientific names are listed in Appendix 2.6C.

^bSee Figure 2.6-4 for locations.

^cDensity per 40.5 ha (100 acres) ± 95 percent confidence limits.

^dToo few birds observed to calculate densities.

^eLower confidence limits of these estimated densities cannot be less than zero.

TABLE 2.6-20 (continued)

SPECIES ^a	SPRING 1978				SUMMER 1978				OVERALL RELATIVE ABUNDANCE
	WEST TRANSECT ^b		EAST TRANSECT ^b		WEST TRANSECT ^b		EAST TRANSECT ^b		
	MEAN DENSITY ^c	RELATIVE ABUNDANCE	MEAN DENSITY ^c	RELATIVE ABUNDANCE	MEAN DENSITY ^c	RELATIVE ABUNDANCE	MEAN DENSITY ^c	RELATIVE ABUNDANCE	
Ruby-Crowned Kinglet	d	0.27	0	0	0	0	0	0	0.27
House Wren	d	0.27	0	0	0	0	0	0	0.27
Sora Rail	d	0.27	0	0	0	0	0	0	0.27
Total	355 + 76	99.89	288 + 145	100.00	378 + 98	99.94	193 + 62	100.03	399.86
Number of Species	48	-	37	-	33	-	23	-	-
Total Observed	-	367	-	267	-	340	-	197	1,171

8 frogs, 1 toad, 5 turtles, and 8 snakes. Fourteen of these species expected were observed in the site area (Appendix 2.6-D). Two of the expected species are considered endangered or threatened and are discussed in subsection 2.6.5.

During spring, amphibians concentrate around ponds and water bodies to breed. Blue spotted salamanders (Ambystoma laterale) and spotted salamanders (Ambystoma maculatum) were frequently observed around most water bodies during spring, but migrated to the uplands during the summer where they were seldom found. American toads (Bufo americanus), spring peepers (Hyla crucifer), and wood frogs (Rana sylvatica) were abundant around water bodies during the spring. During the summer, American toads and wood frogs were frequently found in upland situations as well as near water bodies. The gray treefrog (Hyla sp.), chorus frog (Pseudacris triserata), green frog (Rana clamitans), mink frog (Rana septentrionalis), and leopard frog (Rana pipiens) were less frequently observed or heard. The gray treefrog reported is most likely the eastern gray treefrog (Hyla versicolor), because it is more widely distributed throughout northeastern Wisconsin and Michigan than the similar southern gray treefrog (Hyla chrysoscelis) that does not penetrate the densely forested regions of north central Wisconsin (Vogt, 1981). No gray treefrogs were collected, so positive identification is not possible. Eastern gray treefrogs have been observed in Oconto, Oneida, and Marinette counties (Vogt, 1981), but observations made during this study may be the first record of the species in Forest County. The chorus frogs heard calling during evening surveys were somewhat unexpected since chorus frogs have not been reported in northeastern Wisconsin (Vogt, 1981). Chorus frogs were also reported in the site area by Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982).

Four species of reptiles were observed in the environmental study area. Painted turtles (Chrysemys picta) were common in water bodies. Several garter snakes (Thamnophis sirtalis) and a single fox snake (Elaphe vulpina) were also observed, both of which are on the DNR "watch" list. The DNR has also observed snapping turtles (Chelydra serpentina) in the environmental study area (Ramharter, 1981).

Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982) also conducted surveys for amphibians and reptiles in the site area. The most commonly observed species during their surveys were the American toad, spring peeper, chorus frog and wood frog. The leopard frog was the only species reported in the site area by Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. that was not observed in the site area during the 1977-78 study.

2.6.5 Threatened and Endangered Species

Endangered species are those species of plants or animals that are in danger of extinction throughout all or a significant portion of their range. Populations of these species have usually been severely reduced in distribution and density from historical levels. Threatened species are those that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

A variety of species listed as threatened or endangered either by the DNR or the federal government might occur in the environmental study area. Throughout the course of the baseline studies special consideration was directed towards threatened and endangered species because of the "importance" of these species.

2.6.5.1 Plants

The northern wild monkshood (Aconitum noveboracense) is the only federally designated threatened or endangered plant species that occurs in Wisconsin (U.S. Department of Interior, 1982). This plant is found only in the driftless area of southwestern Wisconsin (Wisconsin DNR, 1982a).

There are 87 plant species listed as threatened or endangered by the Wisconsin DNR (1982b) (Appendix 2.6-E). Two of the state endangered plant species and five of the threatened plant species have ranges and habitat preferences that include the environmental study area (Wisconsin DNR, 1982a). The two endangered species are small yellow water crowfoot (Ranunculus gmelinii) and foamflower (Tiarella cordifolia). The five threatened species are ram's head lady's-slipper (Cypripedium arietinum), tubercled orchid (Habenaria flava), small round-leaved orchis (Orchis rotundifolia), New England violet (Viola novae-angliae) and algal-leaved pondweed (Potamogeton confervoides). The only endangered or threatened species observed was the algal-leaved pondweed. This species was observed during the aquatic surveys and is discussed in section 2.5, Aquatic Ecology. There is only a slight possibility that the six other species would occur in the environmental study area. A short description of these six species is given below.

Small Yellow Water Crowfoot - This aquatic plant had not been seen in Wisconsin since 1938, then in 1979 it was recorded in Douglas County (Wisconsin DNR, 1982a). Historical records show that this flower occurred in most counties along Wisconsin's northern border (Wisconsin DNR, 1982a). There is an abundance of aquatic habitat present in the environmental study area and a remote chance of its occurrence.

Foamflower - Foamflower grows on the shady floor of rich, mixed hardwood forests in eastern North America, south to Tennessee and North Carolina. Three colonies are known to occur in northeastern Wisconsin (Wisconsin DNR, 1982a). Although the likelihood of occurrence in the environmental study area is slight, there is suitable habitat present.

Ram's-Head Lady's-Slipper - This plant is very rare in Wisconsin, found only in a few locations in the eastern and northeastern portions of the state. This species is usually found in cold white cedar swamps, or beach sand over limestone, partly shaded by conifer forest (Wisconsin DNR, 1982a). White cedar swamps are present in the environmental study area.

Tuberclad Orchid - Only three populations of this plant are known in Wisconsin, but records include northeastern Wisconsin. It prefers moist soils of partly shaded open meadows and swampy woodlands (Wisconsin DNR, 1982a). Suitable habitat is present in the environmental study area.

Small Round-Leaved Orchis - This plant is a boreal species, growing in the shade of black spruce, tamarack, and white cedar on cold and marly bog soils. Only three small populations are known in Wisconsin; one is located in a Forest County bog. Based on historic records, it may grow elsewhere in northeastern bogs (Wisconsin DNR, 1982a). Black spruce, tamarack, and white cedar swamps are common in the environmental study area.

New England Violet - This plant grows on open, rocky shores along northern rivers and in cold, boggy soils and gravels in northeastern Wisconsin (Wisconsin DNR, 1982a). This habitat is present in the environmental study area.

2.6.5.2 Wildlife

This subsection presents background information on the threatened and endangered wildlife that occur in northeastern Wisconsin and are likely to occur in the environmental study area based on the presence of favorable habitat (Table 2.6-21). Those species designated by the DNR as "watch" status have been discussed in previous subsections.

Mammals

Three mammal species found in Wisconsin are listed as endangered either by the state or the federal government (Table 2.6-21). All three have ranges and habitat preferences that make their occurrence in the environmental study area reasonably possible. No mammals are listed as threatened by the state or federal government in Wisconsin.

Gray Wolf - The gray wolf occurred throughout Wisconsin in nearly every habitat during pre-settlement times (Jackson, 1961). Widespread habitat loss and hunting/trapping pressure reduced the state population to the point of possible extirpation around 1960 (Thiel, 1982). Breeding populations became reestablished by 1975, and there are now approximately four to five packs in northern Wisconsin totaling about 25 individuals. These packs are located in Douglas County, Lincoln County, and on the Oneida/Price County line (Thiel, 1982). Wandering individuals have also been observed in other northern counties.

There have been no recent sightings of wolves in the environmental study area. The closest reporting of wolves has been two individuals

TABLE 2.6-21

ENDANGERED AND THREATENED TERRESTRIAL WILDLIFE OF WISCONSIN^a

	FEDERAL STATUS		
	ENDANGERED	THREATENED	WATCH (ADVISORY)
BIRDS	Peregrine Falcon	Bald Eagle ^b	N/A
MAMMALS	Gray Wolf ^c		N/A
	STATE STATUS		
	ENDANGERED	THREATENED	WATCH (ADVISORY)
AMPHIBIANS	Blanchard's Cricket Frog	Tremblay's Salamander ^c	Bullfrog ^c Pickereel Frog Burns' Leopard Frog Leopard Frog ^b Tiger Salamander Spotted Salamander ^b
REPTILES	Ornate Box Turtle Slender Glass Lizard Queen Snake Massasauga Western Ribbon Snake Northern Ribbon Snake	Blanding's Turtle Wood Turtle ^c	Ring-Necked Snake ^c Black Rat Snake Eastern Hognose Snake Butler's Garter Snake ^c Milk Snake Smooth Green Snake ^c Bull Snake Fox Snake ^b Garter Snake ^b Red-Bellied Snake ^c
BIRDS	Bald Eagle ^b Osprey ^b Peregrine Falcon Piping Plover Forster's Tern Common Tern Barn Owl Loggerhead Shrike	Red-Necked Grebe Double-Crested Cormorant Cooper's Hawk ^b Red-Shouldered Hawk ^b Greater Prairie Chicken Great Egret	Common Loon ^b Great Blue Heron ^b Black-Crowned Night Heron Black Duck ^b Red-Breasted Merganser ^c Merlin ^b Marsh Hawk ^b Spruce Grouse ^b Sharp-Tailed Grouse Yellow Rail ^c Upland Sandpiper ^b Caspian Tern Black Tern ^b Common Flicker ^b Bewick's Wren Eastern Bluebird ^b Dickcissel Grasshopper Sparrow ^b Vesper Sparrow ^b Field Sparrow ^b
MAMMALS	Marten ^c Lynx ^c Gray Wolf ^c		Mountain Lion Bobcat ^b Moose Fisher ^c White-Tailed Jack Rabbit Gray Fox Woodland Vole Least Shrew Thompson's Pygmy Shrew

Sources: U.S. Department of the Interior, 1982; Wisconsin Department of Natural Resources, 1979, 1982b; Jurewicz, 1983a.

^aScientific names are listed in Appendices 2.6B, 2.6C, and 2.6D.

^bObserved in the environmental study area.

^cCould reasonably occur in the environmental study area.

N/A = Not applicable.

approximately 40 km (25 miles) northeast of Crandon, near Tipler, in the winter of 1981-1982 (Thiel, 1982).

Wolves are wide-ranging animals, small packs may have home ranges of 150 to 250 square miles (Jackson, 1961). Like most of Forest County, the environmental study area contains forested habitat suitable for timber wolves (Thiel, 1982).

Marten - Originally, the marten probably occurred in most wooded areas of Wisconsin, particularly where there were dense conifer forests (Jackson, 1961). Trapping and habitat destruction from the extensive logging period of the late 1800's steadily reduced the state population to the point of extirpation by 1925.

The DNR is presently attempting to reestablish martens in Wisconsin through a restocking program. In 1975, 124 martens were released in the Nicolet National Forest in northern Forest County; 37 more were released in 1980-1981.

Martens recently released are using a variety of existing habitats of mixed hardwood-conifer stands and are expected to expand their range beyond the release area (Wisconsin DNR, 1979). No martens were observed during this study.

Lynx - Historically, the lynx occurred throughout Wisconsin whenever mature forest and swamp brushland habitat was predominant (Jackson, 1961). However, the lynx has always been uncommon or rare in Wisconsin. Habitat changes that resulted from lumbering in the late 1800's and early 1900's, along with hunting/trapping pressure and possibly competition with bobcats,

have significantly reduced lynx populations in Wisconsin (Wisconsin DNR, 1979).

Since 1973, nine positive records of the lynx are known for Wisconsin (Jurewicz, 1983b). All of these are from the northern two tiers of counties. Since 1977, the Wisconsin DNR has summarized the number of lynx observations reported on bobcat hunter/trapper questionnaires. An average of 10 lynx have been reported every year, with a total of only six observations having been recorded in northeastern Wisconsin. There have been no recent sightings of lynx in the environmental study area, and the closest reported lynx sighting is at least 19.3 km (12 miles) west of the environmental study area in Oneida County (Jurewicz, 1983b).

The dense forests that characterize the environmental study area constitute suitable habitat for the lynx.

Birds

There are two federally designated endangered or threatened birds that occur in Wisconsin, the peregrine falcon (Falco peregrinus) and bald eagle (Table 2.6-21). The bald eagle is known to occur in the environmental study area. The peregrine falcon is a rare migrant in the region (Vanderschaegen, 1981) and would not be expected to regularly occur in the environmental study area.

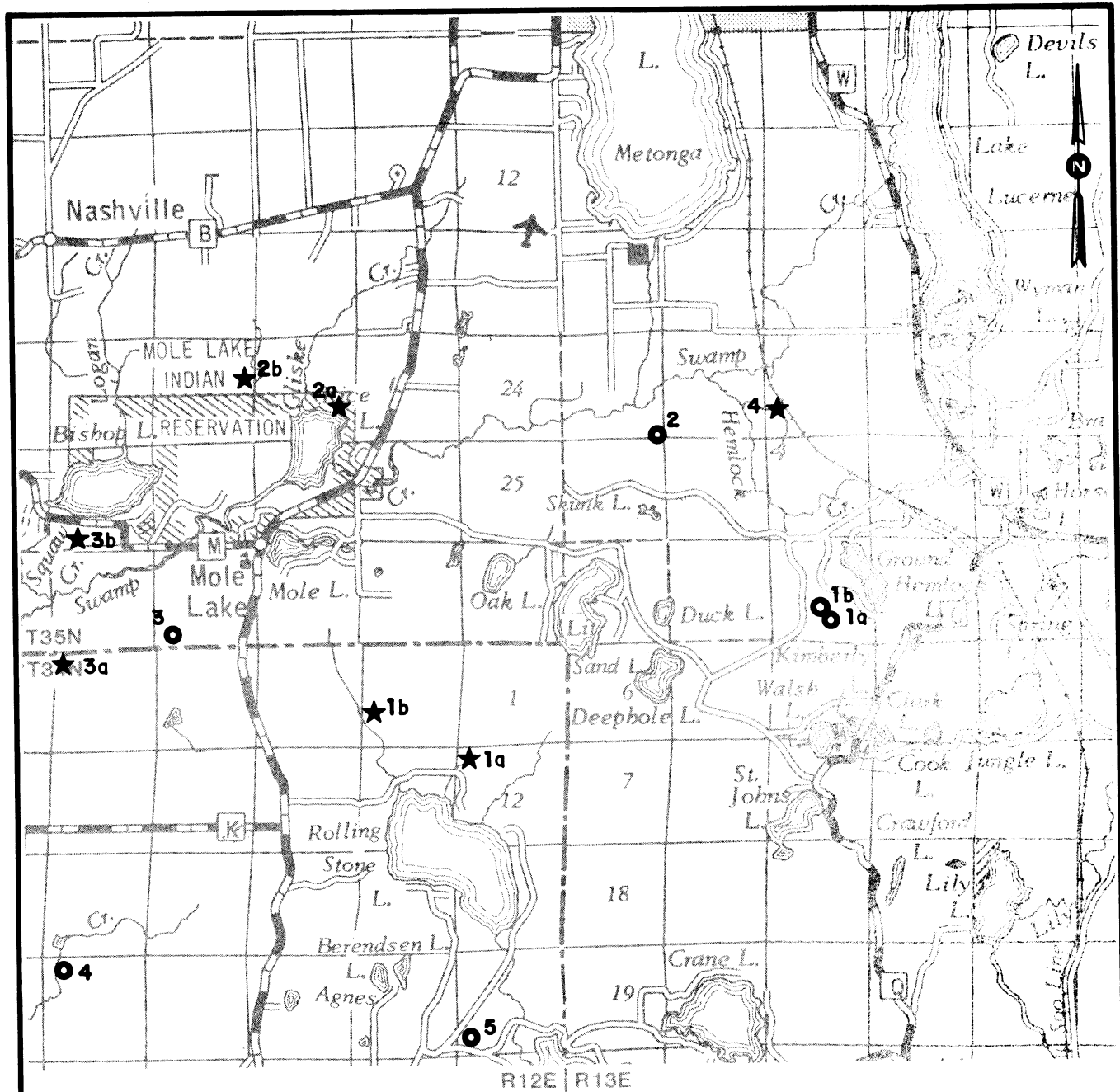
In addition to the federally designated peregrine falcon and bald eagle, there are 12 other birds listed as endangered or threatened by the DNR (Table 2.6-21). Three of these bird species (osprey, Cooper's hawk and red-shouldered hawk) have ranges and habitat preferences that make their

occurrence in the environmental study area possible. All three have been observed in the environmental study area.

Bald Eagle - Historically, bald eagles nested throughout Wisconsin. After a drastic decline in the 1950's and 1960's from habitat destruction, pesticides, and human disturbance, the species has made a comeback in Wisconsin. Nesting is now generally restricted to the northern one-half of the state. Bald eagle productivity has remained relatively stable since 1978, and the number of occupied territories has increased from 140 in 1978 to 207 in 1982 (Sindelar, 1982).

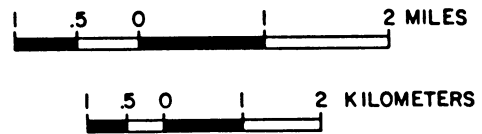
There are four known bald eagle territories in the environmental study area (Figure 2.6-11), two of which were active in 1982 (Table 2.6-22). Of the four bald eagle territories in the environmental study area, three appear to contain alternate nest sites. The Rolling Stone Lake territory has been the most productive and is approximately 4.0 km (2.5 miles) southwest from the center of the potential mining activities (Figure 2.6-11). The mean number of young produced per active territory in the environmental study area during the period 1974-1982 was 1.2.

Sindelar (1978) has indicated that nest sites are extremely important resources. Often a nest site will not be used for several years and appear to be abandoned when it again becomes active. When this happens, it is probably a different pair from those using the site prior to abandonment. For example, the Rice Lake nest site, which was inactive for a period during the early 1970's, was reused again in 1977 through 1981 (Table 2.6-22). Consequently, it is important that both inactive and alternate nest sites be protected and development precluded according to DNR guidelines for activities



KEY:

- ★ BALD EAGLE NESTS
 1. ROLLING STONE LAKE (2 ALTERNATE NESTS)
 2. RICE LAKE (2 ALTERNATE NESTS)
 3. MOLE LAKE AND BISHOP LAKE (2 ALTERNATE NESTS)
 4. SWAMP CREEK
- OSPREY NESTS
 1. GROUND HEMLOCK LAKE (2 ALTERNATE NESTS)
 2. SWAMP CREEK
 3. MOLE LAKE
 4. SPIDER CREEK FLOWAGE
 5. PICKEREL CREEK



EXXON MINERALS COMPANY
GRANDON PROJECT

BALD EAGLE AND OSPREY NESTS
IN THE ENVIRONMENTAL STUDY AREA

SOURCE: ECKSTEIN, 1978, 1980 AND 1982.

BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION, JANUARY, 1978. FOREST CO. AND LANGLADE CO. HIGHWAY MAPS.

DAMES & MOORE FIGURE 2.6-11

TABLE 2.6-22

BALD EAGLE AND OSPREY NEST SUCCESS^a IN THE ENVIRONMENTAL STUDY AREA

BREEDING TERRITORY NAME ^b	NUMBER OF YOUNG PRODUCED ^c								
	1974	1975	1976	1977	1978	1979	1980	1981	1982
<u>Bald Eagles</u>									
Rolling Stone Lake (Alternate A)	1	2	1	1	2	2	2	S	I
Rolling Stone Lake (Alternate B)	-	-	-	-	-	-	-	-	N-2
Rice Lake (Alternate A)	I	I	I	1	1	0	2	0	I
Rice Lake (Alternate B)	-	-	-	-	-	-	-	-	N-I
Mole and Bishop Lakes (Alternate A)	-	-	-	N-1	0	0	NG	-	-
Mole and Bishop Lakes (Alternate B)	-	-	-	-	-	-	N-0	2	2
Swamp Creek	-	-	-	-	-	N-I	I	I	I
Total	1	2	1	3	3	2	4	2	4
Production ^d	1.0	2.0	1.0	1.0	1.0	0.6	1.3	0.6	2.0
<u>Ospreys</u>									
Ground Hemlock Lake (Alternate A)	I	2	1	0	1	0	1	0	0
Ground Hemlock Lake (Alternate B)	-	-	N-I	I	I	I	I	I	I
Swamp Creek	-	-	N-2	2	2	0	2	0	0
Mole Lake	-	-	-	N-0	0	1	0	2	2
Spider Creek Flowage	-	2	3	2	0	1	0	1	3
Pickrel Creek	-	-	-	N-0	0	2	1	1	3
Total	0	4	6	4	3	4	4	4	8
Production ^d	0.0	2.0	2.0	0.8	0.6	0.8	0.8	0.8	1.6

^aSources: Eckstein, 1978, 1980, 1982; Sindelar, 1978.

^bLocations shown on Figure 2.6-11.

^cKey: I = Inactive
 N = First year discovered
 0 = Active but failed
 - = No data
 NG = Nest gone
 S = Some activity.

^dMean number of young per active territory.

near bald eagle and osprey nest sites. Habitat disturbance or destruction while a nest site is inactive will often preclude the site from ever being used again.

The nearest bald eagle nests to any proposed mine related facility are the Swamp Creek nest located approximately 760 m (2,492 feet) south of the proposed south turnout for the railroad spur and the Bishop Lake nest located 805 m (2,640 feet) north of the proposed water discharge structure.

Osprey - Historically, ospreys probably nested throughout Wisconsin. As a result of habitat destruction, pesticides, and human disturbance, nesting is presently restricted to the northern half of the state and scattered locations in central Wisconsin. Osprey productivity has remained relatively stable since 1978 at approximately 1.1 young per active territory (Wisconsin DNR, 1983). The number of active breeding territories in Wisconsin has increased steadily from 125 in 1978 to 186 or more in 1982 (Wisconsin DNR, 1983). Estimates of young produced per active nest for the late 1960's varied between 0.6 and 0.8 (Sindelar, 1971). It has been estimated that Wisconsin osprey populations were declining at a rate of 12 to 13 percent during this period (Henny and Ogden, 1970). Henny and Wight (1969) indicated that an annual production of approximately 1.2 to 1.3 young per breeding age female is required to maintain a stable population.

The environmental study area contained five active osprey territories in 1982 (Figure 2.6-11). One of these territories, Ground Hemlock Lake, has two alternate nest sites. Of these five territories, three produced a total of eight young (Table 2.6-22). Annual osprey production in the environmental study area has varied from a high of 2.0 young per active

territory in 1975 to 0.6 young per active territory in 1978 (Table 2.6-22). The mean number of young produced per active territory in the environmental study area during the period 1974-1982 was 1.0 (Table 2.6-22). Osprey production in the DNR North Central District for the four summers 1979-1982 has been stable and similar to the previous four summers 1975-1978 (Eckstein, 1982). Annual osprey production per active territory in the North Central District from 1975 through 1981 was 1.3, 1.3, 1.2, 0.9, 1.3, 1.1 and 1.0, respectively (Eckstein, 1978 and 1982). This is an average production of 1.2 young per active territory for the 1975-1981 period.

The nearest osprey nest to any proposed mine related facility is the Mole Lake nest located within 402 m (1,320 feet) of the proposed water discharge pipeline.

Cooper's Hawk - The Cooper's hawk once occurred throughout Wisconsin but is now found only in scattered locations as a result of pesticide poisoning, persecution and habitat loss (Wisconsin DNR, 1979). Cooper's hawks prefer mixed deciduous-coniferous woods with frequent openings and wooded brushlands near farms.

One Cooper's hawk was observed building a nest in the environmental study area in April 1981, approximately 1 km (1.0 mile) northwest of Jungle Lake. The nest tree was destroyed a short time thereafter during land clearing for county highway improvement. Cooper's hawks were also observed by Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982) in the site area in May 1981.

Red-Shouldered Hawk - The red-shouldered was once a common Wisconsin hawk. It is now found primarily in undisturbed woodlands of the Mississippi and lower Wisconsin rivers, northern Kettle Moraine State Forest, and northeastern Wisconsin. Habitat destruction, particularly indiscriminate logging, is the main threat to the red-shouldered hawk (Wisconsin DNR, 1979).

The preferred habitat for red-shouldered hawks is a mixture of mesic conifers and hardwoods near swamps, rivers and marshes (Erdman, 1978). This type of habitat is common in the environmental study area. One red-shouldered hawk was heard calling during the summer breeding season of 1981 in the environmental study area, approximately 1.6 km (1.0 mile) south of Rolling Stone Lake. There have been a few nest records of red-shouldered hawks immediately east of the environmental study area (Erdman, 1982).

Amphibians and Reptiles

No amphibians or reptiles that are considered endangered or threatened by the U.S. Fish and Wildlife Service occur in Wisconsin (U.S. Department of the Interior, 1982). There are 10 species of amphibians and reptiles that are listed by the DNR as endangered or threatened (Table 2.6-21). Of these 10 species, two have ranges and habitat preferences that make their occurrence in the environmental study area possible; these include the wood turtle (Clemmys insculpta) and Tremblay's salamander (Ambystoma tremblayi).

Wood Turtle - The wood turtle has been found throughout Wisconsin in its preferred habitat of forested areas along fast-moving streams. Habitat destruction and widespread collection of this turtle by biological supply houses has reduced their populations to the point that they are considered

endangered by the DNR (Vogt, 1981). No wood turtles were observed during the field studies but they have been reported in Forest County (Vogt, 1981). Suitable habitat for this species is present in the site area and environmental study area.

Tremblay's Salamander - Tremblay's salamander is very similar to the blue-spotted salamander. It is only found in association with the blue-spotted salamander and the population consists exclusively of triploid females of hybrid origin. Adult individuals can be identified with reasonable certainty through measurements, but the only positive method for separating this salamander from the blue-spotted salamander is by chromosome number and red blood cell size. Both Tremblay's salamander and the blue-spotted salamander prefer mesic forests that contain woodland ponds for breeding (Vogt, 1981). This habitat is common throughout the environmental study area. There are no records of Tremblay's salamander in Forest County, although this species has been recorded in eastern Oneida County (Vogt, 1981).

2.6.6 Sensitive Receptors

2.6.6.1 Agricultural Crop and Native Plant Species

The vegetation of the site area and environmental study area, as well as the surrounding regional study area, consists primarily of Northern Hardwood, Aspen-Birch, and Swamp Conifer forest (see subsection 2.6.3 for further description). Less than 5 percent of the environmental study area is in agricultural use, and local crops include oats, barley, wheat, alfalfa, hay, and potatoes (see subsection 2.9.2, Land Uses).

There are no known experimental farms, State Scientific Areas, vegetation research plots or extensive forest plantations in the environmental study area. The only uncommon or unusual plant communities in the area are the wild rice beds in Rice Lake and a bur oak swamp east-northeast of the ore body. An aquatic plant designated by the state as threatened was found in Duck Lake.

Although several studies have been done on the effects of air pollutants on forest ecosystems, it would be difficult to evaluate the sensitivity of the extensive forest land in the regional study area to air emissions for several reasons: (1) forest stands differ greatly in species composition, age, stability and capacity to recover from disturbance; (2) individual plant responses to a given concentration of pollutant are appreciably modified by a variety of factors such as duration of exposure, age of plants, age of leaf, and prevailing environmental conditions; and (3) the sensitivity of different species to different pollutants varies considerably, even diurnally and seasonally (Kozlowski, 1979, 1980).

One biological advantage of forests in the environmental study area is that there are several different forest types and mixed stands containing a variety of dominant trees. Mixed forest stands generally have a greater capacity to recover from disturbance since they are more likely to contain species that are resistant to air pollution of insect and disease epidemics. Listed below are common trees in the environmental study area and their relative susceptibility to sulfur dioxide and ozone, the two compounds that are thought to cause the most injury to plants (Kozlowski, 1979):

Tree	Relative Susceptibility to	
	Sulfur Dioxide	Ozone
Paper Birch	Sensitive	Not Given
Quaking Aspen	Sensitive	Sensitive
Large-Toothed Aspen	Sensitive	Not Given
Eastern Hemlock	Not Given	Tolerant
White Pine	Sensitive	Intermediate
Red Pine	Sensitive	Tolerant
White Cedar	Tolerant	Tolerant
Sugar Maple	Tolerant	Tolerant
Red Maple	Intermediate	Tolerant
Balsam Fir	Intermediate	Tolerant
Basswood	Intermediate	Tolerant

2.6.6.2 Wildlife

The bald eagle, osprey, and common loon are three "important" wildlife species of the environmental study area whose reproductive success is particularly susceptible to construction activity and human disturbance. Several bald eagle and osprey nests are present in the environmental study area (Figure 2.6-11), and a pair of common loons nested on Deep Hole Lake in 1978.

Freedom from human disturbance or intervention is one of the most variable factors involved in bald eagle and osprey nesting (Snow, 1973). The effects of human disturbance on nesting bald eagles are still being argued. Mathisen (1968) reported that human activity was not seriously affecting bald eagles. Nests in very isolated parts of Chippewa National Forest were occupied 78 percent of the time and 54 percent were successful. Nests in areas where human beings and associated activities were frequent were occupied 79 percent of the time and successful 48 percent of the time. Mathisen indicated that the timing of human disturbance in relation to the eagle's breeding chronology was important. The potential for impact by human disturbance is greatest during egg-laying, incubation, and when the eaglets are newly hatched. In Chippewa National Forest, human activity began to increase in mid-May, when the adults would have very small eaglets. Mid-June through the summer is when human activity would approach maximum levels, and by this time the young are half grown, and the potential impact of human disturbance is greatly reduced.

Human disturbance does not appear to be as important a consideration for ospreys as for bald eagles. Ospreys have often been known to nest close to human activity. Bald eagle and osprey nest sites may be vacant for a number of years and then be reused often by a different pair. It is important that inactive as well as active nest sites be monitored and development precluded from the immediate area surrounding the nest site. Habitat disturbance or destruction while a site is inactive may prevent the site from ever being used again. The sensitivity of bald eagles and ospreys to disturbance has prompted the Wisconsin DNR (1976a) and the U.S. Forest

Service to adopt policies governing human activities during the breeding season on lands they manage near bald eagle and osprey nests.

The common loon has suffered severe population declines in Wisconsin, and recent studies indicate that increasing human disturbance from shoreline development and vacationers could lead to further decline (Wisconsin DNR, 1979).

2.6.6.3 Aquatic Organisms

The aquatic resources of the site and environmental study area are typical of north central Wisconsin. Based on baseline data collection activities, sensitive receptors in the aquatic environment appear to be the algal-leaved pond weed (a threatened plant species found once along the shore of Duck Lake), trout streams, and wild rice.

The algal-leaved pond weed, a rooted macrophyte species, was found floating at the surface of Duck Lake on only one occasion (see EIR subsection 2.5.3.2, p. 2.5-91). A subsequent investigation of Duck, Deep Hole, and Skunk lakes located no other specimens of this plant. Therefore, the distribution of this species in terms of location and abundance, or the extent of potential impact from any Project activities, is uncertain.

Brook trout require silt-free, cold water streams, high in dissolved oxygen concentrations. Within the environmental study area, there are 11.7 km (7.3 miles) of Class I trout streams and 31.1 km of Class II trout streams. Streams located in the site area that are designated as Class II trout streams include Hemlock, Hoffman, Metonga, and Swamp (above State Highway 55) creeks.

No wild rice has been observed in Swamp Creek from a point approximately 0.4 km (0.25 mile) upstream of the proposed water discharge site to the confluence downstream with the Wolf River. However, Rice Lake contains extensive beds of wild rice, and concern over potential impacts to this sensitive species from mine development have been expressed by the Mole Lake Indian community and the DNR. The impetus for the concern arises from a Minnesota water quality standard (WPC 15, "Criteria for the Classification of Interstate Water of the State and Establishment of Standards of Quality and Purity") that, in one section, specifically limits sulfate levels in waters where wild rice grows to a concentration of 10 mg/l during the growing season.

Growth of wild rice has been shown to be dependent upon an interrelated set of biological, physical, and chemical variables. Lee and Stewart (1981) found wild rice density, water depth, water temperature, and water and sediment quality to be the four most important variables affecting wild rice growth in Minnesota. They modeled wild rice growth based on studies of rice growth in relation to a wide variety of environmental factors that included sulfate concentrations in the water.

Wild rice density was found to influence productivity through intraspecific competition. Commercial growers in Minnesota have found that mechanically thinned wild rice fields are more productive than denser, unthinned fields (Lundberg and Trihey, 1975). Changes in water levels at the critical submerged- and floating-leaf stages appear to increase plant mortality and, thus, to lower productivity (Lee and Stewart, 1978). An important chemical factor in wild rice growth, identified by Lee and Stewart (1981), was alkalinity. However, under natural conditions, no chemical

parameter, including sulfate and alkalinity, was found to act upon wild rice growth in isolation (Lee and Stewart, 1978). No single chemical element could be specifically identified as the factor controlling wild rice growth.

Minnesota's standard of 10 mg/l of sulfate in natural waters was based upon work done throughout Minnesota by Moyle (1944, 1945) and Tripler (1978). However, subsequent advances in quantitative ecology have allowed more thorough analysis of the impact of sulfate and other water quality parameters upon wild rice growth (Lee and Stewart, 1978, 1981, 1983).

Although Moyle suggested that sulfate levels above 10 mg/l inhibited wild rice growth, he acknowledged that wild rice occurs in Minnesota water with up to 282 mg/l of sulfates (Moyle, 1944). Wild rice planted in Saskatchewan has grown well in water with between 105 and 575 mg/l sulfate (median 220 mg/l) (Peden, 1982). Lee and Stewart (1978) have shown that sulfate in water in a Minnesota wild rice bed varied temporally from approximately 20 to 120 mg/l. Wild rice has also been found growing in lake bottom sediments where sulfate concentrations were 1500 mg/l (Vicario and Halstead, 1968). Lee and Stewart (1978) experimentally grew wild rice in water with varying concentrations of sulfate. They found a statistically significant linear relationship between increased weight per plant and increasing sulfate concentrations, up to at least 200 mg/l sulfate.

Sulfates in Rice Lake averaged 4 mg/l (range 4 to 8); in Swamp Creek, 5 mg/l (range 4 to 12); and in the Wolf River, 6 mg/l (range 4 to 9).

2.6.7 Ecological Relationships

2.6.7.1 Comparative Relationships

The environmental study area is a rural, sparsely populated area possessing intrinsic values for human uses and ecological relationships. These values enable the area to support some species preferring solitary habitats and to support the tourism industry, an essential element of the area's economy (Druckenmiller, 1983).

The site area, like most of the surrounding region, is predominantly forested. The soils, topography, and climate all favor the continued presence of forests in the site area. The forests of the site area are primarily second-growth northern hardwood poletimber. Landowner preferences dictate a variety of management practices. Many areas are managed for pulp production because of the quicker return on investment. Management for saw logs requires longer time between harvesting and the resultant economic return. Management for quality saw logs with intermediate cuts to release saw log crop trees and, thus, intermediate production of hardwood pulp is also a frequent management practice. In addition to providing forest products, these forest lands provide recreational opportunities such as fishing, hunting, and snowmobiling (see subsection 2.9.2, Land Uses).

Most wildlife species occurring in northern Wisconsin are found in the site area and the site area's wildlife community is typical of the surrounding region. The forested habitats of the site area support only low to moderate populations of white-tailed deer and ruffed grouse, two of the most popular game species of the environmental study area.

When the location, extent, and integrity of the terrestrial resources found in the site area are compared to those of the surrounding region, there are few notable and no unique resources. These notable resources are a bur oak swamp near Skunk Lake; the wild rice beds in Rice Lake; a possible population of algal-leaved pond weed in Duck Lake; breeding bald eagles, ospreys, Cooper's hawks, red-shouldered hawks; and a small population of the southern flying squirrel. The threatened and endangered species found in the site area are also found throughout northern Wisconsin. More detailed discussions of these resources and comparative relationships are presented in chapter 4.0.

2.6.7.2 Functional Relationships

The site area has limited functional relationships to terrestrial resources beyond the site area. This is primarily because of the extensiveness of similar ecosystems in the surrounding region. The only major functional linkage with other terrestrial resources is for migratory wildlife species. Some linkage also occurs through dispersion of plant seeds and emigrating wildlife species.

Disruption of terrestrial resources by site development is anticipated to have minimal influence upon the functional relationships of site area terrestrial resources to those beyond the site area.

2.6.8 Summary and Conclusions

Soils

1. There are three major surficial soil regions in the environmental study area: northern silty uplands and plains, northern loamy uplands and plains, and stream bottoms and major wetlands.
2. The site area is located within the Kennan, Iron River, Pence, Vilas Soil Association, which is part of the northern loamy uplands and plains surficial soil region.
3. In the site area the surficial soils are generally well drained loams in the uplands and poorly drained peats and mucks in the wetlands.
4. The most common soil type in the site area is the Iron River Variant Stony Loam.

Vegetation

1. Vegetation in the environmental study area generally consists of heavily forested uplands interspersed with forested wetlands and is typical of this region of Wisconsin.
2. Northern Hardwoods, including Aspen-Birch, cover approximately 60 percent of the site area. Sugar maple and basswood were the dominant overstory tree species in the Mesic Northern Hardwood vegetation type. In the Dry-Mesic Northern Hardwood vegetation type, red maple, aspen, and paper birch were the dominant overstory tree species. The Aspen-Birch community was dominated by paper birch, aspen, and sugar maple.
3. Wet-Mesic and Wet Northern Forests (Swamp Conifer) are the second most common vegetation types, covering approximately 20 percent of the site area. In the Wet-Mesic Northern Forest community in the site area, white cedar and balsam fir were the dominant overstory species. Black spruce and tamarack were dominant in the Wet-Northern Forest type.
4. Wetland vegetation types (marsh, shrub swamp, and bog) comprise approximately 6 percent of the site area. Small deciduous forested swamps also occur on the site but are less than 1 ha (2.5 acres) in size. The remaining 14 percent of the site area is comprised of urban or developed land, old field or clearcut, agriculture, and water.

5. A timber inventory within the site area indicated that the Northern Hardwoods consisted primarily of well stocked pole-timber that contained an average volume of 39 cords and 2,842 board feet per hectare (16 cords and 1,150 board feet per acre). The majority of the Aspen-Birch is medium or well stocked poletimber, averaging 22 and 42 cords per hectare (9 and 17 cords per acre), respectively. The swamp conifer type contained the lowest poletimber volumes, averaging 11 to 22 cords per hectare (4.5 to 9 cords per acre).
6. The total cord volume and board foot volume for forest resources within the 1,407-ha (3,474-acre) area included in the forest inventory were 43,892 cords and 2,534,599 board feet, respectively. Sugar maple, American basswood, aspen, white birch, and red oak were the species with the highest cord and/or board foot volumes. The market value of merchantable forest resources in the inventory area was estimated at approximately \$435,000.
7. A forest management plan for the inventory area was developed, based on DNR silvicultural guidelines, to stimulate timber production through prescribed stand treatments and to maintain aesthetic qualities. A harvesting schedule was prepared that would be most advantageous for wildlife and aesthetics.
8. Rice Lake supports an uncommon emergent aquatic community of wild rice. A small stand of bur oak, uncommon in this region, is located approximately 1.6 km (1 mile) east-northeast of the ore body. A calypso orchid, a rare orchid of the Great Lakes region but not listed as threatened or endangered by the state, was found approximately 1.6 km (1 mile) northeast of the ore body.
9. The concentration of nine heavy metals in plants collected in the environmental study area compared favorably with values reported in the literature. The metals and ranges of values from this study are as follows: Manganese 70 to 928 mg/kg, zinc 27 to 117 mg/kg, cadmium 0.25 to 2.13 mg/kg, copper 6.1 to 20.8 mg/kg, arsenic <0.01 mg/kg, lead 1.0 to 6.3 mg/kg, mercury <0.01 mg/kg, cobalt 0.5 to 3.1 mg/kg, and total chromium <0.01 to 3.47 mg/kg.
10. A total of 158 wetlands were inventoried and evaluated within the 4,735-ha (11,700-acre) wetlands study area. Approximately 692 ha (1,710 acres) were classified as wetlands in the study area. Wetlands in the Project area constituted 2.8 percent of the estimated total land area of wetlands in the region, Wolf River drainage basin upstream from Langlade, Wisconsin.
11. The most common wetland type in the study area was the coniferous swamp (383 ha [946 acres]). Less common types included bogs (130 ha [321 acres]), deciduous swamps (59 ha

[146 acres]), shrub swamps (59 ha [146 acres]), marshes (60 ha [148 acres]), and aquatic beds (2 ha [5 acres]).

12. Of the ten highest ranked wetlands in the study area, five were shallow marshes, two were bogs, two were coniferous swamps, and one was a shrub swamp. These wetlands were assigned high functional values because they possessed many of the following characteristics: large size (>1.9 ha [4.6 acres]), high number of wetland classes, favorable water/cover interspersions, high interspersions of wetland types, part of a riparian system, and high scenic or recreational qualities.

Wildlife

Mammals

1. Twenty-nine species of mammals were found in the site area. Nine additional species not recorded during the study are reported to occur in Forest County. The southern flying squirrels found are beyond previously recorded range limits in northeastern Wisconsin.
2. White-tailed deer population density in the site area was low and is approximately half of the DNR's goal for the management units, which include the site area. The 1977 pre-hunting season white-tailed deer population density in the site area was estimated to be between 6.1 and 7.8 deer per 259 ha (1 square mile) of deer range.
3. Two areas "important" to white-tailed deer occur in the site area: the Swamp Creek Deeryard and the Rolling Stone Lake Deeryard.
4. The environmental study area provides good habitat for black bears. Black bear density in the environmental study area is expected to be approximately 0.25 per 259 ha (1 square mile).
5. Three species of small game mammals, the snowshoe hare, cottontail rabbit and gray squirrel, occur in the environmental study area.
6. The important furbearers in the region are the bobcat, river otter, red fox, coyote, beaver, raccoon, muskrat, mink, and fisher. All but the red fox and fisher were observed in the site area. The bobcat and fisher are on the DNR "watch" list.
7. A total of 189 individuals representing 13 species of nongame mammals were collected during nongame mammal surveys. The five most predominant species, in decreasing order, were the deer

mouse, Gapper's red-backed mouse, masked shrew, short-tailed shrew and eastern chipmunk.

8. Nongame mammals were most abundant in northern hardwood communities followed by Swamp Conifer and Aspen-Birch. Capture rates were lowest in old field and bog communities. Diversity of nongame mammals was higher in northern hardwood communities than in other habitats sampled. Additional small mammal trapping was conducted in each wetland type by Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982). Their results indicated that the deciduous swamp type had the greatest species richness and the bog type the lowest.

Birds

1. One hundred-sixty-four species of birds were observed in the environmental study area.
2. The bird communities in the environmental study area exhibited substantial seasonal variability. Approximately 80 percent of the bird species breeding in the site area migrate to milder climates for the winter. Densities during summer were approximately 400 to 600 individuals per 40.5 ha (100 acres), whereas during winter they declined to less than 100 individuals per 40.5 ha (100 acres). Twenty-four species were observed during winter and 110 additional species were observed during spring and summer.
3. During migrating waterfowl surveys, 1,296 individuals constituting 16 species were observed. Rice Lake received most of the use by migrating waterfowl observed in the environmental study area, 79 percent of the total numbers observed. Rolling Stone Lake and Skunk Lake were also important feeding and resting areas for migrating waterfowl. The remaining lakes received little use by migrating waterfowl.
4. During the spring of 1978, ruffed grouse densities in the site area were estimated at 2.8 ± 1.3 grouse per 40.5 ha (100 acres). When compared with densities estimated for other areas of Wisconsin, this value suggests that the site area is of low to moderate value to ruffed grouse.
5. The environmental study area received very little apparent use by breeding waterfowl. Rice Lake was the only water body with concentrations of breeding waterfowl. Rice Lake produced at least four broods, whereas no more than one brood was observed in each of the other lakes or ponds surveyed.
6. Songbird densities along two transects in the site area were similar to those reported by others in northern forests. Along

the east transect the density was 193 ± 62 per 40.5 ha (100 acres) and along the west transect 378 ± 98 per 40.5 ha (100 acres). Bird surveys by Normandeau Associates, Inc. and Interdisciplinary Environmental Planning, Inc. (1982) indicated that values for species diversity, richness, and bird density were similar in each of the wetland types found on the site.

7. Birds observed in the site area that are listed on the DNR "watch" list were the common loon, great blue heron, black duck, black tern, common flicker, grasshopper sparrow, vesper sparrow, and field sparrow.

Amphibians and Reptiles

1. Twenty-two species of amphibians and reptiles occur in Forest County. Fifteen species of amphibians and reptiles were observed in the environmental study area.
2. Small woodland ponds, often times ephemeral, provided important breeding habitat for amphibians. Eleven species of amphibians found in the environmental study area rely on these small ponds during the breeding and larval portions of their life cycles.
3. Amphibians and reptiles observed in the site area that are listed on the DNR "watch" list were the leopard frog, spotted salamander, fox snake, and garter snake.

Threatened and Endangered Species

1. No federally- or state-listed threatened or endangered plant species were found in the site area during the terrestrial surveys. One aquatic plant, the algal-leaved pondweed, is listed by the state as threatened and was observed in the site area (see section 2.5).
2. No federally- or state-listed threatened or endangered mammal species were observed in the site area.
3. The bald eagle is listed as threatened in Wisconsin by federal regulations and as endangered under state regulations. Three bald eagle territories lie within the site area. There were four bald eagle nests in the environmental study area, and the closest nest to any proposed mine related facility was the Swamp Creek nest, located approximately 760 m (2,492 feet) south of the proposed south turnout for the railroad spur.
4. The osprey is listed as endangered under Wisconsin regulations. Two osprey territories lie within the site area. The closest

nest to any proposed mine related facility is the Mole Lake nest, located within 402 m (1,320 feet) of the proposed water discharge pipeline.

5. The Cooper's hawk is listed by the state of Wisconsin as a threatened species. Cooper's hawks were observed in the site area; no nest sites were found.
6. The red-shouldered hawk, a state-designated threatened species, is known to have nested as close as within 16 km (10 miles) of the ore body. One red-shouldered hawk was identified in the environmental study area.
7. No amphibians or reptiles that are listed as threatened or endangered under federal regulations occur in Wisconsin. No amphibians or reptiles listed as threatened or endangered under Wisconsin regulations were observed in the site area.

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2.7 ARCHAEOLOGICAL AND HISTORICAL RESOURCES

In April 1977, Beloit College initiated an intensive archaeological survey of approximately 1,521.6 ha (3,760 acres) of land in the area of the proposed Crandon Project in Forest and Langlade counties, Wisconsin (Salzer and Birmingham, 1978). Following clarification of project plans, an additional 437.65 ha (1,078.6 acres) were subjected to intensive archaeological survey by GLARC, Inc. (Overstreet and Brazeau, 1982; Overstreet, 1982, 1983). During the Beloit College field investigations in 1977 and 1978, three building groups, a total of five individual structures, were identified as having potential historical or architectural significance. These structures were evaluated by MacDonald and Mack Partnership in terms of the explicit criteria for National Register of Historic Places eligibility (MacDonald and Mack Partnership, 1982).

The investigations conducted by Beloit College, GLARC, Inc., and MacDonald and Mack Partnership were mandated by current state of Wisconsin legislation: Section 1.11, Wisconsin Statutes (The Wisconsin Environmental Policy Act), Section 23.11 (5), Wisconsin Statutes (Environmental Impact Report Submittal) and NR 150 of the Wisconsin Administrative Code. However, as several Federal agencies may have interest and authority regarding cultural resources, archaeological and historical studies were designed to comply with guidelines for implementing 36 CFR 800, Protection of Historic and Cultural Properties. This current federal regulation dated May 1979 and the draft revised section 106 regulations dated December 14, 1981 specify acceptable methods and techniques for identifying and evaluating archaeological and historic sites and structures. In turn, the guidelines for conducting

archaeological and historical studies jointly established by The Wisconsin Archaeological Survey, Inc., a state-wide professional organization, and the Historic Preservation Division, State Historical Society of Wisconsin are derived primarily from 36 CFR 800. As a result, all the aforementioned investigations were conceptualized and designed to meet the standards set forth by state organizations and are consistent with the mandates of the National Historic Preservation Act of 1966 (PL 89-665). The interim guidelines, 36 CFR 800.4, state:

An intensive survey is designed to fully identify all historic properties within an area, and document them sufficiently to allow for determination of their eligibility for the National Register (National Advisory Council on Historic Preservation 1981: 22).

With regard to particular sites or properties these same interim guidelines note:

A definition and evaluation study is directed at specific potentially eligible properties or at areas known or suspected to contain such properties; it includes such special studies as are necessary to apply the National Register Criteria, and where appropriate the Criteria of Effect and others, and/or to determine methods of treating the property (National Advisory Council on Historic Preservation 1981: 23).

The objectives of the Beloit College survey and the GLARC, Inc. survey were to identify and evaluate, in terms of the explicit criteria, any properties which might qualify for the National Register of Historic Places. The objectives of the MacDonald and Mack Partnership were more specific in scope and entailed architectural and historical evaluation of five structures in three distinct groups. Studies by Beloit College consisted of literature and archives investigation and on-site inspection while the GLARC, Inc. studies included literature and archives search, field inspection, and test excavations at two prehistoric archaeological sites. The MacDonald and Mack

Partnership study consisted of historical background research and on-site architectural investigations of the five structures. Figure 2.7-1 portrays the area of intensive archaeological survey conducted by Beloit College and GLARC, Inc., and provides locations of the building groups evaluated by MacDonald and Mack Partnership.

2.7.1 Field and Laboratory Methods

2.7.1.1 Literature Search

Prior to deployment of field crews to conduct on-site inspection, background information was compiled to allow assessment of the regional culture-history, environmental context of the project area, past and present land use patterns, and the known distribution of historic and prehistoric sites (Salzer and Birmingham, 1978; Overstreet and Brazeau, 1982; MacDonald and Mack, 1982; Overstreet, 1982, 1983). Traditional archaeological and historical literature, state site files, inventory files, unpublished manuscripts, and published contract reports were reviewed to provide a comprehensive tabulation of the extant data and to plot the locations of reported sites (Salzer and Birmingham, 1978; Overstreet and Brazeau, 1982; Overstreet, 1982, 1983). In addition to literature and archival sources, local informants were interviewed both to provide substantiation of library sources and to secure additional information (Salzer and Birmingham, 1978; Overstreet and Brazeau, 1982; MacDonald and Mack Partnership, 1982).

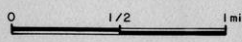
2.7.1.2 Archaeological Field Reconnaissance

Following the literature and archive investigations, an intensive field survey was conducted on 1,959.25 ha (4,838.6 acres). The proposed project area can be characterized as heavily forested (see section 2.9, Land Use and Aesthetics). As a result, field methods and techniques that allowed subsurface evaluation were required. In this instance, tight interval shovel testing along predetermined transects was the most effective method. This method entails the excavation of small pits at either 5-, 10-, or 15-m (16.4-, 32.8-, or 49.2-foot) intervals dependent upon topography, soil conditions, or the presence of an archaeological site (Salzer and Birmingham, 1978; Overstreet and Brazeau, 1982; Overstreet, 1982, 1983). In the few areas where soil surfaces were exposed, pedestrian survey or surface collection was used; however, the primary site location technique employed was systematic shovel testing. Shovel tests conducted by Beloit College were hand-troweled and any artifacts recovered were labeled and bagged (Salzer and Birmingham, 1978), whereas GLARC, Inc. shovel tests were passed through 6.35-mm (0.25-inch) mesh screen and then labeled and bagged. These methods of site location and techniques of artifact retrieval can be considered comparable for intensive archaeological surveys.

In addition to shovel probing, visual inspection was conducted over the surface of the entire project area noted on Figure 2.7-1. The purpose of this visual inspection was to secure evidence of any surficial manifestation of past occupation or utilization, for example, burial mounds, cabin foundations, or man-made pits or depressions. (For example see: Salzer and Birmingham, 1978; Overstreet and Brazeau, 1982). Visual inspection was the



- Historic sites evaluated by MacDonald & Mack Partnership
- ▲ Archaeological sites - Beloit College inventory
- Archaeological sites - GLARC inventory
- ▨ Limits of Beloit College survey
- ▩ Limits of GLARC survey



EXXON MINERALS COMPANY			
CRANDON PROJECT			
TITLE			
SURVEY AREA FOR			
ARCHAEOLOGICAL & HISTORICAL			
INVESTIGATIONS			
SCALE	SHOWN	STATE	WISCONSIN
		COUNTY	FOREST
DRAWN BY	DR SPRINGBORN	DATE	8/84
CHECKED BY		DATE	
APPROVED BY		DATE	
		EXXON	
DRAWING NO	FIGURE 2.7-1		SHEET
		OF	REVISION NO

only technique used in low wet areas or where soil conditions or vegetation cover prohibited shovel testing.

Laboratory Methods and Techniques - Information, artifacts, and other data retrieved in the field require processing and analyses in the laboratory prior to final interpretations and conclusions (Salzer and Birmingham, 1978; Overstreet and Brazeau, 1982). A basic concern is the appropriate organization of notes, records, and artifacts. All artifacts were cleaned, assigned site numbers, and catalogued. Currently all data from these investigations are housed at the Logan Museum of Anthropology, Beloit College for permanent curation.

Soil samples were extracted in the field and returned to the laboratory for flotation (water screening and separation) to recover carbonized organic remains (Overstreet and Brazeau, 1982). Carbonized plant remains were identified with the aid of a binocular microscope and a comparative floral collection by Ms. Judith Smith (Overstreet and Brazeau, 1982).

Additional analyses were conducted on the lithic and ceramic assemblages (Overstreet and Brazeau, 1982). These analyses were directed to discovery of the processes of manufacturing and utilizing stone tools at prehistoric sites and the construction and design of clay pottery vessels.

Archaeological Test Excavations - Test excavations were conducted by both Beloit College and GLARC, Inc. for purposes of evaluating archaeological sites (Salzer and Birmingham, 1978; Overstreet and Brazeau, 1982). Formal test excavation units were dug in arbitrary 10-cm (3.93-inch) levels unless cultural stratigraphy was encountered. In this case excavation followed

cultural rather than arbitrary levels. Prior to excavation with shovels and hand tools, horizontal controls were established by developing a metric grid. Maps of profiles and plan views were drawn and photographic records were made of each excavation unit. Soil samples and charcoal samples were collected from various provenience units and returned to the laboratory for further processing and analysis.

2.7.1.3 Historical Field Reconnaissance

Remains of structures encountered by GLARC, Inc. crews in the field were subjected to preliminary evaluation. This evaluation consisted of making a hand-transit map in the field and selective surface collection of diagnostic artifacts used both to determine function of the structure and to assist in securing a date of occupation. Local tax rolls and land deed records were investigated to determine dates of occupation and ownership (Overstreet and Brazeau, 1982). No standing structures were encountered by GLARC, Inc. field crews; however, structural remains and associated trash heaps and other features were evaluated in terms of potential as archaeological sites.

The five structures clustered in three groups noted by Beloit College (Salzer and Birmingham, 1978) were evaluated by MacDonald and Mack Partnership. Field procedures consisted of photographic records, functional/structural description, historical documentation, and preparation of floor plans (MacDonald and Mack Partnership, 1982). In addition, architectural features such as style, orientation, roof, wall, floor, door, and window forms were identified during the on-site inspections. Each structure, once architectural and historical data had been tabulated, was evaluated in accord with the National Register of Historic Places criteria (MacDonald and Mack Partnership, 1982).

2.7.1.4 Quality Control

Several quality control measures were employed by Beloit College and GLARC, Inc. during the archaeological survey. While some differences exist between the measures utilized by the respective institutions, they can be categorized as variations on a common theme. For example, to assure adequate survey coverage, Beloit College personnel subdivided their survey area into manageable sub-units. GLARC, Inc. also applied a sub-unit concept. Both survey crews took special consideration to maintain intervals between and within transects and both organizations labeled and bagged artifacts in the field to ensure that specific provenience (locational data) was maintained. Photographic records of individual survey units were kept for future reference, and any variations in standard methodology were fully detailed in submitted reports.

Shovel test intervals were decreased whenever cultural materials (artifacts) were encountered in the field (Salzer and Birmingham, 1978; Overstreet and Brazeau, 1982). Finally, site maps were drawn in the field with the aid of a Brunton hand transit and either Wisconsin Codification Site file numbers or Logan Museum of Anthropology site numbers were assigned to a specific site, and all artifacts recovered were properly cleaned and catalogued (number applied to artifacts) to enhance future data retrieval. This latter control measure is of critical importance because without proper provenience the artifacts have little scientific utility. Selection of a single repository for permanent curation of artifacts and records, again, enhances the value for both scientific purposes and public access.

Historic structure evaluation conducted by MacDonald and Mack Partnership relied upon several methods to assure control of the quality of recovered data. Photographic records were made from various angles of each of the structures and this allows for a comprehensive appraisal in their report. In addition, a comprehensive survey form was completed for each individual structure. These forms include such data as legal description, date surveyed and surveyor, film reference, plan/dimensions of each structure, and descriptions of specific architectural features (MacDonald and Mack Partnership, 1982).

Reviews by qualified archaeologists, historians, and architectural historians of the Historic Preservation Division, State Historical Society of Wisconsin of the four consultants' reports were positive. These positive reviews by qualified agency personnel serve to underscore the high quality of the archaeological and historical investigations.

2.7.2 Results of Literature Search

Fifty-four archaeological and historical sites were identified in the vicinity of the project region. Both the Beloit College and the GLARC, Inc. literature and archive searches focused on a more expansive area than the specific project boundaries (Salzer and Birmingham, 1978; Overstreet and Brazeau, 1982). By concentrating on an area larger than the zone enclosed within the project boundaries, additional information regarding the regional culture history was compiled. This more comprehensive literature and records review provided a stronger basis for understanding site distributions and variations within the project zone and investigators could more effectively assess areas of high and low archaeological potential. Table 2.7-1 summarizes

TABLE 2.7-1

PREHISTORIC AND HISTORIC ABORIGINAL SITES
IN THE CRANDON PROJECT REGION

SOURCE	FILE NUMBER	LOCATION	DESCRIPTION
Forest County			
C.E. Brown Atlas	47 Fr 1 (?)	T35N,R13E,Sec.11	Mounds
C.E. Brown Atlas		T35N,R13E,Sec.11	Garden Beds
C.E. Brown Atlas		T34N,R13E,Sec.11	Campsite
C.E. Brown Atlas		T35N,R13E,Sec.22	Campsite
C.E. Brown Atlas		T34N,R13E,Sec.28	Enclosure
S.H.S.W.*	47 Fr 1	T35N,R13E,Sec.11	Garden Beds
S.H.S.W.	47 Fr 4	T35N,R13E,Sec.14	Boulder mortar
C.E. Brown ms.	47 Fr 5	T35N,R13E,On shared line, Sections 14&15	Chippewa Village
C.E. Brown Atlas	47 Fr 6	T35N,R13E, Sec.22	Chippewa Village
S.H.S.W.	47 Fr 8	T35N,R13E,Sec.2	Potawatomi cemetery
S.H.S.W.	47 Fr 9	T36N,R12E,Sec.17	Village dance ground
S.H.S.W.	47 Fr 116	T35N,R12E,Sec.34	Habitation
S.H.S.W.	47 Fr 117	T35N,R12E,Sec.27	Habitation, cemetery
S.H.S.W.	47 FR 118	T35N,R13E,Sec.6	Mounds
S.H.S.W.	47 Fr 119	T35N,R12E,Sec.26	Habitation, cemetery
S.H.S.W.	47 Fr 120	T34N,R13E,Sec.20	Habitation
GLARC, Inc.	47 Fr 121	T35N,R12E,Sec.36	Habitation
Langlade County			
S.H.S.W.	47 Lg 2	T34N,R11E,Sec.11	Cemetery
S.H.S.W.	47 Lg 5	T34N,R12E,Sec.34	Mound
S.H.S.W.	47 Lg 7	T34N,R12E,Sec.2	Campsite
S.H.S.W.	47 Lg 18	T34N,R12E,Sec.14	Mounds
S.H.S.W.	47 Lg 20	T34N,R12E,Sec.12	Habitation
S.H.S.W.	47 Lg 21	T34N,R12E,Sec.25	Habitation, cemetery
S.H.S.W.	47 Lg 22	T34N,R12E,Sec.13	Mounds

*State Historical Society of Wisconsin.

the prehistoric and historic period aboriginal sites while Table 2.7-2 summarizes Euro-American sites. The literature and archives search indicates sporadic use of the project region throughout the 9,000-year prehistoric continuum. As well, several historic occupations related to the fur trade era, logging industry, and pioneer settlement were noted.

2.7.3 Archaeological Resources

During the 1977-1978 intensive survey conducted by Beloit College, artifacts or features were encountered at 14 locations. Three sites were recorded in Unit 1, one in Unit 2, and ten in Unit 3 (Salzer and Birmingham, 1978). Table 2.7-3 describes and summarizes archaeological resources discovered during the Beloit College intensive archaeological survey.

None of the 13 sites or locations reported by Salzer and Birmingham (1978) were determined eligible for the National Register of Historic Places. The structures noted during their survey have since been evaluated by a qualified architectural historian and are summarized in a subsequent discussion.

In eight survey units investigated by GLARC, Inc. 12 artifact locations and features were encountered. Of these, two were further investigated for purposes of evaluating their potential for National Register of Historic Places significance. Archaeological resources discovered during the intensive inventory are described in Table 2.7-4. Two sites, 47 Fr 121 (Beloit College's number 4853) and 47 Fr 143, were evaluated through controlled test excavations and laboratory analyses of materials recovered during the test excavations (Figure 2.7-1).

TABLE 2.7-2

EURO-AMERICAN SITES
IN THE CRANDON PROJECT REGION

SOURCE	FILE NUMBER	LOCATION	DESCRIPTION
Forest County			
GLARC, Inc.	R of I #88	T34N,R14E,Sec.3	Logging camp
GLARC, Inc.	R of I #88	T34N,R14E,Sec.1	Logging camp
GLARC, Inc.	R of I #88	T34N,R14E,Sec.4	Rail camp
GLARC, Inc.	R of I #88	T34N,R14E,Sec.9	Logging camp
GLARC, Inc.	R of I #88	T34N,R14E,Sec.10	Logging camp
GLARC, Inc.	R of I #88	T34N,R14E,Sec.20	Logging camp
GLARC, Inc.	R of I #88	T34N,R14E,Sec.6	Cemetery
GLARC, Inc.	R of I #88	T34N,R14E,Sec.17	Logging camp
GLARC, Inc.	R of I #88	T34N,R14E,Sec.29	Logging camp
Salzer & Birmingham (1978)		T35N,R11E,Sec.24	Logging camp
Salzer & Birmingham (1978)		T35N,R12E,Sec.25	Logging sleigh
C.E. Brown Atlas		T35N,R12E,Sec.27	Trading post
Salzer & Birmingham (1978)		T35N,R12E,Sec.35	Popple peeling
Salzer & Birmingham (1978)		T35N,R12E,Sec.35	Clearing
Salzer & Birmingham (1978)		T35N,R12E,Sec.26	Log Building
Salzer & Birmingham (1978)		T35N,R13E,Sec.(?)	Trading post
Salzer & Birmingham (1978)		T35N,R13E,Sec.17	Trading post
GLARC, Inc.	R of I #88	T35N,R14E,Sec.13	Logging camp
GLARC, Inc.	R of I #88	T35N,R14E,Sec.3	Logging camps
GLARC, Inc.	R of I #88	T35N,R14E,Sec.26	RR grade
GLARC, Inc.	R of I #88	T35N,R14E,Sec.29	Logging camp
GLARC, Inc.	R of I #88	T35N,R14E,Sec.32	Logging camp
GLARC, Inc.	R of I #88	T35N,R14E,Sec.35	Logging camp
GLARC, Inc.	R of I #88	T35N,R14E,Sec.36	Logging camp
GLARC, Inc.	R of I #88	T35N,R14E,Sec.36	Logging camp
GLARC, Inc.	R of I #88	T35N,R14E,Sec.4	Logging camp
GLARC, Inc.	R of I #88	T35N,R14E,Sec.7	Fish dam
GLARC, Inc.	R of I #88	T35N,R14E,Sec.17	Logging camp
GLARC, Inc.	R of I #88	T35N,R14E,Sec.36	Logging camp
S.H.S.W.*	47 Fr 113	T35N,R13E,Sec.24	C.C.C. camp

*State Historical Society of Wisconsin.

TABLE 2.7-3

ARCHAEOLOGICAL HISTORICAL SITES DISCOVERED
DURING БЕЛОIT COLLEGE INTENSIVE SURVEY
(SALZER AND BIRMINGHAM, 1978)

SITE NUMBER	ARTIFACTS/FEATURES	EVALUATION METHODS	DETERMINATION/ RECOMMENDATIONS
Unit 1:			
4855	2 quartz flakes	Close interval shovel testing and test excavation yielded no additional artifacts	Site determined insignificant
4854	Buckets, paint cans, and tin cans indicated a post-1922 sugar maple	Cans were piece plotted, site was mapped, and artifacts were bagged and labeled	Site determined important, but mitigation completed through removal of artifacts
4856	Remains of a late 19th-early 20th century logging sleigh	Inspection revealed no associated features or structures, logging sleigh remains were collected and labeled	No further work recommended, mitigation completed with removal of logging sleigh
Unit 2:			
4849	1 quartz flake, 1 quartz cobble	Close interval shovel testing and test excavations revealed no additional artifacts	Site determined insignificant
Unit 3:			
4850	Clearing, tin plate, stove parts, tin cans, buckets, other modern debris	Shovel testing and informant interviews	Recent popple peeling camp, site preserved by avoidance
4851	Modern debris (refer to 4850)	Shovel testing and informant interviews	Recent popple peeling camp, site preserved by avoidance

TABLE 2.7-3 (continued)

SITE NUMBER	ARTIFACTS/FEATURES	EVALUATION METHODS	DETERMINATION/ RECOMMENDATIONS
4851	4 #10 cans	Shovel testing and surface collection	Recent berry picking or maple sugar camp. No further recommendations
4853	1 quartz fragment, clay pipe stem, possible hearth, window glass, stove	Surface collection	Site not in Beloit project area, should be evaluated if threatened by development
4857	Chert-like flakes and shatter	Shovel testing and test excavations	Insignificant, not of human origin
4858	Chert-like flakes and shatter	Shovel testing and test excavations	Insignificant, not of human origin
4859	Structures	Photographed	Should be evaluated by qualified architectural historian
4860	Structures	Photographed	Should be evaluated by qualified architectural historian
4861	Shack	Photographed	Should be evaluated by qualified architectural historian
4862	3 piece mold gin bottle (late 18th century)		Isolated find, no further recommendations

ARCHAEOLOGICAL HISTORICAL SITES DISCOVERED
DURING GLARC, INC. INTENSIVE SURVEY

SITE NUMBER	ARTIFACTS/FEATURES	EVALUATION METHODS	DETERMINATION/ RECOMMENDATIONS
Parcel B:			
47Fr149	Various metal containers, metal cable	Shovel testing, surface collection, archive review, informant interview	20th century logging camp dump, no further work recommended
Parcel F:			
not assigned	Clearing related to settlement of Keith siding	Shovel testing, surface collection, archive search, informant interview	Results negative, no further work recommended
not assigned	Unfinished contemporary log structure	Photographic record, interviews	Determined insignificant, no further work recommended
Parcel G:			
47Fr121	Quartz flakes, fire- cracked rock	Close interval shovel testing, surface collection	Prehistoric site, test excavations recommended
47Fr143	Quartz flakes, pottery	Close interval shovel testing	Prehistoric site, test excavations recommended
47Fr145	Structural remains, midden	Surface collection, mapping archive review	Mitigation served by preservation in place
47Fr146	Structural remains, midden	Surface collection, mapping, archive review	Mitigation served by preservation in place

TABLE 2.7-4 (continued)

SITE NUMBER	ARTIFACTS/FEATURES	EVALUATION METHODS	DETERMINATION/ RECOMMENDATIONS
Parcel H:			
47Fr148	Cans, crockery, patent medicine bottle	Shovel testing, surface collection, photographic records, identification of artifacts, archive review	Logging company rail camp, mitigation served by preservation in place
Parcel I:			
47Lg23	Structural remains, midden	Shovel testing, surface collection, photographic records, identification of artifacts, archive review	Logging camp, mitigation served by preservation in place
Outside Project Area:			
47Fr144	Structural remains and midden	Surface collection, mapping, archive review	Preserved in place, outside project area
47Fr150	Structural remains and midden	Shovel testing, surface collection, archive review	Insignificant, previously disturbed
47Fr151	Structural remains and midden	Surface collection, archive review	1920's era logging camp, preserved in place, outside project area

At 47 Fr 121 two excavation units were established. The first of these produced more than sufficient data for evaluation so the second unit was not excavated. The excavations were conducted in arbitrary 10-cm (3.93-inch) levels. All earth was passed through hardware cloth. Photographic records, plan views and profiles were made for each excavation, and soil samples were extracted and returned to the laboratory for processing. The test excavations yielded significant numbers of readily identifiable or diagnostic projectile points and remains of ceramic vessels. Analyses and interpretation of these artifacts allowed for the determination that 47 Fr 121 and its features are Lakes Phase (Late Woodland) archaeological contexts that can be dated to about 1200 A.D. This prehistoric site is significant in the project area as well as the regional context and harbors undisturbed deposits.

The second prehistoric site recommended for controlled test excavations as a means of evaluating the site in terms of National Register criteria was 47 Fr 143. At 47 Fr 143 two units, one 2 m² (43.0 square feet) and the other a 1-m (3.28-foot) by 8-m (26-foot) trench, were excavated in 10-cm (3.93-inch) levels. A detail map was also made with a transit to provide precise locations and dimensions of 43 pits or depressions, interpreted as prehistoric wild rice processing pits. Finally, maps of profiles and plan views were constructed, photographic records maintained and radiocarbon assay samples were collected for laboratory processing.

Many stone tools and associated waste products were recorded and recovered from 47 Fr 143. In addition, diagnostic ceramics were also found. The site is considered highly significant as it represents the only known Lakes Phase (Late Woodland) rice processing station in Wisconsin. It is likely that the site would qualify for the National Register of Historic Places.

More than 700 stone, ceramic, and bone artifacts were returned to the GLARC, Inc. laboratory for cleaning, recording, and analyses. Soil samples were processed and ethnobotanical samples were forwarded to a specialist for identification. Identification of these remains failed to specifically identify wild rice grains from the features; however, the flotation inventory resulted in the identification of charred nuts, seeds, and various species of plants. The identification fostered reconstruction of the tree cover and food resources during the prehistoric occupation. Further, the fact that carbonized plant remains can be expected in the archaeological contexts at the site serves to underscore the scientific and interpretive potential of 47 Fr 143.

Wood charcoal samples from two separate prehistoric pits at the site were submitted to the University of Wisconsin-Madison, Center for Climatic Research. Radiocarbon assay resulted in the determination of two closely bracketed dates for the prehistoric occupation at 47 FR 143. The first of these dates was: 750 \pm 70 radiocarbon years; A.D. 1200 (WIS-1339). The second date was: 830 \pm 70 radiocarbon years; A.D. 1120 (WIS-1340). Both dates are within the anticipated range of occupation for a Late Woodland Lakes Phase cultural component.

Both 47 Fr 121 and 47 Fr 143 are unique within the project area, contain significant areas of undisturbed prehistoric deposits, and probably qualify for The National Register of Historic Places. Management practices on the project site currently serve to provide additional protection for the sites as gates prohibit unauthorized access.

2.7.4 Historical Resources

Three sites noted in the Beloit College inventory had standing structures. Recommendations for the evaluation of these structures were made by Birmingham and Salzer (1978). This evaluation was conducted by MacDonald and Mack Partnership in December 1981 (MacDonald and Mack Partnership, 1982). Field survey and historical research were conducted and each structure was evaluated in terms of the eligibility criteria of the National Register of Historic Places. Preliminary evaluations were reviewed with Mr. Richard Dexter of the Historical Preservation Division of the State Historical Society of Wisconsin. The results of the evaluation of each structure are summarized in Table 2.7-5. None of the structures were found to be significant from an architectural or historical perspective.

2.7.5 Summary and Conclusions

During the years 1977-1983, investigations were conducted to inventory archaeological and historical resources in the proposed Crandon Project area. The following summary presents the conclusions of these investigations.

1. Beloit College inventoried 1,521.6 ha (3,760 acres) and identified artifacts or features at 14 locations. Eleven of the locations were identified as archaeological sites based on the occurrence of stone tool manufacturing debris, an abandoned logging sleigh of late 19th century origin, and late historic period artifacts such as bottles or cans. None of the 11 sites are considered eligible for the National Register of Historic Places. Three locations were identified as potentially significant building clusters and it was recommended that the standing structures be evaluated by a qualified architectural historian.
2. GLARC, Inc. conducted an intensive inventory of 437.65 ha (1,078.6 acres) resulting in the identification of 12 artifact locations or features. Four historic sites, all of 20th century origin, were determined ineligible for the National

TABLE 2.7-5

EVALUATION OF STANDING STRUCTURES
 (MACDONALD AND MACK PARTNERSHIP, 1982)

BUILDING GROUP AND STRUCTURE	DESCRIPTION/STYLE	CONCLUSIONS
4859	Abandoned one story gable roofed house. Utilitarian, date of construction 1964.	Insignificant, lacking in architectural or historical merit.
4859-Tool Barn	Abandoned one story gable roofed barn. Utilitarian, date of construction <u>circa</u> 1920's.	Insignificant, lacking in architectural or historical merit.
4860-Residence	Abandoned low one story gable roofed house. Crudely constructed utilitarian. Date of construction of log house <u>circa</u> 1920's.	Insignificant, lacking in architectural or historical merit.
4861-Shack	Abandoned one story gable roofed shack. Strictly utilitarian. Date of construction post-1930.	Insignificant, lacking in architectural or historical merit.

Register of Historic Places. Two prehistoric sites were evaluated and considered eligible for the National Register of Historic Places. Six remaining sites, all related to late 19th and early 20th century logging activities, were subjected to preliminary evaluation and may be eligible for the National Register of Historic Places. All of the archaeological sites determined to be significant or potentially significant will be preserved in place.

3. MacDonald and Mack Partnership conducted an evaluation of the architectural and historical significance of the three building clusters identified during investigations by Beloit College. In all locations the standing structures were determined to be lacking in any historical or architectural significance.
4. Personnel of the Historical Preservation Division conducted review of the five consultants' studies: Birmingham and Salzer (1978), MacDonald and Mack Partnership (1982), Overstreet and Brazeau (1982), and Overstreet (1982, 1983). In all cases the reviews were positive, based on the criteria set forth in 36 CFR 800, and agreed with the consultants' conclusions: the investigations regarding cultural resources have been sufficiently thorough to meet both the letter and intent of legislative mandates.

2.7.6 References

- MacDonald and Mack Partnership, 1982, Evaluation of Buildings in the Crandon Project Area, Forest County, Wisconsin. Report prepared for Exxon Minerals Company.
- National Advisory Council on Historic Preservation, 1981, Draft Revised Regulations for The Protection of Historic Properties, dated December 14, 1981. National Advisory Council on Historic Preservation. Washington, D.C.
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2.8 NOISE

The range of sound pressure that can be heard by humans is very large, varying from sounds that are barely audible to sounds that are so loud as to be painful. The decibel (dB) notation system uses logarithms to compress this wide range of sound pressures to convenient quantities called sound pressure levels (Beranek, 1971).

$$\text{Sound pressure levels (dB)} = 20 \log_{10} \frac{P}{P_0}$$

where:

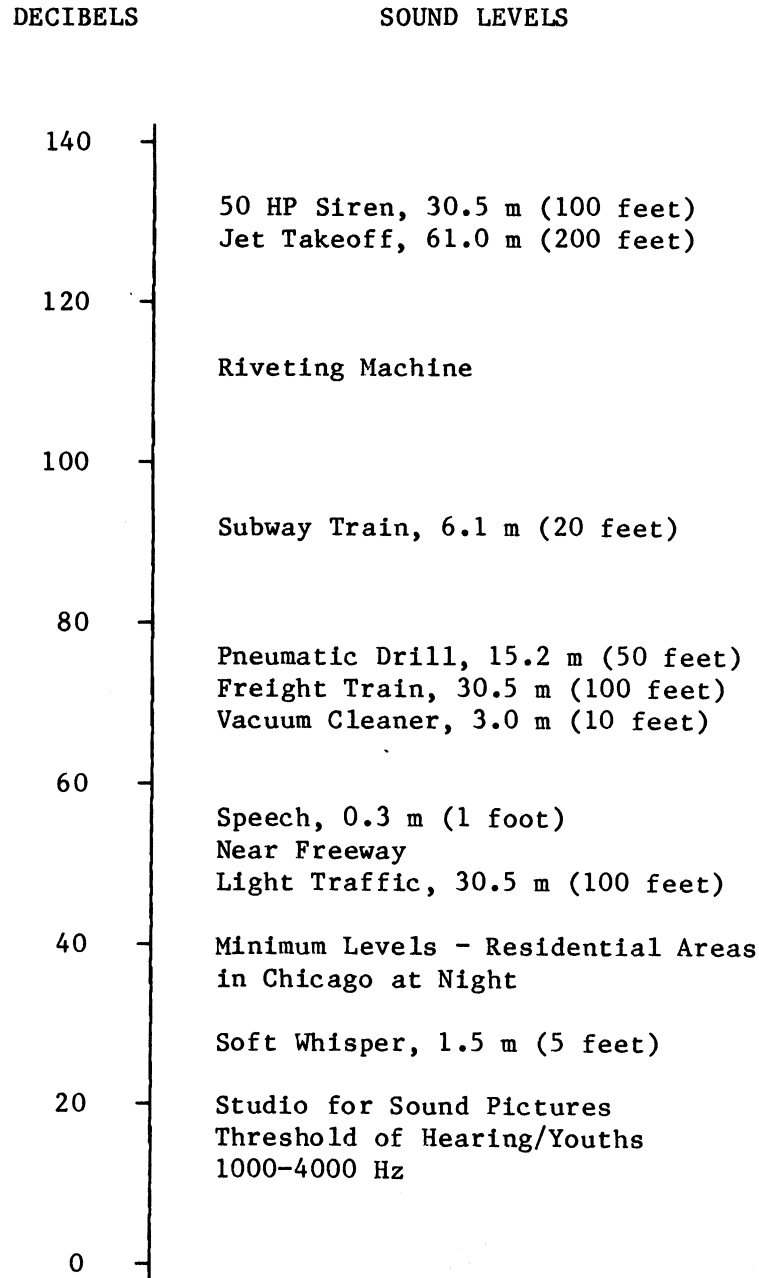
P_0 = sound pressure required for a threshold sensation of hearing; equal to 20 μ Pa (microPascals, where 1 microPascal = 10^{-6} newton per square meter) or 0.0002 μ Atmosphere; and

P = the measured sound pressure in Pascals or Atmospheres.

On the decibel scale, 0 dB is assigned to P_0 . Approximately 125 dB is the sound level at the threshold of pain (U.S. Department of Labor, 1980).

The human ear does not perceive sounds at low frequencies in the same manner as those at higher frequencies. Sounds of equal pressure level at low frequency do not seem as loud as those at higher frequencies. To simulate the human ear in evaluations of hearing damage risk or community annoyance impacts (Peterson and Gross, 1967), sound analysis systems incorporate an A-weighting network (American National Standards Institute, 1971a). A-weighted sound levels are expressed in decibels (dB) and are used in federal, state, and local noise (unwanted sound) ordinances. Typical A-weighted sound levels at a given distance from a sound source and in the environment are shown in the following chart (adapted from Peterson and Gross, 1967).

TYPICAL A-WEIGHTED SOUND LEVELS



Because sound is not constant with time, statistical analysis is used to describe the temporal distribution of a sound and to compute single-number descriptors for that sound. The following statistical, A-weighted sound levels (National Academy of Science, 1977; Bureau of National Affairs, 1978) are used in this report.

- L₉₀ - The sound level exceeded 90 percent of the time during the measurement period, often called the residual sound level.
- L₅₀ - The sound level exceeded 50 percent of the time during the measurement period; the median sound level.
- L₁₀ - The sound level exceeded 10 percent of the time during the measurement period, often called the intrusive sound level.
- L_{eq} - The equivalent steady sound level that provides an equal amount of acoustic energy* as the time-varying sound.
- L_d - Day sound level, L_{eq} for the daytime period (0700-2200) only.
- L_n - Night sound level, L_{eq} for the nighttime period (2200-0700) only.
- L_{dn} - Day-night sound level, defined as (U.S. EPA, 1974):

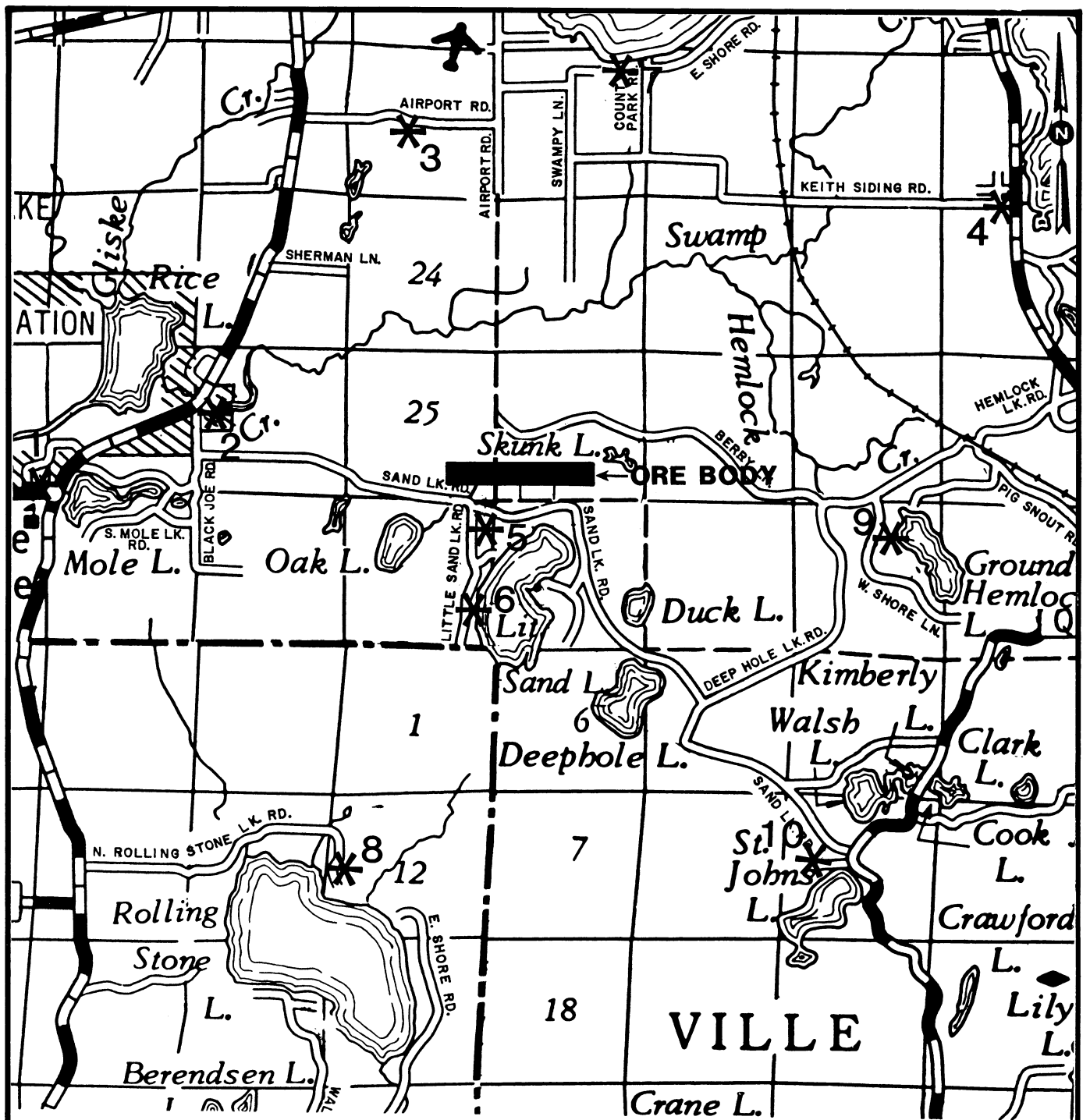
$$L_{dn} = 10 \log_{10} \frac{(15 \times 10^{(L_d/10)}) + (9 \times 10^{(L_n+10)/10})}{24}$$

Note: The EPA adds this 10 dB correction factor to the night sound level as a weighting to compensate for the greater annoyance of nighttime noise (U.S. EPA, 1974).

2.8.1 Field and Laboratory Methods

Background sound level data were obtained during the winter and summer and at three representative times of the day. During the periods of March 5 and 6 and July 16 and 17, 1977, background sound level data were collected at Locations 1 through 6 (Figure 2.8-1). An additional four sites (Locations 7 through 10) were monitored during the periods of March 29 through 31 and July 11 through 13, 1983. The 1977 measurements were made on weekends to exclude sounds uncharacteristic of the area such as site exploratory drilling. Similar site activities were not present during the additional monitoring conducted in 1983.

*Acoustic energy can be defined as follows: "Acoustic" means of or relating to sound; therefore, the sound energy of the given part of a medium is the total energy in this part of the medium minus the energy which would exist in the same part of the medium with no sound waves present (American National Standards Institute, 1971b).



KEY:

***** NOISE SURVEY LOCATION

EXXON MINERALS COMPANY
CRANDON PROJECT

1977 AND 1983 NOISE SURVEY
LOCATIONS

BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION,
1978.

FIGURE 2.8-1

Methods used for data acquisition and analyses are presented in the following subsections: Survey Locations, Measurement Program, Analytical Procedures, and Quality Control.

2.8.1.1 Survey Locations

To describe the background sound level within the environmental study area, sound measurements were obtained at the following ten locations, as presented on Figure 2.8-1:

- Location 1 - Playground at the Mole Lake School yard near County Road M and State Highway 55;
- Location 2 - In parking lot of the former Community Center at the Indian Subdivision near State Highway 55 and Sand Lake Road;
- Location 3 - At the Mihalko residence on Airport Road;
- Location 4 - In the driveway of residence No. 3712 on County Road W and Keith Siding Road;
- Location 5 - Exxon Field Office on Sand Lake Road, across from the potential mining site;
- Location 6 - Across from the C. F. Webb residence on Little Sand Lake Road;
- Location 7 - South shore of Lake Metonga in parking lot of Forest County Veterans Memorial Park;
- Location 8 - North shore of Rolling Stone Lake on the Simonson property;
- Location 9 - Northwest shore of Ground Hemlock Lake on the Solper property; and
- Location 10 - North of St. John's Lake on Sand Lake Road.

The above locations were monitored to represent the sound climate at selected noise-sensitive land use areas within the environmental study area.

Such land uses included homes and recreational areas that may be negatively affected by noise. Sleep interference, loss of tranquility, and hearing damage are examples of negative effects. No measurements were made in "wilderness" or undeveloped areas, since background noise levels in these areas would be similar to those near isolated residences.

2.8.1.2 Measurement Program

Background sound measurements were obtained during both winter and summer conditions (foliage attenuates sound propagation during summer months, and local activities tend to differ from winter to summer.). Measurements were made with a magnetic tape recorder data acquisition system consisting of a GenRad one-inch electret condenser microphone with windscreen, a GenRad Type 1933 Sound Level Meter, and a Nagra 4.2L single trace magnetic tape recorder. At each location, the microphone was located 1.2 to 1.5 m (4 to 5 feet) above the ground, at least 3.7 m (12 feet) from any large reflecting plane, and approximately 30 m (100 feet) from the observation station. During the data recording period, meteorological parameters that could affect the ambient sound were recorded on a data sheet, including wet and dry bulb temperatures (determined by a Bacharach hygrometer), barometric pressure, wind speed and direction (determined by a Sims BX anemometer). Humidity exceeding 95 percent reduces microphone output. High wind (>19.3 km/hour [>12 miles/hour]) generates self-noise in the microphone. Had these conditions been noted during a survey, the survey would have been postponed (see Appendices 2.8A, Table A-37 and 2.8B, Table B-48).

Also identified on the data sheet were all contributing sound sources, such as wind gusts and human and other animal activity. Sound level

meter readings were collected with a GenRad Type 1933 sound level meter, which records from 10 to 130 dB, for later confirmation of the recorded data.

Instrument calibration to a prerecorded tone of known sound pressure was undertaken in the field prior to each measurement. Background sound levels were recorded for continuous periods of 16 to 21 minutes, a time period considered sufficient to describe the character of the background sound (Safeer et al., 1972).

Sound level recordings for both winter and summer survey measurements were made during daytime (0700-1800), evening (1800-2200), and nighttime (2200-0700) periods. These periods are in accordance with the daytime (daytime and evening) and nighttime periods used by the U.S. EPA in its definition of day-night sound levels (U.S. EPA, 1974).

2.8.1.3 Analytical Procedures

The data recorded on magnetic tape were returned to the acoustic laboratory at Dames & Moore for statistical analysis by a computer-controlled data analysis system consisting of a GenRad Real Time Analyzer and a Digital Equipment Corporation minicomputer.

Analog data from the tape recorder were sampled after prefiltering by the A-weighting network; the sampled data were converted to digital binary form, and the binary numbers were used in the minicomputer to compute mean square level. Each sample was used to construct an A-weighted sound level histogram, indicating the number of times a particular sound occurred during the measurement period, and a cumulative distribution of the A-weighted sound levels, indicating the percentage of time a sound level was exceeded during the measurement period.

2.8.1.4 Quality Control

Quality control procedures were used by field and laboratory personnel during the background sound level study as a means of assuring that the study was completed according to currently accepted standards and methods.

Field Procedures - At each measurement location for each measurement period, a log of important information was maintained. The sound level meter setting, the weighting network, and the instrument response ("fast" or "slow") were noted. Noise sources observed by the operator were recorded, as were the times when overloads or intrusive (short duration, high pressure level) noises occurred. As discussed in subsection 2.8.1.2, meteorological parameters that might affect sound measurement were also noted, and measurements were made only when those parameters were within specified operating ranges for the instrumentation used.

The sound level recording system was calibrated before the acquisition of data using a GenRad 1562-A sound level calibrator. A 114-dB, 1000-Hz tone was recorded on magnetic tape at the start of each measurement period.

Data Analyses - The tape recorded data were analyzed using a Digital Equipment Corporation PDP 8/a digital computer controlling a GenRad real time analyzer, whose input was from a Nagra 4.2L tape recorder. The calibration tone recorded on magnetic tape in the field was used to calibrate the data analysis system. Once calibrated, the computer controls the analysis and prints the results without operator interface, thus maintaining a high quality of analysis.

2.8.2 Background Sound Levels

Background sound level data collected at the ten monitoring locations are presented in Table 2.8-1. This table contains the statistical A-weighted sound levels, L_{90} , L_{50} , L_{10} , and L_{eq} , for each measurement period and L_d , L_n , and L_{dn} for each of the measurement locations.

Appendices 2.8A, Tables A-1 through A-36, and 2.8B, Tables B-1 through B-47 contain (1) A-weighted sound level histograms, indicating the number of times a particular sound level occurred during the measurement period, and (2) the cumulative distributions of the A-weighted sound levels, indicating the percentage of time a sound level was exceeded. Also included are the $L_{99,*}$, L_{90} , L_{50} , L_{10} , $L_1,*$ and L_{eq} of the sound pressure levels at octave band center frequencies. The octave band data on the appendix tables are unweighted.

The background sound level data obtained in 1977 sampling periods are representative of the acoustical environment during the period sampled. The A-weighted sound level values for the following five sampling periods were influenced by a small number of short duration, high sound pressure level events:

- 1) Location 6, 1617 Hours, March 5, 1977;
- 2) Location 4, 1900 Hours, March 5, 1977;
- 3) Location 5, 2350 Hours, March 5, 1977;
- 4) Location 3, 1905 Hours, July 16, 1977; and
- 5) Location 5, 2130 Hours, July 16, 1977.

The probability of such events occurring during the sampling periods was not under the control of the observers acquiring the data as the sampling periods were selected on a random basis. However, the data recorded during the above

* L_{95} and L_5 for 1977 data.

SUMMARY OF A-WEIGHTED BACKGROUND SOUND LEVELS^a, dB

LOCATION	WINTER			SUMMER		
	DAYTIME ^b (DATE-TIME)	EVENING ^b (DATE-TIME)	NIGHTTIME ^b (DATE-TIME)	DAYTIME ^b (DATE-TIME)	EVENING ^b (DATE-TIME)	NIGHTTIME ^b (DATE-TIME)
1 - Mole Lake School	<u>3/05/77</u> 1155	<u>3/05/77</u> 2030	<u>3/06/77</u> 0025	<u>7/16/77</u> 1015	<u>7/16/77</u> 2015	<u>7/17/77</u> 0050
L ₉₀	38	26	24	43	29	24
L ₅₀	40	29	26	46	33	27
L ₁₀	43	31	31	49	43	40
L _{eq}	44.1	30.9	29.8	47.2	44.6	42.7
L _d		42.8			46.6	
L _n		29.8			42.7	
L _{dn}		41.9			49.9	
2 - Community Center	<u>3/05/77</u> 1230	<u>3/05/77</u> 2000	<u>3/06/77</u> 0055	<u>7/16/77</u> 0930	<u>7/16/77</u> 1930	<u>7/16/77</u> 2345
L ₉₀	33	23	26	36	27	26
L ₅₀	35	28	27	39	32	32
L ₁₀	41	37	31	46	42	45
L _{eq}	37.9	38.1	28.5	43.0	38.0	39.7
L _d		37.9			42.1	
L _n		28.5			39.7	
L _{dn}		38.1			46.5	
3 - Mihalko Residence	<u>3/05/77</u> 1312	<u>3/05/77</u> 1930	<u>3/05/77</u> 2250	<u>7/16/77</u> 1525	<u>7/16/77</u> 1905	<u>7/17/77</u> 0130
L ₉₀	34	21	20	36	31	39
L ₅₀	36	39	22	39	33	43
L ₁₀	40	46	26	44	40	47
L _{eq}	37.8	41.9	23.9	45.3	50.1 (39.7) ^c	44.1
L _d		39.3			47.1 (44.4) ^c	
L _n		23.9			44.1	
L _{dn}		37.9			51.0 (50.5) ^c	
4 - Residence 3712	<u>3/05/77</u> 1455	<u>3/05/77</u> 1900	<u>3/05/77</u> 2215	<u>7/16/77</u> 1445	<u>7/16/77</u> 1810	<u>7/17/77</u> 0205
L ₉₀	35	21	21	40	31	23
L ₅₀	38	22	24	46	38	30
L ₁₀	48	28	33	63	52	44
L _{eq}	44.6	39.8 (33.3) ^c	35.1	65.1	54.1	47.0
L _d		43.7 (43.4) ^c			63.8	
L _n		35.1			47.0	
L _{dn}		44.2 (44.1) ^c			62.2	

^aL₉₀, L₅₀, and L₁₀ are measured quantities rounded to the nearest whole number.

L_{eq}, L_d, L_n, and L_{dn} are calculations rounded to the nearest tenth.

$$L_d = 10 \log_{10} \frac{[11 \times 10^{(L_1/10)} + 4 \times 10^{(L_2/10)}]}{15}$$

where: L₁ = L_{eq} 0700-1800

L₂ = L_{eq} 1800-2200

^bThe times shown for the daytime, evening, and nighttime periods signify the start time of recorded 16- to 21-minute data samples.

^cValues were adjusted to reduce the contribution from short duration, high sound pressure level sources. The procedure for making these adjustments is described in subsection 2.8.2.

^dNumbers in brackets [] are average L_{eq} values for each time period.

TABLE 2.8-1 (continued)

LOCATION	WINTER			SUMMER		
	DAYTIME ^b (DATE-TIME)	EVENING ^b (DATE-TIME)	NIGHTTIME ^b (DATE-TIME)	DAYTIME ^b (DATE-TIME)	EVENING ^b (DATE-TIME)	NIGHTTIME ^b (DATE-TIME)
5 - Exxon Field Office	<u>3/05/77</u> 1555	<u>3/05/77</u> 2130	<u>3/05/77</u> 2350	<u>7/16/77</u> 1600	<u>7/16/77</u> 2130	<u>7/17/77</u> 0020
L ₉₀	31	25	22	35	21	25
L ₅₀	37	27	24	41	23	26
L ₁₀	45	30	29	53	26	28
L _{eq}	43.8	28.4	50.5 (37.7) ^c	58.2	42.7 (36.8) ^c	26.5
L _d		42.4			56.8	
L _n		50.5 (37.7) ^c			26.5	
L _{dn}		56.4 (45.2) ^c			54.7	
6 - Webb Residence	<u>3/05/77</u> 1617	<u>3/05/77</u> 2100	<u>3/06/77</u> 2320	<u>7/16/77</u> 1140	<u>7/16/77</u> 2050	<u>7/16/77</u> 2215
L ₉₀	23	18	18	31	21	19
L ₅₀	25	19	19	35	24	21
L ₁₀	37	22	20	39	34	35
L _{eq}	53 (43.4) ^c	22.6	19.0	38.4	36.8	38.6
L _d		51.6 (42.1) ^c			38.0	
L _n		19.0			38.6	
L _{dn}		49.5 (40.2) ^c			44.9	
7 - Lake Metonga	<u>3/30/83</u> 1225 1300	<u>3/29/83</u> 2100	<u>3/30-31/83</u> 2340 0010	<u>7/12/83</u> 1500 1530	<u>7/11/83</u> 1910 1937	<u>7/11-12/83</u> 2350 0020
L ₉₀	41 41	43	41 41	41 41	41 39	39 38
L ₅₀	42 41	44	42 42	44 44	44 42	41 39
L ₁₀	43 42	45	42 42	48 51	50 47	46 39
L _{eq} (Avg) ^d	46.9 41.4 [44.2]	44.3 [44.3]	41.9 41.7 [41.8]	46.4 48.8 [47.6]	47.7 44.5 [46.1]	42.9 38.9 [40.9]
L _d		44.8			47.5	
L _n		41.8			41.3	
L _{dn}		48.8			49.3	
8 - Rolling Stone Lake	<u>3/30/83</u> 1345 1413	<u>3/30/83</u> 2045 2115	<u>3/31/83</u> 0100 0125	<u>7/12/83</u> 1530 1555	<u>7/11/83</u> 2036 2110	<u>7/11/83</u> 2230 2300
L ₉₀	31 32	31 30	30 30	38 35	34 33	36 34
L ₅₀	33 33	32 31	31 31	42 40	37 34	39 38
L ₁₀	36 38	34 31	31 31	44 43	43 40	43 42
L _{eq} (Avg) ^d	33.7 35.5 [34.6]	32.1 30.7 [31.4]	30.8 30.8 [30.8]	42.1 40.6 [41.4]	39.3 36.2 [37.8]	40.2 38.9 [39.6]
L _d		34.2			40.7	
L _n		30.8			39.6	
L _{dn}		37.9			46.2	

TABLE 2.8-1 (continued)

LOCATION	WINTER						SUMMER					
	DAYTIME ^b		EVENING ^b		NIGHTTIME ^b		DAYTIME ^b		EVENING ^b		NIGHTTIME ^b	
	(DATE-TIME)		(DATE-TIME)		(DATE-TIME)		(DATE-TIME)		(DATE-TIME)		(DATE-TIME)	
9 - Ground Hemlock Lake	<u>3/30/83</u>		<u>3/30/83</u>		<u>3/29/83</u>		<u>7/13/83</u>		<u>7/12/83</u>		<u>7/12/83</u>	
	<u>1008</u>	<u>1027</u>	<u>1910</u>	<u>1940</u>	<u>2245</u>	<u>2310</u>	<u>1205</u>	<u>1230</u>	<u>1825</u>	<u>1847</u>	<u>2200</u>	<u>2230</u>
L ₉₀	30	31	30	30	30	29	37	37	31	28	26	25
L ₅₀	31	33	30	30	30	29	42	39	33	32	26	26
L ₁₀	34	35	31	31	31	30	47	42	39	35	28	29
L _{eq} (Avg) ^d	32.1	33.4	30.5	36.8	30.3	29.6	44.2	39.6	46.0	32.5	26.8	28.0
	[32.8]		[33.7]		[30.0]		[41.9]		[39.2]		[27.4]	
L _d			33.4						42.7			
L _n			30.0						27.4			
L _{dn}			37.1						41.4			
10 - St. John's Lake	<u>3/30/83</u>		<u>3/30/83</u>		<u>3/30/83</u>		<u>7/13/83</u>		<u>7/12/83</u>		<u>7/12/83</u>	
	<u>1118</u>	<u>1143</u>	<u>1800</u>	<u>1827</u>	<u>2225</u>	<u>2250</u>	<u>1655</u>	<u>1725</u>	<u>2025</u>	<u>2055</u>	<u>2315</u>	<u>2345</u>
L ₉₀	31	33	30	30	31	31	34	33	26	26	25	24
L ₅₀	33	34	31	31	31	31	38	37	28	29	25	25
L ₁₀	35	36	32	32	31	31	42	43	36	40	27	26
L _{eq} (Avg) ^d	33.4	34.5	30.9	31.6	31.0	31.0	38.9	39.6	32.6	37.3	28.0	28.1
	[34.0]		[31.3]		[31.0]		[39.3]		[35.0]		[28.1]	
L _d			33.4						38.6			
L _n			31.0						28.1			
L _{dn}			37.8						38.4			

sampling periods were reviewed and were modified by comparing the data to that obtained at the same or similar locations during other sampling periods. The intrusive sounds, based on duration and sound pressure level, were eliminated from the A-weighted sound level histograms and new values for the Equivalent Sound Levels were computed. Elimination of these intrusive sounds was accomplished as follows:

Location 6, 1617 Hours, March 5, 1977 - The A-weighted sound level histogram was truncated at 66 dB (values greater than 66 dB were deleted). The new value for the Equivalent Sound Level is 43.4 dB which is presented in Table 2.8-1 in parentheses.

Location 4, 1900 Hours, March 5, 1977 - The histogram was truncated at 56 dB resulting in a new Equivalent Sound Level of 33.3 dB as presented in parentheses in Table 2.8-1.

Location 5, 2350 Hours, March 5, 1977 - The histogram was truncated at 58 dB resulting in a new Equivalent Sound Level of 37.7 dB as presented in parentheses in Table 2.8-1.

Location 3, 1905 Hours, July 16, 1977 - The histogram was truncated at 56 dB resulting in a new Equivalent Sound Level of 39.7 dB as presented in parentheses in Table 2.8-1.

Location 5, 2130 Hours, July 16, 1977 - The histogram was truncated at 63 dB resulting in a new Equivalent Sound Level of 36.8 dB as presented in parentheses in Table 2.8-1.

In five instances, the L_{eq} values (1983 data) reported in Table 2.8-1 exceed the summary components presented (L_{90} , L_{50} , L_{10}); these cases are the result of infrequently recorded high sound pressure levels that are reported in the corresponding appendix tables. Appendices 2.8A, Table A-37, and 2.8B, Table B-48 present a summary of the meteorological conditions during the measurement periods. The wind speed, humidity, and temperature data indicate that the range of meteorological conditions was within appropriate limits for optimal performance of the instrumentation (GenRad, 1976).

Sound levels at Location 1 during the winter survey were a result of sparse traffic on County Road M and occasional trucks on State Highway 55. During the summer survey, sound levels at Location 1 were dominated by traffic on County Road M and State Highway 55, and by resident and local farm activities.

Sound levels at Location 2 during the winter survey were dominated by children and a radio at a nearby home, by traffic on State Highway 55, and by a mercury vapor lamp. During the summer survey, sound levels at Location 2 were dominated by traffic on State Highway 55, local traffic at the Indian Subdivision, residents conversing, children playing, and occasional passing aircraft.

Sound levels at Location 3 at the Milhalko residence during the winter survey were mainly from wind in the trees and distant traffic. During the summer survey, sound levels were mainly attributable to traffic on Airport Road, distant traffic, birds, insects, and rustling foliage.

Sound levels at Location 4 during the winter survey were from traffic on County Road W, snowmobiles, and distant traffic. During the summer survey, sound levels at this location were dominated by cars and motorcycles on County Road W, resident activities, motorboats, and occasional passing aircraft.

Sound levels at Location 5 during the winter survey were dominated by occasional cars passing on Sand Lake Road, wind in the trees, dogs barking, and snowmobiles. During the summer survey, sound levels at this location were dominated by occasional cars passing on Sand Lake Road, resident activities, dogs barking, rustling foliage, and occasional passing aircraft.

During the winter survey, sound levels at Location 6 on Little Sand Lake Road were dominated by distant traffic, dogs barking, wind in the trees, and snowmobiles. During the summer survey, sound levels at this location were dominated by traffic on Little Sand Lake Road, resident activities, motorboats, and occasional passing aircraft.

Sound levels at Location 7 during the winter survey were the result of water flowing over a small dam and wind moving fallen tree leaves. During the summer survey, sound levels were mainly from human activities associated with the picnic area and campground.

Sound levels at Location 8 during the winter survey were from wind moving through nearby trees, bird sounds, and an occasional gunshot and dog barking. During the summer survey, wind moving tree leaves, birds, insects, and occasional aircraft were the major noise sources.

At Location 9 during the winter survey, the sound levels were caused by wind moving tree leaves, bird sounds, and occasional cars. During the summer survey, wind moving tree leaves, bird and insect sounds, cars, and distant aircraft were the major contributing noise sources.

Sound levels at Location 10 during the winter survey were mainly caused by wind blowing through nearby trees, bird sounds, distant chainsaws, and cars. Summer survey sound levels were from bird sounds, distant voices, cars, moving leaves, and occasional aircraft.

The day sound levels, L_d , night sound levels, L_n , and day-night levels, L_{dn} , obtained at the ten locations are summarized in Table 2.8-2. The data presented in this table indicate that, except for Location 6, winter daytime sound levels were lower than those in summer. The noise sources observed at each measurement location indicate the reason for higher summer noise levels. The residents' summer activities included use of motorcycles and motorboats that usually are not used in winter. Even though snowmobiles were heard in winter, their contributions to sound levels at all locations except Location 6 were not particularly high. During winter months of heavy snowfall or during early winter months when winter sports are popular, sound levels from snowmobiles may be more extensive, as indicated by measurements made at Location 6. At this location, activities such as snowmobiles, dogs barking, and wind in the trees raised the ambient sound levels to a higher value than the summer level.

The summer daytime and nighttime sound levels are representative of a rural or quiet suburban neighborhood (National Academy of Science, 1977). Only the day sound levels, L_d , at Locations 4 and 5 (63.8 and 56.8 dB, respectively) are somewhat high for rural background ambient sound levels. These sound levels are explained by a motorcycle and lawn mower recorded at Location 4, and by dogs barking and nearby residents' activities (conversation, car door slam) at Location 5. The daytime L_{50} at Locations 4 and 5 (46 and 41 dB, respectively, Table 2.8-1) was low, indicating that the high day-night sound levels in these instances were caused by intrusive sounds occurring only a small percentage of the time.

In winter, only the unadjusted day-night level at Location 5 exceeded the levels characteristic of quiet suburban neighborhoods. After

TABLE 2.8-2

DAYTIME, NIGHTTIME, AND DAY-NIGHT EQUIVALENT SOUND LEVELS (dB)

LOCATION	WINTER			SUMMER		
	L _d	L _n	L _{dn}	L _d	L _n	L _{dn}
1. Mole Lake School	42.8	29.8	41.9	46.6	42.7	49.9
2. Community Center	37.9	28.5	38.1	42.1	39.7	46.5
3. Mihalko Residence	39.3	23.9	37.9	47.1(44.4)	44.1	51.0(50.5)
4. Residence 3712	43.7(43.4)	35.1	44.2(44.1)	63.8	47.0	62.2
5. Exxon Field Office	42.4	50.5(37.7)	56.4(45.2)	56.8	26.5	54.7
6. Webb Residence	51.6(42.1)	19.0	49.5(40.2)	38.0	38.6	44.9
7. Lake Metonga	44.8	41.8	48.8	47.5	41.3	49.3
8. Rolling Stone Lake	34.2	30.8	37.9	40.7	39.6	46.2
9. Ground Hemlock Lake	33.4	30.0	37.1	42.7	27.4	41.4
10. St. John's Lake	33.4	31.0	37.8	38.6	28.1	38.4

*Values in parentheses were computed from truncated histograms which were adjusted to remove the contributions from short duration, high sound pressure level noise sources.

adjustment, the sound level at this location met the levels characteristic of a quiet suburban neighborhood. At all other locations, the sound sources were typically distant traffic and wind in the trees. A review of the A-weighted sound level histogram (Appendix 2.8A, Table A-17) indicates that most of the time the sound levels were low. For example, the L_5 (sound level exceeded 5 percent of the time) was 31 dB. However, high sound levels (greater than 70 dB) were measured for a very short time (approximately 9 seconds), resulting in an unadjusted high equivalent sound level of $L_{eq} = 50.5$ dB and an adjusted level of $L_{eq} = 37.7$ dB. The sounds were probably dog barks. The calculation of L_{dn} requires the penalization of nighttime sound levels by 10 dB to compensate for the greater annoyance factor of sound at night (U.S. EPA, 1974). The computation of L_{dn} at this location was 56.4 dB (unadjusted) and 45.2 dB after adjustment. Without the intrusive nighttime sound, the L_{dn} would be as low as that at other locations.

The U.S. EPA has identified a day-night sound level (L_{dn}) of 55 dB as requisite for the protection of public health and welfare (U.S. EPA, 1974). Since the sound levels in most communities across the United States generally exceed this level at present (Galloway et al., 1973), the agency has identified an L_{dn} of 65 dB as its short-term goal and an L_{dn} of 55 dB as its long-term goal (U.S. EPA, 1977). Day-night sound levels at all locations sampled in summer and winter were below the short-term goal. Only the unadjusted day-night sound levels at Location 4 in the summer and Location 5 in the winter exceeded the U.S. EPA's long-term goal. However, after adjustment all day-night sound levels except Location 4 in summer meet this

long-term goal. All daytime and nighttime sound levels sampled were representative of a rural or quiet suburban neighborhood (National Academy of Science, 1977).

2.8.3 Summary and Conclusions

1. Background sound level measurements were obtained at ten locations representing noise-sensitive land uses within 6 km (4 miles) of the mine/mill site, during both winter and summer conditions (without and with foliage, respectively), and at three representative time periods of the day.
2. The background sound levels were indicative of a rural or quiet suburban neighborhood, as defined by the National Academy of Science (1977).
3. All adjusted day-night sound levels except Location 4 in summer meet the U.S. EPA's long-term goal for the protection of public health and welfare.

2.8.4 References

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2.9 LAND USE AND AESTHETICS

The objectives of this section are to present a detailed description of land uses and to identify their geographical distribution within the environmental study area. This section also includes a discussion of the aesthetic characteristics of the environmental study area. The land uses discussed include forestry, agriculture, recreation, residential/institutional, commercial/industrial, transportation, public lands, special use areas, and multiple use areas. The discussion of this land use information is designed to complement regional information presented in section 2.10, Socioeconomics, and is intended to identify and discuss those specific local land uses that could be affected during project development.

A regional discussion of land use characteristics in the area surrounding the Crandon Project (most of Forest and Langlade counties and approximately one-half of Oneida County [Figure 2.10-1]) is presented in section 2.10, Socioeconomics. The objective of the regional land use discussion was to identify those uses that preclude future development and to analyze zoning and other constraints that could restrict growth in developable areas.

2.9.1 Field and Laboratory Methods

The land use and aesthetics investigation consisted of two tasks: a literature search and a field reconnaissance. The literature search was conducted to obtain published information on the land use and aesthetic characteristics of Forest, Langlade, and Oneida counties. The types of information obtained during the literature search included USGS 7.5-minute

topographic maps, plat books, regional plans, regional outdoor recreation plans, chamber of commerce publications, and forest resource assessments. An important portion of the literature search consisted of contacting governmental bodies that might have information useful to the land use investigation. The agencies contacted included, but were not limited to, the DNR; the Wisconsin Department of Administration; the Northeastern Wisconsin Regional Planning Agency; the North Central Wisconsin Regional Planning Commission; and offices of the Forest, Langlade, and Oneida county clerks.

During January and September 1978 and again in May 1982, field reconnaissances were conducted of the environmental study area. These reconnaissances were conducted by automobile and on foot to verify the information obtained during the literature search and from April 1976, June 1978, and April 1981 aerial photos. The type of information recorded included the distribution of land uses, vegetation types and residences, the location of recreational resources and businesses, and aesthetic characteristics. The minimum size of any land use delineated was 16.2 ha (40 acres). Linear land uses such as highways and railroads are not included in acreage calculations.

Quality control procedures were utilized during the land use and aesthetics investigation. Quantitative data were collected in conjunction with the field activities for terrestrial ecology. These quality control procedures are discussed in subsection 2.6.1.

In the land use and aesthetics investigation, a daily record of field activities was maintained by the investigator and summarized as field memoranda. No data sheets were required or used as a part of this study.

There were no laboratory analyses or data analyses for this investigation requiring quality control procedures.

2.9.2 Land Uses

Notable characteristics of the land uses within the environmental study area were similar to those of the regional study area. The area was primarily forested upland and forested wetland with an abundance of lakes and streams. It is popular for both land- and water-based recreation and has an abundance of publicly owned land (North Central Wisconsin Regional Planning Commission, 1979).

Land use within the environmental study area has been divided into nine categories. A definition for each of the land use categories is presented below:

Forestry - Land being used to produce forest products such as pulp wood, saw timber, wood chips and/or maple syrup. This includes all forested land capable of producing trees with a diameter at breast height of over 2.5 cm (1 inch) and where canopy coverage is greater than 25 percent. It also includes clearcuts that will be left to revert to forest cover and old agricultural fields that are obviously being allowed to revert to forest cover.

Agriculture - Land being used for agricultural purposes. This includes crop fields, hay fields, and pastures. Old agricultural fields that can potentially be used as pasture because they are fenced and are not reverting to forest cover were also included in this land use.

Recreation - This land use includes those lands whose primary use is recreation. It does not include areas where recreation is a secondary use, such as Forest Crop Law lands. Lands included within this category are primarily parks and water bodies. However, this category also includes marshes and shrub swamps as recreation is probably their only major active use.

Residential/Institutional - This includes all residential areas, both permanent and seasonal, as well as any institutional uses such as churches, schools, nursing homes, and/or hospitals.

Commercial/Industrial - Land being used for any business enterprise, excluding forestry and agriculture, is included within this land use category.

Transportation - Any lands used by transportation systems, such as roads, railroads and airports.

Public Lands - Any lands owned by a governmental unit whether they are open to public use or not. Governmental units include federal, state, county and township jurisdictions.

Special Use Areas - This category includes any lands that are valuable for scientific research, educational use (school forests), or identified threatened or endangered species habitats.

Multiple Use - Lands governed by official multiple use management objectives are included in this category. An example is land under the jurisdiction of the U.S. Forest Service.

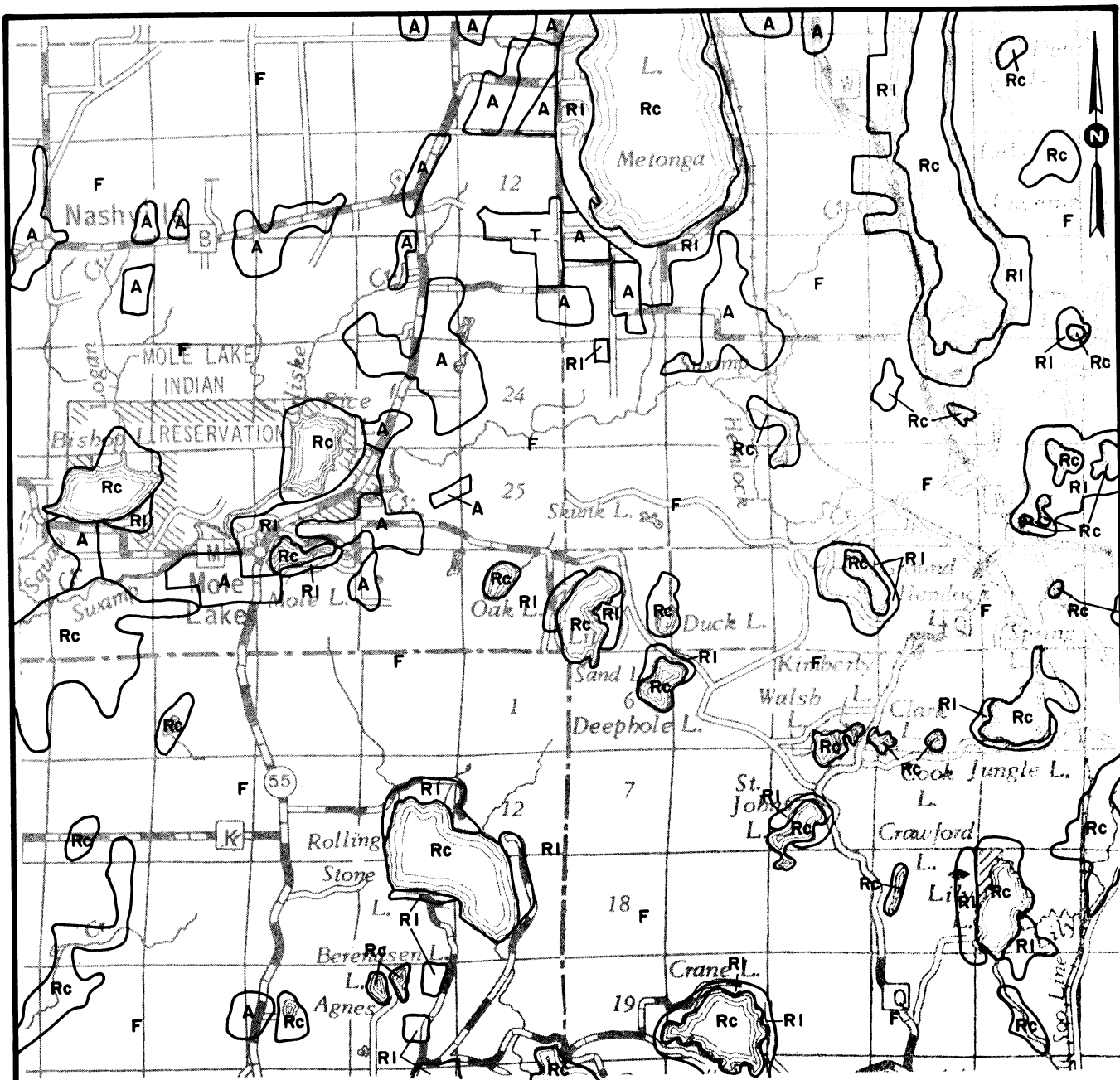
The distribution of major land uses in the environmental study area is illustrated on Figure 2.9-1.

The percentage of each land use, estimated from topographic maps, aerial photographs, and reconnaissance of the environmental study area, is presented below.

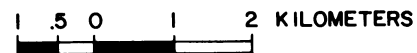
LAND USE
WITHIN THE ENVIRONMENTAL STUDY AREA

LAND USE	PERCENT OF TOTAL AREA	AREA	
		Sq. Kilometers	Sq. Miles
Forestry	76.5	198.0	76.5
Recreation	11.8	30.5	11.8
Residential	6.4	16.5	6.4
Agriculture	5.0	13.0	5.0
Transportation	0.3	1.0	0.3
Total	100.0	259.0	100.0

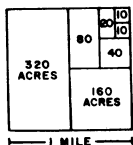
Forestry, recreation, residential/institutional, agriculture, and transportation were the primary land uses within the environmental study area. Commercial/industrial, special use, and multiple use comprised a minor proportion of the environmental study area and were, therefore, not illustrated on Figure 2.9-1. Although public lands constituted an important portion of the environmental study area, their use was predominantly for



- KEY:**
- A** AGRICULTURE
 - F** FORESTRY
 - Rc** RECREATIONAL
 - RI** RESIDENTIAL/INSTITUTIONAL
 - T** TRANSPORTATION



NOTE: MINIMUM SIZE DELINEATED IS 16.2 HECTARES (40 ACRES).



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LAND USE IN THE ENVIRONMENTAL STUDY AREA

BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION, JANUARY, 1978. FOREST CO. AND LANGLADE CO. HIGHWAY MAPS.

DAMES & MOORE

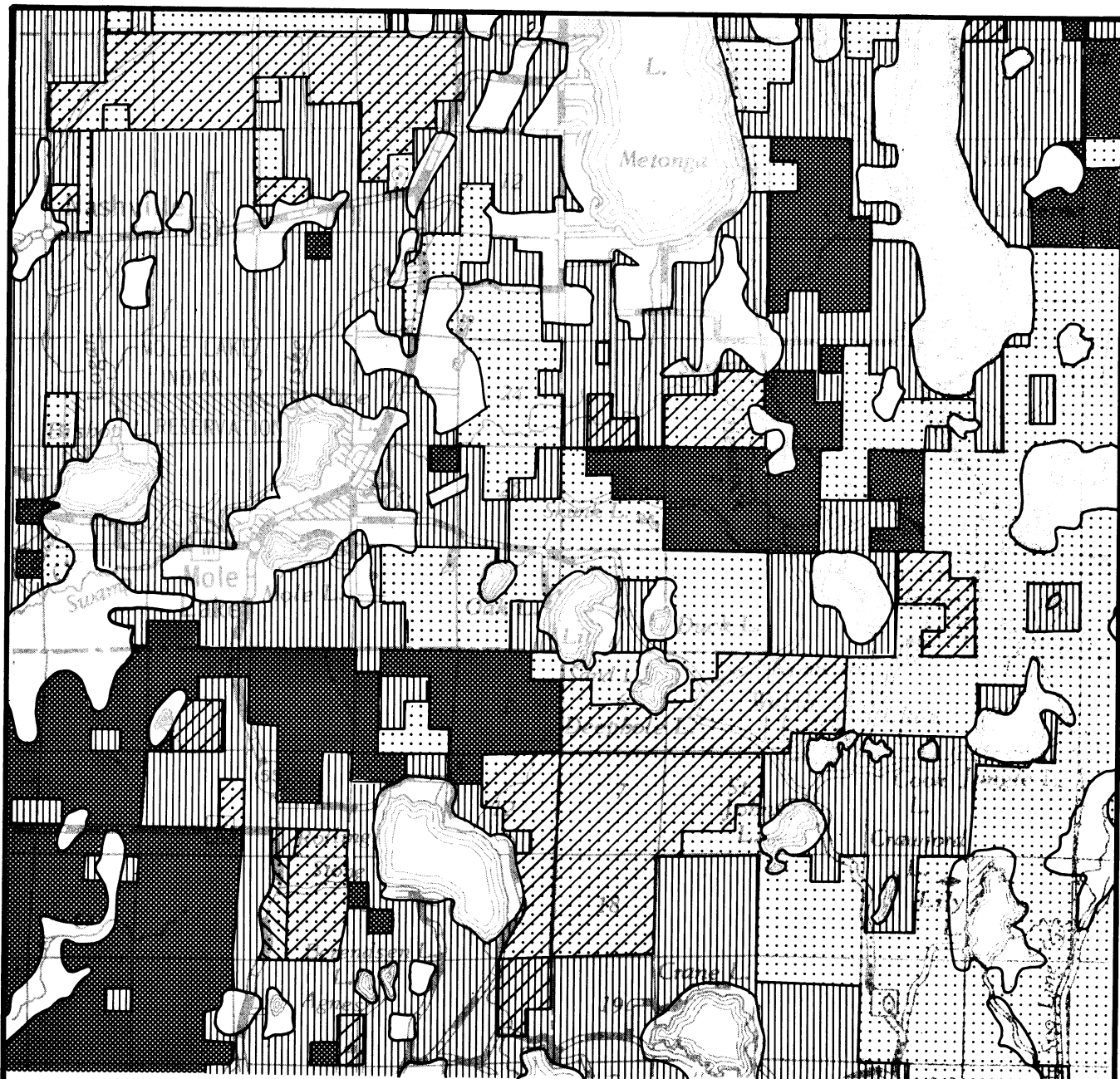
FIGURE 2.9-1

forestry or recreation; therefore, public lands were not mapped on Figure 2.9-1. For a discussion of public lands see subsection 2.9.2.7. Each of the nine land use categories is discussed in the following subsections.







2.9.2.1 Forestry

Approximately 76.5 percent of the environmental study area was forestland that could conceivably be harvested, that is, used for forestry (Figure 2.9-1). Pole-sized aspen-birch and northern hardwood consisting primarily of sugar maple and basswood were the most abundant upland forest types in the environmental study area (see section 2.6, Terrestrial Ecology). Tamarack and black spruce were the most common tree species in the coniferous forested wetlands, whereas ash, quaking aspen, American elm, and red maple were the most common tree species in deciduous forested wetlands. Logging during the late 1800's and early 1900's removed most of the original forest in the regional study area; however, forest is once again the principal land cover of the environmental study area (Figure 2.9-1). Maple-basswood and aspen-birch are the most abundant forest types and cover approximately 63 percent of the total commercial forest acreage in Forest, Langlade, and Oneida counties (Spencer and Thorne, 1972). Approximately 20 percent of the commercial forest acreage is in wetland stands of black spruce and balsam fir (Spencer and Thorne, 1972).

Forest lands in the environmental study area were owned by forest products corporations (43.6 percent), private individuals (37.8 percent), with the remainder in public ownership (18.6 percent) (Figure 2.9-2). Seven large corporations owned 8,610 ha (21,260 acres) of forest lands in the



KEY:

-  NON-FORESTED AREAS
-  PRIVATE OWNERSHIP
-  PUBLIC OWNERSHIP
-  CORPORATE OWNERSHIP
-  FOREST CROP LAW LANDS
-  WOODLAND TAX LAW LANDS



EXXON MINERALS COMPANY
CRANDON PROJECT

**FOREST OWNERSHIP IN THE
ENVIRONMENTAL STUDY AREA**

BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION,
JANUARY, 1978. FOREST CO. AND LANGLADE
CO. HIGHWAY MAPS.

DAMES & MOORE

FIGURE 2.9-2

environmental study area. Consolidated Papers Inc., the largest corporate land owner in the environmental study area, owned 4,275 ha (10,556 acres) of forest land or 49.6 percent of the corporate forest land. The other corporate owners were: Owens-Illinois Inc., 1,175 ha (2,900 acres); Exxon Corporation, 805 ha (1,987 acres); Connor Forest Industries, 724 ha (1,789 acres); Kimberly-Clark Corporation, 409 ha (1,009 acres); American Can Company, 178 ha (440 acres); and Tigerton Lumber Company, 32 ha (80 acres). Two small forest products businesses owned the remaining 410 ha (1,012 acres) of the corporate forest land shown on Figure 2.9-2. The Mihalko Land and Logging Company owned 882 ha (2,179 acres) and Walentowski Logging owned 130 ha (320 acres).

The remaining forest areas were owned by private individuals (7,464 ha [18,429 acres]), with the balance of 3,675 ha (9,075 acres) in public ownership. Public ownership in the environmental study area was primarily county forest land. The Langlade County Forest comprised 55.8 percent, and Forest County forests 30.8 percent of the 3,149 ha (7,775 acres) of public forest land. The remaining 530 ha (1,300 acres) were owned either by the state of Wisconsin or local townships.

Two tax laws in Wisconsin, Forest Crop Law and Woodland Tax Law, allow owners of woodlands being managed primarily for wood production to be taxed at lower rates. The Forest Crop Law stipulates that lands receiving this tax reduction must be open to public hunting and fishing. There were 3,188 ha (7,871 acres) of land entered into these two tax programs in the environmental study area. The distribution of these lands is shown on Figure 2.9-2. In the environmental study area 3,136 ha (7,742 acres) of land have

been entered into the Forest Crop Law tax program and 53 ha (129 acres) into the Woodland Tax Law program.

Forestlands in the region surrounding the environmental study area are managed primarily for sawtimber and pulp production (Spencer and Thorne, 1972; Mihalko, 1977). Data on stand size for Forest, Langlade, and Oneida counties indicate that approximately 50 percent of the commercial forestlands are classified as pole timber size, 30 percent as sapling and seedling size, 15 percent as sawtimber size, and 5 percent as nonstocked (Spencer and Thorne, 1972). Volume of growing stock per acre in Forest, Langlade, and Oneida counties is well above the average for Wisconsin counties. The average net volume for saw timber and pole timber size classes on commercial forest lands in the three-county area is approximately 38 cords/ha (15.7 cords per acre) (Spencer and Thorne, 1972); saw timber volumes range from approximately 12,355 to 14,826 board feet/ha (5,000 to 6,000 board feet per acre) for saw timber stands only (Druckenmiller, 1984).

2.9.2.2 Agriculture

Approximately 5.0 percent of the environmental study area was in agricultural use, which included dairy farming, livestock production, and crops of oats, barley, wheat, alfalfa, hay, and potatoes. Agricultural lands are shown on Figure 2.9-1. Irregular slopes, stoniness, droughtiness on rises, wetness in depressions, and short growing season limit agricultural use of soils in the environmental study area (Hole et al., undated). The soils of the environmental study area are described in section 2.6, Terrestrial Ecology.

Information on agricultural use and production in the environmental study area was obtained from the Wisconsin Agriculture Reporting Service for the 1979 and 1980 seasons. The Wisconsin Assessor Farm statistics from the 1979 harvest are only available by townships (Young, 1982); more detailed reporting would essentially divulge the financial affairs of individual farmers. The environmental study area covers parts of Lincoln and Nashville townships in Forest County and Ainsworth Township in Langlade County. In these three townships information was reported for 36 farms with a total area of 3,084 ha (7,614 acres) and an average size of 85.7 ha (211.5 acres) (Young, 1982).

Hay and alfalfa were the most important crops, comprising approximately 48 and 15 percent of the reported crop acreage, respectively. Oats and potatoes, the only other prevalent crops, comprised 22 and 9 percent of the reported crop acreage, respectively. Barley and wheat were infrequent crops.

A substantial portion of the agricultural use in the environmental study area was related to dairy farming. A total of 783 cattle was reported for 1980, with 21 percent milk cows, 30 percent beef cows, and 49 percent other cattle (bulls, heifers, and calves).

The severe limitations placed upon farming by the frequently poor soil conditions and short growing season are apparent when countywide agricultural production for Forest and Langlade counties are compared with other counties in Wisconsin.

1980 AGRICULTURAL PRODUCTION IN FOREST AND LANGLADE COUNTIES*

CROP	FOREST COUNTY	LANGLADE COUNTY	STATEWIDE RANK FOREST/LANGLADE
Hay	1.9 tons/acre	2.1 tons/acre	55/23
Alfalfa	2.4 tons/acre	2.6 tons/acre	63/69
Oats	58.1 bu/acre	58.7 bu/acre	65/37
Potatoes	260 cwt.	295 cwt.	42/2
Barley	56.5 bu/acre	56.0 bu/acre	37/61
Wheat	32.0 bu/acre	27.7 bu/acre	60/45
Milk Production	10,900 lbs/cow	11,600 lbs/cow	66/49

*From 1981 Wisconsin Agricultural Statistics.

As suggested by the above data, Forest County is consistently low in the rankings for agricultural products produced by Wisconsin counties. Even though Langlade County has higher agricultural production, the portion of Langlade County in the environmental study area is much more like Forest County than the more agricultural portions of Langlade County to the south and west.

2.9.2.3 Recreation

The environmental study area is located approximately 2 to 6 hours by automobile from the metropolitan areas of Green Bay, Madison, Milwaukee, Minneapolis, and Chicago. These relatively short driving distances, the abundant forest and water resources, and the large public land areas contribute to the popularity of the regional area for recreation. Activity participation in the environmental study area was assumed to be similar to the Forest, Langlade, and Oneida county area where, based upon available resources, the most popular activities are fishing, hunting, swimming, boating, automobile camping, snowmobiling, and sightseeing (Langlade County and Wisconsin DNR, 1979; Johanesen, 1976; De Waal and Johanesen, 1977).

A recreational plan prepared by the North Central Wisconsin Regional Planning Commission in 1977 for Forest County (De Waal and Johanesen, 1977) encompassed approximately 75 percent of the environmental study area. A similar plan has also been prepared for Langlade County encompassing the remaining portion of the environmental study area (Langlade County and Wisconsin DNR, 1979). A general indication of the supply of recreational resources, demand for them, and needs for new recreational development can be obtained from these two reports. The situation in the environmental study area was assumed to be most like Forest County, and selected information from the 1977 Forest County recreation plan was used herein to characterize recreational supply, demand, and need.

Recreational resources in Forest County are generally adequate to meet demands (De Waal and Johanesen, 1977). A summary of supply, estimated demand, and estimated need is presented in Table 2.9-1. There is a projected need in 1980 and 1990 for only a few recreational uses (Table 2.9-1). A similar pattern has been found for Langlade County (Johanesen, 1979) (see section 2.10, Socioeconomics). The major deficiency of recreational resources in Forest County is in picnicking opportunities (70 percent). There is also a predicted shortage of campsites (9 percent) and cross-country ski trails (33 percent) in 1990. While there is a predicted shortage for canoeing, the resource is physically limited and there is little potential to increase the amount of resource available.

Lakes and streams in the environmental study area support a variety of water-based recreational activities such as boating, fishing, and water skiing. As calculated from values reported by Steuck and Andrews (1976),

TABLE 2.9-1

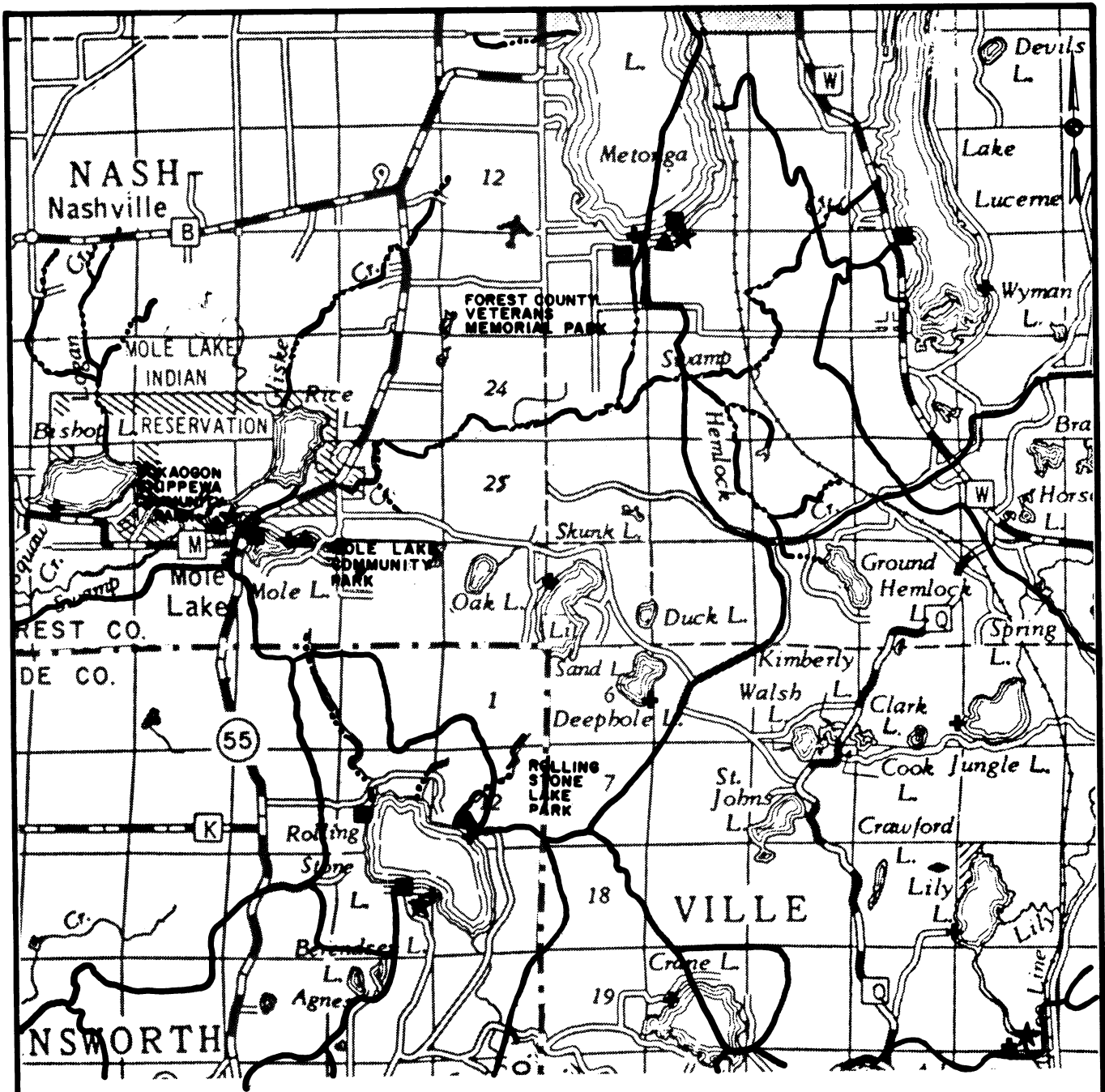
SUPPLY, ESTIMATED DEMAND, AND ESTIMATED NEED FOR SELECTED RECREATIONAL
RESOURCES IN FOREST COUNTY

Activity (units)	1976 Supply	Estimated 1980 Demand	Estimated 1980 Need	Estimated 1990 Demand	Estimated 1990 Need
Swimming (ha/acres)	4.6/11.4	3.7/9.2	None	4.1/10.2	None
Boating (ha/acres)	6417/15,845	1715/4234	None	1953/4822	None
Water Skiing (ha/acres)	6417/15,845	1675/4135	None	1851/4570	None
Fishing-Lake (ha/acres)	8782/21,684	1518/3748	None	1709/4219	None
Fishing-Stream (km/miles)	767/477	Undetermined Demand and Need			
Canoeing (km/miles)	117/73	122/76	5/3	138/86	16/10
Camping (sites)	419	417	None	461	42
Picnicking (tables)	166	498	332	552	386
Auto. Sightseeing (km/miles)	Undetermined Supply, Demand and Need				
Hiking (km/miles)	125/78	29/18	None	34/21	None
Horseback Riding (km/miles)	2/1	5/3	2/1	6/4	2/1
Bicycling (km/miles)	37/23	2/1	None	3/2	None
Cross-Country Skiing (km/miles)	16/10	51/32	25/16	77/48	25/16
Target Shooting (ranges)	1	1	None	1	None
Nature Trails (km/miles)	2/1	2/1	None	3/2	2/1
Snowmobile Trails (km/miles)	539/335	117/73	None	142/88	None







Source: DeWaal and Johanesen, 1977.

Steuck et al. (1977), and the Wisconsin DNR (1976), surface waters constitute 9 percent of the environmental study area, with 31 lakes that total 2,472 ha (6,103 acres) and 42.8 km (26.6 miles) of designated trout streams (Figure 2.9-3) (Wisconsin DNR, 1980). The Wisconsin DNR classifies trout streams into three categories: Class I streams are the highest quality trout waters with self-sustaining populations of native trout, Class II waters are moderate quality trout waters, and Class III are marginal trout habitat. There are 11.7 km (7.3 miles) of Class I, 31.1 km (19.3 miles) of Class II, and no Class III trout streams in the environmental study area. The 43 km (27 miles) of trout streams in the environmental study area were frequently used by fishermen. As reported by Steuck and Andrews (1976) and Steuck et al. (1977), most lakes within the environmental study area also support fish populations and are used by fishermen. Fish populations found in the lakes and streams are discussed in section 2.5, Aquatic Ecology.

Eleven of the larger lakes in the environmental study area have public access (Figure 2.9-3), and these lakes support the majority of water-based recreation. There are six lakes greater than 81 ha (200 acres) in the environmental study area that are generally considered suitable for fast boating and waterskiing: Lake Metonga, Lake Lucerne, and Little Sand, Crane, Rolling Stone, and Bishop lakes. Sandy shorelines are frequent on lakes within the environmental study area. Many of the smaller lakes have mud or muck bottoms, and most larger lakes usually contain some areas of muck bottoms (Ramharter, 1981). Public swimming is permissible at the Forest County Veterans Memorial Park on Lake Metonga (Figure 2.9-3). No streams identified in the Forest County Recreational Plan as providing canoeing opportunities are



KEY:

-  SNOWMOBILE TRAIL
-  TROUT STREAMS
-  PUBLIC LAKE ACCESS SITE
-  CAMP GROUNDS
-  PARKS
-  BOAT RENTALS

0 1 2 MILES

0 1 2 KILOMETERS

EXXON MINERALS COMPANY
CRANDON PROJECT

**RECREATIONAL RESOURCES
IN THE
ENVIRONMENTAL STUDY AREA**

BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION,
JANUARY, 1978. FOREST CO. AND LANGLADE
CO. HIGHWAY MAPS.

DAMES & MOORE

FIGURE 2.9-3

found in the environmental study area. The nearest stream considered suitable for canoeing is the Wolf River downstream of Lower Post Lake, 3 to 5 km (2 to 3 miles) west and south of the environmental study area. For the adventuresome canoeist, portions of Swamp Creek can be canoed below the confluence of Outlet Creek and Swamp Creek.

There was ample opportunity for land-based recreational activities on the public lands in the environmental study area. Camping and hunting are popular recreational activities in the environmental study area. Public camping facilities are available at the Forest County Veterans Memorial Park (65 sites) and at private campgrounds on Rolling Stone Lake, Lake Metonga, the Lily River and near Rice Lake (Figure 2.9-3). Campgrounds in Forest County generally operate at less than 30 percent capacity (see section 2.10, Socioeconomics). Public picnic areas are located at the Forest County Veterans Memorial Park on Lake Metonga. Picnic tables are also available at town parks on the northern shore of Mole Lake and the northeastern shore of Rolling Stone Lake, and at local, private campgrounds. There are no designated hiking trails within the environmental study area. The nearest hiking trail is located at Ed's Lake, 1.6 km (1 mile) east of the environmental study area in Nicolet National Forest.

Winter recreational activities include snowmobiling and cross-country skiing. Segments of three snowmobile routes are located within the environmental study area: (1) the 100-mile Snow Safari Route, (2) the Lumberjack Memorial Trail, and (3) the Pearson-Tombstone Sno-Riders Trail system (De Waal and Johansen, 1977; Langlade County Snowmobile Council, undated). In all, there are approximately 92 km (57 miles) of

snowmobile trails in the environmental study area (Figure 2.9-3). No public cross-country ski trails that can be used free of charge are located in the environmental study area. The closest public cross-country ski trail is approximately 1.6 km (1 mile) east of the environmental study area at Ed's Lake in Nicolet National Forest. There also are ample opportunities to cross-country ski within the environmental study area on unplowed logging roads and trails.

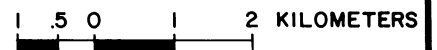
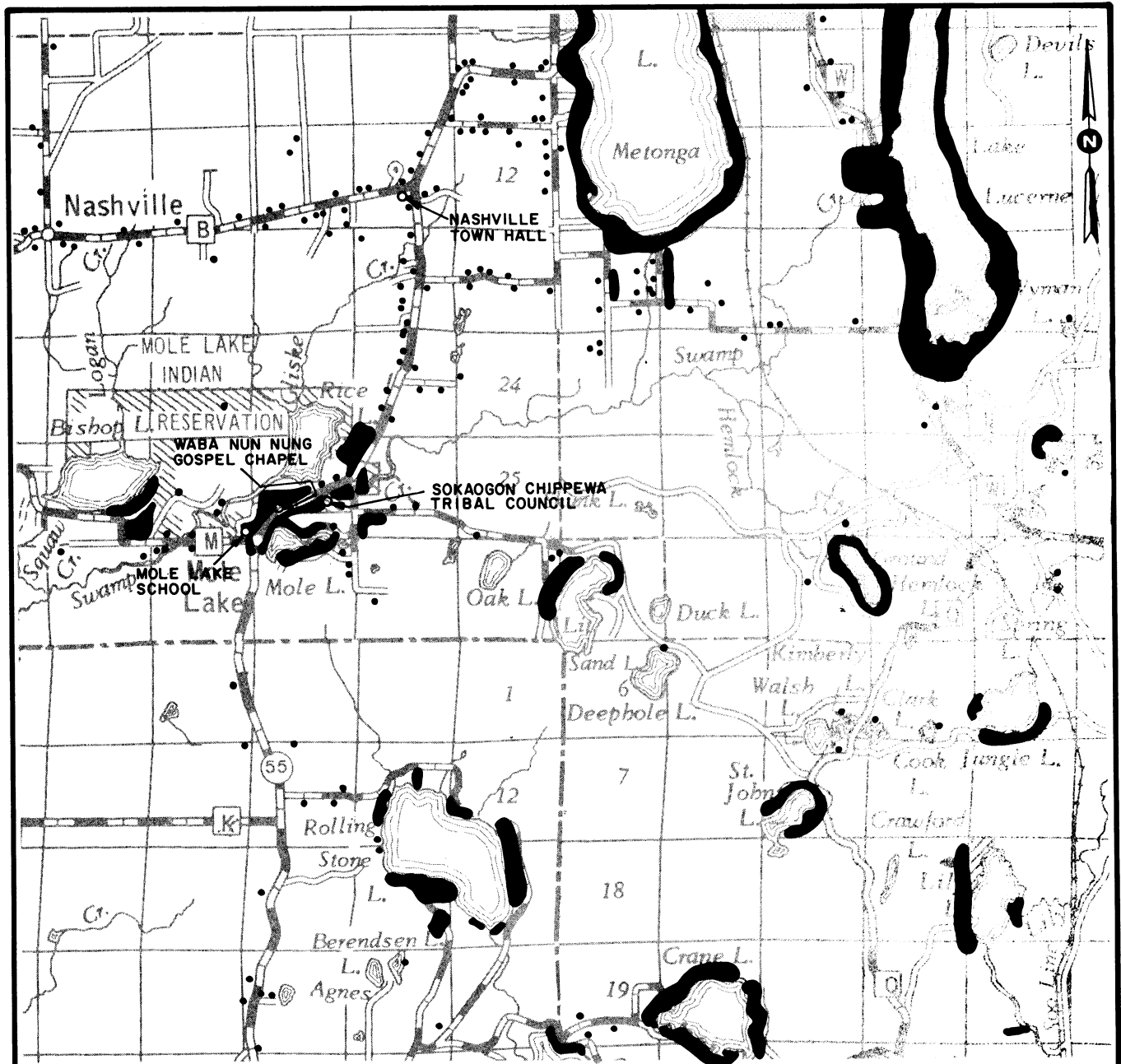
The large areas of public land and land open to recreation through Forest Crop Law supplement the recreational resources discussed above and shown on Figure 2.9-3. There were approximately 3,675 ha (9,075 acres) of public land in the environmental study area that are open to passive recreational activities, including the Lily Lake Wildlife Management Area, Spider Creek Wildlife Management Area, county forests, state trust lands, and a few small parcels of township land. Additional passive recreational opportunities are provided by the 3,136 ha (7,742 acres) of tax law lands in the environmental study area (see Figure 2.9-7 for the location and distribution of these lands). These lands can generally be used for passive recreational activities. Passive recreational activities such as automobile sightseeing, hiking, horseback riding, nature study, bird watching, and bicycling are available in the environmental study area even though no specific facilities have been created for these activities.

Although not located in the environmental study area, there are two nearby recreational areas that attract and receive substantial use by out-of-region visitors. The Nicolet National Forest, located 1.6 km (1 mile) east of the environmental study area, provides opportunities for most types of

recreation dependent upon natural resources. A large portion of the supply of recreational resources included in Table 2.9-1 is provided by Nicolet National Forest. The Upper Wolf River Fishery Area begins approximately 16 km (10 miles) south of the environmental study area along the Wolf River. This area is primarily used by canoeists and fishermen. Discussion of other regional recreational areas can be found in section 2.10, Socioeconomics.

2.9.2.4 Residential/Institutional

The environmental study area is located in the civil townships of Nashville and Lincoln in Forest County and Ainsworth Township in Langlade County. The final 1981 population estimates for the townships of Nashville, Lincoln, and Ainsworth are 781, 576, and 441, respectively (Davis, 1982). The 1981 estimated population densities for these townships were 10.7, 8.2, and 6.1 people per square mile, respectively, far below the 1980 state average of 86.4 (Davis, 1982). Most residences in the environmental study area were concentrated along large lakes (Figure 2.9-4). Forest and Oneida counties have peak seasonal populations that total nearly 190 percent of the resident population (Uekert, 1977), indicating that a substantial proportion of the residences in Forest and Oneida counties is used for seasonal recreational purposes. Nearly half (49 percent) of all housing units in Forest County are second homes (see section 2.10, Socioeconomics). Seasonal and permanent residences are so interspersed with one another that it was not practical to identify them separately. Most permanent residences were located in Mole Lake, along Lakes Metonga and Lucerne and along Highway 55, County Highway B, Keith Siding Road and Airport Road.



KEY:

-  CONCENTRATION OF RESIDENCES
-  SINGLE RESIDENCE

EXXON MINERALS COMPANY
CRANDON PROJECT

**RESIDENTIAL CONCENTRATIONS
AND INSTITUTIONS IN THE
ENVIRONMENTAL STUDY AREA**

BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION,
JANUARY, 1978. FOREST CO. AND LANGLADE
CO. HIGHWAY MAPS.

DAMES & MOORE

FIGURE 2.9-4

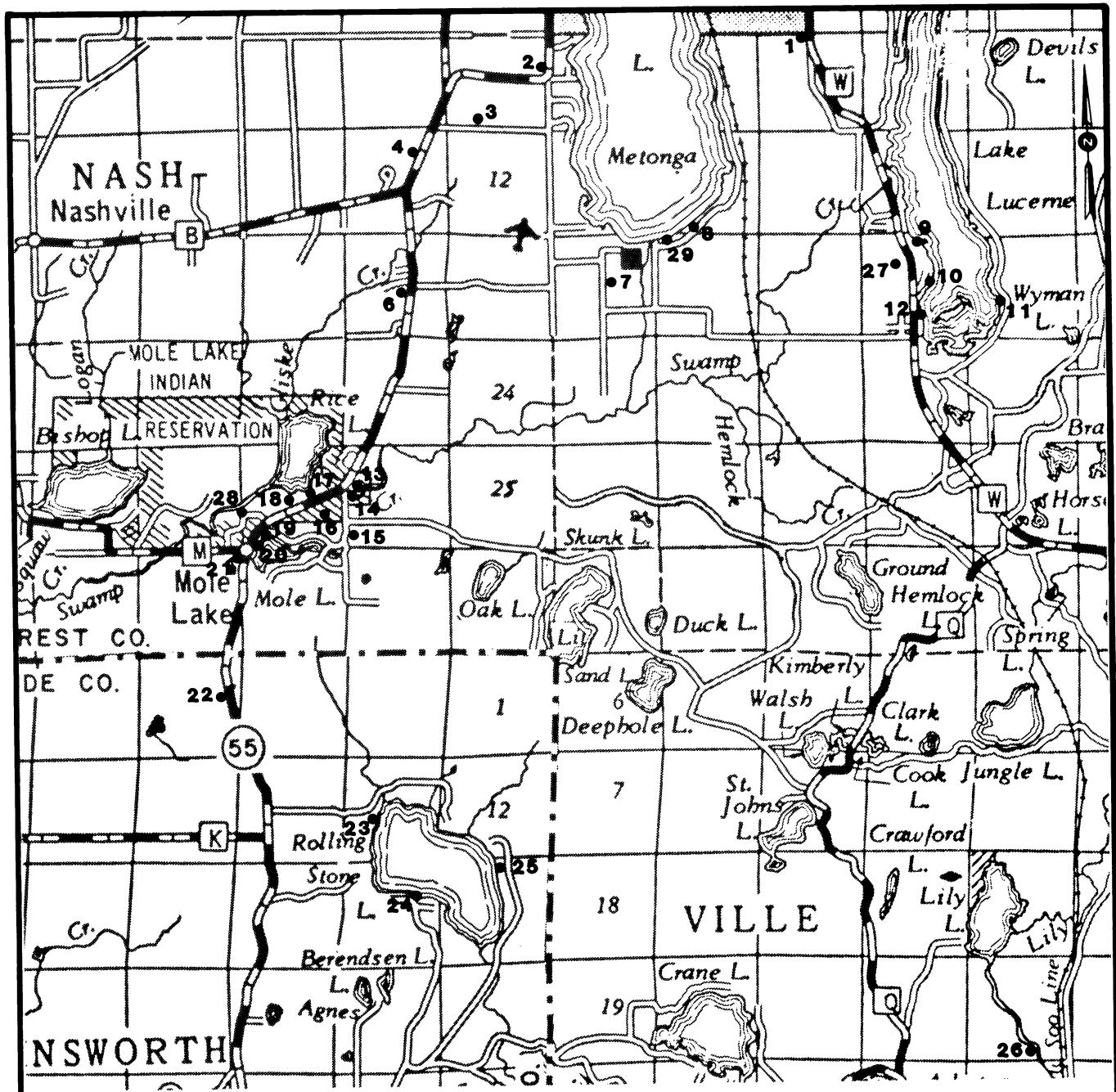
Little Sand Lake, the closest large lake to the ore body, has a developed shoreline with approximately 44 residences. Many of the residences clustered along the northwest shore of Little Sand Lake, as well as other lakes in the environmental study area, were 1- or 2-room seasonal cottages. Several new seasonal residences have been constructed along the eastern shore of Little Sand Lake in recent years, but there was no new home construction concentrated in or adjacent to the mine/mill area. Other residences were sparsely located along roads in the site area.

The town nearest the ore body was the unincorporated community of Mole Lake. In early 1982 the Mole Lake Indian Community had a population of 262 (Divine, 1982).

There were only four institutional buildings in the environmental study area (Figure 2.9-4). There were no institutions generally considered sensitive receptors within the environmental study area other than the Mole Lake School. The nearest nursing homes are in Crandon, 8 km (5 miles) north; Laona, 29 km (18 miles) northeast; Rhinelander, 45 km (28 miles) west; Eagle River, 63 km (39 miles) northwest; and Antigo, 74 km (46 miles) southwest. The nearest hospitals are in Rhinelander, Eagle River, and Antigo.

2.9.2.5 Commerical/Industrial

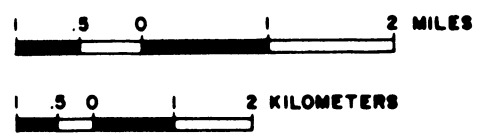
Businesses and industries in the environmental study area were primarily related to tourism or forest products. The locations of the 28 commercial/industrial establishments in the environmental study area are shown on Figure 2.9-5. The numbers on Figure 2.9-5 correspond to the list of



KEY:
 23 ● COMMERCIAL/INDUSTRIAL FACILITIES

NOTE: BUSINESSES ARE IDENTIFIED BY NUMBER IN TABLE 2.9-2.

BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION, JANUARY, 1978. FOREST CO. AND LANGLADE CO. HIGHWAY MAPS.



EXXON MINERALS COMPANY	
CRANDON PROJECT	
COMMERCIAL/INDUSTRIAL FACILITIES	
IN THE	
ENVIRONMENTAL STUDY AREA	
DAMES & MOORE	FIGURE 2.9-5

commercial/industrial establishments presented in Table 2.9-2. The only area where there was a concentration of businesses was near Mole Lake (Figure 2.9-5). The most frequently provided services were food, taverns, lodging, and boat rentals (Table 2.9-2). The only businesses resembling industry are an auto salvage operation, two logging contractors, and a general contractor. All other businesses are service oriented. Crandon, 8 km (5 miles) north, is the nearest area with a concentration of business and light industry.

2.9.2.6 Transportation

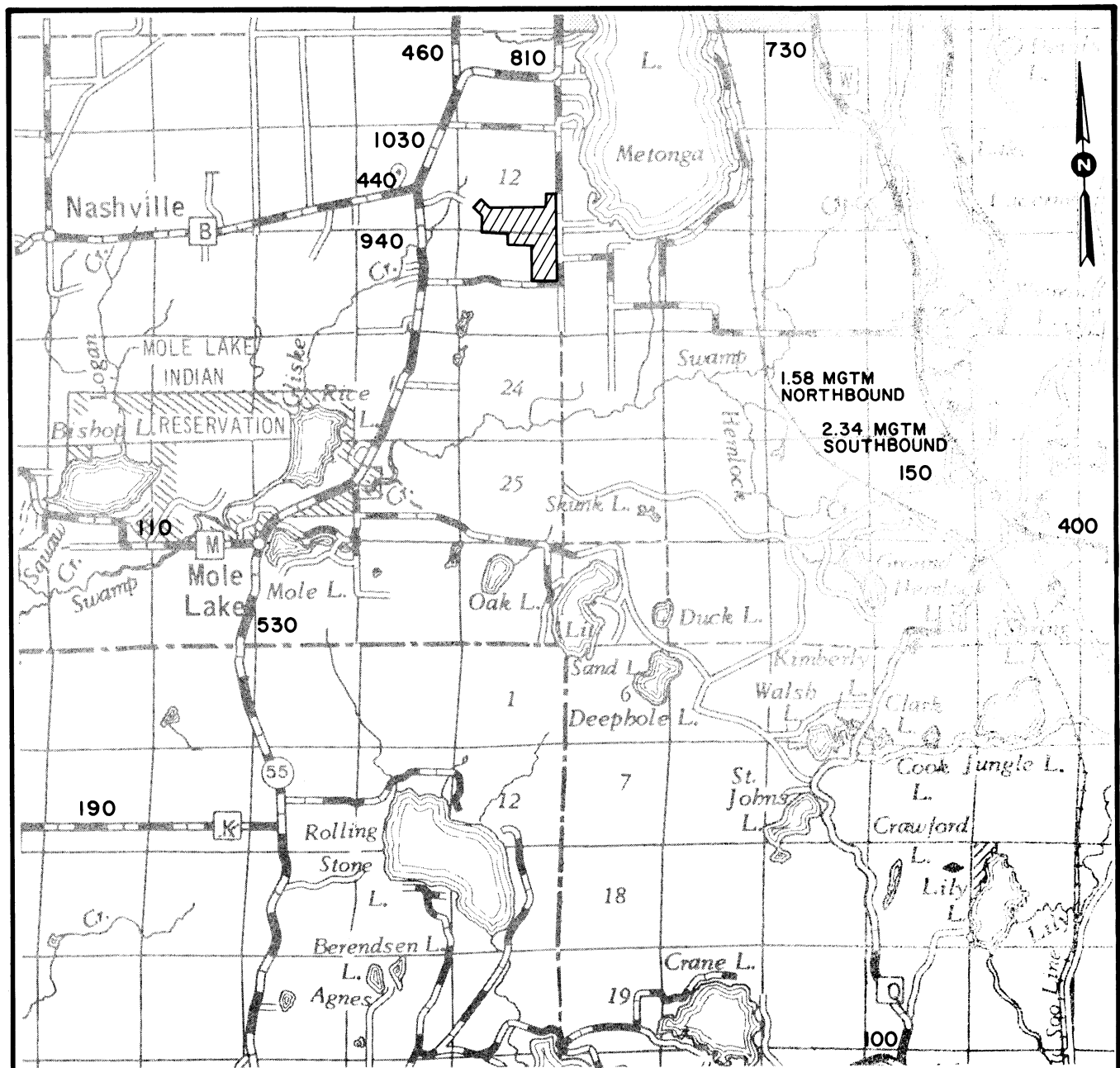
For northern Wisconsin, the regional study area has a well-developed system of federal, state, and county highways, and all lands within the environmental study area are within 3 to 5 km (2 to 3 miles) of a county highway. Additional access is provided by numerous town roads (Figure 2.9-6). Average daily traffic counts in the environmental study area range between 100 vehicles on County Trunk Q and 1,840 vehicles on U.S. Highway 8, which passes through Crandon to the north of the environmental study area (Grossen, 1982). Seasonal traffic levels fluctuate widely in the region because of tourist traffic, and the average daily traffic in June, July, and August ranges from 50 to 100 percent greater than in the remaining months of the year (Wagner, 1977). Weight capacity on roads in the environmental study area is generally 8,172 kg (18,000 pounds) per axle; however, this may vary depending upon conditions. During spring frost breakup all county and town roads have 10,896 kg (24,000 pound) total weight limits (Pitts, 1982; Schallock, 1982). The only current plans for upgrading of roads in the environmental study area are being implemented as funds become available to surface the gravel portion of County Highway Q between County Highways W and DD.

TABLE 2.9-2

BUSINESSES AND INDUSTRIES IN THE ENVIRONMENTAL STUDY AREA

MAP ^a NO.	BUSINESS	TYPE														
		ARTS & CRAFTS	AUTOMOTIVE	SALVAGE	BAIT	TAVERN	BOATS & MOTORS	CABINS & COTTAGES	CAMPING	FOOD	GENERAL CONTRACTING	GROCERY	HORSES	LOGGING	RECREATION	SYRUP
1	Crandon Riding Stables											X				
2	Payless Tire Store		X													
3	Lemke's Maple Syrup															X
4	Miles Phalen & Sons Salvage			X												
5 ^b	Kramer's Ski Trails														X	
6	Mihalko Land & Logging Co.												X			
7	Forest Transmission Service		X													
8	Lake Metonga Resort					X	X	X		X						
9	Radida Resort				X	X	X	X		X						
10	Island View Resort						X	X								
11	Rustic Haven Resort						X	X								
12	Lake Lucerne Resort				X			X								
13	Arrowhead Drive-In & Cafe	X								X						
14	Chippewa Arts & Crafts Coop Shop	X								X						
15	Walentowski Logging												X			
16	Grass Festival Grounds														X	
17	The Mole Hole					X				X						
18 ^c	Mole Lake Community Center															X
19	Mole Lake Trading Post	X														X
20	Bauman's Grocery		X		X		X									X
21	Sundown Tap					X				X						
22	Forest Inn					X				X						
23	Rolling Stone Lake Resort						X	X								
24	Schmidt's Walleye Lodge					X	X	X	X	X						
25	Hills East-Shore Resort					X	X	X		X						
26	Lily River Lodge				X	X	X	X	X	X						
27	Joe Perry & Sons Inc.													X		X
28	Sokaogon Chippewa Community Park		X							X						
29	Forest County Veterans Memorial Park									X						

^aSee Figure 2.9-5 for location.^bNo longer in operation.^cUnder Construction.



KEY:

190 AVERAGE DAILY TRAFFIC (1979)

MGTM MILLION GROSS TON MILES

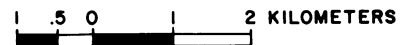
 AIRPORT

 BLACKTOP ROAD

 GRAVEL ROAD

 COUNTY HIGHWAY

 STATE HIGHWAY



EXXON MINERALS COMPANY

CRANDON PROJECT

**TRANSPORTATION SYSTEMS
IN THE ENVIRONMENTAL
STUDY AREA**

BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION, JANUARY, 1978. FOREST CO. AND LANGLADE CO. HIGHWAY MAPS.

DAMES & MOORE

FIGURE 2.9-6

The only airport in the environmental study area was the Crandon Municipal Airport, 4.8 km (3 miles) north of the ore body (Figure 2.9-6). It is classified as a less-than-basic utility airport and does not have commercial service. The longest runway is asphalt, 944.9 m (3,100 feet), oriented west-northwest to east-southeast. A second runway consists of turf and is 822.6 m (2,700 feet) in length oriented in a north-south direction. The main (asphalt) runway is open year round and the turf runway is open from April 1 to December 1. The main runway is lighted from dusk to dawn. In 1980-81, there were approximately 1,250 takeoffs and landings (Thomas, 1982). Of these, 50 were for a weekly charter taxi service from Milwaukee, 200 were from local users, and 1000 were from non-resident users. There is no regularly scheduled passenger service to the Crandon Municipal Airport.

The only railroad within the environmental study area was a branch of the Soo Line, located 4.1 km (2.5 miles) northeast of the ore body (Figure 2.9-6). This line begins at Wisconsin Junction, 8.1 km (5 miles) north of Crandon, passes through Crandon, and extends south to Milwaukee. At Wisconsin Junction, it joins another branch of the Soo Line that traverses Wisconsin from east to west.

The portion of the Soo Line through the environmental study area has an annual rail freight density of 1.58 million gross ton miles northbound and 2.34 million gross ton miles southbound (Henning, 1982). This rail line has recently been upgraded which included reballasting, tie replacement, and installation of welded rail. With this level of capital improvement, the line is unlikely to be abandoned in the near future. No rail passenger service is available in or near the environmental study area.

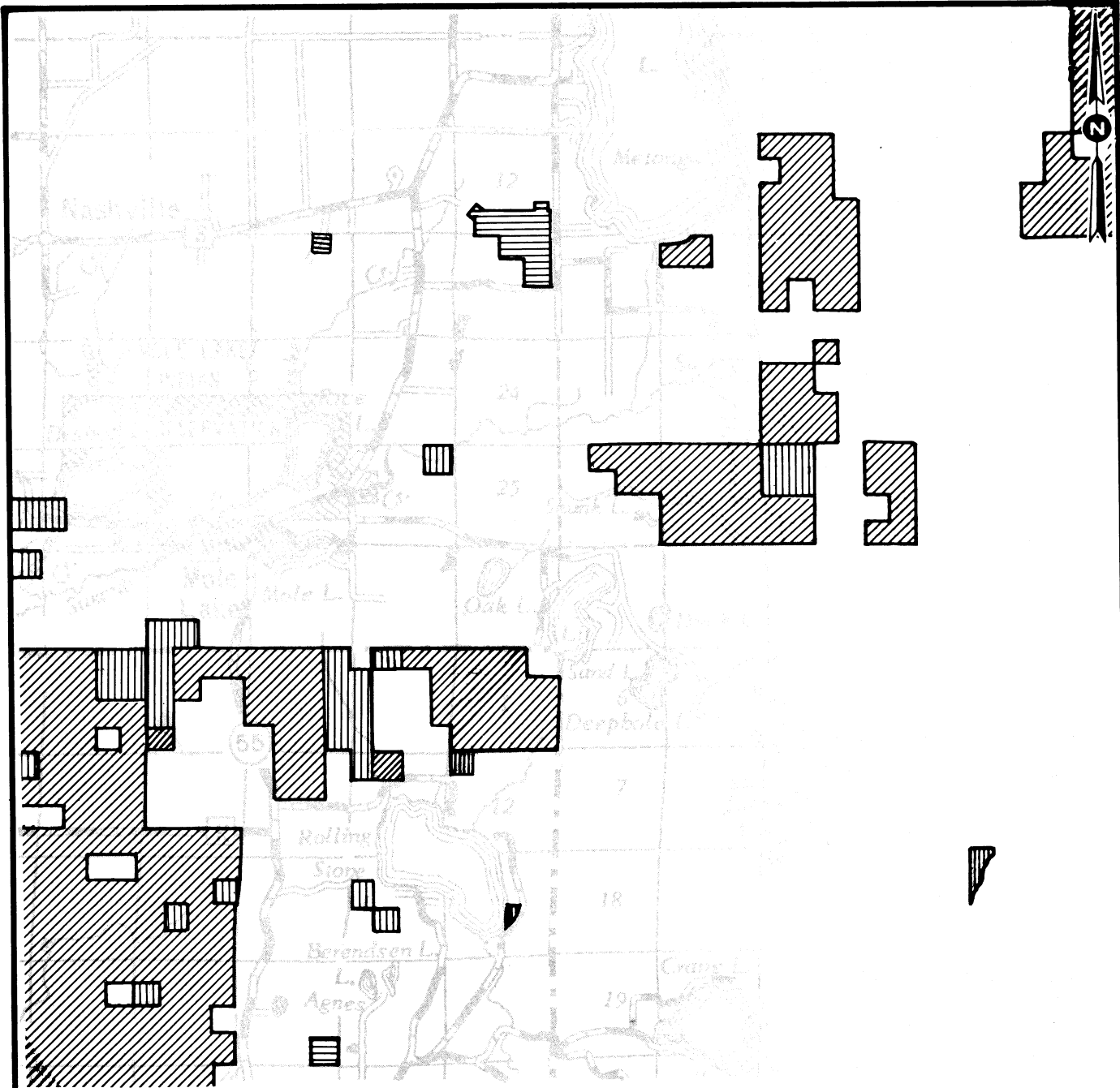
2.9.2.7 Public Lands

Approximately 15 percent or 3,824 ha (9,442 acres) of the land in the environmental study area was publicly owned, most of which was county forest land. County forest lands covered 3,181 ha (7,855 acres) of the environmental study area. Other public lands include state trust and DNR owned lands, 494 ha (1,220 acres); the county airport, 96 ha (237 acres); a county park, 32 ha (80 acres); and 20 ha (50 acres) of township land (Figure 2.9-7). County forests are multiple-use oriented, with timber production the primary land use as discussed in subsection 2.9.2.1. State trust lands are also managed for timber production but are often sold to finance educational needs (Wisconsin Board of Commissioners on Public Lands, 1974).





2.9.2.8 Special Use Areas

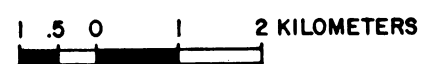
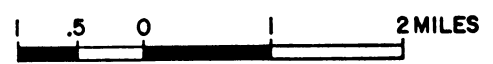
Resources within the environmental study area considered to be special use areas were limited to those associated with valuable wildlife habitat. Within the environmental study area, there were no special use areas associated with educational use, such as school forests, or with scientific research, such as state scientific areas.

The wildlife habitats that were considered to be special use areas were deeryards, bald eagle and osprey nest sites, and trout streams. These three types of resources are formally designated as special use areas by the DNR on lands under their management. The DNR also has cooperative agreements with other resource management agencies (U.S. Forest Service, U.S. Fish and Wildlife Service, county forest administrators) where these resources are managed as special use areas. The DNR encourages private and corporate land



KEY:

-  PRIVATE
-  COUNTY
-  STATE
-  CITY, TOWN, VILLAGE



BASE MAP REFERENCE: WISCONSIN DEPARTMENT OF TRANSPORTATION, JANUARY, 1978. FOREST CO. AND LANGLADE CO. HIGHWAY MAPS.

REFERENCES:

ROCKFORD MAP PUBLISHERS, INC., 1980 LAND ATLAS AND PLAT BOOK, FOREST COUNTY, ROCKFORD, ILL.

ROCKFORD MAP PUBLISHERS, INC., 1982 LAND ATLAS AND PLAT BOOK, LANGLADE COUNTY, ROCKFORD, ILL.

EXXON MINERALS COMPANY CRANDON PROJECT	
PUBLIC LANDS IN THE ENVIRONMENTAL STUDY AREA	
DAMES & MOORE	FIGURE 2.9-7

managers to treat these resources in a similar manner, as special use areas. There were five deeryards recognized by the DNR in the environmental study area. The State of Wisconsin lists bald eagles and ospreys as endangered species and recommends minimal disturbance of nest sites by land managers. There were seven bald eagle and six osprey nest sites in the environmental study area that were considered special land use areas. Trout streams have already been discussed. More detailed descriptions and discussions of deeryards and bald eagle and osprey nests are presented in section 2.6, Terrestrial Ecology; and of trout streams in section 2.5, Aquatic Ecology.

2.9.2.9 Multiple Use Areas

Multiple use of lands in the environmental study area most frequently occurred in the forestry, recreation, and public lands categories. For this study the primary use was mapped and discussed in subsection 2.9.2. In most cases, forestry is the primary use and it was given precedence over designation of areas as recreation, public lands, or special use. Although land management on county forest lands generally follows the concept of multiple use, its primary use was forestry.

2.9.3 Aesthetics

The environmental study area contains most of the visual amenities that are common to northern Wisconsin. The numerous lakes, streams, forestlands, low population, and rolling terrain contribute to the scenic diversity of the environmental study area, offering a pleasurable sightseeing experience. Seasonal attractions include the autumn leaf colors, winter snow scenes, and the spring flora.

The landscapes in the environmental study area are primarily natural. The topography is gently rolling with prominent hills and ridges located near Nashville, between Lake Metonga and Lake Lucerne, west of Oak Lake, and west of Hemlock Creek. Sugarbush Hill, the second highest point in Wisconsin, is located northeast of the environmental study area, 6.4 km (4 miles) east of Crandon. Forested upland and forested wetland are the predominant landscape views.

There are no state or federally designated scenic areas, such as state parks, Wisconsin Scientific Areas, or National Natural Landmarks, within the environmental study area. A state historical roadside marker is located on the Mole Lake Indian Community. A distant view of the environmental study area can be obtained from a lookout tower on Sugarbush Hill northeast of the environmental study area.

Most views along the county and state highways and town roads in the environmental study area consist of the adjacent forestland but are occasionally interrupted by open land, agricultural land, and rural shoreline residences. Scenic vistas are frequent along the shoreline roads of Lake Metonga and Lake Lucerne. Motorists traveling south from Crandon along State Highway 55 within the site area have a field of view that extends an average of approximately 1.4 km (0.9 mile) southeast. Views from gravel roads in the site area are largely screened and limited by the adjacent hardwood forest. Within the environmental study area, there are no known intrusive man-made features such as towers and airport beacons.

Evidence of mineral exploration activities can be partially viewed from Sand Lake Road, but a buffer strip of hardwood trees screens most of the

area. The areas cleared for drilling have been graded, seeded, and mulched, and most trees and slash have been disposed of properly.

2.9.4 Summary and Conclusions

Land Use

1. The major land use within the environmental study area is forestry. Other major land uses include recreation, residential, agriculture, and transportation.
2. The land use and land cover within the environmental study area is as follows: forestry, 77 percent; recreation, 12 percent; residential, 6 percent; agricultural, 5 percent; and transportation, less than 1 percent.
3. Approximately 15 percent of the land in the environmental study area is publicly owned, most of which is county forestland. There are three town parks and one county park within the environmental study area.
4. Thirty-one lakes and approximately 43 km (27 miles) of trout stream provide ample opportunities for water-based recreation. The abundant public land in the environmental study area also provide ample opportunity for land-based recreation. Hunting and snowmobiling are the most common land-based recreational uses.
5. The majority of the residences in the environmental study area are located along lake shores. There is also a concentration of residences at the village of Mole Lake and in the Mole Lake Indian Community.
6. There are no commercial or retail facilities in or immediately adjacent to the site area.
7. There is one airport in the environmental study area, and one railroad, the Soo Line, passes through the environmental study area in a north-south direction.

Aesthetics

1. The environmental study area contains the visual amenities common to northern Wisconsin. The numerous lakes and streams, forestlands, and gently rolling terrain contribute to the scenic diversity of the area.

2. Seasonal attractions include the autumn leaf colors, winter snow scenes, and spring flora.
3. There are no designated scenic areas, such as state parks, Wisconsin Scientific Areas, or National Natural Landmarks, in or near the environmental study area.

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2.10 SOCIOECONOMICS

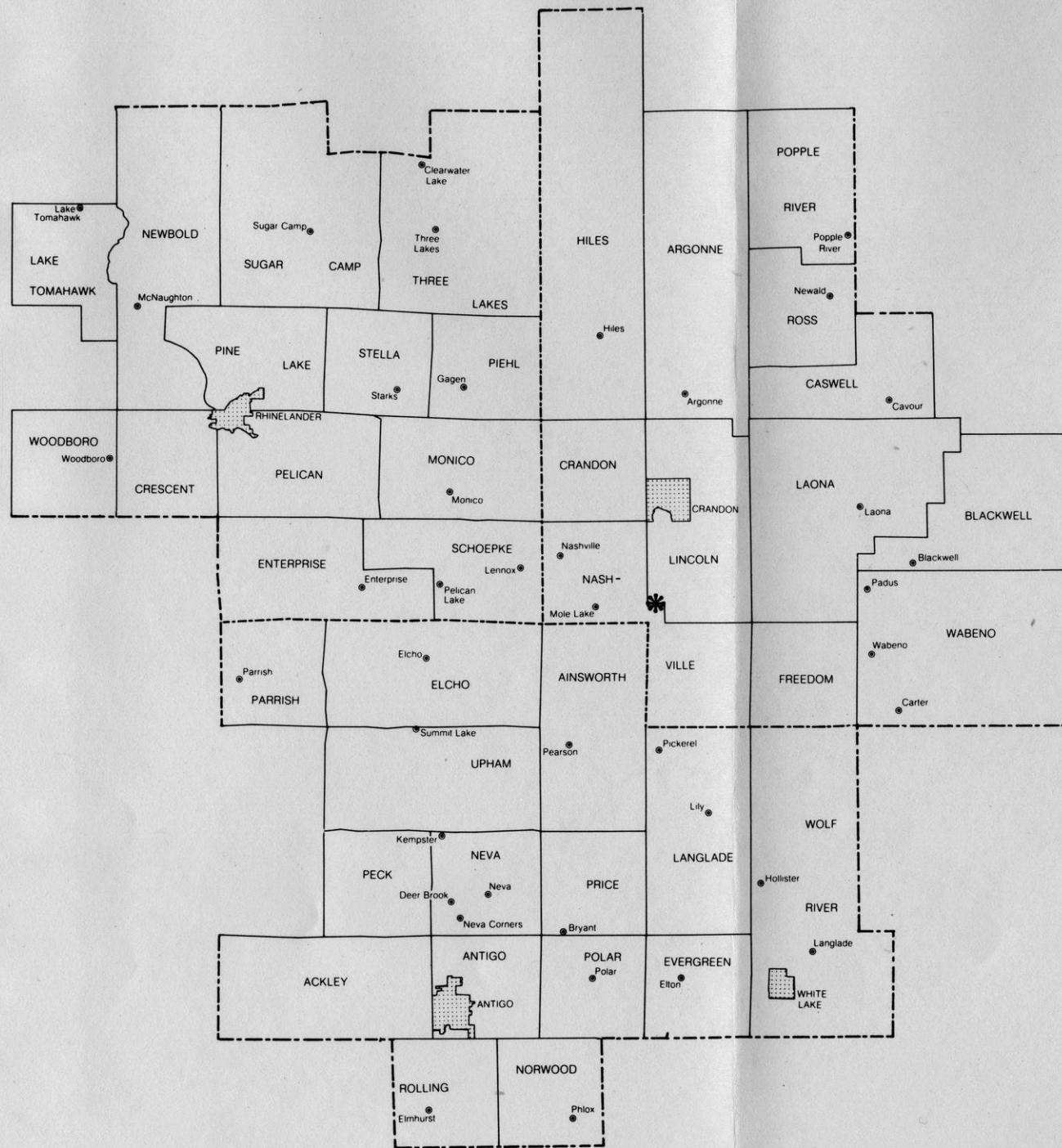
INTRODUCTION






The local study area defined for the proposed Crandon Project consists of 40 towns and four incorporated areas in Forest, Langlade, and Oneida counties (Figure 2.10-1). It includes the cities of Crandon (Forest County), Antigo (Langlade County), Rhinelander (Oneida County), and White Lake Village (Langlade County). Table 2.10-1 lists the 40 towns included in the local study area. The local study area covers 2,398.6 square miles. (For an explanation of local study area, see RPC, 1980a.)

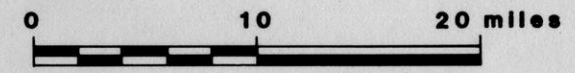
Historical Background

The earliest inhabitants of the northern Wisconsin region which encompasses the local study area were Native Americans. The Native American cultures which inhabited this area before white settlement began included the Chippewa, Potawatomi, Menominee, and Sioux.

Physical resources such as forests, rivers, and streams strongly influenced the settlement and development of northern Wisconsin. The first white explorers entered Wisconsin in the mid 1600's and shortly thereafter fur trade was established between these French explorers and the Native Americans in the



-  **County Boundary**
-  **Township Boundary**
-  **Incorporated Area**
-  **Unincorporated Village**
-  **Crandon Project Discovery Site**



Source: RPC, Inc., Definition of the Local Study Area.

EXXON MINERALS COMPANY CRANDON PROJECT	
LOCAL STUDY AREA	
rpc, inc.	FIG. 2.10-1

Table 2.10-1

LIST OF TOWNS IN THE LOCAL STUDY AREA

Forest County

Argonne	Laona
Blackwell	Lincoln
Caswell	Nashville
Crandon	Popple River
Freedom	Ross
Hiles	Wabeno

Langlade County

Ackley	Parrish
Ainsworth	Peck
Antigo	Polar
Elcho	Price
Evergreen	Rolling
Langlade	Upham
Neva	Wolf River
Norwood	

Oneida County

Crescent	Pine Lake
Enterprise	Schoepke
Lake Tomahawk	Stella
Monico	Sugar Camp
Newbold	Three Lakes
Pelican	Woodboro
Piehl	

SOURCE

Research and Planning Consultants, Inc.

area. Langlade County is named for the leader of the French garrison at Green Bay--De Langlade.

French influence in the area survived until the 1760's when French trading posts were replaced by British military power. American control of the area began after the War of 1812.

The three counties of which the local study area is a part were established between 1879 and 1885, approximately 30 years after Wisconsin became a state. Settlement of the three counties was due to the logging and lumber industries which attracted people to the area. After the lumber industry declined in the 1920's, reforestation activities were undertaken to establish future forest resources.

Forest County. Forest County was organized in 1885 and encompasses 14 townships and one city, Crandon, the county seat. When the county was organized, it was the logging and lumber industries which attracted people to the area. When timber resources were depleted at the turn of the century, some of the population followed the logging ventures to other areas in search of employment.

Fire control and reforestation have allowed timber and wood products to assume greater importance in the county. The forest resource provides an excellent recreation resource as well. The recreation industry also provides employment in the county. Dairy farming is the major agricultural activity today.

Langlade County. Langlade County was organized in 1879 out of part of Shawano County. Today it is comprised of 17 townships, one incorporated village, and the city of Antigo, the county seat. At the time of modern settlement, most of Langlade County was held by the Chippewa. In 1842, the Chippewa lost control of their claim to northern Wisconsin. The first permanent white settler in Langlade County established a farm, logging operation, and trading post in the 1850's. Between 1850 and 1880 most of the population was involved with the logging operations. With the decline in the timber industry in the 1920's, agricultural production increased. Dairying and potato farming are now the principal agricultural activities in the county.

As in Forest County, with the advent of forest management techniques (fire control and reforestation) the forests have not only continued to provide a timber resource but an attractive recreation resource as well.

Oneida County. Oneida County was organized in 1885 and is comprised of 20 townships and the city of Rhinelander, the county seat. Initial settlement of Oneida County was due to the logging industry. The first logging operations occurred at the mouth of the Tomahawk River near Rhinelander in the 1850's. The heaviest stands of White and Norway pine in the state were in this area along the Wisconsin River, north of Rhinelander. By

the 1890's, eight large saw mills were operating in Rhinelander. By the 1920's, the pine stands had declined and many of these operations closed. Papermaking from pulpwood products replaced the pine logging industry and a large pulp and paper mill at Rhinelander provides a large share of the county's manufacturing jobs.

Recreation industry development began in Oneida County, as well as Forest and Langlade counties, when replanting was begun in the 1920's. Oneida County has numerous lakes and streams, as well as forests, and the recreation industry provides an important part of Oneida County's economy.

Organization of this Section

This introduction is followed by eight subsections. The first seven subsections provide profiles of existing conditions in the local study area for elements of the overall socioeconomic assessment:

1. Demographic analysis
2. Economic analysis
3. Housing and land use analysis
4. Public facilities and services analysis
5. Fiscal analysis
6. Sociocultural analysis
7. Native American communities analysis

The eighth subsection summarizes the findings and collections from the preceding subsections.

Organization within Profiles

We present the profile data in tables. Each subsection begins with a narrative discussion of trends and highlights of the data.

To the extent possible, we provide data for each of the three counties, three cities, and 40 towns. Data for White Lake Village, the only other incorporated area, are included in the total for Wolf River Town unless otherwise stated. Unless otherwise designated, county data are for the entire county, not just the portion of the county within the local study area. In some cases for comparison, we provide national data, data for the state of Wisconsin, and data for the local study area as a whole. Within each table, we have organized the data by jurisdiction as follows:

1. United States
2. State of Wisconsin
3. Local study area
4. Forest, Langlade, and Oneida counties
5. The cities of Crandon, Antigo, and Rhinelander
6. The 40 towns listed in Table 2.10-1, in alphabetical order by county (Forest, Langlade and Oneida)

Calculation of Local Study Area Data

Many types of data for the local study area are not directly available from published sources. We calculate local study area data by adding the data for all towns and cities in the local study area, if such data are available.

However, in many cases, data are not collected for towns by any organization; for some types of data, such as population characteristics, we calculate local study area data as a percent of the three-county total, based on the population of the local study area as a percent of the three-county total population for the year reported.

There are some types of data, such as those for the economic profile, which do not lend themselves to calculation for the local study area as a percent of the three-county total. Businesses, industries, and other employers are not likely to be distributed throughout a county in any predictable way. There is no reasonable method to arrive at a multiplier for distributing employers within counties. Therefore, in many of the tables in the economic analysis and in some of the tables in the other subsections, we are unable to include data for the local study area as a whole.

2.10.1 DEMOGRAPHIC PROFILE

This subsection describes the demographic conditions in the local study area in terms of trends in population based on age, sex, ethnic composition, and rural versus urban living patterns.

Of the three counties in the local study area, Oneida had the greatest population in 1979 (30,379), followed by Langlade (19,797) and Forest (8,713). The local study area is rural, with only the cities of Antigo and Rhinelander classified as urban according to the Bureau of the Census. The city of Crandon does not meet the criteria for classification as "urban."

In 1970, the majority of local study area residents were white (98.5 percent) with the largest number of minority population being Native Americans (1.1 percent). The local study area population was 49.6 percent male and 50.4 percent female in 1979. The population was older than for the state as a whole, with both median age and the percentage of population 65 and older being greater than for the state as a whole. This trend has been more pronounced in recent years. While the local study area had a higher proportion of school age population than the state in 1970, by 1980 the proportion was below the state average. In general, then, the local study area is ethnically homogeneous and stable with respect to distribution by sex. The local study area has a growing population, although one that is becoming increasingly older.

2.10.1.1 Population Trends

The local study area as a whole experienced steady population growth between 1970 and 1979, with a growth rate twice that of Wisconsin (Table 2.10-2).

Oneida County is the only one of the three counties that has experienced consistent population growth since 1950. Growth in this county, especially since 1970, has been noteworthy. The compound annual growth rate of 2.5 percent is almost four times that of the state (0.7 percent). Both Forest and Langlade counties, in contrast, had fewer residents in 1979 than in 1950, due to outmigration. Outmigration was particularly severe in Forest County in the 1950's, resulting in a 20.1 percent reduction in population during that decade. Population in Forest County increased slightly during the 1960's and grew at a compound annual rate of 1.4 percent during the 1970's, a rate double the state's rate of 0.7 percent. Population in Langlade County decreased steadily between 1950 and 1970. Compound annual growth for the county since 1970 (0.3 percent) has been at a rate of less than half that of Wisconsin.

The population growth of Oneida and Forest counties and the associated high net immigration since 1970 can be explained in part by a phenomenon known as "turnaround migration." This term refers to the national trend observed since 1970 of net migration away from, rather than into, metropolitan areas. Rural counties, especially those with ample recreational resources, are

Table 2.10-2

POPULATION TRENDS, 1950-1979

	<u>State of Wisconsin</u>	<u>Local Study Area</u>	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>	<u>City of Crandon</u>	<u>City of Antigo</u>	<u>City of Rhinelander</u>	<u>Argonne Town</u>	<u>Blackwell Town</u>
Population ^a										
1950	3,331,615	47,130	9,437	21,975	20,648	1,922	9,902	8,774	613	122
1960	3,952,839	45,052	7,542	19,916	22,112	1,679	9,691	8,790	461	147
1970	4,417,821	45,315	7,691	19,220	24,427	1,582	9,005	8,218	390	418
1975	4,581,701	48,537	8,184	19,394	28,302	1,703	8,862	8,703	413	361
1979	4,688,278	50,552	8,713	19,797	30,379	1,849	8,565	8,407	417	364
Net change (percent)										
1950-1960	+18.6	- 4.6	-20.1	-9.4	+7.1	-12.6	-2.1	+0.2	-24.8	+20.5
1960-1970	+11.8	+ 0.6	+ 2.0	-3.5	+10.5	-5.8	-7.1	-6.5	-15.4	+184.4
1970-1975	+3.7	+ 7.1	+6.4	+0.9	+15.9	+7.6	-1.6	+5.9	+5.9	-13.6
1975-1979	+2.3	+ 4.2	+6.5	+2.1	+7.3	+8.6	-3.4	-3.4	+1.0	+0.8
Population density per square mile ^b										
1950	61.2	20.7	9.4	25.7	18.6	384.4	2,250.5	3,133.6	5.7	1.9
1960	72.6	19.8	7.5	23.3	19.9	335.8	2,202.5	3,139.3	4.3	2.3
1970	81.1	19.9	7.6	22.4	22.0	316.4	2,046.6	2,935.0	3.6	6.4
1975	84.1	21.3	8.1	22.6	25.5	340.6	2,014.1	3,108.0	3.9	5.6
1979	86.1	22.2	8.6	23.1	27.3	369.8	1,946.6	3,003.0	3.9	5.6
Net migration ^c										
1950-1960	+1.9		-28.1	-21.5	-7.8					
1960-1970	+1.2		-3.8	-11.3	+2.6					
1970-1975	+1.1		+10.3	+1.9	+15.1					

(continued)

(Table 2.10-2, continued)

	<u>Caswell Town</u>	<u>Crandon Town</u>	<u>Freedom Town</u>	<u>Hiles Town</u>	<u>Laona Town</u>	<u>Lincoln Town</u>	<u>Nashville Town</u>	<u>Popple River Town</u>
Population ^a								
1950	133	470	204	286	1,807	396	576	77
1960	107	324	207	247	1,430	319	539	60
1970	96	406	276	283	1,395	350	519	36
1975	101	545	295	312	1,453	431	611	37
1979	104	631	311	351	1,467	467	667	55
Net change (percent)								
1950-1960	-19.5	-31.1	+1.5	-13.6	-20.9	-19.4	-6.4	-22.1
1960-1970	-10.3	+25.3	+33.3	+14.6	-2.4	+9.7	-3.7	+40.0
1970-1975	+5.2	+34.2	+6.9	+10.2	+4.2	+23.1	+17.7	+2.8
1975-1979	+3.0	+15.8	+5.4	+12.5	+1.0	+8.4	+9.2	+48.6
Population density per square mile ^b								
1950	3.0	13.7	6.1	2.1	18.1	7.0	8.5	1.5
1960	2.4	9.4	6.2	1.8	14.3	5.6	8.0	1.2
1970	2.2	11.8	8.3	2.1	14.0	6.2	7.7	0.7
1975	2.3	15.9	8.8	2.3	14.5	7.6	9.1	0.7
1979	2.4	18.4	9.3	2.6	14.7	8.2	9.9	1.1

(continued)

(Table 2.10-2, continued)

	<u>Ross Town</u>	<u>Wabeno Town</u>	<u>Ackley Town</u>	<u>Ainsworth Town</u>	<u>Antigo Town</u>	<u>Elcho Town</u>	<u>Evergreen Town</u>	<u>Langlade Town</u>
Population ^a								
1950	247	1,597	768	328	1,699	1,059	687	553
1960	188	1,142	683	302	1,618	833	473	410
1970	178	1,144	681	348	1,692	885	436	342
1975	194	1,079	660	380	1,738	927	439	346
1979	186	1,139	590	466	1,808	1,105	475	385
Net change (percent)								
1950-1960	-23.9	-28.5	-11.1	-7.9	-4.8	-21.3	-31.1	-25.9
1960-1970	-5.3	+0.2	-0.3	+15.2	+4.6	+6.2	-7.8	-16.6
1970-1975	+8.9	-5.7	-3.1	+9.2	+2.7	+4.7	+0.7	+1.2
1975-1979	-4.1	+5.6	-10.6	+22.6	+4.0	+19.2	+8.2	+11.3
Population density per square mile ^b								
1950	7.4	15.0	10.6	4.7	53.3	16.2	19.4	7.7
1960	4.9	10.7	9.4	4.3	50.7	12.7	13.4	5.7
1970	4.6	10.7	9.4	5.0	53.0	13.5	12.3	4.8
1975	5.0	10.1	9.1	5.4	54.5	14.2	12.4	4.8
1979	4.8	10.7	8.1	6.7	56.7	16.9	13.4	5.4

(continued)

(Table 2.10-2, continued)

	<u>Neva Town</u>	<u>Norwood Town</u>	<u>Parrish Town</u>	<u>Peck Town</u>	<u>Polar Town</u>	<u>Price Town</u>	<u>Rolling Town</u>	<u>Upham Town</u>
Population ^a								
1950	1,033	1,034	104	477	902	359	869	461
1960	855	883	79	410	811	269	844	406
1970	819	836	60	413	737	259	914	486
1975	855	860	73	404	770	291	1,011	484
1979	882	878	80	384	773	315	1,175	524
Net change (percent)								
1950-1960	-17.2	-14.6	-24.0	-14.0	-10.1	-25.1	-2.9	-11.9
1960-1970	-4.2	-5.3	-24.1	+0.7	-9.1	-3.7	+8.3	+19.7
1970-1975	+4.4	+2.9	+21.7	-2.2	+4.5	+12.4	+10.6	-0.4
1975-1979	+3.2	+2.1	+9.6	-5.0	+0.4	+8.2	+16.2	+8.3
Population density per square mile ^b								
1950	28.9	29.3	2.9	13.3	25.2	10.1	24.0	6.9
1960	23.9	25.0	2.2	11.4	22.7	7.6	23.3	6.1
1970	22.9	23.7	1.7	11.5	20.6	7.3	25.2	7.3
1975	23.9	24.4	2.0	11.3	21.5	8.2	27.9	7.2
1979	24.6	24.9	2.2	10.7	21.6	8.4	32.5	7.9

(continued)

(Table 2.10-2, continued)

	Wolf River Town	Crescent Town	Enterprise Town	Lake Tomahawk Town	Monico Town	Newbold Town	Pelican Town	Piehl Town	Pine Lake Town
Population ^a									
1950	1,157	836	234	418	399	691	1,928	79	1,299
1960	857	1,117	200	455	314	949	2,415	51	1,617
1970	854	1,441	213	434	306	1,234	2,576	64	1,853
1975	852	1,716	243	516	305	1,684	3,034	86	2,165
1979	943	1,785	247	592	293	1,990	3,221	95	2,450
Net change (percent)									
1950-1960	-25.9	+33.6	-14.5	+8.9	-21.3	+37.3	+25.3	-22.8	+24.5
1960-1970	-0.4	+29.0	+6.5	-4.6	-2.5	+30.0	+6.7	+4.9	+14.6
1970-1975	-0.2	+19.1	+14.1	+18.9	-0.3	+36.5	+17.8	+34.4	+16.8
1975-1979	+10.7	+4.0	+1.6	+14.7	-3.9	+18.2	+6.2	+10.5	+13.2
Population density per square mile ^b									
1950	10.2	26.5	+4.2	12.6	7.6	8.8	41.0	2.3	33.2
1960	7.5	34.3	+3.6	13.7	6.0	12.1	51.4	1.7	41.4
1970	7.5	44.2	+3.8	13.0	5.8	15.7	54.8	1.8	47.4
1975	7.5	52.6	+4.3	15.5	5.8	21.4	64.6	2.5	55.4
1979	8.3	54.8	+4.4	17.8	5.6	25.3	68.7	2.7	62.7

(continued)

(Table 2.10-2, continued)

	Schoepke Town	Stella Town	Sugar Camp Town	Three Lakes Town	Woodboro Town
Population ^a					
1950	379	271	550	1,250	180
1960	332	255	627	1,205	171
1970	358	299	816	1,376	287
1975	378	315	979	1,641	285
1979	380	385	1,164	1,743	444
Net change (percent)					
1950-1960	-12.4	-5.9	+14.0	-3.6	-5.0
1960-1970	+7.8	+17.3	+30.1	+14.2	+67.8
1970-1975	+5.6	+5.4	+20.0	+19.3	-0.7
1975-1979	+0.5	+22.2	+18.9	+6.2	+55.8
Population density per square mile ^b					
1950	8.4	8.2	6.4	15.8	5.2
1960	7.4	7.7	7.3	15.3	5.0
1970	8.0	9.1	9.5	17.4	8.3
1975	8.4	9.5	11.5	20.8	8.3
1979	8.5	11.7	13.6	22.1	12.9

NOTES

^a Estimates for years 1950, 1960, and 1970 are census estimates as of April 1; estimates for 1975 and 1979 are Wisconsin Department of Administration estimates as of January 1 for each year.

^b Population density is calculated based on population and square mile of land area in 1960; inland water area is not included in the density calculations.

^c Data not available for cities and towns.

^d Includes White Lake Village.

SOURCES

Tordella, S. 1977. Net Migration by Age for Wisconsin Counties, 1950 to 1960 and 1960 to 1970. Madison: Applied Population Laboratory, University of Wisconsin-Extension.

_____. (forthcoming). Net Migration by Age for the United States Regions, Divisions, States, and Counties, 1970-1975. Population Series 14. Madison: Applied Population Laboratory, University of Wisconsin-Extension.

U.S. Department of Commerce, Bureau of the Census. 1967. Areas of Wisconsin: 1960. Area Measurement Reports: GE-20, No. 51. Washington, D.C.: U.S. Government Printing Office.

Wisconsin Department of Administration. 1979. Municipality File, Selective Listing. Computer printout. Madison.

Wisconsin Legislative Reference Bureau. 1980. The State of Wisconsin 1979-1980 Blue Book. Madison.

particularly affected. Of special interest in terms of the local study area is the fact that a sizable number of migrants to northern Wisconsin counties are retirees and are adding to the relatively large number of older persons already residing in the area (Voss and Fuguitt, 1979). Immigration of working age population has been smaller. Overall economic conditions within the local study area (discussed in subsection 2.10.2) have not made the region attractive to working age immigrants.

While the population of the local study area as a whole grew during the 1970's, several jurisdictions experienced overall population decline: the towns of Blackwell and Wabeno in Forest County; the towns of Ackley and Peck, and the city of Antigo in Langlade County; and the town of Monico in Oneida County.

The population densities of most townships in the local study area were substantially lower than the state average, reflecting the rural character of the area. Only the densities of the three cities exceeded the state average. Of the cities, Rhinelander had the highest population density, and Crandon the lowest.

2.10.1.2 Ethnic Composition

The majority of residents in the three-county area are white: 94.8 percent in Forest, 99.1 percent in Langlade, and 99.4 percent in Oneida in 1970 (Table 2.10-3). Due to the presence of two Native American reservations (Mole Lake Chippewa

Table 2.10-3

ETHNIC COMPOSITION AS PERCENT OF TOTAL POPULATION, 1970

	<u>White</u>	<u>Black</u> ^a	<u>Native</u> ^a <u>American</u>	<u>Other</u> ^b
State of Wisconsin	96.4	2.9	0.4	0.3
Local Study Area	98.5	0.3	1.1	0.1
Forest County	94.8	1.4	3.6	0.2
Langlade County	99.1	0.1	0.7	0.1
Oneida County	99.4	0.01	0.5	0.09

NOTE

^aThe Wisconsin Department of Administration reports this data as "Negro" and "Indian." These designations were changed to make them consist with the text of this report.

^bIncludes Japanese, Chinese, Filipino, Hawaiian, Korean and other not specified.

SOURCE

Wisconsin Department of Administration. 1980. Computer printout. 1970 Census Summary Tables. Table 201. Madison.

and Forest County Potawatomi), Forest County had the largest minority population with 3.6 percent Native Americans. The 1.4 percent blacks (mainly at Blackwell Job Corps Center) and 0.2 percent other minorities made up the remainder of the minority population. Native Americans also comprised the largest minority group in Langlade and Oneida counties, although the group was small compared to the overall population (0.7 and 0.5 percent, respectively). Statewide, white residents comprised 96.4 percent of the population and blacks represented the largest minority group (2.9 percent of the total). Native Americans represented 0.4 percent of the statewide total in 1970.

2.10.1.3 Urban and Rural Populations

The rural nature of the local study area is confirmed by comparing the percent of the local study area's population living in rural areas with the percentage for the state (Table 2.10-4). The Bureau of the Census defines urban population as all persons living in urbanized areas (a central city of 50,000 or more) or in places of 2,500 or more inhabitants outside urban areas (U.S. Department of Commerce, Bureau of the Census, 1973a). The population not classified as urban constitutes the rural population. Using the census definition, the cities of Antigo and Rhinelander were the only urban areas in the local study area in 1979. Thus, the local study area urban population is the combined populations of Antigo and Rhinelander.

Table 2.10-4

URBAN AND RURAL POPULATIONS, 1960-1979^a

	1960		1970		1979 ^b		Percent Change	
	Number	Percent ^c	Number	Percent ^c	Number	Percent ^c	1960-1970	1970-1979
State of Wisconsin ^d	3,952,839		4,417,821		4,688,278		+11.8	+6.1
Urban population	2,522,179	63.8	2,910,418	65.9	NA ^f	NA	+15.4	NA
Rural population	1,430,660	36.2	1,507,403	34.1	NA	NA	+5.4	NA
Local study area ^e	45,052		45,315		50,552		+0.6	+11.6
Urban population	18,481	41.0	17,223	38.0	16,972	33.6	-6.8	-1.5
Rural population	26,571	59.0	28,092	62.0	33,580	66.4	+5.7	+19.5
Forest County ^d	7,542		7,691		8,713		+2.0	+13.3
Urban population	0	0.0	0	0.0	0	0.0	0.0	0.0
Rural population	7,542	100.0	7,691	100.0	8,713	100.0	+2.0	+13.3
Langlade County ^d	19,916		19,220		19,797		-3.5	+3.0
Urban population	9,691	48.7	9,005	46.9	8,565	43.3	-7.1	-4.9
Rural population	10,225	51.3	10,215	53.1	11,232	56.7	-0.1	+10.0
Oneida County ^d	22,112		24,427		30,379		+10.5	+24.4
Urban population	8,790	39.8	8,218	33.6	8,407	27.7	-6.5	+2.3
Rural population	13,322	60.2	16,209	66.4	21,972	72.3	+21.7	+35.6

NOTES

^aThe urban population comprises all persons living in urbanized areas and in places of 2,500 or more inhabitants outside urban areas. The population not classified as urban constitutes the rural population.

^b1979 figures are calculated from county and city populations in Table 2.10-2; 1979 figures for the state are not available.

^cPercent of total population for jurisdiction.

^dJurisdiction population totals are from Table 2.10-2.

^eLocal study area population is from Table 2.10-2.

^fNA - Data not available.

SOURCE U.S. Department of Commerce, Bureau of the Census. 1973. 1970 Characteristics of the Population, Vol. 1, Part 51, Wisconsin. Washington, D.C.: U.S. Government Printing Office.

In 1970, one-third of Wisconsin residents lived in rural areas. In contrast, all of Forest County's residents, more than half of Langlade County's population, and two-thirds of Oneida County residents lived in rural areas. While 62.0 percent of the local study area population was rural in 1970, by 1979 the percentage of rural population increased to 66.4 percent.

2.10.1.4 Population Distribution by Age and Sex

In 1970, Wisconsin's population was 49.1 percent male and 50.9 percent female (Table 2.10-5). The populations of the counties, cities, and towns in the local study area were similarly distributed, with the exception of the town of Blackwell, which was 75.0 percent male. A federal Job Corps center there results in 200 male residents between the ages of 15 to 19 and 10 female residents for the same age group. The median age for each of the three counties (29.5 years in Forest, 30.0 in Langlade, and 32.3 in Oneida) is greater than that for the state (27.2 years).

2.10.1.5 Estimated Population Aged 65 and Over

The percentage of population in the three counties aged 65 and older was greater than for the state as a whole in 1970 and 1975, and the percent increase over the five years was greater in the local study area than in the state as a whole (Table 2.10-6).

Table 2.10-5

POPULATION DISTRIBUTION BY AGE AND SEX, 1970

Age	State of Wisconsin						Local Study Area					
	Male Population		Female Population		Total Population		Male Population		Female Population		Total Population	
	Number	Percent ^a	Number	Percent ^b	Number	Percent ^c	Number	Percent ^a	Number	Percent ^b	Number	Percent ^c
0-4	195,495	9.0	186,910	8.3	382,405	8.7	1,881	8.4	1,817	7.9	3,698	8.2
5-9	235,102	10.8	226,082	10.0	461,184	10.4	2,423	10.8	2,371	10.4	4,794	10.6
10-14	242,456	11.2	231,722	10.3	474,178	10.7	2,689	11.9	2,497	10.9	5,186	11.4
15-19	218,148	10.1	215,005	9.6	433,153	9.8	2,389	10.6	2,125	9.3	4,514	10.0
20-24	158,146	7.3	178,952	7.9	337,098	7.6	1,025	4.6	1,149	5.0	2,174	4.8
25-29	135,126	6.2	137,620	6.1	272,746	6.2	1,078	4.8	1,108	4.9	2,186	4.8
30-34	115,779	5.3	117,856	5.2	233,635	5.3	1,016	4.5	1,065	4.7	2,081	4.6
35-39	111,619	5.2	114,402	5.1	226,021	5.1	1,049	4.7	1,088	4.8	2,137	4.7
40-44	121,235	5.6	122,990	5.5	244,225	5.5	1,120	4.9	1,179	5.2	2,299	5.1
45-49	119,545	5.5	124,178	5.5	243,723	5.5	1,162	5.2	1,235	5.4	2,397	5.3
50-54	112,749	5.2	119,464	5.3	232,208	5.3	1,228	5.5	1,373	6.0	2,601	5.7
55-59	104,836	4.8	111,060	4.9	215,896	4.9	1,297	5.8	1,349	5.9	2,646	5.8
60-64	90,479	4.2	98,005	4.4	188,484	4.3	1,170	5.2	1,262	5.5	2,432	5.4
65-69	72,670	3.4	83,141	3.7	155,811	3.5	1,086	4.8	1,072	4.7	2,158	4.8
70-74	56,950	2.6	71,309	3.2	128,259	2.9	764	3.4	841	3.7	1,605	3.5
75+	77,083	3.6	111,712	5.0	188,795	4.3	1,096	4.9	1,311	5.7	2,407	5.3
Total	2,167,413	100.0	2,250,408	100.0	4,417,821	100.0	22,477	100.0	22,843	100.0	45,315	100.0
Percent ^c		49.1		50.9		100.0		49.6		50.4		100.0
Median age	-		-		27.2		-		-		-	

(continued)

(Table 2.10-5, continued)

Age	Forest County						Langlade County					
	Male Population		Female Population		Total Population		Male Population		Female Population		Total Population	
	Number	Percent ^a	Number	Percent ^b	Number	Percent ^c	Number	Percent ^a	Number	Percent ^b	Number	Percent ^c
0-4	338	8.4	303	8.3	641	8.3	828	8.8	782	8.0	1,610	8.4
5-9	436	10.8	410	11.2	846	11.0	1,044	11.1	984	10.0	2,028	10.6
10-14	428	10.6	408	11.1	836	10.9	1,138	12.1	1,090	11.1	2,228	11.6
15-19	544	13.5	328	8.9	872	11.3	966	10.2	936	9.6	1,902	9.9
20-24	181	4.5	164	4.5	345	4.5	464	4.9	508	5.2	972	5.1
25-29	172	4.3	168	4.6	340	4.4	424	4.5	453	4.6	877	4.6
30-34	178	4.4	162	4.4	340	4.4	419	4.4	427	4.4	846	4.4
35-39	164	4.1	187	5.1	351	4.6	394	4.2	423	4.3	817	4.2
40-44	166	4.1	187	5.1	353	4.6	473	5.0	507	5.2	980	5.1
45-49	201	5.0	205	5.6	406	5.3	493	5.2	513	5.2	1,006	5.2
50-54	183	4.6	228	6.2	411	5.4	507	5.4	550	5.6	1,057	5.5
55-59	265	6.6	226	6.2	491	6.4	516	5.5	550	5.6	1,066	5.5
60-64	211	5.2	190	5.2	401	5.2	473	5.0	554	5.7	1,027	5.3
65-69	192	4.8	157	4.3	349	4.5	423	4.5	495	5.1	918	4.8
70-74	155	3.8	139	3.8	294	3.8	350	3.7	375	3.8	725	3.8
75+	212	5.3	203	5.5	415	5.4	519	5.5	642	6.6	1,161	6.0
Total	4,026	100.0	3,665	100.0	7,691	100.0	9,431	100.0	9,789	100.0	19,220	100.0
Percent ^c	-	52.3	-	47.7	-	100.0	-	49.1	-	50.9	-	100.1
Median Age	-	-	-	-	29.5	-	-	-	-	-	-	30.0

(continued)

(Table 2.10-5, continued)

Age	Oneida County						City of Crandon					
	Male Population		Female Population		Total Population		Male Population		Female Population		Total Population	
	Number	Percent ^a	Number	Percent ^b	Number	Percent ^c	Number	Percent ^a	Number	Percent ^b	Number	Percent ^c
0-4	914	7.6	902	7.3	1,816	7.4	66	8.7	72	8.8	138	8.7
5-9	1,225	10.2	1,285	10.3	2,510	10.3	90	11.8	77	9.4	167	10.6
10-14	1,422	11.9	1,332	10.7	2,754	11.3	71	9.3	78	9.5	149	9.4
15-19	1,144	9.5	1,109	8.9	2,253	9.2	60	7.9	71	8.6	131	8.3
20-24	489	4.1	630	5.1	1,119	4.6	47	6.2	37	4.5	84	5.3
25-29	611	5.1	613	4.9	1,224	5.0	25	3.3	43	5.2	68	4.3
30-34	558	4.6	628	5.1	1,186	4.8	41	5.4	32	3.9	73	4.6
35-39	633	5.3	603	4.8	1,236	5.1	39	5.1	49	6.0	88	5.6
40-44	649	5.4	682	5.5	1,331	5.4	35	4.6	31	3.8	66	4.2
45-49	646	5.4	699	5.6	1,345	5.5	38	5.0	45	5.5	83	5.2
50-54	738	6.2	824	6.6	1,562	6.4	35	4.6	56	6.8	91	5.8
55-59	731	6.1	766	6.2	1,497	6.1	49	6.4	44	5.4	93	5.9
60-64	677	5.6	729	5.9	1,406	5.8	51	6.7	39	4.8	90	5.7
65-69	656	5.5	604	4.9	1,260	5.2	36	4.7	39	4.8	75	4.7
70-74	396	3.3	428	3.4	824	3.4	27	3.5	43	5.2	70	4.4
75+	502	4.2	602	4.8	1,104	4.5	52	6.8	64	7.8	116	7.3
Total	11,991	100.0	12,436	100.0	24,427	100.0	762	100.0	820	100.0	1,582	100.0
Percent ^c	-	49.1	-	50.9	-	100.0	-	48.2	-	51.8	-	100.0
Median Age	-		-		32.3		-		-		-	

(continued)

(Table 2.10-5, continued)

Age	City of Antigo						City of Rhinelander					
	Male Population		Female Population		Total Population		Male Population		Female Population		Total Population	
	Number	Percent ^a	Number	Percent ^b	Number	Percent ^c	Number	Percent ^a	Number	Percent ^b	Number	Percent ^c
0-4	375	8.8	349	7.4	724	8.0	305	7.9	303	7.0	608	7.4
5-9	459	10.8	435	9.2	894	9.9	381	9.9	423	9.7	804	9.8
10-14	506	11.9	474	10.0	980	10.9	502	13.0	451	10.4	953	11.6
15-19	433	10.1	422	8.9	855	9.5	386	10.0	392	9.0	778	9.5
20-24	237	5.6	275	5.8	512	5.7	164	4.2	227	5.2	391	4.8
25-29	195	4.6	212	4.5	407	4.5	200	5.2	219	5.0	419	5.1
30-34	200	4.7	209	4.4	409	4.5	158	4.1	185	4.2	343	4.2
35-39	189	4.4	206	4.3	395	4.4	198	5.1	209	4.8	407	4.9
40-44	198	4.6	244	5.1	442	4.9	203	5.3	229	5.3	432	5.2
45-49	232	5.4	248	5.2	480	5.3	217	5.6	250	5.7	467	5.7
50-54	236	5.5	249	5.3	485	5.4	249	6.4	282	6.5	531	6.5
55-59	217	5.1	261	5.5	478	5.3	240	6.2	266	6.1	506	6.1
60-64	205	4.8	267	5.6	472	5.3	205	5.3	247	5.7	452	5.5
65-69	161	3.8	270	5.7	431	4.8	167	4.3	219	5.0	386	4.7
70-74	154	3.6	231	4.9	385	4.3	112	2.9	178	4.1	290	3.5
75+	268	6.3	388	8.2	656	7.3	178	4.6	273	6.3	451	5.5
Total	4,265	100.0	4,740	100.0	9,005	100.0	3,865	100.0	4,353	100.0	8,218	100.0
Percent ^c	-	47.4	-	52.6	-	100.0	-	47.0	-	53.0	-	100.0
Median Age	-		-		-		-		-		-	

NOTES

^aPercent equals percent of male population.^bPercent equals percent of female population.^cPercent equals percent of total population.

SOURCE

Wisconsin Department of Administration. 1980. Computer printout. 1970 Census Summary Tables. Tables 121, 122, 125, 126. Madison.

Table 2.10-6

ESTIMATED POPULATION AGED 65 AND OVER, 1970 AND 1975

	April 1, 1970		April 1, 1975		Percent Change 1970 - 1975
	Number	Percent ^a	Number	Percent ^a	
State of Wisconsin population ^b	4,417,821		4,581,701		3.7
Under 65 years	3,944,956	89.3	4,071,801	88.9	3.2
65+ years	472,865	10.7	509,900	11.1	7.8
65-69 years	155,811	3.5	170,296	3.7	9.2
70-74 years	128,259	2.9	134,478	2.9	4.8
75-79 years	95,645	2.2	100,570	2.2	5.1
80+ years	93,150	2.1	104,556	2.3	22.4
Local study area population ^{b,c}	45,315		48,537		7.1
Under 65 years	39,145	86.4	41,548	85.6	6.1
65+ years	6,170	13.6	6,989	14.4	13.3
65-69 years	2,158	4.8	2,475	5.1	14.7
70-74 years	1,605	3.5	1,990	4.1	24.0
75-79 years	1,264	2.8	1,262	2.6	- 0.2
80+ years	1,143	2.5	1,262	2.6	10.4
Forest County population ^b	7,691		8,184		6.4
Under 65 years	6,633	86.2	6,991	85.4	5.4
65+ years	1,058	13.8	1,193	14.6	12.8
65-69 years	349	4.6	405	4.9	16.0
70-74 years	294	3.8	322	3.9	9.5
75-79 years	210	2.7	236	3.0	12.4
80+ years	205	2.7	230	2.8	12.2
Langlade County population ^b	19,220		19,394		0.9
Under 65 years	16,416	85.4	16,406	84.6	- 0.1
65+ years	2,804	14.6	2,988	15.4	6.6
65-69 years	918	4.8	989	5.1	7.7
70-74 years	725	3.8	807	4.2	11.3
75-79 years	597	3.1	558	2.9	- 6.5
80+ years	564	2.9	634	3.3	12.4

(contin

(Table 2.10-6, continued)

	<u>April 1, 1970</u>		<u>April 1, 1975</u>		Percent Change <u>1970 - 1975</u>
	<u>Number</u>	<u>Percent</u> ^a	<u>Number</u>	<u>Percent</u> ^a	
Oneida County population ^b	24,427		28,302		15.9
Under 65 years	21,239	86.9	24,436	86.3	15.1
65+ years	3,188	13.1	3,866	13.7	21.3
65-69 years	1,260	5.2	1,464	5.2	16.2
70-74 years	824	3.4	1,148	4.1	39.3
75-79 years	606	2.5	656	2.3	8.3
80+ years	498	2.0	598	2.1	20.1

NOTES

^aPercent of total population for jurisdiction.

^bJurisdiction population totals are from Table 2.10-2.

^cEstimates for local study area calculated on the basis of the percentages of each age group for total three-county area for each year.

SOURCE

Kale, B., S. Drake, and H. Krebs. 1978. Revised Population Projections, Persons Age 65 and Over by County for Period 1970-1985. Madison: Demographic Services Center, Wisconsin Department of Administration.

This reflects several demographic forces: the older age structure typical of rural areas and small towns, increasing longevity, and the sizable turnaround migration of retirees into high-growth counties in northern Wisconsin.

2.10.1.6 Proportion of School Age Population

The percentage of school age population in the three counties declined from 1970 to 1980 (Table 2.10-7). This reflected statewide trends. In 1970, the counties had a proportion of school age population slightly higher than that of the state (28.6 percent compared to 27.2 percent). By 1980, however, the proportion of school age population in the three counties had fallen below that of the state (20.9 percent compared to 21.4 percent). Males have historically exhibited a higher proportion of school age population than females for all local jurisdictions and for the state as a whole.

2.10.2 ECONOMIC PROFILE

This subsection describes economic conditions in the local study area--the area's income, employment, business, and industrial activity. Specific economic industries such as retail trade, agriculture, forestry and forest products, mining, and recreation and tourism were studied.

Table 2.10-7

SCHOOL AGE POPULATION,^a
1970 and 1980

	<u>1970</u> percent	<u>1980</u> ^b percent
State of Wisconsin		
Male ^c	28.3	22.4
Female ^d	26.1	20.4
Total ^e	27.2	21.4
Three-County Area		
Male	29.7	22.0
Female ^d	27.5	19.8
Total ^e	28.6	20.9
Forest County		
Male ^c	31.9	25.8
Female ^d	28.8	23.7
Total ^e	30.4	24.8
Langlade County		
Male ^c	30.0	22.3
Female ^d	27.6	19.5
Total ^e	28.8	20.8
Oneida County		
Male ^c	28.7	20.8
Female ^d	27.1	19.1
Total ^e	27.9	20.0

NOTES

^aSchool age population is population aged 5 to 17.

^b1980 estimates are derived by the Wisconsin Department of Administration using the 1970 fertility levels.

^cPercentage of total male population in jurisdiction.

^dPercentage of total female population in jurisdiction.

^ePercentage of total population in jurisdiction.

SOURCE

Wisconsin Department of Administration. June 1975. Wisconsin Population Projections. Third Edition. Madison.

The local study area and all of Forest, Langlade, and Oneida counties were less industrialized and less affluent than Wisconsin as a whole. For example, manufacturing accounted for a much smaller percentage of the local study area counties' total earnings than it did for earnings in the state as a whole. Per capita incomes in all three counties were lower than for the state in 1978, and the unemployment rates were higher.

Overall, the local study area economy is oriented toward forestry and wood related manufacturing, especially in Forest and Oneida counties. Agriculture is important primarily in Langlade County. The recreation and tourism industry is also substantial and stimulates activity in retail trade and services. However, these are low wage industries, and partially explain the low income levels in the local study area.

Forest County is the least economically diverse and most economically depressed of the three counties. With its small population, it had the lowest total income and earnings and the lowest per capita income of the local study area. Manufacturing and government are the largest income producing sectors in Forest County. Since most of the county is heavily forested, most of the manufacturing jobs are in saw mills and wood products plants. Grandon is the county seat of Forest County and the county's only incorporated area. The county's largest employer, a wood products plant, is located in Laona Town. Wages in the county tend to be the lowest in the local study area, while unemployment is the

highest. Per capita transfer payments in the county are higher than in the other counties and are also higher than the statewide level. The largest categories of transfer payments were retirement benefits, disability payments, government pensions, and health insurance payments--all of which are generally attributable to elderly recipients. Thus, this indicates a high number of retirees have migrated to the local study area, and reflects the older age structure of the population.

Due to a relatively large agricultural base, Langlade County is the most economically balanced county of the local study area. Although manufacturing was the most important economic sector, retail trade, farming, services, and government were also important. Major manufacturing industries in the county include lumber and wood products, food and kindred products, and fabricated metals. Langlade County is one of Wisconsin's top potato producers; vegetable crops accounted for a third of the county's cash receipts from farm marketings in 1978; only dairy products produced more revenue in the county's agriculture sector. Antigo is the county seat for Langlade County and a major population center. Antigo serves as the county's industrial and trade center and accounts for about three-fourths of the county's total retail and service sales. Antigo is also the location of the county's major employers. Per capita personal income is higher in Langlade County than in Forest County. Both, however, were below that for Oneida County, and

far below state and U.S. levels. Per capita personal income growth has been moderate in the county in recent years.

Oneida County is the most populous and most economically developed of the three counties. The county surpassed both Forest and Langlade counties in 1978 in total earnings, average weekly wages, and employment. Nonetheless, Oneida County residents had a lower per capita income than the average Wisconsin resident. The major economic sectors as reflected in 1978 earnings were manufacturing, services, retail trade, and government. Key manufacturing industries were paper and allied products, machinery (except electrical), printing and publishing, and lumber and wood products. The county has abundant recreational resources, and tourism is an important source of income and employment. Rhinelander is the county seat of Oneida County and the county's only incorporated community. It is the location of the county's major employers and serves as a trade center for surrounding jurisdictions.

Past trends indicate that the local study area economies have grown slowly. Manufacturing has increased moderately but has still not reached a level proportionate to its share of the state economy. In employment, manufacturing has a lower share of local study area employment than of state employment. Retail trade has grown rapidly, while services and tourism have grown more moderately. Forestry is the most important resource industry in the local study area, due to the abundance of timber;

expansion of the industry will depend primarily on management practices. The only mining activity at present in the local study area is sand and gravel mining--resources which are common in all counties of the state. Mining has grown moderately over the past years as has construction. In general, then, the local study area is less affluent than the state as a whole, and lacks the industry to allow the area to improve its economic condition.

2.10.2.1 Income

Personal Income. Total personal income is defined as labor and proprietors' income less social insurance program contributions, plus dividends, interest, rent and transfer payments (U.S. Department of Commerce, Bureau of Economic Analysis, no date). Total personal income in 1978 was \$38 million for Forest County, \$107 million for Langlade County, and \$194 million for Oneida County (Table 2.10-8). From 1970 to 1978, total personal income increased 124.8 percent in Forest County, 106.0 percent in Langlade County, and 148.3 percent in Oneida County.

Per capita personal income in 1978 ranged from \$4,251 for Forest County to \$6,379 for Oneida County. Langlade County showed the greatest increase in per capita personal income between 1970 and 1978 (106.0 percent). In spite of the increases, per capita incomes for all three counties were lower in 1978 than for the state (\$7,532) and national levels (\$7,840).

Table 2.10-8

PERSONAL INCOME, 1970 AND 1978

	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>
<u>Personal income</u> ^a			
by residence (\$ thousands)			
1970	16,876	52,107	78,177
1978	37,941	107,349	194,132
Percent change 1970-1978	124.8	106.0	148.3
<u>Total net earnings</u> ^b			
by residence (\$ thousands)			
1970	11,136	37,333	54,506
1978	21,821	71,962	129,112
by place of work (\$ thousands)			
1970	10,820	35,652	55,738
1978	19,393	67,611	130,977
<u>Per capita personal income</u>			
1970	2,195	2,702	3,180
1978	4,251	5,566	6,379
Percent change 1970-1978	93.7	106.0	100.6
Percent of state			
1970	59.1	72.8	85.7
1978	56.4	73.9	84.7
Percent of U.S.			
1970	55.7	68.5	80.6
1978	54.2	71.0	81.4

NOTES

^aTotal personal income is net earnings plus dividends, rent and transfer payments.

^bTotal net earnings is labor and proprietors' income less personal contributions for social insurance.

SOURCE

U.S. Department of Commerce, Bureau of Economic Analysis. 1980. Regional Economic Information System, Personal Income by Major Sources. Computer printout. Washington, D.C.

Real Per Capita Personal Income. To determine real income, we must consider the effects of inflation from 1970 to 1978. Using the Consumer Price Index (CPI) (Economic Report of the President, 1980) as an indicator of price changes, we adjust per capita personal incomes for 1970 to 1978 dollars to show changes in real income. All three counties, the state, and the nation experienced increases in real per capita personal income from 1970 to 1978 (Table 2.10-9).

Langlade County exhibited the greatest increase in real per capita income (22.6 percent), increasing faster than the national (18.3 percent) and state (20.8 percent) rates. Oneida County's rate of increase (19.4 percent) fell between the U.S. and state rates, while Forest County showed the smallest increase (15.3 percent).

Estimated Money Income. Estimates of personal income are not available at the subcounty level. However, estimates of median money income for 1969 and per capita money income for 1975 are available for towns and cities (Table 2.10-10). Money income is defined as total income received before deductions for personal income taxes, social security contributions, bond purchases, union dues, etc. (U.S. Department of Commerce, Bureau of the Census, 1979e). Money income and personal income are similar measures, but they are not equivalent.

Table 2.10-9

REAL PER CAPITA PERSONAL INCOME, 1970 AND 1978
(1978 dollars)^a

	<u>1970</u>	<u>1978</u>	<u>% Change 1970-1978</u>
United States	6,625	7,840	+18.3
State of Wisconsin	6,237	7,532	+20.8
Forest County	3,688	4,251	+15.3
Langlade County	4,540	5,566	+22.6
Oneida County	5,343	6,379	+19.4

NOTE

^aPer capita personal income in current dollars was deflated by the Consumer Price Index for the appropriate years. Source for the Consumer Price Index is Economic Report of the President, 1980, U.S. Government Printing Office, Washington, D.C., 1980.

SOURCES

Wisconsin Legislative Reference Bureau. 1980. The State of Wisconsin 1979-1980 Blue Book. Madison.

U.S. Department of Commerce, Bureau of Economic Analysis. 1971 and 1980. Regional Economic Information System, Personal Income by Major Sources. Computer printout. Washington, D.C.

Table 2.10-10
ESTIMATED MONEY INCOME, 1969 AND 1975^a

<u>Jurisdiction</u>	<u>Type of Income Estimated</u>	<u>Dollars</u>	<u>Percent of State</u>	<u>Percent of U.S.</u>
Forest County	Median money income, 1969	\$5,157	62.8	59.0
	Per capita money income, 1975	2,987	63.8	61.7
Langlade County	Median money income, 1969	5,919	72.0	67.8
	Per capita money income, 1975	3,756	79.5	77.6
Oneida County	Median money income, 1969	7,137	86.9	81.7
	Per capita money income, 1975	4,188	88.7	86.6
City of Crandon	Median money income, 1969	5,045	61.4	57.8
	Per capita money income, 1975	3,074	65.1	63.5
City of Antigo	Median money income, 1969	6,176	75.2	70.7
	Per capita money income, 1975	3,939	83.4	81.4
City of Rhinelander	Median money income, 1969	7,235	88.0	82.8
	Per capita money income, 1975	4,630	98.1	95.7
Argonne Town	Median money income, 1969	5,667	69.0	64.9
	Per capita money income, 1975	3,000	63.5	62.0
Blackwell Town	Median money income, 1969	736	9.0	8.4
	Per capita money income, 1975	2,679	56.7	55.4
Caswell Town	Median money income, 1969	6,400	77.9	73.3
	Per capita money income, 1975	2,873	60.8	59.4
Crandon Town	Median money income, 1969	5,125	62.4	58.7
	Per capita money income, 1975	2,711	57.4	56.0
Freedom Town	Median money income, 1969	8,100 ^o	98.6	92.7
	Per capita money income, 1975	4,247	90.0	87.8
Hiles Town	Median money income, 1969	5,874	71.5	67.3
	Per capita money income, 1975	2,931	62.1	60.6
Laona Town	Median money income, 1969	5,975	72.7	68.4
	Per capita money income, 1975	2,889	61.2	59.7
Lincoln Town	Median money income, 1969	4,894	59.6	56.0
	Per capita money income, 1975	2,601	55.1	53.8
Nashville Town	Median money income, 1969	2,981	36.3	34.1
	Per capita money income, 1975	2,522	53.4	52.1
Popple River Town	Median money income, 1969	2,250	27.4	25.8
	Per capita money income, 1975	2,590	54.8	53.5
Ross Town	Median money income, 1969	3,653	44.5	41.8
	Per capita money income, 1975	2,473	52.4	51.1
Wabeno Town	Median money income, 1969	6,033	73.4	69.1
	Per capita money income, 1975	3,256	69.0	67.3
Ackley Town	Median money income, 1969	5,271	64.1	60.4
	Per capita money income, 1975	3,630	76.9	75.0
Ainsworth Town	Median money income, 1969	6,384	77.7	73.1
	Per capita money income, 1975	3,729	79.0	77.1
Antigo Town	Median money income, 1969	6,950	84.6	79.6
	Per capita money income, 1975	3,702	78.4	76.5
Elcho Town	Median money income, 1969	5,500	66.9	63.0
	Per capita money income, 1975	3,400	72.0	70.3
Evergreen Town	Median money income, 1969	5,083	61.9	58.2
	Per capita money income, 1975	3,585	75.9	74.1
Langlade Town	Median money income, 1969	1,956	23.8	22.4
	Per capita money income, 1975	3,368	71.3	69.6
Neva Town	Median money income, 1969	5,946	72.4	68.1
	Per capita money income, 1975	3,049	64.6	63.0
Norwood Town	Median money income, 1969	8,562	104.2	98.0
	Per capita money income, 1975	3,205	67.9	66.2

(continued)

(Table 2.10-10, continued)

<u>Jurisdiction</u>	<u>Type of Income Estimated</u>	<u>Dollars</u>	<u>Percent of State</u>	<u>Percent of U.S.</u>
Parrish Town	Median money income, 1969	\$5,832	71.0	66.8
	Per capita money income, 1975	5,333	112.9	110.2
Peck Town	Median money income, 1969	4,908	59.7	56.2
	Per capita money income, 1975	3,089	65.4	63.8
Polar Town	Median money income, 1969	6,500	79.1	74.4
	Per capita money income, 1975	4,220	89.4	87.2
Price Town	Median money income, 1969	6,727	81.9	77.0
	Per capita money income, 1975	4,088	86.6	84.5
Rolling Town	Median money income, 1969	5,935	72.2	68.0
	Per capita money income, 1975	4,643	98.3	96.0
Upham Town	Median money income, 1969	3,764	45.8	43.1
	Per capita money income, 1975	3,505	74.2	72.4
Wolf River Town ^b	Median money income, 1969	7,689	93.6	88.1
	Per capita money income, 1975	6,170	130.7	127.5
Crescent Town	Median money income, 1969	7,702	93.7	88.2
	Per capita money income, 1975	3,462	73.3	71.6
Enterprise Town	Median money income, 1969	7,100	86.4	81.3
	Per capita money income, 1975	3,809	80.7	78.7
Lake Tomahawk Town	Median money income, 1969	4,699	57.2	53.8
	Per capita money income, 1975	3,789	80.2	78.3
Monico Town	Median money income, 1969	7,949	96.7	91.0
	Per capita money income, 1975	3,583	75.9	74.1
Newbold Town	Median money income, 1969	8,449	102.8	96.7
	Per capita money income, 1975	3,420	72.4	70.7
Pelican Town	Median money income, 1969	7,721	94.0	88.4
	Per capita money income, 1975	4,200	88.9	86.8
Piehl Town	Median money income, 1969	2,849	34.7	32.6
	Per capita money income, 1975	2,899	61.4	59.9
Pine Lake Town	Median money income, 1969	7,443	90.6	85.2
	Per capita money income, 1975	4,208	89.1	87.0
Schoepke Town	Median money income, 1969	2,305	28.1	26.4
	Per capita money income, 1975	3,615	76.6	74.7
Stella Town	Median money income, 1969	8,692	105.8	99.6
	Per capita money income, 1975	4,243	89.9	87.7
Sugar Camp Town	Median money income, 1969	6,924	84.3	79.3
	Per capita money income, 1975	4,448	94.2	91.9
Three Lakes Town	Median money income, 1969	6,316	76.9	72.3
	Per capita money income, 1975	4,047	85.7	83.7
Woodboro Town	Median money income, 1969	5,521	67.2	63.2
	Per capita money income, 1975	3,664	77.6	75.7

NOTES

^aTotal money income as measured by the U.S. Bureau of the Census is income received before deductions for personal income tax, social security contributions, bond purchases, union dues, Medicare, etc., and as reported in the 1970 census. In general, estimates for noncensus years are based on procedures that carry forward the census estimates. The estimates are not equivalent to measures of personal income.

^bIncludes White Lake Village.

SOURCES

U.S. Department of Commerce, Bureau of the Census. 1979. 1976 Population Estimates and 1975 and Revised 1974 Per Capita Income Estimates for Counties, Incorporated Places and Selected Minor Civil Divisions in Wisconsin. Series P-25, No. 788. Washington, D.C.: U.S. Government Printing Office.

Wisconsin Department of Administration. 1980. 1970 Census Summary Tables. Table 468. Computer printout. Madison.

The four jurisdictions in the local study area with the highest 1969 median money income for families and unrelated individuals were the towns of Freedom in Forest County, Norwood in Langlade County, and Newbold and Stella in Oneida County. Their median money incomes were all between \$8,100 and \$8,700--greater than the values for their respective counties. The towns of Norwood (104.2 percent of state), Newbold (102.8 percent of state), and Stella (105.8 percent of state) were the only three jurisdictions in the local study area with higher median money incomes than the state.

The jurisdictions with the highest 1975 per capita money income, and the only jurisdictions within the local study area to exceed state and national values, were the towns of Parrish (\$5,333) and Wolf River (\$6,170) in Langlade County. Other jurisdictions with per capita money income equal to 90.0 percent or more of the state average were the towns of Freedom (Forest County), Rolling (Langlade County), and Sugar Camp (Oneida County), and the city of Rhinelander. The jurisdictions with the lowest per capita money incomes were the towns of Ross, Nashville, Popple River, and Lincoln, all in Forest County. Values for these towns ranged between 51.1 and 55.1 percent of state and national averages.

Transfer Payments. Total transfer payments increased in each of the local study area counties between 1970 and 1978, with

the increases in Oneida and Forest counties being greater than that for Wisconsin (Table 2.10-11). Total transfer payments include government payments to civilians (retirement, disability and health insurance; unemployment insurance; education and training assistance; income maintenance); government payments to retired military, veterans, and dependents (pensions and retirement benefits, unemployment insurance, education payments, government life insurance payments); payments to non-profit institutions; and business transfer payments. Government payments to civilians accounted for about 85 percent of total transfer payments for the state and for the three counties. For all four areas, the largest single payments category was government retirement, disability, and health insurance payments to civilians, followed by government income maintenance payments to civilians, and government pension and retirement payments to retired military, veterans, and dependents. Those government payments associated with the older segment of the population (pension, retirement, disability and health insurance payments to civilians and retired military and veterans) accounted for a greater percentage of total payments in the three counties (from 74.1 to 78.3 percent) than for the state (73.6 percent). This reflects the increasingly older age structure of the local study area, as described in subsection 2.10.1.

For 1978, transfer payments represented 12.3 percent of personal income by place of residence for the state, 29.7 percent

Table 2.10-11

TRANSFER PAYMENTS BY TYPE, 1970 AND 1978

	State of Wisconsin			Forest County			Langlade County			Oneida County		
	1970	1978	Percent Change 1970-1978	1970	1978	Percent Change 1970-1978	1970	1978	Percent Change 1970-1978	1970	1978	Percent Change 1970-1978
Government payments to civilians	1,260,013	3,686,430	192.6	2,932	9,699	230.8	6,427	18,987	195.4	9,016	32,255	257.8
Retirement, disability and health insurance	1,052,104	2,970,037	182.3	2,111	7,478	254.2	5,380	15,171	182.0	7,753	26,818	245.9
Unemployment insurance	85,295	195,984	129.8	246	491	99.6	430	850	97.7	501	1,751	249.5
Education and training assistance	9,622	40,407	319.9	16	19	18.8	40	45	12.5	51	255	400.0
Income maintenance	112,779	477,691	323.6	559	1,711	206.1	577	2,916	405.4	706	3,370	377.3
Other	213	2,311	985.0	0	0	0.0	0	5	-	5	61	1,120.0
Government payments to retired military, veterans and dependents	176,217	301,115	70.9	516	1,000	93.8	1,178	2,086	77.1	1,674	2,847	70.1
Pensions and retirement	130,438	224,638	72.2	457	887	94.1	999	1,780	78.2	1,413	2,473	75.0
Unemployment insurance	5,201	5,950	14.4	6	9	50.0	20	23	15.0	29	26	-10.3
Education payments	23,222	43,700	88.2	28	63	125.0	90	174	93.3	130	192	47.7
Government life insurance payments	15,648	21,792	39.3	22	33	50.0	61	89	45.9	93	128	37.6
Other	1,708	5,035	194.8	3	8	166.7	8	20	150.0	9	28	211.1
Payments to non-profit institutions	56,293	174,943	210.8	99	307	210.1	245	733	199.2	312	1,110	255.8
Business transfer payments	78,977	180,949	129.1	123	279	126.8	346	770	122.5	492	1,270	158.1
TOTAL	1,571,500	4,343,437	176.4	3,670	11,285	207.5	8,196	22,576	175.5	11,494	37,442	225.8

SOURCE

U.S. Department of Commerce, Bureau of Economic Analysis. 1980. Regional Economic Information System, Transfer Payments by Major Source, United States, States and Counties, Computer printout. Washington, D.C.

for Forest County, 21.0 percent for Langlade County, and 19.3 percent for Oneida County. That the local study area relies more on transfer payments as a source of personal income indicates the area is relatively less affluent than the state.

Personal Income by Place of Residence. In the three-county area as a whole, the balance of personal income in 1978 was 65.7 percent net earnings and 13.3 percent dividends, interest and rent (Table 2.10-12). Forest County, which had the highest percentage of transfer payments, had the lowest percentage of personal income contributed by net earnings (57.5 percent). For Langlade and Oneida counties, net earnings accounted for about two-thirds of personal income (67.0 and 66.5 percent, respectively). For the state, net earnings represented about 75.3 percent of total personal income in 1978.

Table 2.10-12 compares earnings by place of work to earnings by place of residence. The fact that net earnings in Oneida County by place of work exceeded net earnings by place of residence indicates that Oneida County served as a net source of jobs and income for residents of surrounding counties. The relationship was reversed for Langlade and Forest counties, indicating that a number of residents in these counties worked elsewhere.

Table 2.10-12

PERSONAL INCOME BY PLACE OF RESIDENCE, 1970-1978
(\$ thousands)

	1970	1972	1974	1976	1978	% Change 1970-1978
<u>State of Wisconsin</u>						
Earnings by place of work	13,111,431	15,217,399	18,462,993	21,619,340	27,521,229	+110.0
Farm earnings	651,484	769,141	820,216	669,531	1,286,076	+ 97.4
Total nonfarm earnings	12,459,947	14,447,258	17,652,777	20,949,809	26,235,153	+110.6
Private nonfarm earnings	10,634,094	12,237,850	15,065,218	17,831,949	22,637,939	+112.9
Agricultural services, forestry, fisheries	34,840	39,975	49,988	62,783	81,569	+134.1
Mining	26,608	29,275	39,303	40,031	49,124	+ 84.6
Construction	795,112	907,656	1,054,296	1,209,936	1,619,791	+103.7
Manufacturing	4,655,385	5,273,749	6,667,170	7,669,621	9,814,614	+110.8
Transportation, communica- tion, utilities	789,776	953,276	1,132,959	1,317,039	1,661,117	+110.3
Wholesale trade	672,398	774,826	1,022,590	1,292,068	1,558,246	+131.7
Retail trade	1,477,104	1,671,192	1,970,275	2,199,433	2,682,356	+ 81.6
Finance, insurance, real estate	543,182	673,888	766,289	997,751	1,318,583	+142.8
Services	1,639,689	1,753,996	2,362,348	3,043,287	3,852,539	+135.0
Government earnings	1,825,853	2,219,408	2,577,559	3,117,860	3,597,214	+ 97.0
Federal, civilian	235,350	271,342	316,815	395,614	447,859	+ 90.3
Federal, military	42,769	51,497	50,908	55,403	57,694	+ 34.9
State and local	1,547,734	1,896,569	2,209,836	2,666,843	3,091,661	+ 99.8
Net earnings by place of residence	12,741,587	14,757,205	17,756,360	20,807,704	26,539,840	+108.3
Total earnings by place of work	13,111,431	15,217,399	18,462,993	21,619,340	27,521,229	+110.0
Less personal contributions to social insurance	574,214	623,381	995,118	1,136,423	1,409,594	+145.5
Plus residence adjustment	204,370	238,003	288,485	324,787	428,205	+114.5
Personal income by place of residence	16,426,958	17,606,275	23,666,768	28,060,628	35,240,732	+114.5
Net earnings by place of residence	12,741,587	14,757,205	17,756,360	20,807,704	26,539,840	+108.3
Dividends, interest, and rent	2,113,871	2,444,528	3,188,899	3,585,824	4,357,455	+106.1
Transfer payments	1,571,500	2,051,191	2,721,509	3,667,100	4,343,437	+176.4
Per capita personal income	3,712	4,266	5,183	6,087	7,532	+102.9
<u>Forest County</u>						
Earnings by place of work	10,820	13,383	13,908	17,229	20,526	+ 89.7
Farm earnings	274	437	555	641	1,497	+446.4
Total nonfarm earnings	10,546	12,946	13,353	16,588	19,029	+ 80.4
Private nonfarm earnings	7,221	8,930	9,269	11,723	13,577	+ 88.0
Agricultural services, forestry, fisheries	65	121	63	63	99	+ 52.3
Mining	0	0	0	0	0	0.0
Construction	337	359	315	782	982	+191.4
Manufacturing	3,799	4,962	4,582	5,370	5,658	+ 48.9
Transportation, communica- tion, utilities	445	671	911	1,144	1,164	+161.6
Wholesale trade	119	131	221	342	462	+228.2
Retail trade	1,198	1,301	1,360	1,640	1,993	+ 66.4
Finance, insurance, real estate	291	370	410	522	616	+111.7
Services	967	1,015	1,407	1,860	2,603	+169.2
Government earnings	3,325	4,016	4,084	4,865	5,452	+ 64.0
Federal, civilian	1,325	1,554	1,304	1,551	1,702	+ 28.5
Federal, military	45	61	66	68	72	+ 60.0
State and local	1,955	2,401	2,714	3,246	3,678	+ 88.1
Net earnings by place of residence	11,136	13,662	14,434	17,993	21,821	+ 96.0
Total earnings by place of work	10,820	13,383	13,908	17,229	20,526	+ 89.7
Less personal contributions to social insurance	565	703	833	1,004	1,133	+100.5
Plus residence adjustment	881	982	1,359	1,708	2,428	+175.6
Personal income by place of residence	16,876	21,136	24,651	31,177	37,941	+124.8
Net earnings by place of residence	11,136	13,662	14,434	17,993	21,821	+ 96.0
Dividends, interest, rent	2,070	2,544	3,390	3,878	4,835	+133.6
Transfer payments	3,670	4,930	6,827	9,366	11,285	+207.5
Per capita personal income	2,195	2,649	2,902	3,788	4,251	+ 93.7

(continued)

(Table 2.10-12, continued)

	1970	1972	1974	1976	1978	% Change 1970-1978
<u>Langlade County</u>						
Earnings by place of work	37,300	39,085	49,777	52,896	71,180	+ 90.8
Farm earnings	4,284	4,492	8,015	3,167	10,796	+135.6
Total nonfarm earnings	33,016	31,427	41,762	49,729	60,384	+ 82.9
Private nonfarm earnings	26,282	27,206	33,759	41,024	51,707	+ 96.7
Agricultural services, forestry, fisheries	184	189	187	248	345	+ 87.5
Mining	0	0	0	0	0	0.0
Construction	1,042	1,021	1,488	2,289	3,177	+204.9
Manufacturing	8,724	7,516	9,885	11,419	15,438	+ 76.9
Transportation, communica- tion, utilities	2,157	2,599	2,992	2,978	3,847	+ 78.3
Wholesale trade	2,151	2,714	3,287	5,412	6,202	+188.3
Retail trade	6,615	7,280	8,907	9,584	11,654	+ 76.2
Finance, insurance, real estate	968	1,092	1,278	1,739	2,208	+128.1
Services	4,441	4,795	5,735	7,355	8,836	+ 99.0
Government earnings	6,734	7,387	8,003	8,705	8,677	+ 28.9
Federal, civilian	949	1,103	1,143	1,106	1,229	+ 29.5
Federal, military	790	1,037	1,198	1,085	174	- 78.0
State and local	4,995	5,247	5,662	6,514	7,274	+ 45.6
Net earnings by place of residence	37,333	39,559	49,780	53,090	71,962	+ 92.8
Total earnings by place of work	37,300	39,085	49,777	52,896	71,180	+ 90.8
Less personal contributions to social insurance	1,648	1,807	2,543	2,949	3,569	+116.6
Plus residence adjustment	1,681	2,281	2,546	3,143	4,351	+158.8
Personal income by place of residence	52,107	56,851	73,307	82,795	107,349	+101.0
Net earnings by place of residence	37,333	39,559	49,780	53,090	71,962	+ 92.8
Dividends, interest, rent	6,578	7,051	9,439	10,551	12,881	+ 95.8
Transfer payments	8,196	10,241	14,088	19,154	22,576	+175.5
Per capita personal income	2,702	2,879	3,811	4,221	5,566	+106.0
<u>Oneida County</u>						
Earnings by place of work	58,575	75,047	91,276	111,808	138,670	+136.7
Farm earnings	682	524	1,206	1,488	1,945	+185.2
Total nonfarm earnings	57,893	74,523	90,070	110,320	136,725	+136.2
Private nonfarm earnings	47,206	60,216	74,361	92,083	115,977	+145.7
Agricultural services, forestry, fisheries	D ^a	D	D	484	678	--
Mining	D	D	D	426	519	--
Construction	4,394	5,616	6,079	7,317	10,968	+149.6
Manufacturing	16,065	20,156	25,451	28,625	35,299	+119.7
Transportation, communica- tion, utilities	3,934	4,877	5,984	7,135	8,175	+107.8
Wholesale trade	1,947	2,539	3,468	4,490	5,036	+158.7
Retail trade	10,064	12,406	14,250	19,375	22,694	+125.5
Finance, insurance, real estate	1,752	2,649	3,156	4,606	6,713	+283.2
Services	8,648	11,658	15,078	19,625	25,895	+199.4
Government earnings	10,687	14,307	15,709	18,237	20,748	+ 94.1
Federal, civilian	1,944	2,470	2,721	3,205	3,867	+ 98.9
Federal, military	146	201	211	239	265	+ 81.5
State and local	8,597	11,636	12,777	14,793	16,616	+ 93.3
Net earnings by place of residence	54,506	69,307	84,026	103,886	129,112	+136.9
Total earnings by place of work	58,575	75,047	91,276	111,808	138,670	+136.7
Less personal contributions to social insurance	2,837	3,774	5,358	6,266	7,693	+171.2
Plus residence adjustment	-1,232	-1,966	-1,892	-1,656	-1,865	- 51.4
Personal income by place of residence	78,117	99,374	125,441	157,135	194,132	+148.5
Net earnings by place of residence	54,506	69,307	84,026	103,886	129,112	+136.9
Dividends, interest, and rent	12,117	14,616	19,478	22,933	27,538	+127.3
Transfer payments	11,494	15,451	21,937	30,316	37,482	+226.1
Per capita personal income	3,180	3,789	4,585	5,479	6,379	+100.6

NOTE

^aD - data withheld to avoid disclosure of information on individual firms.

SOURCE

U.S. Department of Commerce, Bureau of Economic Analysis, Washington, D.C., Regional Economic Information System, 1971 and 1980. Personal Income by Major Sources. Computer printout.

Percent Distribution of Earnings by Industry. Manufacturing was the single largest economic sector in 1978 for the three-county area, accounting for 24.5 percent of total earnings (Table 2.10-13). Retail trade, services, and government were next in importance, each contributing approximately 15 to 16 percent of total earnings for the three-county area. The combined share of services and retail trade (32.0 percent) reflects the importance of tourism to the economy, as discussed later in this subsection.

Comparing the percent distribution of earnings by industry for all three counties and for the state reveals similarities in shares for most sectors. Major differences existed for manufacturing and retail trade: for the state, the manufacturing sector share (35.9 percent in 1978) was greater, and the retail trade share (9.8 percent) was less than for the combined counties (24.5 percent for manufacturing, and 15.8 percent for retail trade). This indicates that the economy of the local study area is more resource oriented than the state as a whole. The higher share of earnings from manufacturing for the state illustrates that it is more industrialized than the local study area.

Differences in distribution of earnings by industry did exist among the three counties. In Forest County, manufacturing (27.6 percent of total earnings) and government (26.5 percent) dominated in 1978. Next in importance were services (12.7 percent) and retail trade (9.7 percent). Manufacturing was also first in Langlade County (21.7 percent), followed by retail trade

Table 2.10-13

PERCENT DISTRIBUTION OF EARNINGS BY INDUSTRY, 1970 AND 1978^a
(\$ thousands)

<u>State of Wisconsin</u>	1970 <u>Earnings</u>	<u>Percent</u>	1978 <u>Earnings</u>	<u>Percent</u>	<u>% Change 1970-1978</u>
Farm	651,484	5.0	1,286,076	4.0	68.9
Agricultural services, forestry, fisheries	34,840	0.3	81,569	0.3	134.1
Mining	26,608	0.2	49,124	0.2	84.6
Construction	795,112	6.1	1,619,791	5.9	103.7
Manufacturing	4,655,385	35.5	9,814,614	35.9	110.8
Transportation, communication, utilities	789,776	6.0	1,661,117	6.1	110.3
Wholesale trade	672,398	5.1	1,558,246	5.7	131.7
Retail trade	1,477,104	11.3	2,682,356	9.8	81.6
Finance, insurance, real estate	543,182	4.1	1,318,583	4.8	142.8
Services	1,639,689	12.5	3,852,539	14.1	135.0
Government	1,825,853	13.9	3,597,214	13.2	97.0
Total	13,111,431	100.0	27,521,229	100.0	108.5
<u>Forest County</u>					
Farm	274	2.5	1,497	7.3	446.4
Agricultural services, forestry, fisheries	65	0.6	99	0.5	52.3
Mining	0	0.0	0	0.0	0.0
Construction	337	3.1	982	4.8	191.4
Manufacturing	3,799	35.1	5,658	27.6	48.9
Transportation, communication, utilities	445	4.1	1,164	5.7	161.6
Wholesale trade	119	1.1	462	2.2	288.2
Retail trade	1,198	11.1	1,993	9.7	66.4
Finance, insurance, real estate	291	2.7	616	3.0	111.7
Services	967	9.0	2,603	12.7	169.2
Government	3,325	30.7	5,452	26.5	63.9
Total	10,820	100.0	20,526	100.0	89.7
<u>Langlade County</u>					
Farm	4,284	11.5	10,796	15.2	152.0
Agricultural services, forestry, fisheries	184	0.5	345	0.5	87.5
Mining	0	0.0	0	0.0	0.0
Construction	1,042	2.8	3,177	4.4	204.9
Manufacturing	8,724	23.4	15,438	21.7	77.0
Transportation, communication, utilities	2,157	5.8	3,847	5.4	78.3
Wholesale trade	2,151	5.8	6,202	8.7	188.3
Retail trade	6,615	17.7	11,654	16.4	76.2
Finance, insurance, real estate	968	2.6	2,208	3.1	128.1
Services	4,441	11.9	8,836	12.4	99.0
Government	6,734	18.0	8,677	12.2	28.9
Total	37,300	100.0	71,180	100.0	90.8
<u>Oneida County</u>					
Farm	682	1.2	1,945	1.4	185.2
Agricultural services, forestry, fisheries	D ^b	-	678	0.5	-
Mining	D	-	519	0.4	-
Construction	4,394	7.5	10,968	7.9	149.6
Manufacturing	16,065	27.4	35,299	25.5	119.7
Transportation, communication, utilities	3,934	6.7	8,175	5.9	107.8
Wholesale trade	1,947	3.3	5,036	3.6	158.7
Retail trade	10,064	17.2	22,694	16.4	125.5
Finance, insurance, real estate	1,752	3.0	6,713	4.8	283.2
Services	8,648	14.8	25,895	18.7	199.4
Government	10,687	18.2	20,748	14.9	94.1
Total	58,575	100.0	138,670	100.0	136.7

NOTES

^aEarnings are total labor and proprietors' income by place of work.^bD - Data withheld to avoid disclosure on individual firms.

SOURCE

U.S. Department of Commerce, Bureau of Economic Analysis. Regional Economic Information System, 1971 and 1980. Personal Income by Major Sources. Computer printout. Washington D.C.

(16.4 percent), farming (15.2 percent), services (12.4 percent), and government (12.2 percent) in 1978. In Oneida County, manufacturing had the greatest share of 1978 total earnings (25.5 percent), followed by services (18.7 percent), retail trade (16.4 percent), and government (14.9 percent).

The relative isolation of the local study area and the sparser population has been the limiting factor on manufacturing development. It would be expected that with a better transportation network and a greater population and work force, manufacturing would increase in relative importance in the three counties. Past economic and demographic trends indicate that the manufacturing base in the local study area has attracted such growth.

2.10.2.2 Employment

Civilian Labor Force and Unemployment Rate. Unemployment rates for the local study area and for the three counties are historically higher than for Wisconsin. The difference is particularly great for Forest County, whose rate has been close to double the state average for each year from 1975 to 1979 (Table 2.10-14). The differences between the unemployment rates for Langlade and Oneida counties and the state are smaller, and the rates for the two counties are within a percentage point of the national rate. The state has historically had lower

Table 2.10-14

CIVILIAN LABOR FORCE
AND UNEMPLOYMENT RATE, 1975-1979

	Annual Average				
	1975	1976	1977	1978	1979
Local study area ^a					
Civilian labor force ^b	20,691	21,762	22,202	22,024	21,742
Total employed ^c	18,944	20,213	20,793	20,420	20,335
Total unemployed ^d	1,747	1,549	1,409	1,604	1,407
Unemployment rate ^e	8.5	7.1	6.3	7.3	6.5
Forest County					
Civilian labor force ^b	2,300	2,600	2,800	2,700	2,600
Total employed ^c	2,000	2,400	2,500	2,400	2,300
Total unemployed ^d	300	250	250	360	250
Unemployment rate ^e	13.5	9.6	9.2	13.3	9.6
Langlade County					
Civilian labor force ^b	8,400	8,600	8,900	8,300	9,000
Total employed ^c	7,800	8,000	8,300	7,800	8,500
Total unemployed ^d	690	610	530	520	500
Unemployment rate ^e	8.2	6.7	6.0	6.3	5.5
Oneida County					
Civilian labor force ^b	13,000	13,600	13,900	14,600	13,800
Total employed ^c	12,000	12,700	13,100	13,600	12,900
Total unemployed ^d	1,020	910	840	990	890
Unemployment rate ^e	7.9	6.7	6.1	6.8	6.5
Unemployment rate					
State of Wisconsin	6.9	5.6	4.9	5.1	4.5
United States	8.5	7.7	7.0	6.0	6.0

NOTES

^a Local study area calculated on the basis of local study area population as a percent of total three-county population for each year.

^b Civilian labor force is the sum of all employed and unemployed persons in the noninstitutional population over 16 years of age and not in the armed forces; figure reported may not be sum of employed and unemployed because figures were rounded to the nearest 100.

^c Employment constitutes those individuals 16 years of age and older who worked at least one hour for pay or profit or worked at least 15 unpaid hours in a family business during the reference week (the week including the 12th of the month). Individuals are also counted as employed if they have a job but did not work because of bad weather or taking time off for personal reasons.

^d Unemployment constitutes those individuals 16 years of age and older who have no job but are available for work and actively seeking work during the reference week (the week including the 12th of the month). This includes individuals who are waiting to be recalled from a layoff and individuals waiting to report to a new job within 30 days.

^e Unemployment rates for counties calculated from unrounded figures.

SOURCES

Wisconsin Department of Industry, Labor and Human Relations. Civilian Labor Force Estimates. (annual) 1975-1978. Madison.

unemployment rates than the United States. In 1979, the state rate was 4.5 percent while the U.S. rate was 6.0 percent.

Civilian Labor Force Participation Rates by Age and Sex.

The 1970 labor force participation rates for the city of Crandon and for Forest County as a whole were lower than those of the other two counties, the local study area, and for the state (Table 2.10-15). This relationship is consistent with the relative importance of transfer payments as a component of personal income in Forest County. For the state and all jurisdictions within the local study area, the 45-64 age group had the greatest number of potential employees. However, the labor force participation rates were not consistent for age groups across jurisdictions.

For the local study area as a whole, Forest County, and the city of Crandon, the highest participation rate was for the 35-44 age group (70.1, 71.6, and 66.1 percent, respectively). Langlade County's greatest labor force participation rate applied to residents between the ages of 22 and 24 (71.6 percent), as did that for Wisconsin (71.5 percent). Oneida County had the greatest percentage of employed labor force in the 45-64 age group (73.2 percent); however, Rhinelander, the county seat of Oneida County, had its greatest participation rate in the 18-21 age group (85.0 percent). Labor force participation by males was almost twice that for females for all jurisdictions.

Table 2.10-15

CIVILIAN LABOR FORCE PARTICIPATION RATES BY AGE AND SEX, 1970

Age	State of Wisconsin		Local Study Area ^a		Forest County		Langlade County	
	Civilian Labor Force ^b	Participation Rate ^c	Civilian Labor Force	Participation Rate	Civilian Labor Force	Participation Rate	Civilian Labor Force	Participation Rate
Total employed								
14+ years of age	1,802,681	54.6	16,274	49.9	2,409	41.0	6,926	50.2
14-15	25,272	13.4	279	13.1	20	5.0	180	18.7
16-17	64,096	36.4	512	26.1	50	11.9	301	38.6
18-21	189,111	61.8	1,303	59.1	117	36.4	575	55.1
22-24	137,133	71.5	845	68.1	116	46.8	374	71.6
25-34	351,025	69.5	2,662	63.9	469	43.5	1,096	64.7
35-44	345,996	73.4	3,270	70.1	453	71.6	1,255	68.9
45-64	609,630	69.2	6,592	65.4	1,053	61.7	2,724	65.5
65+	80,418	17.0	811	13.2	131	12.4	421	15.0
Male employed								
14+ years of age	1,129,553	73.3	10,678	66.8	1,659	56.8	4,542	68.3
14-15	17,674	18.1	172	15.6	20	8.5	117	22.7
16-17	38,112	42.3	345	30.1	38	12.8	190	56.1
18-21	95,501	65.9	689	66.5	81	40.1	305	70.3
22-24	78,345	85.8	589	93.8	81	82.7	275	98.2
25-34	238,316	95.3	1,905	93.7	357	94.7	801	95.1
35-44	225,401	96.4	2,190	96.0	287	96.3	824	95.0
45-64	384,067	89.8	4,240	87.8	692	80.1	1,749	87.9
65+	52,137	25.2	548	18.6	103	18.4	281	21.7
Female employed								
14+ years of age	673,128	38.2	5,595	33.7	750	25.4	2,384	39.7
14-15	7,598	8.3	107	10.1	0	0.0	63	14.1
16-17	25,984	30.3	167	19.9	12	9.8	111	30.4
18-21	93,610	58.2	614	52.5	36	29.5	270	44.3
22-24	58,788	58.4	256	41.8	35	23.3	99	42.3
25-34	112,709	44.1	757	35.5	112	16.0	295	34.6
35-44	120,595	51.0	1,080	46.0	166	49.5	431	45.1
45-64	225,563	49.8	2,352	44.8	361	42.5	975	45.0
65+	28,281	10.6	262	8.1	28	5.6	140	9.3

(continued)

(Table 2.10-15, continued)

Age	Oneida County		City of Crandon		City of Antigo		City of Rhineland	
	Civilian Labor Force	Participation Rate	Civilian Labor Force	Participation Rate	Civilian Labor Force	Participation Rate	Civilian Labor Force	Participation Rate
Total employed 14+ years of age	9,033	52.9	470	41.4	3,463	53.1	1,240	56.0
14-15	115	11.5	0	0.0	113	24.7	57	16.1
16-17	227	23.4	0	0.0	189	54.8	104	29.3
18-21	779	60.3	29	60.4	293	69.8	268	85.0
22-24	464	70.7	60	53.6	180	68.2	177	77.0
25-34	1,439	66.5	102	51.0	541	67.0	493	72.1
35-44	1,983	70.1	80	66.1	616	72.5	639	69.7
45-64	3,663	73.2	189	59.8	1,351	69.0	1,316	78.0
65+	363	11.4	10	4.2	180	12.6	186	16.6
Male employed 14+ years of age	5,851	67.3	306	56.4	2,115	69.5	1,985	71.7
14-15	57	11.8	0	0.0	69	28.3	33	20.4
16-17	161	33.5	0	0.0	103	53.9	76	38.6
18-21	392	66.8	10	100.0	126	63.3	125	67.6
22-24	309	88.3	54	91.5	136	94.4	95	93.1
25-34	992	95.8	83	85.6	384	76.5	344	100.0
35-44	1,361	96.2	55	100.0	361	93.0	401	96.6
45-64	2,344	84.0	94	57.0	835	89.9	824	90.5
65+	235	15.2	10	10.1	101	18.5	87	19.2
Female employed 14+ years of age	3,182	37.9	154	38.7	1,348	38.7	1,255	41.6
14-15	58	11.2	0	0.0	44	20.6	24	12.6
16-17	66	13.5	0	0.0	86	55.8	28	17.8
18-21	387	54.9	9	23.7	167	75.6	143	57.7
22-24	155	50.1	6	12.2	44	36.7	82	64.1
25-34	447	39.6	19	18.4	157	38.4	149	43.8
35-44	622	44.5	25	37.9	255	55.2	238	47.4
45-64	1,319	59.6	95	62.9	516	50.3	492	63.2
65+	128	7.8	0	0.0	79	9.0	99	14.8

NOTES

^aLocal study area calculated on the basis of local study area population as a percent of total three-county population in 1970.

^bCivilian labor force is the sum of all employed and unemployed persons in the noninstitutional population over 14 years of age and not in the armed forces.

^cParticipation rate is the number in the labor force as a percent of total population in each age-sex cohort for each jurisdiction. Participation rate is derived using sample count Census data for population in each age-sex cohort; these census data are different from population by age-sex cohort presented in Table 2.10-5 of this report.

SOURCE

Wisconsin Department of Administration. 1980. 1970 Census Summary Tables. Tables 202, 454, 455, and 456. Computer printout. Madison.

Average Weekly Wages, 1970 and 1978. In 1978, the lowest average weekly wage for covered employment in the local study area (\$146.94) was in Forest County; this value was 65.2 percent of the state average weekly wage (Table 2.10-16). As was true statewide, average manufacturing wages in all three counties were higher than the averages of total wages; manufacturing wages were approximately equal in Forest and Langlade counties (\$178) and substantially higher in the more manufacturing oriented Oneida County (\$292). In 1978, Oneida County's average weekly manufacturing wages slightly exceeded the state average (by 1.3 percent). With the exception of manufacturing wages in Oneida County, the percentage increase in average weekly wages between 1970 and 1978 for the three counties was less than for the state as a whole for all industries.

Total Covered Employment. Statistics on total covered employment by quarter illustrate both the dominance of Oneida County as the major employment base for the three-county area and the seasonal nature of employment in each county (Table 2.10-17). "Covered employment" statistics presented here are not the same as the employment figures discussed previously. Covered employment includes only those employees of employers who are subject to the Wisconsin Unemployment Compensation Law. The criteria for defining such employers are explained in Table 2.10-17.

Table 2.10-16

AVERAGE WEEKLY WAGES, 1970 and 1978

	STATE OF WISCONSIN		FOREST COUNTY		LANGLADE COUNTY		ONEIDA COUNTY	
	Average Weekly Wages	Percent of State	Average Weekly Wage	Percent of State	Average Weekly Wage	Percent of State	Average Weekly Wages	Percent of State
All industries								
1970	\$139.64	100.0	\$98.73	70.7	\$101.67	72.8	\$123.07	88.1
1978	225.45	100.0	146.94	65.2	161.79	71.8	195.20	86.6
Percent change 1970-1978 ^a	-	61.5	-	48.8	-	59.1	-	58.6
Manufacturing								
1970	161.91	100.0	104.39	64.5	121.67	75.1	155.51	96.0
1978	288.25	100.0	178.11	61.8	178.75	62.0	291.96	101.3
Percent change 1970-1978 ^a	-	78.0	-	70.6	-	46.9	-	87.7

NOTE

^a Percent changes for wages is not calculated because the 1970 and 1978 wages are not reported here in constant dollars.

SOURCE

Wisconsin Department of Industry, Labor and Human Relations. 1970 and 1978.
Employment and Wages Covered by Wisconsin's U.C. Law. Quarters 1 through 4. Madison.

Table 2.10-17

TOTAL COVERED EMPLOYMENT^a, 1978

Jurisdiction	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		1978 Average	
	Number	Percent ^b	Number	Percent ^b	Number	Percent ^b	Number	Percent ^b	Number	Percent ^b
Local study area	13,358	100.0	15,097	100.0	14,655	100.0	13,853	100.0	14,241	100.0
Forest County	1,819	-	1,780	-	1,514	-	1,776	-	1,722	-
Langlade County	4,499	-	5,462	-	5,607	-	5,435	-	5,251	-
Oneida County	9,350	-	10,778	-	10,778	-	10,150	-	10,114	-
City of Crandon	727	5.4	768	5.1	705	4.8	777	5.6	744	5.2
City of Antigo	3,275	24.5	3,886	25.7	4,039	27.6	3,949	28.5	3,787	26.6
City of Rhinelander	6,267	47.0	6,539	43.2	6,564	44.8	6,238	45.1	6,402	45.0
Argonne Town	22 ^c	0.2	22	0.1	26	0.2	22	0.2	23	0.2
Blackwell Town	D ^c	-	D	-	D	-	D	-	D	-
Caswell Town	104	0.8	98	0.7	76	0.5	96	0.7	94	0.7
Crandon Town	7	0.1	9	0.1	21	0.1	18	0.1	14	0.1
Freedom Town	11	0.1	5	0.0	17	0.1	13	0.1	12	0.1
Hiles Town	37	0.3	30	0.2	37	0.3	25	0.2	32	0.2
Laona Town	577	4.3	540	3.6	324	2.2	47	0.3	372	2.6
Lincoln Town	D	-	D	-	D	-	D	-	D	-
Nashville Town	56	0.4	42	0.3	48	0.3	59	0.4	51	0.4
Popple River Town	D	-	D	-	D	-	D	-	D	-
Ross Town	D	-	D	-	D	-	D	-	D	-
Wabeno Town	207	1.5	194	1.3	179	1.2	220	1.6	200	1.4
Ackley Town	22	0.2	32	0.2	47	0.3	52	0.4	38	0.3
Ainsworth Town	24	0.2	31	0.2	19	0.1	16	0.1	23	0.2
Antigo Town	416	3.1	523	3.5	523	3.6	498	3.6	490	3.4
Elcho Town	163	1.2	185	1.2	148	1.0	162	1.2	165	1.2
Evergreen Town	D	-	D	-	D	-	D	-	D	-
Langlade Town	15	0.1	20	0.1	25	0.1	16	0.1	19	0.1
Neva Town	106	0.8	138	0.9	141	1.0	134	1.0	130	0.9
Norwood Town	49	0.4	60	0.4	63	0.4	59	0.4	58	0.4
Parrish Town	D	-	D	-	D	-	D	-	D	-
Peck Town	9	0.1	8	0.0	10	0.0	9	0.0	9	0.1
Polar Town	36	0.3	47	0.3	44	0.3	44	0.3	43	0.3
Price Town	78	0.6	129	0.9	101	0.7	96	0.7	101	0.7
Rolling Town	80	0.6	95	0.6	27	0.2	22	0.2	56	0.4
Upham Town	D	-	D	-	D	-	D	-	D	-
Wolf River Town ^d	171	1.3	232	1.5	206	1.4	192	1.4	200	1.4

(Table 2.10-17, continued)

TOTAL COVERED EMPLOYMENT^a, 1978

JURISDICTION	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		1978 Average	
	Number	Percent ^b	Number	Percent ^b	Number	Percent ^b	Number	Percent ^b	Number	Percent ^b
Crescent Town	12	0.1	11	0.1	10	0.1	13	0.1	12	0.1
Enterprise Town	D	-	D	-	D	-	D	-	D	-
Lake Tomahawk Town	60	0.4	48	0.3	52	0.3	48	0.3	52	0.4
Monico Town	50	0.4	54	0.4	52	0.4	60	0.4	54	0.4
Newhold Town	70	0.5	77	0.5	72	0.6	82	0.6	75	0.5
Pelican Town	145	1.1	575	3.8	265	1.4	200	1.4	296	2.1
Piehl Town	D	-	D	-	D	-	D	-	D	-
Pine Lake Town	14	0.1	14	0.1	22	0.1	19	0.1	17	0.1
Schoepke Town	17	0.1	25	0.2	28	0.3	42	0.3	28	0.2
Stella Town	6	0.0	4	0.0	39	0.3	8	0.1	14	0.1
Sugar Camp Town	90	0.7	113	0.7	139	0.9	133	1.0	119	0.8
Three Lakes Town	363	2.7	384	2.5	436	3.0	386	2.8	392	2.8
Woodboro Town	6	0.0	11	0.1	23	0.2	10	0.1	13	0.1

NOTES

^a Includes full-time and part-time employment. Discrepancies exist between Table 2.10-14 and 2.10-17 because of differences between employment figures reported in Table 2.10-14 and "covered employment" figures reported here. Covered employment includes employees of employers who are subject to the Unemployment Compensation Law, including:

1. Employers of one or more workers on each of some 20 days during the taxable year, each day being in a different calendar week.
2. Employers who paid wages for employment which totaled \$1,500 or more during any quarter in either that year or the preceding year.
3. Employers who are subject to the Federal Unemployment Tax Act, based on their employment in all states.
4. Employers of nonprofit organizations with at least 4 employees on each of some 20 days during the taxable year, each day being in a different calendar week.
5. Agriculture employers who have at least 10 employees on each of some 20 days during the taxable year, each day being in a different calendar week or who have \$20,000 cash wages paid during the calendar quarter.
6. Domestic employers who have at least \$1,000 of cash wages paid in a calendar quarter.
7. All government units.
8. Other employers who have elected coverage who otherwise might not be required to be covered.

^b Percent of local study area. No percentages are calculated for the three counties as they each contain employment outside the local study area.

^c D = data withheld to avoid disclosure of information on individual firms.

^d Includes White Lake Village.

SOURCE

Wisconsin Department of Industry, Labor and Human Relations. 1980. Employment by 4-Digit SIC Code and Jurisdiction. Computer printout. Madison.

On the average in 1978, over two-thirds of those employed in the local study area worked in Oneida County (10,114 employed), followed by Langlade County (5,251 employed) and Forest County (1,722 employed). Overall, employment was highest in the local study area in early spring (second quarter) and lowest in winter (first quarter). In Forest County, more people were employed in winter than any other quarter. This is due to the importance of logging (classified as a manufacturing sector) which employs larger numbers at that time of year. Langlade County, which is more oriented towards agriculture and tourism, showed the greatest employment during the late summer (when tourism peaks and crops are harvested).

The three cities are the major employment centers for their respective counties. Grandon was the site of 43.2 percent of the 1978 average employment in Forest County; Antigo hosted 72.1 percent of Langlade County's employees, and Rhinelander employed 63.3 percent of Oneida County's employees. Together, the three cities provided 76.8 percent of covered employment in the local study area. The towns with the greatest employment were Antigo (Langlade County), Three Lakes (Oneida County), and Laona (Forest County). Antigo Town, with 3.4 percent of the local study area's 1978 average employment, reflects the town's proximity to the city of Antigo. Three Lakes, a popular recreation area close to Eagle River in Vilas County, accounted for 2.8 percent of employment in the local study area. Laona, which is the location

of Connor Forest Industries, the largest employer in the county, hosted 2.6 percent of the employees in the local study area in 1978.

Wage and Salary Covered Employment by Industry, 1970 and 1978. The industries with the greatest number of employees in Forest County were state and local government (554 employees) and manufacturing (500 employees) in 1978 (Table 2.10-18). In Langlade County, the manufacturing sector accounted for 1,390 employees, followed by retail trade, which employed 1,246 people. Retail trade and services were the top two employment sectors in Oneida County in 1978, with 2,463 and 2,244 employees, respectively.

Major manufacturing and non-manufacturing employers (excluding government) in the local study area in 1978 are shown in Table 2.10-19.

Average Annual Manufacturing Employment. Manufacturing accounted for the largest share of employment in each of the local study area counties (Table 2.10-20). Major manufacturing activities, as reflected by annual average employment in 1978, were the production of lumber and wood products (42.7 percent) and furniture and fixtures (55.1 percent) in Forest County; lumber and wood products (20.8 percent), food processing (19.6 percent) and the production of fabricated metals (11.9 percent)

Table 2.10-18

WAGE AND SALARY COVERED EMPLOYMENT BY INDUSTRY, 1970 AND 1978

	Annual Averages, 1970				Annual Averages, 1978				Percent Change, 1970-78	
	Reporting Units		Employment ^a		Reporting Units		Employment ^a		Reporting Units	Employment ^a
	No.	Percent ^b	No.	Percent ^b	No.	Percent ^b	No.	Percent ^b		
Forest County										
Private, nonfarm	63	100.0	947	100.0	183	88.8	1,255	68.9	190.5	32.5
Agriculture, forestry, fisheries	0	0.0	0	0.0	1		2	0.1	-	0.0
Mining	0	0.0	0	0.0	0	0.0	0	0.0	-	0.0
Construction	3	4.8	31	3.3	28	13.6	64	3.5	833.3	106.5
Manufacturing	20	31.8	608	64.2	37	18.0	500	27.5	85.0	-17.8
Transportation, communication, utilities	6	9.5	39	4.1	14	6.8	102	5.6	133.3	161.5
Wholesale trade	4	6.3	9	0.9	8	3.9	89	4.9	100.0	988.9
Retail trade	16	25.4	118	12.5	52	25.2	237	13.0	225.0	100.8
Finance, insurance, real estate	4	6.3	25	2.6	11	5.3	40	2.2	175.0	60.0
Services	10	15.9	117	12.4	32	15.5	221	12.1	220.0	68.9
Government ^c	-	-	-	--	23	11.2	566	31.1	-	-
Federal	-	-	-	--	4	2.0	12	0.7	-	-
State and local	-	-	-	--	19	9.2	554	30.4	-	-
Langlade County										
Private, nonfarm	201	100.0	2,879	100.0	467	94.7	4,555	84.4	132.3	58.2
Agriculture, forestry, fisheries	0	0.0	0	0.0	14	2.8	149	2.8	-	-
Mining	1	0.5	0	0.0	0	0.0	0	0.0	-100.0	0.0
Construction	14	7.0	51	1.8	50	10.1	175	3.2	257.1	243.1
Manufacturing	33	16.4	1,079	37.5	52	10.5	1,390	25.7	57.6	26.8
Transportation, communication, utilities	16	8.0	188	6.5	34	6.9	212	3.9	112.5	12.8
Wholesale trade	20	9.9	200	6.9	42	8.5	408	7.6	110.0	104.0
Retail trade	84	41.8	950	33.0	160	32.5	1,246	23.1	90.5	31.2
Finance, insurance, real estate	9	4.5	92	3.2	22	4.5	150	2.8	144.4	63.0
Services	24	11.9	319	11.1	93	18.9	825	15.3	287.5	158.6
Government ^c	-	-	-	-	26	5.3	844	15.6	-	-
Federal	-	-	-	-	2	0.4	22	0.4	-	-
State and local	-	-	-	-	24	4.9	822	15.2	-	-

(continued)

(Table 2.10-18, continued)

	Annual Averages, 1970				Annual Averages, 1978				Percent Change, 1970-78	
	Reporting Units		Employment ^a		Reporting Units		Employment ^a		Reporting Units	Employment ^a
	No.	Percent ^b	No.	Percent ^b	No.	Percent ^b	No.	Percent ^b		
Oneida County										
Private, nonfarm	286	100.0	4,908	100.0	892	95.8	8,597	85.4	211.9	75.2
Agriculture, forestry, fisheries	2	0.7	9	0.2	12	1.3	129	1.3	500.0	1,333.3
Mining	1	0.4	16	0.3	3	0.3	27	0.3	200.0	68.8
Construction	40	14.0	286	5.8	155	16.6	659	6.5	287.5	130.4
Manufacturing	24	8.4	1,740	35.5	42	4.5	1,990	19.8	75.0	14.4
Transportation, communication, utilities	17	5.9	383	7.8	38	4.1	426	4.2	123.5	11.2
Wholesale trade	13	4.5	132	2.7	34	3.7	245	2.4	161.5	85.6
Retail trade	117	40.9	1,282	26.1	331	35.6	2,463	24.5	182.9	92.1
Finance, insurance, real estate	14	4.9	288	5.9	59	6.3	414	4.1	321.4	43.8
Services	58	20.3	772	15.7	218	23.4	2,244	22.3	275.9	190.7
Government ^c	---	---	---	---	39	4.2	1,467	14.6	---	---
Federal	---	---	---	---	5	0.5	59	0.6	---	---
State and local	---	---	---	---	34	3.7	1,408	14.0	---	---

NOTES

^aIncludes full-time and part-time employment.

^bPercentages are percent of total private, nonfarm employment.

^cGovernment employment not reported in 1970.

SOURCE

Wisconsin Department of Industry, Labor and Human Relations. 1970 and 1978. Employment and Wages Covered by Wisconsin's U.C. Law. Quarters 1-4. Madison.

Table 2.10-19

MAJOR EMPLOYERS^a
IN LOCAL STUDY AREA, 1978

Forest County - Manufacturing ^b	
Connor Forest Industries	Laona
Bemis Manufacturing	Crandon
Elliott Glove	Wabeno
Ted Roberts	Hiles
Ronald Brooks	Caswell
Forest Saw Mill, Inc.	Wabeno
Connors Forest Products	Wabeno
Fraley and Van Cleve	Crandon
George Brewer	Caswell
IJ Millan Lumber Corp.	Armstrong Creek
Forest County - Non-Manufacturing ^b	
Crandon Convalescent Center	Crandon
Nu Roc Nursing Home	Laona
Mi De, Inc.	Crandon
Schaeffer Enterprises	Crandon
Langlade County - Manufacturing ^b	
Sheldon's	Antigo
Baker Canning Co.	Antigo
AMRON Corp. (Nasco)	Antigo
Kraft Foods	Antigo
Yawkey - Bissel Hardwood Flooring Co.	White Lake
Weinbrenner Shoe Corp.	Antigo
Vulcan Corp.	Antigo
Duffek Sand and Gravel, Inc.	Antigo
Kretz Lumber Co., Inc.	Summit
Nortech, Inc.	Antigo
Langlade County - Non-Manufacturing ^b	
Langlade County Memorial Hospital	Antigo
Copp's	Antigo
All-Car Distributors, Inc.	Antigo
Lock Wood Corp.	Antigo
Oneida County - Manufacturing ^b	
St. Regis Paper Co.	Rhineland
Triumph Twist Drill Co.	Rhineland
Daniels Packaging Co., Inc.	Rhineland
Marplex Products Co, Inc.	Rhineland
Coca-Cola Bottling Co., Inc.	Rhineland
Electro-Mel Industries, Inc.	Hazelhurst
Northern Lakes Publishing Co.	Rhineland
Rhineland Foods, Inc.	Rhineland
Lakeland Printing Co., Inc.	Minocqua
Oneida County - Non-Manufacturing ^b	
St. Mary's Hospital	Rhineland
Friendly Village, Inc.	Rhineland
Howard Young Medical Center	Woodruff

NOTES

^a Does not include public employees.

^b Listed in size order, with firms with largest number of employees first.

SOURCE

Wisconsin Department of Business Development. 1979. Economic Profiles for Forest, Langlade, and Oneida Counties. Madison.

Table 2.10-20

AVERAGE ANNUAL MANUFACTURING EMPLOYMENT, 1970 and 1978

	1970 Average		1978 Average		Percent Change 1970-1978		
	No.	No.	No.	No.	No.	No.	
	Units	Emp.	Units	Emp.	Units	Emp.	
Forest County							
SIC 20	Food and kindred products	2	51	0	0	0.0	0.0
SIC 24	Lumber and wood products	17	546	33	214	94.1	-60.8
SIC 25	Furniture and fixtures	1	6	2	276	100.0	4,500.0
SIC 26	Paper and allied products	0	0	0	0	0.0	0.0
SIC 27	Printing and publishing	1	5	1	7	0.0	40.0
SIC 28	Chemicals and allied products	0	0	0	0	0.0	0.0
SIC 30	Rubber and plastics	0	0	0	0	0.0	0.0
SIC 32	Stone, clay, and glass	0	0	0	0	0.0	0.0
SIC 34	Fabricated metals	0	0	1	0	-	0.0
SIC 35	Machinery, except electrical	0	0	1	4	-	-
SIC 36	Electrical machinery and equipment	0	0	0	0	0.0	0.0
SIC 39	Miscellaneous manufacturing	0	0	0	0	0.0	0.0
Total		21	608	38	501	81.0	-17.6
Langlade County							
SIC 20	Food and kindred products	5	489	8	273	60.0	-44.2
SIC 24	Lumber and wood products	14	216	24	290	71.4	34.3
SIC 25	Furniture and fixtures	2	10	0	0	-100.0	-100.0
SIC 26	Paper and allied products	0	0	1	20	-	-
SIC 27	Printing and publishing	4	48	3	64	-25.0	33.3
SIC 28	Chemicals and allied products	1	9	1	14	0.0	55.6
SIC 30	Rubber and plastics	0	0	3	99	-	-
SIC 31	Leather and leather products	1	67	0	0	-100.0	-100.0
SIC 32	Stone, clay, and glass	2	76	2	72	0.0	-5.3
SIC 34	Fabricated metals	1	29	3	165	200.0	469.0
SIC 35	Machinery, except electrical	2	44	3	57	50.0	29.5
SIC 36	Electrical machinery and equipment	0	0	1	39	-	-
SIC 39	Miscellaneous manufacturing	1	89	3	298	200.0	234.8
Total		33	1,077	52	1,391	57.6	29.2
Oneida County							
SIC 20	Food and kindred products	4	192	5	137	25.0	-28.6
SIC 24	Lumber and wood products	9	95	18	214	100.0	125.3
SIC 25	Furniture and fixtures	0	0	0	0	0.0	0.0
SIC 26	Paper and allied products	2	1,303	1	926	-50.0	-28.9
SIC 27	Printing and publishing	3	38	8	297	166.7	681.6
SIC 28	Chemicals and allied products	0	0	0	0	0.0	0.0
SIC 30	Rubber and plastics	0	0	0	0	0.0	0.0
SIC 32	Stone, clay, and glass	5	37	6	50	20.0	35.1
SIC 34	Fabricated metals	0	0	1	4	-	-
SIC 35	Machinery, except electrical	0	0	1	320	-	-
SIC 36	Electrical machinery and equipment	1	73	1	42	0.0	-42.5
SIC 39	Miscellaneous manufacturing	1	2	1	1	0.0	-50.0
Total		25	1,740	42	1,991	68.0	14.4

SOURCE

Wisconsin Department of Industry, Labor and Human Relations. 1970 and 1978. Employment and Wages Covered by Wisconsin's U.C. Law. Quarters 1 through 4. Madison.

in Langlade County; and the manufacture of paper and allied products (46.5 percent), non-electrical machinery (16.1 percent), and printing and publishing (14.9 percent) in Oneida County.

2.10.2.3 Business and Financial Activity Summary

Business and Industrial Activity Summary, 1972 and 1977.

Oneida County surpassed the other counties in 1978 in total earnings, average weekly wages, and covered employment. Consistent with its higher population, income, and employment levels, Oneida County accounted for 55.4 percent of the three counties' value added (the appreciation in dollar terms as a result of manufacturing) and 59.9 percent of value of shipments (dollar value of the manufactured goods) in manufacturing for 1977, 52.5 percent of wholesale trade sales, 62.9 percent of retail sales, and 66.4 percent of service receipts (Table 2.10-21). Rhinelander, as the focus of economic activity in Oneida County, is the major trade center, accounting for 34.8 percent of total retail sales in 1977 for the three-county area. Percentage growth in wholesale trade sales for Langlade County between 1972 and 1977 exceeded growth in wholesale trade sales for the state as a whole, as did growth in retail sales for Langlade and Oneida counties, and growth in service receipts for Langlade County.

Finance, 1970 and 1978. Assets, loans, and deposits of financial institutions are used here as indicators of capital in

Table 2.10-21

BUSINESS AND INDUSTRIAL ACTIVITY SUMMARY, 1972 and 1977

	State of Wisconsin			Forest County			Langlade County			Oneida County		
	1972	1977	Percent Change 1972-1977	1972	1977	Percent Change 1972-1977	1972	1977	Percent Change 1972-1977	1972	1977	Percent Change 1972-1977
Manufacturing												
Value added (\$ millions)	9,443.3	16,761.5	+77.5	7.9	11.2	+41.8	15.8	28.4	+79.7	31.5	49.1	+55.9
Value of shipments (\$ millions)	17,578.8	39,060.0	+122.2	13.9	20.5	+47.5	48.2	72.0	+49.4	67.0	137.9	+105.8
Number of firms	7,849	8,681	+10.6	29	40	+37.9	40	50	+25.0	36	51	+41.7
Wholesale trade												
Sales (\$ thousands)	10,838,629	19,648,057	+81.3	2,240	3,408	+52.1	26,126	69,692	+166.8	60,956	80,911	+32.7
Number of firms	8,233	7,874	-4.4	10	8	-20.0	58	53	-8.6	47	48	+2.1
Retail trade												
Sales (\$ thousands)	9,253,744	14,930,207	+61.3	10,852	14,156	+30.4	40,913	68,756	+68.1	76,504	140,498	+83.6
Number of firms	42,982	42,819	-0.4	148	130	-12.2	289	288	-0.3	526	543	+3.2
Selected services												
Receipts (\$ thousands)	1,505,806	2,579,040	+71.3	1,379	1,627	+18.0	3,799	7,493	+97.2	12,046	17,987	+49.3
Number of firms	30,421	35,435	+16.5	79	85	+7.6	121	146	+20.7	388	458	+18.0

	City of Antigo			City of Rhinelander		
	1972	1977	Percent Change 1972-1977	1972	1977	Percent Change 1972-1977
Manufacturing						
Value added (\$ millions)	10.2	NR ^a	-	29.8	NR	-
Value of shipments (\$ millions)	38.7	NR	-	63.8	NR	-
Number of firms	22	NR	-	15	NR	-
Wholesale trade						
Sales (\$ thousands)	22,215	51,655	+132.5	54,753	D ^b	-
Number of firms	48	41	-14.6	29	D	-
Retail trade						
Sales (\$ thousands)	36,596	54,674	+49.4	46,038	77,792	+69.0
Number of firms	204	182	-10.8	247	240	-2.8
Selected services						
Receipts (\$ thousands)	1,206	4,705	+46.8	5,206	7,694	+47.8
Number of firms	81	94	+16.0	159	176	+10.7

NOTES

^aNR - not reported; no data reported for city of Crandon.

^bD - data withheld to avoid disclosure of information on individual firms.

SOURCES

U.S. Department of Commerce, Bureau of the Census. 1979. 1977 Census of Manufactures - Wisconsin. Washington, D.C.: U.S. Government Printing Office.

..... 1979. 1977 Census of Retail Trade - Wisconsin. RC 77-A-50. Washington, D.C.: U.S. Government Printing Office.

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..... 1976. 1972 Census of Service Industries - Wisconsin. Washington, D.C.: U.S. Government Printing Office.

..... 1976. 1972 Census of Wholesale Trade - Wisconsin. Washington, D.C.: U.S. Government Printing Office.

the local study area. Commercial banks and savings and loan associations are located in all three counties. Total assets, loans, and deposits increased for all types of institutions from 1970 to 1978, and the percentage increases were generally greater in the three counties than for the state as a whole (Table 2.10-22). Savings and loan associations in the local study area tended to be smaller than the average state institution, as measured by average institution assets, loans, and deposits. Banks and credit unions, however, were generally larger in the local study area than they were statewide. Two credit unions, Antigo Co-Op in Antigo and Ripco in Rhinelander, accounted for 100 percent of total credit union assets in the local study area in 1978.

The loan/deposit ratio is a measure of capital availability and reflects the willingness and ability of financial institutions to extend credit. The 1978 loan/deposit ratios for banks and credit unions in the local study area exceeded state ratios; the ratio for local savings and loans (1.06) was only slightly lower than the ratio for the state as a whole (1.08). If financial institutions in the local study area had the same loan/deposit ratios as their statewide counterparts, loans made in the local study area would have been \$6.4 million less in 1978. Therefore, investment in the local study area was above the state level, indicating a greater willingness on the part of local institutions to create loans than institutions statewide.

Table 2.10-22

FINANCE, 1970 AND 1978
(\$ thousands)

	Number	Assets		Loan Amount		Deposit Amount		Loan/ Deposit Ratio
		Total	Average	Total	Average	Total	Average	
Commercial banks								
State of Wisconsin ^a								
1970	486	6,259,710	12,880	3,145,747	6,473	5,552,276	11,424	0.567
1978	507	13,626,095	26,876	8,134,118	16,044	11,886,330	23,444	0.684
Percent change 1970-1978	4.3	117.7	108.7	158.6	147.9	114.1	105.2	20.6
Local study area								
1970	8	83,641	10,455	43,545	5,443	74,393	9,299	0.585
1978	8	186,989	23,373	123,412	15,427	166,952	20,869	0.739
Percent change 1970-1978	0.0	123.6	123.6	183.4	183.4	124.4	124.4	26.3
Forest County								
1970	3	14,019	4,673	7,383	2,461	11,666	3,889	0.633
1978	3	32,821	10,940	21,934	7,311	29,052	9,684	0.755
Percent change 1970-1978	0.0	134.1	134.1	197.1	197.1	149.0	149.0	19.3
Langlade County								
1970	3	33,470	11,157	17,397	5,799	29,824	9,941	0.583
1978	3	68,809	22,936	48,981	16,327	59,770	19,923	0.820
Percent change 1970-1978	0.0	105.8	105.8	181.5	181.5	100.4	100.4	40.7
Oneida County								
1970	2	36,152	18,076	18,765	9,383	32,903	16,452	0.570
1978	2	85,359	42,680	52,497	26,249	78,130	39,065	0.672
Percent change 1970-1978	0.0	136.1	136.1	179.8	179.8	137.5	137.4	17.9
Credit unions								
State of Wisconsin								
1970	766	840,420	627	368,154	481	427,523	558	0.862
1978	642	1,157,587	1,803	970,160	1,511	1,038,710	1,618	0.934
Percent change 1970-1978	-16.2	37.7	187.6	163.5	214.1	143.0	190.0	8.4
Local study area								
1970	5	8,100	1,622	6,515	1,303	7,237	1,447	0.900
1978	5	27,252	5,450	23,584	4,717	24,621	4,924	0.958
Percent change 1970-1978	0.0	236.4	236.0	262.0	262.0	240.2	240.3	6.4
Forest County								
1970	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
Percent change 1970-1978	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Langlade County								
1970	3	4,508	1,503	3,916	1,305	4,029	1,343	0.972
1978	2	16,894	8,447	15,190	7,595	15,118	7,559	1.005
Percent change 1970-1978	-33.3	274.8	462.0	287.9	482.0	275.2	462.8	3.4
Oneida County								
1970	2	3,602	1,801	2,599	1,300	3,208	1,604	0.810
1978	3	10,358	3,453	8,394	2,798	9,503	3,168	0.883
Percent change 1970-1978	50.0	187.6	91.7	223.0	115.2	196.2	97.5	9.0

(continued)

(Table 2.10-22, continued)

	Number	Assets		Loan Amount		Deposit Amount		Loan/ Deposit Ratio
		Total	Average	Total	Average	Total	Average	
Savings and loan associations ^c								
State of Wisconsin								
1970 ^d	135	3,950,537	29,263	3,413,821	25,288	3,307,836	24,502	1.032
1978 ^e	116	11,029,363	95,081	9,869,027	85,078	9,116,084	78,587	1.083
Percent change								
1970-1978	-14.1	179.2	224.9	189.1	236.4	175.6	220.7	4.9
Local study area								
1970	2	26,743	13,372	23,528	11,764	22,482	11,241	1.047
1978	3	96,357	32,119	86,963	28,988	81,978	27,326	1.061
Percent change								
1970-1978	50.0	260.3	140.2	269.6	146.4	264.6	143.1	1.3
Forest County								
1970	0	0	0	0	0	0	0	0.0
1978	0	0	0	0	0	0	0	0.0
Percent change								
1970-1978	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Langlade County								
1970	1	9,142	9,142	7,971	7,971	7,571	7,571	1.053
1978 ^f	1	35,311	35,311	31,355	31,355	29,355	29,355	1.068
Percent change								
1970-1978	0.0	286.3	286.3	293.4	293.4	287.7	287.7	1.4
Oneida County								
1970	1	17,601	17,601	15,557	15,557	14,911	14,911	1.043
1978 ^g	2	61,046	30,523	55,608	27,804	52,623	26,311	1.057
Percent change								
1970-1978	100.0	246.8	73.4	257.4	78.7	252.9	76.5	1.3

NOTES

^aThere are 20 counties for which data on national banks are not available.

^bNo national banks in Langlade County; totals are for state and mutual banks only.

^cCombined state-chartered and federally chartered associations.

^d135 associations; 57 branch offices.

^e116 associations; 373 other offices.

^f1 association; 1 branch office

^g2 associations; 4 branch offices

SOURCES

Wisconsin Office of Commissioner of Banking. 1978. Eighty-Fourth Annual Report of the Office of Commissioner of Banking. Madison.

_____. 1970. Seventy-Sixth Annual Report of the Condition of State Banks, Trust Companies and National Banks in Wisconsin. Madison.

Office of Commissioner of Credit Unions. 1978. Fifty-Sixth Annual Report on the Condition of Credit Unions. Madison.

_____. 1970. Forty-Eighth Annual Report on the Condition of Credit Unions. Madison.

Office of Commissioner of Savings and Loan Associations. 1978. Eighty-Second Annual Report on the Condition of Wisconsin Savings and Loan Associations. Madison.

_____. 1970. Seventy-Fourth Annual Report on the Condition of Wisconsin Savings and Loan Associations. Madison.

2.10.2.4 Retail Trade

Our study of retail trade in the local study area relies primarily on the 1977 Census of Retail Trade and the 1977 Census of Service Industries (U.S. Department of Commerce, Bureau of the Census, 1979b and c). These are the most consistent and complete sources of data for sales and establishments. Other major data sources are the Regional Economics Information System, U.S. Bureau of Economic Analysis; quarterly reports of employment and wages from the Wisconsin Department of Industry, Labor, and Human Relations (DILHR); and unpublished employment data from DILHR.

None of the income, sales, and establishment data are available for towns or in a form that can be readily and reasonably reduced to the local study area. Because most of the population of the three counties and all of the major trade centers are included in the local study area, discussion of these factors at the county level will accurately reflect conditions in the local study area.

Data from sources other than the 1977 Census of Service Industries are not available for the service sector. Therefore, we have limited our discussion of service sector sales and establishment characteristics to the types of service firms covered in the census data. This excludes eating and drinking establishments, which are considered as a subsector of retail trade.

Overall, retail trade is a larger sector of the local study area economy than it is for the state. Retail trade employs a greater percentage of workers in the local study area than in the state, but at wages lower than the state level. Retail trade has been growing in importance in recent years in the three-county area. Rhinelander and Antigo are the major trade centers in the local study area.

Services are also relatively more important to the local study area economy, but in recent years they have grown more slowly in the local study area relative to the state as a whole.

Employment in both sectors is highly seasonal, with employment peaking during the tourist season.

Relative Importance of Retail Trade and Services, 1978. The retail trade and service sectors are proportionately more important to the economy of the three-county area than they are for the state (Table 2.10-23). In 1978, retail trade accounted for 15.8 percent of the total earnings for the three-county area (calculated from Table 2.10-13); the service sector accounted for 16.2 percent. In contrast, 9.7 percent of earnings for the state as a whole was contributed by retail trade and 14.0 percent by services. For Wisconsin, 16.7 percent of all wage and salary workers were employed in retail trade and 18.2 percent were employed in services (or, 14.8 and 16.3 percent of state total employment, respectively). In the three counties, retail

Table 2.10-23

RELATIVE IMPORTANCE OF RETAIL TRADE AND SERVICES, 1978

	<u>State of Wisconsin</u>	<u>Forest County</u>	<u>Lan glade County</u>	<u>Oneida County</u>
Earnings				
Retail trade				
Amount (\$ thousands)	2,682,356	1,993	11,654	22,694
Percent of total earnings ^a	9.7	9.7	16.4	16.4
Services				
Amount (\$ thousands)	3,852,539	2,603	8,836	25,895
Percent of total earnings ^a	14.0	12.7	12.4	18.7
Wage and salary employment				
Retail trade				
Number employed ^b	332,878	254	1,318	2,596
Percent of total wage and salary employment ^a	16.7	13.2	19.6	22.3
Percent of total employment ^a	14.8	10.2	16.1	19.8
Services				
Number employed ^b	365,278	281	1,070	2,557
Percent of total wage and salary employment ^a	18.2	14.6	15.9	22.0
Percent of total employment ^a	16.3	11.3	13.0	19.5

NOTES

^a Percent is a percent of each jurisdiction's total.

^b Because of a difference in sources, these employment figures do not correspond to employment numbers presented in Table 2.10-18.

SOURCE

U.S. Department of Commerce, Bureau of Economic Analysis. 1980. Regional Economic Information System, Personal Income by Major Sources. Computer printout. Washington, D.C.

trade and service workers constituted 20.5 and 19.3 percent, respectively, of all wage and salary employees in 1978 (or, 17.5 and 16.4 percent of the three-county total employment, respectively).

Summary Statistics, Retail Trade and Selected Services, 1977. Total 1977 retail sales in the three counties equaled \$223.4 million, an increase of 74.0 percent since 1972 (Table 2.10-24). This growth was much higher than the 61.3 percent increase statewide over the same period. In 1977, Oneida County accounted for 62.9 percent of total retail sales in the three counties, and Langlade County for 30.8 percent. Two regional trade centers, the cities of Rhinelander and Antigo, are located in these counties. Rhinelander alone accounted for 34.8 percent of total sales in the three-county area, and Antigo for 24.5 percent.

Service receipts in the three counties were \$27.1 million in 1977. This represented an increase of 57.0 percent since 1972. This increase was lower than the 71.3 percent increase statewide over the same period. As with retail sales, most service receipts were generated in Oneida County (66.4 percent) and Langlade County (27.6 percent). Within the three counties, however, service receipts were more dispersed than were retail sales, with the cities of Rhinelander and Antigo accounting for smaller shares (28.4 and 17.4 percent, respectively).

Table 2.10-24

SUMMARY STATISTICS, RETAIL TRADE AND SELECTED SERVICES, 1977

	<u>State of Wisconsin</u>	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>	<u>City of Antigo</u>	<u>City of Rhinelander</u>
Retail trade						
All establishments						
Number	42,819	130	288	543	182	240
Percent change, 1972-1977	-0.4	-12.2	-0.3	3.2	-10.8	-2.8
Sales (\$ thousands)	14,930,207	14,156	68,756	140,498	54,674	77,792
Percent change, 1972-1977	61.3	30.4	68.1	83.6	49.4	68.9
Establishments with payroll						
Number	29,801	60	167	362	120	159
Percent change, 1972-1977	-0.5	-21.1	0.6	6.5	-6.9	-1.2
Sales (\$ thousands)	14,427,034	11,612	64,693	133,915	52,835	75,044
Percent change, 1972-1977	62.7	30.7	70.5	87.4	52.6	72.5
1977 payroll (\$ thousands)	1,788,047	979	6,754	15,262	5,639	8,567
Percent change, 1972-1977	59.1	29.2	54.5	84.3	40.3	69.8
Selected services						
All establishments						
Number	35,435	85	146	458	94	176
Percent change, 1972-1977	16.5	7.6	20.7	18.0	16.0	10.7
Receipts (\$ thousands)	2,579,040	1,627	7,493	17,987	4,705	7,694
Percent change, 1972-1977	71.3	18.0	97.2	49.3	46.8	47.8
Establishments with payroll						
Number	13,938	17	60	162	50	68
Percent change, 1972-1977	4.0	-11.8	57.9	11.7	8.7	4.6
Receipts (\$ thousands)	2,307,897	731	6,340	14,297	4,004	6,380
Percent change,	73.2	-6.7	100.2	47.2	39.6	46.3
1977 payroll (\$ thousands)	792,707	233	1,721	4,469	1,085	2,148
Percent change, 1972-1977	75.1	16.5	132.3	42.3	59.3	33.2

SOURCES

U.S. Department of Commerce, Bureau of the Census. 1979. 1977 Census of Retail Trade-Wisconsin. RC 77-A-50.
Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1979. 1977 Census of Service Industries-Wisconsin. SC 77-A-50.
Washington, D.C.: U.S. Government Printing Office.

In the three counties, 61.3 percent of the retail stores and 34.7 percent of the service establishments were sufficiently large to have payrolls; these accounted for 94.1 percent of total retail sales and 78.8 percent of service receipts in 1977. In Wisconsin, 69.6 percent of the retail establishments had payrolls, accounting for 96.6 percent of sales; the 39.3 percent of the state's service establishments that had payrolls in 1977 generated 89.5 percent of the service receipts in the state.

Retail trade has consistently been a proportionately larger sector of the economy in the local study area than for the state. Services has also been a proportionately larger sector, though recently it has grown more slowly than the state. Both retail and service establishments with payrolls in the local study area tend to be smaller than the state average.

Retail Sales and Selected Service Receipts, 1977. Averages for total retail sales and service receipts per establishment in 1977 were lower in each of the three counties than for Wisconsin (Table 2.10-25). Only the average sales of building materials and hardware stores in Oneida County (\$484,000) exceeded the state average (\$427,000). Average sales of food stores in Oneida County were comparable to the statewide average for food stores (\$715,000 and \$716,000, respectively). Otherwise, all establishments in the three counties had average sales lower than their statewide counterparts. This is reflective of the rural

Table 2.10-25

RETAIL SALES AND SELECTED SERVICE RECEIPTS, 1977

	Sales		Establishments Reporting		Average Sales (\$ thousands)
	Amount (\$ thousands)	Percent Change 1972-1977	Number	Percent Change 1972-1977	
State of Wisconsin					
Retail sales					
SIC 52 - Building materials, hardware, etc.	984,727	69.6	2,307	-3.5	427
SIC 53 - General merchandise stores	1,928,788	45.4	1,125	-6.2	1,714
SIC 54 - Food stores	3,083,992	54.7	4,310	-12.2	716
SIC 55 - Automotive dealers, gas, and service stations	4,283,528	73.8	6,592	-14.6	650
SIC 56 - Apparel and accessory stores	560,107	45.6	2,396	2.0	234
SIC 57 - Furniture, home furnishings, etc.	681,796	56.1	2,846	10.2	240
SIC 58 - Eating and drinking places	1,523,778	62.1	12,889	-2.4	118
SIC 59 - Miscellaneous retail	1,883,491	66.9	10,354	20.1	182
Total retail sales	14,930,207	61.3	42,819	-0.4	349
Selected service receipts					
SIC 70 - Hotels, motels, etc.	276,367	60.5	2,556	-10.6	108
SIC 72 - Personal services	348,770	32.8	9,219	5.9	38
SIC 73 - Business services	666,837	94.5	8,380	64.3	80
SIC 75 - Automotive repair service and garages	370,063	99.0	3,659	16.8	101
SIC 76 - Miscellaneous repair services	191,224	86.0	3,672	8.1	52
SIC 78					
79 ^c - Amusement and recreation services, including motion pictures	271,758	54.3	3,892	13.9	70
SIC 80 - Dental labs	20,489	90.8	146	7.4	140
SIC 81 - Legal services	283,363	64.5	2,724	2.3	104
SIC 89 - Engineering, architectural, and surveying services	150,169	87.2	1,187	17.1	127
Total selected service receipts	2,579,040	71.3	35,435	-16.5	73
Forest County					
Retail sales					
SIC 52 - Building materials, hardware, etc.	1,289	-53.5	11	0.0	117
SIC 53 - General merchandise stores	D ^a	-	2	0.0	-
SIC 54 - Food stores	D	-	16	-20.0	-
SIC 55 - Automotive dealers, gas, and service stations	D	-	23	-11.5	-
SIC 56 - Apparel and accessory stores	154	1.9	4	0.0	39
SIC 57 - Furniture, home furnishings, etc.	D	-	1	-75.0	-
SIC 58 - Eating and drinking places	1,885	34.0	53	-11.7	36
SIC 59 - Miscellaneous retail	D	-	20	4.8	-
Total retail sales	14,156	30.4	130	-12.2	109
Selected service sales					
SIC 70 - Hotels, motels, etc.	575	28.3	30	-6.3	19
SIC 72 - Personal services	NR ^b	NR	NR	NR	NR
SIC 73 - Business services	NR	NR	NR	NR	NR
SIC 75 - Automotive repair service and garages	139	124.2	10	66.7	14
SIC 76 - Miscellaneous repair services	133	146.3	8	0.0	17
SIC 78					
79 ^c - Amusement and recreation services, including motion pictures	D	-	12	71.4	-
SIC 80 - Dental labs	NR	NR	NR	NR	NR
SIC 81 - Legal services	D	-	1	-50.0	-
SIC 89 - Engineering, architectural, and surveying services	NR	NR	NR	NR	NR
Total selected service sales	1,627	18.0	85	7.6	19

(continued)

(Table 2.10-25, continued)

	Sales		Establishments Reporting		Average Sales (\$ thousands)
	Amount (\$ thousands)	Percent Change 1972-1977	Number	Percent Change 1972-1977	
Langlade County					
Retail sales					
SIC 52 - Building materials, hardware, etc	6,028	51.1	17	13.3	355
SIC 53 - General merchandise stores	3,292	9.2	9	12.5	366
SIC 54 - Food stores	18,140	25.6	35	9.4	518
SIC 55 - Automotive dealers, gas, and service stations	23,268	124.4	46	-13.2	506
SIC 56 - Apparel and accessory stores	3,356	132.4	17	23.5	197
SIC 57 - Furniture, home furnishings, etc	967	3.2	16	33.7	60
SIC 58 - Eating and drinking places	6,464	53.1	97	2	67
SIC 59 - Miscellaneous retail	7,241	86.7	51	-10.5	142
Total retail sales	68,756	68.1	288	-0.3	239
Selected service receipts					
SIC 70 - Hotels, motels, etc.	1,182	-6.0	23	-25.8	51
SIC 72 - Personal services	NR	NR	NR	NR	NR
SIC 73 - Business services	NR	NR	NR	NR	NR
SIC 75 - Automotive repair service and garages	1,428	475.8	18	28.6	79
SIC 76 - Miscellaneous repair services	990	168.3	23	35.3	43
SIC 78					
79 ^c - Amusement and recreation services, including motion pictures	1,437	159.4	21	75.0	68
SIC 80 - Dental labs	NR	NR	NR	NR	NR
SIC 81 - Legal services	463	56.4	8	33.3	58
SIC 89 - Engineering, architectural and surveying services	NR	NR	NR	NR	NR
Total selected service receipts	7,493	97.2	146	20.7	51
Oneida County					
Retail sales					
SIC 52 - Building materials, hardware, etc.	14,523	88.6	30	3.4	484
SIC 53 - General merchandise stores	D	-	13	8.3	-
SIC 54 - Food stores	26,455	48.3	37	-15.9	715
SIC 55 - Automotive dealers, gas, and service stations	42,601	88.7	77	-19.8	553
SIC 56 - Apparel and accessory stores	6,522	57.9	29	7.4	225
SIC 57 - Furniture, home furnishings, etc.	6,420	103.2	36	38.5	178
SIC 58 - Eating and drinking places	12,646	54.5	170	-0.6	80
SIC 59 - Miscellaneous retail	D	-	151	24.8	-
Total retail sales	140,498	83.6	543	3.2	259
Selected service receipts					
SIC 70 - Hotels, motels, etc.	7,134	-24.8	176	-6.9	41
SIC 72 - Personal services	NR	NR	NR	NR	NR
SIC 73 - Business services	NR	NR	NR	NR	NR
SIC 75 - Automotive repair service and garages	1,942	65.1	32	32.4	61
SIC 76 - Miscellaneous repair services	1,039	171.3	25	36.0	42
SIC 78					
79 ^c - Amusement and recreation services, including motion pictures	1,631	44.8	41	28.1	40
SIC 80 - Dental labs	NR	NR	NR	NR	NR
SIC 81 - Legal services	1,957	D	22	69.2	89
SIC 89 - Engineering, architectural and surveying services	NR	NR	NR	NR	NR
Total selected service receipts	17,987	49.3	458	18.0	39

(continued)

(Table 2.10-25, continued)

	Sales		Establishments Reporting		Average Sales (\$ thousands)
	Amount (\$ thousands)	Percent Change 1972-1977	Number	Percent Change 1972-1977	
City of Antigo					
Retail sales					
SIC 52 - Building materials, hardware, etc.	3,855	D	11	-18.2	350
SIC 53 - General merchandise stores	D	-	6	-	-
SIC 54 - Food stores	16,951	30.5	22	4.5	771
SIC 55 - Automotive dealers, gas, and service stations	17,145	-	34	20.6	504
SIC 56 - Apparel and accessory stores	D	-	16	23.1	-
SIC 57 - Furniture, home furnishings, etc.	D	-	13	18.2	-
SIC 58 - Eating and drinking places	3,470	21.8	42	21.3	83
SIC 59 - Miscellaneous retail	5,986	-	38	-17.4	158
Total retail sales	47,407	101.6	182	-12.1	260
Selected service receipts					
SIC 70 - Hotels, motels, etc.	801	-22.8	8	33.3	100
SIC 72 - Personal services	NR	NR	NR	NR	NR
SIC 73 - Business services	NR	NR	NR	NR	NR
SIC 75 - Automotive repair service and garages	632	680.2	10	42.9	63
SIC 76 - Miscellaneous repair services	D	-	13	30.0	-
SIC 78					
79 ^c - Amusement and recreation services, including motion pictures	D	-	14	40.0	-
SIC 80 - Dental labs	NR	NR	NR	NR	NR
SIC 81 - Legal services	463	56.4	8	33.3	58
SIC 89 - Engineering, architectural, and surveying services	NR	NR	NR	NR	NR
Total selected service receipts	1,896	-40.9	53	-34.6	36
City of Rhinelander					
Retail sales					
SIC 52 - Building materials, hardware, etc.	5,180	51.3	13	15.4	398
SIC 53 - General merchandise stores	8,909	121.4	7	16.7	1,272
SIC 54 - Food stores	D	-	16	-12.5	-
SIC 55 - Automotive dealers, gas, and service stations	23,436	73.4	37	-24.3	633
SIC 56 - Apparel and accessory stores	4,533	63.6	16	0.4	283
SIC 57 - Furniture, home furnishings, etc.	3,846	63.9	18	12.5	214
SIC 58 - Eating and drinking places	5,376	35.2	68	-8.8	79
SIC 59 - Miscellaneous retail	7,583	47.6	65	14.0	117
Total retail sales	58,863	27.9	240	-2.9	245
Selected service receipts					
SIC 70 - Hotels, motels, etc.	D	-	38	-30.9	-
SIC 72 - Personal services	NR	NR	NR	NR	NR
SIC 73 - Business services	NR	NR	NR	NR	NR
SIC 75 - Automotive repair service and garages	649	-30.4	13	18.2	50
SIC 76 - Miscellaneous repair services	436	379.1	15	0.0	29
SIC 78					
79 ^c - Amusement and recreation services, including motion pictures	546	-9.3	14	-6.7	39
SIC 80 - Dental labs	NR	NR	NR	NR	NR
SIC 81 - Legal services	1,437	62.2	12	50.0	120
SIC 89 - Engineering, architectural, and surveying services	NR	NR	NR	NR	NR
Total selected service receipts	3,068	-41.1	92	-42.1	33

NOTES

^aD - data withheld to avoid disclosure of information on individual firms.

^bNR - not reported.

^cData for SIC 78 and 79 are combined.

SOURCES

U.S. Department of Commerce, Bureau of the Census. 1979. 1977 Census of Retail Trade - Wisconsin. RC 77-A-50. Washington, D.C.: U.S. Government Printing Office.

_____. 1979. 1977 Census of Service Industries - Wisconsin. Washington, D.C.: U.S. Government Printing Office.

_____. 1976. 1972 Census of Retail Trade - Wisconsin. Washington, D.C.: U.S. Government Printing Office.

_____. 1976. 1972 Census of Service Industries - Wisconsin. Washington, D.C.: U.S. Government Printing Office.

nature of the area. The sparse population within the three counties is responsible for the establishments being smaller and more dispersed than those in more urban areas.

Percentage Distribution of Retail Sales and Selected Service Receipts, 1977. The data we present for Forest County show that the greatest percentage of the county's 1977 retail sales were attributed to eating and drinking establishments (13.3 percent); hotels and motels represented 35.3 percent of Forest County's service receipts (Table 2.10-26). Retail sales for Langlade and Oneida counties were most heavily represented by automotive dealers and gas and service stations (33.8 and 30.3 percent, respectively) and by food stores (26.4 and 18.8 percent, respectively). Most of the 1977 service expenditures in these two counties were for hotels and motels, automotive repair, and amusement and recreation. Statewide percentages for retail sales were also greatest for food stores and automotive. However, the greatest percentage of statewide service receipts was for business services, with automotive repair ranking second, hotels and motels fifth, and amusement and recreation sixth. Business service receipts were not reported for any of the three counties. Due to the rural nature and the less diverse industrial base of the three counties, it would not be expected that the proportion of business services would be as high in the local study area as for the state as a whole.

Table 2.10-26

PERCENTAGE DISTRIBUTION OF RETAIL SALES AND SELECTED SERVICE RECEIPTS, 1977^a

	<u>State of Wisconsin</u>	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>	<u>City of Antigo</u>	<u>City of Rhinelander</u>
Retail sales						
SIC 52 - Building materials, hardware, etc.	6.6	9.1	8.8	10.3	7.1	6.7
SIC 53 - General merchandise stores	12.9	D ^b	4.8	D	D	11.5
SIC 54 - Food stores	20.7	D	26.4	18.8	31.0	D
SIC 55 - Automotive dealers, gas and service stations	28.7	D	33.8	30.3	31.4	30.1
SIC 56 - Apparel and accessories stores	3.8	1.1	4.9	4.6	D	5.8
SIC 57 - Furniture, home furnishings, etc.	4.6	D	1.4	4.6	D	4.9
SIC 58 - Eating and drinking places	10.2	13.3	9.4	9.7	6.3	6.9
SIC 59 - Miscellaneous retail	12.6	D	10.5	D	10.9	D
Selected service receipts						
SIC 70 - Hotel, motels, etc.	10.7	35.3	15.8	39.7	17.0	D
SIC 72 - Personal Services	13.5	NR ^c	NR	NR	NR	NR
SIC 73 - Business services	25.9	NR	NR	NR	NR	NR
SIC 75 - Auto repair services and garages	14.3	8.5	19.1	10.8	13.4	8.4
SIC 76 - Miscellaneous repair services	7.4	8.2	13.2	5.8	D	5.7
SIC 78 - Amusement, recreation, including motion						
SIC 79 - pictures	10.5	NR	19.2	9.1	D	7.1
SIC 80 - Dental labs	0.8	NR	NR	NR	NR	NR
SIC 81 - Legal services	11.0	D	6.2	10.9	9.8	18.7
SIC 89 - Engineering, architectural, and surveying	5.8	NR	NR	NR	NR	NR

NOTE

^a May not add to 100 percent because of rounding.

^b D - data withheld to avoid disclosure of information on individual firms.

^c NR - not reported.

SOURCE

U.S. Department of Commerce, Bureau of the Census. 1979. 1977 Census of Retail Trade - Wisconsin. RC 77-A-50. Washington, D.C.: U.S. Government Printing Office.

..... 1979. 1977 Census of Service Industries - Wisconsin. SC 77-A-50. Washington, D.C.: U.S. Government Printing Office.

Retail sales and services in the local study area are proportionately larger economic sectors of the local economies due, not only to the less industrialized nature of the economy, but also due to a substantial amount of tourism.

Comparative Statistics, Retail Trade and Selected Services,

1977. The lower population density in the local study area caused retail sales and service receipts to be distributed among smaller and more numerous stores than in the state as a whole (Table 2.10-27). While the state had one retail store for every 108 residents in 1977, Forest, Langlade, and Oneida counties contained one store for every 66, 68, and 55 residents, respectively. With the exception of Langlade County, the same pattern held for service establishments. The population per service establishment in the state was 131, compared with 101 for Forest County, 135 for Langlade County, and 65 for Oneida County.

In addition to being more numerous, retail trade and service establishments in the three-county area were considerably smaller than the average Wisconsin firm. Retail stores in Forest, Langlade, and Oneida counties averaged sales of \$108,892, \$238,756, and \$258,744, respectively, compared with the statewide average of \$348,682 in 1977. Only in Rhineland, where average retail sales were \$324,133, did the size of retail firms approach the state average. While the average service firm in Wisconsin had receipts of \$72,782 in 1977, receipts per service

Table 2.10-27

COMPARATIVE STATISTICS, RETAIL TRADE AND SELECTED SERVICES, 1977

	<u>State of Wisconsin</u>	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>	<u>City of Antigo</u>	<u>City of Rhinelander</u>
Retail trade						
All establishments						
Sales per establishment	348,682	108,892	238,756	258,744	300,407	324,133
Sales per personal income	0.47	0.41	0.71	0.81	NR ^a	NR
Sales per capita ^b	3,218	1,665	3,499	4,707	6,336	9,116
Population per establishment ^b	108	66	68	55	47	36
Establishments with payroll						
Sales per establishment	484,112	193,533	387,383	369,931	440,292	471,975
Sales per employee	48,066	48,790	60,292	57,972	63,124	54,066
Payroll per employee	5,957	4,113	6,295	6,607	6,737	6,172
Employees per establishment	10	4	6	6	7	9
Selected services						
All establishments						
Receipts per establishment	72,782	19,141	51,322	39,273	50,053	43,716
Receipts per personal income	0.08	0.05	0.08	0.10	NR	NR
Receipts per capita ^b	556	189	381	603	545	902
Population per establishment ^b	131	101	135	65	92	48
Establishments with payroll						
Receipts per establishment	165,583	43,000	105,667	88,253	80,080	93,824
Receipts per employee	21,645	14,918	21,063	22,875	18,452	20,000
Payroll per employee	7,435	4,755	5,718	7,150	5,000	6,734
Employees per establishment	8	3	5	4	4	5

NOTES

^aNR - not reported.

^bCalculated from population estimates developed by Wisconsin Department of Administration.

SOURCES

U.S. Department of Commerce, Bureau of the Census. 1979. 1977 Census of Retail Trade - Wisconsin. RC 77-A-50. Washington, D. C.: U.S. Government Printing Office.

U.S. Department of Commerce, Bureau of Economic Analysis. 1979. 1977 Census of Service Industries - Wisconsin. SC-77-A-50. Washington, D. C.: U.S. Government Printing Office.

U.S. Department of Commerce, Bureau of Economic Analysis. 1980. Regional Economic Information System, Personal Income by Major Sources. Computer printout. Washington, D. C.

Wisconsin Department of Administration. 1979. Municipality File, Selective Listing. Computer printout. Madison.

establishment were \$19,141 in Forest County, \$51,322 in Langlade County, and \$39,273 in Oneida County.

Average sales and receipts for establishments with a payroll in the three counties were lower than state averages. Corresponding to the lower average sales of firms in the three-county area was a lower average number of employees in firms with a payroll. The statewide average for retail stores with a payroll was 10.0 employees, and service firms averaged 8.0 employees. In contrast, retail stores with a payroll in the three counties had an average of 5.3 employees, and service firms averaged 4.0 employees.

Even though these firms in general had lower average sales, average retail sales per employee in Langlade and Oneida counties, and in Antigo and Rhineland, were considerably higher than for the entire state. Comparing the trade centers to the local study area, sales per employee in retail firms with a payroll ranged from \$54,066 in Rhineland to \$63,124 in Antigo, compared with the statewide average of \$48,066. The retail sales employees in these jurisdictions were paid from \$215 to \$780 more per year than the average salary for retail employees in the state. However, the average annual salary for retail employees in Forest County (\$4,113) was only 69.0 percent of the state average, even though these employees generated approximately the same volume of sales per employee.

There were substantial differences in retail and service activity between Forest County and Langlade and Oneida counties. These differences may have existed partially because residents in Langlade and Oneida counties have higher incomes per capita, and because each of the two larger counties has a regional trade center. Of the three counties, firms in Forest County had the lowest dollar amount of sales per establishment and per capita. Retail firms in the county averaged only 31.2 percent of state sales per establishment, and 51.7 percent of state sales per capita. Receipts per service firm were 26.3 percent of the state average, and service receipts per capita were 33.9 percent. Retail sales and service receipts as a percent of personal income were also lower than state values, indicating that residents probably did some shopping outside of the county.

In contrast, retail sales per capita and sales as a percent of personal income in Langlade and Oneida counties were substantially higher than state averages. In the regional trade centers, Antigo and Rhinelander, sales per capita were at least 43 percent higher than in their respective counties, and these cities had fewer residents per establishment, more employees per establishment, and higher average sales than their respective counties. The higher level of sales is accounted for by the high proportion of recreational visitors to the area. This indicates that retail sales show substantial fluctuations in conjunction with the tourist season. Employment in the trade sector is

seasonal with wages being lower than the average for all industries.

With the exception of certain specialty shops, the local study area has most types of retail and service establishments. Very few goods or services are unavailable in the local study area, and these tend to be products or services that are normally provided only by specialty stores in much larger cities (e.g., data processing, motion picture producers).

Ownership Patterns, Retail Trade and Selected Services, 1977. With the exception of retail stores in Oneida County and Rhineland, a greater proportion of firms in the local study area were sole proprietorships in 1977 than in the state as a whole, and fewer were operated as corporations (Table 2.10-28). The difference was especially apparent in Forest County, where 82.3 percent of the retail firms and 87.0 percent of the service firms were sole proprietorships, compared to statewide proportions of 58.2 and 76.2 percent, respectively.

Characteristics of Retail Trade Labor Force in Local Study Area, 1980. We obtained age and average wage information through a survey of employers in the local study area (Table 2.10-29). The totals are not intended to represent the total retail trade labor force in the local study area; however, we designed our sampling method to ensure a representative selection of employers

Table 2.10-28

OWNERSHIP PATTERNS, RETAIL TRADE AND SELECTED SERVICES, 1977

	<u>State of Wisconsin</u>	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>	<u>City of Antigo</u>	<u>City of Rhineland</u>
Retail Trade						
Sole proprietorships						
Number	24,945	107	197	312	114	132
Percent ^a	58.2	82.3	68.4	57.5	62.6	55.0
Partnerships						
Number	2,853	6	17	20	12	5
Percent ^a	6.7	4.6	5.9	3.7	6.6	2.1
Corporations						
Number	15,021	17	74	211	56	103
Percent ^a	35.1	13.1	25.7	38.8	30.8	42.9
Selected services						
Sole proprietorships						
Number	26,993	74	121	354	74	136
Percent ^a	76.2	87.0	82.9	77.3	78.7	77.3
Partnerships						
Number	2,093	2	7	21	7	8
Percent ^a	5.9	2.4	4.8	4.6	7.5	4.5
Corporations						
Number	6,349	9	18	83	13	32
Percent ^a	17.9	10.6	12.3	18.1	13.8	18.2

NOTE

^aPercent of total in each jurisdiction.

SOURCES

U.S. Department of Commerce, Bureau of the Census. 1979. 1977 Census of Retail Trade - Wisconsin. RC 77-A-50. Washington, D.C.: U.S. Government Printing Office.

_____. 1979. 1977 Census of Service Industries - Wisconsin. SC 77-A-50. Washington, D.C.: U.S. Government Printing Office.

Table 2.10-29

CHARACTERISTICS OF RETAIL TRADE LABOR FORCE, LOCAL STUDY AREA, 1980

	Total ^a		Male		Female	
	Number	Percent	Number	Percent	Number	Percent
Age						
Under 18	86	15.6	48	8.7	38	6.9
18 - 34	253	46.0	175	31.8	78	14.2
35 - 50	124	22.6	86	15.7	38	6.9
51 - 64	71	12.9	45	8.2	26	4.7
65+	16	2.9	11	2.0	5	0.9
Total	550	100.0	365	66.4	185	33.6
Hourly wage						
\$3.10 and under	83	15.9				
3.11 - 4.50	189	36.2				
4.51 - 7.00	173	33.2				
7.01 - 9.00	64	12.2				
9.01+	13	2.5				
Total	522	100.0				

NOTE

^aTotals are different for age and hourly wage because one or more employers did not complete both parts of the questionnaire.

SOURCE

Consultant's survey of employers in the local study area, 1980.

in each of 15 industrial categories. For example, if retail trade covered employment comprises 16 percent of total employment in the local study area, then approximately 16 percent of the employment of sample companies is in retail trade. See our Survey Research Methodology Paper (RPC, 1980b) for a detailed description of the survey design.

The local study area retail labor force is predominantly young (61.6 percent under 35) and male (66.4 percent). Most employees earn between \$3.11 and \$7.00 an hour; 36.2 percent earn an hourly wage of \$3.11 to \$4.50, and 33.2 percent earn \$4.51 to \$7.00 an hour. Minimum wage at the time of the survey was \$3.10 an hour.

Employers reported peak employment during the summer months. The businesses hiring the most help are apparel and accessory, miscellaneous retail, and furniture stores. Two-thirds of reported employment is full-time (64.3 percent) with 35.7 percent part-time. The high proportion of part-time workers reflects the highly seasonal nature of the local study area retail sector which depends heavily on summer tourism.

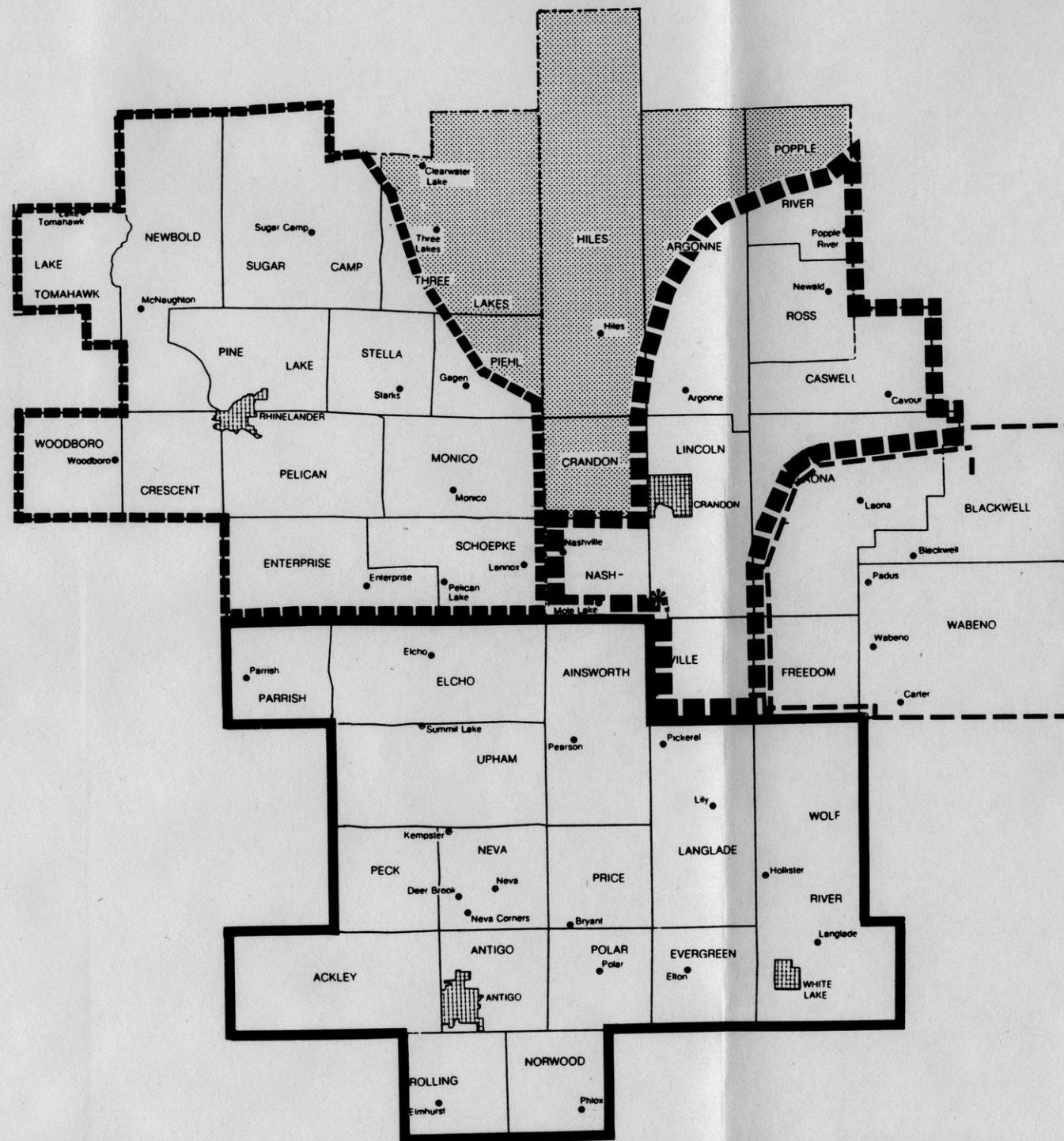
Average Annual Employment in Retail Trade and Selected Services, 1978. Retail trade employment in the local study area fluctuated from a low of 2,778 in the first quarter of 1978 to 3,452 during the third quarter; for services, first quarter

employment was 2,354 and peak (summer) employment was 2,887 (Table 2.10-30).

Employment patterns in Langlade and Oneida counties were similar to that of the local study area, with peak employment during the third quarter. Although peak employment in retail sales for Forest County was also in the summer, peak employment for services was during the fourth quarter. This seasonal pattern is confirmed by our employer survey as discussed above. The summer was the peak season for the hospitality/recreation/tourism industry in the local study area.






With the exception of Forest County, the types of firms hiring the most employees during their peak seasons were food stores, automotive, eating and drinking places, hotels and motels, and health services. (Tourists and recreational visitors were important customers of these types of establishments; the hospitality/recreation/tourism industry is profiled in more detail below.) In Forest County, miscellaneous retail establishments hired the greatest number of retail trade employees; eating and drinking places ranked fourth in number of employees hired.

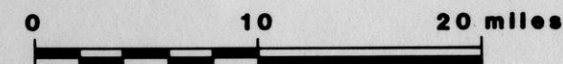
Within the local study area, there were five primary trade areas for groceries. As shown in Figures 2.10-2 and 2.10-3, residents traveled only moderate distances for these relatively frequent purchases. For less frequent, more expensive purchases, such as clothing and furniture, consumers were willing to travel



Encompasses areas in which the majority of shopping trips have that trade center as their destination .

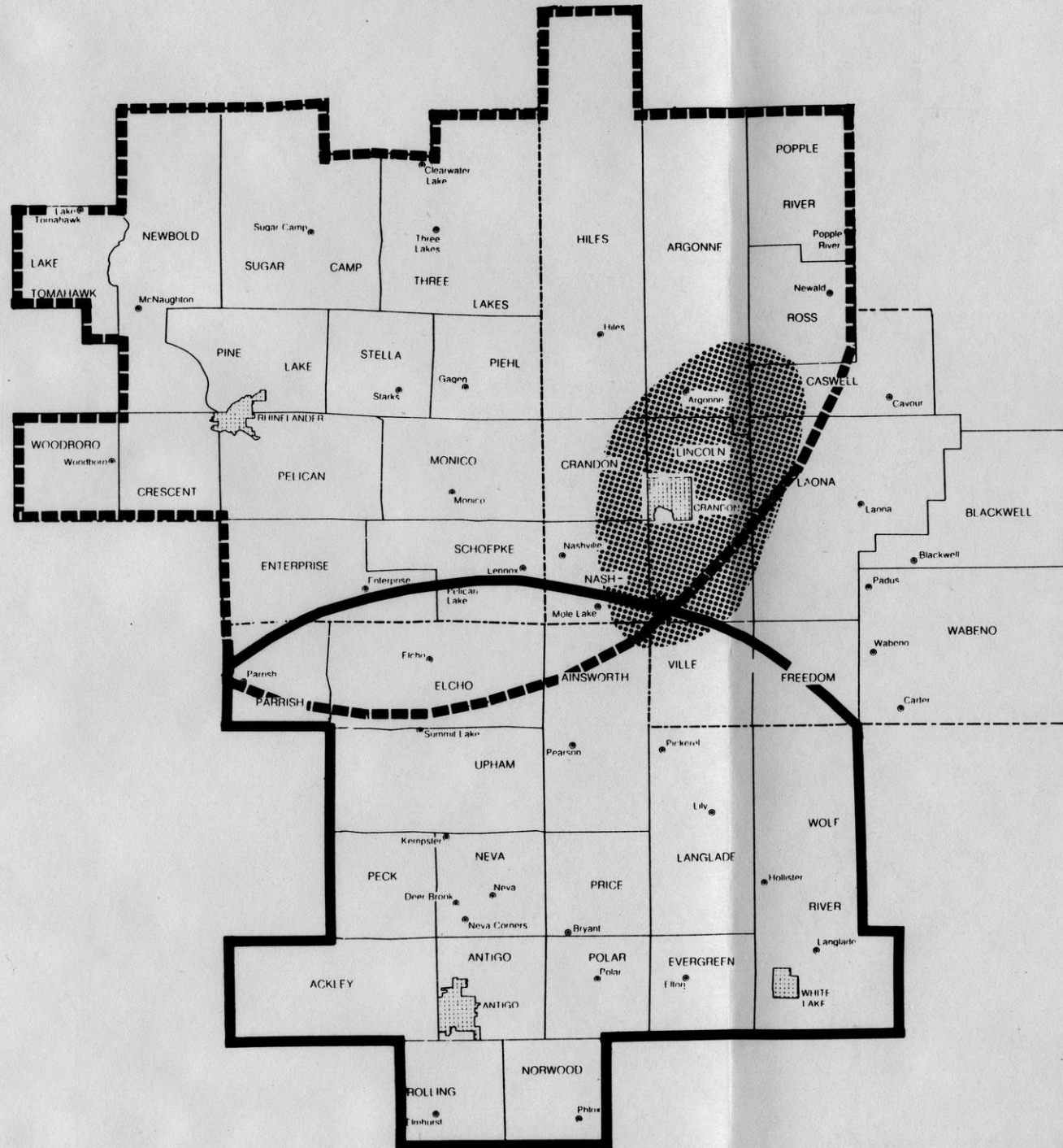


-  **ANTIGO**
-  **CRANDON**
-  **LAONA/WABENO**
-  **RHINELANDER**
-  **THREE LAKES**






EXXON MINERALS COMPANY
CRANDON PROJECT

RETAIL TRADE AREAS
Groceries: Primary Trade Areas



Encompasses areas in which 15% of shopping trips have that trade center as their destination.



-  **ANTIGO**
-  **CRANDON**
-  **RHINELANDER**



EXXON MINERALS COMPANY
CRANDON PROJECT

RETAIL TRADE CAPTURE AREAS
Groceries: Secondary Trade Areas (15%)

Table 2.10-30

AVERAGE ANNUAL EMPLOYMENT IN RETAIL TRADE AND
SELECTED SERVICES, 1978

	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>	<u>Annual Average</u>
Local study area ^a					
Retail trade					
SIC 52 - Building materials, hardware, etc.	266	379	329	296	318
SIC 53 - General merchandise stores	322	240	403	359	331
SIC 54 - Food stores	357	400	430	395	396
SIC 55 - Automotive dealers, gas and service stations	440	496	559	490	496
SIC 56 - Apparel and accessory stores	170	194	213	192	192
SIC 57 - Furniture, home furnishings, etc.	95	108	121	106	108
SIC 58 - Eating and drinking places	816	921	1,009	908	914
SIC 59 - Miscellaneous retail	312	355	388	352	352
Total retail trade employment	2,778	3,093	3,452	3,098	3,105
Selected services ^c					
SIC 70 - Hotels, motels, etc.	373	400	460	399	408
SIC 72 - Personal services	195	209	234	210	212
SIC 73 - Business services	106	114	131	114	116
SIC 75 - Auto repair services and garages	67	71	79	71	72
SIC 76 - Miscellaneous repair services	20	21	24	22	22
SIC 78 - Motion pictures	18	19	22	20	20
SIC 79 - Amusement and recreation except motion pictures	115	123	137	126	125
SIC 80 - Health services	1,312	1,400	1,612	1,401	1,431
SIC 81 - Legal services	62	68	81	67	70
SIC 83 - Social services	23	25	30	50	32
SIC 84 - Museums, art galleries, etc.	0	0	0	0	0
SIC 89 - Miscellaneous services	63	68	77	68	69
Total service employment	2,354	2,518	2,887	2,528	2,572
Forest County ^b					
Retail trade					
SIC 52 - Building materials, hardware, etc.	16	19	21	19	19
SIC 53 - General merchandise stores	6	7	8	7	7
SIC 54 - Food stores	46	53	58	54	53
SIC 55 - Automotive dealers, gas and service stations	45	52	57	53	52
SIC 56 - Apparel and accessory stores	4	5	5	5	5
SIC 57 - Furniture, home furnishings, etc.	0	0	0	0	0
SIC 58 - Eating and drinking places	33	38	42	39	38
SIC 59 - Miscellaneous retail	55	65	70	66	64
Total retail trade employment	205	239	261	243	237
Selected services ^c					
SIC 70 - Hotels, motels, etc.	20	19	20	21	20
SIC 72 - Personal services	9	8	9	9	9
SIC 73 - Business services	4	4	4	5	4
SIC 75 - Auto repair services and garages	9	9	9	9	9
SIC 76 - Miscellaneous repair services	0	0	0	0	0
SIC 78 - Motion pictures	0	0	0	0	0
SIC 79 - Amusement and recreation except motion pictures	13	13	13	13	13
SIC 80 - Health services	158	153	157	164	158
SIC 81 - Legal services	0	0	0	0	0
SIC 83 - Social services	4	4	4	5	4
SIC 84 - Museums, art galleries, etc.	0	0	0	0	0
SIC 89 - Miscellaneous services	2	2	2	2	2
Total service employment	219	212	218	228	219
Langlade County					
Retail trade					
SIC 52 - Building materials, hardware, etc.	120	131	137	129	129
SIC 53 - General merchandise stores	115	126	130	123	124
SIC 54 - Food stores	214	235	244	250	236
SIC 55 - Automotive dealers, gas and service stations	160	175	182	171	172
SIC 56 - Apparel and accessory stores	60	66	68	65	65
SIC 57 - Furniture, home furnishings, etc.	21	23	24	22	23
SIC 58 - Eating and drinking places	359	393	408	385	386
SIC 59 - Miscellaneous retail	109	119	124	117	117
Total retail trade employment	1,158	1,268	1,317	1,242	1,246
Selected Services ^c					
SIC 70 - Hotels, motels, etc.	129	138	148	139	139
SIC 72 - Personal services	118	127	136	128	127
SIC 73 - Business services	36	38	41	39	39
SIC 75 - Auto repair services and garages	36	38	42	39	39
SIC 76 - Miscellaneous repair services	15	16	17	16	16
SIC 78 - Motion pictures	10	11	11	11	11
SIC 79 - Amusement and recreation except motion pictures	57	62	66	62	62
SIC 80 - Health services	326	351	375	354	352
SIC 81 - Legal services	8	9	10	9	9
SIC 83 - Social services	0	0	0	0	0
SIC 84 - Museums, art galleries, etc.	0	0	0	0	0
SIC 89 - Miscellaneous services	31	33	35	33	33
Total service employment	766	823	881	830	825

(continued)

(Table 2.10-30, continued)

	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>	<u>Annual Average</u>
Oneida County					
Retail trade ^b					
SIC 52 - Building materials, hardware, etc.	246	432	323	280	320
SIC 53 - General merchandise stores	254	136	335	290	254
SIC 54 - Food stores	316	365	416	361	365
SIC 55 - Automotive dealers, gas and service stations	304	350	400	346	350
SIC 56 - Apparel and accessory stores	132	153	174	157	154
SIC 57 - Furniture, home furnishings, etc.	90	104	118	102	104
SIC 58 - Eating and drinking places	586	676	770	668	675
SIC 59 - Miscellaneous retail	209	242	275	239	241
Total retail trade employment	2,137	2,468	2,811	2,437	2,463
Selected Services ^c					
SIC 70 - Hotels, motels, etc.	353	382	460	376	393
SIC 72 - Personal services	111	120	145	118	124
SIC 73 - Business services	75	81	97	79	83
SIC 75 - Auto repair services and garages	30	33	39	32	34
SIC 76 - Miscellaneous repair services	8	8	11	9	9
SIC 78 - Motion pictures	8	8	11	9	9
SIC 79 - Amusement and recreation except motion pictures	71	76	92	75	79
SIC 80 - Health services	1,223	1,324	1,596	1,304	1,362
SIC 81 - Legal services	56	61	74	60	63
SIC 83 - Social services	28	31	37	30	32
SIC 84 - Museums, art galleries, etc.	0	0	0	0	0
SIC 89 - Miscellaneous services	52	57	68	56	58
Total service employment	2,015	2,181	2,630	2,148	2,244

NOTES

^aWe calculated the percentage of employment for the portion of each county that is in the local study area from the computer printout and multiplied the quarterly report employment by this percentage.

^bA percentage of employment in each SIC in retail trade was applied to retail trade employment reported in the quarterly reports.

^cA percentage of employment in each SIC in selected services was applied to selected service employment reported in the quarterly reports.

SOURCES

Wisconsin Department of Industry, Labor and Human Relations. 1980. Employment by 4-Digit SIC Code and Jurisdiction. Computer printout. Madison.

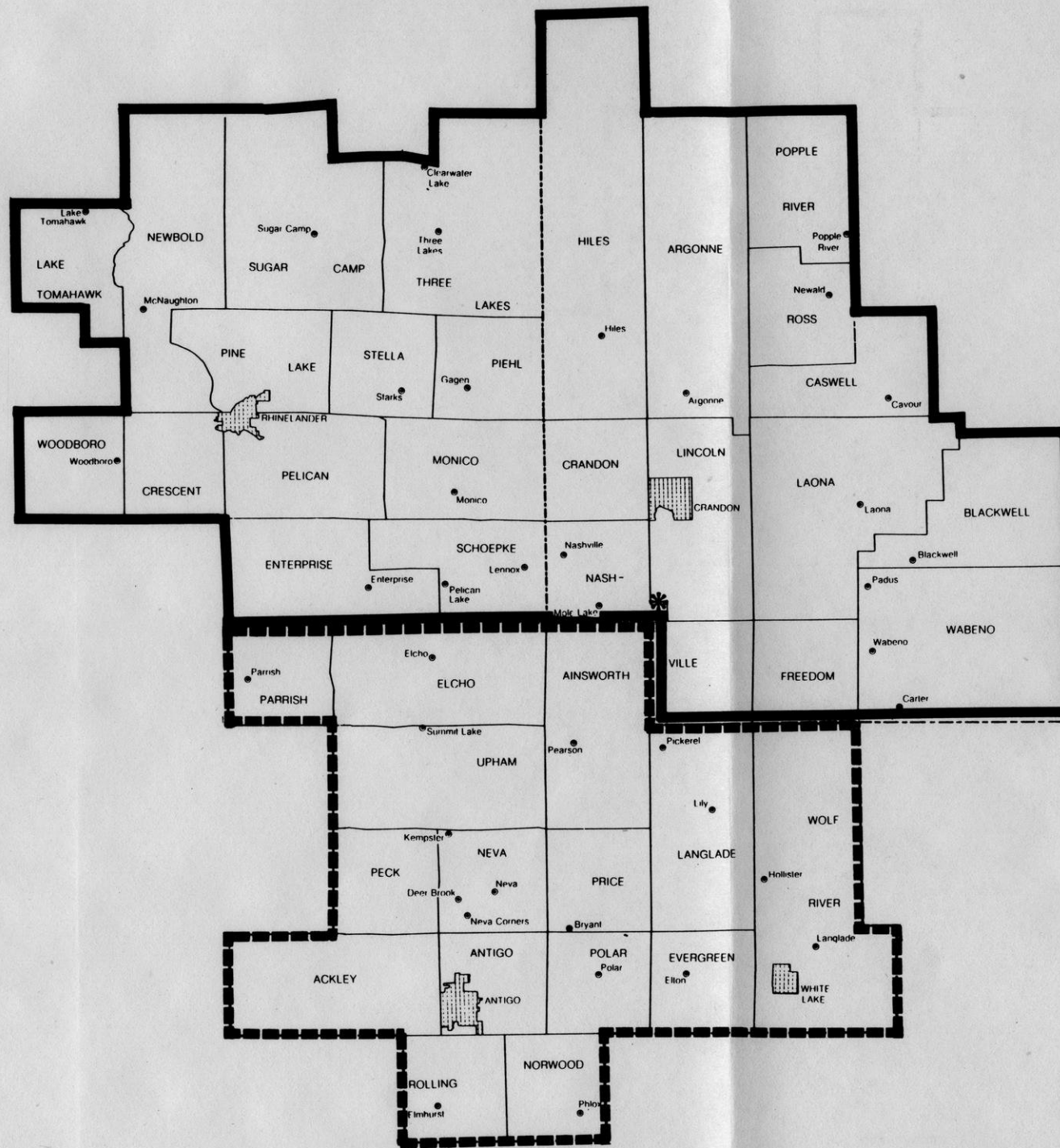
Wisconsin Department of Industry, Labor and Human Relations. 1979. Employment and Wages Covered by Wisconsin's UC Law. Quarters 1 through 4. Madison.

further (Figures 2.10-4 through 2.10-7). For these purchases, Rhineland, Antigo, and Crandon captured the market for shopping within the local study area.

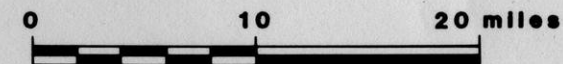
2.10.2.5 Agriculture

Summary Agriculture Statistics. In recent years, the number of farms in Wisconsin has been decreasing. This trend has been more pronounced in the local study area than statewide. Between 1974 and 1979, the number of farms in Forest, Langlade, and Oneida counties decreased by greater percentages than in the state as a whole (Table 2.10-31). Farm acreage also decreased, but not at as high a rate as the number of farms. Thus, while the number of farms decreased, average farm size increased in the three-county area. The average farm within the local study area, however, has consistently been larger than the average Wisconsin farm.

Number of Farms and Land in Farms, 1979. A smaller percentage of land in the three counties was devoted to agriculture than in the state as a whole. During 1979, 6.5 percent of land in Forest County, 5.1 percent of land in Oneida County, and 28.0 percent of land in Langlade County was in farms (Table 2.10-32), compared with 54.0 percent of Wisconsin's land. In the local study area, Langlade County was the center of



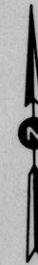
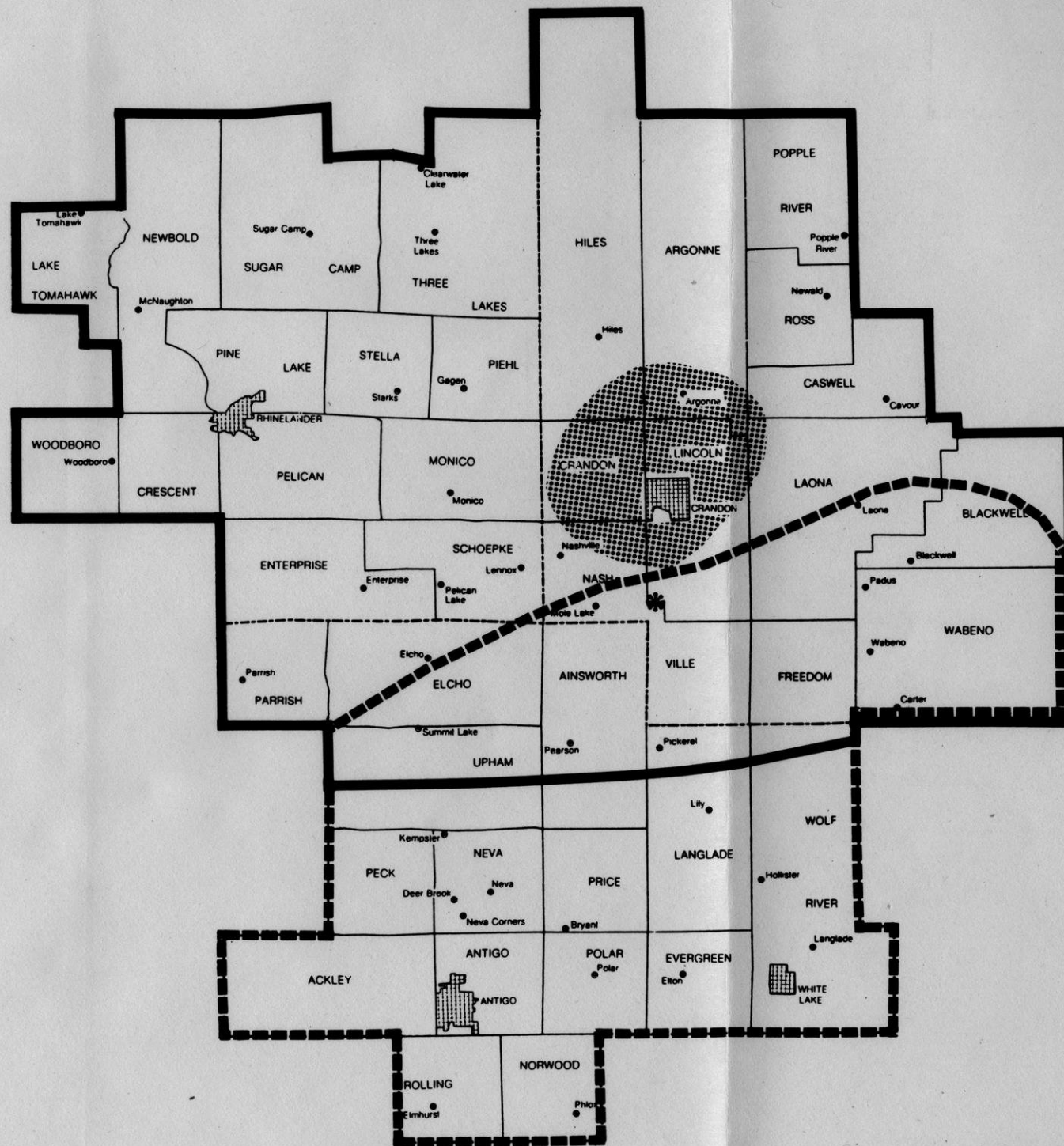
-  **ANTIGO**
-  **RHINELANDER**




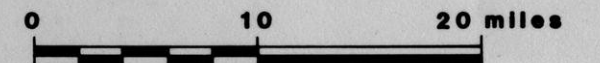
Encompasses areas in which the majority of shopping trips have that trade center as their destination .

EXXON MINERALS COMPANY
CRANDON PROJECT

RETAIL TRADE CAPTURE AREAS
Clothing: Primary Trade Areas



-  ANTIGO
-  CRANDON
-  RHINELANDER



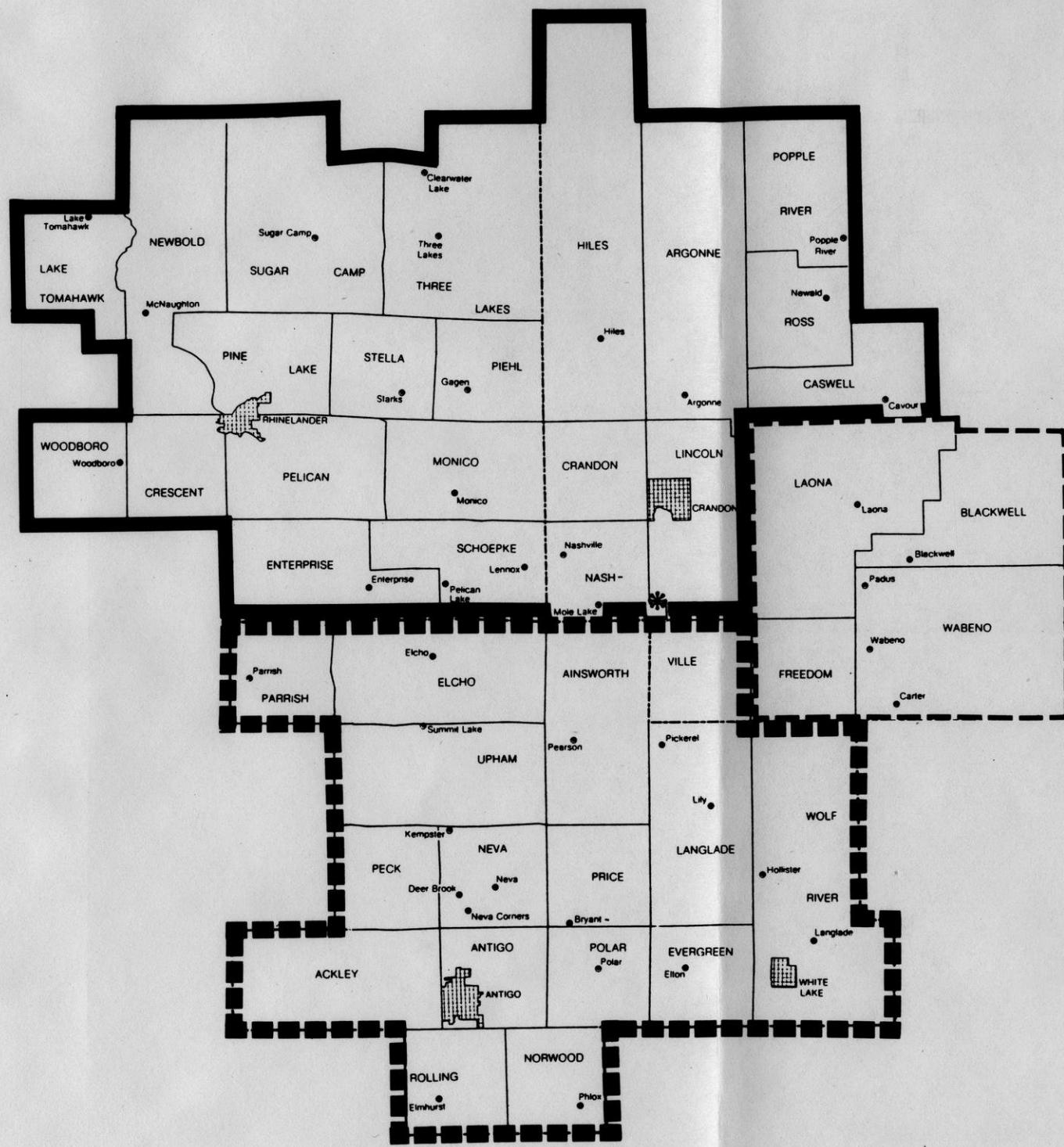
Encompasses areas in which 15% of shopping trips have that trade center as their destination.

EXXON MINERALS COMPANY
CRANDON PROJECT

RETAIL TRADE CAPTURE AREAS
Clothing: Secondary Trade Areas (15%)




rpc, inc.

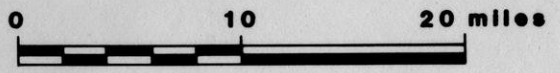
FIG. 2.10-5



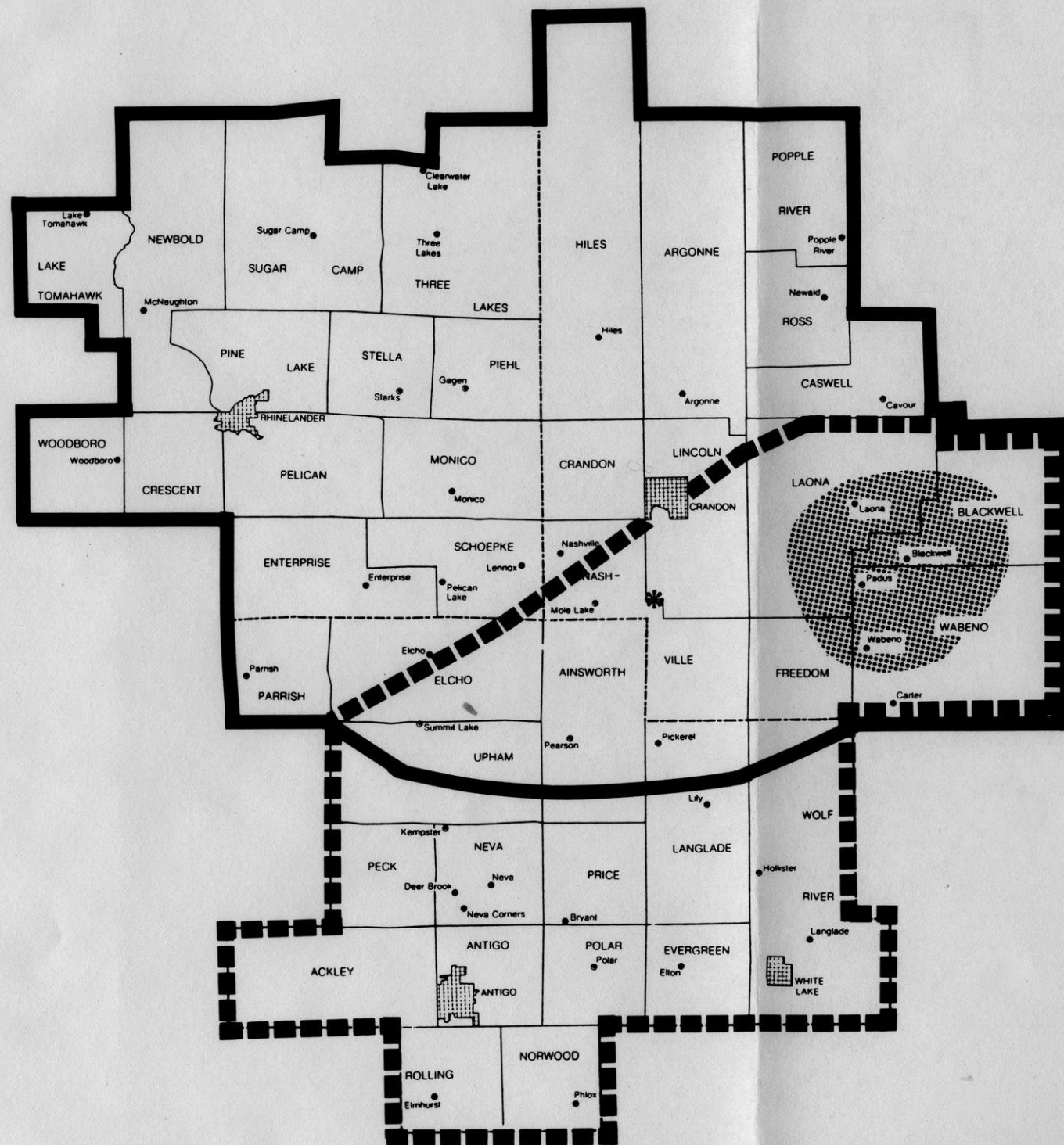
Encompasses areas in which the majority of shopping trips have that trade center as their destination .






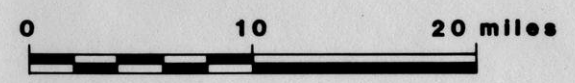
-  **ANTIGO**
-  **LAONA/WABENO**
-  **RHINELANDER**



EXXON MINERALS COMPANY CRANDON PROJECT	
RETAIL TRADE CAPTURE AREAS Furniture: Primary Trade Areas	
rpc, inc.	FIG. 2.10-6



-  **ANTIGO**
-  **LAONA/WABENO**
-  **RHINELANDER**



Encompasses areas in which 15% of shopping trips have that trade center as their destination.

EXXON MINERALS COMPANY CRANDON PROJECT	
RETAIL TRADE CAPTURE AREAS Furniture: Secondary Trade Areas (15%)	
rpc, inc.	FIG. 2.10-7

Table 2.10-31

SUMMARY AGRICULTURE STATISTICS, 1974, 1978, AND 1979

	<u>State of Wisconsin</u>	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>
Number of farms				
1974	105,000	210	760	160
1979	95,000	180	650	130
Percent change 1974-1979	-9.5	-14.3	-14.5	-18.8
Land in farms (acres)				
1974	19,600,000	48,000	164,100	41,000
1979	18,700,000	41,800	153,600	36,400
Percent change 1974-1979	-4.6	-12.9	-6.4	-11.2
Average farm size (acres)				
1974	187	228.6	215.9	256.3
1979	197	231.0	235.0	278.0
Percent change 1974-1979	5.3	1.0	8.8	8.5
Cash receipts from farm marketings (\$ thousands)				
1974	2,444,530	1,794	23,246	5,391
1978	3,644,406	3,142	31,599	5,937
Percent change 1974-1978	49.1	75.1	35.9	10.1
Average cash receipts				
1974	23,281	8,543	30,586	33,693
1978	37,963	17,456	48,614	45,669
Percent change 1974-1978	63.1	104.3	58.9	35.5
Farm earnings 1978 (\$ thousands)				
Total	1,286,076	1,497	10,796	1,945
Percent of state/county total earnings	4.7	7.3	15.2	1.4
Farm employment 1978				
Total	151,953	204	1,503	569
Percent of state/county total employment	6.8	8.2	18.3	4.3

SOURCES

U.S. Department of Commerce, Bureau of Economic Analysis. 1980. Regional Economic Information System, Personal Income by Major Sources. Computer printout. Washington, D.C.

Wisconsin Department of Agriculture. 1979. Cash Receipts from Marketings, Wisconsin, 1978. Wisconsin Agriculture Reporting Service. Madison.

Wisconsin Department of Agriculture. 1980. 1980 Wisconsin Agricultural Statistics. Wisconsin Agriculture Reporting Service. Madison.

Wisconsin Department of Agriculture. 1976. Wisconsin Agricultural Statistics, 1976. Wisconsin Statistical Reporting Service. Madison.

Wisconsin Statistical Reporting Service. 1975. Cash Receipts from Farm Marketings in 1974. Madison.

Table 2.10-32

NUMBER OF FARMS AND LAND IN FARMS, 1979

	Number of Farms	Average Size (Acres)	Land in Farms	
			Total Acres In Farms	% of Farm Land In Each Jurisdiction
Local study area	853	250	213,184	14.6
Forest County	180	221	41,800	6.5
Langlade County	650	235	153,600	28.0
Oneida County	130	278	36,400	5.1
City of Crandon	2	33	65	2.0
City of Antigo	13	45	579	20.6
City of Rhinelander	0	0	0	0.0
Argonne Town	25	216	5,400	7.9
Blackwell Town	2	279	558	1.3
Caswell Town	6	31	185	0.7
Crandon Town	17	199	3,387	15.4
Freedom Town	19	273	5,181	24.2
Hiles Town	7	240	1,678	1.9
Laona Town	22	242	5,320	8.3
Lincoln Town	8	184	1,471	4.0
Nashville Town	21	337	7,073	16.4
Popple River Town	5	126	628	1.9
Ross Town	2	138	276	1.1
Wabeno Town	5	438	2,188	3.2
Ackley Town	87	234	20,389	43.9
Ainsworth Town	11	182	2,007	4.5
Antigo Town	75	241	18,104	88.7
Elcho Town	15	223	3,340	7.9
Evergreen Town	23	359	8,258	36.4
Langlade Town	23	289	6,653	14.5
Neva Town	46	261	12,025	52.5
Norwood Town	78	267	20,788	92.0
Parrish Town	1	108	108	0.5
Peck Town	38	134	5,110	22.2
Polar Town	63	192	12,095	52.8
Price Town	17	272	4,623	20.4
Rolling Town	76	256	19,474	84.1
Upham Town	11	286	3,149	7.4
Wolf River Town	23	388	8,924	12.1
Crescent Town	13	104	1,354	6.5
Enterprise Town	1	86	86	0.2
Lake Tomahawk Town	1	501	501	2.4
Monico Town	8	96	766	2.3
Newbold Town	7	132	927	1.8
Pelican Town	24	54	1,291	4.3
Piehl Town	4	46	183	0.8
Pine Lake Town	8	103	822	3.3
Schoepke Town	7	281	1,970	6.9
Stella Town	8	1,085	8,680	41.1
Sugar Camp Town	10	1,120	11,204	20.5
Three Lakes Town	8	477	3,819	7.6
Woodboro Town	13	196	2,545	11.0

NOTE

The acreage for townships was calculated using a ratio of Wisconsin Agriculture Reporting Service data to Assessor Farm data.

SOURCES

Wisconsin Department of Administration. 1980. 1979 Wisconsin Assessor Farm Statistics. Computer printout. Madison.

Wisconsin Department of Agriculture. 1979. 1979 Wisconsin Agricultural Statistics. Wisconsin Agricultural Reporting Service. Madison.

agricultural activity, accounting for 71.8 percent of the local study area's farm acreage and 76.8 percent of the farms.

There were 853 farms in the local study area in 1979, with an average size of 250 acres. Of these farms, 141 were in the Forest County portion of the local study area, 600 were in the Langlade County portion, and 112 were in the Oneida County portion. The average size of farms in the local study area portions of Forest and Langlade counties (235 and 243 acres, respectively) was smaller than average for the entire local study area (250 acres) due to the farms in the local study area portion of Oneida County (which averaged 305 acres). Farms in the local study area were larger on average than farms in the state as a whole (197 acres).

Cash Receipts from Farm Marketings, 1978. In 1978, Langlade County accounted for 77.7 percent of cash receipts for the three counties, reflecting that county's dominance of the local study area's agricultural activity (Table 2.10-33). Of the three counties, Langlade had the most diverse agricultural base. While Forest County agricultural cash receipts were primarily from livestock production (76.0 percent) and Oneida was primarily crop oriented (69.2 percent), cash receipts in Langlade County were more evenly divided. Livestock accounted for 57.8 percent of total Langlade County cash receipts, while crops accounted for 42.2 percent. Overall, the local study area is more crop and

Table 2.10-33

CASH RECEIPTS FROM FARM MARKETINGS, 1978
(\$ Thousands)

	<u>State of Wisconsin</u>		<u>Forest County</u>		<u>Langlade County</u>		<u>Oneida County</u>	
	<u>Amount</u>	<u>Percent</u>	<u>Amount</u>	<u>Percent</u>	<u>Amount</u>	<u>Percent</u>	<u>Amount</u>	<u>Percent</u>
Livestock	2,970,855	81.5	2,389	76.0	18,276	57.8	1,828	30.8
Dairy products	2,127,661	58.4	1,851	58.9	14,936	47.3	426	7.2
Meat animals	658,605	18.1	467	14.9	2,053	6.5	256	4.3
Poultry and eggs	132,281	3.6	64	2.0	197	0.6	13	0.2
Miscellaneous	52,308	1.4	7	0.2	1,090	3.4	1,133	19.1
Crops	673,551	18.5	753	24.0	13,323	42.2	4,109	69.2
Field crops	358,042	9.8	115	3.7	564	1.8	34	0.6
All vegetables	171,177	4.7	154	4.9	10,865	34.4	2,705	45.5
Specialty crops	138,253	3.8	482	15.3	1,877	5.9	1,365	23.0
Miscellaneous	6,079	0.2	2	0.1	17	0.1	5	0.1
Total	3,644,406	100.0	3,142	100.0	31,599	100.0	5,937	100.0

SOURCE

Wisconsin Agriculture Reporting Service. 1979. Cash Receipts from Marketings, Wisconsin, 1978. Madison.

much less livestock oriented than the state as a whole. In 1978, 81.5 percent of Wisconsin's cash receipts from farm marketings were from livestock, while in the three counties, 55.3 percent of the total was from livestock.

Dairy products (a subclassification of livestock) were the major source of cash receipts for both Forest and Langlade counties and for the state as a whole. The second major source of cash receipts for Langlade County was vegetables (a subclassification of crops) (34.4 percent). This was due to Langlade County's position as a potato producer, the state's second largest, accounting for 14.0 percent of Wisconsin's potato production in 1978.

Vegetable crops were the major contributor (45.5 percent) to cash receipts in Oneida County; dairy products played a smaller role, contributing only 7.2 percent to Oneida County's cash receipts. Specialty crops, which include forest products, ranked second in percentage of contribution to cash receipts in Forest and Oneida counties (15.3 and 23.0 percent, respectively). Specialty crops represented only 3.8 percent of the state's cash receipts.

Farm Ownership and Operator Characteristics, 1978. Most farms in the three counties and the state were owned by individuals or families; those farms which were incorporated tended to be family-held corporations (Table 2.10-34). Most of

Table 2.10-34

FARM OWNERSHIP AND OPERATOR CHARACTERISTICS, 1978

	<u>State of Wisconsin</u>		<u>Forest County</u>		<u>Langlade County</u>		<u>Oneida County</u>	
	<u>Number</u>	<u>Percent^a</u>	<u>Number</u>	<u>Percent^b</u>	<u>Number</u>	<u>Percent^b</u>	<u>Number</u>	<u>Percent^b</u>
Farms by ownership type								
Individual or family	79,413	88.2	138	94.5	514	85.7	94	75.8
Partnership	8,777	9.8	7	4.8	50	8.3	9	7.3
Corporation	1,631	1.8	1	0.7	35	5.8	19	15.3
Family-held	1,501	1.7	1	0.7	35	5.8	15	12.1
Other	130	0.1	0	0.0	0	0.0	4	3.2
Other ^c	185	0.2	0	0.0	1	0.2	2	1.6
Total	90,006	100.0	146	100.0	600	100.0	124	100.0
Tenure of operator								
Full owner	55,914	62.1	93	63.7	346	57.7	88	71.0
Part owner	27,245	30.3	50	34.2	236	39.3	33	26.6
Tenant	6,847	7.6	3	2.1	18	3.0	3	2.4
Total	90,006	100.0	146	100.0	600	100.0	124	100.0

NOTES

^aPercent of total farms in state of Wisconsin.

^bPercent of total farms in county.

^cIncludes cooperatives, estates or trusts, institutional, etc.

SOURCE

U.S. Department of Commerce, Bureau of the Census. 1980. 1978 Census of Agriculture, Preliminary Report. Washington, D.C.: U.S. Government Printing Office.

the farm operators were full or part owners. Tenants represented only 2 to 3 percent of farm operators in the counties, as compared to 7.6 percent in the state. Therefore, the farm population in the local study area is slightly more stable than that for the state.

Average Farm and Nonfarm Earnings, 1978. As would be expected, farm earnings in 1978 were highest in Langlade County (\$10.8 million), accounting for 15.3 percent of the county's total earnings (Table 2.10-35). Farm earnings in Forest County were \$1.5 million (7.3 percent of total earnings), and farm earnings in Oneida County were \$1.9 million (1.4 percent of total earnings).

Farm employment (including proprietors) in Langlade County was 18.3 percent of total county employment; comparable percentages for Forest and Oneida counties were 7.7 and 4.3 percent, respectively.

Average earnings of farm proprietors in Forest and Langlade counties were higher than earnings of nonfarm proprietors. In the more industrialized Oneida County, nonfarm proprietors earned considerably more than farm proprietors. In all three counties, farm wage earners earned considerably less than their nonfarm counterparts.

Table 2.10-35

AVERAGE FARM AND NONFARM EARNINGS, 1978

	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>
Farm earnings			
Proprietors' incomes (\$ thousands)	1,320	7,599	44
Number of proprietors	172	696	110
Average annual earnings	7,674	10,918	400
Wage and salary income (\$ thousands)	177	3,287	1,901
Number of workers	32	807	459
Average annual earnings	5,531	4,073	4,142
Nonfarm earnings			
Proprietors' income (\$ thousands)	2,303	7,156	13,465
Number of proprietors	562	779	1,399
Average annual earnings	4,098	9,186	9,625
Wage and salary income (\$ thousands)	16,726	53,228	123,304
Number of workers	1,894	5,929	11,173
Average annual earnings	8,831	8,978	11,036

SOURCE

U. S. Department of Commerce, Bureau of Economic Analysis. 1980. Regional Economic Information System, Personal Income by Major Sources. Computer printout. Washington, D. C.

Agricultural Acreage Sold, 1978. Sales of agricultural land reflected both the value of the land and the change in land use from agricultural to other uses. During 1978, 2,788 acres of agricultural land were sold in the three counties; 82.6 percent of this land continued in agricultural use (Table 2.10-36). Statewide, 81.7 percent of farm acreage continued in agricultural use after it was sold.

The greatest amount of agricultural land sold was in Langlade County (2,037 acres). Although acreage sold in Forest and Oneida counties was small compared to Langlade County, much higher proportions (48.7 and 43.9 percent, respectively) of the land sold were diverted to nonagricultural uses. In Langlade County, 7.1 percent of farm land sold was diverted to nonagricultural uses. This indicates that there is a weaker trend away from agriculture in this county than in the other two counties and the state.

Agricultural Land Sales, 1974 and 1978. In 1978, prices paid for land continuing in agriculture ranged from \$324 per acre in Forest County to \$820 per acre in Oneida County; the average price statewide was \$872 per acre (Table 2.10-37). The average 1978 price paid for land diverted to other uses was \$25 per acre higher than for land continuing in agriculture in Forest County, and \$359 per acre higher in the state as a whole. Land diverted from agricultural use sold for \$50 per acre less than land

Table 2.10-36

AGRICULTURAL ACREAGE SOLD, 1978

	<u>State of Wisconsin</u>	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>
Land continuing in agricultural use				
Acreage	281,222	122	1,892	288
Percent of total	81.7	51.3	92.9	56.1
Agricultural land diverted to other uses				
Acreage	62,839	116	145	225
Percent of total	18.3	48.7	7.1	43.9
Total acreage sold	344,061	238	2,037	573

SOURCE

Wisconsin Agriculture Reporting Service. 1979. Agricultural Land Sales and Rental Rates by Counties, Wisconsin, 1977 and 1978. Madison.

Table 2.10-37

AGRICULTURAL LAND SALES, 1974 AND 1978^a

	<u>State of Wisconsin</u>	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>
Number of transactions				
1974	7,039	17	71	26
1978	6,163	12	63	20
Percent change 1974-1978	-12.4	-29.4	-11.3	-30.0
Dollar per acre for land continuing in agricultural use				
1974	438	135	258	913
1978	872	324	565	820
Percent change 1974-1978	99.1	140.0	118.9	-10.2
1978 percent of state average price	100.0	37.2	64.9	94.1
Dollar per acre for land diverted to other uses				
1974	592	195	205	635
1978	1,231	349	515	507
Percent change 1974-1978	107.9	78.9	151.2	-20.2
1978 percent of state average price	100.0	28.4	41.9	41.2
Dollar per acre for all agricultural lands				
1974	465	148	252	838
1978	937	336	562	682
Percent change 1974-1978	1.02	127.0	123.0	-18.6
1978 percent of state average price	100.0	35.9	59.9	72.8

NOTE

^aAverage of all agricultural land transactions where both buyer and seller have several alternatives with neither acting under any constraints.

SOURCES

Wisconsin Agriculture Reporting Service. 1979. Agricultural Land Sales and Rental Rates by Counties, Wisconsin, 1977 and 1978. Madison.

_____. 1977. Agricultural Land Sales and Rental Rates by Counties, Wisconsin, 1974 and 1975. Madison.

continuing in agriculture in Langlade County and \$313 per acre less in Oneida County. This indicates that the land taken out of agriculture in these two counties was not the prime farm land. Agricultural land prices more than doubled in Forest and Langlade counties between 1974 and 1978; they declined in Oneida County.

The decline in land prices in Oneida County is misleading because 1974 was a year in which a very small amount of agricultural land was sold at an unusually high price. Overall, Oneida County agricultural land prices have risen in recent years.

Characteristics of Agricultural Labor Force in Local Study Area, 1980. The agricultural labor force in the local study area is predominantly male (86.4 percent), with 43.2 percent of agricultural employees in the 35 to 50 age group and 29.0 percent aged 51 to 64 (Table 2.10-38). The labor force is predominantly full-time (72.5 percent). Part-time work is primarily seasonal, with employment increasing at harvest or peak production periods.

Almost all of the agricultural employees in the local study area (92.7 percent) earn from \$3.11 to \$7.00 per hour; most of these (62.8 percent) fall in the \$4.51 to \$7.00 range.

Table 2.10-38

CHARACTERISTICS OF AGRICULTURAL^a LABOR FORCE IN
LOCAL STUDY AREA, 1980

	<u>Total¹</u>		<u>Male</u>		<u>Female</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Age						
Under 18	3	1.8	2	1.2	1	0.6
18-34	43	25.4	34	20.2	9	5.3
35-50	73	43.2	66	39.0	7	4.2
51-64	49	29.0	43	25.4	6	3.5
65+	1	0.6	1	0.6	0	0.0
Total	169	100.0	146	86.4	23	13.6
Hourly wage						
\$3.10 and under	3	1.8				
3.11 - 4.50	49	29.9				
4.51 - 7.00	103	62.8				
7.01 - 9.00	8	4.9				
9.01+	1	0.6				
Total	164	100.0				

NOTE

^aIncludes food processing.

^bTotals are different for age and hourly wage because one or more employers did not complete both parts of the questionnaire.

SOURCE

Consultant's survey of employers in the local study area.

2.10.2.6 Forestry and Forest Products

Almost all of the original forests in the local study area had been cut by the early 1900's. Therefore, the forests in the local study area are the result of second growth and planting.

Our study of forests and related industries focuses on the forest resources represented by the trees growing in the local study area, and on the employment by businesses engaged in cutting, sawing, and processing primary forest products. Our major source of information on forest resources is a periodic survey conducted jointly by the North Central Forest Experiment Station and the Wisconsin Department of Natural Resources. The latest survey for which data are available was completed in 1968 and provides resource information at the county level only (Spencer and Thorne, 1972); the next comprehensive survey is scheduled for 1981-1984. Other data sources are Blythe et al., 1973, 1977, and 1979, and Adams and Brodie, 1977. The major source of employment information is the Wisconsin Department of Industry, Labor and Human Relations, 1978 and 1980.

Oneida County leads in timber production, but is closely followed by Forest County. Langlade County is less forested and more oriented towards agriculture. In terms of relative shares of the economy, timber production is considered to be most important to Forest County. Oneida County has a larger industrial base, and although timber production is higher, its share of the economy is smaller. However, a great deal of

industry and manufacturing in Oneida is related to forest products.

Area of Land and Forest Land. Commercial forest land is forest land that is producing or is capable of producing crops of industrial wood, and is land that has not been withdrawn from timber use by either statute or administrative regulation. Much of the three-county area (77.5 percent) was classified as commercial forest land, nearly double the statewide percentage (41.7 percent) (Table 2.10-39). Forest and Oneida counties are among the most heavily forested in the state. Commercial forests represented 81.9 percent of the land area in Forest County and 79.6 percent of the land area in Oneida County in 1968. Langlade County, which is more oriented towards agriculture, had less forest area than the other two counties, but its percentage of commercial forest land (69.7 percent) was still two-thirds greater than that for the state.

Area of Commercial Forest Land by Forest Type, 1968. The forest types in the local study area included stands of white pine, red pine, jack pine; spruce, fir; oak, hickory; elm, ash, cottonwood; maple, beech, birch; and aspen, birch. For the three-county area, aspen and birch (31.4 percent), maple, beech and birch (30.8 percent), and spruce and fir (20.5 percent) dominated the commercial tracts (Table 2.10-40). Statewide, aspen

Table 2.10-39

AREA OF LAND AND FOREST LAND, 1968
(1,000s of acres)

<u>Jurisdiction</u>	<u>Land Area</u>	<u>All Forest</u>	<u>Non- Commercial Forest</u>	<u>Commercial Forest</u>	<u>Commercial Forest As Percent of Land Area</u>
State of Wisconsin	34,858.5	14,945.4	408.6	14,536.8	41.7
Three-county total	1,904.2	1,549.4	72.9	1,476.5	77.5
Forest County	644.7	549.5	21.8	527.7	81.9
Langlade County	548.1	395.9	13.7	382.2	69.7
Oneida County	711.4	604.0	37.4	566.6	79.6

SOURCE

Spencer, J.S., Jr. and G.W. Thorne. 1972. Wisconsin Timber Resources, A Perspective. USDA Forest Service Resource Bulletin NC-15. St. Paul, Minnesota: North Central Forest Experiment Station.

Table 2.10-40

AREA OF COMMERCIAL FOREST LAND BY TYPE OF FOREST, 1968
(1,000s of acres)

Jurisdiction	TYPE OF FOREST													
	<u>White-Red-Jack Pine</u>		<u>Spruce-Fir</u>		<u>Oak-Hickory</u>		<u>Elm-Ash-Cottonwood</u>		<u>Maple-Beech-Birch</u>		<u>Aspen-Birch</u>		<u>Nonstocked</u>	
	Acres	Percent ^a	Acres	Percent ^a	Acres	Percent ^a	Acres	Percent ^a	Acres	Percent ^a	Acres	Percent ^a	Acres	Percent ^a
State of Wisconsin	1,215.4	8.4	1,388.5	9.6	2,664.9	18.3	1,159.6	8.0	3,521.6	24.2	4,219.1	29.0	369.7	2.5
Three-county total	99.5	6.7	302.9	20.5	54.9	3.7	80.6	5.5	454.8	30.8	463.3	31.4	20.6	1.4
Forest County	27.4	5.2	108.4	20.5	7.7	1.5	16.9	3.2	218.3	41.4	139.2	26.4	9.8	1.9
Langlade County	17.9	4.7	75.8	19.8	16.6	4.3	25.2	6.6	116.4	30.5	126.1	33.0	4.2	1.1
Oneida County	54.2	9.6	118.7	20.9	30.5	5.4	38.5	6.8	120.1	21.2	198.0	34.9	6.6	1.2

NOTE

^aPercentages are based on the acres of commercial forest given in Table 2.10-39; may not add to 100 percent because of rounding.

SOURCE

Spencer, J.S., Jr. and G.W. Thorne. 1972. Wisconsin Timber Resources, A Perspective. USDA Forest Service Resource Bulletin NC-15. St. Paul Minnesota: North Central Forest Experiment Station.

and birch and maple, beech and birch were the two largest categories (29.0 and 24.2 percent) with oak and hickory (18.3 percent) third. Oak and hickory accounted for only 3.7 percent of the stands in the three counties.

Area of Commercial Forest Land by Stand-Size Class, 1968.

Forest lands are also classified by the size of their stands. At least 16.7 percent of forest area must be stocked with growing trees for stand-size classification. Otherwise they are considered to be nonstocked. The stand-size classes are: sawtimber stands (at least half of the trees contain a 12-foot saw log or two non-contiguous 8-foot saw logs, and diameter at a point 4.5 feet above ground must be at least 9 inches for softwood and 11 inches for hardwood), poletimber stands (at least half of the trees measure a minimum of 5 inches in diameter at a point 4.5 feet above ground), and sapling and seedling stands (more than half the trees measure less than 5 inches in diameter).

Stands of commercial forests in the three-county area in 1968 were 51.1 percent poletimber, 32.0 percent sapling and seedling, and 15.4 percent sawtimber (Table 2.10-41). This distribution was similar for the state and each of the three counties. Commercial forests in the state were 45.3 percent poletimber stands, 30.9 percent sapling and seedling stands, and 21.3 percent sawtimber stands. In the three counties, there was

Table 2.10-41

AREA OF COMMERCIAL FOREST LAND BY STAND-SIZE CLASS, 1968
(1,000s of acres)

<u>Jurisdiction</u>	<u>Stand-Size Class</u>							
	<u>Sawtimber Stands</u>		<u>Poletimber Stands</u>		<u>Sapling and Seedling Stands</u>		<u>Nonstocked</u>	
	<u>Acres</u>	<u>Percent</u> ^a	<u>Acres</u>	<u>Percent</u> ^a	<u>Acres</u>	<u>Percent</u> ^a	<u>Acres</u>	<u>Percent</u> ^a
State of Wisconsin	3,098.4	21.3	6,579.5	45.3	4,489.2	30.9	369.7	2.5
Three-county total	227.5	15.4	755.2	51.1	473.2	32.0	20.6	1.4
Forest County	81.6	15.5	292.1	55.4	144.2	27.3	9.8	1.9
Langlade County	63.3	16.6	187.4	49.0	127.3	33.3	4.2	1.1
Oneida County	82.6	14.6	275.7	48.7	201.7	35.6	6.6	1.2

NOTE

^a Percentages are based on acres of commercial forest given in Table 2.10-39; may not add to 100 percent because of rounding.

SOURCE

Spencer, J.S., Jr. and G.W. Thorne. 1972. Wisconsin Timber Resources, A Perspective. USDA Forest Service Resource Bulletin NC-15. St. Paul, Minnesota: North Central Forest Experiment Station.

little variation in the areas of stand-size classes (poletimber stands, 48.7 to 55.4 percent; sapling and seedling stands, 27.3 to 35.6 percent; sawtimber stands 14.6 to 16.6 percent). The predominance of poletimber stands indicates that the forests were middle-aged and, thus, still growing. The greater percentage of sawtimber for the state indicates that commercial forests in other parts of Wisconsin were older and closer to harvesting than those in the local study area. However, the greater proportion of poletimber in the local study area indicates that this relationship should be reversed in the future, and that lumber production in the local study area should increase.

Net Annual Growth Rates on Commercial Forest Land, 1968. In 1968, the growth rate of hardwood and softwood growing stock in each of the three counties exceeded the state growth rate (Table 2.10-42). Forest County's growth rate for sawtimber softwoods (5.8 percent) was nearly the same as the 1968 state rate for softwoods (5.2 percent), and the county exceeded the state rate by almost 2 percent for hardwoods sawtimber. Sawtimber growth in Langlade County for softwoods (5.0 percent) and for hardwoods (5.6 percent) was less than the statewide rate. In Oneida County, the net volume of softwood sawtimber increased by only 4.7 percent; however, the growth rate of hardwood sawtimber (8.0 percent) far exceeded the statewide growth rate. In general, the

Table 2.10-42

NET ANNUAL GROWTH RATES ON COMMERCIAL FOREST LAND, 1968

Jurisdiction	Softwoods		Hardwoods		All Species	
	Growing Stock ^a	Sawtimber ^b	Growing Stock ^a	Sawtimber ^b	Growing Stock ^a	Sawtimber ^b
State of Wisconsin						
Net volume	2,474,541	6,497,100	8,521,231	15,258,600	10,995,772	21,755,700
Net growth	123,105	337,738	377,008	925,927	500,113	1,263,665
Net growth rate (%)	4.9	5.2	4.4	6.0	4.5	5.8
Forest County						
Net volume	145,265	369,493	303,700	422,356	448,965	791,849
Net growth	8,400	21,518	16,216	32,957	24,616	54,475
Net growth rate (%)	5.8	5.8	5.3	7.8	5.5	6.9
Langlade County						
Net volume	62,916	124,981	224,163	375,240	287,078	500,221
Net growth	3,473	6,232	10,126	20,912	13,599	27,144
Net growth rate (%)	5.5	5.0	4.5	5.6	4.7	5.4
Oneida County						
Net volume	209,129	659,429	273,111	307,220	482,240	966,649
Net growth	10,503	31,031	13,659	24,578	24,162	55,609
Net growth rate (%)	5.0	4.7	5.0	8.0	5.0	5.8

NOTES

^a Figures are in 1,000s of cubic feet; net volume of growing stock is the volume of sound wood in the trunk of live pole timber and saw timber trees from stump to a minimum 4-inch top diameter outside bark, or to a point where the central stem breaks into limbs.

^b Figures are in 1,000s of board feet; net volume of saw timber is the volume of sound wood in the saw log portion of live saw timber trees from stump to a minimum 7-inch top diameter outside bark for softwoods and 9 inches for hardwoods.

SOURCE

Wisconsin Department of Natural Resources. n.d. Wisconsin Forest Resource Statistics, North Central Survey Report. Madison.

highest growth rates in each of the three counties were for softwood growing stock and for hardwood sawtimber.

According to Spencer and Thorne (1972), a commercial forest has the capacity to produce 49 cubic feet of wood per acre per year. With 1,476,500 acres of commercial forest in the three counties (from Table 2.10-39), the local study area produced 42.2 cubic feet of growing stock per acre in 1968. Although this is below the estimated production capacity of a commercial forest, it is well above the 1968 statewide average growth of 34 cubic feet per acre (Spencer and Thorne, 1972).

Net Annual Removals on Commercial Forest Land, 1968. Timber removals include trees harvested for forest products and trees cut or destroyed by thinnings, land clearings, or changes in land use. If the net volume of removals is less than the net volume of annual growth, the forest's inventory will increase. Overall, the local study area exhibited increasing inventory (Table 2.10-43). In 1968, removals of growing stock and sawtimber represented 62.7 percent of net growth (Spencer and Thorne, 1972). Removals of softwoods, both growing stock and sawtimber, in the local study area were well below the state average, meaning that inventories were increasing proportionately greater. Each of the three counties, however, had a high rate of removal for hardwoods, particularly for sawtimber. The only inventory decline for a particular category was in Langlade County, where

Table 2.10-43

NET ANNUAL REMOVALS ON COMMERCIAL FOREST LAND, 1968

Jurisdiction	Softwoods		Hardwoods		All Species	
	Growing Stock ^a	Sawtimber ^b	Growing Stock ^a	Sawtimber ^b	Growing Stock ^a	Sawtimber ^b
State of Wisconsin						
Net removals	30,000	100,000	203,200	550,000	233,200	650,000
Percent of net growth	24.3	29.6	53.8	59.3	44.6	51.4
Forest County						
Net removals	1,765	7,689	10,048	29,838	11,813	37,527
Percent of net growth	21.0	35.7	62.0	90.5	48.0	68.9
Langlade County						
Net removals	284	1,190	7,193	22,485	7,477	23,675
Percent of net growth	8.2	19.1	71.0	107.5	55.0	87.2
Oneida County						
Net removals	2,518	7,683	10,818	23,687	13,336	31,370
Percent of net growth	24.0	24.8	79.2	96.4	55.2	56.4

NOTES

^aFigures are in 1,000s of cubic feet; represent the volume of sound wood in live pole timber and saw timber trees for forest products, including roundwood products, logging residues, and other removals.

^bFigures are in 1,000s of board feet; represent the net board-foot volume of live saw timber trees cut for forest products annually, including roundwood products, logging residues, and other removals.

SOURCE

Wisconsin Department of Natural Resources. n.d. Wisconsin Forest Resource Statistics, North Central Survey Report. Madison.

removal of sawtimber hardwoods exceeded growth by 7.5 percent. With the exception of growing stock in Forest County (48 percent of growth), 1968 removals of growing stock and sawtimber in all three counties were greater than the 1968 statewide removal rate.

Primary Forest Products and Residue Production, 1973.

Several primary forest products are made from the timber removed from commercial forest land. The most important of these are pulpwood, saw logs, veneer logs, poles, pilings, posts, cooperage logs, charcoal bolts, particle board bolts, and excelsior bolts. In addition, usable wood residue is produced as a by-product from sawmills. Oneida County's production of pulpwood was almost twice as much as Forest County's, and more than double the amount produced in Langlade County (Table 2.10-44). Forest County produced the most saw logs, and Langlade County led in the production of veneer logs. The three counties produced few poles, pilings, posts, and miscellaneous products compared to statewide production.

Area of Commercial Forest Land by Type of Owner, 1968.

Commercial forest lands are owned by the federal government, state and local governments, forest industries, farmers, corporations (nonforest industries), or other private owners. The major owners of commercial forests throughout the state were farmers (33.0 percent) and other private individuals (23.0

Table 2.10-44

PRIMARY FOREST PRODUCTS AND RESIDUE PRODUCTION, 1973

<u>Product</u>	<u>Volume of Production</u>				
	<u>State of Wisconsin</u>	<u>Three-County Total</u>	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>
Pulpwood ^a	124,970	22,987	6,757	5,194	11,035
Saw logs	77,687	53,937	23,742	11,060	19,133
Veneer logs	2,349	1,069	381	534	145
Poles, pilings, posts, miscellaneous products	7,032	32	5	0	27

NOTE

^aFigures for pulpwood are in 1,000s of cubic feet; all others are in 1,000s of board feet.

SOURCE

Blythe, J.E., E.F. Landt, J.W. Whipple, and J.T. Hahn. 1976. Primary Forest Products Industry and Timber Use, Wisconsin, 1973. USDA Forest Service Resource Bulletin NC-31. St. Paul, Minnesota: North Central Forest Experiment Station.

percent) (Table 2.10-45). In the three-county area, the major owners of commercial forests were the federal government (23.7 percent), forest industries (23.0 percent), and corporations (23.0 percent). In Forest County, the single largest portion (55.5 percent) of the commercial forest land was in the Nicolet National Forest. In Langlade County, municipal and county governments owned the largest amount (31.3 percent), followed by private corporations (25.9 percent). In Oneida County, the forest industry's 35.5 percent share of commercial forests was the largest, followed by private corporate ownership of 28.8 percent.

An important consideration in the growth and development of forest resources is the type of forest management employed by forest owners. The purpose of management is to maximize long-run economic and other benefits from the forest resources. The forests owned by forestry industry businesses are managed to produce the greatest long-run economic return. Publicly owned lands are managed with greater attention to the recreational and aesthetic value of the forests. In 1968, much of the commercial forest lands owned by farmers and other nonindustrial owners were not managed.

Characteristics of Forestry Labor Force in the Local Study Area, 1980. Most activities normally associated with forestry (e.g, cutting trees) are done by local study area firms

Table 2.10-45

AREA OF COMMERCIAL FOREST LAND BY TYPE OF OWNER, 1968

<u>Type of Owner</u>	<u>State of Wisconsin</u>	<u>Three-County Total</u>	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>
Federal government					
National forest					
Acres	1,317.7	329.6	292.7	29.0	7.9
Percent ^a	9.1	22.3	55.5	7.6	1.4
Other					
Acres	264.8	20.2	11.5	0.9	7.8
Percent ^a	1.8	1.4	2.2	0.2	1.4
State government					
Acres	568.0	78.2	19.4	1.6	57.2
Percent ^a	3.9	5.3	3.7	0.4	10.1
County or municipal government					
Acres	2,365.7	209.0	9.2	119.5	80.3
Percent ^a	16.3	14.2	1.7	31.3	14.2
Forest industry					
Acres	1,368.1	339.1	86.7	51.3	201.1
Percent ^a	9.4	23.0	16.4	13.4	35.5
Farmer					
Acres	4,809.0	113.6	20.5	67.1	26.0
Percent ^a	33.0	7.7	3.9	17.6	4.6
Corporation					
Acres	490.2	339.2	76.9	98.9	163.4
Percent ^a	3.4	23.0	14.6	25.9	28.8
Other private					
Acres	3,343.3	47.6	10.8	13.9	22.9
Percent ^a	23.0	3.2	2.0	3.6	4.0

NOTE

^a Percentages are based on acres of commercial forest given in Table 2.10-41; may not add to 100 percent because of rounding.

SOURCE

Wisconsin Department of Natural Resources. n.d. Wisconsin Forest Resource Statistics, North Central Survey Report. Madison.

classified as logging camps and logging contractors, not operating sawmills. (This classification is provided by the Standard Industrial Classification (SIC) system administered by the U.S. Department of Commerce, which gives detailed employment and output data by assigning each industry a 4-digit code based on type of output and method of production.) Male forestry workers in the local study area outnumber females by almost two to one (65.7 percent male and 34.3 percent female) (Table 2.10-46). Most workers of both sexes are in the 18-34 age group (59.4 percent of total). Wages in the forestry industry are substantially higher than for retail trade (Table 2.10-29) and agriculture (Table 2.10-38). More than one-fourth of the employees represented in the sample (27.4 percent) earn from \$7.01 to \$9.00 an hour, and 54.8 percent earn from \$4.51 to \$7.00 an hour.

Average Annual Employment in Forestry/Forest Products, 1978.

Oneida County's forestry/forest products industry averaged the greatest number of employees in 1978 (1,140) (Table 2.10-47). Forest County averaged less than half as many employees (492), and Langlade County employed less than a third as many forestry/forest products workers (310). However, the annual average numbers of employers (units) in Forest and Langlade counties (36 and 25, respectively) were much higher than the number of employers in Oneida County (19). Therefore,

Table 2.10-46

CHARACTERISTICS OF FORESTRY LABOR FORCE
LOCAL STUDY AREA, 1980

	Total ^a		Male		Female	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Age						
Under 18	0	0	0	0	0	0
18 - 34	85	59.4	58	40.5	27	18.9
35 - 50	38	26.6	27	18.9	11	7.7
51 - 64	19	13.3	8	5.6	11	7.7
65+	<u>1</u>	<u>0.7</u>	<u>1</u>	<u>0.7</u>	<u>0</u>	<u>0</u>
Total	143	100.0	94	65.7	49	34.3
Hourly Wage						
\$3.10 and under	2	1.6				
3.11 - 4.50	19	14.0				
4.51 - 7.00	74	54.8				
7.01 - 9.00	37	27.4				
9.01+	<u>3</u>	<u>2.2</u>				
Total	135	100.0				

NOTE

^aTotals are different for age and hourly wage because one or more employers did not complete both parts of the questionnaire.

SOURCE

Consultant's survey of employers in the local study area, 1980.

Table 2.10-47

AVERAGE ANNUAL EMPLOYMENT IN
FORESTRY/FORREST PRODUCTS, 1978^a

	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Annual Average		Total Wages
	Units	Emp.	Units	Emp.	Units	Emp.	Units	Emp.	Units	Emp.	
Local Study Area ^a											
SIC 08 - Forestry	1	0	1	0	1	0	1	6	1	2	4,363
SIC 24 - Lumber and wood products	48	627	48	615	49	702	46	627	48	634	4,148,003
SIC 25 - Furniture and fixtures	3	368	3	348	2	117	2	272	3	276	1,741,657
SIC 26 - Paper and allied products	2	923	2	975	2	1,020	2	29	2	737	724,065
Total	54	1,918	54	1,938	54	1,839	51	988	54	1,649	6,618,088
Forest County											
SIC 08 - Forestry	1	0	1	0	1	0	1	6	1	2	4,363
SIC 24 - Lumber and wood products	33	206	34	194	31	231	32	225	33	214	2,128,159
SIC 25 - Furniture and fixtures	2	367	2	348	2	117	2	272	2	276	2,405,926
SIC 26 - Paper and allied products	0	0	0	0	0	0	0	0	0	0	0
Total	36	573	37	542	34	348	35	503	36	492	4,538,448
Langlade County											
SIC 08 - Forestry	0	0	0	0	0	0	0	0	0	0	0
SIC 24 - Lumber and wood products	24	278	24	302	23	290	23	288	24	290	2,683,617
SIC 25 - Furniture and fixtures	0	0	0	0	0	0	0	0	0	0	0
SIC 26 - Paper and allied products	1	20	1	20	1	20	1	20	1	20	116,994
Total	25	298	25	322	24	310	24	308	25	310	2,800,611
Oneida County											
SIC 08 - Forestry	0	0	0	0	0	0	0	0	0	0	0
SIC 24 - Lumber and wood products	20	204	19	208	17	218	17	227	18	214	1,990,528
SIC 25 - Furniture and fixtures	0	0	0	0	0	0	0	0	0	0	0
SIC 26 - Paper and allied products	1	903	1	955	1	1,001	2	844	1	926	18,468,459
Total	21	1,107	20	1,163	18	1,219	19	1,071	19	1,140	20,458,987

NOTE

^a We calculated the percentage of employment for the portion of each county that is in the local study area from the printout and multiplied the quarterly report employment by this percentage.

SOURCES

Wisconsin Department of Industry, Labor and Human Relations. 1980. Employment by 4-Digit SIC Code and Jurisdiction. Computer printout. Madison.

Wisconsin Department of Industry, Labor and Human Relations. 1978. Employment and Wages Covered by Wisconsin's UC Law. Quarters 1 through 4. Madison.

operations in these two counties were substantially smaller than in Oneida County.

Lumber and wood products industries provided employment for most of the forestry/forest products workers in each of the three counties. The rest worked in furniture and fixtures in Forest County (with the exception of six employees in forestry law in the fourth quarter) and in paper and allied products in Langlade and Oneida counties, due in large part to the paper company in Rhinelander.

According to recent surveys, local consumption of local forestry products varies. Within the forestry and wood product sector, purchases of local wood products constitute 5 to 65 percent of all product purchases. The construction industry uses a much higher proportion of local products. According to the surveys, approximately 90 percent of the wood products consumed by construction are obtained in the local study area.

2.10.2.7 Mining

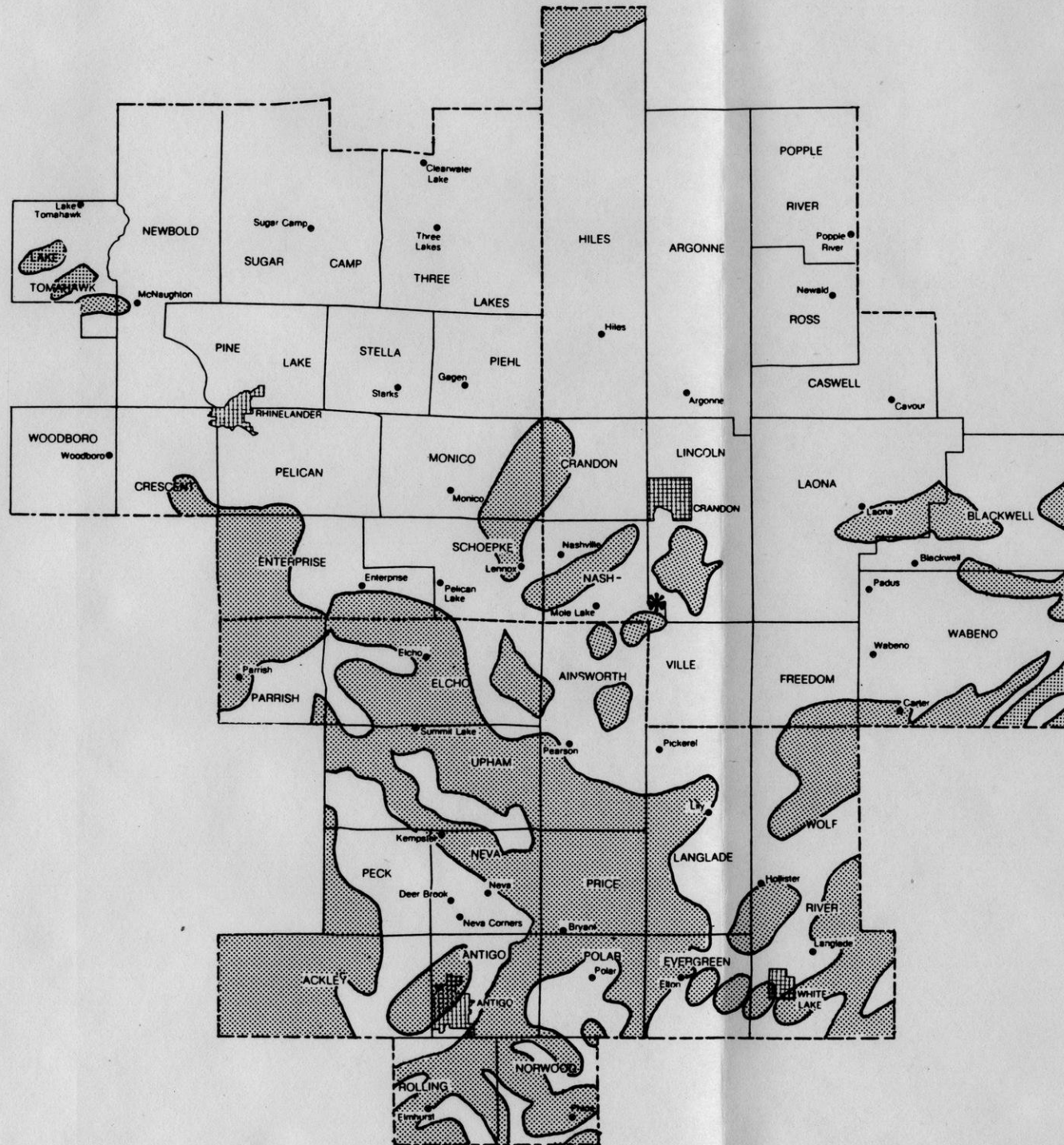
In 1978, the only mineral resources produced commercially in the three-county area were sand and gravel. Sand and gravel production is closely related to construction of roads and buildings in the area. Due to an abundance of sand and gravel throughout the state, sand and gravel have not been developed for export markets. Local supply services local demand.



There is geologic evidence of the possibility of several metallic mining activities developing in the three-county area, as evidenced by several announced deposits.

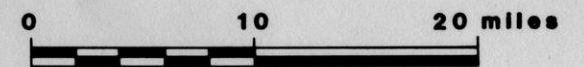
Sand and Gravel Production, 1970 and 1978. In Wisconsin, more sand and gravel were mined than any other mineral; stone was second in volume of minerals produced in the state (U.S. Department of the Interior, Bureau of Mines, 1970). Sand and gravel are found primarily in outwash bodies and in ice contact features, which are shown on Figure 2.10-8. Glacial activity in Wisconsin, particularly in the northeastern part of the state, has provided the area with abundant sand and gravel resources. In 1978, in the three-county area, 725,418 tons were produced at a value of \$1.19 million (Table 2.10-48).

Because sand and gravel are found in abundance in many areas in Wisconsin, most mining operations serve only local demand. The potential for shipment of these minerals to other parts of Wisconsin is limited because supplies are generally available throughout the state. The production of sand and gravel in the local study area is likely to be sufficient to meet local demands, but the opportunity for export sales is limited.

Massive Sulfide Deposits. The bedrock comprising northern Wisconsin consists of volcanic, sedimentary, and intrusive rocks ranging in age from 1,500 to 2,100 million years (Sims, 1976).



 **Moraines**
 **Outwashes**



SOURCE:
 Wisconsin Geological and Natural History Survey. 1976. Glacial Deposits
 of Wisconsin. Sand and Gravel Resource Potential. Madison.

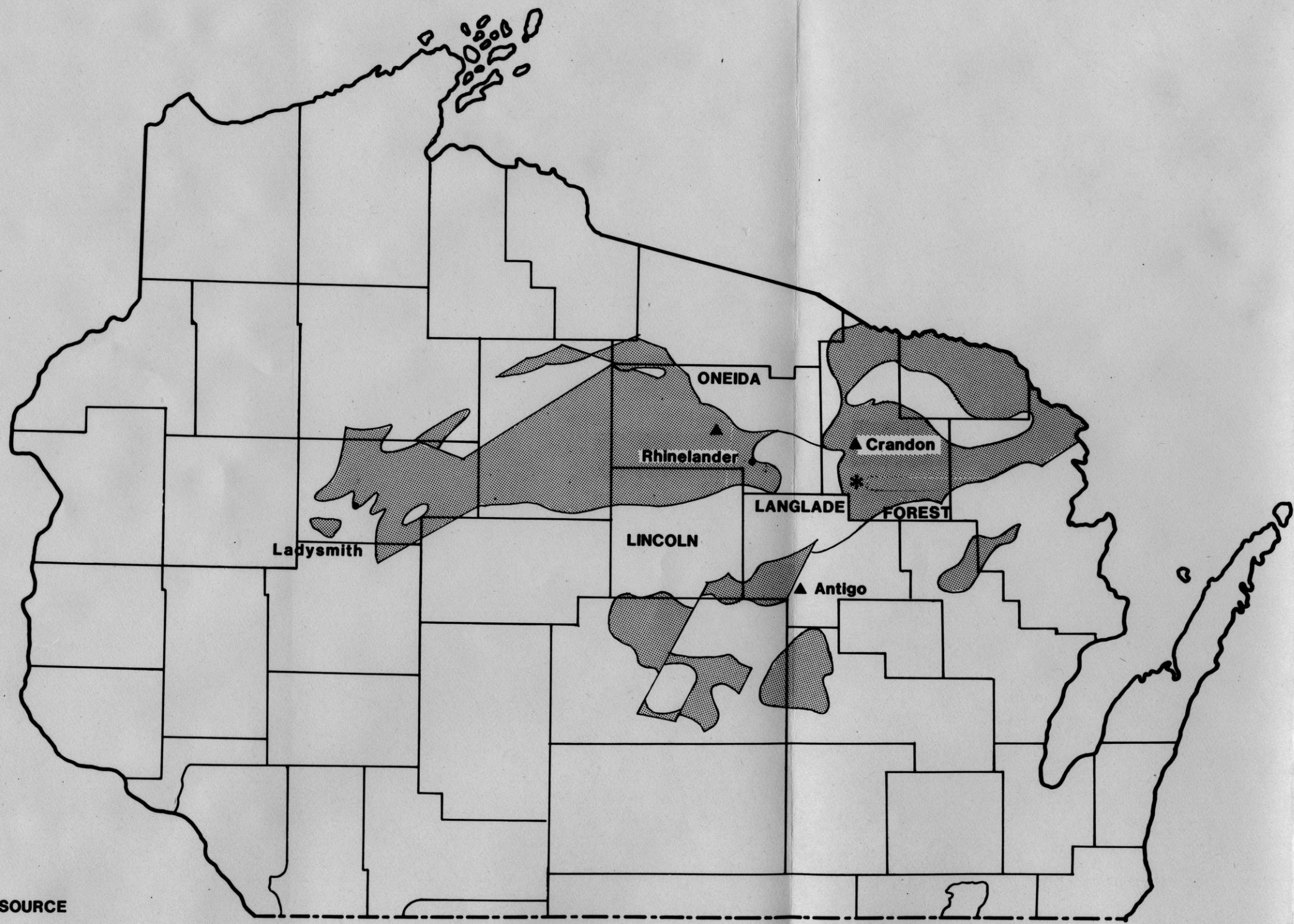
EXXON MINERALS COMPANY CRANDON PROJECT	
GLACIAL DEPOSITS Three County Area	
rpc, inc.	FIG. 2.10-8

Volcanic and sedimentary rocks form a linear belt extending from Ladysmith, east through Rhinelander, to Pembine. This belt of metamorphosed volcanic and sedimentary rocks, referred to as a greenstone belt, is surrounded by and intruded by gneisses and granitic plutons. The Rhinelander-Ladysmith greenstone belt has been the site of exploration for massive sulfide ore deposits since the late 1960's (Figure 2.10-9).

Three massive sulfide deposits have been discovered in northern Wisconsin. These deposits are massive or bedded tabular shaped bodies consisting of more than 50 percent sulfide by volume. Pyrite (iron sulfide) is the principal sulfide mineral with lesser amounts of sphalerite (zinc sulfide), chalcopyrite (copper sulfide), and galena (lead sulfide). The tabular shaped massive ore is commonly underlain by veins of chalcopyrite with quartz and pyrite.

The three massive sulfide deposits discovered in Wisconsin are the Flambeau (Kennecott), Pelican River (Noranda), and Grandon (Exxon Minerals Co.). The Flambeau deposit, discovered in 1968 near Ladysmith, measures approximately 720 meters in length, 15 meters in width and extends to a depth of 240 meters (May, 1977). Reserves have been estimated at 5.5 million metric tons averaging 1.5 percent zinc, 3.7 percent copper (May, 1977), and about 1.0 ounce per ton silver and 0.1 ounce per ton gold.

The Pelican River deposit, discovered in 1974 east of Rhinelander, measures about 300 meters in length, 15 meters in



- Middle Precambrian Metavolcanic Belt
- ▲ Cities
- * Crandon Deposit
- Announced Deposits

SOURCE

Mudrey, M. G., Jr. 1979. The Massive Sulfide Occurrences in Wisconsin. Wisconsin Geological and Natural History Survey . Misc. Paper 79-2. Madison .

EXXON MINERALS COMPANY	
CRANDON PROJECT	
MASSIVE SULFIDE DEPOSITS	
rpc, inc.	FIG. 2.10-9

width, and extends to a depth of 200 meters (Mudrey, 1979). Reserves are estimated at 2.0 million metric tons averaging 4.5 percent zinc and 1 percent copper (Mudrey, 1979). Gold and silver are present.

The Crandon deposit, discovered in 1976 south of Crandon, measures approximately 1,700 meters in length, varies in thickness from 0 to 100 meters, and extends to a depth of 850 meters. The deposit is nearly vertical. Estimated reserves are 75 million metric tons averaging 5.0 percent zinc, 1.1 percent copper, 0.4 percent lead, 1.1 ounces per ton silver, and 0.03 ounces per ton of gold. Most of the zinc is contained in pyrite-rich bedded massive ore, while most of the copper is contained in the underlying chalcopyrite-quartz stringer veins.

The search for massive sulfide deposits continues in the Precambrian greenstone belt in northern Wisconsin. Although there is a reasonable expectation that more deposits of massive sulfide ore will be found in Wisconsin, there is less certainty that they will be developed. Whether the deposits are developed will depend on costs, metal prices, environmental constraints, taxes, and the state's policy toward mineral development (Mudrey, 1979).

2.10.2.8 Hospitality, Recreation, and Tourism

Hospitality, recreation, and tourism play important roles in the economies of the three counties of the local study area.

This section examines the economic aspects of the hospitality, recreation, and tourism (HRT) industry, provides an inventory of available facilities and activities, and outlines supply and demand characteristics.

Economic aspects discussed in this profile include sales, employment and wages within the industry, the impact of fuel availability on the industry, and the significance of seasonal and second homes. Sources of information include public and private agencies and facilities; our surveys of permanent and seasonal residents, of employers in and visitors to the local study area; and professional observations.

Overall, the local study area has a wealth of outdoor recreational facilities. Tourists attracted by these facilities support the local study area economy by purchasing lodging, food, and recreational equipment. Most of the visitors to the local study area travel by car, although in recent years growth in tourism has been hampered by sporadic national fuel shortages and rising fuel prices.

Economic Aspects. The economic data are categorized according to the Standard Industrial Classification (SIC) codes most closely related to the HRT industry. Those codes are: SIC-58, eating and drinking places; SIC-70, hotels, motels, etc.; SIC-78, motion pictures; and SIC-79, amusement and recreation establishments.

Eating and Drinking Establishments. From 1972 to 1977, all three counties in the local study area showed increased sales for eating and drinking establishments (Table 2.10-49). Oneida County displayed the largest increase (54.5 percent), followed by Langlade County (53.1 percent) and Forest County (34.0 percent). However, each of the three counties experienced a smaller growth in sales than the state average of 62.1 percent for the same period. Reasons for the slower growth of recreation in the three-county area include the below-average income and above-average age of the local population, the barriers of travel time and fuel costs to visitors from major population centers, and the relatively untapped potential for winter activities--currently the fastest growing segment of the state's recreation industry (Wisconsin Outdoor Recreation Plan, 1977).

In 1977, Oneida County reported the highest total sales (\$13.6 million) for eating and drinking establishments in the three counties. This represented 0.9 percent of total state sales in this category. Forest and Langlade counties accounted for 0.1 and 0.4 percent, respectively, of total state sales in the same category.

Lodging. Though the state as a whole experienced a substantial increase (60.5 percent) in hotel, motel, and other lodging sales from 1972 to 1977, the local study area did not fare as well (Table 2.10-49). Forest County and Oneida County

Table 2.10-49

SALES FOR HOSPITALITY, RECREATION, AND TOURISM INDUSTRY, 1977

	Sales		Establishments		Average Sales (\$1,000)	Percent of State Sales
	Amount (\$1,000)	Percent Change 1972-1977	Number	Percent Change 1972-1977		
Eating and Drinking Places						
State of Wisconsin	1,523,778	62.1	12,889	-2.4	118	100.00
Forest County	1,885	34.0	53	-11.7	36	0.12
Langlade County	6,464	53.1	97	2.0	67	0.42
Oneida County	13,646	54.5	170	-0.6	80	0.89
Hotels, Motels, Etc.						
State of Wisconsin	276,367	60.5	2,556	-10.6	108	100.00
Forest County	575	28.3	30	-6.3	19	0.21
Langlade County	1,182	-6.0	23	-25.8	51	0.43
Oneida County	7,134	24.8	176	6.9	41	2.58
Amusement and Recreation Services, including Motion Pictures						
State of Wisconsin	271,758	54.3	3,892	13.9	70	100.00
Forest County	NA	NA	NA	NA	NA	NA
Langlade County	1,437	159.4	21	75.0	68	0.53
Oneida County	1,631	44.8	41	28.1	40	0.60

NOTES

^aData not available for Forest County

SOURCES

U.S. Department of Commerce, Bureau of the Census. 1979. 1977 Census of Retail Trade - Wisconsin. RC 77-A-50. Washington, D.C.: United States Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1979. 1977 Census of Service Industries Wisconsin. SC 77-A-50. Washington, D.C.: United States Government Printing Office.

reported increases of 28.3 and 24.8 percent, respectively, while Langlade County reported a decrease of 6.0 percent.

Amusement and Recreation Service. In amusement and recreation service sales, Langlade County had the largest increase (159.4 percent) of the three counties over the period 1972 to 1977 (Table 2.10-49). Oneida County sales increased 44.8 percent; figures are not available for Forest County. In comparison, the state had an overall increase of 54.3 percent. Average sales per establishment in each category were smaller for Langlade and Oneida counties than for the state as a whole.

The University of Wisconsin-Extension Recreation Resources Center (UWEXRRC) reports the impact of gross sales in selected categories on consumer spendable income. The categories include sales from restaurants, taverns, hotel-motel-resorts, trailer parks and campgrounds, sporting goods stores, motion pictures, and amusement and recreation establishments. The impact of these selected HRT industry components on county income is determined by a ratio of the county's percent of state gross sales to its percent of state consumer spendable income. In 1979, Oneida County ranked 12th in the state in terms of impact, Langlade County 24th, and Forest County 47th (UWEXRRC, 1979b).

An employer survey conducted by RPC, Inc. in July 1980, included 31 HRT industry establishments in the local study area. Of these establishments, 54.8 percent expected their sales growth

to be similar to related businesses in other parts of the country; 35.5 percent expected their growth to be greater; 6.5 percent felt their growth would be slower. One firm did not indicate its opinion.

Gross dollar sales in 1979 for the firms surveyed ranged from \$24,000 to \$650,000 per year. These firms purchased 40.0 percent of their supplies from industries within the local study area.

Employment. Oneida County had the highest average annual employment in the HRT industry for the three counties in the local study area (Table 2.10-50). However, the county is more densely populated and produces more activity in these areas than the other two counties.

The employer survey indicated that the labor force in the HRT industry is predominantly young, female, and low paid (Table 2.10-51). This is the only special industry sector in which the majority of employees (51.4 percent) receive \$3.10 per hour or less; it is also the only special industry sector in which women constitute more than half (65.2 percent) of the labor force. Seasonal variation in the work force is approximately 25.0 percent, with peak employment occurring in the summer months.

Housing is another aspect of the HRT industry important to the local study area. Nearly half (49.2 percent) of all housing units in Forest County, 27.1 percent in Oneida County, and 22.7

Table 2.10-50

EMPLOYMENT IN THE HOSPITALITY, RECREATION AND TOURISM
INDUSTRY BY COMPONENT, 1978

	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>	<u>Annual Average</u>
Eating and Drinking Places					
Local Study Area	816	921	1,009	908	914
Forest County	33	38	42	39	38
Langlade County	359	393	408	385	386
Oneida County	586	676	770	668	675
Hotels, Motels, Etc.					
Local Study Area	373	400	460	399	408
Forest County	20	19	20	21	20
Langlade County	129	138	148	139	139
Oneida County	353	382	460	376	393
Amusement and Recreation Services, including Motion Pictures					
Local Study Area	133	142	159	146	145
Forest County	13	13	13	13	13
Langlade County	67	73	77	73	73
Oneida County	79	84	103	84	88

SOURCES

Wisconsin Department of Industry, Labor, and Human Relations. 1980. Employment by 4-digit SIC Code and Jurisdiction. Computer printout. Madison.

Wisconsin Department of Industry, Labor, and Human Relations. 1979. Employment and Wages Covered by Wisconsin UC Law, Quarters 1 through 4, 1978. Madison.

Table 2.10-51

LABOR FORCE PARTICIPATION IN HOSPITALITY SECTOR, 1980

Breakdown by Sex:

(percent)

Female	65.2
Male	34.8

Breakdown by Age:

(percent)

	<u>Male</u>	<u>Female</u>	<u>Total</u>
Under 18	7.0	15.5	22.5
18 - 34	10.4	30.7	41.1
35 - 50	9.6	11.1	20.7
51 - 65	6.0	6.3	12.3
Over 65	1.7	1.7	3.4

Breakdown by Hourly Wage:

(percent)

\$3.10 or less	51.4
\$3.11 to \$4.50	42.5
\$4.51 to \$7.00	5.4
\$7.01 +	0.7

SOURCE

Consultant's survey of employers in the local study area, 1980.

percent in Langlade County are second homes (discussed in subsection 2.10.3).

Seasonal residents and tourists substantially increase the overall income of the local study area. Seasonal residents spend more time in the local study area than tourists who stay at hotels, motels or cottages, but they spend less money locally per day. According to a 1978 UWEXRRC study conducted in the northern Wisconsin area, the average expenditure per person per day among visitors staying overnight at hotels, resorts, tourist homes, motels or rented cottages was \$28.04 (1976 dollars). The largest components of this total were lodging, eating and drinking, and auto supplies and service. Second-home owners spent an average of \$18.31 (1976 dollars) locally per day of occupancy, with the largest components being food, retail and service purchases. Campers spent an average of \$8.05 (1976 dollars) per person per day, largely on auto supplies and service and food bought at food stores.

Available Facilities and Activities. Oneida County has 68,148 acres of named lakes, including 138 lakes over 100 acres in area (Table 2.10-52). Forest County has 32,488 acres of named lakes, and Langlade County has 5,445. Forest County contains 374,491 acres of public land designated for recreation use; Langlade County has 170,067 acres, and Oneida County has 169,724 acres. Table 2.10-52 presents data for various recreation

Table 2.10-52

OUTDOOR RECREATION HIGHLIGHTS
By County

	<u>Forest</u>	<u>Langlade</u>	<u>Oneida</u>
Total Acreage	667,520	557,440	779,520
Acreage of named lakes	32,488	5,445	68,148
Lakes with public access (no.)	75	87	171
Public land designated for:			
recreation use (acres)	374,491	170,067	169,724
federal (acres)	339,899	32,236	11,074
state (acres)	23,415	11,744	75,362
county (acres)	10,847	121,773	81,313
other (acres) ^a	330	4,314	1,975
Canoe trails (number)	5	2	2
Canoe trails (miles)	112	80	120
Swimming (areas) ^b	21	40	29
Golfing (number of holes)	9	45	36
Camping (developed/primitive) sites ^a	439	499	1,295
Major hiking trails (miles)	25	22	12
Bicycling trails (miles)	85	0	24
Snowmobile trails open to public			
use (miles)	245	406	151
Downhill skiing (areas) ^a	1	1	3
Cross-country skiing (areas)	1	4	13
Cross-country skiing (miles)	25	21	185
Hunting acres ^c	399,570	212,552	302,866

NOTES

^aIncludes local parks, school forests and quasi-public areas.

^bPrivate as well as publicly owned areas.

^cPublic land only.

SOURCE

Wisconsin Department of Business Development. 1979. Economic Profiles for Forest, Langlade, and Oneida Counties. Madison.

activities on public lands, including canoeing, swimming, fishing, golfing, hiking, and camping.

The local study area contains a variety of public recreation facilities, including a portion of the Nicolet National Forest, a portion of the Northern Highland-American Legion State Forest, and various county parks and forests. There are also numerous private establishments associated with the HRT industry in the local study area. Oneida County, the most densely populated of the three counties, had 3,950 units in 1979, compared to 486 units in Forest County and 590 in Langlade County. Oneida County also has the largest number of eating and drinking establishments of the three counties (Table 2.10-53). In 1979, Oneida County had 284 establishments, compared with 115 in Langlade County and 63 in Forest County.

Although the majority of campgrounds in the local study area are privately owned, 66.0 percent of Forest County's campsites are public, due to the large number located in the Nicolet National Forest. Table 2.10-54 presents the total campgrounds and campsites by county and types of ownership for 1978 and 1979.

Supply Characteristics. This section discusses supply characteristics of public and private recreational areas by types of available activities and current usage.

Table 2.10-53

FOOD SERVICE ESTABLISHMENTS, BY NUMBER
OF ESTABLISHMENTS, BY COUNTY, 1974, 1978, 1979

County	Year	RESTAURANTS					Total Other Food Service	Total All Types
		Total All Restaurants	Less Than \$5,000 Gross Income		\$5,000 and Over Gross Income			
			Year Round	Seasonal	Year Round	Seasonal		
Forest	1974	56	27	4	21	4	2	58
	1978	61	34	3	19	5	1	62
	1979	62	33	2	22	5	1	63
Langlade	1974	102	52	5	37	8	6	108
	1978	102	47	3	47	5	6	108
	1979	109	50	2	52	5	6	115
Oneida	1974	254	111	30	86	27	16	270
	1978	276	121	18	110	27	14	290
	1979	271	116	19	114	22	13	284

SOURCE

University of Wisconsin-Extension, Recreation Resources Center. 1980. File information.
Madison.

Table 2.10-54

SUMMARY OF CAMPGROUNDS BY TYPE OF OWNERSHIP
BY COUNTY, 1978 AND 1979

	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>
Total campgrounds			
1978	8	14	35
1979	9	12	40
Total sites			
1978	439	499	1,295
1979	489	455	1,470
Total private campgrounds			
1978	4	12	34
1979	5	10	39
Total private sites			
1978	114	450	1,282
1979	164	406	1,457
Total public campgrounds			
1978	4	2	1
1979	4	2	1
Total public sites			
1978	325	49	13
1979	325	49	13
Percent of public to total campgrounds			
1978	50.0	14.0	9.8
1979	44.0	17.0	11.0
Percent of public to total sites			
1978	74.0	2.9	1.0
1979	66.0	2.5	0.9

SOURCE

University of Wisconsin - Extension, Recreation Resources Center. December 1979.
Wisconsin Campgrounds Summary. Madison.

Public Areas

Nicolet National Forest. In this subsection, any reference to "the National Forest" or "the Nicolet National Forest" means that portion of the Nicolet National Forest which lies in the local study area. A portion of the 651,000 acre National Forest covers the eastern end of the local study area, offering a variety of recreational opportunities, including hiking, fishing, camping, backpacking, cross-country skiing, berry picking, swimming, and hunting. The National Forest contains numerous lakes and rivers, including portions of the Pine, Popple, Oconto, Peshtigo, and Rat rivers.

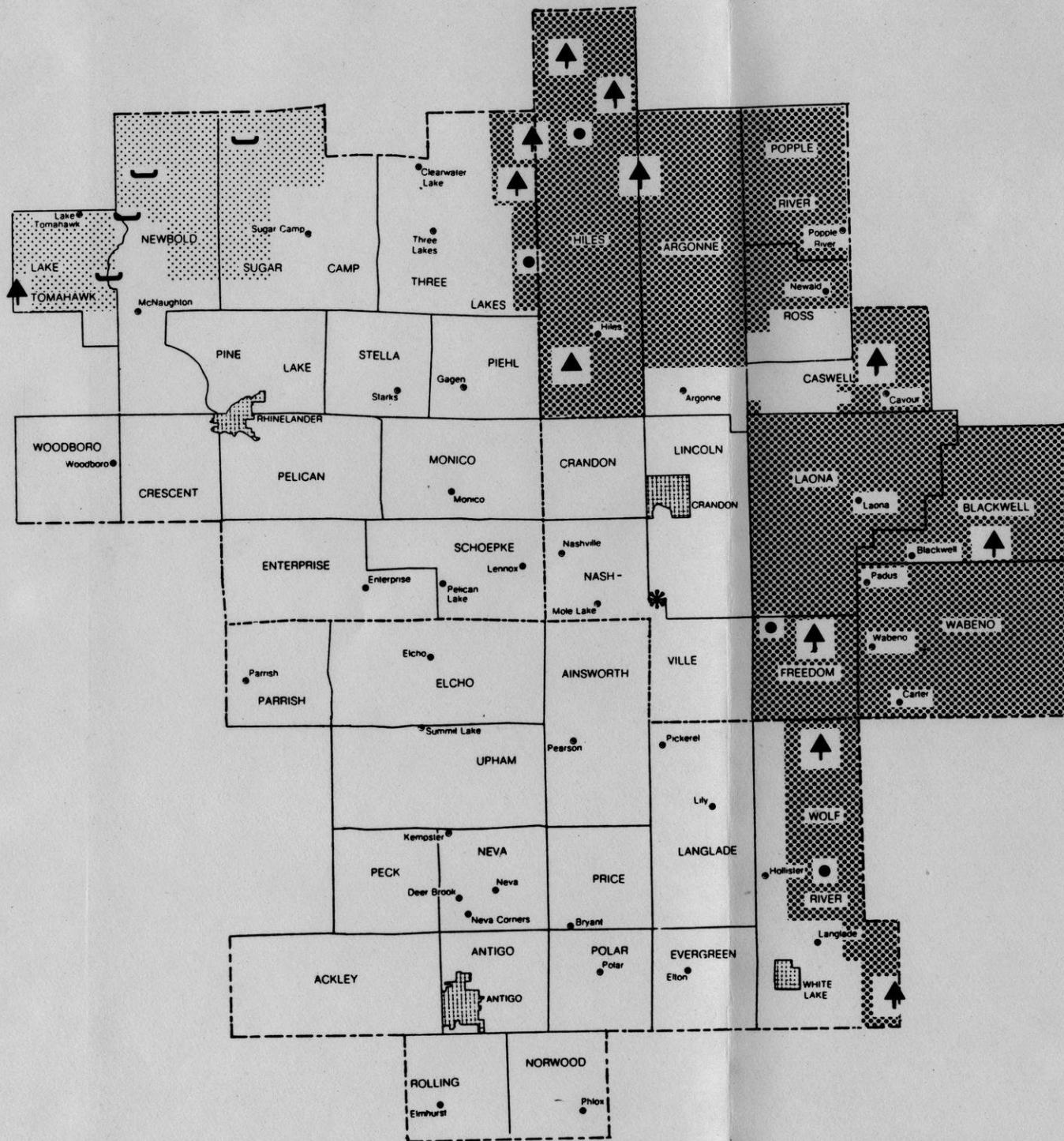
The local study area contains 14 recreation sites within the National Forest and part of the Boulder Lake site. Boulder Lake, the largest campground in the National Forest with 100 units, lies mainly in Oconto County. The 14 sites located entirely within the local study area all have access to some body of water and include boat launches; ten sites have campgrounds, with 250 camp sites available for general use. All National Forest recreation sites within the local study area have been ranked "3" in terms of development, on a scale of 1 (very primitive) to 5 (very modern).

Reported recreation use for the 1979 fiscal year showed that only one site operated at more than 30.0 percent of its capacity. Swimming and boating areas were the most used. The Ada Lake swimming area operated at 39.0 percent capacity and the

campground at 37.0 percent capacity. Other capacities ranged from just over 2.0 percent for boating at Richardson Lake to just over 29.0 percent for swimming at Franklin Lake. Camping units were used by approximately 74,200 people in fiscal year 1979, with campgrounds (excluding the Boulder Lake site) operating at between 10.0 and 20.0 percent capacity.






Northern Highland-American Legion State Forest. A small portion of the Northern Highland-American Legion State Forest (the State Forest), the largest of the five northern unit forests in the state system, is found in the northwest corner of the local study area. It attracts almost 73.0 percent of the users in the northern area. State forests in Wisconsin generally operate at 70.0 to 75.0 percent capacity; northern unit forests, which are more isolated, operate at a lower level of capacity.

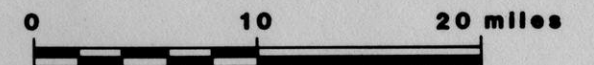
The local study area portion of the State Forest contains one family campground (Bearskin Lake) with 18 camp sites and four canoeing sites. For the State Forest as a whole, total attendance in 1978 was 1,234,941, up 21.0 percent from 1977. Of that total, 214,791 were campers. Total attendance figures for the area of the State Forest within the local study area were unavailable. Figure 2.10-10 details locations of recreation facilities in these public forests in the local study area.



SOURCE: U.S. Forest Service



-  FAMILY CAMPSITES
-  CANOE CAMPSITES
-  OTHER RECREATION SITES
-  STATE FOREST LAND
-  NATIONAL FOREST LAND



EXXON MINERALS COMPANY
CRANDON PROJECT

**SELECTED RECREATION
FACILITIES IN
STATE & NATIONAL FORESTS**

rpc, inc.

FIG. 2.10-10

County Facilities. Table 2.10-55 is an inventory of county recreational facilities. Information on each county is discussed below.

Forest County. Forest County Veterans Memorial Park, the only county park in Forest County, encompasses 80 acres, eight developed for picnicking. The park has 95 picnic tables, 65 grills, 600 feet of beach on Lake Metonga, and one boat launch. There are 65 camping sites and no developed trails. In 1979, 14,714 campers visited this site.

Langlade County. The 1979 inventory by the Wisconsin Department of Natural Resources indicated that Langlade County has nine developed recreation areas on county forest land. These areas include campground units, trails, grills, shelters, picnic areas, swimming areas, and boat landings.

The major park in Langlade County is the Veterans Memorial Park in Upham Town. It includes 40 developed acres, 31 camping units, 59 picnic tables, 13 grills, and 3 shelters. The park also contains hiking, skiing, nature and other trails, 200 feet of swimming beach, and two boat landings. The county also operates Summit Lake Park, with five developed acres, 2 changing houses, 17 picnic tables, 7 grills, and 200 feet of swimming beach. Moose Lake Park includes three developed acres with two picnic tables, three grills, and a boat landing.

Table 2.10-55

COUNTY OPERATED

RECREATIONAL FACILITY INVENTORY

	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>
Total acres	10,846.87	121,853.07	81,281.59
Number of major developed areas ^a	1	9	6
Number of family campground units	54	31	NR
Family units with electricity	22	14	NR
Number of indoor facilities - group campgrounds	NR ^c	2	NR
Number of outdoor sites - group campgrounds	NR	1	NR
Miles of nature trails	NR	2	2
Miles of hiking and game trails	35	30	129
Miles of snowmobile trails	11	114	87
Miles of other trails	NR	10	39
Number of picnic tables	25	93	60
Number of grills	59	30	49
Number of shelters	2	8	11
Linear feet swimming beach	600	400	490
Beach parking stalls	40	155	230
Boat landings	1	12	15
Boat landing parking stalls	12	100	70
Others areas ^b	6	6	5

NOTES

^aIncludes number of separate recreation complex areas where facilities are developed for one or more of the following activities: Family or Group Camping, Picnicking, and Swimming.

^bIncludes vistas, waysides, etc.

^cNo data reported.

SOURCE

Wisconsin Department of Natural Resources. June 1979. County Forest Recreational Facility Inventory as of June 30, 1979. Madison.

Oneida County. Oneida County maintains a number of picnic and recreation areas providing picnicking, boating, and swimming facilities. Oneida County also has 81,281.6 acres of forest land with six developed recreation areas. Facilities include hiking, snowmobiling and skiing trails, shelters, grills, picnic tables, and swimming. There are no developed campgrounds. The Logging Museum in Rhineland, operated by the Senior Citizens of Rhineland in cooperation with the City Parks and Recreation Department, registered 14,146 visitors to the museum in 1980. There is no admission charge. The Oneida County Parks and Recreation Department indicates that use is nearing capacity in the Alman Recreation Area; otherwise, Oneida County facilities are adequate for current use.

Private Facilities. There are a number of private and semi-private facilities available other than the previously discussed campsites, hotels, motels, and resorts. These include fishing, golf, snow skiing, shooting, hunting, historical and archeological resources, water sports, field sports, and other enterprises.

Observational Analyses. A visual survey of recreational facilities in the local study area was conducted in September 1980 by a qualified recreational professional. This survey identified a number of private cabins, cottages, and

lodges in a wide price range on virtually every developed lake in the local study area. Many private facilities are for sale and/or in a poor state of repair. The growth of lodging sales in Oneida and Forest counties, although slower than the state rate, suggests that newer developments have begun replacing older facilities. However, a decrease in lodging sales in Langlade County suggests a general decline in lodging developments.

Observation of the outdoor recreation facilities indicated a small number of areas had experienced heavy summer use. For the most part, camping and water access facilities appeared to be utilized below capacity.

The counties, Forest Service, and private sector provide most of the outdoor recreation facilities in the local study area. Some facilities are provided by the state, but are limited to waysides, water access points, and the State Forest.

Demand Characteristics. Most of the information in the following discussion of demand characteristics is drawn from the surveys of permanent and seasonal residents and tourists. Information on specific locations from UWEXRRC Guest Studies and demand data from county recreation plans are also incorporated.

Oneida County estimated 1981 demand for several categories of activities. A need factor based on these estimates and the available supply (1976 figures) indicates some deficit will occur in all categories of activities (Johanesen, 1976). Demand and

need estimates provided by Langlade County's Outdoor Recreation Plan do not show as great a deficit in facilities for various activities as does Oneida County (Johanesen, 1979). Similar forecasts for Forest County are not available.

Both visitors and residents indicated a strong demand for recreation. Of those visitors surveyed, demand was strongest for summer facilities; 62.0 percent participated in boating and canoeing, 51.0 percent in bicycling, and 45.0 percent in camping on an average weekend day in the local study area. Fewer visitors participated in winter activities. Of those visitors surveyed, 26.7 percent participated in snowmobiling and 18.0 percent in cross-country skiing, probably due to recreational choice. In year-round activities, visitor participation ranged from 16.6 percent of the horseback riding, to 42.6 percent of the hiking, and 62.2 percent of the pleasure walking.

Fishing was listed as the favorite summer recreation activity by 22.0 percent of the permanent residents surveyed. Swimming, fishing, and boating/sailing accounted for a total of 46.0 percent of the permanent residents' favorite summer activities, while water-skiing accounted for 2.3 percent. Frequently listed fall activities among the permanent residents surveyed were hunting (34.0 percent) and fishing (11.0 percent). Favorite winter recreations were snowmobiling (20.8 percent), ice fishing (1.85 percent), and cross-country skiing (17.2 percent).

2.10.3 HOUSING AND LAND USE PROFILE

This subsection presents information on local study area housing and land use characteristics. This information is drawn together to provide an overall picture of housing and land use conditions within the local study area.

The local study area housing market is characterized by relatively slow but steady additions to housing stock. Most housing developers and builders operate on a small scale and engage in little speculative housing construction. Low levels of speculative construction result from a number of factors including conservative lending patterns by local study area financial institutions, and the absence of rapid population growth within the local study area. Also, consumer preference for large, relatively unimproved lots removes many of the economies of scale traditionally associated with large scale speculative housing development.

Local study area developers and builders tend to concentrate their operations around the cities of Crandon, Antigo, and Rhinelander, although they do engage in building activity across the entire local study area. The presence of uniform building codes across jurisdictions and financial institutions willing to extend financing across county lines enables local builders and developers to construct housing at the locations where it is demanded.

As of 1979, there were approximately 27,900 housing units within the local study area. These units are divided between primary residences, second homes (housing units that are not the primary residence of their owner and are occupied only during certain portions of the year), and vacant units available for rent or sale. Some 17,184 local study area housing units are primary residences. This is an increase of approximately 3,260 units over 1970 levels and is a direct result of a corresponding increase in the number of local study area households. Over 48 percent of all new housing starts between 1970 and 1979 occurred in Oneida County, with Langlade and Forest counties respectively accounting for 32 and 20 percent of new starts.

Total housing stock within the local study area increased by 25.5 percent between 1970 and 1979. This compares with a statewide increase in total housing stock of approximately 19 percent over the same period. This difference in housing stock growth rates arises from the relatively high level of second home construction occurring within the local study area between 1970 and 1979. Focusing only on the growth in number of primary residences between 1970 and 1979, local study area housing stock would have increased by only 14.7 percent, a growth rate slightly lower than the statewide average.

Second homes comprise over 36 percent of total housing units within the local study area. More than 10,100 housing units fall into this category. Over 80 percent of these second homes are

located within Oneida and Forest counties. Although, for the most part, these homes are not currently available for rent or sale, they do represent a large stock of housing that could meet a certain amount of increased housing demand resulting from population increases. Our survey of temporary residents of the local study area revealed that 4.5 percent of second home owners responding to our survey currently rent out their properties at various times. Nine percent of survey respondents indicated that they planned to sell their properties within the next two years. Generalizing to the total population of second home owners, this indicates that approximately 450 second home owners are currently willing to rent out their property and 900 second home owners are considering selling their properties.

There are currently very few vacant housing units within the local study area that are available for rent or sale. We estimate that as of 1979 there were only 558 housing units that fell into this category, indicating a two percent overall vacancy rate for the local study area in 1979. This does not differ from the 1970 overall vacancy rate of 2.01 percent. This continued pattern of low vacancy rates highlights the fact that the local study area remained relatively "tight" in terms of housing availability throughout the 1970's. Increases in housing stock have just kept pace with slow but steady population increases. This, along with low levels of speculative construction, have contributed to this steady and low vacancy rate. Interviews with

local study area Realtors revealed that since 1979, vacancy rates have been at or below their previously low levels.

Interviews with local study area housing developers and builders indicated that climbing mortgage interest rates have slowed the rate of housing starts within the local study area. This slowdown in construction has forced some small builders out of business. However, the capacity of the local study area to produce housing appears to be relatively high. Due to the slowdown in construction, most local study area builders are eager for work and are willing to construct housing at relatively low profit levels. Using previous years' figures on housing starts, it appears that local builders could produce at least 500 to 750 housing units annually should they be called upon to do so. This capacity could be boosted significantly through increased use of manufactured housing within the local study area.

Houses currently being built in the local study area use both stick-built and manufactured housing techniques. A number of builders we contacted stated that they combine both construction techniques in the houses they build. Relatively high builder and consumer acceptance of manufactured housing indicates that if housing demand increased rapidly, manufactured housing should be able to meet a substantial amount of that demand. This is especially true given the proximity of the local study area to Wausau, a major center for manufactured housing.

Although most local study area cities and townships have adopted zoning and land use control ordinances, none of these controls are specifically growth inhibiting. Use of mobile homes are permitted across the local study area; however, they are restricted to mobile home parks in certain locations. Minimum lot size restrictions are not severe, the most restrictive being a two-acre minimum lot size in parts of Forest County. County, city, and township officials within the local study area indicated that they do not plan to institute growth control ordinances. Thus, there are few current or foreseeable institutional constraints on residential development.

We estimate that within the local study area there are over 250,000 acres that are suitable and potentially available for residential development. Due to the presence of publicly owned and commercial forest lands, however, only 11 percent of this available land is located within Forest County. Approximately 35 percent of local study area available land is located within Oneida County and 54 percent is located within Langlade County. Despite the imbalance in the distribution of this land across local study area counties, there is enough land in each county to accommodate large levels of residential growth.

In sum, it appears that there are very few factors which would act to constrain the local study area's ability to absorb new population and the housing they will demand.

Housing and land use conditions in the local study area are organized into three major categories for descriptive purposes in this report. These three categories of housing and land use conditions are:

1. Housing stock characteristics,
2. Housing market characteristics, and
3. Land use patterns and controls.

The profile of housing stock characteristics focuses on the amount, type, and condition of housing units provided within the local study area. Current housing stock levels along with trends in the mix and amount of housing units supplied in the local study area are provided in this section. This information is used to determine the degree to which project-related housing demand can be accommodated by the local study area's existing housing stock.

The profile of local study area housing market characteristics presents information on housing prices, availability, and sales and rental times. An overview of local study area home financing patterns and a description of residential developer characteristics are also included in this section. This information provides an indication of how the local study area housing market will respond to project-related housing demand.

The final section of this profile concentrates on local study area land use patterns and controls. Land uses, such as

wetlands, that preclude residential development are identified. Based on the location of these constraining land uses, the amount and location of land available for residential development is determined. The impact of zoning and other land use controls on residential development patterns is also described. Taken together, this information on physical, institutional, and political restraints to growth provides an overview of areas within the local study area that can accommodate residential development generated by the Crandon Project.

2.10.3.1 Housing Stock

For descriptive purposes, and in an effort to maintain consistency with census reporting conventions, local study area housing is divided into four major categories of occupancy:

1. Total housing stock,
2. Occupied primary residences,
3. Second homes, and
4. Vacant units available for sale or rent.

Total housing stock includes all local study area housing stock regardless of occupancy status. This aggregate count of housing provides a base upon which to gauge any housing increases generated by the Crandon Project.

Occupied residences are housing units occupied by a household or unattached individual. Both rental and owner-occupant residences fall under this heading. We have assumed

that occupied housing units will not be available to project-related employees seeking housing in the local study area.

Second homes are housing units that are not the primary residences of their owners and are typically used only occasionally or for vacation purposes. Second homes may or may not be suitable for winter occupancy. Second homes form a large pool of housing that could potentially meet part of the short-term demand for housing generated during the construction phase of the Crandon Project.

Vacant units are unoccupied owner or rental units listed for sale or rent. Although vacant for much of the year, second homes are not included in this category unless they are listed for sale or rent. Vacant units represent surplus housing in the local study area. The extent to which project-related housing demand can be accommodated by vacant units will largely determine the amount of new housing that will be required in the local study area as a result of the Crandon Project.

Technique for Estimating Housing Stock. Total housing units for local study area townships located in Forest and Langlade counties were estimated through a two-step process. First, a preliminary count of total housing units was obtained from North Central Wisconsin Regional Planning Commission (NCWRPC) township land use maps and USGS land use maps. Next, these preliminary counts were updated to 1979 using county building permit data.

Total housing stock for local study area townships located in Oneida County was estimated using a different methodology since NCWRPC township land use maps are not available for Oneida County. For these townships, total housing stock was estimated by updating 1970 census figures with building permit data.

Total housing stock for the portions of Forest, Langlade, and Oneida counties located within the local study area was determined by adding housing counts for individual local study area townships within each county. Our estimates of total housing units by township will reflect any errors made in compiling USGS or NCWRPC land use maps. Any errors made in reporting the number and location of building permits issued will be reflected in our estimates of total housing. Although it is difficult to determine the amount of error in our estimates, the estimated total number of housing units within the local study area should be well within ± 5 percent of the true value. Estimates for some individual townships may, however, exceed ± 5 percent of their true values.

Total housing stock in each local study area township was divided between occupied units, second homes, and vacant units for sale or rent using an estimation process developed by the State of Wisconsin Department of Local Affairs and Development (DLAD). First, the total number of occupied units per township was assumed to equal the number of households present in each township. The 1979 level of households per township was

estimated by dividing 1979 population by 1979 township average household size. The 1979 township average household size was determined by applying the ratio between 1970 township and county average household size to 1979 county average household size as reported in Sales and Marketing Magazine. Changes in the relationship between township and county average household sizes resulted in errors in estimates of total households and occupied units for certain townships. These errors should, however, only slightly affect estimates for the total number of households and occupied housing units within the local study area.

Second, the number of unoccupied housing units was determined by subtracting occupied residences from total housing units. These unoccupied units were then divided between second homes and vacant units for sale or rent. The 1979 second home levels were determined by applying the 1970 ratio of second homes to unoccupied units to the 1979 total number of unoccupied units. Vacant units for sale or rent in 1979 were then estimated as the difference between 1979 total unoccupied units and 1979 second homes. Estimates of second homes and vacant units were affected by any errors in estimating total housing stock, primary residences and/or the ratio between vacant units not for sale or rent and the total number of vacant units. Errors from all of these sources could result in a possible 10 to 15 percent error in some local study area townships.

Total Housing Stock. The total number of housing units (including primary residences, second homes, and vacant units) in the local study area was 27,911 in 1979 (Table 2.10-56). The bulk of these units (48.1 percent) was located within Oneida County. Housing in Langlade County comprised 32.1 percent of total local study area housing units. Forest County was the least residentially developed of the three counties in the local study area, accounting for 19.8 percent of the total local study area housing stock.

Total housing stock for the local study area grew from 22,208 units in 1970 to 27,911 units in 1979, a 25.7 percent increase. Each county's share of the total local study area housing stock remained relatively stable over this 10-year period.

The towns that experienced the most residential growth between 1970 and 1979 are all located in Oneida County. The number of housing units in the towns of Pine Lake, Pelican, Crescent, Newbold, Three Lakes, and Sugar Camp all grew substantially during this period.

Occupied Housing Units. As previously noted, the number of occupied housing units or primary residences within a county, city, or town was assumed to equal the number of households residing within the same jurisdiction. Using this estimation procedure it was determined that in 1979 there were a total of

Table 2.10-56

TOTAL HOUSING STOCK,
1970 and 1979

<u>Jurisdiction</u>	1970	1979	<u>Change 1970-1979</u>	
	<u>Housing</u>	<u>Housing</u>	<u>Number</u>	<u>Percent</u>
Local Study Area	22,208	27,911	5,703	25.7
City of Crandon	606	701	95	15.7
City of Antigo	3,153	3,510	357	11.3
City of Rhinelander	2,815	3,026	211	7.5
Argonne Town	153	277	124	81.0
Blackwell Town	98	84	-14	-14.3
Caswell Town	84	108	24	28.6
Crandon Town	194	369	175	90.2
Freedom Town	240	277	37	15.4
Hiles Town	357	517	160	44.8
Laona Town	534	625	91	17.0
Lincoln Town	430	654	224	52.1
Nashville Town	672	1,037	365	54.3
Popple River Town	76	107	31	40.8
Ross Town	123	171	48	39.0
Wabeno Town	559	611	52	9.3
Ackley Town	183	208	25	13.7
Ainsworth Town	219	368	149	68.0
Antigo Town	466	537	71	15.2
Elcho Town	879	1,091	212	24.1
Evergreen Town	144	178	34	23.6
Langlade Town	212	275	63	29.7
Neva Town	292	342	50	17.1
Norwood Town	243	265	22	9.1
Parrish Town	61	81	20	32.8
Peck Town	118	139	21	17.8
Polar Town	232	271	39	16.8
Price Town	93	89	-4	-4.3
Rolling Town	252	354	102	40.5
Upham Town	567	672	105	18.5
Wolf River Town	541	591	50	9.2
Crescent Town	596	809	213	35.7
Enterprise Town	254	281	27	10.6
Lake Tomahawk Town	514	736	222	43.2
Monico Town	148	180	32	21.6
Newbold Town	966	1,533	567	58.7
Pelican Town	1,078	1,444	366	34.0
Piehl Town	41	54	13	31.7
Pine Lake Town	773	1,109	336	43.5
Schoepke Town	397	486	89	22.4
Stella Town	158	241	83	52.5
Sugar Camp Town	650	853	203	31.2
Three Lakes Town	1,732	2,215	483	27.9
Woodboro Town	305	435	130	42.6

SOURCE

Wisconsin Department of Administration. 1980. 1970 Census Summary Tables. Computer printout. Madison.

North Central Wisconsin Regional Planning Commission. Dates Vary. Existing Land Use Maps by township and city. Wausau.

17,202 occupied units or primary residences within the local study area (Table 2.10-57). The distribution of these units across the local study area closely resembled that of total housing stock. Of all occupied units in the local study area, 45 percent were located within Oneida County. Langlade County accounted for 39 percent of permanent residences. Forest County's occupied residences comprised approximately 16 percent of these units within the local study area. The relative distribution of occupied residences across the local study area remained fairly stable between 1970 and 1979.

Second Homes. Second homes are defined as housing units that are not the primary residence of their owner and are occupied only during certain portions of the year. Second homes are typically considered "vacation homes" and may or may not be suitable for winter residency. Second homes form a large pool of housing that could potentially meet the needs of project-related, short-term residents. In an attempt to gauge the size of this potential short-term housing pool, it is necessary to estimate how many second homes there are in the local study area.

Using techniques developed by DLAD, we estimate the number of second homes within the local study area was approximately 10,144 units in 1979 (Table 2.10-58). The number of second homes within each local study area township was determined by multiplying the number of unoccupied homes in each township by

Table 2.10-57

PRIMARY RESIDENCES, 1970 AND 1979

<u>Jurisdiction</u>	Primary	Primary	<u>Change 1970-1979</u>	
	Residences 1970	Residences 1979	Number	Percent
Local Study Area	13,921	17,202	3,281	23.6
City of Crandon	513	689	176	34.3
City of Antigo	3,019	3,277	258	8.5
City of Rhinelander	2,672	2,927	255	9.5
Argonne Town	109	133	24	22.0
Blackwell Town	49	84	35	71.4
Caswell Town	32	39	7	21.9
Crandon Town	101	176	75	74.3
Freedom Town	72	91	19	26.4
Hiles Town	85	121	36	42.4
Laona Town	404	529	125	30.9
Lincoln Town	111	163	52	46.8
Nashville Town	171	248	77	45.0
Popple River Town	16	27	11	68.8
Ross Town	63	74	11	17.5
Wabeno Town	339	374	35	10.3
Ackley Town	181	184	3	1.7
Ainsworth Town	97	150	53	54.6
Antigo Town	427	529	102	23.9
Elcho Town	307	442	135	44.0
Evergreen Town	109	136	27	24.8
Langlade Town	123	159	36	29.3
Neva Town	247	309	62	25.1
Norwood Town	199	240	41	20.6
Parrish Town	24	37	13	54.2
Peck Town	103	111	8	7.8
Polar Town	191	229	38	19.9
Price Town	72	89	17	23.6
Rolling Town	234	344	110	47.0
Upham Town	163	210	47	28.8
Wolf River Town	262	331	69	26.3
Crescent Town	363	519	156	43.0
Enterprise Town	77	92	15	19.5
Lake Tomahawk Town	148	213	65	43.9
Monico Town	89	90	1	1.1
Newbold Town	374	630	256	68.4
Pelican Town	783	1,019	236	30.1
Piehl Town	22	34	12	54.5
Pine Lake Town	539	753	214	39.7
Schoepke Town	125	142	17	13.6
Stella Town	92	122	30	32.6
Sugar Camp Town	233	341	108	46.4
Three Lakes Town	490	650	160	32.7
Woodboro Town	91	145	54	59.3

SOURCE

Wisconsin Department of Administration. 1980. 1970 Census Summary Tables. Computer printout. Madison.

North Central Wisconsin Regional Planning Commission. Dates vary. Land Use Maps by township and city. Wausau.

Sales and Marketing Magazine. 1979. "Annual Survey of Buying Power" issue (July 23).

Sales and Marketing Magazine. 1971. "Annual Survey of Buying Power" issue (July 10).

Table 2.10-58

SECOND HOMES, 1970 AND 1979

<u>Jurisdiction</u>	Second	Second	<u>Change 1970-1979</u>	
	Homes 1970	Homes 1979	<u>Number</u>	<u>Percent</u>
Local Study Area	7,843	10,144	2,301	29.3
City of Crandon	83	11	-72	-86.7
City of Antigo	67	116	49	73.1
City of Rhinelander	73	50	-23	-31.5
Argonne Town	40	131	91	227.5
Blackwell Town	48	0	-48	-100.0
Caswell Town	52	69	17	32.7
Crandon Town	83	168	85	102.4
Freedom Town	167	185	18	10.8
Hiles Town	271	394	123	45.4
Laona Town	119	88	-31	-26.1
Lincoln Town	316	487	171	54.1
Nashville Town	497	783	286	57.5
Popple River Town	56	79	23	41.1
Ross Town	60	97	37	61.7
Wabeno Town	212	228	16	7.5
Ackley Town	2	24	22	1,100.0
Ainsworth Town	120	215	95	79.2
Antigo Town	27	6	-21	-77.8
Elcho Town	564	640	76	13.5
Evergreen Town	35	42	7	20.0
Langlade Town	86	112		30.2
Neva Town	37	25	-12	-32.4
Norwood Town	42	23	-19	-45.2
Parrish Town	37	44	7	18.9
Peck Town	13	24	11	84.6
Polar Town	38	39	1	2.6
Price Town	20	0	-20	-100.0
Rolling Town	16	9	-7	-43.8
Upham Town	383	438	55	14.4
Wolf River Town	275	251	-24	-8.7
Crescent Town	198	246	48	24.2
Enterprise Town	177	189	12	6.8
Lake Tomahawk Town	308	440	132	42.9
Monico Town	56	85	29	51.8
Newbold Town	579	884	305	52.7
Pelican Town	262	377	115	43.9
Piehl Town	18	19	1	5.6
Pine Lake Town	226	335	109	48.2
Schoepke Town	272	344	72	26.5
Stella Town	65	117	52	80.0
Sugar Camp Town	403	495	92	22.8
Three Lakes Town	1,227	1,546	319	26.0
Woodboro Town	213	289	76	35.7

SOURCES

North Central Wisconsin Regional Planning Commission. Dates vary. Existing Land Use Maps by township and city. Wausau.

Wisconsin Department of Administration. 1979. Municipality File, Selective Listing. Computer printout. Madison.

Wisconsin Department of Administration. 1980. 1970 Census Summary Tables. Computer printout. Madison.

Table - 2.10-56 - Total Housing Stock.

Table - 2.10-57 - Primary Residences.

the 1970 ratio of second homes to total unoccupied units in each township. Second homes comprised 36.3 percent of all housing units within the local study area in 1979. Over half of these second homes were located in Oneida County (53 percent). Forest County followed with 27 percent of total local study area second homes. Langlade County contained only 20 percent of all local study area second homes.

The relative distribution of second homes across local study area counties did not change substantially between 1970 and 1979, with Oneida County continuing to account for the most second homes, followed by Forest and Langlade counties. During that period, however, the number of second homes in Forest and Oneida counties did increase at a faster rate than those in Langlade County. Local study area county, city, and township officials indicated that most second homes constructed in the past 10 years are suitable for year-round occupancy.

Although many second homes within the local study area are not suitable for year-round occupancy, 32 percent of respondents in our survey of temporary residents indicated that they visited their second homes from two to six times during the winter season. This shows that a relatively large proportion of second homes, perhaps 30 percent, are suitable for year-round occupancy.

Less than 5 percent of respondents (4.5 percent) indicated that they currently rent out their property. Nine percent of respondents stated that they would likely sell their homes within

the next two years. The responses indicate that the pool of second homes in the local study area could meet a significant amount of housing demand from immigrating population.

Vacant Units Available for Rent or Sale. Vacant housing units for sale or rent represent a housing surplus that will absorb at least a portion of project-generated housing demand. This housing surplus, however, is small. In 1979, there were only 565 vacant units for sale or rent within the local study area, reflecting a vacancy rate of only 2.0 percent for the local study area as a whole (Table 2.10-59). Vacancies in Oneida County accounted for 55 percent of all vacant units in the local study area in 1979. Langlade County contained 33 percent of all vacant units for sale or lease in 1979. Forest County contained 69 vacant units, 12 percent of the local study area total. Table 2.10-59 shows the number of vacant units for local study area cities and townships from 1970 and 1979. A more detailed view of trends in local study area vacancy rates is included in our discussion of housing market characteristics.

Hotel, Motel, and Resort Units. Hotel, motel, and resort units may be used as short-term housing during the construction phase of the Crandon Project. We assume that this will occur only if alternative short-term housing is unavailable. The data on hotel, motel, and resort units are available only on a county

Table 2.10-59

VACANT UNITS AVAILABLE FOR RENT OR SALE
1970 and 1979

Jurisdiction	1970	1979	Change 1970-1979	
			Number	Percent
Local Study Area	444	565	121	27.3
City of Crandon	10	1	-9	-90.0
City of Antigo	67	117	50	74.6
City of Rhinelander	70	49	-21	-30.0
Argonne Town	4	13	9	225.0
Blackwell Town	1	0	-1	-100.0
Caswell Town	0	0	0	0.0
Crandon Town	10	25	15	150.0
Freedom Town	1	1	0	0.0
Hiles Town	1	2	1	100.0
Laona Town	11	8	-3	-27.3
Lincoln Town	3	4	1	33.3
Nashville Town	4	6	2	50.0
Popple River Town	4	1	-3	-75.0
Ross Town	0	0	0	0.0
Wabeno Town	8	9	1	12.5
Ackley Town	0	0	0	0.0
Ainsworth Town	2	3	1	50.0
Antigo Town	12	2	-10	-83.3
Elcho Town	8	9	1	12.5
Evergreen Town	0	0	0	0.0
Langlade Town	3	4	1	33.3
Neva Town	8	8	0	0.0
Norwood Town	2	2	0	0.0
Parrish Town	0	0	0	0.0
Peck Town	2	4	2	100.0
Polar Town	3	3	0	0.0
Price Town	1	0	-1	-100.0
Rolling Town	2	1	-1	-50.0
Upham Town	21	24	3	14.3
Wolf River Town	4	9	5	125.0
Crescent Town	35	44	9	25.7
Enterprise Town	0	0	0	0.0
Lake Tomahawk Town	58	83	25	43.1
Monico Town	3	5	2	66.7
Newbold Town	13	19	6	46.2
Pelican Town	33	48	15	45.5
Piehl Town	1	1	0	0.0
Pine Lake Town	8	21	13	162.5
Schoepke Town	0	0	0	0.0
Stella Town	1	2	1	100.0
Sugar Camp Town	14	17	3	21.4
Three Lakes Town	15	19	4	26.7
Woodboro Town	1	1	0	0.0

SOURCES

North Central Wisconsin Regional Planning Commission. Dates vary. Existing Land Use Maps by township and city. Wausau.

Sales and Marketing Magazine. 1979. "Annual Survey of Buying Power" issue (July 23).

Sales and Marketing Magazine. 1971. "Annual Survey of Buying Power" issue (July 10).

Wisconsin Department of Administration. 1979. Municipality File, Selective Listing. Computer printout. Madison.

Wisconsin Department of Administration. 1980. 1970 Census Summary Tables. Computer printout. Madison.

level--not township--thus, we are presenting data only for the three counties. Currently, over 5,000 of these units in the three-county area are in operation (Table 2.10-60). Table 2.10-60 points out another important characteristic of the area's inventory of hotel, motel, and resort units. Between 1971 and 1979, the number of these units operating in the Forest, Langlade, and Oneida County area dropped by 1,568 units.

Age of Year-Round Units. A substantial amount (44.4 percent) of the local study area's housing stock is over 40 years old (Table 2.10-61). For the local study area as a whole, the amount of housing added to the existing housing stock has risen steadily during each decade since 1939. Comparing local study area housing stock to that of Wisconsin as a whole reveals that the local study area has a slightly older mix of housing than does the state as a whole.

Analyzing information for the portions of Forest, Langlade, and Oneida counties that are located within the local study area reveals that Langlade County's housing stock is older than that of either Forest or Oneida County. In Langlade County, 56.8 percent of all year-round housing units are over 40 years old, as compared with 39.0 and 36.6 percent for Forest and Oneida counties, respectively.

Table 2.10-60

HOTEL, MOTEL AND RESORT UNITS, 1971 AND 1979

<u>County</u>	<u>1971</u>	<u>1979</u>	<u>Change 1971-1979</u>	
			<u>Number</u>	<u>Percent</u>
Forest County	614	486	- 128	- 20.8
Langlade County	914	590	- 324	- 35.4
Oneida County	5,066	3,950	- 1,116	- 22.0
Three County Total	6,594	5,026	- 1,568	- 23.8

SOURCE

University of Wisconsin - Extension. 1979. Trends in Wisconsin Overnight Lodging Establishments 1971-1979.
 Recreation Resources Center. Madison.

Table 2.10-61

AGE OF YEAR-ROUND HOUSING UNITS, 1979

Year Built	State of Wisconsin		Local Study Area		Forest County portion of lsa ^a		Langlade County portion of lsa		Oneida County portion of lsa	
	number	percent	number	percent	number	percent	number	percent	number	percent
1970-1979	312,061	18.0	4,307	19.2	1,022	23.5	1,151	14.2	2,134	21.5
1960-1969	286,439	16.6	3,150	14.1	628	14.5	776	9.6	1,746	17.6
1950-1959	245,935	14.2	2,590	11.6	487	11.2	743	9.1	1,360	13.7
1940-1949	137,755	8.0	2,407	10.7	512	11.8	840	10.3	1,055	10.6
1939 or earlier	746,298	43.2	9,939	44.4	1,691	39.0	4,620	56.8	3,628	36.6
Total	1,728,488	100.0	22,393	100.0	4,340	100.0	8,130	100.0	9,923	100.0

NOTE

^a lsa refers to local study area

^b 1979 housing numbers calculated by RFC as described in subsection 2.10.3.1.

SOURCE

North Central Wisconsin Regional Planning Commission, 1970. Selected Housing Characteristics for the North Central Wisconsin Region. Wausau.

Wisconsin Department of Administration. 1980. 1970 Census Summary Tables. Computer printout. Madison.

Structural Condition of Occupied Dwellings. Information on the structural condition of occupied housing units is presented in Table 2.10-62. Data on 1979 structural condition were obtained from Wisconsin Department of Local Affairs and Development (DLAD) Housing Information System Report 101 estimates of substandard housing by county. DLAD defines substandard units as: 1) all owner-occupied housing units valued at less than \$15,500, 2) all renter-occupied units lacking some or all plumbing facilities, and 3) all renter-occupied units with all plumbing facilities having rents below the median rent of units lacking some or all plumbing facilities. This information is not available on a township level, and figures shown represent totals for the entire area of Forest, Langlade, and Oneida counties.

Nearly 13 percent of all occupied housing units within the three-county area was classified as substandard in 1979. This is more than twice the rate of substandard units that was reported for Wisconsin in 1979. Substandard housing constitutes a large proportion of the total occupied dwellings in Forest and Langlade counties.

Substandard housing as a percent of total occupied housing units in the local study area has decreased substantially since 1970. In 1970, 20 percent of the households in the three-county area occupied substandard housing units. In 1979, only about 12 percent of households were housed in substandard units. Between

Table 2.10-62

STRUCTURAL CONDITION OF OCCUPIED DWELLINGS
1970 AND 1979

	Owner Occupied				Renter Occupied				Total Occupied			
	Standard	Substandard	Total	% Substandard	Standard	Substandard	Total	% Substandard	Standard	Substandard	Total	% Substandard
State of Wisconsin												
1970	841,013	77,110	918,123	8.4	359,472	51,209	410,681	12.5	1,200,485	128,319	1,328,804	9.7
1979	1,004,016	74,192	1,078,208	6.9	474,776	26,119	500,895	5.2	1,478,792	100,311	1,579,103	6.4
Forest, Langlade and Oneida Counties												
1970	10,261	2,410	12,671	19.0	2,460	784	3,244	24.2	12,721	3,194	15,915	20.1
1979	14,789	2,242	17,031	13.2	3,408	456	3,864	11.8	18,197	2,698	20,895	12.9
Forest County												
1970	1,245	595	1,840	32.3	178	251	429	58.5	1,423	846	2,269	37.3
1979	1,893	553	2,446	22.6	354	146	500	29.2	2,247	699	2,946	23.7
Langlade County												
1970	3,571	1,070	4,641	23.1	1,003	245	1,248	19.6	4,574	1,315	5,889	22.3
1979	4,445	996	5,441	18.3	1,285	143	1,428	10.0	5,730	1,139	6,869	16.6
Oneida County												
1970	5,445	745	6,190	12.0	1,279	288	1,567	18.4	6,724	1,033	7,757	13.3
1979	8,451	693	9,144	7.6	1,769	167	1,936	8.6	10,220	860	11,080	7.8

SOURCE

Wisconsin Department of Local Affairs and Development. 1978. Housing Element, State of Wisconsin. Madison.Wisconsin Department of Local Affairs and Development. 1979. Report 101 for Forest, Langlade and Oneida Counties. Madison.

1970 and 1979, the largest drop in the percent of occupied housing classified as substandard occurred in Forest County, where substandard units as a percent of total occupied units dropped 14 percent. Despite this major decline, 23.7 percent of all Forest County's occupied units were classified as substandard in 1979.

Table 2.10-62 presents information on the absolute number of substandard units within Forest, Langlade, and Oneida counties for 1970 and 1979.

2.10.3.2 Housing Market Characteristics

This subsection discusses the characteristics of the housing market in the local study area. We examine vacancy rates, current sales and rental price, capacity for new housing construction, trends in speculative housing construction, and access to mortgage money.

Vacancy Rates. The local study area housing market is currently characterized by a very low vacancy rate (Table 2.10-63). Using DLAD estimation procedures, the local study area residential vacancy rate was 1.97 percent in 1979. This is practically the same as the 1970 local study area vacancy rate of 1.96 percent. Langlade County was the only portion of the local study area to experience an increase in vacancy rates between

Table 2.10-63

VACANCY RATES, 1970 AND 1979

<u>Jurisdiction</u>	<u>Percent 1970</u>	<u>Percent 1979</u>
Local Study Area	2.0	2.0
City of Crandon	1.7	0.0
City of Antigo	2.1	3.3
City of Rhinelander	2.5	1.6
Argonne Town	2.6	4.7
Blackwell Town	1.0	0.0
Caswell Town	0.0	0.0
Crandon Town	5.2	6.8
Freedom Town	0.4	0.4
Hiles Town	0.3	0.4
Laona Town	2.1	1.3
Lincoln Town	0.7	0.6
Nashville Town	0.6	0.6
Popple River Town	5.3	0.9
Ross Town	0.0	0.0
Wabeno Town	1.4	1.5
Ackley Town	0.0	0.0
Ainsworth Town	0.9	0.8
Antigo Town	2.6	0.4
Elcho Town	0.9	0.8
Evergreen Town	0.0	0.0
Langlade Town	1.4	1.5
Neva Town	2.7	2.3
Norwood Town	0.8	0.8
Parrish Town	0.0	0.0
Peck Town	1.7	2.9
Polar Town	1.3	1.1
Price Town	1.1	0.0
Rolling Town	0.8	0.3
Upham Town	3.7	3.6
Wolf River Town	0.7	1.5
Crescent Town	5.9	5.4
Enterprise Town	0.0	0.0
Lake Tomahawk Town	11.3	11.3
Monico Town	2.0	2.8
Newbold Town	1.3	1.2
Pelican Town	3.1	3.3
Piehl Town	2.4	1.9
Pine Lake Town	1.0	1.9
Schoepke Town	0.0	0.0
Stella Town	0.6	0.8
Sugar Camp Town	2.2	2.0
Three Lakes Town	0.9	0.9
Woodboro Town	0.3	0.2

SOURCES

Table 2.10-56

Table 2.10-59

between 1970 and 1979. Both Forest and Oneida counties experienced drops in vacancy rates during this period.

This pattern of increased vacancy rates for Langlade County and decreased vacancy rates for Forest and Oneida counties was supported by information provided by a number of local study area Realtors. Realtors contacted, who operate primarily in Langlade County, indicated that vacancy rates in that area had increased slightly in past years. Realtors operating primarily in Forest and Oneida counties indicated that vacancy rates had remained stable or declined somewhat since 1970.

Time on Market. Local study area Realtors indicated that housing remains on the market for a relatively long period of time before it is sold or rented. According to local study area Realtors, over the past year sales time for owner-occupied housing has averaged six months. The same Realtors indicated that this is substantially longer than the average sales time of three months observed within the local study area over the past three years. According to Realtors, the current lengthy sales time is due in large part to high mortgage interest rates.

The Realtors, however, indicated that rental units remain on the market for a much shorter period of time than do owner-occupied units. Realtors noted that rental units rarely go unrented for more than one month at a time. The relatively short time rental units spend on the market coupled with the low

vacancy rate for these rental units indicates that the supply of local study area rental housing may be barely adequate to meet current demands for rental housing.

Housing Sales by Price. Information on housing sales prices was obtained by interviewing local study area Realtors and builders. In these interviews, Realtors were asked to estimate the percent of purchased housing that fell into different price categories. Builders were asked to provide the average sales price for homes constructed by home builders similar to themselves. Builders' responses were then grouped into the same price categories as the Realtors' responses.

Analysis of Realtors' responses shown in Table 2.10-64 indicates that the median sales price for a single family home in the local study area is between \$20,000 and \$39,999. This is lower than the median sales price of new housing, indicated by builders to be between \$40,000 and \$59,999. This discrepancy arises from the fact that Realtors' responses reflect sales prices for all single family homes, regardless of age, while builders' responses are for new housing only.

Rental Price. Information on rental prices for local study area housing was obtained by surveying owners of multi-unit housing rental properties. These properties are located in the cities of Crandon, Antigo, and Rhinelander.

Table 2.10-64

PERCENT OF TOTAL HOUSING SALES BY PRICE, 1980

<u>Housing Sales Price</u>	<u>Realtor's Responses</u>	<u>Builder's Responses</u>
less than \$20,000	6.5	0
\$20,000-39,999	47.9	26.6
\$40,000-59,999	27.7	46.8
\$60,000-79,999	12.4	13.3
\$80,000+	5.5	13.3
Median Sales Price	\$20,000-39,999	\$40,000-59,999

SOURCE

Consultant's survey of Realtors and builders. September, 1980.

The housing rental prices vary with both unit size and location (Table 2.10-65). Larger units can command higher rental prices than smaller units. Also, while holding unit size constant, rental units in Rhinelander are able to command higher rents than units in either Crandon or Antigo. Again holding unit size constant, rental prices for one and two bedroom units located in Antigo are higher than those for units located in Crandon.

Development Capacity. To determine whether builders will be able to meet the housing demands of new residents, it is necessary to estimate the construction capacity of local study area builders. Builder construction capacity is defined as the total number of housing units that local study area builders are capable of producing annually.

One measure of builder capacity is the past level of annual housing starts within the local study area. For the years 1977 through 1979, the annual number of homes constructed ranged from 758 units in 1977 to 460 units in 1979. Although housing starts slowed dramatically during 1980, this does not indicate that builder capacity necessarily dropped. Instead, it reflects the reduced demand for housing brought on by rising construction costs and mortgage interest rates.

The sharp reduction in demand for housing has driven some small builders out of business over the past year. This became

Table 2.10-65
HOUSING RENTAL PRICES, 1980
(Monthly)

<u>Rental Unit</u>	<u>Rental Price by City</u>		
	<u>Crandon</u>	<u>Antigo</u>	<u>Rhineland</u>
<u>Type</u>			
Efficiency	\$145 ^a	\$75-80	---
1 Bedroom	\$ 95-175	\$100-195	\$200-225
2 Bedroom	\$160-180	\$165-265	\$225-275
3 Bedroom	---	\$250 ^a	\$275 ^a

NOTE

^aOnly one rental price obtained for particular category indicated.

SOURCE

Consultant's survey of rental housing owners. 1980.

evident while trying to contact local study area builders to obtain information. This reduction is likely, however, to be only a temporary drop. Most of these small builders, or ones similar to them, will probably re-enter the construction industry when the housing market improves.

Most local study area builders indicated that they are willing to develop housing at relatively low profit margins. This willingness is a result of the current virtual standstill in the housing industry in northern Wisconsin. Many builders are eager for work, and if the selling price of their houses covers their costs and produces a slight return on investment, they will develop the housing demanded. This behavior suggests that the builder capacity indicated by housing starts from 1977 to 1979 is attainable and can most likely be surpassed.

The capacity of the local study area construction industry can also be expanded through increased use of manufactured housing. Manufactured housing is well accepted by both housing builders and consumers. A number of local study area builders combine manufactured housing components with on-site construction techniques in the houses they produce. Use of manufactured housing reduces construction time and labor costs. In a survey of local study area permanent residents, 21.3 percent of respondents indicated that they preferred manufactured to stick-built housing. Given this acceptance of manufactured housing and the local study area's close proximity to manufactured housing

centers, the potential exists for major use of manufactured housing should the local study area construction industry be called upon to produce a large number of houses over a short time period.

Speculative Housing Construction. Speculative housing construction is the construction of housing absent a specific buyer. Construction of housing on a speculative basis prior to start-up of the Crandon Project could ease pressure placed on the local study area housing stock by project-related immigrants. To identify current and past trends in speculative housing construction and help set assumptions for our housing market model, we questioned a number of local study area builders on their willingness and ability to construct housing on a speculative basis.

Ten of the 19 local study area builders we contacted indicated that they engage in speculative construction. These builders stated, however, that speculative housing construction within the local study area over the past 12 months has declined sharply. Of the 10 builders who indicated that they built speculative housing, 4 stated that they had not constructed any housing on a speculative basis during the past year. For those builders who had constructed speculative housing during the past 12 months, the median number of speculative homes developed

totaled three, with most builders producing only one or two homes at a time.

The builders indicated that this current low level of speculative construction was a result of the general housing market slump affecting the local study area and the nation as a whole. According to local study area builders, availability of construction and home-owner loan financing is an overriding factor in determining the timing and amount of speculative construction in the local study area. Speculative builders indicated that they will most likely increase their speculative construction activity if and when construction and mortgage financing becomes more readily available at a lower interest rate.

Speculative housing builders indicated that when financing was available in the past, they usually constructed no more than three speculative houses at one time. This low level of speculative construction at any one time stems from two sources: builders' attempts to minimize their exposure to risk, and lender reluctance to extend loans for the construction of more than several speculative homes by a single developer at any one time. Local study area speculative builders tend to construct only one or two speculative houses at a time and wait for them to sell before engaging in more speculative construction. This incremental approach to speculative housing construction reduces

builder risk by minimizing the number of homes that could possibly remain unsold at any one time.

Local study area lenders that we contacted indicated that they are generally reluctant to extend financing to a builder for construction of more than three speculative homes at any one time. This speculative construction loan "rationing" procedure is another risk minimizing technique, this time on the part of local study area lenders. Using cautious lending patterns, lenders are able to minimize the number of unsold, speculative houses they could be forced to assume, should builders default on loans.

As we have noted, terms and availability of financing is a key factor influencing speculative housing construction. Local study area builders also pointed out that some indication of a present or potential demand for housing is a second factor influencing their decisions. Local study area builders were imprecise in describing how they gauge housing demand. However, several builders noted that population and employment changes in their operating areas are signals they look for when deciding to start speculative construction.

Builders we contacted who do not engage in speculative construction indicated that they did not do so because they perceive speculative construction to be overly risky. They noted that difficulty in selling speculative housing kept them out of

this market. Most builders not currently engaging in speculative construction do not plan to do so in the foreseeable future.

Housing Finance in the Local Study Area. To assess the housing finance market, we interviewed lending officers from 13 local study area banks and savings and loans. These lenders supplied us with information on the amount and type of real estate loans they make and their lending policies.

Amount and Type of Mortgages Written. Through August 1980, the 13 lenders contacted had written a total of 383 single-family home mortgages. This is down sharply from the 1,111 loans that the same lenders closed during 1979. Of the 383 mortgages written, 90 percent were for owner-occupied primary homes. The remaining 10 percent of these loans were made for second homes and rental properties. This mix of loans between owner-occupied homes, second homes, and rental homes differs slightly from that reported from 1977 through 1979. Over that three-year period, lenders reported that approximately 75 percent of the single-family home mortgages they extended were for owner-occupied primary housing, with the remaining 25 percent of the loans going to second homes and rental properties.

Mortgage Terms. As of September 1980, lending institutions in the local study area charged between 12 and 14

percent on single-family home mortgages. The typical mortgage life is 20 years, although some lenders do extend 25- and 30-year mortgages. Down payment of 20 to 25 percent of total purchase price is required by most local study area lenders. Only about half the lenders contacted indicated that they charge loan origination fees on single-family home mortgages. Those who do, charge an average of one percent on each mortgage written.

Only five of the lenders contacted indicated that they use different mortgage terms for second homes and rental properties than for owner-occupied single-family homes. For those lenders that do use different mortgage terms for second homes and rental properties, the differences are slight. Mortgage interest rates for second homes and rental properties tend to be about half a percentage point higher than for owner-occupied primary homes. In some cases, lenders impose longer mortgages than for primary residences. Several lenders who do not charge loan origination fees on owner-occupied single-family homes charge a one percent origination fee on second home and rental property mortgages.

Mortgage Income Qualifications. Mortgage income qualification requirements are fairly constant for local study area lenders. The income qualifying guideline commonly used is that mortgage payments should not exceed 25 percent of applicant's monthly household income. Several lenders indicated that this guideline is not always strictly enforced when loan

applicants belong to upper income groups. When loan applicants are low income individuals, lenders indicated that less flexibility can be used in determining mortgage qualification.

Only four of the lenders contacted indicated that they extend loans on multi-family housing. Mortgages written on multi-family housing typically bear an interest rate one to two percent higher than that for single-family housing and require down payments between 20 and 35 percent of total purchase price.

Besides single- and multi-family permanent housing, local study area lenders also finance mobile home purchases. These loans are written as both consumer loans and mortgages. Interest rates on these loans ranged from 14 to 15 percent with down payments of 25 percent as of September 1980. They are typically written for periods ranging from 7 to 15 years. Lenders indicated that the median value for these mobile home loans is between \$10,000 and \$15,000.

FNMA and FMAC Participation. Only two of the lenders contacted indicated that they participate in Federal National Mortgage Association (FNMA) or Federal Mortgage Assistance Corporation (FMAC) arrangements. However, both lenders indicating participation in these arrangements noted that none of the mortgages they currently write are sold to either FNMA or FMAC. This lack of active participation by local study area

lenders in the secondary mortgage markets reduces the possible amount of funding available for use in making mortgage loans.

Although local study area lenders may currently be able to meet mortgage demand without active FMNA or FMAC participation, this may not always be the case. Should mortgage demand substantially increase, lenders may find FNMA or FMAC participation necessary to meet such demands.

2.10.3.3 Land Use Characteristics

Our analysis of local study area land use characteristics focuses on three points:

1. Identification of land uses that preclude development;
2. Identification of locations within the local study area that can be developed; and
3. Analysis of zoning and other land use controls that could restrict growth in developable areas.

Our concern with these land use aspects arises from the need to identify the amount and location of available developable land within the local study area for use in our population and housing distribution models. The remainder of this subsection identifies land use constraints on development and the amount and location of developable land, and analyzes zoning and land use constraints on development.

Constraints on Residential Development. A number of land uses preclude private residential development in certain portions

of the local study area. To identify the amount and location of local study area land that can be developed, we must identify and map each land use that precludes or constrains development. The land uses we have identified that preclude or constrain residential development are:

1. Water bodies and wetlands,
2. Commercial forest land,
3. Prime agricultural land,
4. Land with soils unsuitable for septic tank use,
5. Publicly owned and Native American lands, and
6. Previously developed land.

The following further defines each of these factors limiting development and describes how each is distributed across the local study area. Most of this information on land uses was obtained from research used to define local study area boundaries.

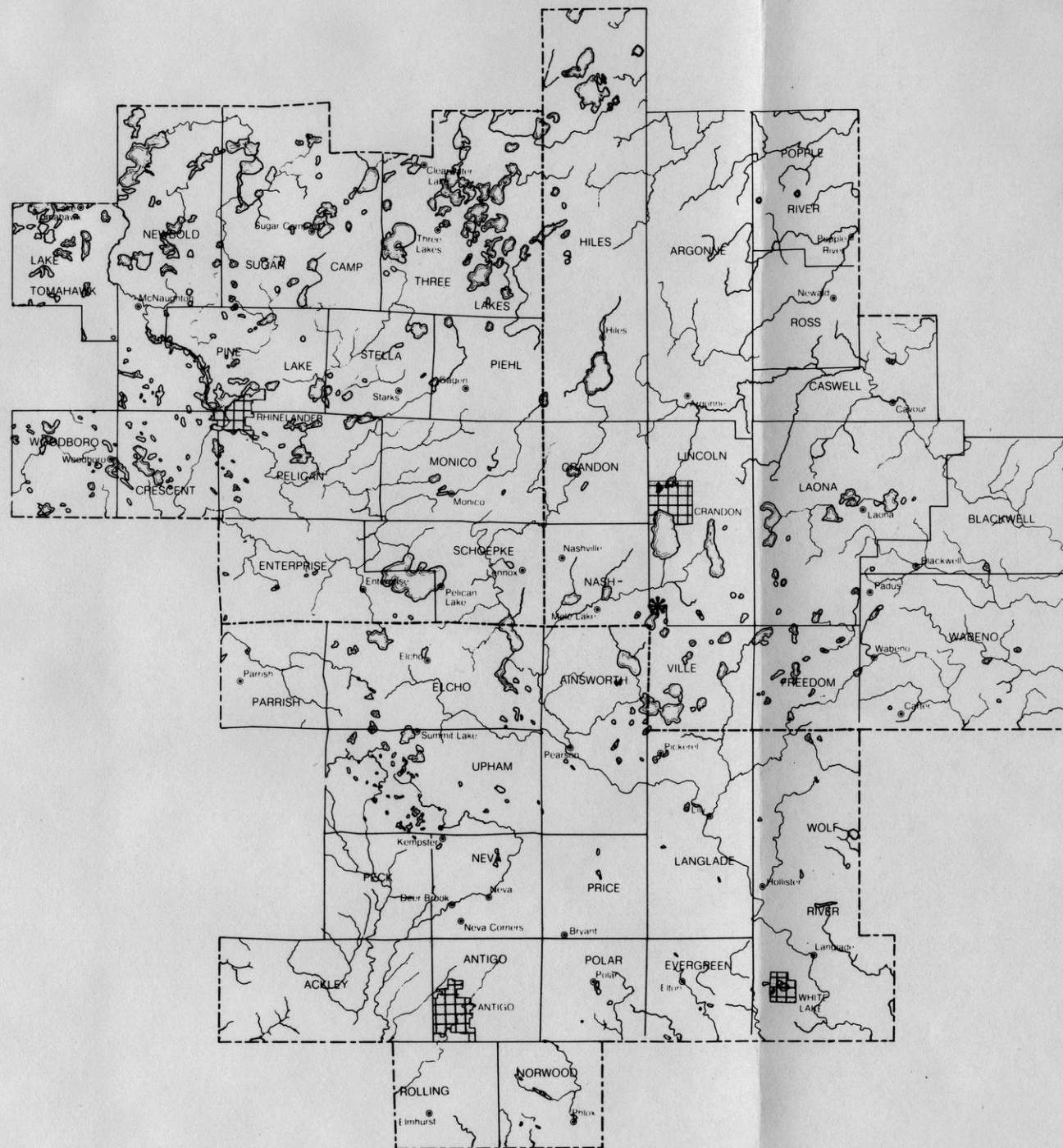
Water Bodies and Wetlands. Although local study area residential development tends to cluster around water bodies, development cannot take place on the water body itself. Development in wetlands areas is restricted by state and county regulations (Wisconsin Administrative Code, Chapter H65.04; Forest County Subdivision Ordinance, Section 3.03; Langlade County Land Division Ordinance, Section 5.2; Oneida County Zoning and Shorelands Protection Ordinance, Chapter 9.113(A)). Because

these areas for the most part cannot be developed, they must be subtracted from the pool of local study area developable land.

Figures 2.10-11 and 2.10-12 show the location of local study area water bodies and wetlands, respectively. These maps show that the majority of water bodies and wetlands are located in the north-central and northeast portions of the local study area. Water bodies and wetlands preclude development over large areas of Forest and Oneida counties. Northern Langlade County does contain a number of water bodies and wetland areas but not in the same concentration as many areas of Forest and Oneida counties.








Commercial Forests. Commercial forests could preclude residential development. Commercial forest lands, shown in Figure 2.10-13, include tracts held by major pulp and paper companies including:

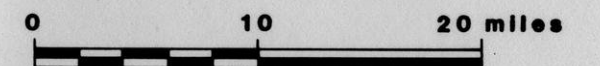
1. Consolidated Papers, Inc.
2. Connor Forest Industries
3. Connor Lumber and Land Company
4. Owens-Illinois
5. Nekoosa Papers, Inc.
6. St. Regis Paper Company
7. Wausau Paper Mills
8. Tigerton Lumber Company
9. Branham Woodlands Products Company
10. M & H Tree Farm



Source: County Highway Maps.



-  **County Boundary**
-  **Township Boundary**
-  **Incorporated Area**
-  **Unincorporated Village**
-  **Crandon Project Discovery Site**
-  **Lake**
-  **River**

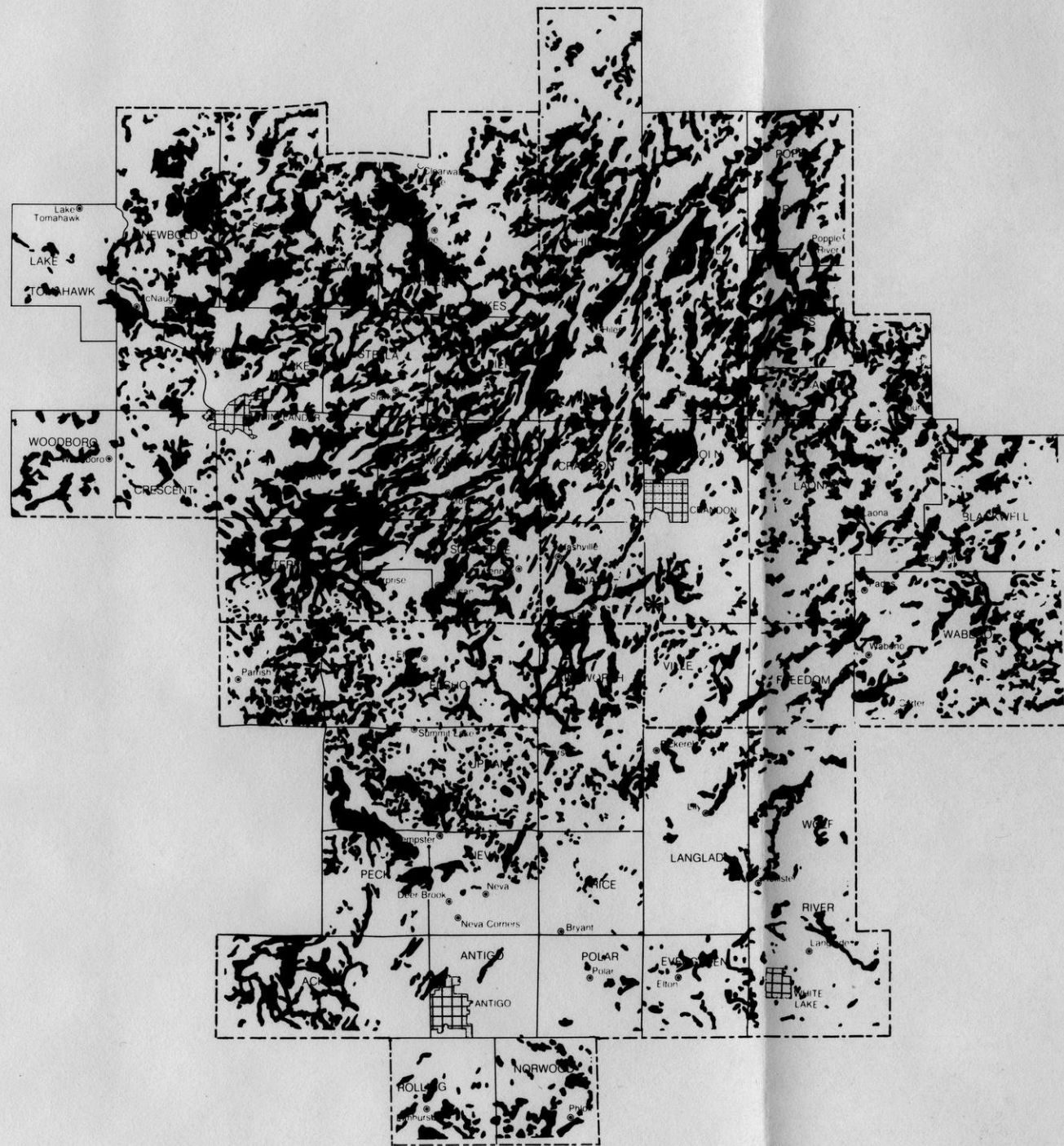


EXXON MINERALS COMPANY
CRANDON PROJECT

SURFACE WATER







rpc, inc.

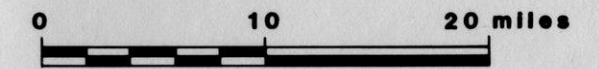
FIG. 2.10-11



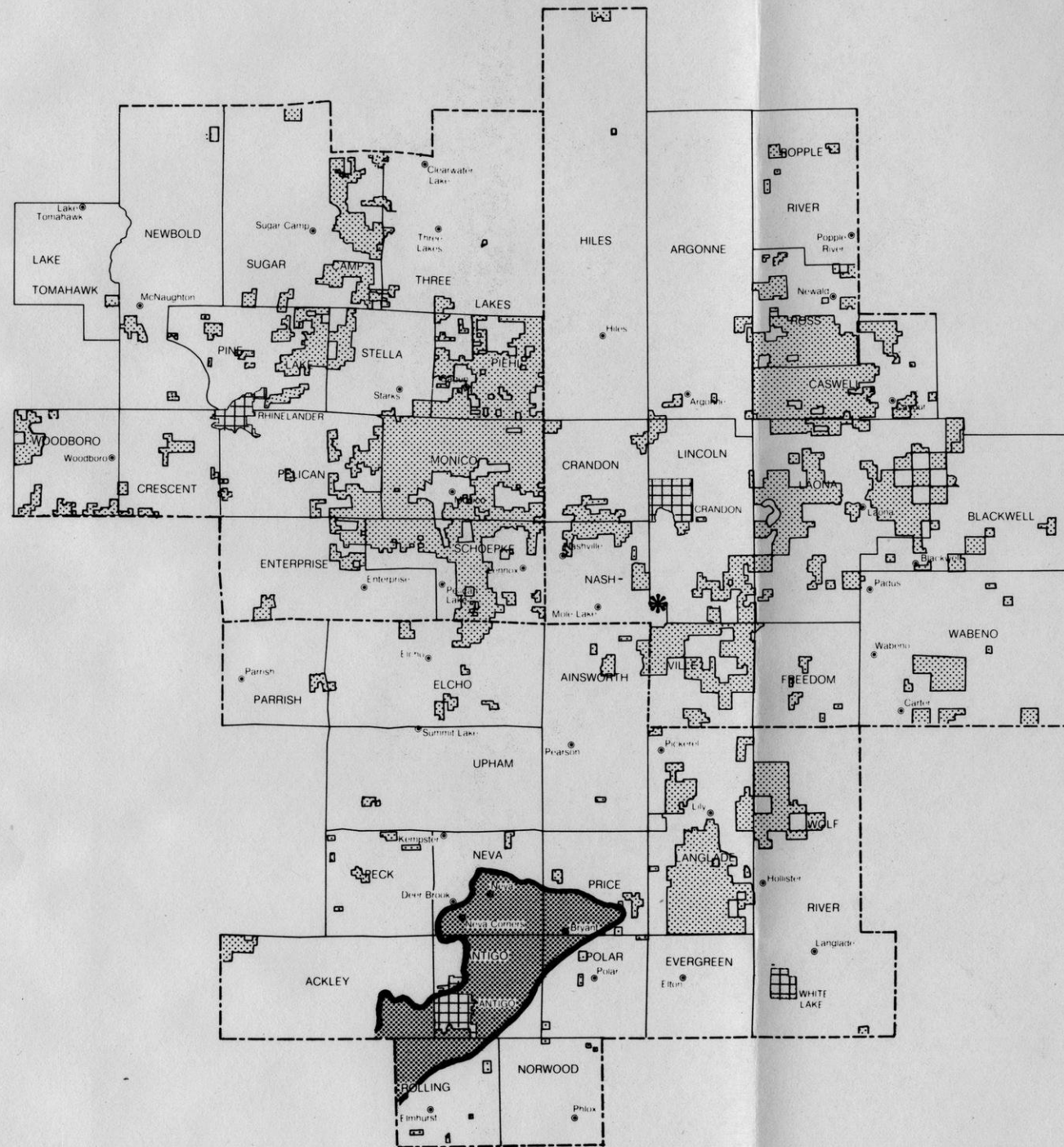
Source: U.S.G.S. Quadrangles.










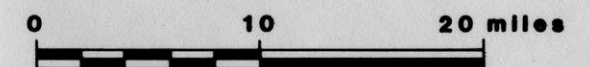
-  County Boundary
-  Township Boundary
-  Incorporated Area
-  Unincorporated Village
-  Crandon Project Discovery Site
-  Wetlands Area



EXXON MINERALS COMPANY CRANDON PROJECT	
WETLANDS	
rpc, inc.	FIG. 2.10-12



-  **County Boundary**
-  **Township Boundary**
-  **Incorporated Area**
-  **Unincorporated Village**
-  **Crandon Project Discovery Site**
-  **Commercial Forest Land**
-  **Prime Agricultural Land**



Note: Prime agricultural land is based on soils in agriculture capability classes 1 and 2.

Source: County Atlas and Plat Books; Soil Conservation Service.

EXXON MINERALS COMPANY
CRANDON PROJECT

**COMMERCIAL FOREST &
PRIME AGRICULTURAL LANDS**

rpc, inc.

FIG. 2.10-13

11. Mihalko Land and Logging Company

12. F.C.L. and P.F.C. Land

In addition to these corporate owners, a sizeable amount of commercial forest land within the local study area is held by private individuals.

As Figure 2.10-13 shows, most commercial forests within the local study area are located in Oneida and Forest counties. Substantial portions of the townships of Monico, Piehl, and Schoepke in Oneida County, and Caswell, Ross, and Laona in Forest County are devoted to commercial forest land. Langlade township in Langlade County also contains a considerable amount of commercial forest land. For these townships, the presence of commercial forest land is a major factor limiting the amount of available developable land.

Prime Agricultural Land. Prime agricultural land is also shown on Figure 2.10-13. Residential development of this land is unlikely due to its high use value and protective zoning and subdivision control ordinances (Langlade County Land Division Ordinance, Section 5.4). We define prime agricultural land as only those lands in the Soil Conservation Service capability classes 1 and 2 (U.S. Department of Agriculture, Soil Conservation Service, Soil Survey Interpretations). Detailed studies are now underway in Forest, Langlade, and Oneida counties to determine the full amount and location of prime agricultural

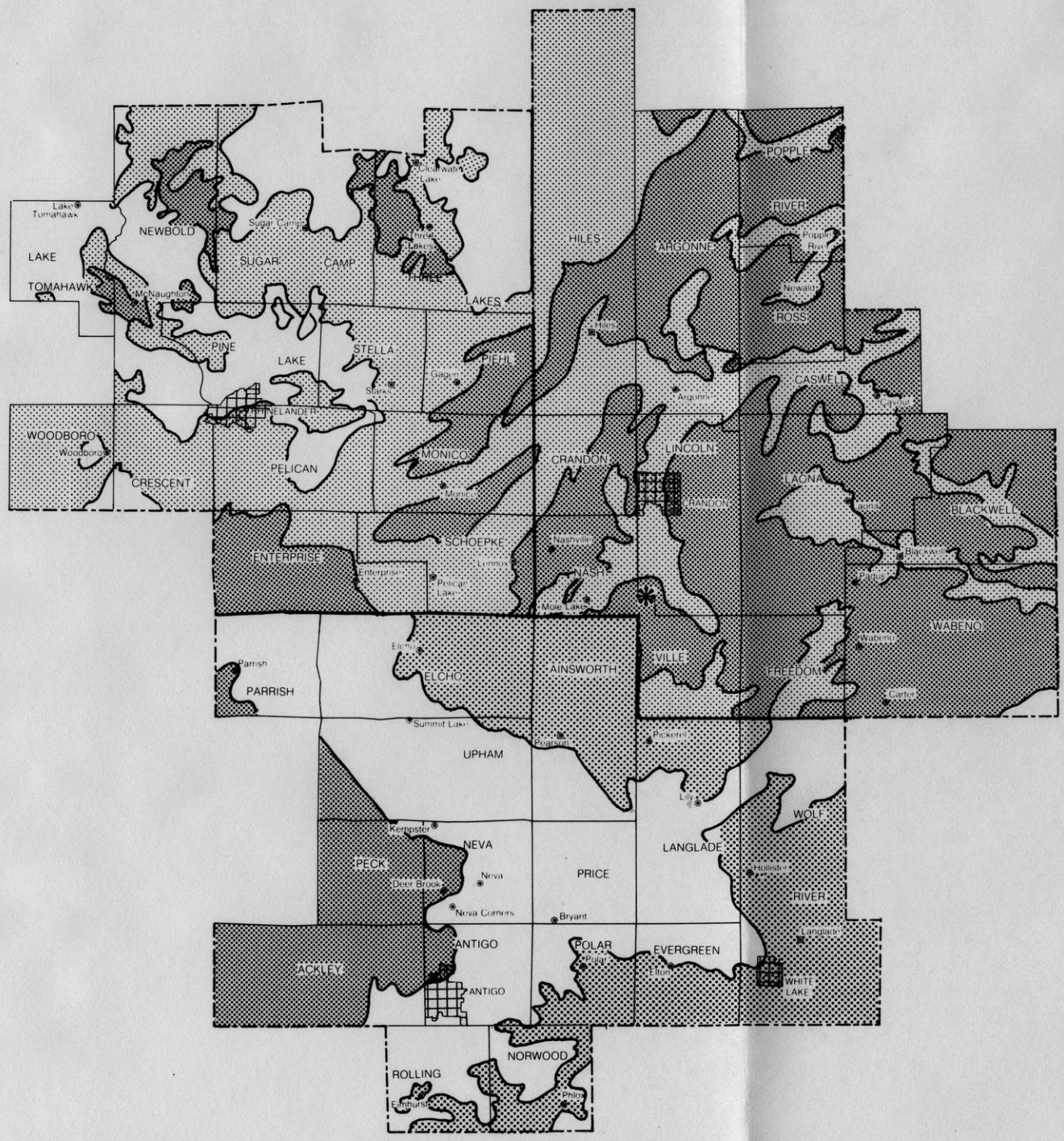
land. Because this information is unavailable, we will continue to assume that prime agricultural land is limited to land in agricultural capability classes 1 and 2.









As Figure 2.10-13 shows, all of the local study area's prime agricultural land is located in the south-central portion of Langlade County, and will be a major constraint on development in the townships of Antigo, Neva, Price, and Rolling.

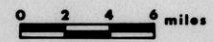
Soils Suitable for Septic Tank Use. Septic tank suitability is the principal soil characteristic limiting residential development in many local study area locations. The factors affecting a soil's suitability for septic tank usage are permeability rates, filtration capacity, and water table depth. The suitability of local study area soils for septic system usage is shown in Figure 2.10-14. Soil suitability ratings were derived from Soil Conservation Service suitability criteria and data on soil associations in each county.

Figure 2.10-14 indicates that most areas of Forest County contain soils unsuitable for septic tanks. Most land within Oneida County is depicted as generally suitable for septic tanks. Most land in Langlade County is shown as very suitable for septic tanks.

Publicly Owned and Native American Land. Private residential development is prohibited on publicly owned lands.



-  County Boundary
-  Township Boundary
-  Incorporated Area
-  Unincorporated Village
-  Crandon Project Discovery Site
-  Very Suitable Soils
-  Generally Suitable Soils
-  Generally Unsuitable Soils



Note: Suitability is determined by soil characteristics as identified in the criteria for sanitary permits. Contributing factors are: permeability rates, filtration capacity, and water table depth. Interpretation is different by county. Specific sites within a suitability ranking may vary.

Source: County Offices, Soil Conservation Service.

EXXON MINERALS COMPANY CRANDON PROJECT	
SOIL SUITABILITY FOR SEPTIC TANKS	
rpc, inc.	FIG. 2.10-14

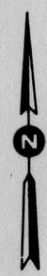
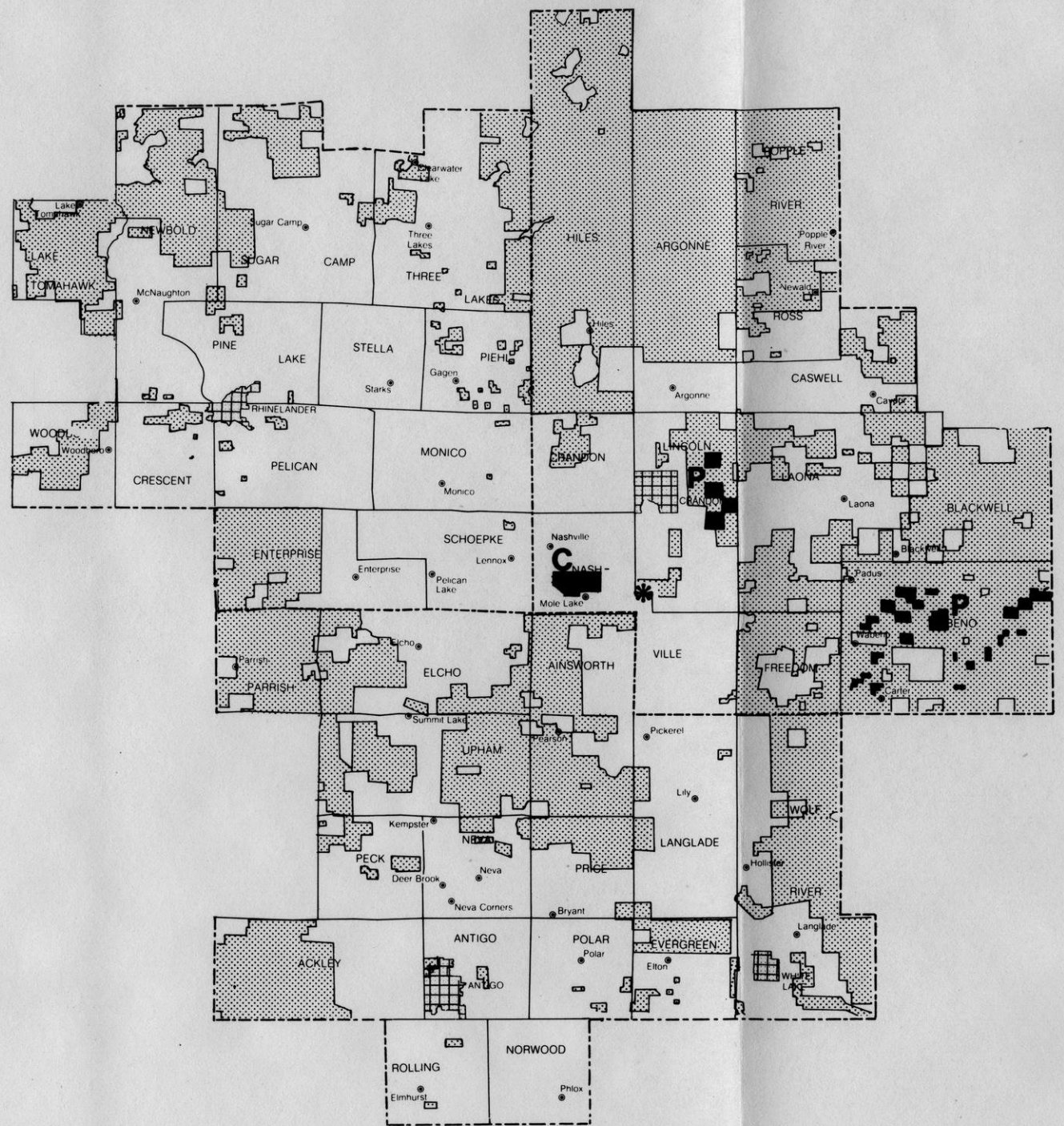
Because of this characteristic, all publicly owned lands are subtracted from the pool of available developable land. Shown in Figure 2.10-15, public lands make up a considerable portion of Forest and Langlade counties. Land use in the townships of Argonne, Blackwell, Freedom, Hiles, Popple River, and Wabeno is almost entirely devoted to publicly owned land.










Residential development on Native American lands is limited to development by members of the tribes holding these lands. These lands, shown in Figure 2.10-15, are held by the Mole Lake Chippewa and the Forest County Potawatomi and are located within the townships of Lincoln, Nashville, and Wabeno in Forest County.

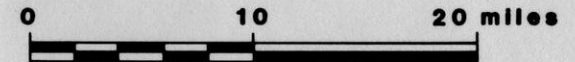
Previously Developed Land. Our analysis assumes that new residential development will occur on land that has not been previously developed for residential purposes. Figure 2.10-16 shows existing areas of residential development. Previous development of these areas precludes new residential development.

Available Developable Land. Total acreage available for development (Table 2.10-66) is limited by the land uses described in the previous discussion on land use. As described above, the land uses which constrain development are:

1. Water bodies and wetlands,
2. Commercial forest land,
3. Prime agricultural land,



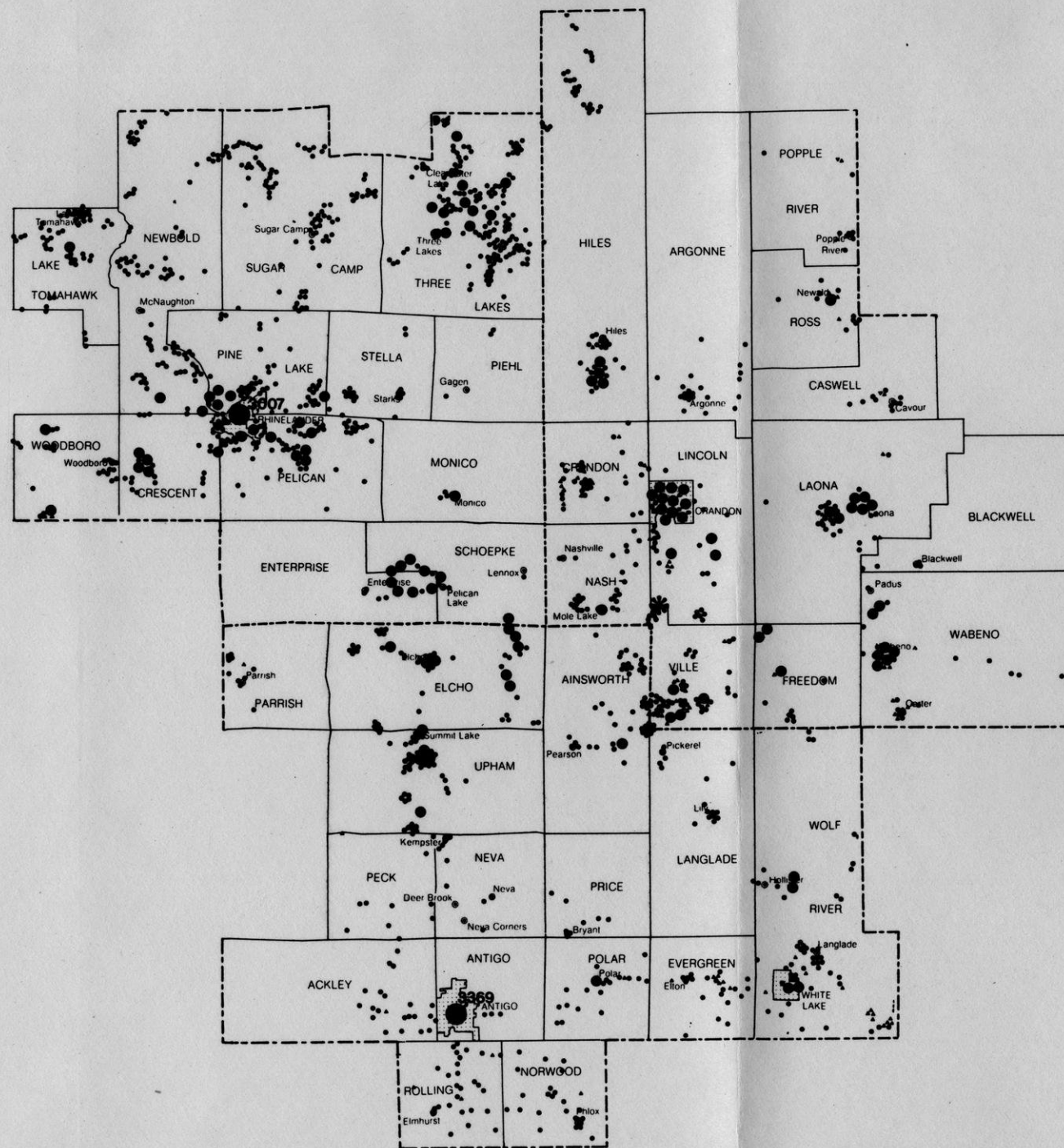
-  **County Boundary**
-  **Township Boundary**
-  **Incorporated Area**
-  **Unincorporated Village**
-  **Crandon Project Discovery Site**
-  **Public Land**
-  **Native American Land**
-  **Forest County Potawatomi**
-  **Mole Lake Chippewa**



Note: The Native American tribes are the Forest County Potawatomi and the Mole Lake Chippewa.











Source: County Atlas and Plat Books.

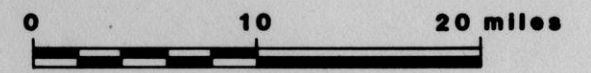
EXXON MINERALS COMPANY CRANDON PROJECT	
PUBLIC LANDS & NATIVE AMERICAN LANDS	
rpc, inc.	FIG. 2.10-15



Source: N.C.W.R.P.C. Land use Maps; U.S.G.S. Quadrangles.



-  **County Boundary**
-  **Township Boundary**
-  **Incorporated Area**
-  **Unincorporated Village**
-  **Crandon Project Discovery Site**
-  **5 Houses**
-  **50 Houses**
-  **More Than 50 Houses (number shown)**
-  **5 Mobile Homes**
-  **5 Multifamily Units**



EXXON MINERALS COMPANY CRANDON PROJECT	
PREVIOUSLY DEVELOPED LAND	
rpc, inc.	FIG. 2.10-16

Table 2.10-66

AVAILABLE DEVELOPABLE LAND

<u>Jurisdiction</u>	<u>Available Acres</u>
Argonne Town	5,939
Blackwell Town	133
Caswell Town	152
Crandon Town	3,240
Freedom Town	2,227
Hiles Town	2,837
Laona Town	3,095
Lincoln Town	3,786
Nashville Town	6,492
Popple River Town	125
Ross Town	41
Wabeno Town	232
Ackley Town	145
Ainsworth Town	7,427
Antigo Town	3,046
Elcho Town	13,874
Evergreen Town	7,455
Langlade Town	16,230
Neva Town	4,224
Norwood Town	16,205
Parrish Town	219
Peck Town	794
Polar Town	17,957
Price Town	6,074
Rolling Town	12,353
Upham Town	7,005
Wolf River Town	23,048
Crescent Town	8,686
Enterprise Town	2,783
Lake Tomahawk Town	1,438
Monico Town	163
Newbold Town	18,020
Pelican Town	7,704
Piehl Town	1,280
Pine Lake Town	5,786
Schoepke Town	2,371
Stella Town	11,494
Sugar Camp Town	13,648
Three Lakes Town	12,235
Woodboro Town	3,773
Total townships	253,736

SOURCE

Figures 2.10-11 through 2.10-16

4. Land with soils unsuitable for septic tank use,
5. Publicly owned and Native American lands, and
6. Previously developed land.

Subtracting land occupied by these uses produces an estimate of available local study area developable land.

There are over 250,000 acres of available developable land in the local study area. Because of the large amounts of publicly owned land and land unsuitable for septic tanks in Forest County, the county has only about 11.2 percent of this total acreage. Oneida County contains 35.2 percent of all local study area developable land. Langlade County contains 53.6 percent of all local study area developable land.

Zoning and Land Use Controls. The amount and type of residential development that can occur in areas identified as available for development will be directly influenced by zoning and other land use controls in effect. Three types of land use controls that may limit the amount and type of residential development occurring in certain jurisdictions of the local study area are:

1. Minimum residential lot size requirements,
2. Mobile home restrictions, and
3. Land preservation policy.

Minimum Residential Lot Sizes. Minimum residential lot size requirements do not vary greatly across the local study area. Wisconsin Shoreland Protection regulations (Wisconsin Administrative Code, Chapter NR 115.03, (2)(a)) require that all residential lots located within unsewered shoreland areas (land located within 1,000 feet of a lake or 300 feet of a river or stream) must, at a minimum, contain 20,000 square feet. This requirement applies to all shoreland areas within the local study area.

Outside of shoreland areas, minimum lot sizes for local study area lands are imposed by county zoning and subdivision control ordinances. Forest County zoning controls require two acre minimum lot sizes in rural areas, one acre minimum lot sizes in villages and urban areas (Forest County Zoning Ordinance, Sections 6.03, 7.03, 10.03), and a 10,000 square foot minimum lot size in sewerage village and urban areas. Forest County townships within the local study area that have not adopted county zoning and are not subject to minimum lot size requirements are the towns of Caswell, Freedom, Nashville, and Ross. However, in June of 1981, all townships within the local study area will be without county zoning unless adopted by the township before that time.

Within Langlade County, minimum lot sizes are set at one acre for all unsewered areas in the county (Langlade County Land Division Ordinance, Section 2.2 (c)). This minimum lot size

requirement is reduced to 20,000 square feet for shoreland areas along with platted city and village areas served by sanitary sewers.

For most areas within Oneida County, minimum lot sizes are set at 50,000 square feet (1.15 acres). This size requirement does not apply in shoreland areas or areas served by sanitary sewage systems. In areas with sewage service, minimum lot sizes are reduced to 10,000 or 15,000 square feet, depending upon the proximity of water bodies (Oneida County Zoning and Shorelands Protection Ordinance, Chapter 9.7).

Mobile Homes. With the exception of a few areas, mobile homes are permitted throughout the local study area. Mobile homes are prohibited from locating in certain shoreland areas of Wabeno, Lincoln, Three Lakes, Newbold, Schoepke, and Pelican towns, as well as in the Laona and Wabeno sanitary districts (Oneida County Zoning and Shoreland Protection Ordinance, Chapter 9.42; personal contacts with Harvey Kopecky and James Baltus, Town Chairmen for Wabeno and Laona). However, except for these areas, mobile homes may locate across the local study area.

There are restrictions in certain areas that require mobile homes to either locate individually or in mobile home parks. For example, across most rural areas of Forest County mobile home parks are prohibited and mobile homes are allowed to locate on an

individual basis only (Forest County Zoning Ordinance, Section 14.04). The cities of Crandon, Antigo, and Rhinelander require that mobile homes be located in mobile home parks (City of Crandon Zoning Ordinance, Section IV; Antigo Zoning Ordinance Section 4.4-2b; Rhinelander Zoning Code, Section 19.03 (3)(b)).

Although these restrictions on mobile home placement do exist, there are no local study area restrictions which limit the absolute number of mobile homes that may locate in any one jurisdiction. Table 2.10-67 provides a listing of the number of mobile homes in each local study area city and township in 1979.

Land Preservation Policy. Langlade County prohibits any subdivision of land located in areas of "high agricultural value" (Langlade County Land Division Ordinance, Section 5.4). At this time, Langlade County is in the process of defining these areas. It has been indicated, however, that this designation will include portions of Ackley, Antigo, Neva, Polar, Price, Rolling, and possibly Norwood townships (personal contact, James Mabry, Langlade County Zoning Administrator).

We assume that areas classified as prime agricultural lands in Figure 2.10-13 will be included in the "high agricultural value" category and will prevent subdivision and residential development of this land. This factor was taken into account in determining available developable land.

Table 2.10-67

MOBILE HOMES, 1970 AND 1979

Jurisdiction	1970	1979	Change 1970-1979	
			Number	Percent
Local Study Area	573	2,492	1,919	434.9
City of Crandon	12	56	44	366.7
City of Antigo	42	88	46	109.5
City of Rhinelander	8	8	0	0.0
Argonne Town	1	35	34	3,400.0
Blackwell Town	20	9	-11	-55.0
Caswell Town	0	22	22	-
Crandon Town	9	106	97	1,077.8
Freedom Town	4	27	23	575.0
Hiles Town	5	23	18	360.0
Laona Town	20	55	35	175.0
Lincoln Town	5	85	80	1,600.0
Nashville Town	8	150	142	1,775.0
Popple River Town	0	16	16	-
Ross Town	6	32	26	433.3
Wabeno Town	13	74	61	469.2
Ackley Town	11	18	7	63.6
Ainsworth Town	7	93	86	1,228.6
Antigo Town	7	50	43	614.3
Elcho Town	8	110	102	1,275.0
Evergreen Town	8	46	38	475.0
Langlade Town	9	45	36	400.0
Neva Town	10	29	19	190.0
Norwood Town	6	24	18	300.0
Parrish Town	0	11	11	-
Peck Town	3	15	12	400.0
Polar Town	6	29	23	383.3
Price Town	5	7	2	40.0
Rolling Town	19	55	36	189.5
Upham Town	2	65	63	3,150.0
Wolf River Town	14	65	51	364.3
Crescent Town	29	79	50	172.4
Enterprise Town	3	8	5	166.7
Lake Tomahawk Town	10	52	42	420.0
Monico Town	8	22	14	175.0
Newbold Town	20	191	171	855.0
Pelican Town	123	241	118	95.9
Piehl Town	4	8	4	100.0
Pine Lake Town	39	126	87	223.1
Schoepke Town	6	49	43	716.7
Stella Town	11	41	30	272.7
Sugar Camp Town	12	60	48	400.0
Three Lakes Town	32	127	95	296.9
Woodboro Town	8	40	32	400.0

SOURCE

Wisconsin Department of Administration. 1980. 1970 Census Summary Tables. Computer printout. Madison.

North Central Wisconsin Regional Planning Commission. Dates vary. Existing Land Use Maps by township and city. Wausau.

2.10.4 PUBLIC FACILITIES AND SERVICES PROFILE

This subsection provides current and historical information on public facilities and services in the local study area. The information includes the types and locations of public facilities, service descriptions, and the capacity of the service to accommodate additional populations.

By studying the supply, demand, and cost trends of public facilities and services--the central elements in projecting service impacts of population growth--local study area officials can plan for the future. However, this decision-making requires knowing not only what services are available but also whether they are adequate for present needs and can accommodate growth.

Planning standards and design criteria have been established in planning literature according to the type (rural or urban) and size of the community (DeChiara and Koppelman, 1975). However, deriving a set of planning standards and design criteria is not a precise art, particularly in adjusting them to fit local conditions (Stenehjem and Metzger, 1976). Many nationally recognized standards, such as minimum levels of police and fire protection, were developed for industrial areas with large populations. Little information has been accumulated on the service requirements in small rural communities with fewer than several thousand residents. After considering all available standards, we have reached the conclusion that with the exception of water and wastewater discharge quality, no minimum standards

have been developed which reflect the needs of the small communities in northern Wisconsin. Thus, we feel that local community officials and permanent residents can best determine their service requirements.

We collected data through telephone and personal interviews with local officials responsible for or knowledgeable about specific facilities or services. A variety of information was requested, including factual information and subjective feelings as to the service adequacy. The information was then translated into per capita statistics for service costs, service demand, population/staff ratios, and effective reserve capacities (number of additional people an existing facility can serve). A set of planning standards will be derived from these per capita statistics and used in the public facilities and services computer model to assess the overall impact of growth on the service infrastructure of a community.

In addition, a survey of permanent residents in the local study area was conducted. The respondents were asked to rate the public facilities and services currently available in their area. Our thinking is that public facilities and services should be treated as any other consumer good available for purchase. In this case, the residents purchase facilities and services through taxes and user fees; the level of services are controlled by the tax rates levied and user fees charged. Thus, if the residents are satisfied with the current level of services--regardless of

how this compares with other communities--then this level is adequate as long as it satisfies existing state, federal, and local regulations.

As described later in this chapter, permanent residents were generally satisfied with the current levels of public services.

We collected data on the following 14 types of facilities and services:

- Police Protection
- Fire Protection
- Streets and Roads
- Solid Waste Disposal
- Water Service
- Wastewater Treatment
- Library Services
- Recreation
- Public Education
- Emergency Medical Services
- General Government
- Health Facilities and Public Health and Welfare Services
- Utilities
- Public Transportation

Our data include both publicly and privately owned services and facilities.

The jurisdictions for which we provide data on specific services and facilities are counties, incorporated cities and secondary service centers, and other towns and school districts. Secondary service centers are towns distinguished from other towns by their larger populations, particularly population concentrations in a single center within a town, and their larger variety of available services. Secondary service centers in the local study area are: Elcho, Laona, Three Lakes, and Wabeno towns, and White Lake Village.

2.10.4.1 Summary of Current Levels of Satisfaction

Local officials generally reported that current service levels are satisfactory. However, actual service levels in towns without larger population centers are not easily identified. Many services in towns, such as police and fire protection, are provided on a part-time or volunteer basis. Others, such as solid waste disposal, libraries, emergency medical services, and health and welfare, are provided in cooperation with other jurisdictions. Furthermore, the less populated towns rely on individual wells and septic tanks rather than provide central water or wastewater systems.

The services with the greatest potential impact on growth and development are streets and roads, water, and wastewater. Among the remaining public services, police, fire protection, and education were important concerns of current residents in the local study area.

Among local study area jurisdictions, the poorest road conditions were reported in Crandon, where local officials stated 65.0 percent of roadways need resurfacing. Other jurisdictions reported adequate roads needing minor repairs. For all the jurisdictions, a minority of the respondents to the permanent residents survey rated street upkeep in their communities good (34.1 percent) or very good (8.8 percent). Responses from urban

areas were similar to those from rural areas, although city respondents rated street maintenance slightly more favorably.

Centralized water services are provided by municipal utilities in the three cities and by sanitary districts in the five secondary service centers. Three water systems had reserve capacities, and all water systems have been improved in the past ten years. The Wisconsin Department of Natural Resources considers water quality in the area very good.

Wastewater treatment services are provided jointly with the centralized water systems. Five systems had reserve capacities which could serve from 202 new users (Three Lakes Town) to 11,846 additional residents (Rhineland). Crandon, the only jurisdiction presently failing to meet state water quality discharge standards, has a new wastewater treatment facility scheduled to open in 1981, which is expected to improve its performance.

Seven cities and secondary service centers provide solid waste disposal services. The exception is the city of Rhineland, which does not currently manage its own facility but contracts with Oneida County.

The five centers with part-time law enforcement constables or officers also relied on the county sheriff. The majority of respondents to the permanent residents survey rated police protection in their communities good or very good. However, two communities, Laona Town and White Lake Village, rated their

police service as fair. More urban respondents than rural respondents rated their service very good.

All the secondary service centers and the city of Crandon provide volunteer fire protection; only the cities of Antigo and Rhinelander have full-time paid fire departments. In the permanent residents survey, most respondents rated fire protection good or very good in their communities. More respondents in urban areas than in rural areas rated their service very good.

Emergency medical services are provided in all eight cities and secondary service centers. Reported services are staffed by volunteer technicians and funded by a variety of sources. Emergency patients are usually transported to St. Mary's Hospital in Rhinelander or Langlade County Hospital in Antigo, or to Howard Young Center in Eagle River or to a Wausau hospital.

Library services are provided in all eight cities and secondary service centers. Per capita expenditures varied almost tenfold among the jurisdictions. However, some of the libraries serve more than one jurisdiction, making per capita comparisons difficult.

In 1979, per capita expenditures for recreation facilities in the eight cities and secondary service centers ranged from \$0.90 in Elcho Town to \$28.88 in Rhinelander, while four jurisdictions spent less than \$10.00 per capita. In the permanent residents survey, most respondents rated outdoor

recreation in their communities good or very good. Although rural respondents rated outdoor recreation facilities more favorably, most responses were similar to those of urban residents.

Education services are considered important by residents with school children. Ten school districts serve the local study area, but Northland Pines and Lakeland districts are only marginally contained in the local study area and are therefore excluded from our assessment.

In the permanent residents survey, the majority of respondents rated the public schools in their communities good or very good. "City" respondents tended to rate their schools higher than did "rural" respondents. When asked to rate their school district, respondents generally selected their own school district as the "most recommended".

<u>Resident of School District</u>	<u>Rating of Respondents Own School District</u>	
	<u>Most Recommended (Percent)</u>	<u>Least Recommended (Percent)</u>
Wabeno	83	2
Antigo	80	35
Laona	78	6
Crandon	72	10
Rhineland	65	36
Three Lakes	54	27
Elcho	48	14
White Lake	14	5

Local study area health services are focused around St. Mary's Hospital in Rhinelander and Langlade Memorial Hospital in Antigo. Persons in the local study area have a maximum travel distance of 20 miles to the nearest of several clinics. A variety of social services is available to the local study area, although they are primarily administered in Rhinelander, Crandon, and Antigo. There is an identified need for more nurses in all three counties.

In the permanent residents survey, most respondents rated medical care in their communities good (41.7 percent) or very good (26.9 percent). A portion rated it fair (20.7 percent). The responses from city and rural areas are similar.

The majority of respondents rated dental care in their communities good or very good. A higher percentage of city respondents than rural respondents regarded their dental care very good.

In summary, current adequacy of most facilities and services in the local study area is considered good by local officials and residents. Furthermore, several services have reserve capacities to accommodate measured growth. Per capita and staffing standards will indicate growth impacts and additional service requirements.

Public facilities and services are organized in this profile by type. Per capita costs and service levels are presented in summary tables which allow comparisons between local study area jurisdictions. Descriptive data on each service and facility specific to a jurisdiction are presented in additional tables to be found in Appendix 2.10-A.

As mentioned previously, the public facilities and services data were collected by telephone and personal interviews with local officials, who had the opportunity to review these data prior to publication. Their comments provide the basis for conclusions about historical trends and adequacies of facilities and services.

2.10.4.2 Description of Public Facilities and Services

The services examined in this socioeconomic assessment are those that are most likely to be affected by growth. Moreover, the governmental services examined in detail constitute the majority of public expenditures. Services not treated individually are aggregated to describe expenditure trends. Privately owned and operated services necessary to accommodate growth, such as electric utilities, telephone services, and bus services, are also discussed. Few jurisdictions in the local study area provide all types of services included in the profile; in some cases, services are purchased from a neighboring

jurisdiction. Table 2.10-68 identifies the facilities and services provided by each jurisdiction.

Service cost trends are derived from per capita annual expenditure data and are exhibited in summary Table 2.10-69 as the 1979 dollar costs per capita for each service and jurisdiction.

Expenditures and capital projects are discussed for each jurisdiction level. Appendix 2.10A, Tables A-1, A-3, A-14, and A-16 summarize the spending patterns for the jurisdictions over the past seven years by service category, total expenditure, and per capita expenditure.

Expenditure data reflect only the governmental cost of providing the service. For example, much of the local study area relies on volunteer fire departments for fire protection; the expenditure data for that type of fire protection service represents only governmental contributions, not fund raisers and other sources of revenue.

The subheading "capital projects/direct appropriations" refers to capital projects expenditures made with current appropriations or cash. On the other hand, the main heading "capital projects" refers to expenditures made fully or partially with borrowed funds. School district tables do not show a separate capital projects category. This information was primarily derived from annual reports provided by the Wisconsin

Table 2.10-68

FACILITIES AND SERVICES BY JURISDICTION

<u>Facilities and Services</u>	<u>Local Study Area^a</u>	<u>County</u>	<u>City and Secondary Service Center</u>	<u>Town- ship</u>	<u>School District</u>
Summary Expenditures and Capital Projects Table		X	X	X	X
Police Service		X	X	X	
Fire Protection			X	X	
Streets and Roads		X	X	X	
Solid Waste Disposal		X	X	X	
Water Supply			X	X	
Wastewater Treatment			X	X	
Library			X	X	
Recreation		X	X	X	
Education				X	X
Emergency Medical Service		X	X	X	
General Government		X	X	X	
Health and Welfare		X			
Public Transportation	X	X			
Utilities	X				
Electricity					
Fuel oil					
Natural or LP gas					
Telephone service					

NOTE

^aLocal study area is a nonpolitical designation.

Table 2.10-69

PER CAPITA EXPENDITURES, SUMMARY
1979
(dollars)

<u>Jurisdiction</u>	<u>General Adminis- tration</u>	<u>Public Safety</u>	<u>Health and Social Services</u>	<u>Transpor- tation</u>	<u>Sanitation</u>	<u>Conser- vation and Leisure</u>	<u>Capital Projects/ Direct Appro- priations</u>	<u>Principal and Interest</u>	<u>Other</u>	<u>Total General Operations</u>	<u>Enter- prises</u>
Counties											
Forest County	36.34	38.56	177.01	118.97	0.00	8.19	26.27	0.71	23.37	429.43	0.00
Langlade County	22.56	22.83	108.05	94.50	0.79	16.74	26.56	6.74	11.93	310.69	0.00
Oneida County	25.25	25.28	118.26	44.03	5.88	9.52	0.75	6.24	9.43	244.65	0.00
Cities and Secondary Service Centers											
City of Crandon	19.09	55.11	0.22	60.74	12.33	7.79	0.00	8.65	43.05	206.98	50.30
City of Antigo	34.27	90.48	3.96	77.64	18.53	41.54	90.30	34.06	93.65	484.42	66.30
City of Rhinelander	34.91	114.20	2.51	120.21	14.86	42.57	46.22	35.27	43.82	454.57	0.00
Laona Town	20.25	18.54	0.00	54.12	10.43	7.43	0.00	0.00	10.29	121.06	0.00
Wabeno Town	16.94	23.09	0.18	86.22	2.81	21.25	0.00	5.79	23.09	179.37	0.00
Elcho Town	18.46	34.84	0.45	72.22	9.86	0.90	0.00	0.00	8.60	145.34	0.00
White Lake Village	45.13	83.44	0.32	56.49	15.91	28.90	0.00	7.79	18.83	256.82	237.01
Three Lakes Town	80.38	34.65	0.69	122.89	6.77	25.59	0.00	0.00	18.65	289.62	0.00
Townships											
Argonne Town	15.59	6.47	0.00	146.28	9.35	0.23	0.00	0.00	20.38	199.04	0.00
Blackwell Town	12.91	2.20	0.00	139.29	10.71	0.00	0.00	0.00	18.68	183.79	0.00
Caswell Town	46.15	5.77	0.00	85.58	11.54	0.00	138.46	117.31	40.38	445.19	0.00
Crandon Town	7.61	2.85	0.00	34.55	3.17	9.51	0.00	0.00	4.60	62.28	0.00
Freedom Town	21.54	4.18	0.32	150.80	3.54	0.64	0.00	40.19	12.54	233.76	0.00
Hiles Town	30.77	5.98	0.28	108.26	12.54	0.00	170.66	0.00	124.22	452.71	0.00
Lincoln Town	31.69	3.64	0.00	241.11	13.92	0.00	0.00	0.00	12.21	302.57	0.00
Nashville Town	39.43	7.95	0.00	113.64	8.25	0.75	0.00	19.79	22.49	212.29	0.00
Popple River Town	85.45	9.09	0.00	347.27	7.27	0.00	0.00	0.00	112.73	561.82	0.00
Ross Town	23.66	7.53	16.13	86.56	5.91	0.54	0.00	0.00	19.89	160.22	0.00
Ackley Town	13.73	14.41	0.85	120.34	4.75	0.51	0.00	0.00	8.64	163.22	0.00
Ainsworth Town	15.45	6.01	1.07	70.39	2.36	0.21	0.00	0.00	7.30	102.79	0.00

(continued)

(Table 2.10-69, continued)

<u>Jurisdiction</u>	<u>General Administration</u>	<u>Public Safety</u>	<u>Health and Social Services</u>	<u>Transportation</u>	<u>Sanitation</u>	<u>Conservation and Leisure</u>	<u>Capital Projects/Direct Appropriations</u>	<u>Principal and Interest</u>	<u>Other</u>	<u>Total General Operations</u>	<u>Enterprises</u>
Townships (continued)											
Antigo Town	9.90	7.63	0.00	72.62	4.70	0.00	0.00	0.00	4.54	99.39	0.00
Evergreen Town	8.63	4.00	0.42	62.95	1.68	1.05	0.00	0.00	22.74	101.47	0.00
Langlade Town	19.22	9.35	0.26	94.55	3.64	3.38	0.00	0.00	22.60	152.99	0.00
Neva Town	9.64	10.88	0.68	34.92	1.59	0.00	0.00	0.00	3.97	61.68	0.00
Norwood Town	8.31	4.67	0.00	77.79	1.25	3.64	0.00	14.92	7.74	118.34	0.00
Parrish Town	42.50	6.25	1.25	55.00	6.25	0.00	0.00	0.00	62.50	173.75	0.00
Peck Town	14.84	25.26	0.00	62.76	1.30	0.00	0.00	9.64	5.21	119.01	0.00
Polar Town	9.57	4.52	0.13	89.13	1.94	1.94	0.00	0.00	1.94	109.18	0.00
Price Town	19.68	6.67	0.32	53.66	5.40	0.32	0.00	0.00	33.65	119.68	0.00
Rolling Town	10.21	10.04	0.26	34.56	0.00	0.00	0.00	0.00	2.98	58.04	0.00
Upham Town	14.02	6.82	0.76	73.48	3.79	0.00	0.00	0.06	41.86	140.72	0.00
Wolf River Town	17.48	7.40	4.09	82.05	11.34	0.00	0.00	0.00	15.28	137.64	0.00
Crescent Town	8.68	18.82	0.00	68.12	2.52	0.39	0.00	0.00	1.18	99.72	0.00
Enterprise Town	36.03	7.69	0.00	53.04	10.53	0.81	0.00	0.00	9.31	117.41	0.00
Lake Tomahawk Town	49.49	15.37	0.51	189.19	12.50	20.78	0.00	24.32	46.62	358.78	0.00
Monico Town	39.25	2.73	0.34	62.46	9.56	4.78	0.00	31.06	10.58	160.76	0.00
Newbold Town	14.02	6.63	0.30	65.38	2.36	0.00	0.00	0.00	4.82	93.51	0.00
Pelican Town	6.92	5.18	0.16	51.67	3.82	0.06	0.75	0.00	2.20	70.75	0.00
Piehl Town	29.47	0.00	0.00	60.00	8.42	0.00	0.00	0.00	7.37	105.26	0.00
Pine Lake Town	10.69	8.53	0.04	56.86	3.88	0.12	0.00	0.00	3.71	83.84	0.00
Schoepke Town	29.47	10.53	0.26	94.21	10.79	1.58	0.00	8.16	18.16	173.16	0.00
Stella Town	17.14	1.56	0.26	54.81	3.90	0.00	12.99	8.57	15.58	114.81	0.00
Sugar Camp Town	19.08	8.16	0.17	137.46	4.98	0.86	0.00	0.00	9.45	180.15	0.00
Woodboro Town	18.69	1.80	0.23	138.29	10.36	0.23	0.00	0.00	3.15	172.75	0.00

SOURCE

Appendix 2.10A, Tables A-1, A-3, and A-14.

Department of Revenue and the Wisconsin Department of Public Instruction.

Police Protection. Police protection is summarized in Table 2.10-70 and discussed for the counties, cities and secondary service centers, and towns in Appendix 2.10A, Tables A-2, A-4, and A-15. Police information for counties and towns is briefly described along with their other facilities and services. Information from cities and service centers is more extensive and, where available, describes police facilities, including detention, equipment and vehicles, number of officers and support staff, salary and operating expenditures, service area, and planned modifications.

Annual police service costs per resident in 1979 ranged from \$57.95 in Rhineland to \$34.34 in Crandon for the three cities in the local study area, and from \$27.71 in Three Lakes Town to \$1.95 in White Lake Village among the local study area secondary service centers. The annual cost per officer shows similar relationships with the high among the cities in Rhineland (\$24,400 per officer) and the low in Crandon (\$15,880 per officer), and the high in the service centers in Three Lakes Town (\$16,100 per officer) and the low cost occurring in White Lake Village (\$600 per officer).

White Lake Village had the highest ratio of officers per 1,000 population (3.2), followed by Rhineland (2.9), Crandon

Table 2.10-70

POLICE SERVICE, SUMMARY
1979

<u>Jurisdiction</u>	<u>Law Enforcement Personnel/1,000 Population</u>	<u>Per Capita Expenditure (dollars)</u>	<u>Per Officer Expenditure (\$ 000)</u>
City of Grandon	2.7	34.34	15.88
City of Antigo	1.9	42.10	22.5
City of Rhinelander	2.9	57.95	24.4
Laona Town	0.7	9.61	14.1
Wabeno Town	0.9	25.37	28.9
Elcho Town	0.9	4.52	5.0
White Lake Village	3.2	1.95	0.6
Three Lakes Town	1.7	27.71	16.1

SOURCE

Appendix 2.10A, Table A-4.

(2.7), Antigo (1.9), Three Lakes (1.7), Wabeno (0.9), Elcho (0.9), and Laona (0.7).

Fire Protection. Fire protection is summarized in Table 2.10-71, and discussed for cities and secondary service centers and towns in Appendix 2.10A, Tables A-5 and A-15. Town fire protection information is briefly described along with their other facilities and services. Information on cities and service centers is more extensive and, where available, describes fire protection facilities, equipment and vehicles, number of firemen, salary and operating expenditures, key fire insurance ratings, service area, and planned modifications.

All the secondary service centers as well as the city of Crandon are served by voluntary fire departments. Crandon does employ a part-time fire chief and assistant fire chief. The annual cost of service per resident in 1979 (for volunteer fire departments) ranged from \$79.87 in White Lake Village to \$4.74 in Wabeno Town. The annual cost per fireman similarly ranged from \$700 in White Lake Village to \$180 in Wabeno Town. Crandon reported a cost of \$1,310 per fireman, reflecting their part-time personnel. For the cities of Antigo and Rhinelander, the annual cost of service per resident was \$48.39 and \$55.60, respectively. The cost per fireman in 1979 was \$24,380 and \$33,400, respectively.

Table 2.10-71

FIRE PROTECTION, SUMMARY
1979

<u>Jurisdiction</u>	<u>Firemen/1,000 Population</u>	<u>Per Capita Expenditure (dollars)</u>	<u>Per Fireman Expenditure (\$ 000)</u>
City of Crandon	15.1(v) ^a	19.90	1.31
City of Antigo	2.0	48.39	24.38
City of Rhinelander	1.7	55.60	33.4
Laona Town	16.4(v)	8.93	0.55
Wabeno Town	26.3(v)	4.74	0.18
Elcho Town	22.6(v)	12.94	0.57
White Lake Village	35.0(v)	79.87	0.70
Three Lakes Town	14.3(v)	4.88	0.34

NOTE

^a(v) = Volunteer firemen

SOURCE

Appendix 2.10A, Table A-5.

The ratio of firemen per 1,000 population varied widely among the cities and secondary service centers. White Lake Village had 35 officers per 1,000 population, followed by Wabeno (26.3), Elcho (22.6), Laona (16.4), Crandon (15.1), Three Lakes (14.3), and Antigo and Rhinelander (2.0 and 1.7).

Streets and Roads. Streets and roads are summarized in Table 2.10-72 and discussed for counties, cities and secondary service centers, and towns in Appendix 2.10A, Tables A-2, A-6, and A-15. The streets and roads information for counties and towns is briefly described along with their other facilities and services. Information for cities and service centers is more extensive and, where available, describes miles of roadway, equipment, number of staff, salary and operating expenditures, and planned modifications.

Of the eight service centers and cities, only Three Lakes Town had an unusually high annual service cost per resident in 1979 (\$120.60)--more than double the cost for the local study area low in Laona Town (\$54.06). The annual service cost per capita in the three cities was \$58.24 in Rhinelander, \$59.71 in Crandon, and \$77.63 in Antigo. The secondary service centers, other than Three Lakes, ranged from \$54.06 in Laona to \$86.22 in Wabeno. The cost per mile of roadway was highest in the cities--particularly in Antigo (\$12,400 per mile) and Rhinelander (\$11,190 per mile)--with the cost in Crandon at \$4,460 per mile

Table 2.10-72

STREETS AND ROADS, SUMMARY
1979

<u>Jurisdiction</u>	<u>Streets and Roads/1,000 Population (miles)</u>	<u>Per Capita Expenditure (dollars)</u>	<u>Per Mile Expenditure (\$ 000)</u>
City of Crandon	13.4	59.71	4.46
City of Antigo	6.3	77.63	12.40
City of Rhinelander	5.2	58.24	11.19
Laona Town	38.4	54.06	1.41
Wabeno Town	86.9	86.22	0.99
Elcho Town	69.6	72.22	1.04
White Lake Village	20.6	56.49	2.74
Three Lakes Town	70.0	120.60	1.72

SOURCE

Appendix 2.10A, Table A-6.

in 1979. The secondary service centers all ranged in cost from \$1,000 per mile in Wabeno and Elcho, to \$1,720 per mile in Three Lakes, with White Lake Village having the highest cost per mile in 1979 of \$2,740.

The miles of roadway per 1,000 population varied from a low of 5.2 miles in Rhinelander to highs of 70 miles in Three Lakes Town and 86.9 miles in Wabeno Town.

The data for the project-related traffic analysis will be compiled after the with-project employee distribution identifies the traffic analysis impact area.

Solid Waste Disposal. Solid waste disposal is summarized in Table 2.10-73 and discussed for counties, cities and secondary service centers, and towns in Appendix 2.10A, Tables A-2, A-7, and A-15. Solid waste disposal information for counties and towns is briefly described along with their other facilities and services. Information on cities and service centers is more extensive and, where available, describes solid waste disposal sites, equipment, number of staff, salary and operating expenditures, operating conditions, expected remaining useful life, and planned modifications.

Per capita expenditures for Crandon, Antigo, and Rhinelander were \$9.19, \$6.97 and \$7.44, respectively. Wabeno Town had the lowest per capita solid waste disposal expenditure (\$2.81) and

Table 2.10-73

SOLID WASTE DISPOSAL, SUMMARY
1979

<u>Jurisdiction</u>	<u>Per Capita Expenditure (dollars)^a</u>
City of Crandon	9.19
City of Antigo	6.97
City of Rhinelander	7.44
Laona Town	6.27
Wabeno Town	2.81
Elcho Town	8.69
White Lake Village	11.36
Three Lakes Town	6.77

NOTE

^aFor solid waste disposal only; collection not included.

SOURCE

Appendix 2.10A, Table A-7.

White Lake Village had the highest (\$11.36) for the secondary service centers.

Water Service. Water service is summarized in Table 2.10-74 and discussed for cities and secondary service centers and towns in Appendix 2.10A, Tables A-8 and A-15. The water service information for towns is briefly described along with their other facilities and services. Most towns are serviced by individual wells. Information on cities and service centers is more extensive and, where available, describes the centralized water facilities, equipment, service area, number of staff, service capacity and demand, operating expenditures, production and consumption by type of user, estimated per capita consumption, and planned modifications.

The three cities provide water supplies to their residents through municipal systems. The secondary service centers are supplied through sanitary utility districts. All residents outside of these areas rely on individual water wells.

The annual cost of service per resident ranged in 1979 from \$23.70 in Crandon to \$35.16 in Antigo for the cities. The secondary service centers varied much more widely with a low service cost of \$20.25 per capita in Laona to a high of \$63.58 per capita in White Lake Village. All jurisdictions except White Lake Village had annual service costs per capita for water of \$35 or less in 1979.

Table 2.10-74

WATER SUPPLY, SUMMARY
1979

<u>Jurisdiction</u>	<u>Annual Service Cost Per Person (\$/Person)</u>	<u>Adjusted Peak Daily Service Demand Per Person (gal./person)</u>	<u>Maximum Eff. Capacity (gal./day)</u>	<u>Peak Demand (gal./day)</u>	<u>Effective Reserve Capacity (gal./day)</u>	<u>Additional User Capacity (new users)</u>
Crandon	23.70	120.9	480,000 ^a	208,000	272,000	2,250
Antigo	35.16	149.8	1,554,000	1,206,000	348,000	2,323
Whineland	31.18	364.2	6,760,000	3,010,000	3,750,000	10,296
Laona Town	20.25	198.3	314,000	211,500	102,500	517
Wabeno Town	22.78	343.5	480,000	306,000	174,000	507
Elcho Town	30.22	148.1	576,000	66,600	509,400	3,440
White Lake Village	63.58	151.7	100,000	59,900	40,100	264
Three Lakes Town	26.94	327.9	432,000	193,500	238,500	727

NOTE

^aCapacity reflects Crandon's new facility opened in Spring, 1981.

SOURCE

Appendix 2.10A, Table A-8.

Rhinelanders had the highest production capacity for its water supply system, with an ability to provide 6,760,000 gallons per day. The other two cities had much lower maximum capacities (1,554,000 gallons per day in Antigo and 480,000 gallons per day in Crandon) as did the service centers, which ranged from 576,000 gallons per day of maximum capacity in Elcho to 100,000 gallons per day in White Lake Village. Because of additional storage capacities, each jurisdiction can handle peak loads higher than their maximum production capacities.

Rhinelanders also had the highest level of peak demand on its system (3,010,000 gallons per day) in 1979. This was followed by Antigo (1,206,000 gallons per day), Crandon (208,000), and by the secondary service centers which ranged from a peak of 306,000 gallons per day in Wabeno Town to 59,900 gallons per day in White Lake Village.

Local officials reported that peak demands generally occurred during periods of extreme cold where water was run through the system to keep pipes from freezing. This contrasts with other regions which experience peak demands during summer months.

All of the eight jurisdictions reported sufficient reserve capacity which could serve new users.

Wastewater Treatment. Wastewater treatment is summarized in Table 2.10-75 and discussed for cities and secondary service

Table 2.10-75

WASTEWATER TREATMENT, SUMMARY
1979

<u>Cities and Secondary Service Centers</u>	<u>Annual Service Cost Per Person (\$/Person)</u>	<u>Adjusted Peak Daily Demand Per Person (gal./person)</u>	<u>Maximum Eff. Capacity (gal./day)</u>	<u>Peak Demand (gal./day)</u>	<u>Effective Reserve Capacity (gal./day)</u>	<u>Additional User Capacity (new pop.)</u>
Crandon	21.98	84.8	260,000 ^a	146,200	113,800	1,342
Antigo	32.40	194.4	2,500,000	1,804,300	695,700	3,579
Rhinelander	23.82	274.6	4,000,000	2,168,900	1,831,100	6,668
Laona Town	18.01	146.3	792,000	156,000	636,000	4,367
Wabeno Town	36.48	86.3	130,000	76,900	53,100	6,153
Elcho Town	35.11	347.3	60,000	156,300	0	0
White Lake Village	53.91	121.7	50,000	50,100	0	0
Three Lakes Town	81.16	145.7	140,000	80,400	59,600	409

NOTE

^aCapacity reflects Crandon's new facility opened in Spring, 1981.

SOURCE

Appendix 2.10A, Table A-9.

centers and towns in Appendix 2.10A, Tables A-9 and A-15. The wastewater treatment information for towns is briefly described along with their other facilities and services. Most towns are serviced by septic tank systems. Information on the cities and service centers is more extensive, and where available, describes the centralized wastewater treatment facilities, equipment, service area, number of staff, service capacity and demand, operating expenditures, consumption by type of user, and planned modifications.

Of the three cities, Antigo had the highest annual per capita service cost for wastewater treatment in 1979 (\$32.40). Crandon and Rhinelander experienced similar per capita costs (\$21.98 and \$23.82, respectively). All of the secondary service centers except Laona Town had higher per capita service costs than the cities. Three Lakes Town had the highest per capita service cost (\$81.16), followed by White Lake Village (\$53.91), Wabeno Town (\$36.48), Elcho Town (\$35.11), and Laona Town (\$18.00).

As in water supplies, Rhinelander had the highest maximum effective capacity for wastewater treatment (4,000,000 gallons per day) followed by Antigo (2,500,000 gallons per day). Rhinelander reported the highest peak demand of the three cities (2,168,900 gallons per day). This translates into a relatively high effective reserve capacity (1,831,100 gallons per day) for Rhinelander, with a capacity to serve 6,668 new users. Antigo

had an effective reserve capacity of 695,700 gallons per day and could serve 3,579 new users.

Crandon officials reported a maximum capacity of 260,000 gallons per day in 1979, and a peak demand of 146,200 gallons per day, leaving a reserve capacity of 113,800 gallons per day. Crandon has sufficient capacity to serve 1,342 additional users.

Among the secondary service centers, Elcho Town and White Lake Village both reported peak demands in 1979 (156,300 and 50,100 gallons per day) higher than their maximum effective capacity (60,000 and 50,000 gallons per day, respectively). Neither, then, have a reserve capacity or can add new users based upon their 1979 peak levels of service. Laona Town reported the highest effective reserve capacity (636,000 gallons per day versus a peak of 156,000 gallons per day), allowing 4,367 additional users.

Library Services. Library services are summarized in Table 2.10-76 and discussed for cities and secondary service centers and towns in Appendix 2.10A, Tables A-10 and A-15. The library service information for towns is briefly described along with their other facilities and services. Information on cities and service centers is more extensive, and, where available, describes the library facilities, number of volumes and periodicals, number of staff, salary and operating expenditures, service area, operating hours, and planned modifications.

Table 2.10-76

LIBRARY, SUMMARY
1979

<u>Jurisdiction</u>	<u>Volumes Per Capita Served</u>	<u>Per Capita Expenditures (dollars)</u>	<u>Per Volume Expenditures (dollars)</u>	<u>Serves Other Jurisdictions</u>
City of Crandon	3.4	3.20	0.93	yes
City of Antigo	3.0	7.73	2.59	yes
City of Rhinelander	1.7	4.46	2.58	yes
Laona Town	8.2	6.41	0.78	no
Wabeno Town	11.4	5.62	0.49	yes
Elcho Town ^a	--	--	--	--
White Lake Village	15.7	1.89	0.12	yes
Three Lakes Town	7.5	3.69	2.15	yes

NOTE

^aPart of Antigo library system.

SOURCE

Appendix 2.10A, Table A-10.

Each of the cities and secondary service centers has library services. Elcho, however, is part of the Antigo library system and not reported separately. Because the remaining jurisdictions, except Laona, serve other jurisdictions, per capita expenditures are hard to compare. More descriptive measures would include volumes per capita served, and per volume expenditures. For the cities, Crandon reports the highest number of volumes per capita served (3.4), followed by Antigo (3.0) and Rhinelander (1.7). However, in terms of per volume expenditure, Crandon ranks the lowest (\$0.93), followed by Rhinelander and Antigo (\$2.58 and \$2.59, respectively).

White Lake Village had the highest number of volumes per capita in 1979 for the secondary service centers (15.7), followed by Wabeno (11.4), Laona (8.2), and Three Lakes (7.5). The per volume expenditures were lowest for White Lake Village (\$0.12) and Wabeno (\$0.49). Only Three Lakes (\$2.15 per volume) approached per volume expenditure levels in Antigo or Rhinelander.

Recreation. Recreation is summarized in Table 2.10-77 and discussed for counties, cities and secondary service centers, and towns in Appendix 2.10A, Tables A-2, A-11, and A-15. The recreation information for the counties and towns is briefly described along with their other facilities and services summaries. Information on cities and service centers is more

Table 2.10-77

RECREATION, SUMMARY
1979

<u>Jurisdiction</u>	<u>Recreation Acreage/ 1,000 Population (acres)</u>	<u>Per Capita Expenditure (dollars)</u>	<u>Per Acre Expenditure (\$ 000)</u>
City of Crandon	6.2 ^a	2.22	0.36 ^a
City of Antigo	5.0	20.05	4.04
City of Rhinelander	8.9	28.88	3.24
Laona Town	6.4 ^a	0.95	0.15 ^a
Wabeno Town	5.7 ^a	15.63	2.70 ^a
Elcho Town	4.5	0.90	0.20
White Lake Village	4.5	25.00	1.71
Three Lakes Town	6.9	9.58	1.39

NOTE

^aNumbers are based on estimates of acreage.

SOURCE

Appendix 2.10A, Table A-11.

extensive and, where available, describes the individual parks and facilities, equipment, number of staff, salary and operating expenditures, and planned modifications.

Per capita expenditures for recreation varied widely between the jurisdictions. Among the cities, Crandon averaged \$2.22 per capita in 1979; Antigo spent \$20.05, and Rhinelander spent \$28.88 per capita. Elcho and Laona had the lowest per capita expenditures among the towns (\$0.90 and \$0.95, respectively), followed by Three Lakes (\$9.58) and Wabeno (\$15.63). White Lake Village had the highest per capita expenditure for recreation (\$25.00)

The recreation acreage available in the cities were Crandon with 6.2 acres per 1,000 population in 1979, Antigo with 5.0 acres per 1,000 population, and Rhinelander with 8.9 acres. Three Lakes had 6.9 acres of recreational area per 1,000 population, while Elcho Town and White Lake Village had 4.5 acres. Per acre expenditures for 1979 for the cities were Antigo (\$4.04), Rhinelander (\$3.24), and Crandon (\$0.36), and for the secondary service centers ranged from \$2.70 in Wabeno Town to \$0.15 in Laona Town.

Public Education. Education is summarized in Table 2.10-78 and discussed for school districts and towns in Appendix 2.10A, Tables A-15 through A-20. The education information for towns identifies schools located in each town and the school district

Table 2.10-78

EDUCATION, SUMMARY
1979

<u>School Districts</u>	<u>Annual Service Cost \$/Pupil</u>	<u>Student/ Staff Ratio</u>	<u>New Student Capacity</u>
Crandon	1,352.86	18.1	80
Laona	1,918.36	12.7	125
Wabeno	1,647.05	14.8	120
Antigo	1,714.90	16.8	302
Elcho	1,663.70	14.7	150
White Lake	1,919.02	13.0	50
Rhineland	1,588.18	16.6	275
Three Lakes	1,744.81	16.2	75

SOURCE

Appendix 2.10A, Tables A-16, A-17, and A-19.

serving each town, along with their other facilities and services summaries. School district information is more extensive, and where available, describes number and type of facilities, educational equipment, number of staff, salary and operating expenditures, student/staff ratios, bus program, curriculum, service area, capacities, enrollment, and planned modifications.

Annual cost per pupil varies somewhat among the various school districts. The costs in 1979 were generally higher in the school districts serving the secondary service centers than the cities. For example, the school districts serving Crandon, Antigo, and Rhinelander had an annual cost per pupil of \$1,352.86, \$1,714.90, and \$1,588.18, respectively. The districts serving the service centers, however, had annual costs ranging from \$1,647.05 in Wabeno to \$1,919.02 in White Lake Village. Only Wabeno and Elcho had lower service costs per pupil than Antigo.

In contrast, the student to staff ratio was higher in each of the three cities than in the secondary service centers. Crandon, Antigo, and Rhinelander had student to staff ratios of 18.1, 16.8, and 16.6, respectively. The secondary service centers' student to staff ratios range from 12.7 in Laona to 16.2 in Three Lakes.

Each of the eight school districts has the capacity to handle new students. In 1979, White Lake had the lowest excess capacity, capable of handling 50 additional students. Wabeno had

the highest excess capacity (240 additional students) among the secondary service centers. Crandon could have accommodated 80 new students in 1979, Antigo 302, and Rhinelander 275.

Emergency Medical Services. Emergency medical services are summarized in Table 2.10-79 and discussed for counties, cities and secondary service centers, and towns in Appendix 2.10A, Tables A-2, A-12, and A-15. The emergency medical service information for counties and towns is briefly described along with their other facilities and services. Information on the cities and service centers is more extensive and, where available, describes the location of facilities, equipment and vehicles, number of certified staff, salary and operating expenditures, response and run times, and planned modifications.

Crandon reported 10.8 emergency medical service personnel per 1,000 population in 1979, compared to 2.7 personnel per 1,000 population in Antigo and Rhinelander. Per capita personnel ratios among the secondary service centers ranged from a local study area low of 5.2 in Three Lakes, to a high of 29.2 in White Lake Village. White Lake Village and Crandon reported that their emergency medical services are funded through user fees, service contracts, donations, and government aid. Laona Town reported only government support and donations as funding sources for its emergency services. The remaining jurisdictions did not provide this information.

Table 2.10-79

EMERGENCY MEDICAL SERVICE, SUMMARY
1979

<u>Jurisdiction</u>	<u>EMS Personnel/ 1,000 Population</u>	<u>Funding Source</u>			
		<u>Government Support</u>	<u>Service Contracts</u>	<u>User Fees</u>	<u>Fund Raisers/ Donations</u>
City of Crandon	10.8	x	x	x	x
City of Antigo	2.7	x	x	x	
City of Rhinelander	2.7	x	x	x	
Laona Town	19.1	x			x
Wabeno Town	29.0	x		x	x
Elcho Town	8.1	x		x	x
White Lake Village	29.2	x	x	x	x
Three Lakes Town	5.2	x		x	x

SOURCE

Appendix 2.10A, Table A-12.

General Government. General government is summarized in Table 2.10-80 and discussed for counties, cities and secondary service centers, and towns in Appendix 2.10A, Tables A-2, A-13, and A-15. The general government information for towns is briefly described along with their other facilities and services. Information on the cities and service centers is more extensive and, where available, describes the type of facilities, equipment and vehicles, number of staff, salary and operating expenditures, and planned modifications.

Grandon and Antigo had similar per capita general government expenditures in 1979 (\$20.66 and \$23.47, respectively) but Rhinelander was considerably higher (\$34.91). General government expenditures in the secondary service centers ranged from a low of \$16.94 per capita in Wabeno to a high of \$81.12 per capita in Three Lakes. Only Three Lakes and White Lake Village (\$45.13) had higher per capita expenditures in 1979 than Rhinelander.

Health Facilities and Public Health and Welfare Services. These services are discussed for counties (Appendix 2.10A, Table A-2). The information, where available, describes the type and location of facilities such as clinics and hospitals, number and type of health care in the county and facilities, type of social and health services provided, salary and operating expenditures, and planned modifications.

Table 2.10-80

GENERAL GOVERNMENT, SUMMARY
1979

<u>Jurisdiction</u>	<u>Per Capita Expenditure (dollars)</u>
City of Crandon	20.66
City of Antigo	23.47
City of Rhinelander	34.91
Laona Town	20.25
Wabeno Town	16.94
Elcho Town	18.55
White Lake Village	45.13
Three Lakes Town	81.12

SOURCE

Appendix 2.10A, Table A-13.

Considering all the jurisdictions in the local study area, the highest per capita expenditure for health and social services is shared at the county level. The per capita expenditures were \$177.01 in Forest County, \$118.26 in Oneida County, and \$108.05 in Langlade County. Meanwhile the cities' per capita expenses were considerably less: \$3.96 in Antigo, \$2.51 in Rhineland, and \$0.22 in Crandon. Among the towns, 14 spent no money on health and social services; 23 towns had less than a one dollar per capita expenditure, and four towns spent more than one dollar (\$1.07 in Ainsworth, \$1.25 in Parrish, \$4.09 in Wolf River, and \$16.13 in Ross).

Utilities. Utilities are provided on a local study area-wide basis. Electricity, heating fuel and telephone service are available in areas suitable for development. The availability of these utilities to the local study area appears to be excellent with no service extension problem, although there may be some problem in the future.

Electricity is provided to the local study area by the privately owned Wisconsin Public Service Corporation. Fuel oil and propane gas are available as heating fuels to any area to which a delivery can be made. Natural gas service lines are provided in Antigo and Ackley by City Gas Company, and to Crandon, Rhineland, Three Lakes, and Lake Tomahawk by Wisconsin Public Service Corporation.

Telephone service is provided to the local study area by a number of companies. General Telephone Company of Wisconsin serves part of the local study area with exchanges located in Laona and Wabeno in Forest County, and Pickerel, White Lake and Antigo in Langlade County. The exchanges located in Three Lakes in Oneida County and Argonne, Crandon, and northern Forest County are served by Crandon Telephone Company. Headwaters Telephone Company has exchanges in Elcho in Langlade County and Pelican Lake and Sugar Camp in Oneida County. Rhinelander and Crescent are served by Rhinelander Telephone Company exchanges.

Public Transportation. There is no mass transportation in the local study area, although intercity buses serve Antigo, Crandon, and Rhinelander. Rhinelander also has regularly scheduled air service provided by Republic Airlines with most major airlines. The approximately 8 daily departures and arrivals connect with most major airlines through Chicago, Minneapolis, and Green Bay.

2.10.5 FISCAL PROFILE

This profile of fiscal conditions covers the conditions of Wisconsin and the jurisdictions in the local study area. We analyze total revenues for each level of government and calculate the net fiscal balance for each jurisdiction. Sources of revenue for local jurisdictions are presented. The local jurisdictions

are county, city, town (including villages), Vocational and Technical Adult Education (VTAE) district, and school district.

At the end of fiscal year 1978, the state showed a surplus of \$407 million. Revenues totaled \$5.4 billion. The largest single revenue source for the state was income taxes on individuals and corporations. In recent years, federal aid has become increasingly important.

The largest single source of revenues for local jurisdictions within the local study area was intergovernmental transfers from the state. The local study area was more reliant on transfers than were localities statewide. Taxes were the second major source of revenue. Property taxes and state transfers were the major revenue sources for local school districts. The Nicolet VTAE, covering Forest, Oneida, Vilas, and parts of Iron, Lincoln, and Langlade counties, was financed primarily by property taxes, almost half of which were collected from the local study area.

None of the local governments had major deficits or surpluses during the late 1970's. Local budgets were generally balanced.

Overall, the average resident of the local study area paid less in state and local taxes than did the average Wisconsin resident. However, the taxes paid were a larger portion of his income. Due to the rural nature of the local study area, residents received, in return, less in local services (as

illustrated by per capita local expenditures) than the average Wisconsin resident.

2.10.5.1 State Revenues and Net Fiscal Balance

During fiscal year 1977-1978, which began July 1, 1977, the Wisconsin state government received \$6.1 billion in revenue from all sources and spent \$5.4 billion (see Table 2.10-81). About 69.3 percent of all revenues were to the General Fund and 73.4 percent of all expenditures were from the General Fund, the state's operating fund of non-dedicated revenues. Segregated funds, or revenues dedicated by law for specific expenditure purposes accounted for the remaining 30.7 percent of revenues and 26.6 percent of expenditures. Segregated revenues and expenditures include the Transportation Fund, the Conservation Fund, and Patient's Compensation Fund. The Transportation Fund, formerly the Highway Fund, is controlled by the Department of Transportation and is dedicated to the development and maintenance of the state's transportation network (Wisconsin Blue Book 1979-80, p. 451). Tax receipts deposited in the Conservation Fund are the state property taxes on forest land and forest crop removal, dedicated to maintaining and reforesting the state's timber resources. The Patient's Compensation Fund is used as an umbrella fund for medical malpractice payments; the tax revenues accrue from payments from physicians and malpractice plaintiffs.

Table 2.10-81

STATE OF WISCONSIN REVENUES AND EXPENDITURES, FY1970 and FY1978
(\$ millions)

	Revenues			Expenditures		
	<u>FY1970</u>	<u>FY1978</u>	<u>Percent Change 1970-1978</u>	<u>FY1970</u>	<u>FY1978</u>	<u>Percent Change 1970-1978</u>
General fund	1,665.6	4,240.3	154.6	1,635.7	3,994.2	144.2
Segregated funds	869.4	1,876.0	115.8	644.5	1,446.3	124.4
Total, all funds	2,535.0	6,116.3	141.3	2,280.2	5,440.5	138.6

SOURCE

Wisconsin Legislative Reference Bureau. 1980. The State of Wisconsin 1979-1980 Blue Book. Madison.

Between fiscal year 1970 and fiscal year 1978, total revenues increased 141.3 percent, and total expenditures increased 138.6 percent. At the end of fiscal year 1978, the state showed a surplus of \$407 million. The most recent previous deficit occurred in fiscal year 1969.

Major Sources of State Government Revenues. State revenues come from within the state and from transfers from the federal government. Revenues generated from within the state consist of General Fund taxes (income, sales and excise, public utility, inheritance, estate and gift taxes, and miscellaneous taxes), fees (from chargeable services provided by the state), licenses and permit charges, and other sources (contributions, investment income, gifts and grants, collections, sale of products, and miscellaneous sources).

Own source revenues are the major source of the state's revenues (Table 2.10-82). In fiscal year 1978, these accounted for 80.8 percent of the state's total revenue. Own source revenues from taxes accounted for 48.0 percent of total revenue. Other own source revenues including fees, licenses, and permits, accounted for 32.8 percent of the state's fiscal year 1978 revenues. Federal aid comprised the remaining 19.2 percent. From 1970 to 1978 the source of revenues which showed the greatest increase was federal aid, growing from 14.1 percent of revenues in 1970 to 19.2 percent of revenues in fiscal year 1978.

Table 2.10-82

MAJOR SOURCES OF STATE GOVERNMENT REVENUES,
 FY1970 and FY1978
 (\$ millions)

	<u>FY1970</u>		<u>FY1978</u>		<u>Percent Change 1970-1978</u>
	<u>Amount</u>	<u>Percent of Total</u>	<u>Amount</u>	<u>Percent of Total</u>	
Own sources	2,178.9	85.9	4,942.8	80.8	126.8
Taxes	1,240.2	48.9	2,933.6	48.0	136.5
Fees	80.5	3.2	148.7	2.4	84.7
Licenses & permits	86.4	3.4	147.2	2.4	70.4
Other	771.8	30.4	1,713.3	28.0	122.0
Federal aid	356.1	14.1	1,173.5	19.2	229.5
Total	2,535.0	100.0	6,116.3	100.0	141.3

SOURCE

Wisconsin Department of Administration. 1979. Wisconsin Statistical
 Abstract 1979. Madison.

Own source revenues, while increasing 126.8 percent in actual terms, dropped from 85.9 percent of revenues to 80.8 percent. This indicates an increased reliance on revenues not generated within the state. Taxes have remained a fairly constant proportion (approximately half) of total revenues throughout the period.

Taxes. Most tax receipts (93.4 percent) accrue to the General Fund (Table 2.10-83). The remaining taxes (6.6 percent) are Transportation Fund, Conservation Fund, or Patient's Compensation Fund receipts.

Income Taxes. Individual and corporate income taxes provided 54.6 percent of total state tax revenues in fiscal year 1978. Wisconsin was one of the first states to tax incomes. Since enactment of the tax in 1911, tax rates have increased numerous times, and the definition of taxable income has expanded until in 1965, it conformed to the Internal Revenue Service (IRS) definition.

The income tax is imposed on the net income of individuals residing in the state, on the income of non-residents derived from property located or business transacted within the state, and on the income of corporations doing business in the state. A schedule of income taxes for 1978 is shown on Table 2.10-84.

Table 2.10-83

STATE OF WISCONSIN TAX REVENUES, FY1978
(\$ millions)

<u>Type of Tax</u>	<u>Total Taxes Less Refunds</u>	<u>Percent of Total State Taxes</u>
General fund		
Income	1,609.7	54.6
Individual	1,324.7	44.9
Corporation	285.0	9.7
Sales and excise	889.5	30.1
General sales	762.2	25.8
Cigarettes	85.0	2.9
Alcoholic beverages	42.3	1.4
Public utility	147.1	5.0
Other	109.2	3.7
Total	2,755.5	93.4
Other funds		
Transportation Fund	178.3	6.1
Motor fuel tax	176.6	6.0
Other	1.7	0.1
Conservation fund and Patient's Compensation Panel	15.3	0.5
Total	193.6	6.6
Total state taxes	2,949.1	100.0
State's share	2,186.5	74.1
Transfers to local governments	762.6	25.9

SOURCE

Wisconsin Legislative Reference Bureau. 1980. State of Wisconsin
1979-1980 Blue Book. Madison.

Table 2.10-84

STATE OF WISCONSIN INCOME TAX SCHEDULES

<u>Individual Income Tax</u>		<u>Corporate Income Tax</u>	
<u>Taxable Income</u>	<u>Rate</u>	<u>Taxable Income</u>	<u>Rate</u>
\$ 0- 3,000	3.4	\$ 0-1,000	2.3
3,001- 6,000	5.2	1,001-2,000	2.8
6,001- 9,000	7.0	2,001-3,000	3.4
9,001-12,000	8.2	3,001-4,000	4.5
12,001-15,000	8.7	4,001-5,000	5.6
15,001-20,000	9.1	5,001-6,000	6.8
20,001-40,000	9.5	6,001 and over	7.9
40,001 and over	10.0		

SOURCE

Wisconsin Department of Revenue. 1978. Schedule of Income Tax Rates. Madison.

Sales and Excise Taxes. Revenues from sales and excise taxes accounted for 30.1 percent of state tax revenues in fiscal year 1978. The most important of these taxes is the general sales and use tax which provided 85.7 percent of all sales and excise tax revenue and 25.8 percent of total state tax revenues in 1978. The general sales tax was first instituted in 1962 as a three percent tax on specific items such as jewelry, office furniture, electric appliances, and other durable goods. The tax was raised to four percent in 1969, and broadened to include almost all consumer goods. Prescription drugs, home heating fuel, and food for off-premise consumption were exempted.

Excise taxes are imposed on cigarettes and alcoholic beverages. The cigarette tax is presently \$0.16 per package. Alcoholic beverage tax rates are graduated according to alcohol content. Liquor is taxed at \$2.60 per gallon, and beer is taxed at a lower rate of \$2.00 per barrel. During fiscal year 1978, the cigarette and alcoholic beverage tax collections equalled 4.3 percent of total state tax revenues.

Public Utility Taxes. Public utility taxes accounted for 5.0 percent of state taxes in 1978. This is the amount of net utility tax collections from railroads and related companies, rural electric cooperative associations, and electric, gas, pipeline, etc., companies allocated to each taxation district.

Other Taxes. General Fund taxes from other sources accounted for 3.7 percent of tax revenues in 1978. These were inheritance, estate and gift taxes, and other miscellaneous taxes on items such as insurance premiums, bingo games, forest crops (the state property tax), etc.

Dedicated Revenues. There are two major types of dedicated revenues--the Transportation Fund and the Conservation Fund. A third fund, the Patient's Compensation Fund, contained less than \$500 during fiscal year 1979; thus, it is an insignificant source of state revenues. The Transportation Fund, however, is supported by the motor fuel tax and vehicle registrations and other fees. The motor fuel tax is quite substantial, providing 6.0 percent of total state tax revenues in 1979, and over half (54.2 percent) of total revenues received by the fund. The motor fuel tax rate has increased from \$0.03 per gallon in 1955 to \$0.09 per gallon in 1980.

The motor vehicle registration fee accounts for 33.6 percent of fund revenues. The remaining 12.2 percent comes from license fees, investment income, airline taxes and fees, motor carrier fees, and other miscellaneous sources (Table 2.10-85).

The Conservation Fund is dedicated to reforestation and conservation of the state's natural resources. Conservation Fund revenues come from tax revenues on forest crop withdrawals and a

Table 2.10-85

STATE OF WISCONSIN TRANSPORTATION FUND REVENUES, FY1978
(\$ millions)

<u>Revenue Source</u>	<u>Amount</u>	<u>Percent of Total</u>
Motor vehicle fuel taxes	176.6	54.2
Motor vehicle registration fees	109.6	33.6
License fees	8.4	2.6
Investment income	4.5	1.4
Airline taxes and related fees	1.9	0.6
Motor carrier fees	1.0	0.3
Miscellaneous	1.3	0.4
Unappropriated fund balance, 6/1/77	17.2	5.3
Lapses to fund from prior years	5.4	1.6
Total fund revenues	325.9	100.0

SOURCE

Wisconsin Legislative Reference Bureau. 1980. State of Wisconsin
1979-1980 Blue Book. Madison.

property tax on forest land. This tax is assessed at 0.2 mill.
(A mill is equal to 0.1 cent.)

Federal Aids to Wisconsin. Federal aid in recent years has become an increasingly important source of revenue for the state of Wisconsin. Most of these funds are dedicated by the federal government for specific purposes. About one-third of these funds (32.0 percent in 1978) are channeled to local governments (Table 2.10-86).

Over half of the federal aids received in fiscal year 1978 were earmarked for human relations and resources and social services (55.8 percent). Education (21.3 percent) and environmental resources (12.7 percent) were the other major categories. Additional transfers were received for general executive, judicial, legislative, and general appropriations. The receiving agencies by category are listed in Table 2.10-86.

State Fiscal Balance. Wisconsin's state budget has shown a General Fund surplus in every year since fiscal year 1970 (Table 2.10-87). Revenues increased in each successive fiscal year. Expenditures varied, in some years exceeding revenues but never exceeding current revenues plus the cumulative surplus. Table 2.10-87 shows the revenues and expenditures of both the General Fund and the various segregated funds such as Transportation,

Table 2.10-86

FEDERAL AIDS TO WISCONSIN, FY1978
(\$ Thousands)

<u>Type of Aid</u>	<u>Received by State</u>		<u>Channeled to Local Governments</u>	
	<u>Amount</u>	<u>Percent of Total Aids</u>	<u>Amount</u>	<u>Percent of Total Aids</u>
Commerce	2,045	0.2	0	0
Education	249,657	21.3	80,436	6.9
Environmental resources	148,616	12.7	37,642	3.2
Department of Natural Resources	11,350	1.0	2,343	0.2
Department of Trans- portation	137,266	11.7	35,299	3.0
Human relations and resources	653,764	55.8	231,603	19.8
Health and social services	607,122	51.8	231,237	19.8
Other	46,642	4.0	366	0
General executive	61,287	5.2	24,974	2.1
Judicial	602	0.1	0	0
Legislative	151	0	0	0
General appropriations	54,930	4.7	0	0
Federal revenue sharing	53,430	4.6	0	0
Other	1,500	0.1	0	0
Building program	0	0	0	0
Total aids	1,171,052 ^a	100.0	374,655	32.0

NOTE

^a Differs from total aids shown on Table 2.10-82. Source used for Table 2.10-82 rounded all values to nearest million.

SOURCE

Wisconsin Legislative Reference Bureau. 1980. State of Wisconsin 1979-1980 Blue Book. Madison.

Table 2.10-87

WISCONSIN REVENUE AND EXPENDITURES
Fiscal Years 1970-71 - 1977-78

<u>Fiscal Year</u>	<u>Total-All Funds</u>		<u>General Fund</u>		<u>Segregated Funds</u>		<u>Net Surplus</u>
	<u>Revenue</u>	<u>Expenditures</u>	<u>Revenue</u>	<u>Expenditures</u>	<u>Revenue</u>	<u>Expenditures</u>	
1970-71	\$2,720,080,792	\$2,507,247,425	\$1,790,956,738	\$1,780,702,690	\$ 929,124,056	\$ 726,544,735	\$ 34,839,575
1971-72	3,058,053,667	2,729,040,050	2,096,084,107	2,031,896,152	961,969,560	697,143,898	116,914,292
1972-73	3,593,347,464	3,088,336,698	2,480,747,761	2,296,679,255	1,112,599,703	791,657,443	217,404,264
1973-74	3,801,842,378	3,595,577,451	2,687,516,857	2,729,853,879	1,114,325,521	865,723,572	241,359,153
1974-75	4,218,954,231	4,073,423,281	2,966,531,871	3,148,968,325	1,252,422,342	924,454,956	78,120,259
1975-76	5,153,845,687	4,722,528,843	3,476,690,404	3,439,062,080	1,677,155,283	1,283,466,673	86,473,015
1976-77	5,694,897,753	5,089,321,662	3,807,747,984	3,712,595,168	1,887,149,769	1,376,726,494	66,587,115
1977-78	6,116,276,711	5,440,486,383	4,240,298,315	3,994,200,433	1,875,978,396	1,446,285,950	407,769,819

SOURCE

Wisconsin Department of Administration. 1979. 1978 Annual Fiscal Report. Bureau of Financial Operations. Madison.

Conservation, and Patient's Compensation and also the General Fund cumulative surplus.

2.10.5.2 Local Revenues and Net Fiscal Balance

Major Sources of Local Government Revenues

Major State Revenues From and Payments to Local Study Area and Wisconsin Localities. The Wisconsin Department of Revenue publishes annually a listing of major state revenues collected by and payments to local government jurisdictions for the previous calendar year. Major state revenues, as defined by the Department of Revenue, consist of all state taxes, fees, and Federal Revenue Sharing receipts. Payments are defined as direct state and shared taxes (Wisconsin Department of Revenue, 1979d, which also presents the balance of state accounts for jurisdictions in the local study area).

In calendar year 1978, the local study area contributed almost \$28 million of the major state revenues of \$3.2 billion (see Table 2.10-88), or 0.9 percent of the state's tax receipts. On a per capita basis, the average resident of the local study area contributed \$553.61 in major state revenues, while the average state resident contributed \$695.55. In return, the average local study area resident realized \$417.28 in payments from the state, while the average state resident realized \$436.92. While local study area residents were receiving less

Table 2.10-88

MAJOR STATE REVENUES FROM AND PAYMENTS TO
 LOCAL STUDY AREA AND WISCONSIN LOCALITIES,
 CALENDAR YEAR, 1978

	<u>Total</u>	<u>Percent of Total</u>
State Revenues		
State of Wisconsin	\$3,236,221,160	100.0
Local Study Area	27,831,095	0.9
State Payments		
State of Wisconsin	2,032,902,969	100.0
Local Study Area	20,977,394	1.0
Payments as Percent of Revenue		
State of Wisconsin	62.82	
Local Study Area	75.37	
Per Capita Revenue		
State of Wisconsin	695.55	
Local Study Area	553.61	
Per Capita Payments		
State of Wisconsin	436.92	
Local Study Area	417.28	

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1979.
Taxes, Aids, and Shared Taxes in Wisconsin Municipalities, 1978. Madison.

than average state residents, their return was much higher. For every dollar of revenue the local study area resident generated for the state, he received \$0.75 in direct aid. On the average, the Wisconsin resident only received \$0.63. Even though the average local study area resident received proportionately more, these taxes totaled 9.73 percent of the personal income of the average resident of Forest, Langlade, and Oneida counties, while the burden was only 9.23 percent of the personal income of the typical state resident. Local study area residents were thus paying a greater portion of their incomes to the state and receiving a smaller per capita payment in return than the average state resident.

Local Taxes. Local government jurisdictions receive revenue from three sources: property taxes, intergovernmental transfers from the state and federal governments, and fees and service charges. Property taxes are defined here as being the sum of net taxes (municipal shares of general property taxes, special assessments, payments in lieu of taxes, mobile home fees, and other miscellaneous local taxes, less tax credits) and tax credits (the part of state tax credits on taxable real and personal property for which the state reimburses the local jurisdictions). Residents of Wisconsin normally pay property taxes to five jurisdictions: state, county, school district, VTAE district, and locality (city, town, or village). The total

state, county, school district, and local taxes paid in 1978 by each of the local study area jurisdictions are shown in Table 2.10-89.

Wisconsin has a system of dual property assessment. Individual properties, except manufacturing and utility properties, are valued by the local assessor; manufacturing and utility properties are valued by the Wisconsin Department of Revenue. In addition, the Department of Revenue annually determines the equalized or full valuation for each taxing jurisdiction (shown for the three counties in Table 2.10-90). The full valuation is the market value of all properties in a given jurisdiction. The local assessed valuation is used within a city or town to apportion taxes to individual property owners. Equalized values are used to apportion school district, county, state, and other regional tax levies to cities and towns within the region and to distribute state aids to local governments. The state property tax, for example, is set by law at \$0.20 per \$1,000 equalized value. Counties, school districts, and VTAE districts apportion their tax levies to each city and town within the district based on the ratio of that city or town's total full valuation to the district's total full valuation.

In 1973, Wisconsin imposed a law limiting the size of county, city, and town property tax levy increases (Wisconsin Statutes, Sec. 70.62, amended 1976). With certain exceptions, the annual increase in local government levies is limited to the

Table 2.10-89

PROPERTY TAXES LEVIED, 1978

<u>Jurisdiction</u>	<u>State Tax</u>	<u>County Tax</u>	<u>Local Tax</u>	<u>School Tax</u>	<u>Total</u>
Local Study Area	\$201,419	\$3,053,580	\$2,809,688	\$12,172,942	\$18,237,629
Forest County	32,801	434,498	260,841	1,910,766	2,638,930
Langlade County	64,589	1,527,622	951,465	3,958,248	6,501,952
Oneida County	168,231	1,756,195	2,409,862	10,098,176	14,432,489
City of Crandon	4,337	61,529	75,414	203,392	344,672
City of Antigo	20,337	480,439	883,975	1,208,592	2,593,343
City of Rhinelander	27,616	353,840	1,082,650	1,737,798	3,201,904
Argonne Town	1,242	17,628	0	58,271	77,141
Blackwell Town	413	4,868	0	21,561	26,842
Caswell Town	388	5,505	13,468	30,962	50,323
Crandon Town	1,438	20,404	2,087	67,445	91,374
Freedom Town	1,930	27,383	15,626	118,418	163,357
Hiles Town	3,696	22,428	5,397	180,185	211,706
Laona Town	4,819	68,362	60,544	384,542	518,267
Lincoln Town	4,084	57,944	17,517	191,531	271,076
Nashville Town	5,048	71,610	25,797	236,711	339,166
Popple River Town	0	109	0	29,220	29,329
Ross Town	554	7,868	251	44,278	52,951
Wabeno Town	2,536	35,986	42,735	155,604	236,861
Ackley Town	2,561	60,904	0	152,260	215,725
Ainsworth Town	2,027	48,197	0	127,479	177,703
Antigo Town	5,861	139,344	96	348,322	493,623
Elcho Town	6,481	154,096	20,865	407,573	589,015
Evergreen Town	1,085	25,806	9,964	79,768	116,623
Langlade Town	1,685	35,071	2	102,010	138,768
Neva Town	2,858	67,955	1	170,929	241,743
Norwood Town	2,765	65,743	12,024	164,341	244,873
Parrish Town	396	9,423	0	20,942	30,761
Peck Town	1,444	34,351	6,826	86,160	128,781
Polar Town	2,257	53,658	11,005	134,142	201,062
Price Town	1,227	29,187	2,056	72,966	105,436
Rolling Town	3,389	80,587	4,395	201,428	289,799
Upham Town	4,214	100,206	20,001	264,760	389,181
Wolf River Town ^a	4,245	100,871	35,442	312,080	452,638
Crescent Town	6,778	69,979	19,626	426,531	522,914
Enterprise Town	2,230	23,027	3,260	140,239	168,756
Lake Tomahawk Town	5,296	54,675	93,519	297,408	450,898
Monico Town	1,606	16,588	12,172	92,851	123,217
Newbold Town	10,715	110,627	1,359	653,654	776,355
Pelican Town	9,899	102,197	2,828	622,937	737,861
Piehl Town	267	2,759	4,030	15,486	22,542
Pine Lake Town	7,606	78,527	12,817	478,579	577,529
Schoepke Town	3,652	37,705	11,244	229,691	282,292
Stella Town	2,032	20,981	6,758	127,874	157,645
Sugar Camp Town	7,601	78,472	49,978	439,227	575,278
Three Lakes Town	19,761	185,324	233,926	1,143,230	1,582,241
Woodboro Town	3,043	31,417	10,033	191,565	236,058
% of Total Local Study Area Levies	1.1	16.7	15.4	66.7	100.0

NOTE

^aIncludes White Lake Village.

SOURCE

Wisconsin Department of Revenue, Bureau of Local Assistance. 1979. Town, City and Village Taxes 1978. Taxes Levied 1978-Collected 1979. Bulletins 178, 278, and 378, combined. Division of State and Local Finance. Madison.

Table 2.10-90

LOCAL STUDY AREA FULL VALUATION
1978

<u>Local Study Area^a</u>	<u>Cities</u>		<u>Towns</u>		<u>Total</u>	
	<u>Amount</u>	<u>Per Capita</u>	<u>Amount</u>	<u>Per Capita</u>	<u>Amount</u>	<u>Per Capita</u>
Forest County	\$ 21,688,910	11,930	\$ 132,601,890	21,589	\$ 154,290,800	19,383
Langlade County	101,687,090	11,892	212,520,160	19,841	314,207,250	16,312
Oneida County	138,081,800	16,193	402,459,450	27,785	540,541,250	23,490
Total	261,457,800	13,837	747,581,500	23,851	1,009,039,300	20,084

NOTE

^a Shows valuation for towns and cities in local study area portions of each county only.

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1979.
Town, Village and City Taxes-1978, Taxes Levied 1978 - Collected 1979. Bulletin
Nos. 178, 278 and 378, combined. Division of State and Local Finance. Madison.

rate of statewide growth in equalized valuations, which are conducted annually.

Tying the local tax rate limit to a statewide rate of increase in valuation has not caused severe problems for jurisdictions with faster-than-average growth. According to Department of Revenue (DOR) information for 1979 levies, counties used 29.0 percent of allowable increase and town tax rate increases averaged 48.0 percent of allowable increase. More specifically, this legislation has not affected the jurisdictions in the local study area. It has not limited revenue collections as is indicated by the number of towns which collect no local taxes whatsoever.

The full valuation of property in the local study area exceeded \$1 billion in 1978. Of this, 25.9 percent was located in the three cities and 74.1 percent in the towns. The tax base varied widely within the local study area: 15.3 percent of the local study area's full valuation was in Forest County, 31.1 percent in Langlade County, and 53.6 percent in Oneida County. Some of the disparity among the counties disappears when per capita valuation is calculated; some of it is due to Forest County's extensive tax-exempt lands such as the Nicolet National Forest, and part of it reflects the variance in residential property valuation/total property valuation ratio. The assessed and full valuations, and the full and effective value rates for 1978 are shown in Table 2.10-91.

Table 2.10-91

TOWN AND CITY FULL VALUATION AND
FULL VALUE TAX RATES, 1978

<u>Jurisdiction</u>	<u>Assessed Valuation^a</u>	<u>Full Valuation^b</u>	<u>Full Value Rate^c</u>	<u>Effective Real Estate Full Value Rate^d</u>
Local study area	\$476,546,069	\$1,009,039,300	.01807	
City of Crandon	2,568,433	21,688,910	.01589	.01484
City of Antigo	27,298,282	101,687,090	.02550	.02195
City of Rhinelander	91,290,467	138,081,800	.02318	.02041
Argonne Town	637,086	6,213,920	.01241	.01235
Blackwell Town	723,869	2,069,330	.01297	.01249
Caswell Town	1,706,987	1,940,260	.02593	.02473
Crandon Town	3,514,411	7,192,070	.01270	.01233
Freedom Town	3,022,884	9,652,880	.01692	.01589
Hiles Town	7,403,598	18,479,990	.01145	.01132
Laona Town	1,985,299	24,097,320	.02150	.01964
Lincoln Town	2,694,471	20,424,140	.01327	.01299
Nashville Town	2,416,361	25,242,040	.01343	.01320
Poppie River Town	703,253	1,831,130	.01601	.01490
Ross Town	1,394,599	2,774,710	.01908	.01783
Wabeno Town	4,261,493	12,684,100	.01867	.01712
Ackley Town	2,758,652	12,808,840	.01684	.01605
Ainsworth Town	3,892,890	10,136,550	.01753	.01672
Antigo Town	32,720,245	29,305,700	.01684	.01616
Elcho Town	11,783,350	32,408,330	.01817	.01707
Evergreen Town	257,335	5,427,510	.02148	.01701
Langlade Town	5,933,979	8,427,460	.01646	.01580
Neva Town	7,404,157	14,291,910	.01691	.01638
Norwood Town	12,325,680	13,826,640	.01771	.01680
Parrish Town	295,984	1,981,840	.01552	.01495
Peck Town	5,562,125	7,224,550	.01782	.01704
Polar Town	7,678,075	11,285,060	.01781	.01704
Price Town	6,585,329	6,138,510	.01717	.01648
Rolling Town	10,224,486	16,948,490	.01709	.01630
Upham Town	9,534,771	21,074,610	.01846	.01585
Wolf River Town ^e	11,960,744	21,234,160	.01231	.01955
Crescent Town	7,506,560	33,891,310	.01542	.01478
Enterprise Town	8,159,750	11,151,200	.01513	.01467
Lake Tomahawk Town	12,225,097	26,481,300	.01702	.01607
Monico Town	6,016,125	8,033,750	.01533	.01509
Newbold Town	43,404,445	53,577,200	.01449	.01400
Pelican Town	8,456,541	49,497,310	.01490	.01429
Piehl Town	1,321,848	1,339,920	.01682	.01848
Pine Lake Town	34,676,320	38,026,950	.01518	.01449
Schoepke Town	3,353,485	18,264,010	.01545	.01489
Stella Town	11,242,435	10,160,640	.01551	.01475
Sugar Camp Town	15,063,676	38,007,270	.01513	.01469
Three Lakes Town	33,539,432	98,807,180	.01601	.01534
Woodboro Town	11,041,060	15,221,410	.01550	.01473
Total - towns in Local Study Area	355,388,887	747,581,500	.01618	
State Average - All Towns	13,397,288	25,397,926	.01735	.01618
Total - cities in Local Study Area	121,157,182	261,457,800	.01618	
State Average - all cities	150,655,784	209,786,557	.02681	.02330

NOTES

^a Assessed valuation is the value of all taxable general property as determined by the municipal assessor.

^b Full valuation is the market value of all taxable general property as determined by the Wisconsin Department of Revenue.

^c The full value rate is the total general property tax (state, county, local and school district taxes) divided by the full valuation.

^d The effective real estate full value rate is the effective rate after taking into account state property tax credits.

^e Includes White Lake Village.

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1979.
Town, Village and City Taxes-1978, Taxes Levied 1978 - Collected 1979. Bulletin
Nos. 1978, 278 and 378, combined. Division of State and Local Finance. Madison.

Residential property, the predominant class in all three counties, represents the greatest percentage of valuations in Oneida County (75.6 percent). Oneida County also has the highest percentage commercial property valuation (15.3 percent) in the local study area (Table 2.10-92). In Forest County, the most substantial non-residential class is timber (16.4 percent); in Langlade County agricultural land is most important (23.0 percent).

Wisconsin has a general property tax relief program (Table 2.10-93). Tax relief reduces the direct tax burden of property owners as the relief is credited against the taxpayer's gross property tax bill. The amount of relief varies across the state, as relief is directed to jurisdictions with rates in excess of one-half the statewide average in proportion to full value tax rates.

Intergovernmental Transfers. Intergovernmental transfers include federal revenue sharing, federal aids, state shared taxes, highway aids, other state aids, and aids received from other local jurisdictions.

State aids attempt to bring tax effort and necessary expenditures into balance. Aids are special purpose revenues which are earmarked for a specific objective such as transportation, natural resources, or education. There are four categories of state aid: natural resources, transportation,

Table 2.10-92

FULL VALUE BY CLASS OF PROPERTY,^a 1978
By County

	<u>Forest County</u>	<u>Langlade County</u>	<u>Oneida County</u>
Residential			
Dollars	102,576,700	153,414,000	594,275,000
Percent	65.3	52.5	75.6
Commercial			
Dollars	14,602,700	33,973,000	120,524,000
Percent	9.3	11.6	15.3
Manufacturing			
Dollars	1,356,400	5,965,000	12,797,500
Percent	0.9	2.0	1.6
Agricultural ^b			
Dollars	12,681,900	67,192,000	14,953,000
Percent	8.1	23.0	1.9
Timber			
Dollars	25,780,900	31,192,000	43,943,000
Percent	16.4	10.9	5.6
Total	\$ 156,998,600	\$ 291,736,000	\$ 786,492,500

NOTES

^a Full value of land and improvements.

^b Agricultural includes swamp and wasteland.

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1979.
Property Tax-1978, Taxes Levied 1978 - Collected 1979. Bulletin No. 478.
Division of State and Local Finance. Madison.

Table 2.10-93

GENERAL PROPERTY TAX RELIEF PAYMENTS, 1978

<u>Jurisdiction</u>	<u>Tax Relief Payments^a</u>	<u>Payment as Percent of Total^b Property Tax</u>
State of Wisconsin	375,305,440	19.6
Local study area	2,264,601	12.4
Forest County	239,457	9.1
Langlade County	1,060,284	16.3
Oneida County	1,350,214	9.4
City of Crandon	41,531	12.0
City of Antigo	701,294	27.0
City of Rhinelander	718,446	22.4
Argonne Town	3,524	4.6
Blackwell Town	1,927	7.2
Caswell Town	4,085	8.1
Crandon Town	4,176	4.6
Freedom Town	19,965	12.2
Hiles Town	6,978	3.3
Laona Town	82,104	15.8
Lincoln Town	8,318	3.1
Nashville Town	9,568	2.8
Popple River Town	2,807	9.6
Ross Town	4,401	8.3
Wabeno Town	28,771	12.2
Ackley Town	16,565	7.7
Ainsworth Town	9,245	5.2
Antigo Town	48,719	9.9
Elcho Town	43,334	7.4
Evergreen Town	8,808	7.6
Langlade Town	7,777	5.6
Neva Town	15,078	6.2
Norwood Town	32,291	13.2
Parish Town	1,004	3.3
Peck Town	16,321	12.7
Polar Town	24,669	12.3
Price Town	9,298	8.8
Rolling Town	36,174	12.5
Upham Town	17,661	4.5
Wolf River Town ^c	56,851	12.6
Crescent Town	22,591	4.3
Enterprise Town	4,689	2.8
Lake Tomahawk Town	24,920	5.5
Monico Town	9,924	8.1
Newbold Town	27,882	3.6
Pelican Town	38,809	5.3
Piehl Town	1,483	6.6
Pine Lake Town	24,027	4.2
Schoepke Town	11,848	4.2
Stella Town	8,410	5.3
Sugar Camp Town	20,858	3.6
Three Lakes Town	75,168	4.8
Woodboro Town	12,302	5.2

NOTES

^a Includes general and personal property tax relief.

^b From Table 6.12, Property Taxes Levied, 1978.

^c Includes White Lake Village.

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1979. Taxes, Aids and Shared Taxes in Wisconsin Municipalities 1978. Madison.

machinery and equipment, and miscellaneous aids (taxes, aids and shared taxes) (Table 2.10-94). Natural resource aids are dedicated to conservation, recreation, and environmental control. Transportation aids are provided to local jurisdictions for highways and airports. Machinery and equipment aids are payments to the local governments reimbursing each taxing jurisdiction for 70 percent of the equalized value of manufacturing machinery and equipment exempted from local taxation multiplied by the tax rate for local purposes. Miscellaneous aids are paid to each taxation district for certain state aids and its shares of various miscellaneous tax collections (these include payments for public safety, planning, community development, etc.).

Transportation, natural resources, and miscellaneous aids are paid to the local jurisdictions on the basis of need, as defined by statute, and the level of per capita expenditures. These aids are also paid to the counties, along with health and social service, education, and general government aids (Table 2.10-95). Distribution of these aids is made by the respective state agencies, not by the Department of Revenue. The state provides 60.0 percent of the revenue for county health and social services programs, and the federal government funds the remaining 40.0 percent.

In addition to state aids, state shared taxes also act to bring taxes and expenditures into balance. Shared taxes are general purpose revenues, which the recipient jurisdiction may

Table 2.10-94

STATE GRANTS AND AIDS PAID TO TOWNS AND CITIES, 1978

<u>Jurisdiction</u>	<u>Natural Resources</u>	<u>Transportation</u>	<u>Machinery & Equipment</u>	<u>Miscellaneous</u>	<u>Total</u>
Local study area	188,145	1,422,239	142,830	72,463	1,825,677
City of Crandon	1	49,620	939	1,303	51,863
City of Antigo	30,327	122,172	29,099	10,376	191,974
City of Rhinelander	23,916	239,191	109,465	11,176	383,748
Argonne Town	200	31,078	0	34	31,312
Blackwell Town	1,221	47,054	0	2,048	50,323
Caswell Town	1,553	7,672	2	571	9,798
Crandon Town	1,159	13,680	0	289	15,128
Freedom Town	231	17,695	342	263	18,531
Hiles Town	4,622	63,772	32	541	68,967
Laona Town	348	34,776	1,558	1,924	38,606
Lincoln Town	3,051	37,270	0	3,828	44,149
Nashville Town	814	31,631	8	1,934	34,387
Popple River Town	122	19,074	0	0	19,196
Ross Town	2,325	9,571	0	449	12,345
Wabeno Town	2,090	31,841	377	1,045	35,353
Ackley Town	4,299	15,249	0	345	19,893
Ainsworth Town	7,912	17,977	0	925	26,814
Antigo Town	16	19,288	0	1,027	20,331
Elcho Town	5,614	34,853	9	1,797	42,273
Evergreen Town	2,548	12,885	0	120	15,553
Langlade Town	8,642	9,564	0	2,507	20,713
Neva Town	660	12,944	0	450	14,054
Norwood Town	97	18,536	347	1,051	20,031
Parrish Town	3,642	4,911	0	54	8,607
Peck Town	199	15,854	0	165	16,218
Polar Town	737	21,322	102	543	22,704
Price Town	2,052	12,077	0	144	14,273
Rolling Town	258	21,846	16	1,888	24,008
Upham Town	4,924	25,325	0	669	30,918
Wolf River Town ^a	10,885	47,688	34	1,578	60,185
Crescent Town	347	26,334	0	2,516	29,197
Enterprise Town	4,523	6,006	0	682	11,211
Lake Tomahawk Town	13,616	30,155	0	213	43,984
Monico Town	1,211	10,804	0	291	12,306
Newbold Town	11,687	59,363	0	3,585	74,635
Pelican Town	1,392	32,792	0	2,510	36,694
Piehl Town	0	6,569	2	937	7,508
Pine Lake Town	1,545	40,314	0	2,473	44,332
Schoepke Town	307	14,501	0	555	15,363
Stella Town	552	20,139	0	516	21,207
Sugar Camp Town	7,103	30,287	353	2,961	40,704
Three Lakes Town	18,953	76,165	145	3,850	99,113
Woodboro Town	2,444	22,394	0	2,330	27,168
Total paid to towns	133,901	1,011,256	3,327	49,608	1,198,092
Total paid to cities	54,244	410,983	139,503	22,855	627,585

NOTE

^aIncludes White Lake Village.

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1980. Municipal Resources Provided and Expended, 1978. Bulletin No. 61. Madison.

Table 2.10-95

STATE AIDS TO COUNTY GOVERNMENTS, 1978

Type of Aid	Forest County		Langlade County		Oneida County	
	Amount	Percent	Amount	Percent	Amount	Percent
General government	\$ 12,093	0.8	\$ 22,077	1.0	\$ 25,052	0.7
Education	9,390	0.6	21,323	0.9	32,595	0.9
Health & social services	1,305,618	84.2	1,801,231	77.7	3,080,058	84.2
Natural resources	24,037	1.6	76,192	3.3	37,835	1.0
Transportation	189,778	12.2	378,131	16.3	448,747	12.3
Machinery & equipment	6,794	0.4	16,208	0.7	29,511	0.8
All other	2,786	0.2	3,210	0.1	2,134	0.1
Total	1,550,496	100.0	2,318,372	100.0	3,655,932	100.0

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1979. Taxes, Aids and Shared Taxes in Wisconsin Municipalities, 1978. Madison.

spend at its discretion. There are five types of state shared revenues: per capita payment, special utility, aidable revenues, adjustments, and shared revenue supplement (Table 2.10-96).

The per capita payment is paid to each taxation district on the basis of population. The 1978 per capita payment was \$39.75. Of this, 16.25 percent (or \$6.46) was required by law to be paid to the appropriate county. The remainder was paid to cities and towns. Aidable revenues and the shared revenue supplement are also paid to both county and local units, based on local purpose revenues (local taxes, fees, interest, and other revenues excluding intergovernmental transfers) and non-manufacturing property valuations.

The utility shared tax is a payment in lieu of local property taxes on exempted heat, power, and light company property as defined by Wisconsin law (Wisconsin Statutes, Sec. 76.02). These aids are paid at the rate of nine mills; if the property is in a city or village, the city or village gets six mills and the county three; if the property is in a town, the town gets three mills and the county six. The rate is applied to each jurisdiction's full valuation.

Adjustments reflect additions or subtractions made to the current shared revenue account for the local jurisdiction in order to correct for over or underpayment in other shared revenue categories made in the current or previous years.

Table 2.10-96

STATE SHARED TAXES, PAID TO TOWNS, CITIES & COUNTY
GOVERNMENTS, 1978

Jurisdiction	Type of Shared Taxes					Total
	Per Capita	Special Utility	Aidable Revenues	Adjustments	Shared Revenue Supplement	
Local study area	\$ 1,667,689	\$ 22,348	\$ 801,316	\$ -7,299	\$ 56,690	\$ 2,540,744
Forest County	56,099	946	30,257	-2,938	2,139	86,503
Langlade County	127,385	3,298	79,923	-10,736	5,651	205,521
Oneida County	194,725	11,127	30,285	10,823	2,141	249,101
City of Crandon	60,529	389	29,105	1,706	2,058	93,787
City of Antigo	284,697	4,052	368,661	-114,248	26,068	569,230
City of Rhinelander	283,898	6,066	342,761	-10,533	24,237	646,429
Argonne Town	13,817	0	2,292	450	162	16,721
Blackwell Town	12,119	0	800	647	57	13,623
Caswell Town	3,562	0	229	1,109	16	4,916
Crandon Town	20,376	1,021	2,464	-1,500	174	22,535
Freedom Town	10,221	0	831	2,528	59	13,639
Hiles Town	11,753	0	0	6,590	0	18,343
Laona Town	49,375	1,258	7,608	7,193	538	65,972
Lincoln Town	15,282	1,147	0	6,738	0	23,167
Nashville Town	21,475	0	0	8,506	0	29,981
Popple River Town	2,064	0	53	105	4	2,226
Ross Town	6,825	0	653	373	46	7,897
Wabeno Town	37,622	694	11,086	-843	784	49,343
Ackley Town	20,276	658	1,331	3,907	94	26,266
Ainsworth Town	15,382	0	494	790	35	16,701
Antigo Town	60,162	0	5,557	3,288	393	69,400
Elcho Town	36,157	8	389	8,938	28	45,520
Evergreen Town	15,781	0	968	835	68	17,652
Langlade Town	12,585	0	748	665	53	14,051
Neva Town	29,099	0	1,786	3,083	126	34,094
Norwood Town	29,598	0	3,193	1,637	226	34,654
Parrish Town	2,597	0	59	132	4	2,792
Peck Town	13,251	0	1,226	1,719	87	16,283
Polar Town	25,736	160	3,584	1,461	253	31,194
Pine Town	10,354	0	487	775	34	11,650
Rolling Town	37,955	0	1,599	1,972	113	41,639
Upham Town	17,146	0	0	6,086	0	23,232
Wolf River Town ^a	30,530	0	2,454	5,611	174	38,769
Crescent Town	59,230	1,513	2,231	3,063	158	66,195
Enterprise Town	8,690	0	0	1,188	0	9,878
Lake Tomahawk Town	19,377	18	0	3,994	0	23,389
Monico Town	9,422	3,034	194	476	14	13,140
Newbold Town	63,392	63	757	3,191	54	67,457
Pelican Town	107,040	1,352	3,195	5,492	226	117,305
Piehl Town	3,196	0	0	158	0	3,354
Pine Lake Town	77,176	0	3,378	4,035	267	84,856
Schoepke Town	12,652	0	0	3,426	0	16,078
Stella Town	12,319	0	459	638	32	13,448
Sugar Camp Town	37,922	0	684	1,916	48	40,570
Three Lakes Town	53,398	905	0	15,600	0	69,903
Woodboro Town	13,651	10	0	-196	0	13,465
Total paid to counties in local study area	378,209 ^b	15,371	140,465	-2,851	9,931	541,125
Total paid to cities in local study area	629,124	10,507	740,527	-123,075	52,363	1,309,446
Total paid to townships in local study area	1,038,565	11,841	60,789	115,776	4,327	1,231,298

NOTE

^aIncludes White Lake Village.^b

This is not 14.9 percent of the total for the local study area; counties received shares from non local study area jurisdictions.

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1979. Taxes, Aids and Shared Taxes in Wisconsin Municipalities 1978. Madison.

Within the local study area, per capita payments accounted for 84.3 percent of state shared tax payments to towns, 48.0 percent of payments to cities, and 69.9 percent of shared tax payments to county governments. Overall, aidable revenue was next in importance (4.9 percent to towns, 56.6 percent to cities and 25.9 percent to counties).

Fees and Service Charges. Fees and service charges consist of regulation and compliance (from licenses, permits, fines, and non-compliance receipts), service to private parties (for judicial, general government, public safety services, inspection, health, social services, transportation services, leisure activities, education, conservation and urban development), use of money and property (income from interest, property rental, property sales, sale of tax deeds, refunds, transfers and refunding debt issues), and intergovernmental contracts and sales (income from services performed for other governments) (Wisconsin Department of Revenue, 1980).

Analysis by Local Jurisdiction. Revenue and cost data used in this analysis are derived from Municipal Resources Provided and Expended, published by the Bureau of Local Financial Assistance of the Wisconsin Department of Revenue (Wisconsin Department of Revenue, 1980). The data are provided for general comparison with the same types of jurisdictions across the state.

We present data for 1978, which were cross-checked with data from the two previous years to identify financial trends. Because of varying accounting practices, the calculation of a net surplus or net deficit may be misleading on an individual jurisdiction level. Some indications of deficits may in actuality be financing from the previous year's surplus.

Counties. The primary source of revenue for the three counties of the local study area was intergovernmental transfers, accounting for 55.8 percent of the counties' 1978 revenues (Table 2.10-97). This was higher than the average for all counties in the state (48.4 percent). Forest County depended most heavily on transfers, with intergovernmental revenues accounting for 65.3 percent of its \$3.3 million of revenues. Transfers accounted for 56.9 percent of Oneida County's revenues and 49.2 percent of Langlade County's (Table 2.10-98).

Property taxes (net taxes and tax credits) accounted for 21.9 percent of total revenues in the three counties. This was higher than the average of 19.4 percent for counties in the state. There was little difference in share of property taxes in Langlade and Oneida counties (23.5 and 24.3 percent), while Forest County tax revenues were only 14.1 percent of revenues.

Fees and services accounted for the remaining 22.1 percent of the three county revenues. This was far below the state average for counties (32.1 percent). The major difference arose

Table 2.10-97

SOURCES OF REVENUE: COUNTY, CITY, AND TOWN GOVERNMENTS, 1978

	Net Taxes		Tax Credits		Intergovernmental Revenues		Regulation & Compliance		Service to Private Parties		Use of Money & Property		Intergovernmental Contract Sales		Total ^a
	\$ 000	%	\$ 000	%	\$ 000	%	\$ 000	%	\$ 000	%	\$ 000	%	\$ 000	%	\$ 000
Total for all Local Jurisdictions ^a in Wisconsin (includes county)	600,815.2	21.9	149,919.5	5.5	1,262,399	46.2	42,691.8	1.6	365,534	13.4	219,362.1	8.0	92,144.8	3.4	2,735,849.7
Total for Local Study Area and Three Counties	5,901.5	22.0	1,005.1	3.8	14,744.3	55.0	336.9	1.3	1,030.2	3.8	1,487.4	5.5	2,315.4	8.6	26,850.8
Total for Counties in Local Study Area	3,111.2	19.5	385.8	2.5	8,891.1	55.8	126.9	0.8	612.8	3.8	561.5	3.6	2,230.4	14.0	15,919
Total for all Counties in Wisconsin	227,760.9	15.7	54,184.3	3.7	700,537.5	48.4	10,145.0	0.8	322,498.9	22.3	49,635.9	3.4	83,185.9	5.7	1,447,948.7
Total for Cities in Local Study Area	2,061.8	31.6	565.9	8.7	2,727.8	41.8	141.1	2.3	248.5	3.8	712.7	10.9	60.8	0.9	6,518.6
Total for all Cities in Wisconsin	310,182.3	31.4	84,380.2	8.5	391,773	39.6	28,528.3	2.9	32,179.2	3.3	134,927.7	13.7	6,400.3	0.6	988,461.7
Total for Towns and Villages in Local Study Area	728.5	16.5	53.4	1.3	3,155.4	71.5	68.9	1.5	168.9	3.8	213.2	4.8	24.2	0.5	4,412.5
Total for all Towns and Villages in Wisconsin	62,872.0	21.0	11,355.0	3.8	170,088.5	56.8	7,018.5	2.4	10,855.9	3.6	34,798.5	11.6	2,558.6	0.8	299,547.0

NOTE

^aIncludes general operations.

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1980. Municipal Resources Provided and Expended 1978. Bulletin 61. Madison.

Table 2.10-98

SOURCES OF REVENUE: BY JURISDICTION, 1978
(\$ thousands)

Jurisdiction	Net Taxes		Tax Credits		Inter-governmental Revenues		Regulation and Compliance		Service to Private Parties		Use of Money & Property		Intergovernmental Contract & Sales		Total \$
	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	
Local Study Area	2,790.4	25.5	619.3	5.7	5,883.2	53.8	210.0	1.9	417.4	3.8	925.9	8.5	85.0	0.8	10,931.2
Forest County	420.7	12.9	39.4	1.2	2,124.1	65.3	14.6	0.5	72.9	2.2	64.5	2.0	515.4	15.8	3,251.6
Langlade County	1,144.5	20.0	201.6	3.5	2,812.8	49.2	39.3	0.7	245.1	4.3	225.5	3.9	1,047.8	18.3	5,716.6
Oneida County	1,546.0	22.2	144.8	2.1	3,954.2	56.9	73.0	1.0	294.8	4.2	271.5	3.9	667.2	9.6	6,951.5
City of Crandon	69.1	18.8	9.2	2.5	200.1	54.5	9.3	2.5	17.5	4.8	56.0	15.3	5.8	1.6	367.0
City of Antigo	846.1	30.6	274.4	9.9	1,055.7	38.2	54.5	2.0	47.5	1.7	478.5	17.3	10.0	0.4	2,766.7
City of Rhinelander	1,146.6	33.9	282.3	8.3	1,472.0	43.5	77.3	2.3	183.5	5.4	178.2	5.3	45.0	1.3	3,384.9
Argonne Town	0.1	0.1	0.0	0.0	93.8	97.1	0.4	0.4	1.6	1.7	0.7	0.7	0.0	0.0	96.6
Blackwell Town	0.5	0.6	0.0	0.0	82.6	96.2	0.1	0.1	2.1	2.4	0.6	0.7	0.0	0.0	85.9
Caswell Town	1.2	5.0	0.1	0.4	19.9	84.3	0.2	0.9	0.2	0.9	1.8	7.6	0.2	0.9	23.6
Crandon Town	8.9	14.5	0.4	0.7	48.5	78.7	0.4	0.6	0.8	1.3	2.6	4.2	0.0	0.0	61.6
Freedom Town	13.2	19.5	1.8	2.7	47.9	70.7	1.1	1.6	1.8	2.7	1.9	2.8	0.0	0.0	67.7
Hiles Town	0.1	0.1	0.0	0.0	142.0	92.4	0.8	0.5	4.5	2.9	6.3	4.1	0.0	0.0	153.7
Laona Town	42.2	18.0	7.9	3.4	165.6	70.8	3.2	1.4	2.2	0.9	9.0	3.8	3.9	1.7	234.0

(continued)

(Table 2.10-98, continued)

<u>Jurisdiction</u>	<u>Net Taxes</u>		<u>Tax Credits</u>		<u>Inter-governmental Revenues</u>		<u>Regulation and Compliance</u>		<u>Service to Private Parties</u>		<u>Use of Money & Property</u>		<u>Intergovernmental Contract & Sales</u>		<u>Total \$</u>
	<u>\$</u>	<u>%</u>	<u>\$</u>	<u>%</u>	<u>\$</u>	<u>%</u>	<u>\$</u>	<u>%</u>	<u>\$</u>	<u>%</u>	<u>\$</u>	<u>%</u>	<u>\$</u>	<u>%</u>	
Lincoln Town	29.9	24.7	0.9	0.7	83.8	69.2	1.5	1.2	3.3	2.7	1.7	1.4	0.0	0.0	121.1
Nashville Town	22.6	15.1	0.6	0.4	84.7	56.7	3.4	2.3	36.1	24.1	1.4	0.9	0.7	0.5	149.5
Popple River Town	0.1	0.3	0.0	0.0	37.5	96.1	0.1	0.3	1.0	2.5	0.3	0.8	0.0	0.0	39.0
Ross Town	1.2	4.2	0.0	0.0	24.2	84.6	0.8	2.8	1.0	3.5	0.5	1.7	1.0	3.5	28.7
Wabeno Town	19.8	10.5	1.7	0.9	149.6	79.4	5.9	3.1	4.9	2.6	4.7	2.5	1.9	1.0	188.5
Ackley Town	2.2	3.5	0.2	0.3	50.5	80.2	0.6	0.9	4.7	7.5	4.7	7.5	0.1	0.1	63.0
Ainsworth Town	0.0	0.0	0.0	0.0	46.7	93.2	1.0	2.0	2.4	4.8	0.0	0.0	0.0	0.0	50.1
Antigo Town	1.6	1.2	0.1	0.1	98.2	76.1	2.6	2.0	9.3	7.2	10.5	8.1	6.8	5.3	129.1
Elcho Town	21.1	13.9	1.6	1.1	115.3	76.0	3.7	2.4	4.1	2.7	3.8	2.5	2.1	1.4	151.7
Evergreen Town	0.2	0.5	0.0	0.0	34.8	92.6	0.1	0.3	1.4	3.7	1.1	2.9	0.0	0.0	37.6
Langlade Town	1.6	3.7	0.0	0.0	35.3	80.9	1.2	2.8	2.6	5.9	2.9	6.7	0.0	0.0	43.6
Neva Town	0.1	0.2	0.0	0.0	52.2	86.3	1.8	2.9	5.4	8.9	1.0	1.7	0.0	0.0	60.5
Norwood Town	5.8	6.6	0.9	1.0	60.1	68.5	0.7	0.8	17.7	20.2	2.3	2.6	0.2	0.2	87.7
Parrish Town	0.0	0.0	0.0	0.0	12.6	98.4	0.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0	12.8
Peck Town	1.7	2.9	0.2	0.3	38.4	66.4	0.4	0.7	2.5	4.3	14.6	25.3	0.0	0.0	57.8
Polar Town	9.0	12.3	1.2	1.6	57.8	79.4	0.6	0.8	1.9	2.6	2.4	3.3	0.0	0.0	72.9
Price Town	1.4	4.0	0.1	0.3	27.5	78.8	0.4	1.1	4.8	13.8	0.7	2.0	0.0	0.0	34.9
Rolling Town	3.3	3.9	0.4	0.5	70.4	83.8	1.9	2.3	7.0	8.3	0.5	0.6	0.5	0.6	84.0
Upham Town	0.5	0.7	0.0	0.0	67.1	92.4	0.9	1.2	2.3	3.2	1.8	2.5	0.0	0.0	72.6
Wolf River Town ^a	39.2	20.7	10.9	5.7	123.0	64.8	2.6	1.4	3.2	1.7	10.1	5.3	0.7	0.4	189.7
Crescent Town	6.4	4.0	0.3	0.2	104.3	64.4	3.6	2.2	2.9	1.8	44.4	27.4	0.0	0.0	161.9

(continued)

(Table 2.10-98, continued)

Jurisdiction	Net Taxes		Tax Credits		Inter-governmental Revenues		Regulation and Compliance		Service to Private Parties		Use of Money & Property		Intergovernmental Contract & Sales		Total \$
	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	
Enterprise Town	3.1	10.0	0.1	0.3	23.4	75.5	0.6	1.9	1.5	4.8	2.3	7.4	0.0	0.0	31.0
Lake Tomahawk Town	65.6	35.6	3.8	2.1	82.6	44.8	0.8	0.4	3.7	2.0	27.6	14.9	0.3	0.2	184.4
Monico Town	7.6	20.0	0.6	1.6	26.7	70.4	0.3	0.8	0.1	0.3	2.6	6.9	0.0	0.0	37.9
Newbold Town	2.0	1.2	0.1	0.1	152.6	90.4	2.6	1.5	6.0	3.6	5.5	3.3	0.0	0.0	168.8
Pelican Town	2.9	1.8	0.1	0.1	149.3	93.4	4.4	2.8	0.3	0.2	2.7	1.7	0.0	0.0	159.7
Piehl Town	3.2	20.9	0.2	1.3	11.5	75.2	0.3	2.0	0.0	0.0	0.1	0.6	0.0	0.0	15.3
Pine Lake Town	21.3	12.2	0.9	0.5	142.7	82.1	3.3	1.9	0.3	0.2	5.4	3.1	0.0	0.0	173.9
Schoepke Town	12.3	20.4	0.5	0.8	35.4	58.8	1.3	2.2	2.5	4.2	4.9	8.1	3.3	5.5	60.2
Stella Town	6.4	13.7	0.3	0.6	36.1	77.3	0.4	0.9	0.8	1.7	1.1	2.4	1.6	3.4	46.7
Sugar Camp Town	71.2	39.1	2.6	1.4	93.4	51.3	3.6	2.0	3.8	2.1	7.0	3.9	0.4	0.2	182.0
Three Lakes Town	284.2	39.1	14.1	1.9	384.5	52.9	8.9	1.2	15.7	2.2	19.3	2.7	0.5	0.1	727.2
Woodboro Town	14.9	22.7	0.8	1.2	42.9	65.3	2.2	3.3	2.5	3.8	2.4	3.7	0.0	0.0	65.7

NOTE

^aIncludes White Lake Village.

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1980. Municipal Resources Provided and Expended 1978. Bulletin 61. Madison.

from the fact that local study area counties' revenue from services to private parties was only 3.8 percent, while Wisconsin counties averaged 22.3 percent. This reflects the rural character of the local study area. In sparsely populated areas, it is not economically feasible for local governments to provide such services as waste disposal. Therefore, local governments receive no revenue from these services.

Expenditures in the three counties in 1978 totaled \$27.8 million, indicating a net surplus of \$1.3 million or 4.7 percent of total revenues. This was higher than the 2.7 percent surplus recorded for Wisconsin county governments as a whole for 1978. This has been a consistent trend in recent years for the local study area counties. In 1978, Langlade County registered a 6.7 percent surplus, Oneida County registered a 4.8 percent surplus, while Forest County showed a deficit of 1.4 percent.

Cities. The primary source of revenue for the three cities within the local study area was intergovernmental transfers, accounting for 41.8 percent of total revenues (Table 2.10-97). This was approximately the same share of revenues as for other cities in the state (39.6 percent). Transfers were most important to Crandon, the local study area's smallest city (accounting for 54.5 percent of revenues). Intergovernmental transfers accounted for 43.5 percent of Rhinelander's revenues and 38.2 percent of Antigo's (Table 2.10-98).

Property taxes were the second major portion of revenues, totaling 40.3 percent of revenues (of this, 31.6 percent was taxes of residents and 8.7 percent was state reimbursed property tax credits) (Table 2.10-97). Taxes accounted for 39.9 percent of revenues for all Wisconsin cities. Of the cities within the local study area, Crandon received the smallest portion of tax revenues (21.3 percent of total revenues). Antigo and Rhinelander tax revenues were 40.5 and 42.2 percent of total city revenues, respectively (Table 2.10-98).

Fees and services accounted for the remaining revenues (17.8 percent) for the local study area city revenues (Table 2.10-97). This was slightly below the total for Wisconsin cities (20.5 percent). Crandon and Antigo received comparatively more from the use of money and property (15.3 and 17.3 percent) than did the average Wisconsin city (13.7 percent), and substantially more than Rhinelander (5.3 percent) (Table 2.10-98).

City expenditures totaled \$6.1 million in 1978. This was \$457 thousand less than revenues received. Rhinelander showed the largest comparative surplus of 9.4 percent of revenues; Antigo's surplus was 5.3 percent of revenues, while Crandon showed a deficit of 2.3 percent. Overall, Wisconsin cities showed a 2.9 percent surplus. In recent years, the local study area cities' fiscal patterns have deviated little from the state norm.

Towns. The major source of revenue for town governments in the local study area was intergovernmental transfers, accounting for 71.5 percent of all revenues in 1978 (Table 2.10-97). Overall, intergovernmental transfers accounted for 69.9 percent of town revenues in the state. Within the local study area, the relative importance of intergovernmental transfers varied from a high of 98.4 percent in Parrish to a low of 44.8 percent in Lake Tomahawk (Table 2.10-98).

The next largest revenue category for local study area towns was taxes, accounting for 17.8 percent of revenues (compared to 24.8 percent statewide). These ranged from a high of 41.0 percent in Three Lakes to a low of zero taxes in Ainsworth and Parrish.

Expenditures of towns in the local study area totaled \$4.6 million in 1978. This yielded a net deficit of \$175 thousand, or 4.0 percent of revenues. Overall, towns in the state showed a net deficit of 1.0 percent. Over the past few years, deficits and surpluses have fluctuated in both the local study area towns and towns in the state, indicating that over time most towns are fiscally balanced.

School Districts. There are eight school districts wholly contained in the local study area: Crandon, Laona, Wabeno, Antigo, Elcho, White Lake, Rhinelander, and Three Lakes. Revenues for these districts were evenly divided between own

source revenues (50.9 percent) and intergovernmental revenues (49.1 percent). There was considerable variation among individual districts, however. Own source revenues ranged from a high of 93.9 percent in the Three Lakes District to a low of 34.7 percent in Antigo (Table 2.10-99).

Federal Aid. In 1978, local study area school districts received \$1,032,265 in federal aid, 5.6 percent of total revenues (Table 2.10-100). Of this, \$631,650 took the form of food service aids for lunch, breakfast, and milk programs. All school districts participated in subsidized food service programs. The largest non-food aid was that legislated by the Elementary and Secondary Education Act. Of these funds, the largest portion was distributed under the provision of Title I, which authorizes supplementary instructional services for children who are educationally and economically deprived. Only the two largest city school districts, Antigo and Rhinelander, received Title I funds.

Three districts, Laona, Antigo, and Rhinelander, received funds from the Vocational Education Act (VEA). Salaries were the largest component of VEA revenues, although some of these funds were used to purchase training equipment.

Antigo and Rhinelander also received funds from the Educationally Handicapped Act. This money was spent on special

Table 2.10-99

SCHOOL DISTRICT REVENUES BY TYPE, 1977-1978

School District	Own Source				Intergovernmental Revenues				Total Revenues
	Property Tax		Other		State Transfers		Federal Transfers		
	Amount	% Total	Amount	% Total	Amount	% Total	Amount	% Total	
Crandon	\$ 590,856	40.0	\$ 107,100	7.2	\$ 675,967	45.8	\$ 101,404	7.0	\$ 1,475,327
Laona	418,852	37.9	77,926	7.1	557,197	50.4	50,879	4.6	1,104,854
Wabeno	453,253	47.7	64,000	6.7	352,559	37.1	80,522	8.5	950,334
Antigo	1,669,804	29.3	305,777	5.4	3,320,356	58.3	399,776	7.0	5,695,713
Elcho	835,648	87.8	49,398	5.1	42,366	4.5	24,903	2.6	952,315
White Lake	302,387	45.5	58,837	8.8	270,050	40.6	33,548	5.2	664,822
Rhineland	2,833,782	45.0	389,600	6.2	2,757,041	43.8	310,911	5.0	6,291,334
Three Lakes	1,149,315	88.6	69,255	5.3	48,694	3.8	30,322	2.3	1,297,586
Total	8,253,897	44.8	1,121,893	6.1	8,024,230	43.5	1,032,265	5.6	18,432,285

SOURCES

Wisconsin Department of Public Instruction. 1979. Distribution of Wisconsin Public School State Aid Dollars for 1977-1978. Bulletin No. 8372. Madison.

Wisconsin Department of Public Instruction. Unpublished data. Madison.

Table 2.10-100

FEDERAL AID TO SCHOOL DISTRICTS
SCHOOL YEAR 1977-1978

District	ESEA ^a Title I (LEA)	Indian Education Aid (LEA)	ESEA Title IVB (LEA)	VEA-SUB2 ^b (LEA)	EHA-6B ^c (LEA)	Food Service Aid-Lunch	Food Service Aid-Milk	Food Service Aid- Breakfast	Nonfood Assistance	Total	Aid Per Member ^d
Local Study Area	311,658.57	18,578.98	35,693.43	5,358.19	20,879.15	544,824.53	76,834.43	9,991.16	8,451.57	1,032,270.01	87.88
Crandon		11,564.39				81,264.71	8,574.40			101,403.50	94.07
Laona			1,148.60	283.96		40,186.16	2,824.05	5,634.13	802.12	50,879.02	101.55
Wabeno		7,014.59	1,552.70			67,025.57	3,753.13		1,177.37	80,523.36	118.94
Antigo	200,570.60		14,364.99	4,115.21	6,874.76	145,728.99	25,899.89		2,222.05	399,776.49	105.15
Elcho			1,693.65			17,504.83	1,349.02	4,357.03		24,904.53	42.64
White Lake			2,083.24			28,712.93	1,100.75		1,652.03	33,548.95	94.24
Rhineland	111,087.97		12,988.82	959.02	14,004.39	141,351.30	30,520.07			310,911.57	78.71
Three Lakes			1,861.43			23,050.04	2,813.12		2,598.00	30,322.59	37.99

NOTES

^aESEA = Elementary and Secondary Education Act.^bVEA = Vocation Education Act.^cEHA = Educationally Handicapped Act.^dMembership from Table 2.10-101.

SOURCE

Wisconsin Department of Public Instruction. Unpublished data. Madison.

education programs for mentally and physically handicapped students.

Crandon and Wabeno districts received funds for Native American education under the Indian Education Act.

State Aid. Overall, local study area school districts received \$8 million in transfers from the state (Table 2.10-101). General state aid to school districts is mandated by state law (Wisconsin Statutes, Sections 121.06-121.08). Shared costs (the district's operating expenditures minus operating receipts plus principal and interest payments) per member of the school district are divided by the legislated statewide guaranteed valuation per member and then multiplied by the net guaranteed valuation per member to determine state aid per member. Shared costs are included in the formula up to a statewide maximum. The net guaranteed valuation per member is the guaranteed valuation per member minus the district's full valuation per member. If the net guaranteed valuation per member is negative, the district receives no aid. In essence, the system is designed so that the district and the state each pay a share of allowable costs per pupil; the district's share is the ratio of its full valuation per member to the guaranteed valuation per member, and the state's share is the remainder. The ceiling on shared cost is 110.0 percent of the previous year's statewide average shared cost per pupil.

Table 2.10-101

STATE AID TO SCHOOL DISTRICTS, 1977-1978

<u>School District</u>	<u>Total Res. & Non-Res. Member- ship</u>	<u>Total Prof. Staff</u>	<u>General State Aid</u>	<u>Special Adjust. Aid</u>	<u>Transpor- tation</u>	<u>Common School Fund</u>	<u>State Tuition</u>	<u>Driver Education</u>	<u>Handic. Children Education</u>	<u>Total State Aid</u>
Local study area	11,746	671	\$ 7,104,623	\$ 18,911	\$ 303,906	\$ 36,992	\$ 14,753	\$ 43,360	\$ 501,685	\$ 8,024,230
Crandon	1,078	55	605,952	0	23,724	3,239	2,476	2,920	37,656	675,967
Laona	501	39	536,619	0	8,526	1,302	0	1,600	9,150	557,197
Wabeno	677	46	308,475	5,687	17,307	1,862	0	1,800	17,428	352,559
Antigo	3,802	197	3,046,597	0	92,817	11,965	0	15,920	153,057	3,320,356
Elcho	584	37	0	0	21,285	1,608	0	1,920	17,553	42,366
White Lake	356	29	219,738	13,224	10,458	1,004	0	1,320	24,306	270,050
Rhineland	3,950	224	2,387,242	0	102,612	13,607	0	15,400	238,180	2,757,041
Three Lakes	798	44	0	0	27,177	2,405	12,277	2,480	4,355	48,694

SOURCE

Wisconsin Department of Public Instruction. 1979. Distribution of Wisconsin Public School Aid Dollars for 1977-78. Bulletin 8372. Madison.

During the 1977-1978 school year, two districts in the local study area, Elcho and Three Lakes, received no general state aids. For the remaining districts, the general aid payments were 88.5 percent of all state aid to local study area school districts. Other state aids include assistance to public schools for specified programs; these are categorical aids. The two largest programs are for handicapped children and school transportation. These programs accounted for 6.3 and 3.8 percent, respectively, of all state categorical aids to local study area school districts. Overall, general and categorical aids ranged from 4.5 percent of school district revenues in Elcho to 58.3 percent in Antigo.

School District Own Source Revenues. The largest single source of revenue for the school districts within the local study area was local property taxes. Taxes accounted for 44.8 percent of total school revenues for the 1977-1978 school year. There were wide fluctuations in its relative importance among districts. Antigo district property tax receipts were only 29.3 percent of total revenues, while Three Lakes district property-based revenues accounted for 88.6 percent of its total revenues.

Other revenues, such as program revenues, accounted for 6.1 percent of local study area school districts' revenues and were a

relatively constant proportion of revenues throughout individual districts.

Expenditures totaled over \$20 million for the 1977-1978 school year. The major operating expenditures incurred by the school districts were for salaries and fringe benefits (64.1 percent) and transportation (bus program, including personnel, 7.9 percent).

Nicolet Vocational and Technical Adult Education District. The primary source of revenues for the Nicolet VTAE is local property taxes (Table 2.10-102). In the 1977-1978 school year, these totaled \$2.6 million--65.5 percent of total Nicolet VTAE revenues. Other major revenue sources were state and federal aids (14.1 and 10.1 percent, respectively) and program fees (6.0 percent).

Towns and cities in the local study area contributed \$1.1 million to the Nicolet VTAE District in 1978 in the form of property tax revenues (Table 2.10-103). This was 42.0 percent of the VTAE's tax based revenues and 27.5 percent of the VTAE's total revenue. The remaining property tax revenues to the VTAE came from towns and cities outside the local study area.

Expenditures of the VTAE totaled \$3.9 million in 1977-1978, equal to its revenues. The VTAE, thus, operated on a balanced budget.

Table 2.10-102

NICOLET VTAE REVENUES BY TYPE
SCHOOL YEAR 1977-1978

<u>Revenue Source</u>	<u>Amount</u>	<u>Percent of Total</u>
Local taxes	\$2,573,252	65.5
State aids	554,477	14.1
Federal aids	396,824	10.1
Program fees	237,630	6.0
Other fees	41,766	1.1
Miscellaneous	127,134	3.2
Total	\$3,931,083	100.0

SOURCE

VTAE Administration. 1980. Personal Communication. Madison.

Table 2.10-103

VTAE TAXES PAID BY TOWN AND CITY, 1978

<u>Jurisdiction</u>	<u>Aid^a to Nicolet VTAE</u>
Local Study Area	\$1,079,714.99
City of Crandon	30,812.03
City of Antigo	0.00
City of Rhinelander	196,163.79
Argonne Town	8,827.71
Blackwell Town	0.00
Caswell Town	2,756.40
Crandon Town	10,217.31
Freedom Town	13,713.23
Hiles Town	26,253.31
Laona Town	34,233.50
Lincoln Town	29,015.25
Nashville Town	35,859.71
Popple River Town	2,601.38
Ross Town	3,941.85
Wabeno Town	18,019.47
Ackley Town	0.00
Ainsworth Town	14,400.34
Antigo Town	0.00
Elcho Town	46,040.39
Evergreen Town	0.00
Langlade Town	0.00
Neva Town	2,201.56
Norwood Town	0.00
Parrish Town	2,815.47
Polar Town	0.00
Peck Town	627.22
Price Town	0.00
Rolling Town	0.00
Upham Town	29,364.37
Wolf River Town ^b	0.00
Crescent Town	48,147.16
Enterprise Town	15,841.78
Lake Tomahawk Town	37,620.26
Monico Town	11,413.03
Newbold Town	76,113.63
Pelican Town	70,317.60
Piehl Town	1,903.55
Pine Lake Town	54,022.41
Schoepke Town	25,946.49
Stella Town	14,434.54
Sugar Camp Town	53,944.44
Three Lakes Town	140,521.74
Woodboro Town	21,624.07

NOTES

^aAids are tax revenues.

^bIncludes White Lake Village

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance.
Unpublished statements of taxes reported by municipality.

Indebtedness. Spot deficits may occur in some local study area jurisdictions due to the periodic costs of capital improvements. Local officials indicated a strong reluctance to issue bonds as a source of financing.

The Wisconsin Constitution (Article XI, Section 3) limits the long-term indebtedness of town, city, and county governments to five percent of the jurisdiction's equalized valuation. Few towns in the local study area have exercised their borrowing authority; those that have remain well under the limit. All three cities have long-term debt outstanding; Crandon has used 5.6 percent of its bonding capacity, Antigo has used 72.8 percent, and Rhinelander has used 31.8 percent (Table 2.10-104). Forest County had no long-term indebtedness as of the end of 1978; Langlade and Oneida County each had used less than 5.0 percent of their bonding capacity. The average bonding capacity use for all county governments in the state was 8.0 percent.

The long-term indebtedness of school districts is limited to 10.0 percent of the district's equalized valuation. All school districts in the local study area are indebted, but none has used more than 10.0 percent of its borrowing capability. School districts throughout the state have borrowed about 11.0 percent of the statutory limit.

The long-term indebtedness of VTAE districts is limited to 2.0 percent of the district's equalized valuation. The Nicolet VTAE has used 4.0 percent of its borrowing capability as of the

Table 2.10-104

LONG-TERM INDEBTEDNESS OF LOCAL STUDY AREA
JURISDICTIONS AS OF DECEMBER 31, 1978

<u>Jurisdiction</u>	<u>Total Indebtedness</u>	<u>Statutory Limitation</u>	<u>% of Limit Currently Utilized</u>
Local Study Area	36,458,677	550,927,365	12.7
Forest County	-0-	8,293,956	-0-
Langlade County	585,000	16,149,755	3.6
Oneida County	1,725,000	42,059,718	4.1
City of Crandon	60,725	1,084,445	5.6
City of Antigo	3,702,275	5,084,354	72.8
City of Rhinelander	2,196,000	6,904,090	31.8
Argonne Town	-0-	310,696	-0-
Blackwell Town	-0-	103,466	-0-
Caswell Town	80,000	97,013	82.5
Crandon Town	-0-	395,603	-0-
Freedom Town	15,000	482,644	3.1
Hiles Town	-0-	923,999	-0-
Laona Town	-0-	1,204,866	-0-
Lincoln Town	-0-	1,021,207	-0-
Nashville Town	100,000	1,262,102	7.9
Popple River Town	-0-	91,556	-0-
Ross Town	-0-	138,735	-0-
Wabeno Town	10,000	634,205	1.6
Ackley Town	-0-	640,442	-0-
Ainsworth Town	-0-	506,827	-0-
Antigo Town	-0-	1,465,285	-0-
Elcho Town	-0-	1,620,416	-0-
Evergreen Town	-0-	271,375	-0-
Langlade Town	-0-	421,373	-0-
Neva Town	-0-	714,595	-0-
Norwood Town	55,000	691,332	7.9
Parrish Town	-0-	99,092	-0-
Peck Town	20,000	361,227	5.5
Polar Town	-0-	564,253	-0-
Price Town	-0-	306,925	-0-
Rolling Town	-0-	847,424	-0-
Summit Town	-0-	181,592	-0-
Upham Town	-0-	1,053,730	-0-
Vilas Town	-0-	257,800	-0-
Wolf River Town ^a	31,000	1,061,707	2.9
Crescent Town	40,000	1,694,585	2.4
Enterprise Town	-0-	557,560	-0-
Lake Tomahawk Town	56,700	1,324,065	4.3
Monico Town	61,571	401,687	15.3
Newbold Town	-0-	2,678,860	-0-
Pelican Town	-0-	2,474,865	-0-
Piehl Town	-0-	66,996	-0-
Pine Lake Town	-0-	1,901,347	-0-
Schoepke Town	13,870	913,200	1.5
Stella Town	16,536	508,032	3.3
Sugar Camp Town	-0-	1,900,363	-0-
Three Lakes Town	-0-	4,940,359	-0-
Woodboro Town	-0-	761,070	-0-
Crandon School District	155,840	8,391,810	1.9
Laona School District	443,000	2,727,270	16.2
Wabeno School District	575,000	6,477,750	8.9
Antigo School District	291,557	22,277,760	1.3
Elcho School District	222,240	8,267,200	2.7
White Lake School District	260,000	2,957,950	8.8
Rhinelander School District	2,118,000	31,733,030	6.7
Three Lakes School District	736,696	13,126,530	5.6
Total School District	4,802,333	95,959,300	5.0
Nicolet VTAE	1,550,000	39,730,935	3.9

NOTE

^aIncludes White Lake Village.

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1979. Long-Term Indebtedness of Wisconsin Political Subdivisions, 1978. Bulletin No. 60. Madison.

end of 1978, compared with a 7.0 percent average use for all VTAE districts in the state.

Local Fiscal Balance. In 1978, Wisconsin county and local governments collected slightly more than \$2.7 billion in revenues for operations (Table 2.10-105). Total expenditures for county and local governments totaled slightly less than \$2.7 billion, creating a positive net balance of \$73.6 million, or 2.7 percent of total revenues. Forest, Langlade, and Oneida counties, and local governments collected \$29.1 million and spent \$27.8 million, for a positive net balance of \$1.3 million, or 4.7 percent of total revenues.

These surpluses were due primarily to the lower level of expenditures in the local study area. Local study area county and local jurisdictions actually collected less revenues per capita than county and local jurisdictions statewide (Table 2.10-106). The surpluses were due to an overall per capita local expenditure of \$474.64 in the local study area, while county and local jurisdictions for the state as a whole spent \$572.20 per resident. The average state resident received the benefits of local expenditures which were 21.0 percent higher.

The lower level of expenditures is in part explained by the rural character of the local study area. Since the local study area is primarily rural, its residents do not receive services common to the urban dweller. For example, some services such as

Table 2.10-105

COUNTY AND LOCAL JURISDICTION REVENUES AND
EXPENDITURES, 1978
(\$ 000)

	<u>Revenues</u>	<u>Expenditures</u>	<u>Net Balance</u>	<u>%</u>
State of Wisconsin	2,735,849.7	2,662,293.7	73,556.0	2.7
Forest County	5,044.9	5,113.3	-68.4	-1.4
Langlade County	9,685.6	9,034.2	651.4	6.7
Oneida County	14,326.5	13,640.8	685.7	4.8
Three County Total	29,057.0	27,788.3	1,268.7	4.7

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance. 1980.
Municipal Resources Provided and Expended 1978. Bulletin 61. Madison.

Table 2.10-106

PER CAPITA REVENUES AND EXPENDITURES, 1978

	<u>Revenues</u>	<u>Expenditures</u>
State of Wisconsin	\$ 588.00	\$ 572.20
Forest County	580.94	588.88
Langlade County	491.18	458.15
Oneida County	475.28	452.54
Three County Total	496.31	474.64

SOURCE

Wisconsin Department of Revenue, Bureau of Local
 Financial Assistance. 1980. Municipal Resources
 Provided and Expended 1978. Bulletin 61. Madison.

garbage collection, may be privately contracted for. Others, such as water supply and wastewater treatment, may be provided by residents through private wells and septic systems.

Residents in the three-county area paid \$6.6 million in local government taxes in 1978 (Table 2.10-107). This averaged \$113.60 per resident. Statewide, residents paid an average of \$129.10. While the level of taxes was lower in the local study area, they were a greater burden. The local study area resident paid 2.0 percent of his income to his local governments, while the state resident paid 1.7 percent. On average, local study area residents paid a greater percentage of their personal income as taxes to local governments than did residents in the state as a whole.

2.10.6 SOCIOCULTURAL PROFILE

In this subsection, we document current sociocultural conditions in the local study area. We describe normal (baseline) sociocultural characteristics for four major sociocultural factors: reproduction, sustenance, order and safety, and socialization. These four factors include all major activities that are necessary for continued functioning of the society. Reproduction includes bearing children and providing sufficient support for them to become fully active members of society. Sustenance refers to the ability of members of a society to provide for their material needs, including leisure.

Table 2.10-107
COUNTY AND LOCAL TAXES, 1978
(\$ 000)

	<u>Net Taxes</u>	<u>Per Capita</u>	<u>Percent of Personal Incomes</u>
State of Wisconsin	600,851.2	129.1	1.70
Forest County	631.5	72.7	1.66
Langlade County	2,083.3	105.6	1.94
Oneida County	3,937.5	130.6	2.02
Three County Total	6,652.3	130.6	1.96

SOURCE

Wisconsin Department of Revenue, Bureau of Local Financial Assistance.
1980. Municipal Resources Provided and Expended 1978. Bulletin 61.
Madison.

Order and safety refers to the capability of the society to allow its members to carry out their normal routines without undue fear or disruption.

Socialization includes all of the processes that a society uses to train its members to be fully active within the society. Changes in these factors may indicate major social change.

Table 2.10-108 illustrates that the four major social factors are performed or accomplished within social institutions such as the family, the economy, government, etc. How well these social institutions perform their functions is described by the "distributive consequences" listed in Table 2.10-108. For example, how well the economy performs its sustenance functions is partially demonstrated by the amount of employment that the economy provides. Major changes in the amount of employment may indicate important changes in the ability of the society to sustain itself.

We have used four sources of information for this chapter: social indicator data, participant-observation research, data from other sections of the socioeconomic study and data from survey research conducted in the local study area.

In general, sociocultural conditions in the local study area are very similar to those in Wisconsin as a whole. Birth and death rates are similar to state rates. Population growth in the local study area exceeded the state rate in the 1970's because of the immigration of older people. This has more than offset

Table 2.10-108

ORGANIZATION OF SOCIOCULTURAL INDICATOR CONTENT AREAS

<u>Type of Activity</u>	<u>Institutional Organization</u>	<u>Distributive Consequences</u>
Reproduction	Family Health care	Marriage Fertility Divorce Morbidity Mortality
Sustenance (production of goods and services)	Economy	Employment Consumption Leisure Housing Transportation
Order and safety	Government Religion	Crime Alcohol and drug abuse Political and religious participation
Socialization	Learning	Schooling

SOURCE

Modified from K.C. Land, "Social Indicator Models: An Overview." In: K.C. Land and S. Spilerman (eds.), Social Indicator Models, Russell Sage Foundation, New York, 1975.

outmigration of younger people seeking better employment opportunities. This migration pattern has produced a population slightly older than the state average, and one with a higher mortality rate attributable to diseases of old age.

The economic base of the local study area is formed by several industries, all of which appear to be mature and growing slowly, if at all. The local study area has not been able to generate new employment opportunities at the same pace as additions to the labor force. These conditions have created higher unemployment rates and lower household incomes than the average for Wisconsin. They also explain the long-run pattern of outmigration by young adults. Attitude surveys of permanent residents indicated dissatisfaction with the current economic base and the desire for new employment opportunities in the local study area, if these can be generated without reducing environmental amenities.

Permanent residents of the local study area exhibit strong social cohesion through high participation rates in political and religious activities. Ethnically and economically the population is very homogeneous, reducing the opportunities for social division. The overall crime rate in the local study area is about the same as for the state. The only notable exception is the higher incidence of crimes of violence in Forest County. Offsetting this was the county's lower incidence of alcohol and drug related offenses.

Overall levels of education, a measure of socialization, are about the same in the local study area as in the state. However, Forest County exhibits some problems in its educational system as the dropout rate is substantially higher than in the state or in Langlade and Oneida counties.

Perhaps the best phrases to describe the sociocultural environment of the local study area are "stable" and "mature." Over the past decade, the local study area has demonstrated its ability to absorb a substantial number of immigrants without damage to its social fabric. The only apparent weakness in the sociocultural environment is the ability of the economic base to provide jobs for those raised in the local study area. There is a widespread feeling that growth in employment opportunities would be an improvement over current conditions if this could be accomplished without loss of environmental quality and without rapid increases in the rate of immigration. We find no evidence of severe sociocultural stress or any evidence that past economic growth and immigration have had any negative effects on the sociocultural environment as perceived by permanent residents.

2.10.6.1 Reproduction

Marriage. Marriage rates per 1,000 people do not show major changes in the local study area for the period 1967 through 1976 (Table 2.10-109). Forest County's average marriage rate for the 10-year period of 9.56 per 1,000 population is slightly

Table 2.10-109

MARRIAGES 1967-1976

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>Average</u>
<u>State of Wisconsin</u>											
Absolute value	30,480	33,019	34,401	34,415	34,858	38,608	40,098	38,248	35,888	36,024	-
Pop. (in 1,000's)	4,207.00	4,212.00	4,326.00	4,417.73	4,473.00	4,526.00	4,540.00	4,564.90	4,589.30	4,608.40	-
Rate ^a	7.25	7.84	7.95	7.79	7.79	8.53	8.83	8.33	7.82	7.82	8.0
<u>Forest County</u>											
Absolute value	64	64	63	64	75	87	89	83	68	77	-
Pop. (in 1,000's)	6.50	6.35	6.45	7.69	7.75	8.00	8.30	8.50	8.20	8.10	-
Rate ^a	9.85	10.08	9.77	8.32	9.68	10.88	10.72	9.76	8.29	9.51	9.56
<u>Langlade County</u>											
Absolute value	162	189	170	167	180	189	204	207	175	166	-
Pop. (in 1,000's)	18.15	17.55	18.10	19.22	19.25	19.80	19.40	19.20	19.80	20.00	-
Rate ^a	8.93	10.77	9.39	8.69	9.35	9.55	10.52	10.78	8.84	8.30	9.52
<u>Oneida County</u>											
Absolute value	167	199	197	202	198	243	266	274	240	251	-
Pop. (in 1,000's)	22.80	22.65	23.25	24.43	25.05	26.30	26.90	27.40	28.30	29.20	-
Rate ^a	7.32	8.79	8.47	8.27	7.90	9.24	9.89	10.00	8.48	8.60	8.70

NOTE

$$^a \text{ Rate} = \frac{\text{Absolute value}}{\text{population}}$$

SOURCE

Wisconsin Department of Administration. 1979. Wisconsin Statistical Abstract. Fourth Edition. Madison.

higher than the average rates for Langlade County (9.52), Oneida County (8.70), and the state (8.00).

Divorce. Divorce rates per 1,000 people indicate a slight increase in the three-county area for the period 1967 through 1976 (Table 2.10-110). Oneida County's average divorce rate for the period (2.18) is slightly higher than Forest County (1.67) and Langlade County (1.79). Average divorce rates in the local study area are similar to the state's average rate of 2.19.

Birth Rates and Average Household and Family Sizes. Birth rates in the three-county area for the period 1967 through 1976 reflect the state and national trends toward smaller families (Table 2.10-111). Forest County had the highest average birth rate per 1,000 people (16.57), while the rates for Langlade County (15.24) and Oneida County (13.88) were somewhat lower. These average birth rates do not differ substantially from that of the state (15.72) for the same period. The state's average household size and average family size are similar to the local study area and Forest, Langlade, and Oneida counties (Table 2.10-112).

Morbidity. Cases of reportable diseases per 1,000 population in the three-county area are similar for Langlade and Oneida counties (Table 2.10-113). These counties are also

Table 2.10-110
 DIVORCES 1967-1976

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	Average
<u>State of Wisconsin</u>											
Absolute value	5,842	6,985	7,547	8,594	8,590	10,189	11,286	12,099	12,837	14,211	-
Pop. (in 1,000's)	4,207.00	4,212.00	4,326.00	4,417.73	4,473.00	4,526.00	4,540.00	4,564.90	4,589.30	4,608.40	-
Rate ^a	1.39	1.66	1.74	1.95	1.92	2.25	2.49	2.65	2.80	3.08	2.19
<u>Forest County</u>											
Absolute value	8	13	8	16	5	7	22	11	15	23	-
Pop. (in 1,000's)	6.50	6.35	6.45	7.69	7.75	8.00	8.30	8.50	8.20	8.10	-
Rate ^a	1.23	2.05	1.24	2.08	0.65	0.88	2.65	1.29	1.83	2.84	1.67
<u>Langlade County</u>											
Absolute value	25	28	20	21	29	30	49	33	53	56	-
Pop. (in 1,000's)	18.15	17.55	18.10	19.22	19.25	19.80	19.40	19.20	19.80	20.00	-
Rate ^a	1.38	1.60	1.10	1.09	1.51	1.52	2.53	1.72	2.68	2.80	1.79
<u>Oneida County</u>											
Absolute value	35	38	51	40	61	51	52	75	67	96	-
Pop. (in 1,000's)	22.80	22.65	23.25	24.43	25.05	26.30	26.90	27.40	28.30	29.20	-
Rate ^a	1.54	1.68	2.19	1.64	2.44	1.94	1.93	2.74	2.37	3.29	2.18

NOTE

$$^a \text{ Rate} = \frac{\text{Absolute Value}}{\text{population}}$$

SOURCE

Wisconsin Department of Administration. 1979. Wisconsin Statistical Abstract. Fourth Edition. Madison.

Table 2.10-111
LIVE BIRTHS 1967-1976

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>Average</u>
<u>State of Wisconsin</u>											
Absolute value	75,979	74,255	74,324	77,455	71,976	64,719	62,796	65,148	65,142	65,042	-
Pop. (in 1,000's)	4,207.00	4,212.00	4,326.00	4,417.73	4,473.00	4,526.00	4,540.00	4,564.90	4,589.30	4,608.40	-
Rate ^a	18.06	17.63	17.18	17.54	16.09	14.30	13.83	14.27	14.20	14.11	15.72
<u>Forest County</u>											
Absolute value	121	126	125	123	136	129	124	122	108	127	-
Pop. (in 1,000's)	6.50	6.35	6.45	7.69	7.75	8.00	8.30	8.50	8.20	8.10	-
Rate ^a	18.62	19.84	19.38	15.99	17.55	16.13	14.94	14.35	13.17	15.68	16.57
<u>Langlade County</u>											
Absolute value	335	292	311	281	305	271	257	276	290	273	-
Pop. (in 1,000's)	18.15	17.55	18.10	19.22	19.25	19.80	19.40	19.20	19.80	20.00	-
Rate ^a	18.46	16.64	17.18	14.62	15.84	13.69	13.25	14.38	14.65	13.65	15.24
<u>Oneida County</u>											
Absolute value	346	316	359	376	377	342	322	337	384	378	-
Pop. (in 1,000's)	22.80	22.65	23.25	24.43	25.05	26.30	26.90	27.40	28.30	29.20	-
Rate ^a	15.18	13.95	15.44	15.39	15.05	13.00	11.97	12.30	13.57	12.95	13.88

NOTE

$$^a \text{ Rate} = \frac{\text{Absolute value}}{\text{population}}$$

SOURCE

Wisconsin Department of Administration. 1979. Wisconsin Statistical Abstract. Fourth Edition. Madison.

Table 2.10-112

AVERAGE HOUSEHOLD AND FAMILY SIZES, 1970

	<u>State of Wisconsin</u>		<u>Local Study Area</u>		<u>Forest County</u>		<u>Langlade County</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Population by Household Relationship ^a	4,417,731	100.0	45,223	100.0	7,691	100.0	19,220	100.0
Persons Living with Relatives	3,953,667	89.5	41,204	91.0	6,861	89.2	17,605	91.6
Unrelated Individuals	330,035	7.5	3,154	7.0	504	6.6	1,395	7.3
Persons in Group Quarters	134,029	3.0	865	2.0	326	4.2	220	1.1
Households ^b								
Number	1,328,804		13,973		2,269		5,889	
Persons Per household	3.2		3.0		3.2		3.2	
Families								
Number	1,072,796		11,332		1,817		4,680	
Average Family Size ^c	3.7		3.6		3.8		3.8	
	<u>Oneida County</u>		<u>City of Crandon</u>		<u>City of Antigo</u>		<u>City of Rhinelander</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Population by Household Relationship ^a	24,427	100.0	1,582	100.0	9,005	100.0	8,218	100.0
Persons Living with Relatives	22,368	91.6	1,404	88.8	8,033	89.2	7,348	89.4
Unrelated Individuals	1,674	6.8	124	7.8	891	9.9	696	8.5
Persons in Group Quarters	385	1.6	54	3.4	81	0.9	174	2.1
Households ^b								
Number	7,757		513		3,019		2,672	
Persons per Household	2.8		3.0		3.0		3.0	
Families								
Number	6,347		402		2,222		2,071	
Average Family Size ^c	3.5		2.9		3.6		3.5	

NOTES

^a Persons living with relatives are heads of households and their relatives who live with them; unrelated individuals are primary individuals and those living in a household who are not related to the household head; persons in group quarters are those in institutions, rooming houses, military barracks, college dormitories, and other group quarters.

^b Number of households equals number of housing units; persons per household equals population divided by number of households.

^c Average family size equals population divided by number of persons living with relatives.

SOURCE

Wisconsin Department of Administration. 1980. 1970 Census Summary Tables, Tables 121, 122, 125, 126. Computer printout. Madison.

Table 2.10-113

TOTAL CASES AND DEATHS FROM REPORTABLE DISEASES^b BY COUNTY, 1970-1976

<u>State of Wisconsin</u>	<u>1970</u> Cases/Deaths	<u>1971</u> Cases/Deaths	<u>1972</u> Cases/Deaths	<u>1973</u> Cases/Deaths	<u>1974</u> Cases/Deaths	<u>1975</u> Cases/Deaths	<u>1976</u> Cases/Deaths	<u>Average</u> Cases/Deaths
Absolute value	35,933/82	47,610/60	49,811/77	48,856/56	35,504/73	39,831/61	45,159/64	-
Pop. (in 1,000's)	4,417.73	4,473.00	4,526.00	4,540.00	4,564.90	4,589.30	4,608.40	-
Rate ^a (per 1,000)	8.13/0.02	10.64/0.01	11.01/0.01	10.76/0.01	7.78/0.02	8.68/0.01	9.80/0.01	9.54/0.01
<u>Forest County</u>								
Absolute value	274/0	208/1	178/0	92/0	106/0	201/0	432/0	-
Pop. (in 1,000's)	7.79	7.75	8.00	8.30	8.50	8.20	8.10	-
Rate ^a (per 1,000)	35.63/0.00	26.84/0.13	22.25/0.00	11.08/0.00	12.47/0.00	24.51/0.00	53.3/0.00	26.5/0.02
<u>Langlade County</u>								
Absolute value	23/0	39/1	17/1	49/1	158/1	118/1	304/0	-
Pop. (in 1,000's)	19.22	19.25	19.80	19.40	19.20	19.80	20.00	-
Rate ^a (per 1,000)	1.20/0.00	2.03/0.05	0.86/0.05	2.53/0.05	8.23/0.05	5.96/0.05	15.20/0.00	5.14/0.04
<u>Oneida County</u>								
Absolute value	180/0	530/1	176/1	321/1	108/1	184/0	408/2	-
Pop. (in 1,000's)	24.43	25.05	26.30	26.90	27.40	28.30	29.20	-
Rate ^a (per 1,000)	7.37/0.00	21.16/0.04	6.69/0.04	11.93/0.04	3.94/0.04	6.50/0.00	13.97/0.07	10.2/0.03

NOTES

^a Rate = $\frac{\text{Absolute value}}{\text{population}}$

^b Reportable diseases include the following: Brucellosis (undulant fever), Chickenpox, Dysentery (bacillary), German Measles, Jaundice (infectious Hepatitis), Measles, Meningitis, Aseptic Meningitis (viral), Mumps, Rabies, Rheumatic Fever, Salmonella Infections, Streptococcal Disease, Tuberculosis (active cases only) and Whooping Cough.

SOURCE

Wisconsin Department of Health and Social Services. 1978. Public Health Statistics. Division of Health, Bureau of Health Statistics.

similar to the state. However, Forest County had a substantially higher rate of reportable disease. Reportable diseases include undulant fever, chickenpox, dysentery, German measles, infectious hepatitis, measles, meningitis, aseptic meningitis, mumps, rabies, rheumatic fever, salmonella infections, streptococcal disease, tuberculosis, and whooping cough. In 1978, streptococcal disease was the leading reportable disease in Forest and Langlade counties, while chickenpox was the most common reportable disease in Oneida County.

Mortality. Death rates in the three-county area are higher than the state's (Table 2.10-114). The average death rate in Forest County for the period 1967 through 1976 (12.84 per 1,000 people) was the highest of the three counties, followed by Langlade County (11.78) and Oneida County (11.32). The major cause of death in the local study area was disease of the circulatory system; the second leading cause of death was cancer (Table 2.10-115).

Summary of Reproductive Capability of Local Study Area. Though the local study area showed a loss of population during the 1950's and 1960's, this loss was due to a general outmigration that affected rural areas all over the nation. Since the 1970's, the local study area has shown a general population increase as people migrate to the area. There are no

Table 2.10-114

DEATHS 1967-1976

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>Average</u>
<u>State of Wisconsin</u>											
Absolute value	39,654	41,323	41,072	40,820	40,380	42,074	41,293	40,808	39,914	40,190	-
Pop. (in 1,000's)	4,207.00	4,212.00	4,326.00	4,417.73	4,473.00	4,526.00	4,540.00	4,564.90	4,589.30	4,608.40	-
Rate ^a	9.43	9.81	9.49	9.24	9.03	9.30	9.10	8.94	8.70	8.72	9.18
<u>Forest County</u>											
Absolute value	86	88	119	101	97	111	87	83	96	92	-
Pop. (in 1,000's)	6.50	6.35	6.45	7.69	7.75	8.00	8.30	8.50	8.20	8.10	-
Rate ^a	13.23	13.86	18.45	13.13	12.52	13.88	10.48	9.76	11.71	11.36	12.84
<u>Langlade County</u>											
Absolute value	218	236	220	253	241	252	213	212	208	184	-
Pop. (in 1,000's)	18.15	17.55	18.10	19.22	19.25	19.80	19.40	19.20	19.80	20.00	-
Rate ^a	12.01	13.45	12.15	13.16	12.52	12.73	10.98	11.04	10.51	9.20	11.78
<u>Oneida County</u>											
Absolute value	263	272	291	293	290	313	291	304	277	290	-
Pop. (in 1,000's)	22.80	22.65	23.25	24.43	25.05	26.30	26.90	27.40	28.30	29.20	-
Rate ^a	11.54	12.01	12.52	11.99	11.58	11.90	10.82	11.09	9.79	9.93	11.32

NOTE

$$^a \text{ Rate} = \frac{\text{Absolute value}}{\text{population}}$$

SOURCE

Wisconsin Department of Administration. 1979. Wisconsin Statistical Abstract. Fourth Edition. Madison.

Table 2.10-115

DEATHS BY MAJOR CAUSES, BY COUNTY, 1977

	<u>Forest</u>	<u>Langlade</u>	<u>Oneida</u>
Tuberculosis	0	1	0
Septicemia	2	0	1
Other infective, parasitic diseases	2	1	0
Malignant neoplasms	23	38	77
Benign and unspecified neoplasms	0	0	0
Endocrine, nutritional and metabolic diseases	1	3	5
Diseases of the blood and blood forming organs	2	0	1
Mental disorders	0	1	1
Diseases of the nervous system	1	3	4
Diseases of the circulatory system	62	115	170
Diseases of the respiratory system	5	12	26
Diseases of the digestive system	3	8	4
Diseases of the genitourinary system	2	2	1
Complications of pregnancy, child- birth and puerperium	0	0	0
Diseases of the skin	0	0	0
Diseases of the musculoskeletal system	0	0	2
Congenital anomalies	0	0	3
Various causes of perinatal mortality	0	1	3
Ill-defined conditions	0	4	1
Motor vehicle	3	5	3
All other accidents	3	4	5
Suicide	5	1	4
Homicide and legal intervention	0	1	1
Operations of war and undetermined violent deaths	0	0	0

SOURCE

Wisconsin Department of Health and Social Services. 1978. Public Health Statistics. 1977. Division of Health, Bureau of Health Statistics. Madison.

indicators of family characteristics or health care that point to an inability of the society to maintain a healthy rate of natural increase and successful care of dependent individuals.

2.10.6.2 Sustenance

Employment. As indicated in the employment subsection of the Economic Profile (Table 2.10-18), manufacturing provides 22.4 percent of the employment in the three-county area, while other major sources of employment are services (19.0 percent), retail trade (22.4 percent), and government (16.6 percent). Unemployment rates are higher for the local study area than for the state as a whole (Table 2.10-14).

The counties of which the local study area is a part differ substantially in the types of employment available. The following paragraphs summarize employment characteristics of each of the three counties. This information is taken from subsection 2.10.2.

Forest County. Forest County is heavily forested, and employment in the county is concentrated in wood work and wood-products manufacturing. Government is also a major employer in the county. The lack of an area trade center limits Forest County's retail trade employment.

As shown in Table 2.10-14, Forest County had the highest average unemployment rate in the three-county area for 1975-1979

(11.0 percent). Forest County's rate is also high compared to the state 1975-1979 average of 5.4 percent.

Langlade County. Langlade County is an agricultural center for which Antigo is the area trade center. In addition to having substantial agricultural employment, Langlade County provides employment in retail trade, manufacturing, and services.

Langlade County's average unemployment rate of 6.5 percent between 1975 and 1979 was higher than the state rate of 5.4 percent.

Oneida County. Oneida County has more manufacturing and retail trade employment than other counties in the local study area. Major employers are the Rhinelander Paper Company and Twist Drill in Rhinelander. Oneida County also has substantial employment related to tourism.

The average unemployment rate for 1975-1979 in Oneida County was 6.8 percent, which was higher than the state average of 5.4 percent.

Income. The median household effective buying income in the local study area was substantially lower than for the state as a whole. The median household effective buying income for the state was \$17,318 in 1978, while those in Forest, Langlade and Oneida counties for the same year were \$9,352, \$12,439, and

\$14,880, respectively (Sales and Marketing Magazine, 1979). Clearly, this comparative level of buying income placed residents of the local study area at a much lower level of material consumption than was common for the state.

These differences are reflected in the commercial activity in the communities in these counties and in each county's caseload for Aid to Families with Dependent Children (AFDC).

As indicated in Table 2.10-116, the average monthly AFDC caseload rose sharply between 1970 and 1979. The rate of such cases was substantially higher in 1979 in Forest County (24 cases/1,000 population) than in Langlade County (18 cases/1,000 population), Oneida County (14 cases/1,000 population), or the state (15 cases/1,000 population).

Leisure. Much of the local study area is comprised of forests and lakes, which are major recreation attractions. This recreation potential is available to residents of the local study area as well as tourists and seasonal residents attracted from outside the area. Those aged 35 years and above tended to rate the available entertainment opportunities and social activities somewhat better than those aged 19 to 34 years. The recreation section of the Economic Profile provides a detailed description of leisure opportunities in the local study area. The following descriptions are generalized from that information.

Table 2.10-116

AID TO FAMILIES WITH DEPENDENT CHILDREN CASELOAD 1970-1979

	<u>1970</u>	<u>1975</u>	<u>1979</u>
State of Wisconsin			
Average Monthly Caseload	23,248	54,664	69,670
Population (in 1,000s)	4,417.73	4,589.30	4,688.28
Rate	5.26	11.91	14.86
Forest County			
Average Monthly Caseload	67	138	211
Population (in 1,000s)	7.69	8.20	8.71
Rate	8.71	16.83	24.23
Langlade County			
Average Monthly Caseload	103	217	359
Population (in 1,000s)	19.22	19.80	19.80
Rate	5.36	10.96	18.13
Oneida County			
Average Monthly Caseload	133	295	438
Population (in 1,000s)	24.43	28.30	30.38
Rate	5.44	10.42	14.42

SOURCE

Wisconsin Department of Health and Social Services, Division of Economic Assistance.

Forest County. Nicolet National Forest covers a large portion of the county. This forest provides public access to a large number of lakes and streams, including the Wolf and Peshtigo rivers. Local residents make much use of these resources for fishing and hunting. The area also provides many snowmobile trails and is the site of a major off-road vehicle race.

Opportunities for leisure pursuits other than the outdoor activities described above are limited in Forest County. Supper clubs and taverns are scattered throughout the county; Crandon and Wabeno have movie theaters and libraries, and the local schools provide various organized activities.

Langlade County. Since much of Langlade County is agricultural land, the county does not provide as many opportunities for outdoor recreation as do Forest and Oneida counties. The major area for outdoor recreation is Wolf River in the eastern part of the county. Smaller streams such as the Eau Claire River also provide opportunities for fishing.

Though outdoor recreation is not as plentiful in Langlade County as in other parts of the local study area, the city of Antigo provides other leisure opportunities. Since Antigo serves as an area trade center, the city has a relatively large number of restaurants, taverns, supper clubs, and other entertainment

facilities. In addition, the local schools provide sports and other organized activities.

Oneida County. Of the three counties of which the local study area is a part, Oneida is the most oriented toward tourism. Consequently, more entertainment and leisure activities are available for local residents. Oneida County is similar to Forest County in being heavily wooded and having a large number of lakes. These forest and water recreation resources are major attractions for fishing, boating, hunting, hiking, snowmobile runs, and cross-county skiing. Consequently, these resources provide leisure opportunities throughout the year.

Though the main tourist area of the county is outside the local study area boundary, substantial tourism development has occurred within the local study area. The local study area portion has a large number of restaurants and supper clubs, taverns and clubs with live music and dancing. Rhinelander has a movie theater and library. Nicolet College provides leisure activities in the form of continuing education classes and music and theater productions. As with the other counties in the local study area, the schools also provide major entertainment through sports events.

Housing. The Housing and Land Use Profile (subsection 2.10.3) of this report provides a detailed analysis of housing

conditions in the local study area. In this subsection we highlight some of that information.

By far the dominant form of housing in the local study area is single-family detached units (84.0 percent of the population lives in single family houses). These homes are usually wood frame construction and small to moderate size. Little new construction has taken place during recent years; consequently, most houses are relatively old. Houses in communities are built on standard city lots. However, there are many houses scattered throughout the countryside built on larger lots than normally found in cities.

Though relatively old, most houses are kept in good repair. Forest County has the highest percentage of substandard housing (23.9 percent), while Langlade and Oneida counties have 16.6 and 7.8 percent, respectively (DLAD, 1978). Rhinelander has a particular absence of substandard houses. The high percentage of home ownership (90.0 percent) probably accounts for the good upkeep of homes.

Transportation. Private automobiles are the dominant form of transportation in the local study area. In June 1980, Forest County had a total of 6,825 registered vehicles, Langlade County 15,766, and Oneida County 26,282 (Wisconsin Dept. of Transportation, 1980). There is no mass public transportation, though intercity bus service is available to Antigo, Crandon, and

Rhineland. Rhineland is also served by regularly scheduled air service provided by Republic Airlines. Taxi service is available in Antigo and Rhineland.

The local study area is served by a good system of two-lane paved roads. The major roads are carefully maintained during the winter, and there is little disruption of travel due to snow conditions. Due to the exclusive dependence on private automobiles and the scattered placement of much of the population in the local study area, segments of the society are limited in their access to services, shopping, and entertainment. This is especially crucial for the very young, the very old, the handicapped, and the very poor.

Community Descriptions. The local study area contains three incorporated cities and one incorporated village--Crandon, Antigo, Rhineland, and White Lake, respectively. The local study area also contains a number of unincorporated communities. Because the incorporated areas have the jurisdictional capability to manage future growth and development, this qualitative community description focuses on the incorporated areas, while the remainder of the local study area is described more generally.

Crandon. Crandon serves as the county seat of Forest County, and the county courthouse and offices are the focal point

of the community. The city is a local trade center, and has a busy commercial district along Highway 8/55, which also serves as the main street. Some of the stores have been vacated on the main street, but a supermarket and a large hardware store have recently opened on the southeast side of the city.

Crandon is built along the north shore of Lake Metonga. The residential section along the lake is a mixture of comfortable, well maintained homes, some mobile homes, and lake cottages. The southwest section of the city continues as an area of comfortable, well maintained homes. The section of the city east of the railroad tracks has a number of substandard and deteriorated houses. The north part of the city is an area of small and well maintained homes but with some degree of deterioration.

Crandon's population has fluctuated for the past thirty years. The population was 1,922 in 1950, fell to 1,582 in 1970, and was 1,849 in 1979. Residential construction has been scattered, and mobile homes have been used to meet some of the housing demand.

Crandon has a weekly newspaper, the Forest County Republican.

Antigo. Antigo is the trade center for the southern part of the local study area. The city is the county seat of Langlade County, and is the focal point of the potato farming

area of the county. Because Antigo serves as an area trade center, the city offers a wide range of commercial and professional services. The downtown part of the city has remained the commercial center, though substantial commercial development has taken place along Highway 45, from the center of the city to its northern boundary. This commercial development is dominated by automobile dealers and franchise restaurants, while the more traditional department stores have remained downtown.

Antigo's population declined from 9,902 in 1950 to 8,565 in 1979. This decline was largely the result of the closing of a military installation south of the city. As a result of population decline, Antigo has had little residential development. Most of the houses in the city are relatively old. However, there are few indications of blighted conditions in the city. New residential construction is limited to scattered individual homes, and a small subdivision of moderately priced houses on the west side of the city.

Antigo has a daily newspaper, the Antigo Daily Journal, and two radio stations.

Rhineland. Rhineland is an area trade center, the Oneida County seat, and the location of a number of federal and state agency offices. Rhineland is also the location of the Northeast Wisconsin Regional Airport. Rhineland has three

major commercial areas--downtown, Oneida Mall, and Sunrise Plaza. Additional commercial development is taking place along Highway 8 in the eastern part of the city. A new K-Mart store was under construction in this area during the summer of 1980. Oneida Mall is located near the downtown commercial area, but is separated from it by a number of railroad tracks. Traffic circulation in the entire area is congested.

A major industry in Rhinelander is the paper mill that employs approximately 800 people. Other small manufacturers have located in Rhinelander in recent years. Public facilities, including schools, parks, the library, and hospital are well developed and maintained. Rhinelander is the site of Nicolet College, the only institution of higher education in the local study area.

The population of Rhinelander has fluctuated since 1950. Population in that year was 8,774, and fell to a low of 8,218 in 1970. Population in 1975 was 8,703, but fell to 8,407 in 1979. However, these population figures do not provide a complete picture of the community. The Rhinelander area has had substantial growth and development immediately outside the corporate limits. Thus, economically and socially, Rhinelander is much larger than indicated by census figures.

Almost all new residential construction in Rhinelander has taken place outside the city. Thus, the city itself is dominated

by older homes. However, these homes are well maintained, and the city shows a remarkable absence of blight.

Rhineland is served by a daily newspaper, the Rhineland Daily News, a local television station, and three local radio stations.

White Lake Village. White Lake Village is dominated by a wood products mill and associated rail yard located in the center of the village. Commercial facilities are limited to a few combination service station/grocery stores and taverns. There is a large vacant site in the center of the community with a faded sign advertising the site for an industrial location. Residences in the south part of the community are relatively old, but moderately well maintained. A residential area parallels the east shore of White Lake, and contains some very comfortable houses. There is a well developed swimming beach on the east shore of White Lake.

White Lake Village does not have a local newspaper, radio or television station.

Remainder of Local Study Area. The local study area contains a large number of unincorporated communities, listed for each county as follows:

Forest County

Argonne
Blackwell

Carter
Cavour
Hiles
Laona
Mole Lake
Nashville
Newald
Padus
Popple River
Wabeno

Langlade County

Bryant
Deer Brook
Elcho
Elmhurst
Elton
Hollister
Kempster
Langlade
Lily
Neva
Neva Corners
Parrish
Pearson
Phlox
Pickerel
Polar
Summit Lake

Oneida County

Clearwater Lake
Enterprise
Gagen
Lake Tomahawk
Lennox
McNaughton
Monico
Pelican Lake
Starks
Sugar Camp
Three Lakes
Woodboro

Most of the unincorporated communities consist of a small number of houses, and a combination grocery store/service

station/tavern. Some of the communities have a post office, and a town hall. Most of the unincorporated communities served the rural population before the automobile made travel to larger trade centers easy. Consequently, these communities' primary function has eroded during the recent past. Notable exceptions to this decline are Clearwater Lake, Elcho, Lake Tomahawk, Laona, Three Lakes, and Wabeno. These communities continue to serve important economic and social functions, including commerce, banking, and education.

Survey Research. We interviewed 778 people in the local study area by telephone to determine attitudes about important sociocultural characteristics (RPC, Inc., 1981). Review of comparisons between age groups and between income groups revealed very small differences. It appears that the local study area is quite homogeneous. The following information highlights important results of the surveys regarding attitudes about sustenance.

When asked if they thought their community would be better off, worse off, or about the same one year from the time of the interview, more than half of the respondents (55.9 percent) were pessimistic and responded that they thought their communities would be worse off in one year; 26.8 percent expected their communities to be better off, and 17.3 percent expected their communities to be about the same in one year.

People were also asked if they thought the U.S. would be better off, worse off, or about the same in one year. The responses were somewhat different from those regarding their own communities: 39.9 percent of the respondents felt the U.S. would be better off, while 31.5 percent thought the U.S. would be worse off, and 28.6 percent felt the U.S. would be about the same. This may indicate a feeling that their local communities are not keeping up with the progress of the rest of the nation.

People in the local study area have a generally favorable impression of their communities. When asked to rate 14 community factors as very good, good, fair, poor, or very poor, the average responses were 18.0 percent very good, 40.8 percent good, 24.4 percent fair, 13.7 percent poor, and 3.1 percent very poor. The community factors included law enforcement, medical care, fire protection, public schools, dental care, shopping, street and road maintenance, housing, utilities, entertainment, social activities, employment opportunities, wages, and outdoor recreation. Law enforcement, medical care, fire protection, public schools, dental care, shopping, and outdoor recreation were rated as very good by 23-41 percent of the respondents. Street maintenance, wages, and employment opportunities were rated very poor by 6-13 percent of the respondents.

When asked about economic growth and development, and environmental quality, residents of the local study area expressed the need for additional economic development, but

wanted that development to occur without major environmental harm. This was especially true for those 25 to 44 years old. Most of the respondents (87.9 percent) agreed or strongly agreed that the area needs additional economic growth, while only 12.1 percent of the respondents disagreed or strongly disagreed. However, 65.7 percent of the respondents disagreed or strongly disagreed that such economic growth should take place even with some environmental harm. Most of the respondents (82.5 percent) agreed or strongly agreed that residential development around lakes should be restricted in order to protect environmental quality, while only 17.5 percent disagreed or strongly disagreed that restrictions should be placed on residential development around lakes.

Of the respondents, 82.9 percent agreed or strongly agreed that new industry would increase the standard of living in the local study area, while 17.1 percent disagreed or strongly disagreed. However, 56.8 percent of the respondents disagreed or strongly disagreed that population growth would improve the quality of life in the local study area. Those 19 to 24 years old felt more strongly about this than the rest of the population. Of the respondents, 42.3 percent felt that increased population growth would improve the quality of life. Residents of the local study area clearly want to have the economic benefits of economic development, but do not want their rural,

outdoor-oriented life style to change appreciably as a result of increased economic activity.

Summary of Sustenance Characteristics of the Local Study Area. Based on sustenance activities, the current residents of the local study area might be typified as being skilled and semi-skilled workers, people who value outdoor recreation, households that receive less than median income, and people who value their homes and center their activities there. Taverns, bars, and supper clubs serve as focal points for much social activity for young and old, male and female.

2.10.6.3 Order and Safety

Public Safety and Crime. The major consideration of public safety is whether individuals and families can live in a locality without unreasonable fear for life and property. It is common knowledge that crime has increased substantially throughout the country in recent years, and that an individual's chances of being a victim have risen. This trend is true for Wisconsin and the local study area as well.

Overall Crime Index. Overall crime rates for the years 1969-1976 averaged 25.7 per 1,000 people in Forest County, 22.79 in Langlade County, and 30.67 in Oneida County (Table 2.10-117). These rates are similar to the state rate of 29.45 crimes per

Table 2.10-117

OVERALL CRIME^b INDEX 1969-1976

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>Average</u>
<u>State of Wisconsin</u>									
Absolute value	58,476	67,292	134,614	133,381	145,154	166,256	183,135	179,753	-
Pop. (in 1,000's)	4,326.00	4,417.73	4,473.00	4,526.00	4,540.00	4,564.90	4,589.30	4,608.40	-
Rate ^a	13.52	15.23	30.09	29.47	31.97	36.42	39.90	39.01	29.45
<u>Forest County</u>									
Absolute value	15	54	209	244	208	291	290	357	-
Pop. (in 1,000's)	6.45	7.69	7.75	8.00	8.30	8.50	8.20	8.10	-
Rate ^a	2.33	7.02	26.97	30.50	25.06	34.24	35.37	44.07	25.70
<u>Langlade County</u>									
Absolute value	129	165	422	470	574	650	646	498	-
Pop. (in 1,000's)	18.10	19.22	19.25	19.80	19.40	19.20	19.80	20.00	-
Rate ^a	7.13	8.58	21.92	23.74	29.59	33.85	32.63	24.90	22.79
<u>Oneida County</u>									
Absolute value	360	437	748	801	951	1,074	1,043	1,176	-
Pop. (in 1,000's)	23.25	24.43	25.05	26.30	26.90	27.40	28.30	29.20	-
Rate ^a	15.48	17.89	29.86	30.46	35.35	39.20	36.86	40.27	30.67

NOTES

^a Rate = $\frac{\text{Absolute value}}{\text{population}}$

^b Includes murder and nonnegligent manslaughter, forcible rape, robbery, aggravated assault, burglary, theft, auto theft.

SOURCE

Wisconsin Department of Administration. 1979. Wisconsin Statistical Abstract. Fourth Edition. Madison.

1,000 people. However, these rates increased rapidly from 1969 to 1976 in the three-county area as well as in the state.

Property Crimes. Property crimes show the same characteristics as the overall crime index. The state and all counties within the three-county area experienced similar property crime rates, and those rates increased between 1969 and 1976 (Table 2.10-118).

Violent Crimes. Crimes of violence show a different pattern. Langlade and Oneida counties have noticeably lower violent crime rates than do Forest County and the state, while Forest County and the state have virtually identical rates of violent crime (Table 2.10-119). However, the violent crime rate in Oneida County fluctuated widely between 1969 and 1976, and no clear trend is obvious. Violent crimes increased at a slower rate in Forest and Langlade counties than in the state.

Forest County was substantially lower in rates of alcohol and drug related offenses than Langlade and Oneida counties (Table 2.10-120). The largest single type of arrest involving alcohol or drug abuse was for driving while under the influence.

Political and Religious Participation. As of April 1, 1980, 16,349 people were registered to vote in the local study area. While this is approximately 50.0 percent of the total voting age

Table 2.10-118

PROPERTY CRIME^b INDEX 1969-1976

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>Average</u>
<u>State of Wisconsin</u>									
Absolute value	55,056	63,453	130,641	129,022	139,878	159,843	176,140	173,410	-
Pop. (in 1,000's)	4,326.00	4,417.73	4,473.00	4,526.00	4,540.00	4,564.90	4,589.30	4,608.40	-
Rate ^a	12.73	14.36	29.21	28.51	30.81	35.02	38.38	37.63	28.33
<u>Forest County</u>									
Absolute value	13	53	203	235	199	278	278	332	-
Pop. (in 1,000's)	6.45	7.69	7.75	8.00	8.30	8.50	8.20	8.10	-
Rate ^a	2.02	6.89	26.19	29.38	23.98	32.71	33.90	40.99	24.51
<u>Langlade County</u>									
Absolute value	126	164	420	446	546	633	634	487	-
Pop. (in 1,000's)	18.10	19.22	19.25	19.80	19.40	19.20	19.80	20.00	-
Rate ^a	6.96	8.53	21.82	22.53	28.14	32.97	32.02	24.35	22.17
<u>Oneida County</u>									
Absolute value	354	426	742	789	928	1,062	1,036	1,171	-
Pop. (in 1,000's)	23.25	24.43	25.05	26.30	26.90	27.40	28.30	29.20	-
Rate ^a	15.23	17.44	29.62	30.00	34.50	38.76	36.61	40.10	30.28

NOTES

a Rate = $\frac{\text{Absolute value}}{\text{population}}$

b Property crime includes auto theft offenses, theft offenses and burglary offenses.

SOURCE

Wisconsin Department of Administration. 1979. Wisconsin Statistical Abstract. Fourth Edition. Madison.

Table 2.10-119
VIOLENT CRIME^b INDEX 1969-1976

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>Average</u>
<u>State of Wisconsin</u>									
Absolute value	3,411	3,839	3,973	4,359	3,276	6,413	6,995	6,343	-
Pop. (in 1,000's)	4,326.00	4,417.73	4,473.00	4,526.00	4,540.00	4,564.90	4,589.30	4,608.40	-
Rate ^a	0.79	0.87	0.89	0.96	0.72	1.40	1.52	1.38	1.07
<u>Forest County</u>									
Absolute value	2	1	6	9	9	13	12	25	-
Pop. (in 1,000's)	6.45	7.69	7.75	8.00	8.30	8.50	8.20	8.10	-
Rate ^a	0.31	0.13	0.77	1.13	1.08	1.53	1.46	3.09	1.19
<u>Langlade County</u>									
Absolute value	3	1	2	24	28	17	12	11	-
Pop. (in 1,000's)	18.10	19.22	19.25	19.80	19.40	19.20	19.80	20.00	-
Rate ^a	0.17	0.05	0.10	1.21	1.44	0.89	0.61	0.55	0.63
<u>Oneida County</u>									
Absolute value	6	11	6	12	23	12	7	5	-
Pop. (in 1,000's)	23.25	24.43	25.05	26.30	26.90	27.40	28.30	29.20	-
Rate ^a	0.26	0.45	0.24	0.46	0.86	0.44	0.25	0.17	0.40

NOTES

^a Rate = $\frac{\text{Absolute value}}{\text{population}}$

^b Violent crimes are murder and nonnegligent manslaughter offenses, forcible rape offenses, robbery offenses and aggravated assault offenses.

SOURCE

Wisconsin Department of Administration. 1979. Wisconsin Statistical Abstract. Fourth Edition. Madison.

Table 2.10-120

ALCOHOL AND DRUG ABUSE ARRESTS, 1976-1979

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1979 rate/1,000 population</u>
<u>Forest County</u>					
Controlled substances sale	1	1	0	0	0
Controlled substances possession	14	0	3	1	0.11
Driving under influence	19	23	20	26	2.96
Liquor laws	4	2	2	12	1.36
<u>Langlade County</u>					
Controlled substances sale	9	1	5	4	0.20
Controlled substances possession	16	20	16	18	0.90
Driving under influence	86	71	136	136	6.82
Liquor laws	45	71	71	114	5.72
<u>Oneida County</u>					
Controlled substances sale	28	9	8	4	0.13
Controlled substances possession	55	50	36	21	0.69
Driving under influence	143	135	150	178	5.82
Liquor laws	27	78	29	101	3.30

SOURCE

Wisconsin Criminal Justice Information - Wisconsin Crimes and Arrests Compiled annually by the Crime Information Bureau, Department of Justice, Division of Law Enforcement Services.

population (Table 2.10-121), 65.0 percent of respondents to surveys indicated that they voted in the Wisconsin Presidential Primary election in April, 1980. The difference in these two figures is probably explained by the fact that voters can register at the poll; thus, the pre-registration figure does not include all participating voters. Based on voter registrations and observations during the 1980 spring elections, there appears to be a healthy interest in local, state, and national politics in the local study area. Meetings are well attended and residents are very active.

Substantial percentages of residents of the three-county area participate in local church activities. Langlade County has the largest percentage of church members (76.5 percent). Oneida County is second with 65.3 percent and Forest County is third with 49.5 percent (Table 2.10-122). Survey research indicated that 57.6 percent of the respondents attend church weekly, 19.9 percent attend bi-monthly or monthly, and 19.0 percent attend on special occasions. The majority of survey respondents are Protestant (51.7 percent), 41.7 percent are Catholic, 0.3 percent are Jewish, 3.8 percent are of other religions, and 2.5 percent expressed no religious affiliation.

Summary of Order and Safety. Like the rest of the state and nation, the three-county area experienced major increases in crime during the recent years. However, as is expected for a

Table 2.10-121

REGISTERED VOTERS IN LOCAL STUDY AREA
1977-1980

<u>Municipality</u>	<u>Apr. 1 1977</u>	<u>Nov. 1 1977</u>	<u>Apr. 1 1978</u>	<u>Nov. 1 1978</u>	<u>Apr. 1 1979</u>	<u>Nov. 1 1979</u>	<u>Apr. 1 1980</u>
Local study area	16,024	15,915	16,143	16,032	16,433	16,098	16,349
City of Crandon	1,195	1,132	1,199	1,114	1,101	1,131	1,141
City of Antigo	4,725	4,703	4,821	4,731	4,901	4,766	4,893
City of Rhinelander	4,706	4,656	4,660	4,714	4,707	4,471	4,500
Hiles Town	221	219	231	232	212	208	208
Lincoln Town	307	307	263	306	300	312	320
Nashville Town	481	490	468	476	476	480	481
Enterprise Town	187	187	185	195	183	196	208
Monico Town	216	231	231	211	218	210	206
Pelican Town	2,250	2,196	2,265	2,372	2,464	2,590	2,590
Schoepke Town	266	295	305	284	297	295	279
Three Lakes Town	1,166	1,197	1,211	1,089	1,242	1,107	1,187
Woodboro Town	304	302	304	308	332	332	336

SOURCE

Wisconsin State Elections Board. 1980. Election and Campaign Manual - State of Wisconsin, Section 9. Revised May, 1980.

Table 2.10-122

CHURCH MEMBERSHIP BY COUNTY: 1971

<u>Jurisdiction</u>	<u>Number of Churches</u>	<u>Total Adherents^a</u>	
		<u>Number</u>	<u>% of Total Population</u>
Forest County	17	3,813	49.5
Langlade County	30	14,706	76.5
Oneida County	29	15,941	65.3

NOTE

^aTotal adherents estimated from known number of communicant confirmed full members.

SOURCE

Johnson, Douglas W., Paul R. Picard, and Bernard Quinn. 1971. Churches and Church Membership in the U.S. Glenmary Research Center, Washington, D. C.

rural area, these rates of increase have not been as rapid as for urban areas. A major advantage of a rural area is its ability to partially maintain order and safety through informal social controls that do not work in urban areas. Because most people are known personally by many residents of their communities, there is greater awareness of their activities and less opportunity for unobserved "misbehavior." Substantial participation in the political process and religious activities acts as a conservative force to reinforce accepted community values and norms and further inhibit individuals from violating sociocultural rules of behavior.

2.10.6.4 Socialization

Socialization is the process by which individuals learn how to function within their own society. Socialization takes many forms--informal learning within the family and between friends, and formal learning within organized institutions such as schools. It is essential that the socialization process be successful for the society to function properly.

In North America, the primary public agent of socialization is the school. This baseline profile focuses on the school because of its importance as a publicly supported agent of socialization.

School Enrollments. The local study area has eight separate school districts that are wholly contained in the local study area--Antigo, Crandon, Elcho, Laona, Rhinelander, Three Lakes, Wabeno, and White Lake (Table 2.10-123). For the 1979-1980 school year, these districts averaged 15.2 elementary pupils per teacher and 14.3 high school pupils per teacher. This compares with a statewide average of 14.7 elementary pupils per teacher and 14.8 high school pupils per teacher. There was little difference in average pupil/staff ratios between the state and the local study area. However, there was a rather wide range of pupil/staff ratios within the local study area. Crandon Independent School District had 19 elementary pupils per staff, while White Lake had 12.9. Antigo Independent School District had 16.6 high school students per staff, while White Lake had 11.7.

Approximately 48.7 percent of survey respondents rated Rhinelander ISD the best school district in the local study area, while 25.0 percent of the respondents rated Antigo ISD the best district. Crandon ISD was rated the worst school district by 30.9 percent of survey respondents, while White Lake and Elcho were rated worst by 16.7 and 15.5 percent, respectively.

The average student enrollment for school districts in the local study area in 1979-1980 was 1,435 students, compared to a statewide average of 1,981 students per district. The smallest school district in the local study area was White Lake with 383

Table 2.10-123

SCHOOL ENROLLMENTS AND PUPIL/STAFF RATIOS FOR SCHOOL DISTRICTS
1970-1980

	<u>1970-71</u>	<u>1973-74</u>	<u>1976-77</u>	<u>1979-80</u>
State of Wisconsin District Averages				
Enrollments				
Elementary (K-8)	952	1,618	1,489	1,258
High School (9-12)	816	866	885	723
Total (K-12)	1,768	2,484	2,374	1,981
Pupil/Staff Ratios				
Elementary (K-8)	20.5	18.5	16.0	14.7
High School (9-12)	17.7	17.1	16.0	14.8
Crandon				
Enrollments				
Elementary (K-8)	723	780	707	726
High School (9-12)	318	307	336	341
Total (K-12)	1,041	1,087	1,043	1,067
Pupil/Staff Ratios				
Elementary (K-8)	22.8	22.4	20.6	19.0
High School (9-12)	16.5	14.4	16.2	15.0
Laona				
Enrollments				
Elementary (K-8)	331	336	336	321
High School (9-12)	135	151	154	149
Total (K-12)	466	487	490	470
Pupil/Staff Ratios				
Elementary (K-8)	19.5	18.7	16.6	14.7
High School (9-12)	12.2	12.6	11.6	8.8
Wabeno				
Enrollments				
Elementary (K-8)	513	331	371	399
High School (9-12)	171	153	249	262
Total (K-12)	684	484	620	661
Pupil/Staff Ratios				
Elementary (K-8)	23.9	20.1	14.4	14.0
High School (K-12)	12.7	15.4	14.4	15.1
Antigo				
Enrollments				
Elementary (K-8)	2,424	2,430	2,279	2,094
High School (K-12)	1,494	1,540	1,691	1,531
Total (K-12)	3,918	3,970	3,970	3,625

(continued)

(Table 2.10-123, continued)

	<u>1970-71</u>	<u>1973-74</u>	<u>1976-77</u>	<u>1979-80</u>
Antigo (continued)				
Pupil/Staff Ratios				
Elementary (K-8)	22.8	22.9	21.0	15.9
High School (9-12)	20.0	19.6	19.1	16.6
Elcho				
Enrollments				
Elementary (K-8)	406	385	359	342
High School (9-12)	176	212	218	221
Total (K-12)	582	597	577	563
Pupil/Staff Ratios				
Elementary (K-8)	20.2	18.7	17.1	14.2
High School (9-12)	14.5	14.4	15.0	14.4
White Lake				
Enrollments				
Elementary (K-8)	277	422	238	243
High School (9-12)	121	185	127	140
Total (K-12)	398	607	365	383
Pupil/Staff Ratios				
Elementary (K-8)	22.3	20.9	14.0	12.9
High School (9-12)	13.0	11.3	11.0	11.7
Rhineland				
Enrollments				
Elementary (K-8)	2,535	2,571	2,388	2,293
High School (9-12)	1,420	1,558	1,657	1,615
Total (K-12)	3,955	4,129	4,045	3,908
Pupil/Staff Ratios				
Elementary (K-8)	21.7	20.8	17.1	14.9
High School (9-12)	22.1	22.4	20.5	17.9
Three Lakes				
Enrollments				
Elementary (K-8)	459	502	478	505
High School (9-12)	210	246	301	301
Total (K-12)	669	748	779	806
Pupil/Staff Ratios				
Elementary (K-8)	18.1	19.3	18.6	16.2
High School (9-12)	15.4	16.4	17.0	15.0

SOURCE

Wisconsin Department of Public Instruction. 1970-1980. Unpublished file information on each school district. Madison.

students in 1979-1980, while Rhineland was the largest with 3,908 students in 1979-1980.

Student Dropout Rate. Forest County reported 7.1 percent of students in grades 9-12 had dropped out of school in 1978 (Table 2.10-124). This compares to 4.3 percent in Langlade County, 4.7 percent in Oneida County, and 4.9 percent for the state as a whole.

Overall, levels of education do not differ substantially between the local study area and the state as a whole. In both cases, 30.0 to 34.0 percent of the residents had completed eight years or less of schooling, and approximately 34.0 percent completed four years of high school (Table 2.10-125).

Summary of Socialization. The socialization process of public education appears to proceed in the local study area much as it does in the state, with the exception of Forest County's higher dropout rate. This similarity is supported by state school finance equalization programs.

2.10.7 NATIVE AMERICAN COMMUNITIES PROFILE

2.10.7.1 Introduction

Two Native American communities are located within the local study area--the Forest County Potawatomi community and the Mole

Table 2.10-124

STUDENT DROPOUT RATE BY COUNTY

<u>Jurisdiction</u>	<u>Dropouts Reported Fall 1977</u>	<u>Percentage of 9-12 Enrollment (1976)</u>	<u>Dropouts Reported Fall 1978</u>	<u>Percentage of 9-12 Enrollment (1977)</u>	<u>Dropouts Reported Fall 1979</u>	<u>Percentage of 9-12 Enrollment (1978)</u>
State of Wisconsin	14,831	4.4	15,584	4.6	15,751	4.9
Forest County	44	6.0	49	6.4	54	7.1
Langlade County	77	3.8	92	4.6	85	4.3
Oneida County	202	7.0	118	4.0	139	4.7

SOURCE

Wisconsin Department of Public Instruction. 1979. Information Series, No. 12. Madison.

Table 2.10-125

YEARS OF SCHOOL COMPLETED BY PERSONS 25 YEARS AND OLDER, 1970

	Males		Females		Total	
	Number	Percent ^a	Number	Percent ^b	Number	Percent ^c
State of Wisconsin						
8 years or less	356,898	31.9	338,369	27.9	695,267	29.8
1-3 years high school	178,728	16.0	186,536	15.4	365,264	15.7
4 years high school	347,639	31.1	463,409	38.3	811,048	34.8
1-3 years college	102,273	9.2	128,601	10.6	230,874	9.9
4+ years college	132,408	11.8	94,935	7.8	227,343	9.8
Total	1,117,946	100.0	1,211,850	100.0	2,329,796	100.0
Local Study Area						
8 years or less	4,451	36.5	4,002	30.8	8,453	33.5
1-3 years high school	2,178	17.9	2,182	16.8	4,360	17.3
4 years high school	3,691	30.3	4,729	36.3	8,420	33.4
1-3 years college	969	7.9	1,442	11.1	2,411	9.6
4+ years college	906	7.4	650	5.0	1,556	6.2
Total	12,195	100.0	13,005	100.0	25,200	100.0
Forest County						
8 years or less	917	43.8	830	40.5	1,747	42.2
1-3 years high school	396	18.9	362	17.7	758	18.3
4 years high school	582	27.8	666	32.5	1,248	30.1
1-3 years college	98	4.7	145	7.1	243	5.9
4+ years college	100	4.8	45	2.2	145	3.5
Total	2,093	100.0	2,048	100.0	4,141	100.0

(continued)

(Table 2.10-125, continued)

	Males		Females		Total	
	Number	Percent ^a	Number	Percent ^b	Number	Percent ^c
Langlade County						
8 years or less	2,195	44.0	1,919	35.0	4,114	39.3
1-3 years high school	759	15.2	838	15.3	1,597	15.3
4 years high school	1,442	28.9	1,736	31.6	3,178	30.3
1-3 years college	261	5.2	738	13.5	999	9.5
4+ years college	333	6.7	255	4.6	588	5.6
Total	4,990	100.0	5,486	100.0	10,476	100.0
Oneida County						
8 years or less	1,987	29.3	1,796	25.0	3,783	27.1
1-3 years high school	1,263	18.6	1,236	17.2	2,499	17.8
4 years high school	2,150	31.6	2,904	40.5	5,054	36.2
1-3 years college	810	11.9	813	11.3	1,623	11.6
4+ years college	582	8.6	433	6.0	1,015	7.3
Total	6,792	100.0	7,182	100.0	13,974	100.0
City of Crandon						
8 years or less	154	37.0	163	35.7	317	36.3
1-3 years high school	98	23.6	78	17.1	176	20.2
4 years high school	123	29.6	191	41.8	314	36.0
1-3 years college	23	5.5	15	3.3	38	4.3
4+ years college	18	4.3	10	2.1	28	3.2
Total	416	100.0	457	100.0	873	100.0

(continued)

(Table 2.10-125, continued)

	Males		Females		Total	
	Number	Percent ^a	Number	Percent ^b	Number	Percent ^c
City of Antigo						
8 years or less	848	37.5	833	30.0	1,681	33.4
1-3 years high school	284	12.5	428	15.4	712	14.1
4 years high school	729	32.2	911	32.9	1,640	32.5
1-3 years college	162	7.2	426	15.4	588	11.7
4+ years college	241	10.6	175	6.3	416	8.3
Total	2,264	100.0	2,773	100.0	5,037	100.0
City of Rhinelander						
8 years or less	465	21.8	551	21.5	1,016	21.9
1-3 years high school	378	17.7	370	14.5	748	16.1
4 years high school	744	34.9	1,102	43.1	1,846	39.7
1-3 years college	295	13.9	369	14.4	664	14.3
4+ years college	250	11.7	165	6.5	370	8.0
Total	2,132	100.0	2,557	100.0	4,644	100.0

NOTES

- ^a Percent of males 25+ years of age in jurisdiction.
^b Percent of females 25+ years of age in jurisdiction.
^c Percent of total population 25+ years of age in jurisdiction.

SOURCE

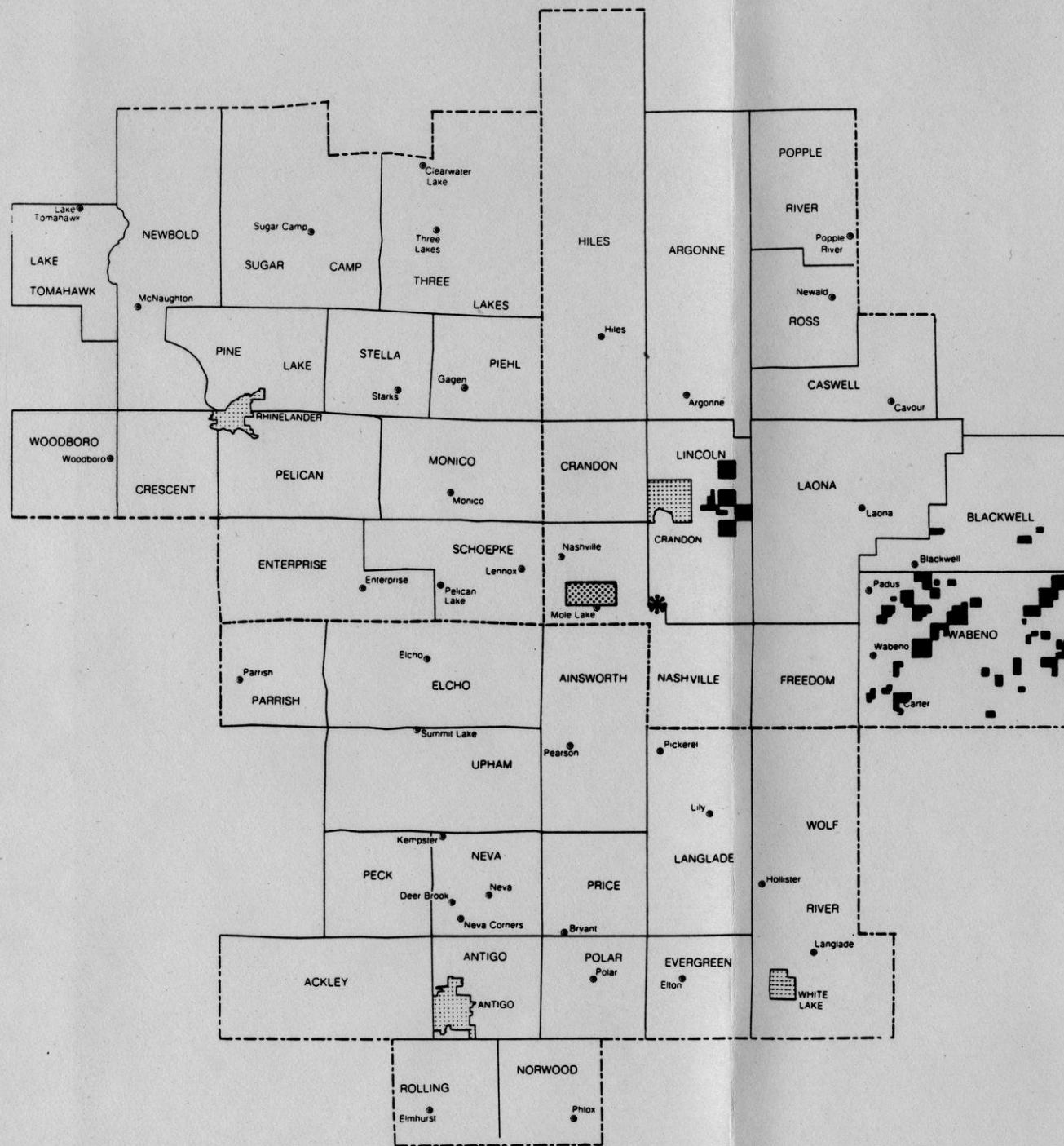
Wisconsin Department of Administration. 1980.
 1970 Census Summary Tables, Table 442.
 Computer printout. Madison.




Lake Sokaogon Chippewa community. This subsection describes existing socioeconomic conditions in those communities. The subsection consists of a general description and brief history of the reservations and discussions on the major socioeconomic characteristics of demography, economy, housing, public facilities and services, fiscal conditions, and sociocultural characteristics. The subsection provides the baseline from which estimates will be made of future conditions both without and with the proposed Crandon Project.

General Description of the Reservations

Forest County Potawatomi. The Forest County Potawatomi reservation consists of scattered holdings totaling 11,786 acres in Blackwell, Lincoln, and Wabeno townships (Figure 2.10-17). The soil consists primarily of glacial till; the topography shows generally moderate relief. Approximately 10,184 acres are in second-growth forest vegetation. There are scattered lakes on the reservation, and the highest point in Forest County, Sugar Bush Hill, is on reservation lands. The land is suited for timber production, but is unsuitable for agriculture.

The reservation is sparsely developed, with single family houses scattered widely throughout the holdings. The tribal office is located east of Crandon, in Lincoln Township. The reservation is served by U.S. Highway 8, State Highway 32, and by roads maintained by the towns (Forest County Potawatomi, 1976).



-  **Crandon Project Discovery Site**
-  **Forest County Potawatomi**
-  **Mole Lake Chippewa**



EXXON MINERALS COMPANY
CRANDON PROJECT

NATIVE AMERICAN LANDS

Mole Lake Sokaogon Chippewa. The Mole Lake Sokaogon Chippewa reservation consists of a single block of 2,000 acres, located approximately six miles southwest of Crandon, in Nashville Township. This reservation is the smallest in the state. The topography of the reservation is one of low relief. Soils consist of glacial till. Rice Lake and Bishop Lake (also called Dry Lake) are the dominant physical features. Lakes and associated wetlands comprise approximately 400 acres of the reservation, and forests and forested wetlands comprise another 1,300 acres (Mole Lake Sokaogon Chippewa, 1976). The remaining 300 acres contain all of the community's residential and commercial development. This development extends along Highway 55, which passes through the southeast corner of the reservation.

History of the Reservations

Forest County Potawatomi. Before white settlement, the Potawatomi were estimated to number 10,000 people, and controlled as much as 30 million acres of land in the Great Lakes area (Forest County Potawatomi, 1976). The Potawatomi relinquished their last claims to Wisconsin land at the Treaty of Chicago in 1833. However, a small minority of the tribe refused to relocate to reservation land in Kansas, and fled to northern Wisconsin. The major remaining Wisconsin band of Potawatomi formed in Forest County (Americans for Indian Opportunity, 1973).

The Forest County Potawatomi reservation was created by an act of Congress in 1913. It was purchased under a policy intended to stimulate assimilation. Thus, the reservation consists of irregularly-spaced holdings, and families were assigned 40-acre tracts. Families were also given four cows, a team of horses, and a house, but title to the land was held in trust for the tribe. Though it was intended that the Potawatomi would become farmers, the tribe had never practiced sedentary agriculture, and the land was unsuitable for this type of use. In addition, it was illegal for Native Americans to sell livestock, and illegal to buy livestock from Native Americans. Thus, the cash crops consisted of natural products of the land, including berries, ferns, ginseng, furs, and maple sugar (Forest County Potawatomi, 1976).

During the years since formation of the reservation, the Potawatomi have continued in a marginal existence. There has been some amount of industrial employment at Connors Mill in the community of Laona, and federal money has created various employment opportunities through the tribal government.

Mole Lake Sokaogon Chippewa. The Mole Lake Sokaogon Chippewa are part of the Algonquian group and are alternately known as the Ojibwa. The Ojibwa were at one time the largest Native American group north of Mexico, occupying land from Lake

Erie to Montana, and from central Ontario to the Ohio River (Ritzenthaler, 1978).

Tribal tradition holds that as part of the Treaty of 1854 at La Pointe, the Sokaogon were promised a reservation of twelve square miles in their ancestral territory. However, for undetermined reasons, this reservation was never formed. For approximately 80 years the Sokaogon ". . . simply remained as landless bands eking out a living as best they could in what had been their tribal homelands" (Lurie, 1973 in COACT, 1980).

In 1937 the Mole Lake reservation was organized on approximately 1,680 acres of land. The land was described in 1936 to have the following characteristics:

"The country around Mole and Rice Lakes may be described as cut-over forest land, with little or no virgin forests left in all the three counties. Part of the Nicolet National Forest extends into Forest County, but this of course is protected. Practically all the rest contains second and third growth birch, Norway and white pine, and spruce, and these are of value to the Indians only as firewood. The birch are almost valueless for their bark, since their diameter is too small, and can be used only in the making of small tourist articles. The Chippewa now must go several miles to find birch sufficiently large to be used in making such articles as baskets, mats and canoes. The soil is a sandy loam, just rich enough for the growing of gardens, but not rich enough for agriculture on a larger scale. The soil is rocky everywhere, with large rocks and boulders of glacial origin protruding in most places. The smaller stones can be removed in small areas for gardening purposes, but farming on a large scale is impossible, as the experience of the few white farmers in the area has conclusively shown. The annual rainfall is usually sufficient for gardening and for the growth of wild food plants, although occasionally droughts are fairly severe. During the past two years very little has been obtained from gardens, as the plants have 'burned up' before harvest time, wild

berries have been exceedingly scarce as well, and this year it was necessary to go as far as twenty miles to find any worth picking." (Wisdom, 1936, in COACT, 1980.)

The purpose of selecting the site for the Mole Lake Reservation was to give the Mole Lake Sokaogon Chippewa control over Rice Lake and its wild rice resource. Wild rice from Rice Lake has continued to be a source of employment and income for the Mole Lake people. In recent years the Mole Lake Sokaogon have derived a small amount of income from employment off the reservation. In addition, as in the case of the Potawatomi, federal programs have provided various employment opportunities through the tribal government.

2.10.7.2 Demographic Characteristics

This subsection presents data on the following aspects of the populations of the Forest County Potawatomi and the Mole Lake Sokaogon Chippewa:

1. Total enrolled population
2. Population that resides on or near the reservations including sex and age distribution
3. Population dynamics, including: births, deaths, and migration

Total Enrolled Population

Forest County Potawatomi. According to the Bureau of Indian Affairs, there are 600 enrolled members of the Forest

County Potawatomi (Table 2.10-126). Only 316 of these people, or approximately 53 percent of total enrolled members live on or near the reservation. The remainder of the enrolled population lives elsewhere in the U.S. (Bureau of Indian Affairs, personal communication), with the majority of non-reservation residents living in Milwaukee, Minneapolis, Chicago, and on other reservations (U.S. Department of Commerce, Bureau of the Census, 1973b).

Mole Lake Sokaogon Chippewa. There are 867 enrolled members of the Mole Lake Sokaogon Chippewa (Table 2.10-126). Of the enrolled members, 312 (35.9 percent) live on or near the Mole Lake Reservation. As stated in the general description of the reservation, the Mole Lake Reservation is small, and a substantial part of the area is covered by lakes and forested wetlands. These space limitations partially account for the small percentage of enrolled members who actually live on the reservation. As with the Forest County Potawatomi, the majority of non-reservation residents live in Milwaukee, Minneapolis, Chicago, and on other reservations.

Population That Resides On or Near the Reservation

Forest County Potawatomi Population Characteristics.

Of the 316 members (52.7 percent) of the Forest County Potawatomi community who live on or near the reservation in Forest County,

Table 2.10-126

TOTAL POPULATION
1980

	<u>Total Enrolled Members</u>	<u>Resident on Reservation</u>	<u>Resident Adjacent to Reservation</u>
Forest County Potawatomi	600	265	51
Mole Lake Sokaogon Chippewa	867	260	52

SOURCE

Bureau of Indian Affairs. 1980. Personal communication, Mrs. Noskoviak. Ashland, Wisconsin.

165 are male and 151 are female, with a sex ratio of the population of 1:0.9, males to females (Table 2.10-127). Though a population would normally have slightly more females than males, with such a small population, it is not likely that the observed sex structure is indicative of any anomalies.

Only three percent of the Forest County Potawatomi population is age 65 or over. This is compared to 10.7 percent for Wisconsin and 13.7 percent for Forest County (subsection 2.10.1). This relatively low percentage of elderly is the result of the small size of the population 60 to 70 years ago. Conversely, 42.0 percent of the population is 15 years or younger. This is indicative of the high birth rates of low income, rural populations.

Mole Lake Sokaogon Chippewa Population Characteristics.

Of the 312 people who live on or near the Mole Lake Reservation, 152 are male and 160 are female, for a sex ratio of 1:1.1, male to female (Table 2.10-128).

Only 1.9 percent of the Mole Lake population is 65 years or older. As with the Forest County Potawatomi, this represents an unusually low percentage of elderly compared to the population of the state and Forest County. As with the Potawatomi, the low number of elderly people is a factor of small population size in the past. The Mole Lake Sokaogon Chippewa show a high percentage

Table 2.10-127

FOREST COUNTY POTAWATOMI POPULATION CHARACTERISTICS
1980

	<u>Total</u>	<u>Male</u>	<u>Female</u>
Population within the reservation	265	144	121
Population adjacent to the reservation	51	21	30
Population on or near the reservation	316	165	151
Age distribution			
0-15 years	132	73	59
16-24 years	73	34	39
25-34 years	24	10	14
35-44 years	35	21	14
45-64 years	42	22	20
65 and above	10	5	5

SOURCE

U.S. Department of the Interior. 1980. Report of the Labor Force. Bureau of Indian Affairs. Washington, D.C.

Table 2.10-128

MOLE LAKE SOKAOGON CHIPPEWA POPULATION CHARACTERISTICS
1980

	<u>Total</u>	<u>Male</u>	<u>Female</u>
Population within the reservation	260	128	132
Population adjacent to the reservation	52	24	28
Population on or near the reservation	312	152	160
Age distribution			
0-15 years	137	68	69
16-24 years	80	34	46
25-34 years	30	15	15
35-44 years	44	26	18
45-64 years	15	7	8
65 and above	6	2	4

SOURCE

U.S. Department of the Interior. 1980. Report of the Labor Force. Bureau of Indian Affairs. Washington, D.C.

of individuals age 15 years or younger, with 43.9 percent of the Mole Lake population in this age category.

Population Dynamics. Data on births and deaths for the two reservations are aggregated at the county level and at the level of the Bemidji Area of the Indian Health Service (IHS). However, due to the small size of the two populations, and the effect of individual births and deaths on rate calculations, these larger aggregations are better indicators of long-term trends.

Births. The Bemidji Area had a three-year average live birth rate for 1974 to 1976 of 31.3 live births per 1,000 population (Table 2.10-129). This is compared to 14.2 live births per 1,000 population for Wisconsin (subsection 2.10.6). This relatively higher birth rate is common with low income, rural populations. The 1974 to 1976 average birth rate of 31.3 per 1,000 is lower than that of 1960 to 1962 (37.6 per 1,000) but higher than that of 1969 to 1971 (28.2 per 1,000).

Table 2.10-130 shows the age of mothers for births in the Forest County Potawatomi and Mole Lake Sokaogon Chippewa for the years 1973 to 1975. A high percentage of births were to mothers ages 15 to 19 years old. This pattern of births to young mothers substantially increases the growth potential of the population.

Table 2.10-129

BEMIDJI AREA
SELECTED VITAL STATISTICS
(Three Year Average Rates)

	Birth Rate ^b	Infant Mortality Rates ^c			Death Crude Rate ^d
		Total	Neonatal	Postneonatal	
1976 ^a	31.3	21.2	7.8	13.4	974.3
1974-1976 ^a	31.3	15.1	5.7	9.4	954.8
1973-1975 ^a	30.7	13.2	4.1	9.1	997.9
1972-1974 ^a	29.9	13.1	4.4	8.7	988.9
1971-1973	29.8	16.6	8.2	8.4	754.9
1970-1972	28.6	18.2	10.9	7.3	778.5
1969-1971	28.2	21.3	12.1	9.2	759.4
1968-1970	28.4	20.6	11.1	9.5	756.6
1967-1969	30.5	21.6	11.7	9.9	737.9
1966-1968	31.1	22.2	11.3	8.9	744.8
1965-1967	30.8	23.9	10.4	13.5	721.5
1964-1966	32.2	24.8	12.4	12.4	728.3
1963-1965	33.5	27.8	14.5	13.3	766.7
1962-1964	34.9	31.9	17.3	14.6	829.0
1961-1963	35.2	35.8	16.4	19.4	853.0
1960-1962	37.6	36.2	16.5	19.7	847.9

NOTES

^a 1972-1976 data are based on community coding of vital event records. Data for other years are based on aggregates of data at the county level.

^b Birth rates are per 1,000 population.

^c Infant mortality rates are per 1,000 live births.

^d Crude death rates are per 100,000 population.

The Bemidji Area includes all reservations in Michigan, Minnesota and Wisconsin.

SOURCE

Indian Health Service. 1978. file information. Vital Events Branch, Office of Program Statistics, Division of Resource Coordination.

Table 2.10-130

MOLE LAKE SOKAOGON CHIPPEWA AND FOREST COUNTY
POTAWATOMI BIRTHS 1973-1975

	1973		1974		1975	
	<u>No.</u>	<u>Percent of Total</u>	<u>No.</u>	<u>Percent of Total</u>	<u>No.</u>	<u>Percent of Total</u>
Total	10		7		9	
Age of Mother						
15-19	5	50.0	3	42.9	4	44.4
20-24	4	40.0	1	14.3	2	22.2
25-29	1	10.0	2	28.8	1	11.1
30-34	0		1	14.3	1	11.1
35-44	0		0		0	
45+	0		0		1	11.1

SOURCE

Wisconsin Department of Health and Social Services. March, 1977. Indians in Wisconsin. Natality and Morbidity Experience for Reservation Areas and Milwaukee County. Bureau of Health Statistics, Division of Health. Madison.

Deaths. The death rate per 100,000 people in the Bemidji IHS Area showed a three-year average of 954.8 for the years 1974 to 1976 (Table 2.10-129). This is an increase over the low number of deaths per 100,000 people during 1965 to 1967 (721.5). The infant mortality rate for the area was 15.1 deaths per 1,000 live births for 1972 to 1974, compared to a low three-year average of 13.1 for 1973 to 1975.

Table 2.10-131 indicates that the leading causes of death of the Forest County Potawatomi and Mole Lake Sokaogon Chippewa are heart disease and accidents. Table 2.10-132 shows that most deaths among the Forest County Potawatomi and the Mole Lake Sokaogon Chippewa are in the ages 75 and above.

Migration. Data on migration are generally non-existent. The fact that large percentages of the enrolled members of the Forest County Potawatomi and Mole Lake Sokaogon Chippewa do not live on or near the reservation indicates that substantial outmigration took place in the past. However, both tribes indicate the reality or potential of immigration to the reservations. In its 1979 Overall Economic Development Program Report, the Forest County Potawatomi state that ". . . emigration of the Potawatomi back to the community could dramatically increase if more job opportunities became available due to the expected mining activity in the Crandon area." Likewise, in regard to their reservation, the Mole Lake Sokaogon Chippewa

Table 2.10-131

FOREST COUNTY POTAWATOMI AND MOLE LAKE SOKAOGON CHIPPEWA
LEADING CAUSES OF DEATH, 1973-1975

	1973		1974		1975	
	No.	Percent of Total	No.	Percent of Total	No.	Percent of Total
Total ^a	5		3		3	
Heart disease	2	40.0	0		3	100.0
Accidents	2	40.0	0		0	
Cancer	0		0		0	
Stroke	0		1	33.3	0	
Influenza and pneumonia	1	20.0	0		0	
Congenital anomolies and diseases of early infancy	0		0		0	

^aTotal includes all deaths for the years shown, not just deaths from the specific leading causes shown here.

SOURCE

Wisconsin Department of Health and Social Services. March, 1977. Indians in Wisconsin. Natality and Morbidity Experience for Reservation Areas and Milwaukee County. Bureau of Health Statistics, Division of Health. Madison.

Table 2.10-132

MOLE LAKE SOKAOGON CHIPPEWA AND FOREST COUNTY POTAWATOMI
DEATHS, 1973-1975

	<u>1973</u>		<u>1974</u>		<u>1975</u>	
	<u>No. of Total</u>	<u>Percent</u>	<u>No. of Total</u>	<u>Percent</u>	<u>No. of Total</u>	<u>Percent</u>
Total	5		3		3	
Infant deaths	0		0		0	
Age						
Under 1	0		0		0	
1-14	0		0		0	
15-34	0		0		0	
35-54	1	20.0	1	33.3	1	33.3
55-64	0		1	33.3	0	
65-74	1	20.0	0		0	
75 and above	3	60.0	1	33.3	2	66.6

SOURCE

Wisconsin Department of Health and Social Services. March, 1977. Indians in Wisconsin, Natality and Morbidity Experience for Reservation Areas and Milwaukee County. Bureau of Health Statistics, Division of Health. Madison.

state that some tribal members are moving back to the reservation from the city (Mole Lake Sokaogon Chippewa, 1980).

Summary of Demographic Characteristics. Both birth and death rates among the Forest County Potawatomi and Mole Lake Sokaogon Chippewa are high. High birth rates are characteristic of rural populations. The most common correlation with birth rates (called the "demographic transition") maintains that birth rates tend to decline as populations become urban and affluent. There are no indications that either the Forest County Potawatomi or the Mole Lake Sokaogon Chippewa are becoming either urban or affluent. Thus, it is expected that the relatively high reproductive rate of the populations will be maintained.

High death rates are also related to non-industrial rural populations, and are one explanation of the accompanying high birth rates. Both the Forest County Potawatomi and the Mole Lake Sokaogon Chippewa lack many things that are essential for good health and consequent long life expectancies. The climate of the area is very rigorous, and housing conditions are overcrowded in many cases and do not always provide the best protection. Water supplies and sewage disposal are generally primitive, and can add to sickness. The populations are isolated from medical care personnel and facilities, and often do not have ready transportation to reach medical care. Finally, household incomes are extremely low, so that individuals must depend on subsidized

medical care that may not be as responsive as that purchased on the open market.

2.10.7.3 Economy

This subsection presents data on the following aspects of economic conditions on and around the Forest County Potawatomi and Mole Lake Sokaogon Chippewa reservations:

1. Labor force and employment
2. Income
3. Business establishments on the reservation
4. Economic development potentials and goals

Labor Force and Employment

Forest County Potawatomi. The Forest County Potawatomi have a labor force of 114, comprised of 66 males and 48 females (Table 2.10-133). Of these individuals, a total of 35.1 percent are unemployed. Of the males in the labor force 45.4 percent are unemployed, compared to 20.8 percent of the females. As of April 1980, four of the 30 unemployed males were actively seeking work, and three of the 10 unemployed females were actively seeking work.

The Overall Economic Development Plan prepared by the Forest County Tribal Council in 1976 reported that 54.0 percent of the labor force had experience in unskilled jobs, 24.0 percent had

Table 2.10-133

FOREST COUNTY POTAWATOMI LABOR FORCE,
EMPLOYMENT AND UNEMPLOYMENT AND INCOME, 1980

	<u>Total</u>	Percent of <u>Total</u>	<u>Male</u>	Percent of <u>Male</u>	<u>Female</u>	Percent of <u>Female</u>
Labor Force	114	100.0	66	100.0	48	100.0
Employed	74	64.9	36	54.5	38	79.2
Unemployed	40	35.1	30	45.5	10	20.8
Actively seeking work	7	6.1	4	6.1	3	6.3
Employed, earning \$5,000 or more per year	32	28.1	18	27.3	14	29.2
Employed, earning less than \$5,000 per year	42	36.8	18	27.3	24	50.0

SOURCE

U.S. Department of the Interior. 1980. Report of the Labor Force. Bureau of Indian Affairs. Washington, D.C.

experience in semi-skilled jobs, and 22.0 percent had worked at skilled jobs. However, the report emphasized that individuals had skills such as secretarial and bookkeeping skills for which there were no employment opportunities. The report also stated:

"Most of the individuals counted as employed in the Potawatomi Community are working in 'soft employment' positions. That is, most of the employed are working in government funded positions that are funded for terms ranging in length from six months to a year and then the people are unemployed again."

Examples of government funded employment are those jobs that are provided through the Comprehensive Employment and Training Act (CETA). The community started an arts and crafts project in 1979 that used CETA funds for training of arts and crafts workers, with the intent that these individuals would become self-supporting after the training.

Tribal members may engage in timber harvesting. However, to be successful in that work requires a minimal capital investment in vehicles and equipment that is beyond the capacity of most members of the community. In addition, tribal members have found employment in the wood products industry.

Mole Lake Sokaogon Chippewa. The Mole Lake Sokaogon Chippewa reported a total labor force of 126, with an unemployment rate of 34.0 percent in May 1980 (Table 2.10-134). The Mole Lake labor force is made up of 62 males and 64 females. Unlike the Potawatomi, the Mole Lake Sokaogon Chippewa males had a much lower unemployment rate than the females, 18.0 and 50.0

Table 2.10-134

MOLE LAKE SOKAOGON CHIPPEWA LABOR FORCE,
EMPLOYMENT AND UNEMPLOYMENT AND INCOME, 1980

	<u>Total</u>	Percent of <u>Total</u>	<u>Male</u>	Percent of <u>Male</u>	<u>Female</u>	Percent of <u>Female</u>
Labor Force	126	100.0	62	100.0	64	100.0
Employed	83	65.9	51	82.3	32	50.0
Unemployed	43	34.1	11	17.7	32	50.0
Actively seeking work	43	34.1	11	17.7	32	50.0
Employed, earning \$5,000 or more per year	32	25.4	15	24.2	17	26.6
Employed, earning less than \$5,000 per year	51	40.5	36	58.1	15	23.4

SOURCE

U.S. Department of the Interior. 1980. Report of the Labor Force. Bureau of Indian Affairs. Washington, D.C.

percent respectively. All unemployed members of the labor force were reported as actively seeking work.

Table 2.10-135 lists the types of employment held by members of the Mole Lake Sokaogon Chippewa community in 1976. Forty of the 44 positions listed were either with the Great Lakes Inter-tribal Council or the Mole Lake Sokaogon Chippewa Tribe. As with the Potawatomi, the majority of these jobs are supported by "soft money," and do not provide long-term stability. As observed in the 1980 Overall Economic Development Program Report prepared by the tribe:

"The Tribe remains heavily reliant on government programs for employment. Over the past few years, the Comprehensive Employment Training Act (CETA) has provided the vast majority of reservation employment opportunities."

Two primary CETA-funded projects have provided local employment. The first is an arts and crafts project, which provided full-time employment for 17 people, from January 1980 through the end of the year. The second is the wild rice improvement project which provided full-time employment for 10 people from February to July. The tribe also uses CETA funds to employ tribal members in a weatherization project.

The major economic activity of the Mole Lake Sokaogon Chippewa has been the Great Northern Bluegrass Festival. The tribe promotes and manages this music event which has attracted large crowds for five years. Revenue from this event has been used as start-up capital for other tribal enterprises. The most

Table 2.10-135

MOLE LAKE SOKAOGON CHIPPEWA TYPES OF EMPLOYMENT
1976

<u>Type of Employment</u>	<u>Number Employed</u>
Logging	1
Nurse's aide	1
Green Thumb (Wisconsin Farmers Union)	2
Great Lakes Intertribal Council	12
Tribal Projects	28

SOURCE

Mole Lake Sokaogon Chippewa. 1976. Overall Economic Development
Plan for the Mole Lake Sokaogon Chippewa.

ambitious of these projects is the Sokaogon Chippewa Excavating Company. During the period from the summer of 1979 until the summer of 1980, this business secured \$64,000 in contracts, and provided employment for 9 people (Mole Lake Sokaogon Chippewa, 1980).

Personal Income

Forest County Potawatomi. Of the 74 Forest County Potawatomi people reported as employed in April 1980, 32 earned \$5,000 or more per year, while 42 earned less than \$5,000 per year (Table 2.10-133).

A substantial number of Forest County Potawatomi households receive income from sources other than employment. As indicated in Table 2.10-136, in 1976 approximately one-fourth of the households received money from the Veterans Administration and the Social Security Administration, almost one-third from various welfare sources, and less than 5 percent from unemployment compensation.

Mole Lake Sokaogon Chippewa. As shown in Table 2.10-134, of the 83 Mole Lake Sokaogon Chippewa reported as employed in May 1980, 32 earned \$5,000 or more per year, and 51 earned less than \$5,000 per year.

As with the Forest County Potawatomi, a substantial number of Mole Lake Sokaogon Chippewa receive income from sources other

Table 2.10-136

FOREST COUNTY POTAWATOMI
SOURCES OF INCOME OTHER THAN EMPLOYMENT, 1976

<u>Source of Income</u>	<u>Percent Households Receiving Income</u>
Veterans Administration and Social Security	26.0
Welfare (including Aid to Dependent Children)	30.0
Unemployment Compensation	4.0

SOURCE

Forest County Potawatomi, 1976. Overall Economic Development
Program.

than employment. In 1976 approximately one-fourth of the population received income from the Veterans Administration and the Social Security Administration, about one-fifth received income from welfare, and a small number of people received income from unemployment compensation (Table 2.10-137).

Business Establishments on the Reservations

Forest County Potawatomi. At the present time there are no private business establishments on the reservation. The Tribal Council has attempted to stimulate business activities through the development of an arts and crafts program and a timber enterprise program. However, no viable business enterprises have resulted from these efforts.

Mole Lake Sokaogon Chippewa. The only private business enterprise on or near the Mole Lake reservation is a small tavern. The Tribal Council established an excavation company that had revenues of \$64,000 during its first year of operation. In addition, the tribe started a tobacco shop. Though not a business in the usual sense of the word, the annual Great Northern Bluegrass Festival promoted and organized by the tribe is an example of tribal initiative and entrepreneurial activity.

Table 2.10-137

MOLE LAKE SOKAOGON CHIPPEWA
SOURCES OF INCOME OTHER THAN EMPLOYMENT, 1976

<u>Source of Income</u>	<u>Percent Households Receiving Income</u>
Veterans Administration and Social Security	27.0
Welfare (including Aid to Dependent Children)	21.0
Unemployment Compensation	2.0

SOURCE

Mole Lake Sokaogon Chippewa. 1976. Overall Economic Development
Program.

Economic Development Potentials and Goals

Forest County Potawatomi. As stated in the 1979 Overall Economic Development Program Report (OEDP Report), the Forest County Potawatomi have the following development goals and objectives:

I. Development Goals

- A. Provide balanced and desired employment for all members of the community.
- B. Instill a desire in the Potawatomi youth for higher education.
- C. Protect and enhance the history and cultural heritage of the Potawatomi Community.
- D. Develop a governmental system capable of handling all the pressures placed on it.
- E. Protect the natural environment of the area.

II. Development Objectives

- A. Economic Development. Creation of industrial and commercial ventures which will fill the need for employment opportunities and tribal cash-flow.
- B. Community Facilities. Provide the community members with all necessary community facilities and services.
- C. Tribal Government. Develop a system of government that will provide the Forest County Potawatomi with effective and knowledgeable leadership in all aspects of governmental activities.
- D. Natural Resources. Protect and enhance the natural resources of the community.

The Forest County Potawatomi have two main resources to accomplish their goals and objectives: natural resources and

people. Regarding natural resources, the 1979 OEDP Report states:

"Natural resources available include potential mineral deposits, lakes, rivers, streams, and forests along with the natural terrain which includes Sugar Bush Hill, one of the highest points in Wisconsin that could be developed into a possible ski hill."

The 1979 OEDP Report also lists the major constraints on economic development of the Forest County Potawatomi reservation.

Those constraints are as follows:

- A. The divided nature of the land areas of the Forest County Potawatomi.
- B. The relatively small size of the tribal population.
- C. Distance from major markets.
- D. Lack of direct contacts between the Forest County Potawatomi and government agencies.
- E. Public and legislative misunderstanding of Tribal Government.
- F. Funding agencies' changing priorities.
- G. Granting agency restrictions.

The Forest County Potawatomi continue to seek a loan/grant through the Economic Development Administration (EDA) to provide capital for a timber business. The major economic resource available to residents of the reservation is the large extent of marketable timber on the reservation. However, in order to harvest and market this timber profitably, it is essential to purchase the necessary equipment and develop an effective management structure. Funding from the EDA would be used for these purposes.

Mole Lake Sokaogon Chippewa. The Mole Lake

Sokaogon Chippewa listed the following development goals in the 1980 OEDP Report:

- A. Provide employment opportunities for all members of the community at a rate of pay conducive to a viable way of life.
- B. Develop the principles of self-determination to the point of providing the community with an independent and effective system of government.
- C. Meet or exceed the demand for community facilities and services.
- D. Protect the natural environment of the area.
- E. Retain and enhance the cultural heritage of the Sokaogon Chippewa Tribe.

In addition, the OEDP Report listed the following economic development projects:

- A. Mini-Mall Project: A grouping of service oriented stores to provide goods and jobs to the people of Mole Lake. Examples of products that might be sold: food, restaurant, laundromat, energy products (oil, gas, firewood).
- B. Energy Related Industry (Bio-Mass): Making useful energy products out of wood waste.
- C. Campground Improvement: Add water/sewer and electricity to the campground.

Constraints on economic development of the Mole Lake Sokaogon Chippewa reservation were listed in the 1980 OEDP Report as follows:

- A. The small land base of the Sokaogon Chippewa Community.
- B. Lack of local funds that inhibits the ability of the community to receive loans.

- C. Unresponsiveness of government agencies to the real needs of the community.
- D. Allocation of funds on a per capita basis based on Bureau of Indian Affairs, Labor Force Reports, and Census Tract Data that inaccurately portrays the service population of the Tribe.
- E. Slowness of action by some government agencies.
- F. A false image of the Sokaogon Chippewa Government carried by some government agencies.

Summary Of Economic Characteristics. Economic characteristics of both the Forest County Potawatomi and the Mole Lake Sokaogon Chippewa must be viewed within the context of Forest County--one of the poorest and most sparsely populated counties in the state. Economic characteristics must also be viewed within the context of culture and history. During recent history both tribes have lived in a context where there was little economic opportunity. Their way of life was based on direct use of natural resources rather than a money/industrial economy. Political events greatly limited their original territory, and government policies attempted to replace the traditional use of resources with European-style agriculture. Little in the tribes' traditional cultures helped them adopt sedentary agriculture, and their land was unsuited for agriculture. Thus, the Forest County Potawatomi and the Mole Lake Sokaogon Chippewa have not worked out the sociocultural patterns that allow them to participate in the dominant economy of the area.

2.10.7.4 Housing

Characteristics of Current Housing Stock

Forest County Potawatomi. There are 102 residences on the Forest County Potawatomi reservation (Wisconsin Department of Local Affairs and Development, personal communication, 1980). Forty-six of these units are single family houses (Table 2.10-138). More than 50 percent of dwelling units of rural Wisconsin Native Americans were 30 years old or older at the time of the 1970 census. Most houses on the reservation were maintained through a Revolving Rehabilitation Fund established with loans and grants from the Bureau of Indian Affairs (BIA) in the 1930's and 1940's (Forest County Potawatomi, 1976). Through the 1960's and 1970's, the tribe received home improvement grants from the Office of Economic Opportunity and the Bureau of Indian Affairs. In addition, the tribe used funds from the Department of Housing and Urban Development (HUD) to construct 11 new houses on three cluster sites in 1971 (Forest County Potawatomi, 1976).

The Tribal Council has continued efforts to secure funds to expand and maintain the housing stock. However, as stated in the Forest County Potawatomi Overall Economic Development Plan in 1976:

"Despite these efforts, twenty percent of the homes in the community do not have plumbing. Fifteen percent of the households in the community do not have electricity. Eighteen percent of the homes are occupied by two or more families."

Table 2.10-138

HOUSING, 1980

<u>Housing Type</u>	<u>Number</u>
Forest County Potawatomi	
Single family units	46
Other (unspecified)	56
Mole Lake Sokaogon Chippewa	
Tribally owned	13
Trailers	23
HUD homes	12
Private homes	9

NOTE

91.2 percent of housing units are substandard (based on HUD procedure of counting a home as substandard twice if it is both substandard and overcrowded).

SOURCE

Mole Lake Sokaogon Chippewa. 1980. Overall Economic Development Program Report for Sokaogon Chippewa Community, Mole Lake Band.

Wisconsin Department of Local Affairs and Development. July 24, 1980. Personal communication, Robert Smith. Madison.

Mole Lake Sokaogon Chippewa. According to the 1980 OEDP Report for the Mole Lake Sokaogon Chippewa, there are 57 housing units on the reservation. Approximately one-fourth of these units are tribally owned, about one-fifth are new HUD units, and about two-fifths are trailers (Table 2.10-138). According to the OEDP Report, 91.2 percent of these units are substandard if the HUD policy is followed of counting a unit twice if it is both substandard and overcrowded. Six of the housing units were constructed 40 years ago through the Works Progress Administration. These units were constructed as "minimum amenity habitations" that did not have basements, insulation, or indoor plumbing. Fourteen homes on the reservation lack piped water, and six units have a serious heating deficiency (COACT, 1980) (Table 2.10-139).

In fiscal year 1979, the Tribal Council submitted an application for a HUD Community Development Block Grant to rehabilitate homes on the reservation. The application was not funded, and was resubmitted for fiscal year 1980 (Mole Lake Sokaogon Chippewa, 1980).

Housing Development. Two primary factors inhibit housing development on the Forest County Potawatomi and Mole Lake Sokaogon Chippewa reservations. Those factors are economic conditions and administrative requirements.

Table 2.10-139

1970 HOUSING CHARACTERISTICS OF RURAL WISCONSIN
NATIVE AMERICAN HOUSEHOLDS

	<u>Percent</u>
In owner occupied units	56.5
Median number of rooms (number)	4.7
Overcrowded (1.01 or more people/room)	35.0
Houses built 1939 or before	54.0
Houses with indoor bathroom	63.0
Houses with piped water	72.0
Houses with public water supply	33.0
Houses with public sewer	29.0
Households with no automobile available	22.0

SOURCE

U.S. Department of Commerce, Bureau of the Census. 1973. Census of Population: 1970 Subject Reports, Final Report P.C. (2)-1F American Indian. Washington, D.C.: U.S. Government Printing Office.

Housing is an economic problem throughout the United States. Both building and financing costs are high, and home purchase requires substantial household income. Due to low household incomes, it is particularly difficult for members of the two tribes in Forest County to purchase housing. Without a drastic improvement in the economic conditions of members of the two communities, purchase and maintenance of non-subsidized housing will remain difficult to impossible.

Due to the low potential of households to purchase housing, reservation residents have relied on housing subsidies provided by the Bureau of Indian Affairs, the Department of Housing and Urban Development, and the Farmers Home Administration. These programs have provided most of the housing stock on the two reservations. However, federal housing programs have traditionally been subject to rapid change. In addition, the grants and loans are often difficult to obtain and administer, especially for small local governments with limited administrative capacities.

Summary of Housing Characteristics. The housing stock on both reservations is relatively old, and a large percentage of units are classified as substandard and/or overcrowded. The tribes have received periodic assistance from the Bureau of Indian Affairs and the Department of Housing and Urban Development to upgrade the housing stock, but much remains to be

done. Economic conditions of the reservations and the county place severe limits on individual, private purchases of housing.

2.10.7.5 Public Facilities and Services

This subsection provides data in two parts on the public facilities and services used by residents of the two reservations. The first covers those public facilities and services provided on or by the reservations. The second part considers facilities and services used by tribal members, but provided by other jurisdictions.

Facilities and Services Provided on or by the Reservations

Forest County Potawatomi. The following public facilities and services are provided on or by the Forest County Potawatomi Reservation:

1. General government
2. Water supply
3. Wastewater collection and treatment
4. Public health and welfare
5. Cultural opportunities
6. Recreational facilities

General Government. General government of the Forest County Potawatomi is provided by the Tribal Council and its

various professional staff members. Support for general government comes from the the Bureau of Indian Affairs; the Department of Health, Education and Welfare; and the Department of Housing and Urban Development.

Water Supply. Private wells provide household water supplies for reservation residents. There is no central supply, treatment, and distribution service. Some housing units do not have piped water.

Wastewater Collection and Treatment. Human wastes are treated on site by septic tanks and outdoor privies.

Public Health and Welfare. The Forest County Potawatomi Tribal Council provides health and welfare services through the following positions:

1. Health Planner/Administrator
2. Community Health Representative
3. Maternal and Child Health Representative
4. Alcoholism Counselor
5. Elderly Program

These full-time positions are supported by funding from the Bureau of Indian Affairs and the Department of Health, Education and Welfare, Administration for Native Americans, and may be shared between reservations.

The Health Planner/Administrator is responsible for development and implementation of a comprehensive health plan, and for administration of all health programs. The role of the Community Health Representative is to provide information to reservation residents regarding health matters, and to serve as a contact with health care agencies and facilities. The Maternal and Child Health Representative provides information to mothers and children regarding care, health, and diet. The Alcoholism Counselor provides direct counseling services, as well as providing education and information regarding alcoholism. The Elderly Program provides eligible reservation residents with information about programs for the elderly and provides liaison with agencies.

Cultural Opportunities. Cultural opportunities are provided to reservation residents through facilities and programs of the Tribal Center. The Center maintains a library. Classes in the Potawatomi language are offered, and various traditional festivals are organized and sponsored by the tribe.

Recreational Facilities. The Tribal Center provides various recreational facilities for all ages. Movies and special programs are offered, and the Center contains a gymnasium.

Mole Lake Sokaogon Chippewa. The following public facilities and services are provided on or by the Mole Lake Sokaogon Chippewa Reservation:

1. General government
2. Water supply
3. Wastewater collection and treatment
4. Public health and welfare
5. Cultural opportunities
6. Recreational facilities
7. Fire protection

General Government. General government of the Mole Lake Sokaogon Chippewa is provided by the Tribal Council and its various professional staff members. Support for general government comes from the Bureau of Indian Affairs; the Department of Health, Education and Welfare; and the Department of Housing and Urban Development (HUD). The Tribal Council sponsors a Public Housing Authority that has been active in securing financing from HUD for additional housing units. The Housing Authority has also been active in managing its housing units.

Water Supply. Private wells provide household water supplies for reservation residents. There is no central supply, treatment, and distribution service.

Wastewater Collection and Treatment. Human wastes are treated on site by septic tanks and outdoor privies.

Public Health and Welfare. The Mole Lake Sokaogon Chippewa Tribal Council provides health and welfare services through the following full-time positions:

1. Health Planner/Administrator
2. Community Health Representative
3. Maternal and Child Health Representative
4. Alcoholism Counselor
5. Elderly Program

The Bureau of Indian Affairs and the Department of Health, Education and Welfare, Administration for Native Americans provide funding for professional positions to administer health and welfare programs. These positions may be shared between reservations depending on funding.

The Health Planner/Administrator is responsible for development and implementation of a comprehensive health plan, and for administration of all health programs. The Community Health Representative is responsible for providing information to reservation residents regarding health matters, and serving as a contact with health care agencies and facilities. The Maternal and Child Health Representative provides information to mothers and children regarding care, health, and diets. The Alcoholism Counselor provides direct counseling services, as well as

education and information regarding alcoholism. The Elderly Program assists eligible reservation residents to obtain information about programs for the elderly, and serves as a liaison with agencies.

Cultural Opportunities. The Mole Lake Sokaogon Chippewa Tribal Council supports a number of facilities and programs that provide significant cultural opportunities to reservation residents. A library and media center are maintained in the Tribal Hall. This facility is also used to offer classes in the Chippewa language, and various traditional festivals are organized and sponsored by the tribe.

Recreational Facilities. As documented in the COACT Report (1980), the Mole Lake Sokaogon Chippewa are currently well supplied with recreational facilities:

"At present, the Tribal endowment of such areas is impressive. It includes three baseball diamonds, various children's playgrounds, extensive fairgrounds and campgrounds developed for the annual Bluegrass Festival, another semi-developed campground currently used for outdoor education workshops and having commercial potential, and several indoor facilities including a library and media center, a Tribal hall large enough for commercial bingo, movies, and wedding receptions, and a multi-purpose senior center. To this list must be added the natural environs of the central woodlands, Rice Lake and Swamp Creek--all used for fishing, hunting, trapping and ricing."

Fire Protection. In 1980, the Mole Lake Sokaogon Chippewa purchased a fire truck with funds from the Housing and Urban Development Community Development Block Grant program. In addition, the Tribal garage was renovated to provide space for the fire truck and fire fighting equipment. The vehicle and equipment will be used by a volunteer fire force to provide fire protection on the reservation. The city of Crandon also provides fire protection services to the reservation.

Facilities and Services Provided by Other Jurisdictions.

Jurisdictions other than the two tribal governments provide many facilities and services used by members of the Forest County Potawatomi and the Mole Lake Sokaogon Chippewa. Those facilities and services include the following:

1. Fire protection
2. Law enforcement
3. Education
4. Solid waste disposal
5. Streets, roads, and public transportation
6. Electric service
7. Fuel oil
8. Natural or LP gas
9. Telephone service
10. Clinics and hospitals
11. Emergency medical service

12. Health care personnel
13. Public health and welfare
14. Recreation

Each of these facilities and services is described below, with emphasis on the accessibility of the service to Native Americans, and the capacity of the facility or service.

Fire Protection. The Forest County Potawatomi rely on the city of Crandon and on Wabeno Town for fire protection in the southern portions of the reservation.

The city of Crandon operates a volunteer fire department with one 750-gallon pumper, one 500-gallon pumper, one 1,000-gallon pumper, one equipment van, and a staff car. There are approximately 28 volunteers on call, plus a salaried part-time chief and assistant chief (see subsection 2.10.4).

Wabeno Town also operates an all-volunteer fire department with two pumpers and an equipment van. All equipment is considered to be in good condition. Approximately 30 volunteers are on call. The department has mutual aid agreements with the communities of Crandon, Laona, Lakewood, and Townsend.

Law Enforcement. Law enforcement for both the Forest County Potawatomi and Mole Lake Sokaogon Chippewa reservations comes from the Forest County Sheriff's Department. The department has 10 full-time officers, three administrative

personnel, and four and a half jail staff. There are 17 vehicles, with 14 in good condition and three in fair condition. The office facility is 14 years old, and is in fair condition. The detention facility has 17 cells and is in good condition (see subsection 2.10.4).

Education. The Forest County Potawatomi are served by both the Crandon and the Wabeno Independent School Districts, while the Mole Lake Sokaogon Chippewa are served only by Crandon Independent School District. In addition, both tribes are served by the Native American Program at Nicolet College in Rhinelander. As described in subsection 2.10.4, the Crandon Independent School District (ISD) has three elementary schools, and one combination junior/senior high school. For its 1979-80 school year, the Crandon ISD had a total enrollment of 1,065 students, and an average expenditure of \$1,352.86 per student. During that same year, the Crandon ISD had a total professional staff of 59, with a student/professional staff ratio of 18 to 1. An elementary school, Mole Lake Elementary, is located near the Mole Lake Sokaogon Chippewa reservation. That school had an enrollment of 103 students in 1979-80. Mole Lake Elementary School is 63 years old, and in poor to fair condition. The building could accommodate 20 more students than were enrolled during 1979-80 (see subsection 2.10.4).

The Crandon Independent School District is accredited by the Wisconsin Department of Public Instruction (DPI). The district offers the following range of courses:

- Vocational agriculture
- Art
- Business
- English language arts
- Foreign languages
- Health education
- Physical education
- Home economics
- Industrial education
- Mathematics
- Music
- Natural sciences
- Social sciences/social studies
- Safety and driver education

During 1976-77 the Crandon ISD offered a bilingual education program funded by a Title VII grant from the Department of Health, Education and Welfare. Both tribes in the district were instrumental in securing funding for this program. In 1977 the Crandon School Board voted to discontinue the program after the 1977-78 school year.

Both tribes have voiced substantial dissatisfaction with the experience of Native American students in the Crandon ISD. Tribal leaders feel the district does not attempt to meet special needs of Native American students (Thunder, personal communication).

As described in subsection 2.10.4, the Wabeno Independent School District has an elementary school and a combination junior/senior high school. The elementary school is six years old, has 15 classrooms, is in excellent condition, and could

accommodate an additional 120 students. Part of the junior/senior high school is 42 years old, while another part is approximately one year old. The 20-classroom building is in good to excellent condition and could accommodate 120 more students.

The Wabeno ISD had a total enrollment of 661 students for the 1979-80 school year, with an average expenditure of \$1,647.05 per student. The district's professional staff of 45 provided a student/professional staff ratio of 14.8 to 1 (see subsection 2.10.4).

The Wabeno Independent School District is accredited by the Wisconsin Department of Public Instruction and offers a normal range of courses, including the following:

- Art
- Business
- English language arts
- Foreign languages
- Health education
- Physical education
- Home economics
- Industrial education
- Mathematics
- Music
- Natural sciences
- Social sciences/social studies
- Safety and driver education

The Native American Program at Nicolet College in Rhinelander is designed to serve two functions. One function is to stimulate and perpetuate Native American culture and folkways. The other function is to assist Native American students in learning the skills necessary to compete successfully outside the reservation. In this function, the Native American program

serves as a liaison with other departments of the college. The program provides counseling services, including interpersonal relationships, personal problems, cultural orientation, educational counseling, career guidance, school admissions procedures, and chemical abuse counseling. The program also maintains a Native American Library and Career Development Library. During the past two years, the program has worked with 20 to 30 Native American students. A major problem of students in the program is travel and accommodations. The program provides no buses or other transportation, and students without access to automobiles have difficulty maintaining participation. Furthermore, Nicolet College provides no dormitory facilities, and students that cannot commute must find lodging in Rhinelander. The expense of private accommodations is often prohibitive, and Native American students are often conscious of feelings of prejudice (La Rock, personal communication, 1980).

Solid Waste Disposal. The only publicly maintained solid waste disposal site available to either reservation is that operated by Wabeno. The Wabeno Town disposal site is 3.8 acres with an estimated remaining life of 10 years. The site is in compliance with Department of Natural Resources waste disposal standards. Collection services are not provided, but private haulers will contract for the service (see subsection 2.10.4).

Streets, Roads, and Public Transportation. Streets and roads that serve the reservations are developed and maintained by the state of Wisconsin, Forest County, and the townships of Nashville, Lincoln, and Wabeno. The entire county contains 108 miles of county trunk roads and 154 miles of state and federal highways. Neither reservation has access to public transportation (see subsection 2.10.4).

Utilities. Utilities include electric service, fuel oil, natural or LP gas, and telephone service. Electricity is provided by the Wisconsin Public Service Corporation. Fuel oil and propane gas are available as heating fuels to any area to which delivery can be made. The General Telephone Company and the Crandon Telephone Company provide telephone service without major limitations.

Clinics and Hospitals. Two satellite clinics of medical groups from Rhinelander are located in Crandon. The nearest hospital facilities are in Antigo and Rhinelander.

Emergency Medical Service. Emergency medical service units are located in Crandon, and the communities of Laona and Wabeno.

Health Care Personnel. The following health care personnel are located within Forest County:

one full-time physician
eight part-time physicians
two full-time dentists
ten full-time registered nurses
six part-time registered nurses
two full-time licensed practical nurses
one part-time licensed practical nurse

There is need in the area for additional nurses (see subsection 2.10.4).

Public Health and Welfare Services. Public health services in Forest County include general public health and home health programs that provide two full-time and two part-time registered nurses, two clerical staff, and two outreach aides.

Social services in Forest County include adoption, day care, counseling, court services, diagnostic/evaluation, education/training, family planning, health-related services, home and financial management, information and referral, placement and supervision, protective payment, home care, and transportation. Sixteen full-time personnel are involved in these services.

Recreation. Forest County provides one major developed recreation area, including campground units, 35 miles of hiking and game trails, 156 miles of snowmobile trails, picnic tables, beaches, and a boat landing.

Summary of Public Facilities and Services. Though the reservations provide a limited range of services and facilities, reservation residents are able to supplement those with services and facilities provided by surrounding jurisdictions (for further discussion, refer to subsection 2.10.4). The most pressing current problem is to provide education services that meet Native American needs and help insure success of Native American students.

2.10.7.6 Fiscal Conditions

This subsection considers fiscal characteristics of the two Native American communities as local governments. Three separate topics are covered--internal sources of revenue, external sources of revenue, and fiscal costs.

Internal Sources of Revenue. Taxation, the primary internal source of funds for most governments, is not an available source of funds for either the Forest County Potawatomi or the Mole Lake Sokaogon Chippewa. The corporate charters of both tribes make no reference to taxing powers (U.S. Department of Interior, 1938 and U.S. Department of Interior, 1939). In addition, the majority of real property is owned by the community rather than by the individuals.

Thus, the only internal source of revenue to the tribes is money generated through various tribal enterprises. The most

sucessful enterprize of either of the two tribes has been the Great Northern Bluegrass Festival of the Mole Lake Sokaogon Chippewa. During the past three years, this festival has generated sufficient profits to fund other enterprizes such as the Sokaogon Chippewa Excavating Company and a tobacco shop.

The Forest County Potawatomi have not been as successful with tribal enterprizes as have the Mole Lake Sokaogon Chippewa. The Potawatomi's primary resource is its forests. For several years the Tribe has attempted to secure funding from government agencies to support a timber enterprize. A successful timber enterprize could generate capital to expand tribal services and to start other enterprizes.

External Sources of Revenue. The primary financial support of tribal government, basic services, and special programs comes from external sources of revenue (Wisconsin Governor's Manpower Office, 1977). These sources include the following:

- Economic Development Administration
- U.S. Department of Labor
- Office of Native American People
- Indian Health Service
- Bureau of Indian Affairs
- U.S. Department of Housing and Urban Development
- Wisconsin Department of Health and Social Services
- Wisconsin Department of Industry, Labor, and Human Relations
- Governor's Manpower Office
- Office of Economic Opportunity
- Upper Great Lakes Regional Commission
- Wisconsin Department of Local Affairs and Development
- Wisconsin Department of Natural Resources
- Great Lakes Inter-Tribal Council

Only the revenues from the Bureau of Indian Affairs and the Indian Health Service provide funding on a continuous basis, and those sources are subject to agency allocations and budgets. The other sources of external revenue are based largely on competitive proposals for grants. Successful competition for such programs requires a high degree of bureaucratic skill.

Expenditures. Both the Forest County Potawatomi and the Mole Lake Sokaogon Chippewa provide only minimal services, and therefore have minimal fiscal costs. Neither tribe provides police service, nor maintains roads. Only the Mole Lake Sokaogon Chippewa provide fire protection, and this is done through a volunteer force using a truck purchased with funds from the Department of Housing and Urban Development (Mole Lake Sokaogon Chippewa, 1980). Neither tribe provides water or sewer service, and general government and special services are all supported by funds from one of the sources listed above.

Summary of Fiscal Conditions. The reservations have a unique public finance situation. They cannot tax, and all facilities and services are paid for by sources of funds that are outside the reservation. However, the reservation communities must try to operate successful enterprises to raise capital for economic development and other community development activities.

2.10.7.7 Sociocultural Characteristics

This subsection considers sociocultural characteristics from two perspectives: sociocultural indicators and qualitative analysis. The sociocultural indicators use data from public agencies to describe major social factors such as reproduction, sustenance, order and safety, and learning. The qualitative analysis considers the unique characteristics of small minority populations and societies with conflicts between modern and traditional sociocultural factors.

Sociocultural Indicators

Reproduction. The family is the basic reproductive unit and carries out many functions essential for the survival of a society. Table 2.10-140 indicates that Native American families generally are larger than the U.S. average. They have more children, fewer husband-wife families, and more female-headed families. Major family characteristics can be described using data on marriage, divorce, births, illnesses, and deaths.

Marriage. Approximately 48 percent of Chippewa men 14 years and older were married with their wives present in the household in 1970, while 49 percent of Chippewa women of the same age were married (Table 2.10-141). In 1970, 47 percent of Potawatomi men were married with their wives present in the

Table 2.10-140

FAMILY CHARACTERISTICS OF THE U.S. TOTAL AND NATIVE AMERICAN
POPULATION, 1970

	<u>Total U.S. Percent</u>	<u>Total Native American Percent</u>
Husband-wife families	86.0	77.0
with children under 18	56.0	67.0
with children under 6	27.0	40.0
Persons under 18 living with both parents	85.0	69.0
Female-headed families	11.0	18.0
with children under 18	55.0	66.0
with children under 6	21.0	32.0
Families with 3 or more own children under 18	20.0	33.0
Families with 5 or more persons	25.0	41.0

SOURCE

U.S. Department of Health, Education, and Welfare. 1974. A Study of Selected Socio-economic Characteristics of Ethnic Minorities Based on the 1970 Census. Volume III: American Indians. Washington, D.C.

Table 2.10-141

1970 MARITAL STATUS OF CHIPPEWA AND POTAWATOMI TRIBES

	<u>Percent</u> ^a	
	<u>Chippewa</u>	<u>Potawatomi</u>
Male 14 years old and over		
single	39.0	44.0
married, wife present	48.0	47.0
separated	3.0	1.0
married, wife absent	2.0	2.0
widowed	3.0	4.0
divorced	3.0	2.0
Female 14 years old and over		
single	30.0	27.0
married, husband present	49.0	52.0
separated	5.0	2.0
married, husband absent	3.0	1.0
widowed	8.0	11.0
divorced	5.0	6.0

NOTE

^a Do not add to 100 percent due to rounding.

SOURCE

U.S. Department of Commerce, Bureau of the Census. 1973. 1970 Census of Population: American Indians. Washington, D.C.: U.S. Government Printing Office.

household, while 52 percent of Potawatomi females were married with their husbands present. This compares to 62 and 58 percent for males and females in the state as a whole (U.S. Department of Commerce, Bureau of the Census, 1973).

Divorce. Very small percentages of the Chippewa and Potawatomi populations are divorced (Table 2.10-141).

Births. Table 2.10-129 indicates that Native Americans of the Northern Great Lakes area had a three-year average birth rate of 31.3 per 1,000 for 1974 to 1976. This compares to 14.2 for the state as a whole (subsection 2.10.6). Table 2.10-130 shows that a large percentage of Forest County Potawatomi and Mole Lake Sokaogon Chippewa births are to mothers between the ages of 15 to 19 years old.

Illness. Diseases common to children are prevalent in the population due to a disproportionate number of children in the population (Table 2.10-142). Though most of these diseases do not lead to death, deafness resulting from otitis media and blindness resulting from trachoma seriously inhibit the ability of many Native American individuals to learn and work (U.S. Department of Health, Education and Welfare, 1974).

Table 2.10-142

NUMBER OF CASES AND INCIDENCE RATES FOR LEADING NOTIFIABLE
DISEASES AMONG INDIANS AND ALASKA NATIVES IN THE SERVICE
RESERVATIONS, SELECTED CALENDAR YEARS 1962-1971
(Rates Per 100,000 Population)

	<u>1971</u>	<u>1969</u>	<u>1967</u>	<u>1965</u>	<u>1962</u>
Otitis Media	10,724.2	8,892.3	7,118.8	6,170.3	3,801.7
Strep Throat, Scarlet Fever	6,443.0	4,524.4	2,815.1	2,028.1	1,132.4
Gastroenteritis	6,050.1	6,736.5	5,388.7	5,457.0	4,545.5
Influenza	3,418.1	1,958.3	897.8	996.5	1,025.6
Pneumonia	2,997.0	3,033.2	3,130.4	3,690.3	2,867.3
Gonococcal Infection	1,644.7	1,026.6	751.7	777.4	756.8
Trachoma	615.8	765.6	858.2	1,290.9	930.4
Chicken Pox	490.1	392.1	459.3	509.4	448.0
Bacillary Dysentery	415.3	178.3	256.4	518.7	637.5
Mumps	288.1	244.7	357.9	308.6	173.0
Measles (Rubella)	161.7	174.9	449.1	684.3	1,323.6

SOURCE

U.S. Department of Health, Education, and Welfare. 1974. A Study of Selected Socio-Economic Characteristics of Ethnic Minorities Based on the 1970 Census Volume III: American Indians. Washington, D.C.

Deaths. Accidents have continued to be the leading cause of death among Native Americans, with rates three times those for the nation as a whole (Table 2.10-143). Death from cirrhosis of the liver and gastritis had a higher incidence among the Native American population than among the entire population. However, Native Americans showed markedly lower rates of diseases of the heart and malignant neoplasms than did the nation as a whole. Life expectancy for Native Americans is approximately six to seven years less than the 71 years for the total U.S. population (U.S. Department of Health, Education and Welfare, 1974).

Sustenance. Sustenance refers to the capability of a society to provide the food and material that is needed and desired. In modern North American society, food and materials are purchased with money earned through employment. Native Americans traditionally obtained sustenance directly from the environment through hunting and gathering activities. However, such sustenance methods required large territories and low density populations. Since white settlement of their former territories, Native Americans have existed marginally in both traditional and modern sustenance modes. Though many of the traditional skills are maintained, such as wild rice gathering and hunting, reservation lands are usually too limited to provide support. In addition, Native American people make use of modern

Table 2.10-143

CRUDE DEATH RATES FOR LEADING CAUSES OF DEATH AMONG INDIANS AND ALASKA NATIVES IN 24 RESERVATIONS AND STATES, AND U.S. TOTAL POPULATION, CALENDAR YEARS 1955, 1967, AND 1971.
(Rates Per 1,000 Population)

<u>Cause of Death</u>	<u>Indian</u> <u>1971</u>	<u>U.S.</u> <u>1971</u>	<u>Indian</u> <u>1967</u>	<u>U.S.</u> <u>1967</u>	<u>Indian</u> <u>1955</u>	<u>U.S.</u> <u>1955</u>
All Causes	771.7	929.0	863.8	935.7	927.2	930.4
Accidents	157.1	53.8	180.9	57.2	155.6	56.9
Diseases of the Heart	142.0	358.4	140.0	364.5	133.8	356.5
Malignant Neoplasms	62.5	160.9	70.9	157.2	59.1	146.5
Influenza and pneumonia (excluding newborn)	38.6	27.2	53.5	28.8	89.8	27.1
Certain diseases of early infancy	29.6	19.2	49.4	24.4	67.6	39.0
Vascular lesions affecting CNS	42.8	100.6	48.8	102.2	46.4	106.0
Cirrhosis of the liver	45.6	15.5	38.9	14.1	14.2	10.2
Homicide	20.6	8.5	19.9	6.8	15.9	4.5
Diabetes mellitus	23.0	18.2	19.4	17.7	13.9	15.5
Suicide	18.7	11.1	17.0	10.8	8.7	10.2
Tuberculosis, all forms	7.8	2.1	16.3	3.5	55.1	9.1
Gastritis, etc.	4.4	1.1	14.5	3.8	36.0	4.7
Congenital malformations	10.9	7.5	13.2	8.8	19.0	12.5
All other causes	168.1	144.9	181.2	136.0	212.1	131.8

SOURCE

U.S. Department of Health, Education, and Welfare. 1974. A Study of Selected Socio-Economic Characteristics of Ethnic Minorities Based on the 1970 Census. Volume III: American Indians. Washington, D.C.

conveniences such as automobiles, that can be supported only with money.

Though traditional sustenance patterns are no longer feasible, Native Americans have not participated fully in the modern economy of North America. Reservations are not located near large centers of employment, and traditional culture does not easily fit into industrialized work patterns. Thus, it is not surprising that 36.8 percent of the Forest County Potawatomi and 40.5 percent of the Mole Lake Sokaogon Chippewa people who were employed in 1980 earned less than \$5,000 (Tables 2.10-133 and 2.10-134).

A major element of sustenance is transportation. In traditional times, Native Americans in northern Wisconsin were able to function using the available transportation modes of walking, canoeing, and snowshoeing. However, to function fully in the modern economy, one must rely either on individual motorized transportation or on public transportation. Since no regularly scheduled public transportation serves either reservation, individuals living on those reservations must rely totally on private vehicles for transportation. However, as indicated in Table 2.10-144, 29.8 percent of Wisconsin Native American households did not have access to an automobile in 1970. Both reservations are located significant distances from employment centers, and the cost of operating private vehicles is substantial--in the range of \$0.22 to \$0.45 per mile (Changing

Table 2.10-144

POPULATION CHARACTERISTICS
 TOTAL U.S. POPULATION, U.S. INDIAN POPULATION, IHS SERVICE POPULATION
 AND INDIANS LIVING IN MICHIGAN, MINNESOTA AND WISCONSIN, 1970

	<u>Total U.S. Population</u>	<u>U.S. Indian Population</u>	<u>IHS Service Population</u>	<u>Michigan Indians</u>	<u>Minnesota Indians</u>	<u>Wisconsin Indians</u>
Median age of population	28.1	20.4	18.6	23.5	17.2	18.5
Average number of persons per family	3.6	4.5	4.8	4.1	4.6	4.7
Percent enrolled in school (3-34 years old)	54.3	52.9	56.4	52.4	55.1	57.6
Median school years completed	12.1	9.8	8.2	10.0	10.1	9.9
Percent high school graduates	52.3	33.3	29.2	30.4	32.5	28.3
Percent college graduates (25+)	10.7	3.8	2.5	4.7	2.0	1.1
Median family income	\$9,590	\$5,832	\$4,885	\$7,955	\$5,391	\$6,506
Percent of all persons under poverty level	13.7	38.3	55.3	22.9	37.6	31.6
Percent of all families under poverty level	10.7	33.3	42.7	17.7	34.8	28.5
Percent in labor force						
Male, 16 years and over	76.6	63.4	55.8	72.0	61.6	63.9
Female, 16 years and over	41.4	35.3	31.1	43.3	36.0	37.5
Percent of civilian labor force unemployed						
Male, 16 years and over	3.9	11.6	14.6	13.9	17.0	15.9
Female, 16 years and over	5.2	10.2	10.9	13.2	11.2	9.7
Median persons income						
Male, 16 years and over	\$7,609	\$3,509	\$2,834	\$5,000	\$3,486	\$3,952
Female, 16 years and over	\$3,649	\$1,697	\$1,494	\$1,995	\$1,829	\$1,688
Percent household occupied by owner	62.9	49.8	62.9	54.0	43.1	42.6
Median number of rooms	5.0	4.2	4.4	4.9	4.4	4.6
Median persons per unit (owner occupied units)	3.0	3.6	4.2	3.5	4.1	4.0
Percent structures built 30 years ago	40.6	40.6	39.6	55.6	57.2	63.6
Percent complete bathroom	92.5	72.0	61.1	83.3	70.9	73.2
Percent no automobile available	17.5	29.5	33.8	24.3	37.7	29.8
Median value household unit	\$17,100	\$9,000	\$5,953	\$11,800	\$9,400	\$8,600
Median contract rent	\$ 89	\$ 73	\$ 74	\$ 83	\$ 80	\$ 70

SOURCE

Indian Health Service. July, 1978. Bemidji Program Area Review. Office of Program Statistics, Division of Resource Coordination.

Times, 1980). Thus, transportation costs are a major burden to reservation residents. These transportation costs make access to work and schooling difficult (La Rock, personal communication).

Public Order and Safety. Public order and safety refer to the potential of members of a society not to be unduly fearful for their personal safety and the protection of their property. Order and safety are maintained by informal and formal means of social control. Informal means of social control include the control over individual behavior exercised by the family and community leaders. Informal social control is extremely important in small, isolated societies such as the Forest County Potawatomi and the Mole Lake Sokaogon Chippewa. There are no data to measure the extent and effect of this type of social control.

Formal social control refers to that exercised by the society through formal institutions such as law enforcement agencies and courts. Neither the Forest County Potawatomi nor the Mole Lake Sokaogon Chippewa have their own law enforcement agencies or courts. Both reservations come under the jurisdiction of the Forest County Sheriff's Department and local courts.

Schooling. Native Americans in rural Wisconsin tend to have smaller percentages of older students enrolled in school

than does the U.S. population as a whole (Table 2.10-145). In addition, far smaller percentages of the Chippewa and Potawatomi Tribes have completed high school and college than the total U.S. population (Table 2.10-146). These data reflect the experience of the Forest County Potawatomi and Mole Lake Sokaogon Chippewa (Thunder, personal communication, 1980). Schooling involves much more than skills training, and deals with factors such as language, dress, values, and norms central to the culture. Thus, it is difficult for cultures as different as the Native American and white American to develop an educational program acceptable and workable for both societies.

Since local public schools are financed and operated by the dominant white society, it is little surprise that Native Americans do not "fit" well into the programs. However, it is the very set of norms and values taught in white-dominated schools that would enable Native Americans to compete successfully in the dominant economy of the country. The fact remains, however, that to adopt those norms and values would mean giving up many unique Native American characteristics.

Qualitative Analysis of Sociocultural Characteristics. A large body of literature exists on the unique characteristics of the northern Chippewa and Potawatomi (Dunning, 1959a and b; Barnouw, 1961; Hickerson, 1971; Ritzenthaler, 1978). This report does not attempt to summarize that body of literature or to

Table 2.10-145

SCHOOL ENROLLMENT WISCONSIN RURAL NATIVE AMERICANS, 1970

<u>Age</u>	<u>Percent Wisconsin Indians Enrolled</u>	<u>Percent Total U.S. Population Enrolled</u>
3 and 4 years old	24.1	13.0
5 and 6 years old	80.1	
7 to 13 years old	95.7	
14 to 17 years old		
Male	83.5	93.0
Female	92.4	92.0
18 to 24 years old		
Male	23.6	37.0
Female	15.5	27.0
25 to 34 years old	2.3	

SOURCE

U.S. Department of Commerce, Bureau of the Census. 1973. 1970 Census of Population: American Indians. Washington, D.C.: U.S. Government Printing Office.

Table 2.10-146

YEARS OF SCHOOL COMPLETED OF CHIPPEWA AND POTAWATOMI TRIBES
1970

	<u>Percent</u>		<u>U.S. Total</u>
	<u>Chippewa</u>	<u>Potawatomi</u>	
Males 25 to 34 years old			
Percent completed through			
Elementary			
Less than 5 years	1.0	2.0	
5 to 7 years	8.0	3.0	
8 years	12.0	12.0	11.0
High School			
1 to 3 years	33.0	36.0	
4 years	32.0	36.0	72.0
College			
1 to 3 years	8.0	11.0	
4 years or more	5.0	0	19.0
Females 25 to 34 years old			
Percent completed through			
Elementary			
Less than 5 years	2.0	2.0	
5 to 7 years	5.0	6.0	
8 years	10.0	10.0	10.0
High School			
1 to 3 years	36.0	22.0	
4 years	35.0	44.0	71.0
College			
1 to 3 years	8.0	10.0	
4 years or more	2.0	6.0	12.0

SOURCE

U.S. Department of Commerce, Bureau of the Census. 1973. 1970 Census of Population: American Indians. Washington, D.C.: U.S. Government Printing Office.

provide a standard "anthropological" analysis of the two tribes. Instead, this subsection focuses on two factors--the characteristics of small minority populations, and the characteristics of societies with a traditional-modern dichotomy.

The Forest County Potawatomi and Mole Lake Sokaogon Chippewa comprise less than 4 percent of the population of Forest County. More importantly, they existed until the mid-1930's with no place designated for them. Since that time, the tribes have been economically marginal, and have had little local political power. In addition, the tribal cultures are markedly different from that of the surrounding society. Thus, both tribes have existed as true social minorities (Wallace, 1969).

A social minority is never completely isolated from the dominant society. Also, because the dominant society is in fact dominant, minority societies are faced with many challenges to their basic sociocultural characteristics (Rushing, 1972). Thus, the Native Americans of Forest County have lived in a situation in which their own cultural ways no longer "worked" as they had in the past, and were challenged by example from the dominant society.

One possible effect of such sociocultural dominance is that the minority society becomes absorbed by the dominant society--that is, it becomes "assimilated." However, assimilation implies that the minority society takes on the major characteristics of the larger society, and loses the major characteristics of its traditional culture.

Whether a society becomes assimilated or not involves an extremely complex set of factors and is not well understood. As observed by Lurie (1971):

"The point is often raised that Indians have not become assimilated because of special legislation, the reservation system usually being blamed for having isolated Indians and hampered the exercise of a free option to become assimilated. Unquestionably, reservation conditions must be taken into analytical account. However, Indian people consistently seek and use special legislation and statutory definitions to protect their lands. . ."

The current status of the Forest County Potawatomi and Mole Lake Sokaogon Chippewa is that they exist between the traditional Native American world and the modern white-European world, but do not fit clearly into either. Again, Lurie (1971) comments on this dichotomy:

"Modern Indian society derives directly and very recently from an antecedent condition of what can be broadly termed tribalism. This society under present conditions retains features that seem disharmonic and undesirable to the larger society, derived as it is from largely European traditions in a phase of transition from peasant to urban. Humankind has been tribal far longer than it has been peasant or urban, and the recently tribal peoples such as American Indians seem to be arguing that they have held fast to still valuable and adaptable social and cultural assets that others have lost in their more rapid pace toward technological improvements."

Hickerson (1971) brings this dichotomy into an economic perspective:

"By and large in areas where there is no work to be had in farming or mining, industrial and commercial development is needed because old subsistence bases, including the technology to exploit resources, play only a minor role in the economy. . . The wild rice

harvest, an activity saturated with nostalgia, provides a very enjoyable social occasion for many Chippewa, many of whom return to the reservation from towns and cities for the event. However, the wild rice is sold to processors, and very little is kept for domestic use. The proceeds from the harvest are used to pay debts, and to buy school clothing and for other immediate needs."

Summary of Sociocultural Characteristics. The objective social indicators show that the Forest County Potawatomi and Mole Lake Sokaogon Chippewa are much poorer in material possessions and opportunities than Americans in general. This poverty is accompanied by higher rates of illness and shorter life spans. Employment and training opportunities in the past have not facilitated the tribes' participation in the dominant economy without migration to urban areas. However, the traditional economy has not been able to provide money to support many desirable aspects of the dominant society. Thus, the people are marginal participants in two worlds.

2.10.8 FINDINGS AND CONCLUSIONS

In discussing the proposed Crandon Project, there has been an occasional reference to the potential of such projects to create "boomtowns," straining public services and social structures in northern Wisconsin in a manner similar to that experienced in the Rocky Mountain states. Later reports in the socioeconomic assessment will examine the potential impacts of the proposed Crandon Project on the local study area. However,

if there was substantial probability of boomtown effects, we should see current conditions in the local study area similar to the predevelopment conditions in the Rocky Mountain area. Having examined the rather massive amount of data in the body of this report, we can now say that current conditions in the local study area are very unlike the predevelopment conditions which resulted in boomtowns.

The local study area has a diverse and well established economic base. It has a mature labor market, a variety of skilled trades represented, and a substantial labor surplus. This is in marked contrast to the simple ranching economies in sparsely settled western areas. These are important differences in predevelopment conditions which will affect the percent of the work force which can be hired locally for any development in the local study area.

The local study area has a well developed system of public facilities and services which, in the opinion of a majority of permanent residents, are considered good or very good. Shortages in water or wastewater treatment capacity are limited to a few cities or towns. There is an abundance of land where good quality well water is economically available and where septic tanks can be used. The local study area's school facilities have sufficient capacity to accommodate additional students. Again, this is in marked contrast to conditions in the western states. There, ground conditions do not allow new housing to be developed

using well/septic systems. This requires heavy investment in centralized systems which often cannot be justified for temporary labor forces. Water and wastewater treatment facilities might determine where development is located in the local study area but it is not a binding constraint on the local study area's ability to accommodate new population.

The local study area has a well-established home construction sector which combines local contractors with major housing manufacturing corporations located within a 100-mile radius. This building capacity, coupled with an abundance of land suitable for development, creates a substantial reserve capacity for housing construction within the local study area. Subdivision ordinances requiring the developer to provide public facilities charges new home buyers for the cost of new streets and utility connections so that new population does not create a public financial burden. Unlike the western states, mobile homes are well regulated throughout the local study area and are not likely to create the usual problems experienced in the western areas.

From a sociocultural standpoint, the local study area has a decade of experience in absorbing immigration from southern Wisconsin and other midwestern states. Further, the population of the local study area is sufficiently large that new population should not disturb a sense of community. We are dealing with a social system which has over 50,000 members (1979 population).

This is very different than Gillette, Wyoming with a predevelopment population of 7,763 (in 1970) or Rock Springs, Wyoming with a predevelopment population of 11,657 (in 1970).

The local study area contains two Native American communities that present a contrast to the local study area in general. Unemployment rates are high on the reservations, and various government-supported efforts at economic development have not alleviated the problem. On the other hand, the communities have made efforts to adapt to the dominant society and economy, as shown by the success of the annual Blue Grass Festival sponsored by the Mole Lake Sokaogon Chippewa.

Because the two Native American communities are marginal economically, they are vulnerable to changes in the local economy and national policy. The ultimate effect of local economic development on the Native American communities depends largely on the policies and actions of the leaders of those communities.

For all these reasons, we feel justified in concluding that current conditions in the local study area indicate a substantial ability to absorb additional population without undue stress on physical or social resources. We also find that there is a generally held view that economic development which does not harm the environment and provides jobs for current residents rather than a large number of immigrants is desirable and will improve the quality of life in the local study area.

2.10.9 Methodology

The principal source of the data presented in this section is government reports from various Federal, State, and local agencies. For the most part, the data gathering methods were straight forward since much of the data were available from the government agencies either in published or unpublished forms. In instances where the data were not directly available from secondary sources, the methods used for data collection are described either in this section or in the previously released methodology reports listed below. The reader should consult those sources for additional detail.

- Native American Analysis Methodology
- Sociocultural Analysis Methodology
- Fiscal Analysis Methodology
- Demographic Analysis Methodology
- Public Facilities and Services Analysis Methodology
- Housing and Land Use Analysis Methodology
- Economic Analysis Methodology
- Survey Research Methodology

Since the structure of the local study area does not conform to county boundaries, it was necessary to collect data at the subcounty level. As discussed on page 2.10-6, data were collected at the township and city level if available. When subcounty data were not available, county data were distributed to the local study area level as appropriate. In certain cases this was not practical, thus data are presented only at the county level.

In addition to existing data sources, primary data were also collected to aid in the Study. Surveys were conducted of three different groups of people: permanent residents, seasonal residents, and tourists. The surveys were conducted in order to gather information about the demographic characteristics, attitudes, and behavior of the groups of people most likely

to be affected and to affect the proposed mine/mill complex. The methodology utilized in the surveys is discussed in detail in the previously released methodology paper. In addition to the survey of households, a survey of local employers was conducted in order to gather data for the Input-Output model. Primary data were also collected for other components of the Study, primarily for the public facilities and services analysis, through contacts with local officials and business leaders.

Finally, it should be noted that every effort has been made in this Study to utilize the most current data available at the time the Study was being conducted. As a result, some of the data presented in this section have been updated with 1980 census and other data which were released following the completion of this baseline report. The more recent data are being utilized in the impact analysis.