Definition of the local study area : socioeconomic assessment, Exxon Crandon Project. 1980

Austin, Texas: RPC, Inc., 1980

EXXON MINERALS COMPANY

CRANDON PROJECT

SOCIOECONOMIC STUDY

prepared by RPC, Inc.

DEFINITION OF THE LOCAL STUDY AREA

SOCIOECONOMIC ASSESSMENT

EXXON CRANDON PROJECT

prepared for
Exxon Minerals Company

by
RPC, Inc.
Austin, Texas
Madison, Wisconsin

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September 1980

FOREWORD

This paper describes the manner in which we arrived at a definition of the local study area for Exxon's proposed Crandon Project. The local study area is the area reasonably expected to be most affected by the project. The mode of presenting the results is 18 maps with accompanying narrative.

We will appreciate any comments you may have on this report. You may direct comments and suggestions to any of the following:

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SUMMARY

As part of the planning for a proposed mine/mill complex near Crandon, Wisconsin, Exxon Minerals Company has contracted for assessment of potential socioeconomic effects of the project. This assessment will consist of a general analysis of potential effects on Wisconsin and a detailed analysis of potential effects on the area and people near the proposed project. We refer to the area for the detailed analysis as the "local study area" in this and other reports. The primary objective of this report is to define the local study area--the area reasonably expected to be most affected by the proposed project.

This report is only a part of the entire socioeconomic assessment. The overall assessment covers the following topics: study plan, demographic analysis, economic analysis, housing analysis, public facilities and services analysis, fiscal analysis, sociocultural analysis, Native American communities analysis.

We will publish the results of each of these studies in a series of reports. The reports will be used to prepare and support the environmental impact report on the project.

The objective of this report is to define the local study area. We accomplish this objective through an analysis of housing supply and demand factors. The data for this analysis are presented in 18 maps which are listed in the Table of Contents. We began our analysis with maps covering an area substantially larger than the local study area. However, all the maps in this report show only the local study area. This simplifies map reproduction.

The township is the smallest area for which data are collected. In order to make use of existing public data, township boundaries must be used. Therefore we can define the local study area as the group of townships reasonably expected to be most affected by the mining activity. We used the following criteria for including townships in the local study area:

1. The township is where substantial numbers of new residents attracted by the project may locate.

2. The township is where substantial numbers of new residents employed in a retail trade center that serves the project population may locate.

3. The township is the location of an existing industry that may be substantially affected by the Crandon Project.

The selection of townships for inclusion based on the first two criteria requires an estimate of the total housing demand generated by the project, an estimate of locational preferences based on driving time to the project site and to major retail centers, and an estimate of the land available within the area of demand to accommodate residential development. The maximum demand can be accommodated within the area we have defined based on criteria 1 and 2. We included two additional townships based on criterion 3. This group of townships, shown on Map 18, is the local study area.

The local study area includes 40 townships in 3 counties and covers 2,500 square miles. Not every effect of the project will occur in the local study area. However, it is the area where most effects of the project are likely to occur. Potential effects occurring outside the local study area defined for this assessment will not be extensive enough to warrant detailed analysis.

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1. PURPOSE OF THIS REPORT

This report presents the second step in the socioeconomic assessment of Exxon's Crandon Project (RPC, 1979). (The first step was preparation of a study plan already distributed to the public.) The purpose of this report is to define the local study area. This local study area is the area within which we are performing an intense socioeconomic assessment to satisfy both planning and regulatory needs. Outside the local study area, we will limit the assessment to the economic and fiscal effects of the Crandon Project on the state as a whole.

We used interviews and field investigations to produce a series of maps that provide much of the data for this paper. Besides supporting this analysis, these maps should serve as a useful planning tool.

There are two reasons why it is important to accurately define a local study area. One is to address the requirements of Wisconsin law. Section NR 132.10 (1)(e) Wis. Adm. Code directs the Department of Natural Resources to deny a mining permit if it finds that "the proposed mine will result in a net substantial adverse economic impact in the area reasonably expected to be most impacted by the mining activity." It is necessary for Exxon as an applicant for a mining permit to satisfy the Department of Natural Resources that no such adverse effect will occur. To do this, it must define an area acceptable to the Department of Natural Resources as that which is expected to be most affected.

Additionally, Section 1.11, Wisconsin Statutes, requires that all state agencies include for all major actions significantly affecting the quality of the human environment, a detailed analysis of the environmental effects of the proposed action. The Department of Natural Resources has informed Exxon that such a detailed analysis--i.e., an Environmental Impact Statement (EIS)--will be prepared for the Crandon Project and that Exxon must submit to the Department an Environmental Impact Report (EIR). Definition of the area most affected is an important part of this EIR.

Another reason for defining a local study area is to facilitate the planning functions of the socioeconomic assessment. It is Exxon's intent to go beyond the normal assessment required for a permit in order to provide public and private planners with the information necessary for effective growth management. Definition of the local study area will indicate the local governments with which particularly close coordination is needed.

For purposes of the socioeconomic assessment we have defined "local study area" as the area reasonably expected to be most affected by the mining activity. In addition to areas immediately adjacent to the proposed mine, the local study area will include the areas where new residents from outside the area are expected to locate in response to new jobs made available directly by the project and by the increased economic activity generated by the project. Further, it includes areas where existing industries may compete with the project for workers.

The precise boundaries of the area reasonably expected to be most affected by the Crandon Project may not precisely follow township lines. However, it is necessary to approximate the area of effects as a group of townships since this is the smallest unit for which the demographic, economic, fiscal, and other data necessary for a thorough assessment are public and thus can be collected. The local study area for our assessment is therefore a group of townships that have been selected on the basis of three criteria:

1. The township is where substantial numbers of new residents attracted by the project may locate.

2. The township is where substantial numbers of new residents employed in a retail trade center that serves the project population may locate.

3. The township is the location of an existing industry that may be significantly affected by the Crandon Project.

These criteria are based on the fact that most of the effects associated with major resource developments come from the population increases that result from new employment generated directly and indirectly by the project. The townships in which these increases occur are those where new residents choose to make their homes. Thus, the determination of the local study area is properly a matter of housing location analysis.

This approach does not assume that the project will not affect existing residents of the area. However, most of the effects on existing residents will be the result of their proximity to the project itself or their proximity to new residents. Thus, it is the location of the new residents rather than the location of existing residents who may be employed that determines the local study area.

For instance, it is possible that some persons who work at the site during the construction phase may come from as far away as Green Bay or Wausau. While these individuals may generate effects as commuters, and may slightly stimulate the economy of their areas by having more money to spend, their employment at the project will not substantially affect Green Bay or Wausau. Their employment at the project does not cause them to generate any increased demand for public services, nor does it necessarily change their demand for housing in their home community. Thus, the townships in which they are located are not included in the local study area.

We selected townships for inclusion in the local study area through a housing market analysis, which examines a series of supply and demand factors to determine the maximum area where new residents attracted by employment at the mine are likely to locate, and to determine which major retail trade centers in the region will be affected. The method chosen approximates the considerations that would guide private developers to invest in subdivisions in certain areas. It is, after all, private developers who will decide where housing will be developed.

Much of our analysis is presented in the 18 maps. We began our analysis with an area substantially larger than the local study area. However, all the maps in this report cover only the local study area, thus simplifying map reproduction.

2. DEFINITION OF THE LOCAL STUDY AREA

Construction and operation of the proposed Crandon Project will generate many new jobs. Some of these jobs will be at the project; others will be generated by the economic effects the project has on other area businesses. These jobs will be filled by some combination of existing residents, commuters, and new residents. Existing residents are those persons who already live in the area. Commuters are those persons who during the construction or operation phase work at the project site, but do not relocate their permanent residence to the vicinity of the project. New residents are those who relocate their permanent residence to the vicinity of the project to accept employment either there or in a trade center serving project employees.

The reason for distinguishing these categories is that commuters and new residents will create immediate demands for housing and public services that may be considered effects of the project. The townships in which commuters and new residents choose to settle will be the ones to experience the effects of the project on public services, taxes, and housing. Thus, to estimate the area in which the effects will occur, we anticipate the area in which commuters and new residents will settle. This means the central question in defining the local study area is how the housing market will respond to the anticipated new population. The

response of the housing market is, of course, the adjustment of various supply and demand forces to reach an equilibrium. To select townships for inclusion in a local study area, we examine housing supply and demand factors in some detail. We then attempt to determine the area in which a sufficient supply of housing can or could exist to satisfy the estimated demand.

HOUSING SUPPLY AND DEMAND FACTORS

For this investigation we have relied heavily on location theory that is well established in the housing and transportation literature (Sumichrast and Seldin, 1977; O'Mara, 1978). The literature indicates that the location of employment for the principal wage earner and the location of retail services are by far the most important determinants of household location. Thus, we have relied on driving time contours as strong indicators of demand for locations.

For the estimate of the amount of new housing required, we have made extreme assumptions to produce the maximum possible demand. We assume the total demand for housing will be met by new construction on two-acre lots. We also assume that all direct and indirect employment generated by the project will be filled by new residents. These assumptions do not correspond to Exxon's employment policies, and they ignore vacancies in the current housing stock. Thus, we have assumed a total demand for housing development greater than is likely to occur.

Likewise, in looking at the supply of residential locations, we have subtracted from the total land supply acreage that for a variety of

reasons might preclude residential development. We fully recognize that many of the factors used to exclude land from the supply available for residential development, such as commitment to commercial forestry, are subject to change. Also, land that appears to be available may be permanently unavailable for reasons known only to the current owners. We will refine estimates of both supply and demand by more empirical data in the housing analysis.

We cannot say that absolutely no new residents attracted by the project will seek housing beyond the boundaries of the local study area. Someone working at the project may settle in Vilas County, even though it means a long and expensive trip to work. The person may have family there or may be attracted to the area by other special circumstances. We do say that because the drive to work is so long and expensive, very few Exxon workers at the mine/mill complex moving into the area will choose to locate outside the local study area. The few that do should have no substantial effects on the communities in which they settle. Although the local study area may not cover the household location of every new resident, we believe it covers the area where almost all the new residents will settle, and where most effects will occur.

We have been careful in this preliminary analysis to avoid any speculations on the distribution of new population within the local study area. Estimates of residential distribution require detailed information that has not yet been gathered and analyzed. Answers to these interesting and important questions will be addressed later in the socioeconomic assessment.

Total Housing Demand

The commuters and new residents who move to the area for employment will determine the immediate housing demand attributable to direct and indirect employment effects of the proposed project. If all jobs were filled by existing residents who already had housing in the area, the immediate housing demand attributable to the project would be slight. If, on the other hand, most of the jobs were filled by commuters and new residents, the immediate housing demand generated by the project would be much greater. It is far too early in the socioeconomic study to make any detailed estimate of the division of jobs between existing residents and new residents to the area. Not having a detailed estimate, we must make assumptions to determine what the maximum immediate demand for housing could be. Since maximum housing demand occurs with maximum employment of persons from outside the area, we will calculate total demand assuming all jobs are filled by new migrants.

Exxon currently estimates that there will be peaks of 800 to 900 contractor construction jobs. They estimate the final number of permanent Exxon employees also to be between 800 and 900. Our preliminary calculations indicate that indirect employment may generate 600 to 700 jobs during the construction period and 1,000 to 1,200 jobs during the operation phase of the project. The maximum new employment generated is the sum of the operation employment and the indirect employment during the operation phase. This we estimate at 2,000 jobs. If we assume for the purposes of this analysis that all 2,000 jobs are filled by new residents and that there is only one wage earner per new-resident

household, then an initial housing demand of 2,000 units would be generated during the operation phase.

We should point out that Exxon has already committed itself to a policy of preference for local residents. The scenario we are defining here is for a maximum case from which we can calculate a limit.

As yet, we have no basis for estimating what the number of housing vacancies might be at the time construction or operation of the project begins. The relatively low number of vacant units currently on the market reflects the lack of speculative development due to stable economic conditions in the area and current high interest rates. For purposes of our housing demand estimate, we will assume few vacancies will exist and all housing needs must be met by new construction.

The most immediate limitation on providing these housing units will be the availability of lots suitable for building. To qualify for a building permit, a lot must also qualify for a septic permit or must be connected to city water and sewer. Interviews with local Realtors indicate that the average lot size in those areas with central sewer services is 0.3 acres. Lots using septic systems average approximately 2 acres. Thus, we can estimate the maximum demand for buildable land if we assume that all housing needs must be met through developing new single-family housing using septic systems. This would indicate a demand for 2,000 two-acre lots.

In addition to the area actually necessary for lots, development of housing will require dedication of land to off-site uses such as

streets and parking. Using Urban Land Institute guidelines (O'Mara, 1978), we estimate that the lot acreage requirement must be multiplied by a factor of 1.125 in order to calculate the total land needed for residential development. Performing this multiplication (2.0 acres x 2,000 lots x 1.125) yields a total acreage requirement of 4,500 acres necessary to accommodate the maximum population.

To reemphasize, 4,500 acres is an absolute maximum demand figure for project-related housing. This demand will be less to the degree that jobs are filled by existing residents, more than one person per household participates in the labor force, housing development is connected to central water and sewer systems and has lots smaller than two acres, or multi-family housing is built. We expect each of these factors to affect development. The purpose of this 4,500 acre estimate is as an upper boundary on land requirements for housing. It should not be taken as our estimate of new-resident employment, actual housing demand, or actual development patterns.

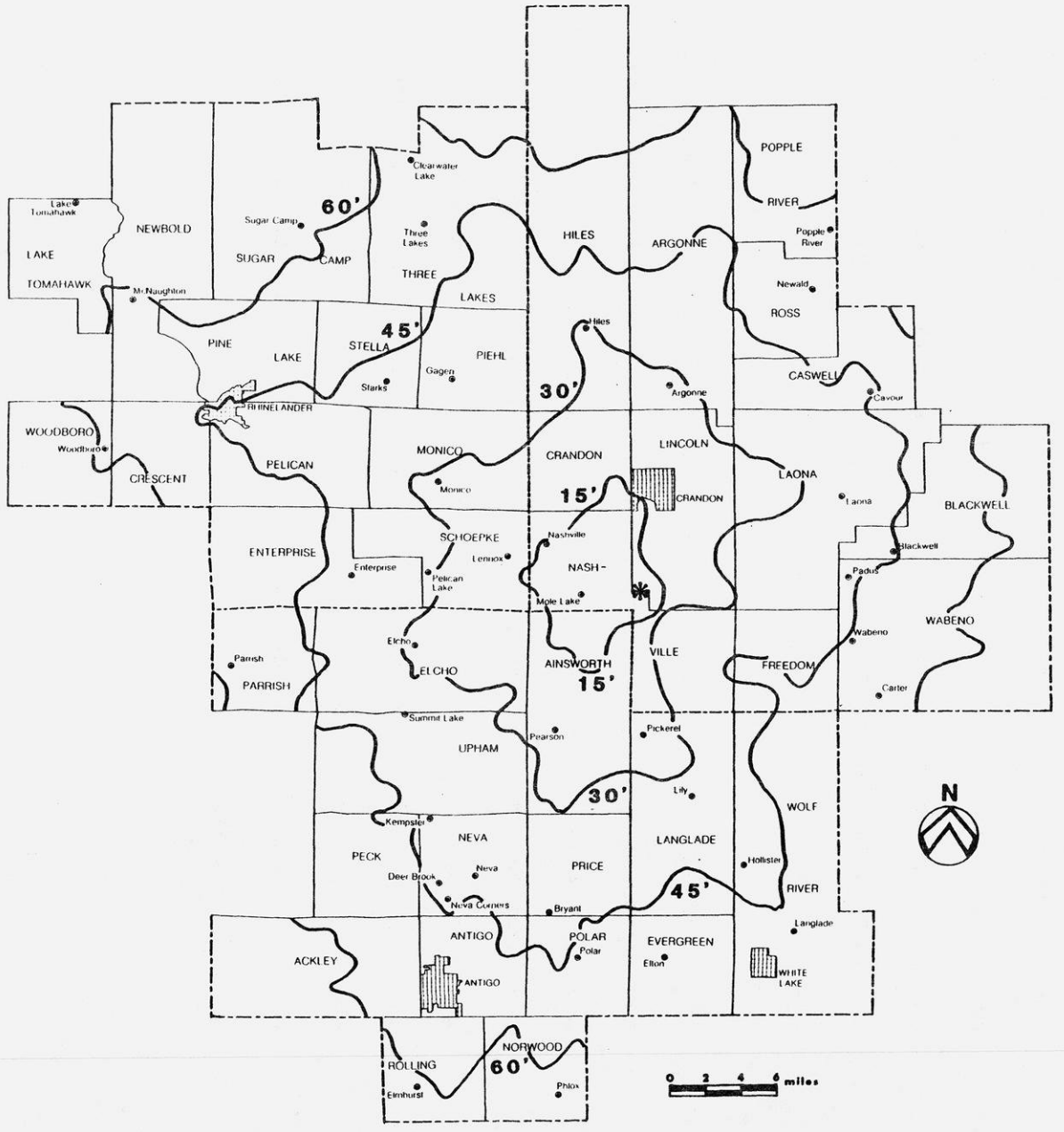
Locational Demand Factors

The locational choices of people with regard to housing vary with a number of factors. These include income, stage in family life cycle, preferences regarding driving time, and value accorded specific services or amenities. Two of the most important locational considerations for a family purchasing a home are, clearly, driving time to work and driving time to shopping. With the increasing cost of gasoline, these factors continually become more important. Less critical but still

important in the choice of a house is the school district serving that location.

Driving Time. To assess the probable locational preferences of project employees and those employed in retail trade centers serving the project population, we have prepared Maps 1, 2, and 3 showing the one-way driving time contours at intervals to and from the project site and to and from the area retail centers of Rhinelander and Antigo. Three Lakes, Crandon, and Wabeno are designated as community retail centers and thus were not included in this travel time assessment. We accumulated the data on driving times by actually driving 99 selected road segments. Half we drove more than once.

Schools. Map 4 shows the school districts serving the area and the locations of public primary and secondary, nonpublic, and post-secondary schools. Table 1 lists each school by district, type, and location. At this stage in the socioeconomic study we have found no indication that any school system is deemed unacceptable. Thus, while families may prefer one system's approach to education over that of another, there appears to be no reason to exclude an area from consideration for new housing based on the reputation of its school district.



MAP 1

DRIVING TIME TO/FROM CRANDON PROJECT SITE

- County Boundary
- Township Boundary
- Incorporated Area
- Unincorporated Village
- Crandon Project Discovery Site
- Driving Time Contours In Minutes

Note: *Contours reflect the fastest route derived from travel times.*

Source: *Driving times were derived by driving road segments.*

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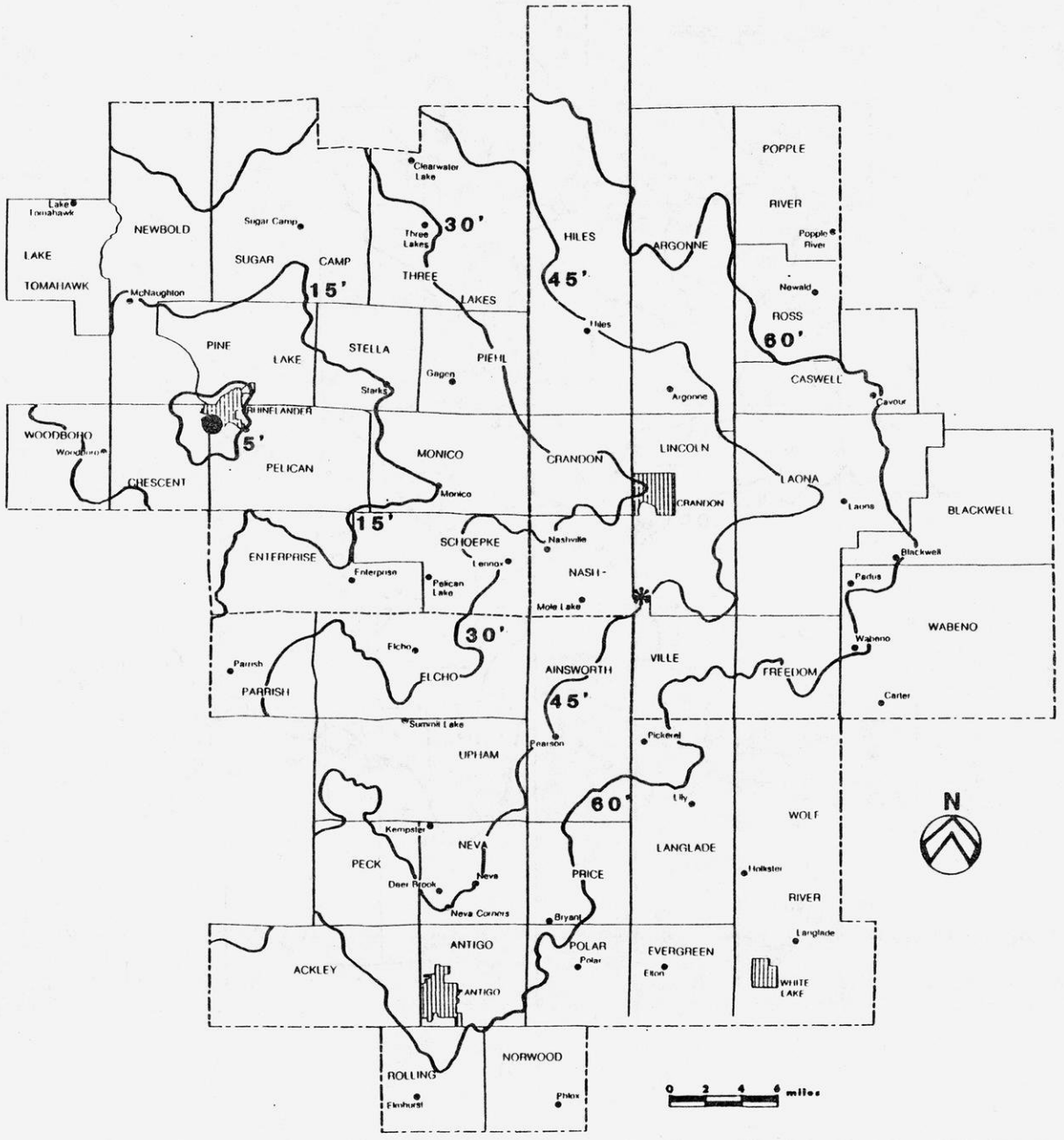

MAP 2

DRIVING TIME TO/FROM RHINELANDER

- County Boundary
- Township Boundary
- Incorporated Area
- Unincorporated Village
- Crandon Project Discovery Site
- Rhinelander
- Driving Time Contours in Minutes

Note: *Contours reflect the fastest route derived from travel times.*

Source: *Driving times were derived by driving road segments.*

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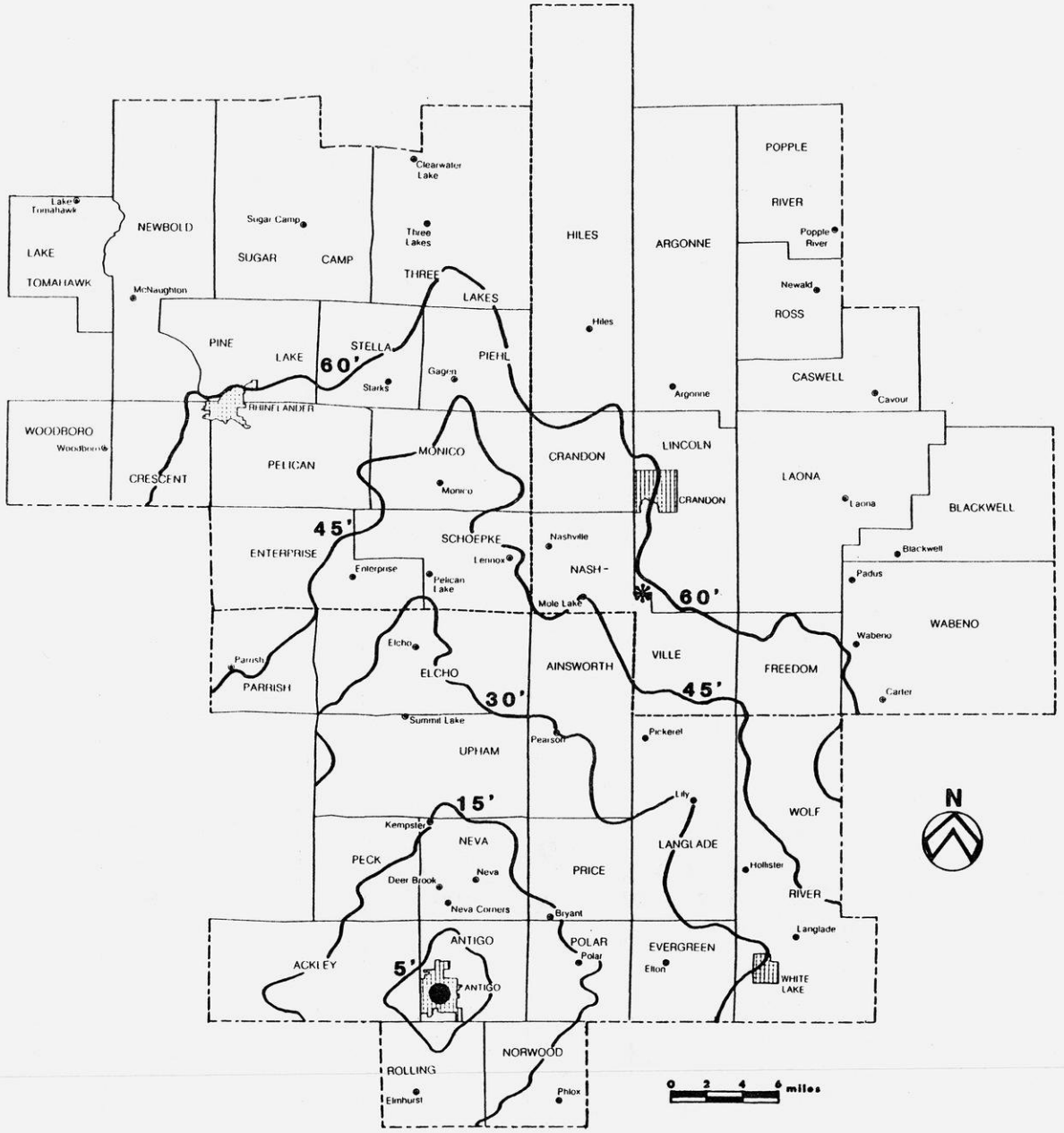

MAP 3

DRIVING TIME TO/FROM ANTIGO

- County Boundary
- Township Boundary
- Incorporated Area
- Unincorporated Village
- Candron Project Discovery Site
- Antigo
- Driving Time In Minutes

Note: *Contours reflect the fastest route derived from travel times.*

Source: *Driving times were derived by driving road segments.*

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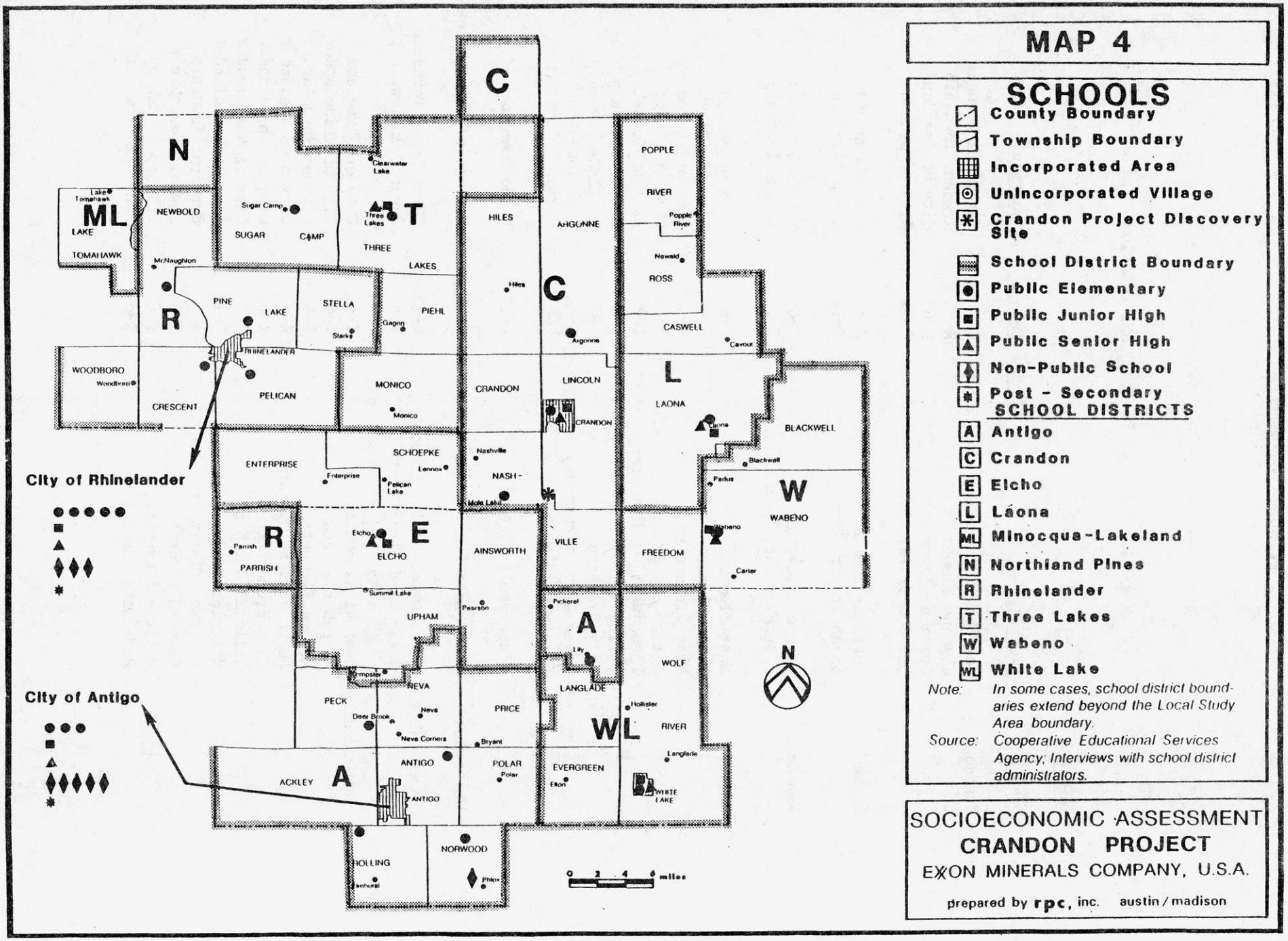
MAP 4
SCHOOLS
County Boundary
Township Boundary
Incorporated Area
Unincorporated Village
Crandon Project Discovery Site
School District Boundary
Public Elementary
Public Junior High
Public Senior High
Non-Public School
Post - Secondary
SCHOOL DISTRICTS
A Antigo
C Crandon
E Elcho
L Laona
ML Minocqua-Lakeland
N Northland Pines
R Rhinelander
T Three Lakes
W Wabeno
WL White Lake
Note: In some cases, school district boundaries extend beyond the Local Study Area boundary.
Source: Cooperative Educational Services Agency; Interviews with school district administrators.
City of Rhinelander
City of Antigo
N
0 2 4 6 miles
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Table 1

SCHOOLS, BY DISTRICT, TYPE, AND LOCATION

PUBLIC

District	Facility	Grade Levels	Location
Crandon	Mole Lake Elementary	K-7	Nashville Township
	Argonne Elementary	K-7	Argonne Township
	Crandon Elementary	K-6	City of Crandon
	Crandon Jr./Sr. High	7-12	City of Crandon
Laona	Robinson Elementary	K-6	Laona Township
	Laona Jr./Sr. High	7-12	Laona Township
Wabeno	Wabeno Elementary	K-6	Wabeno Township
	Wabeno Jr./Sr. High	7-12	Wabeno Township
Antigo	East Elementary	K-6	City of Antigo
	North Elementary	K-6	City of Antigo
	West Elementary	K-6	City of Antigo
	Antigo Jr./Sr. High	7-12	City of Antigo
	Pleasant View Elementary	1-8	Rolling Township
	Spring Valley Elementary	1-8	Antigo Township
	Lily Elementary	K-6	Langlade Township
	River Grove Elementary	K-8	Peck Township
	Crestwood Elementary	1-8	Norwood Township
Elcho	Elcho Public School	K-12	Elcho Township
White Lake	White Lake Public School	K-12	Village of White Lake
Three Lakes	Three Lakes Public School	K-12	Three Lakes Township
	Sugar Camp Elementary	K-6	Sugar Camp Township
Rhinelander	Central Elementary	K-6	City of Rhinelander
	Curran Elementary	1-6	City of Rhinelander
	McCord Elementary	1-6	City of Rhinelander
	South Park Elementary	K-6	City of Rhinelander
	West Elementary	K-6	City of Rhinelander
	Williams Jr. High	7-8	City of Rhinelander
	Rhinelander Sr. High	9-12	City of Rhinelander
	Crescent Elementary	1-6	Crescent Township
	Newbold Elementary	K-6	Newbold Township
	Pelican Elementary	K-6	Pelican Township
	Pine Lake Elementary	K-6	Pine Lake Township

Table 1 (continued)

NON-PUBLIC

Facility	Grade Levels	Location
Seventh-Day Adventist School	1-8	City of Rhinelander
Rhinelander Catholic Central	1-8	City of Rhinelander
Zion Lutheran	1-8	City of Rhinelander
Peace Lutheran	K-8	City of Antigo
Maranatha Baptist	K-12	City of Antigo
St. John's	1-8	City of Antigo
St. Mary's	1-8	City of Antigo
St. Hyacinth's	1-8	City of Antigo
St. Joseph's	1-6	Norwood Township

POST-SECONDARY

Facility	Location
Nicolet College and Technical Institute	City of Rhinelander
North Central Vocational and Technical School	City of Antigo

SOURCE: North Central Wisconsin Regional Planning Commission and school district officials.

For persons working at the mine/mill complex, the main locational demand factors will be driving time to the project and to major retail centers. The relative importance of driving time to the project site and driving time to the area retail centers will vary based on the personal preferences of each household. No attempt is made here to suggest what the statistical distribution of those preferences will be. We will explore this distribution of preferences through the study of analogous development situations, survey research, and review of the literature. This will be the partial basis for allocation of new residents within the local study area. Further, workers are likely to prefer to locate in or near some community retail center rather than be isolated from daily shopping and some sense of community.

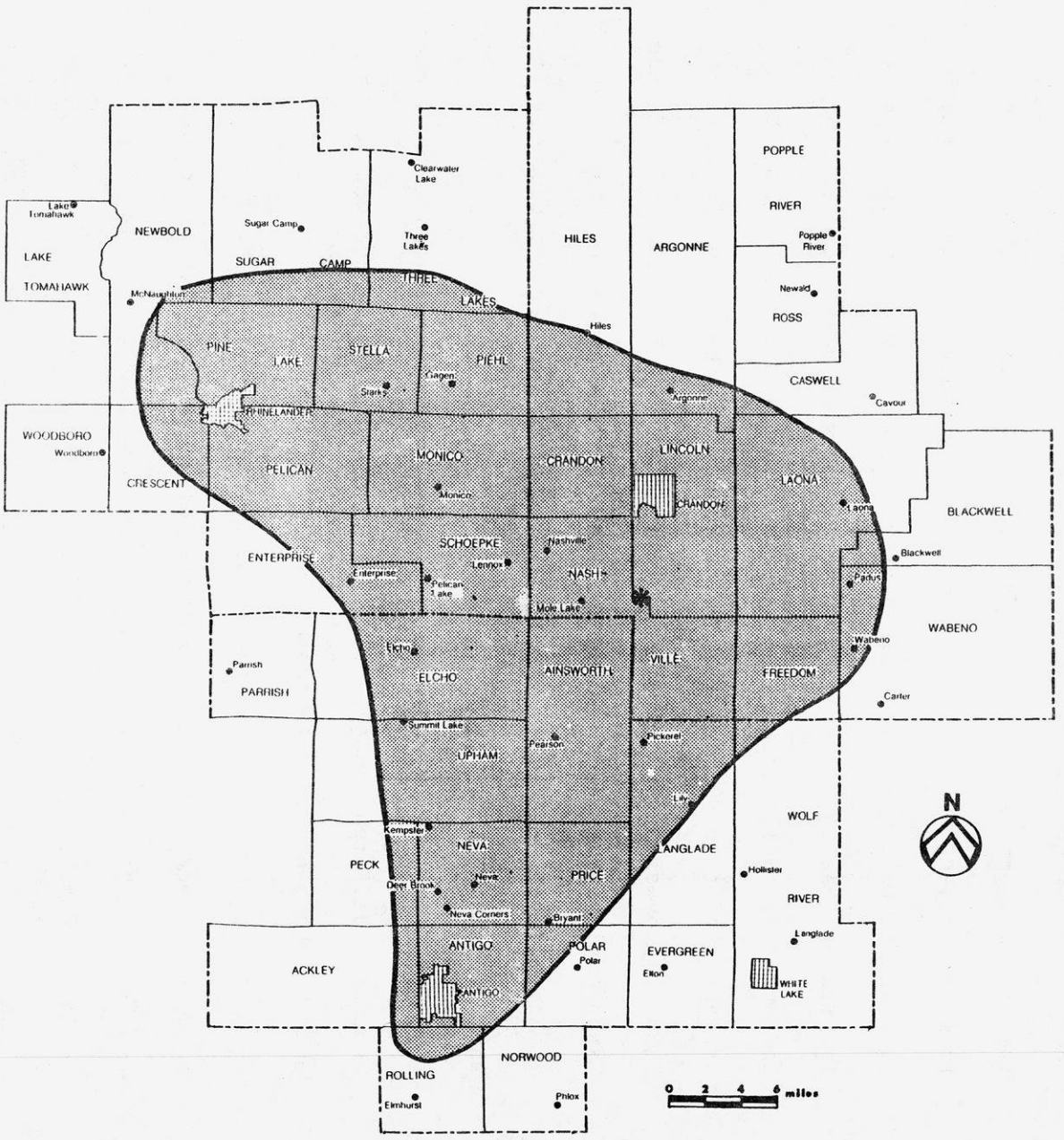
To provide a general guideline of commuting preferences, we assembled preliminary data on the characteristics of workers, particularly the work force for energy-related projects in the West (Wieland and Leistritz, 1978; Leholm et al., 1976; Wieland et al., 1979). This information indicates that the construction work force is generally more tolerant of long commutes than the operation work force. However, these studies clearly show that the majority of the work forces, both in construction and operation, will tend to live close to the site. The actual distance commuted is very clearly influenced by the distribution of population centers relative to the project site. The maximum distance commuted for operation workers in these studies is generally less than 30 miles, with less than 10 percent of the work force commuting a distance greater than 20 miles. Construction workers in these studies tended to commute

a maximum of between 40 and 60 miles. We used the 30-minute driving time contour as a general guide to the area of demand. However, this was one of several factors considered.

We believe that the demand for housing by workers at the project will be concentrated in an area approximately bounded by community retail centers near the project site, and by the area retail centers of Rhinelander and Antigo. Any location on the far side of an area trade center from the project site or on the far side of a community trade center from the project site is likely to be less attractive than one located between the two, because combined driving time to work and to shopping is greater. As the combined distance increases, demand can be expected to decrease. While both Rhinelander and Antigo are farther from the project site than 30 miles, we believe they must be included. Current Exxon employees have located in Rhinelander. If the spouse of a future Exxon employee wishes to work, he or she is most likely to find a job in Rhinelander or Antigo. Thus the area of housing demand does not follow any one driving contour. This area is shown on Map 5.

For persons working in an area retail center, the locational demand assumes a different shape. For these individuals, the commute to work and the shopping trip are approximately the same.

As a measure of existing commuting patterns in the area, we surveyed 10 employers in the Rhinelander area. Information provided by these employers, representing a total of 2,216 employees, shows that at least 70 percent of the workers reside within 10 miles of the establishment. Of the remaining workers, the largest number are commuting



MAP 5

AREA OF HOUSING DEMAND FOR CRANDON PROJECT EMPLOYEES

- County Boundary
- Township Boundary
- Incorporated Area
- Unincorporated Village
- Crandon Project Discovery Site
- Area Of Housing Demand For Crandon Project Employees

Note: *The area is determined by the location of community retail centers near the Crandon Project Site and by the area retail centers.*

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

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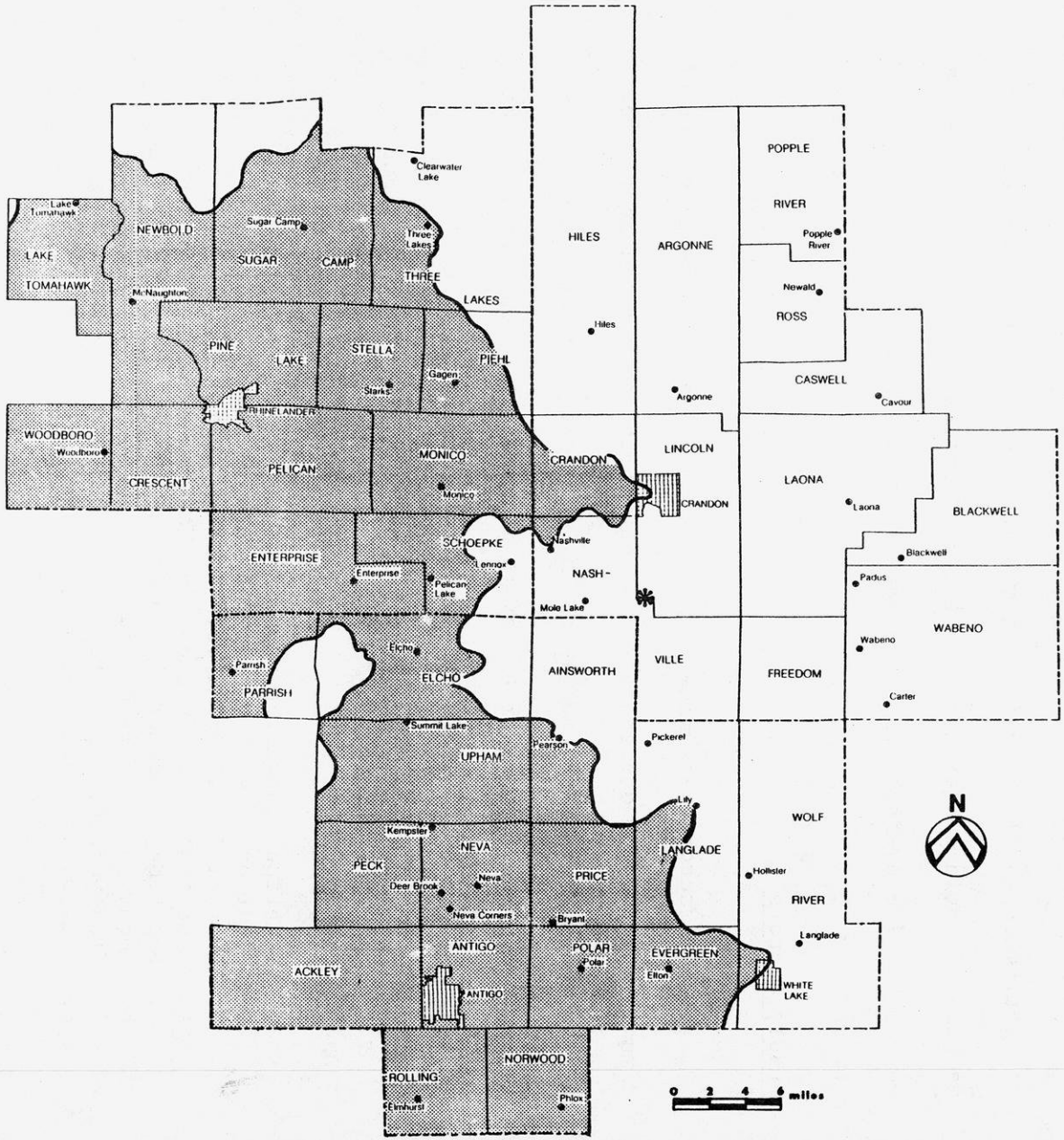
less than 20 miles, and the farthest commute is about 30 miles. Twenty miles is approximately equal to the 30-minute contour. We anticipate similar patterns for persons locating near Rhinelander and Antigo who expect to take jobs in these trade centers that are generated by the mining activity. Thus we started with the 30-minute driving contours from Rhinelander and Antigo to indicate the area of principal demand for these households. We modified the area of demand to reflect patterns of settlement and land availability. The result is a smaller area that we believe would contain most of the new residents. This area is shown on Map 6. The overall area of demand is shown on Map 7.

Supply Factors

Supply factors determine the ability of an area to satisfy housing demand. If they impose constraints that limit the acreage available for housing development, people may be forced to increase the length of their commute to work or to pay to eliminate the constraints. These factors also indicate where supply is presently available.

In this preliminary analysis we have chosen to look at eight supply factors:

1. Location of existing housing stock
2. Location of water, sewer, and gas systems
3. Suitability of soils for septic systems
4. Location of public lands and Native American lands
5. Location of commercial forest and prime agricultural lands
6. Location of surface water
7. Transportation networks
8. Homebuilding and subdivision capacity



MAP 6

AREA OF HOUSING DEMAND FOR AREA RETAIL CENTER EMPLOYEES

- County Boundary
- Township Boundary
- Incorporated Area
- Unincorporated Village
- Crandon Project Discovery Site
- Area Of Housing Demand For Area Trade Center Employees

Note: *The area is determined by the 30-minute driving time contours from Rhinelander and Antigo within the Local Study Area.*

Source: *Maps 2 & 3.*

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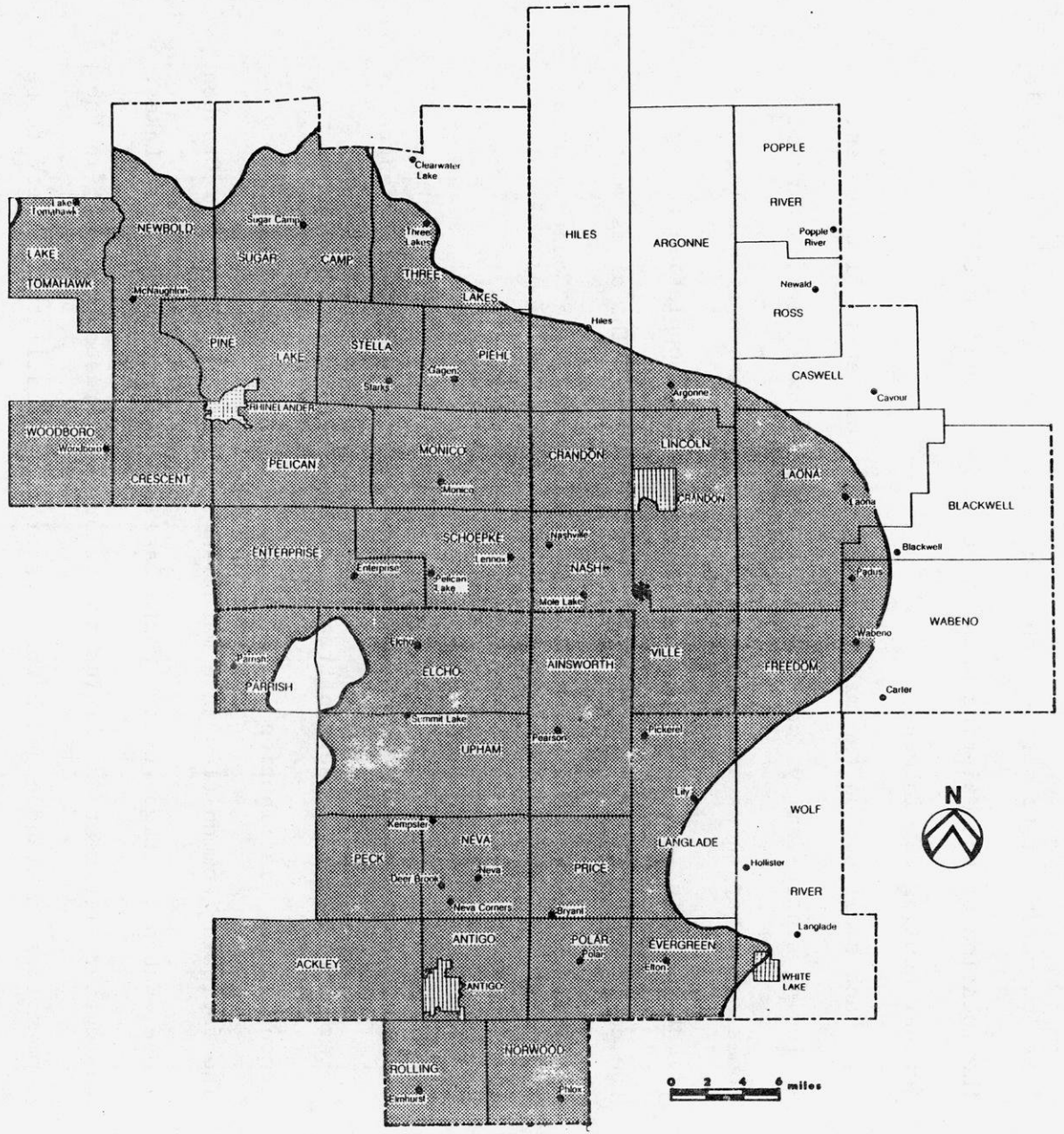

MAP 7

COMBINED AREA OF HOUSING DEMAND

- County Boundary
- Township Boundary
- Incorporated Area
- Unincorporated Village
- Crandon Project Discovery Site
- Combined Area Of Housing Demand

Note: *The overall area combines the housing demand for Crandon Project employees and area retail center employees.*

Source: *Maps 5 & 6.*

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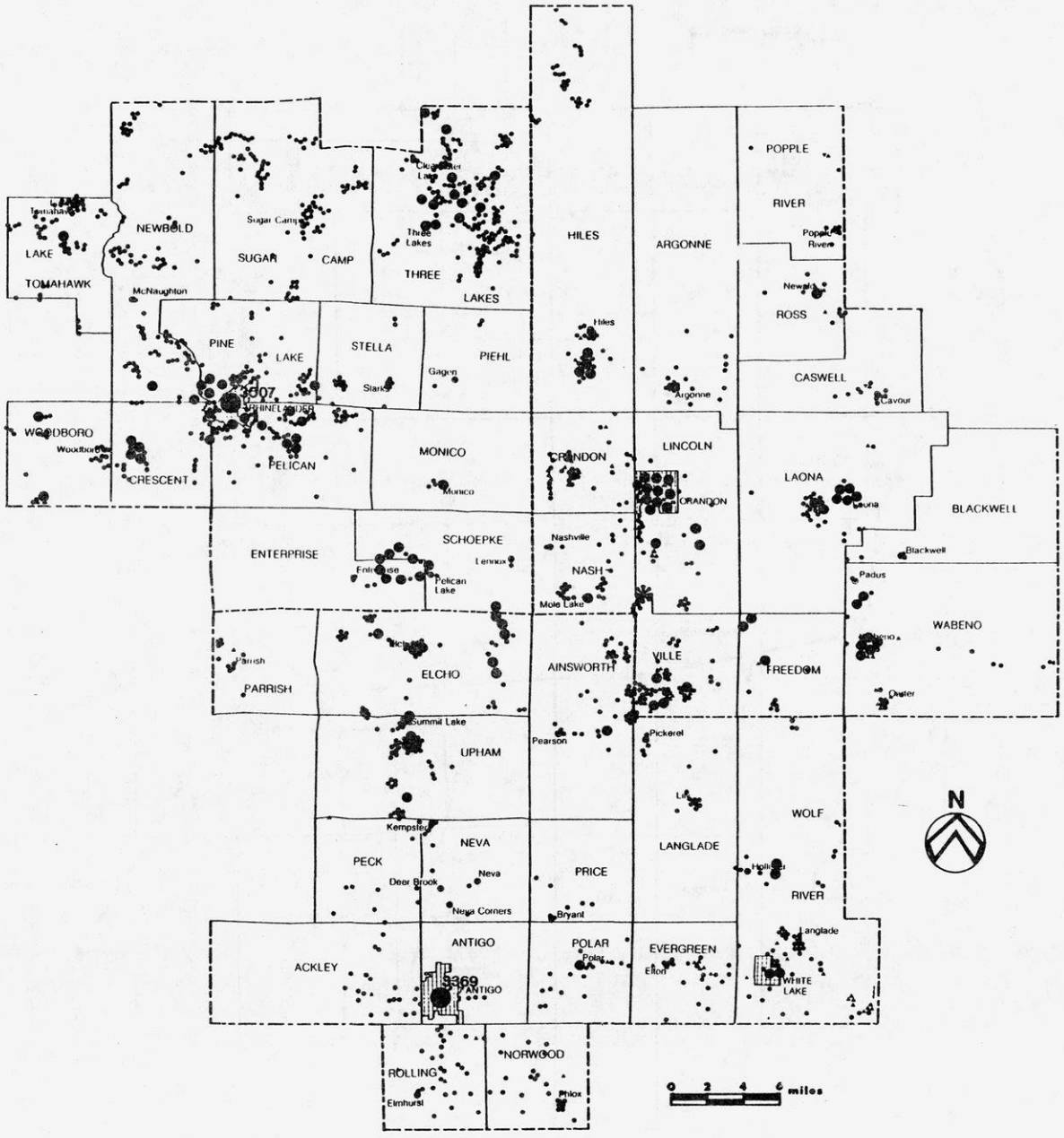
Existing Housing. Map 8 shows the location of existing permanent housing. It does not include transient housing such as resort or hotel units. Preliminary indications are that there is an extremely low vacancy rate (Wisc. Dept. of Local Affairs and Devel. Housing Infor. Syst., 1978; Wisc. Dept. of Local Affairs and Devel., Housing Div., 1978; U.S. Dept. Comm., 1979; NCWR Plan. Com., 1977). Any existing vacant lots may be developed by the time actual construction of the mine/mill complex begins. This low vacancy rate suggests that while some housing may be available, the location of the existing housing stock is a land use that preempts further housing development.

Each small dot on the map represents approximately five houses, including single-family dwellings, multi-family dwellings, and mobile homes. The map shows a relatively predictable pattern of housing distribution in that it indicates a fairly dispersed population throughout the counties, with clustering around water bodies. The areas most notable for their lack of housing include west Langlade County, north Forest County, and east Forest and Langlade Counties.

Water, Sewer, and Gas Systems. We identified and mapped central water supply systems, sewage treatment facilities, and primary and secondary gas distribution lines. These facilities are shown on Map 9. The following communities have water and wastewater utilities: Crandon, Laona, Wabeno, Antigo, Elcho, White Lake, Rhinelander, and Three Lakes. Wastewater treatment facilities are at or near present capacity in the communities of Crandon and Laona. Water supply facilities appear to be



MAP 8

EXISTING HOUSING

- 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

Source: N.C.W.R.P.C. Land use Maps; U.S.G.S. Quadrangles.

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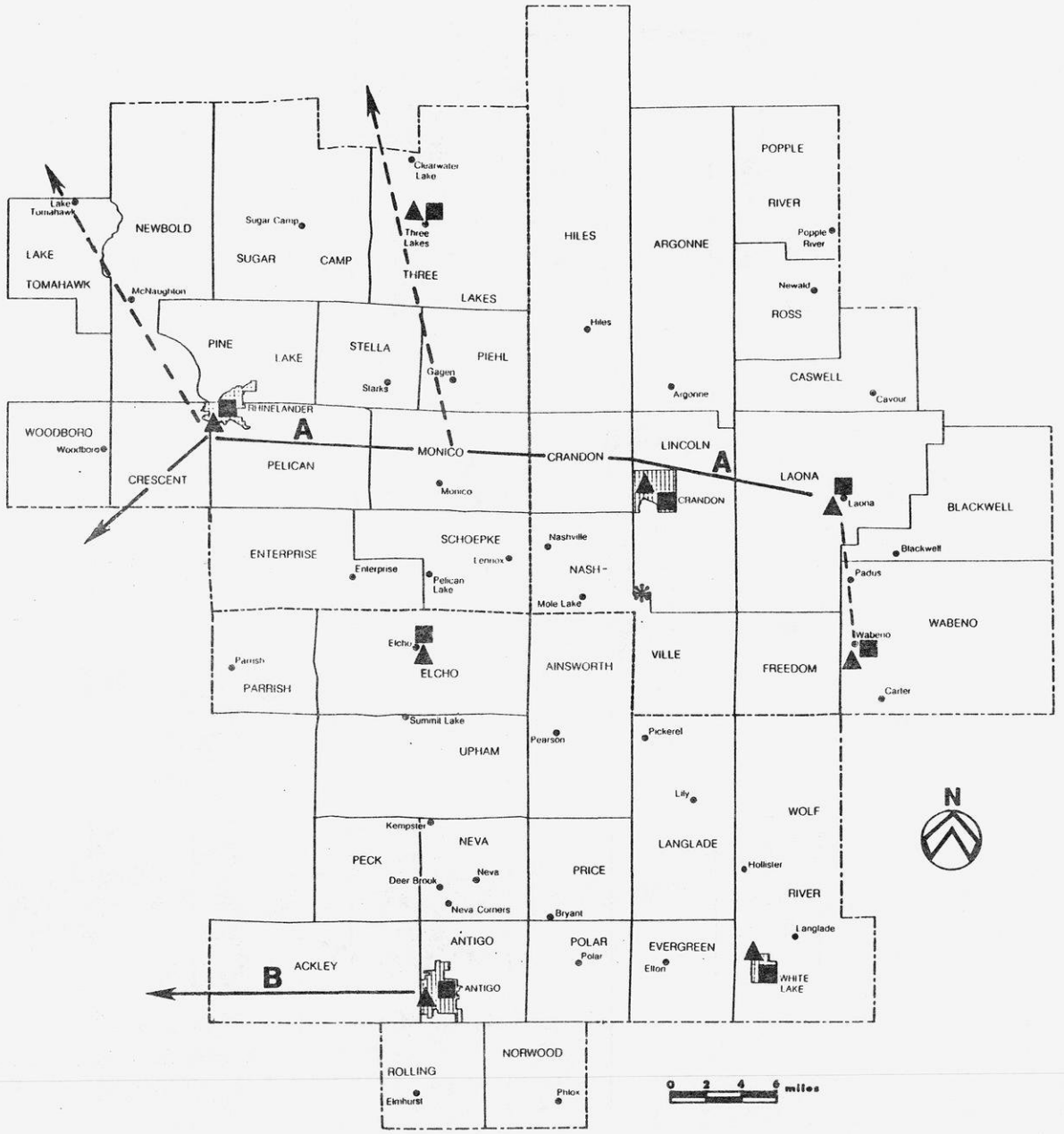

MAP 9

WATER, SEWER AND GAS

- County Boundary
- Township Boundary
- Incorporated Area
- Unincorporated Village
- Crandon Project Discovery Site
- Central Water Systems
- Sewer Treatment Facilities
- Primary Gas Line
- Secondary Gas Line
- A Wisconsin Public Service Gas Corp.
- B City Gas Company Of Antigo

Source: Wisconsin Public Service Commission; County Water and Sewer Plans.

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adequate for all of the communities currently served. The two major retail gas suppliers are the Wisconsin Public Service Corporation and City Gas Company of Antigo.

Septic Tank Suitability. Map 10 shows soil associations in the local study area as mapped by the District Offices of the U.S. Soil and Water Conservation Service in Rhinelander and Antigo. The association names vary by county, although the soil characteristics may be similar. These are generalized descriptions; some associations are included that may be more or less suitable than shown. Table 2 describes the soil associations and the characteristics that determine their suitability for septic tanks.

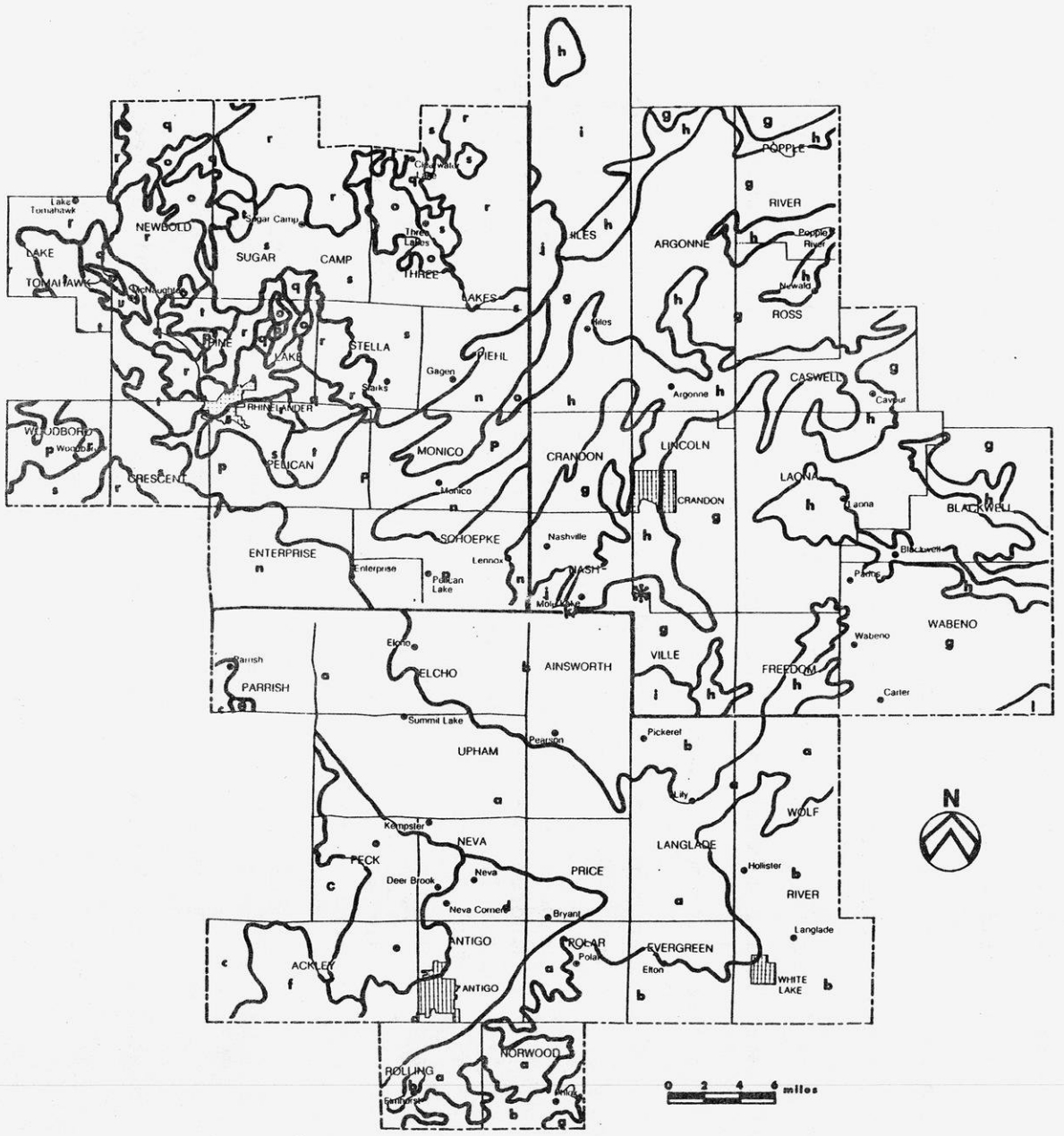
Septic tank suitability is the principal soil characteristic that can limit housing development. The factors that affect a soil's suitability for these purposes include:

1. Permeability: Soils with permeability rates slower than one inch per hour (60 minutes per inch) are considered generally unsuitable, with a severe limitation for absorption fields. Permeability rates between one and 1.33 inches per hour (45 minutes per inch) are considered to have moderate limitations. Permeability rates faster than 1.33 inches per hour are considered generally suitable for septic tank absorption fields.

2. Filtration: Soils underlain by loose sand and gravel at shallow depths (e.g., three feet) may lack sufficient filtration capacity, creating a severe limitation for septic fields.

3. Water table: To be suitable for septic fields, the seasonal water table should be at least three feet below the trench lines.

These limitations apply to standard types of septic system design and installations. In some cases, it may be feasible to install a specialized system, such as larger absorption fields or systems designed to lower the seasonal water table. Such special systems may satisfactorily overcome moderate or severe soils limitations.



MAP 10

SOILS

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

LANGLADE COUNTY ASSOCIATIONS

- a Keweenaw - Kennan - Norrie
- b Padus - Pence-Sayner - Vilas
- c Freer - Auburndale
- d Antigo - Langlade
- e Brill - Poskin - Rib
- f Milladore - Sherry - Cable Variant

FOREST COUNTY ASSOCIATIONS

- g Goodman - Iron River - Cable-Peat
- h Stambaugh - Pence - Peat
- i Iron River - Vilas - Hiawatha-Peat
- j Omega - Rubicon - Crivitz - Pence- Peat
- k Peats - Mucks
- l Kennan - Iron River - Vilas - Peat

ONEIDA COUNTY ASSOCIATIONS

- m Freer - Auburndale-Iron River
- n Iron River - Monico - Cable
- o Greenwood - Dawson
- p Padus - Iron River - Pence
- q Vilas - Croswell - Au Gres
- r Vilas - Sayner
- s Padus - Pence
- t Keweenaw - Vilas - Sayner
- u Lupton - Carbondale

Source: Soil Conservation Service.

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Table 2

SOIL ASSOCIATIONS

Association	Map Key	Description	Suitability for Septic Systems
Langlade Associations			
Keweenaw-Kennan-Norrie	a	deep, well drained	very suitable
Padus-Pence-Sayner-Vilas	b	well drained	generally suitable
Freer-Auburndale	c	poorly drained	generally unsuitable
Antigo-Langlade	d	well drained, prime agricultural	very suitable
Brill-Poskin-Rib	e	moderately well drained to very poorly drained, shallow water table	generally unsuitable
Milladore-Sherry-Cable Variant	f	poorly drained	generally unsuitable
Forest Associations			
Goodman-Iron River-Cable-Peat (some Padus, Stambaugh, and Pence)	g	moderately deep to deep and permeable, moderately drained	generally unsuitable
Stambaugh-Pence-Peat	h	moderately deep to thin, fairly permeable	variable
Iron River-Elderon-Vilas-Hiawatha-Peat	i	moderately deep, medium textured, poor internal drainage	variable

(continued)

(Table 2, continued)

Association	Map Key	Description	Suitability for Septic Systems
Omega-Rubicon-Crivitz-Pence-Peat	j	deep, well drained, high water tables	generally suitable
Organic soils-Peats-Mucks	k	poorly drained	generally unsuitable
Kennan-Iron River-Vilas-Peat	l	fairly well drained	generally suitable
Oneida Associations			
Freer-Auburndale-Iron River	m	poorly drained to moderately well drained	generally unsuitable
Iron River-Monico-Cable	n	poorly drained to moderately well drained	generally unsuitable
Greenwood-Dawson	o	poorly drained to moderately well drained, organic	generally unsuitable
Padus-Iron River-Pence	p	somewhat well drained to well drained	generally suitable
Vilas-Croswell-Au Gres	q	somewhat poorly drained to excessively drained	generally suitable
Vilas-Sayner	r	excessively drained	very suitable
Padus-Pence	s	moderately well drained and well drained	generally suitable
Kemennaw-Vilas-Sayner	t	moderately well drained to excessively drained	very suitable
Lupton-Carbondale	u	very poorly drained, organic	generally unsuitable

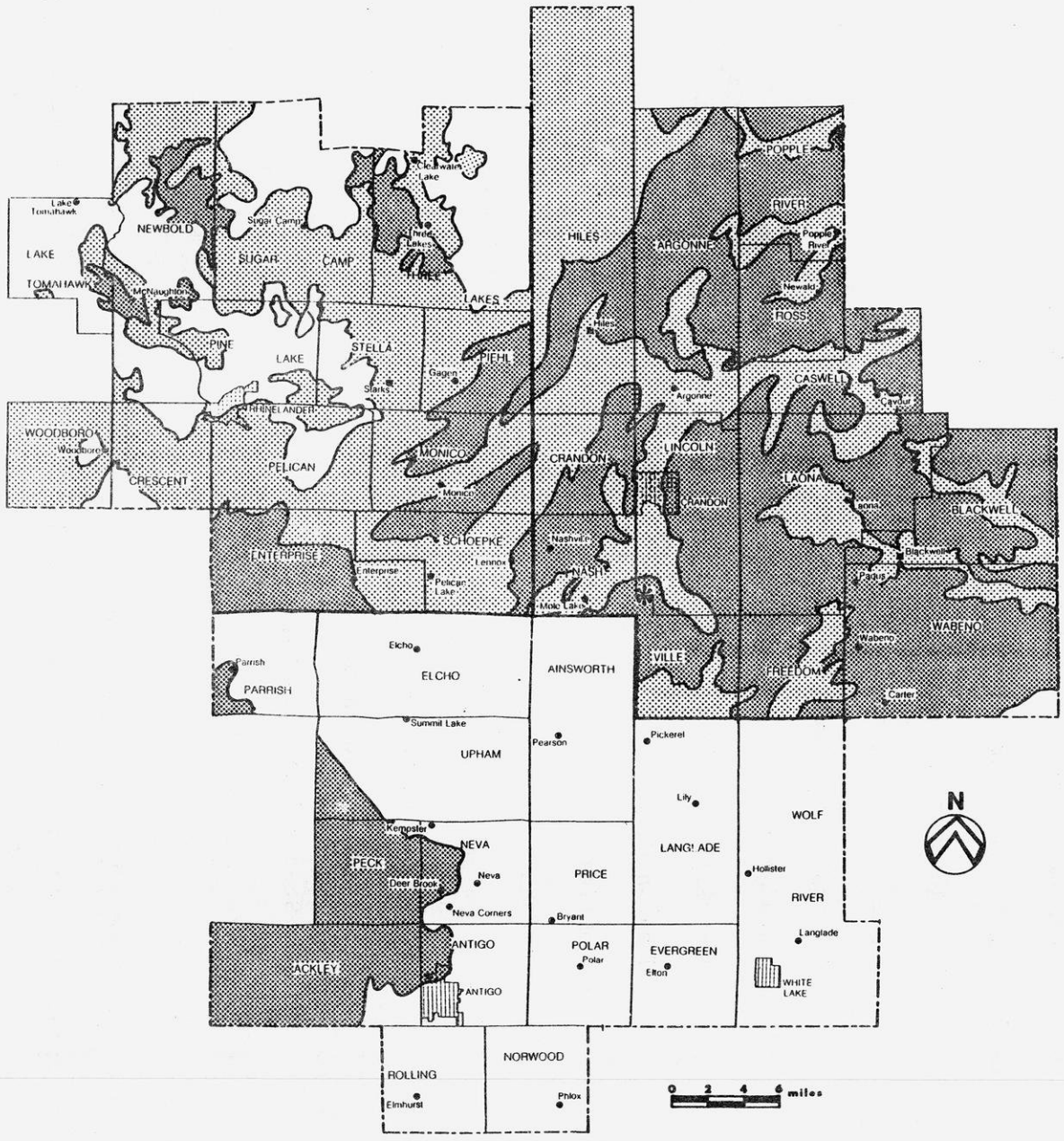
Source: Soil Conservation Service Maps: Langlade County, March 1979; Oneida County, January 1980; Forest County, December 1973.

The suitability of soils for septic systems is shown on Map 11. We derived the suitability ratings from Soil Conservation Service suitability criteria and data on associations in each county (Map 10). These associations were then aggregated according to their suitability for septic systems.

Public Lands. Because residential development cannot be expected to occur on public lands, we have mapped this limitation on Map 12. Public lands are among the dominant land uses in the area. Public lands include those owned by the following entities:

- U.S. government
- State of Wisconsin
- University of Wisconsin
- Board of Regents of the University of Wisconsin System
- Maryville Academy
- Wheaton College
- Counties
- Townships
- Cities and villages
- School districts
- The Nature Conservancy
- Boy Scouts, Girl Scouts, and Campfire Girls
- State Commonwealth for Boys

Native American Lands. Residential development also cannot be expected to occur on Native American lands, except for those new residents



MAP 11

SOIL SUITABILITY FOR SEPTIC TANKS

- 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.

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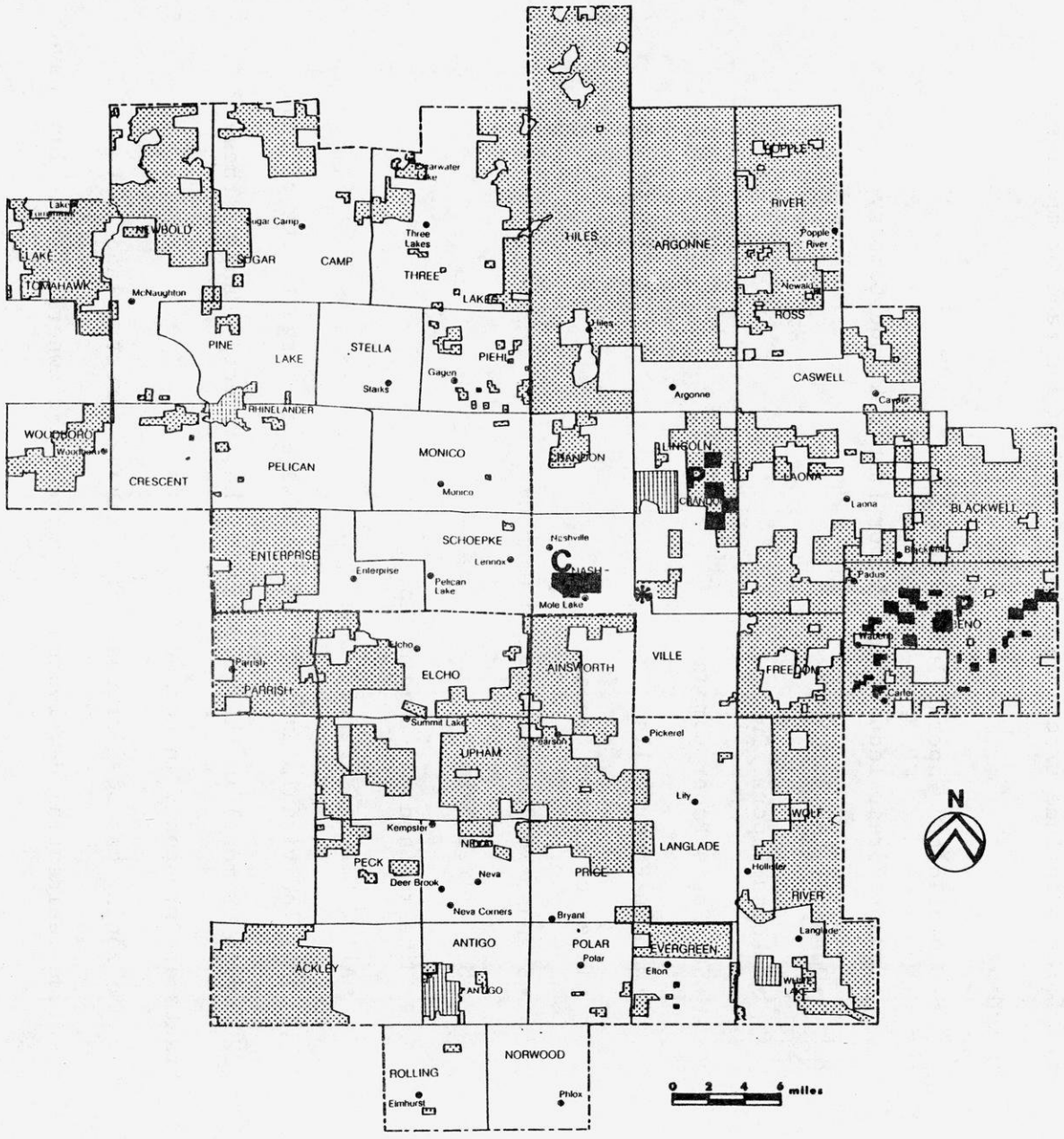

MAP 12

PUBLIC LANDS AND NATIVE AMERICAN LANDS

- County Boundary
- Township Boundary
- Incorporated Area
- Unincorporated Village
- Crandon Project Discovery Site
- Public Land
- Native American Land
- P Forest County Potawatomi
- C Mole Lake Chippewa

Note: *The Native American tribes are the Forest County Potawatomi and the Mole Lake Chippewa.*

Source: *County Atlas and Plat Books.*

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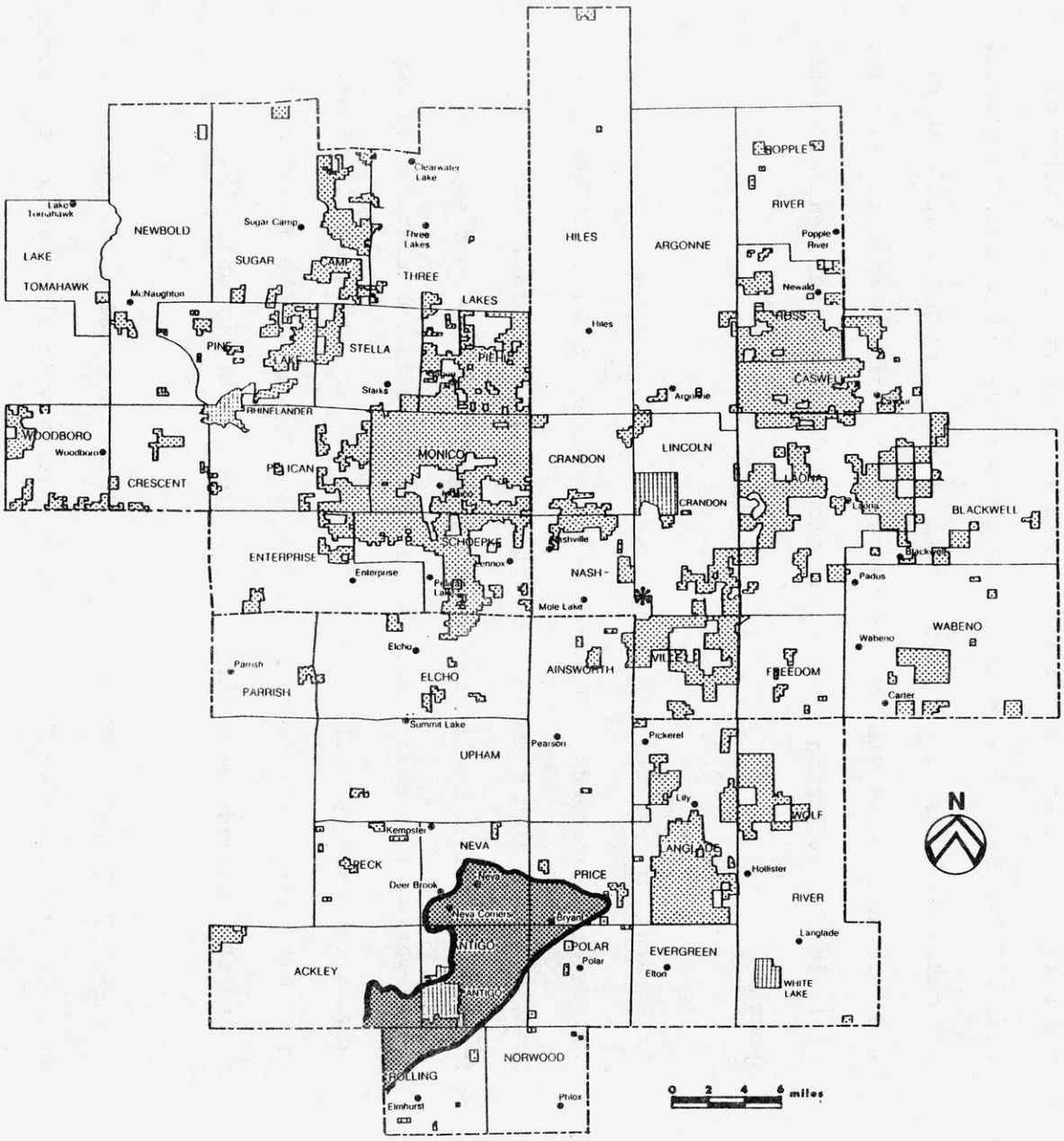
who are members of the tribes holding these lands. These lands, shown on Map 12, are held by the Mole Lake Chippewa and the Forest County Potawatomi.

Commercial Forest and Prime Agricultural Land. Other land uses that could preclude residential development are commercial forest and prime agricultural land. These land uses are shown on Map 13. Commercial forests include tracts held by major pulp and paper companies, including:

- Consolidated Papers, Inc.
- Connor Forest Industries, Connor Lumber & Land Company
- Owens-Illinois
- Nekoosa Papers, Inc.
- St. Regis Paper Company
- Wausau Paper Mills
- Tigerton Lumber Company
- Branham Woodlands Products Company
- M & H Tree Farm
- Mihalko Land and Logging Co.
- All F.C.L. and P.F.C. land

Local individuals and families own several large tracts of land (220 acres or more) in the vicinity of the project. Many of these tracts are presently in commercial forests.

No zoning has been proposed for private forestry land that would preclude residential development. However, the owners of this land have



MAP 13

COMMERCIAL FOREST AND PRIME AGRICULTURAL LANDS

- 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.*

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not, in the past, evidenced an aggressive stance toward use of their land for other than forestry purposes. In order to be conservative in estimating the available land, we have chosen to exclude commercial forests. However, under the appropriate market conditions this land could be made available for residential development.

Map 13 also shows prime agricultural land in which housing development may be preempted by zoning. We have included as prime agricultural land only those lands in the Soil Conservation Service capability classes 1 and 2. Detailed studies are currently underway in Forest, Langlade, and Oneida Counties to determine the full extent of prime agricultural land. These studies will be the basis for our final reports. They may result in the exclusion of some additional land from residential development.

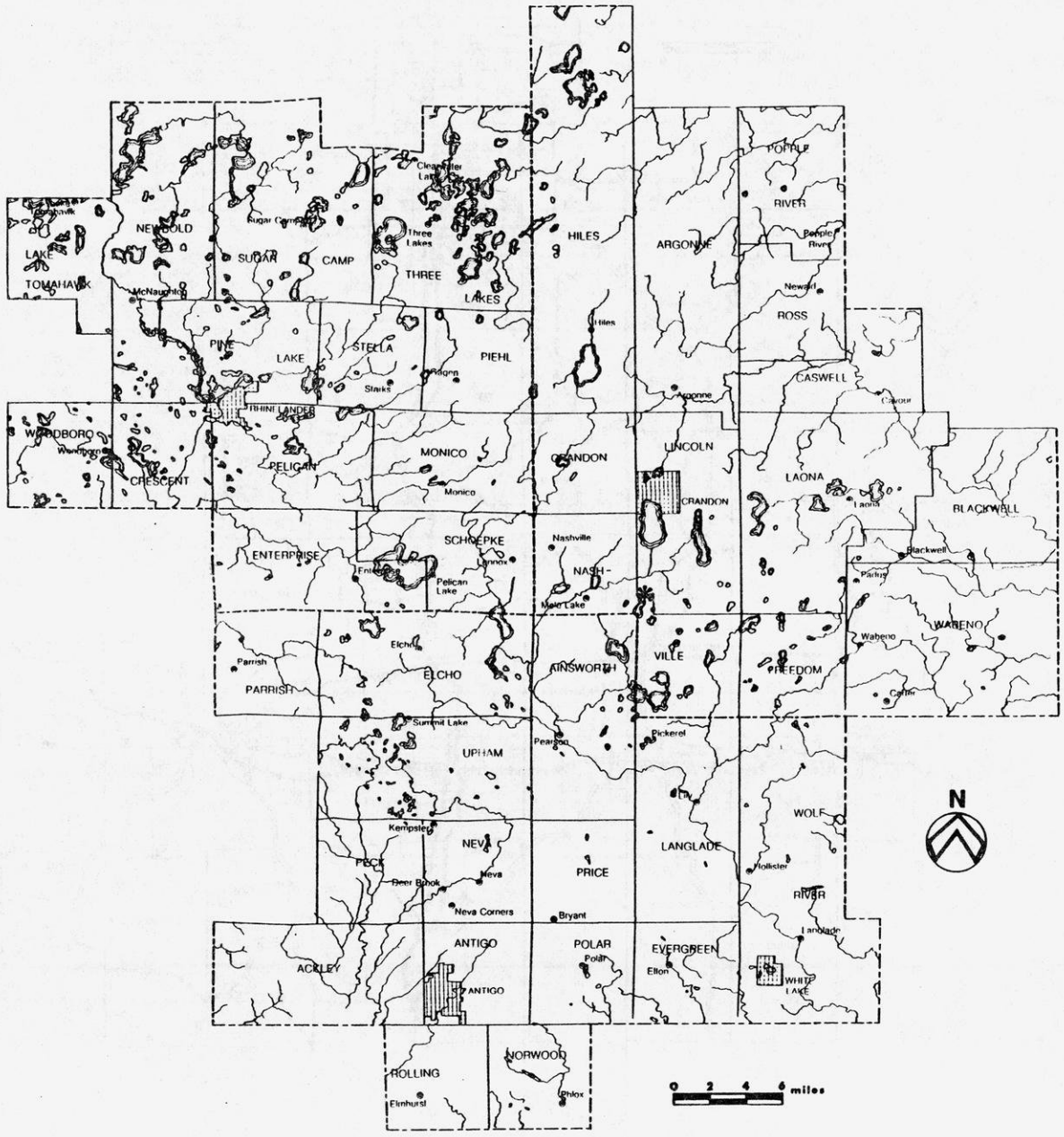
Surface Water. Map 14 locates bodies of surface water. Residential development tends to cluster around bodies of water; at the same time, the land area occupied by surface water, of course, subtracts from the land area available for development. We have not separately mapped wetlands at this time. We believe there is substantial overlap between wetlands and soils unsuitable for septic tanks, public lands, and commercial forest lands. Thus we do not believe the omission of a separate wetlands map will alter the results of our analysis.

Transportation. Map 15 shows the location of airports and major road and rail routes. Transportation systems will also influence residential location decisions and the accessibility of land for development.

MAP 14

SURFACE WATER

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



Source: County Highway Maps

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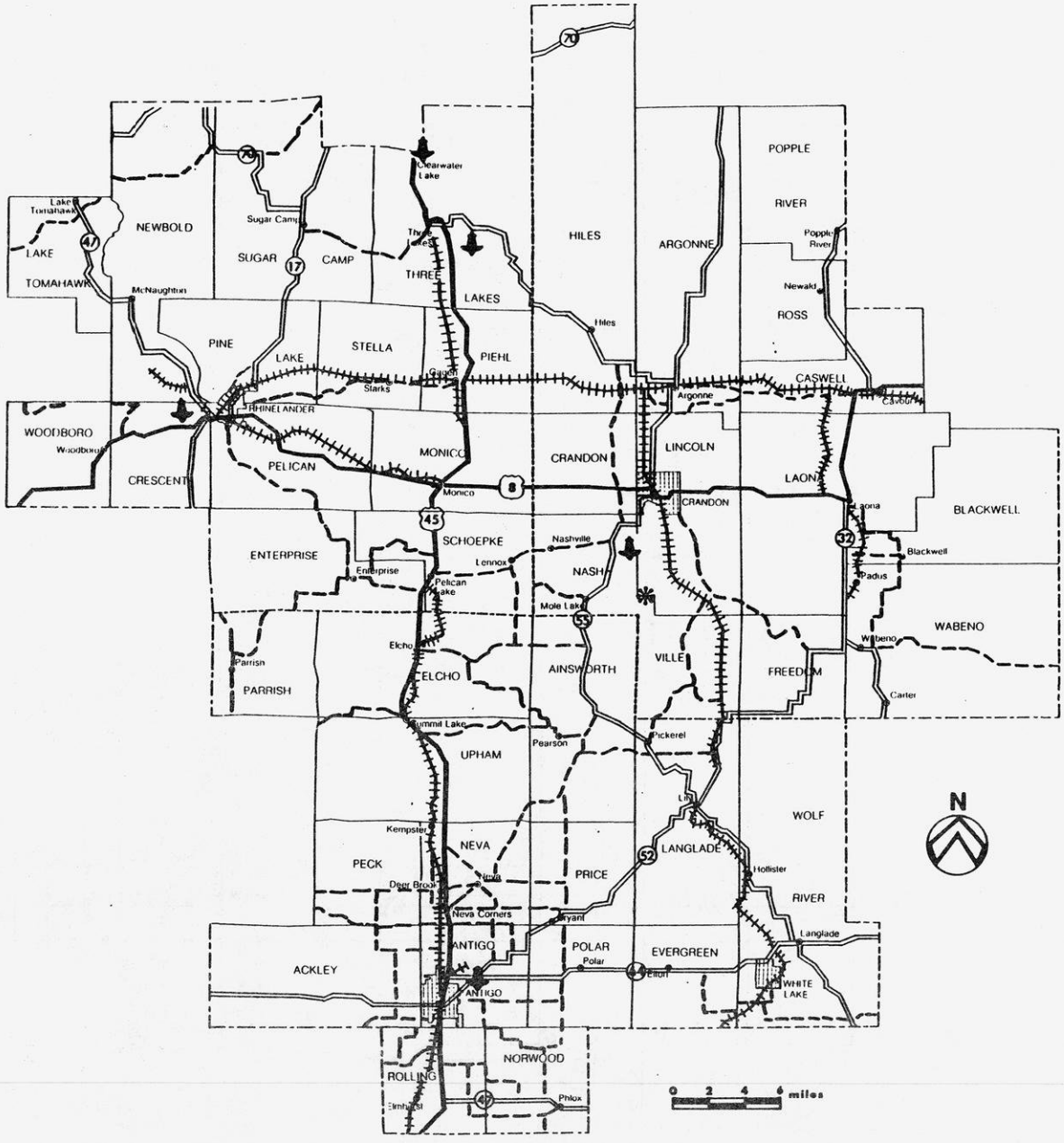
MAP 15



TRANSPORTATION

- County Boundary
- Township Boundary
- Incorporated Area
- Unincorporated Village
- Crandon Project Discovery Site
- U.S. Highway
- State Highway
- County Road
- Airport
- Railroad

Source: County Highway Maps.

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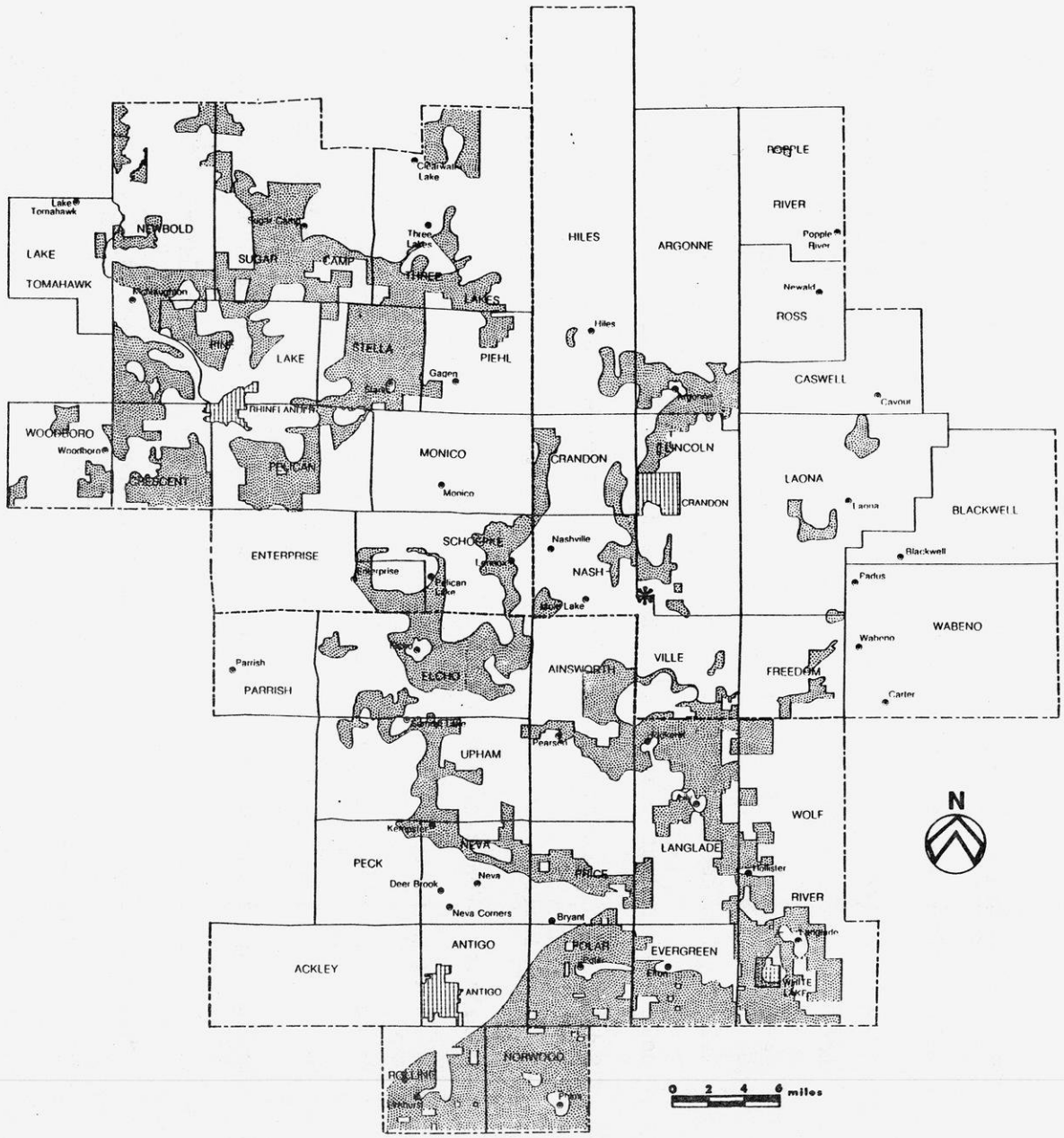
Map 16 shows the land suitable and available for development. To calculate the land available for development, we have taken the total land in the local study area and excluded from it publicly owned land, Native American land, private forestry land, water, already developed areas, prime agricultural land, and land with unsuitable soils. The information necessary to make these exclusions is drawn from Maps 8-15.

Home Building and Subdivision Capacity. The home building and subdivision capacity of the area has never been called upon to respond to a surge of housing demand. However, there are several factors that indicate that a shortage of builders or subdividers would not alter the definition of the local study area. Subdivision activity has been largely limited by demand. Subdivision at present consists of platting, soil tests, installation of roads, and installation of utilities. Subdivision development requires six to twelve months from purchase of land to initial marketing (personal interview, David Smith, Rhinelander developer, February 1980).

The majority of home builders in the area make use of some form of manufactured housing (personal interviews with representatives of Wausau Homes and Rhinelander Realty, February 1980). Even "custom built" homes incorporate some manufactured prefabricated components. Wisconsin has a well developed manufactured housing industry. The local labor required for installation of this housing consists of crews of foundation, plumbing, electrical, and finishing contractors. Manufactured housing dealers indicate that they draw their crews from a large



MAP 16

LAND SUITABLE AND AVAILABLE FOR RESIDENTIAL DEVELOPMENT

- County Boundary
- Township Boundary
- Incorporated Area
- Unincorporated Village
- Crandon Project Discovery Site
- Land Suitable and Available for Residential Development

Actual size of the 4,500 acres needed for maximum project related housing.

Note: Areas are excluded for one or more of the following reasons: publicly owned land, commercial forestry land, water, already developed areas, prime agricultural land, and less than suitable soils.

Source: Combination of Maps 8, 11, 12, 13, & 14.

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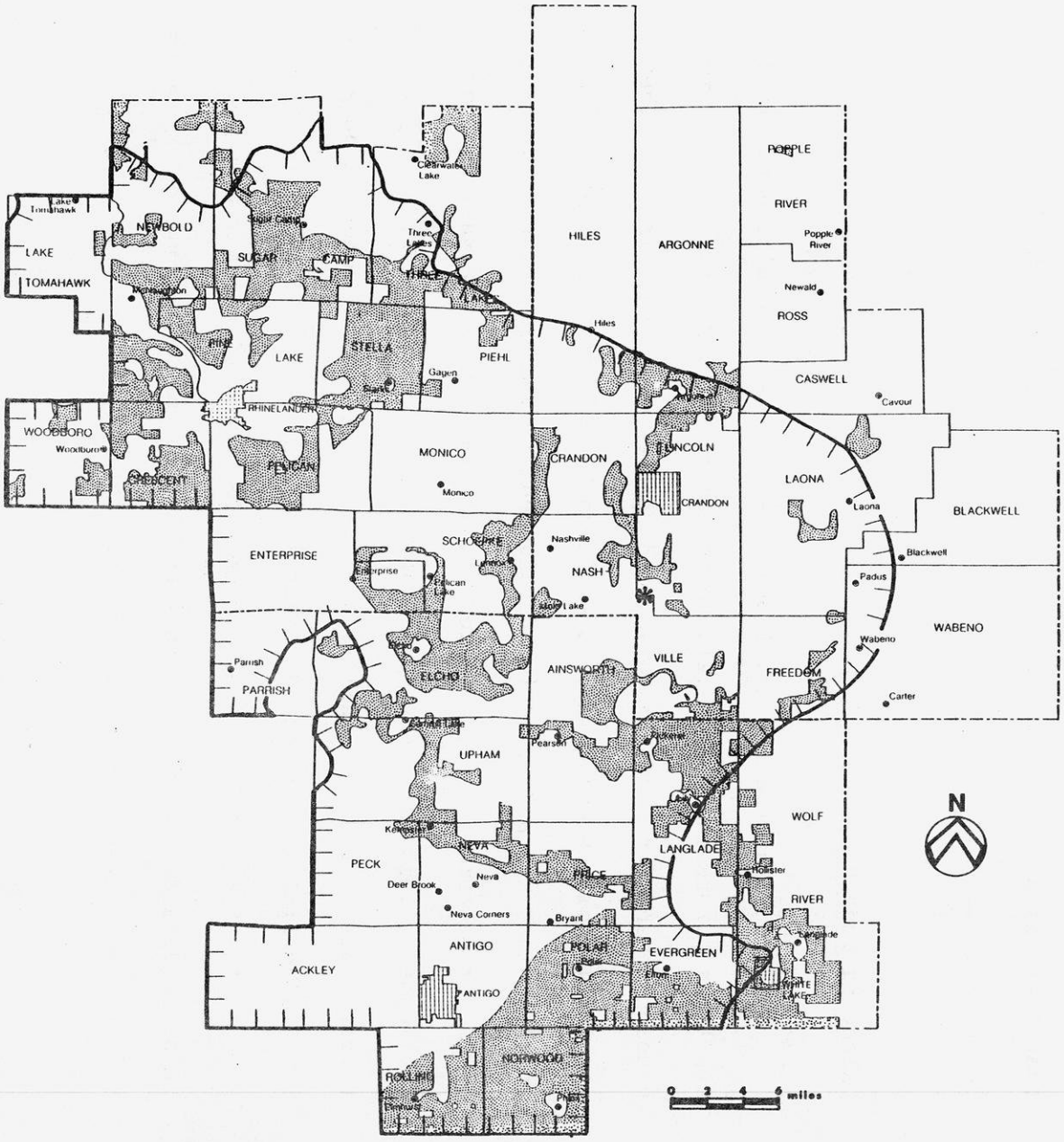
area and could assemble a large number of contractors should demand warrant, particularly during the winter months. The mobility of construction labor for installation of housing combined with the centralized nature of housing manufacturing plants indicates that broadening the local study area would not increase the available housing construction capacity. Thus, the availability of suitable land appears to be the binding constraint on the location of housing for inmigrants, assuming that there is a willingness on the part of developers to build when demand arises.

Balancing Supply and Demand

Using the information developed thus far, we can evaluate the land available for residential development (Map 16) within the area of prime housing demand for Exxon and area trade center employees (Map 7). The combination of these two maps is shown on Map 17, which indicates 312,000 acres of land are available for development in the area of housing demand. Given our restrictive criteria for classifying land as unavailable for development, this is a very conservative estimate. Using similarly restrictive assumptions, we earlier estimated that the maximum land necessary for residential development as a result of the Crandon Project is 4,500 acres. Thus there is ample land available for development within the area of prime demand. Map 17 shows how the local study area would look on the basis of our first two criteria on page three.



MAP 17

LAND SUITABLE FOR DEVELOPMENT WITHIN THE COMBINED AREA OF HOUSING DEMAND

- County Boundary
- Township Boundary
- Incorporated Area
- Unincorporated Village
- Crandon Project Discovery Site
- Land Suitable and Available for Residential Development
- Combined Area of Housing Demand Boundary

Actual size of the 4,500 acres needed for maximum project related housing.

Source: Maps 7 & 16.

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COMPETITION FOR WORKERS WITH EXISTING LOCAL INDUSTRY

The third criterion for definition of the local study area calls for inclusion of townships which are the location of an existing industry that may be substantially affected by the Crandon Project. The wages paid by Exxon are expected to be higher than those paid by many of the existing local industries using workers with comparable skills. One possible economic effect of the project on existing industries from increased wages might be their inability to incorporate the increase in their prices. The industries likely to be most susceptible to this effect are tourism, forestry, and wood and wood product businesses.

Because present wages are not above state or national averages, or above earnings available in southern Wisconsin, Michigan, and Illinois, the area does not now draw workers from great distances. The 30-minute driving contour includes almost all persons working in Rhinelander. Interviews with employers in Crandon indicate most of their employees come from the township in which the company is located, or from an immediately adjacent township.

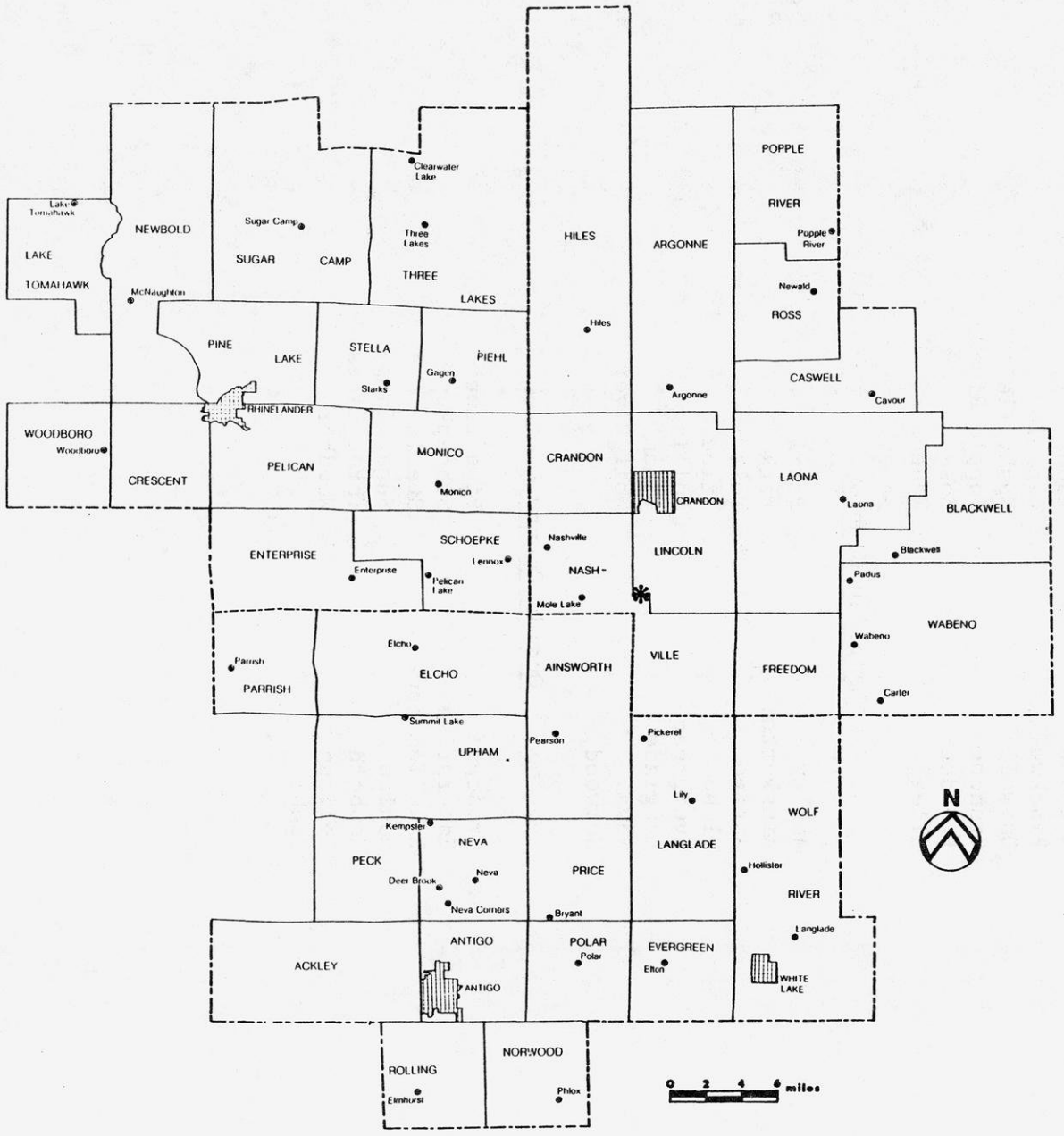
Forestry appears to be the only industry that requires the inclusion of additional townships in the local study area. Our preliminary work indicates that we can better analyze the effects of the project, if any, on forestry if we include the townships of Ross and Popple River in Forest County. We do not expect many new residents to settle in these towns. However, the possibility exists that the local labor force could be attracted to employment at the Crandon Project, possibly reducing the labor available to harvest the forest resources in these townships.

CONVERSION OF THE LOCAL STUDY AREA TO TOWNSHIPS

As stated previously, we define the local study area as a set of townships in order to make use of the existing public data on the area. Thus, it is now necessary to convert the demand area drawn using location theory to include all those townships that fall substantially within the demand boundary. This conversion results in the list of townships to be included in the local study area shown in Table 3.

Map 18 shows the local study area to be used for the socioeconomic assessment. Based on present analysis, we expect some of these townships defined as the local study area to receive sizable increases in population from direct and indirect employment generated by the project. It is this set of townships that, in the words of Section NR132.10 (1)(e), comprise that "area reasonably expected to be most impacted by the mining activity." It is also this area in which the closest coordination is needed with local governments in order to ensure adequate planning for growth management.

In defining the local study area, we have made extreme assumptions to encompass the largest possible new population and demand for housing. The total amount of developable land we found in this area is much greater than the 4,500 acres required to house project employees; there is no reason to expect that enough housing will occur outside the local study area to justify a detailed analysis. We will limit the analysis for townships outside the local study area to assessment of the economic and fiscal effects of the project on the state as a whole.



MAP 18

LOCAL STUDY AREA

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

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

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Table 3

TOWNSHIPS INCLUDED IN THE LOCAL STUDY AREA

Forest County

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

Langlade County

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

Oneida County

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

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LIST OF PERSONAL INTERVIEWS

February 1980

Clements, A., Connor Wood Industries, Laona.

Day, R., Realtor and Three Lake School Board Member, Rhinelander.

DeNoble, A., City Clerk, Crandon.

Estabrook, R.S., Jr., Rhinelander Realty.

Hanson, R.A., Administrator, Rhinelander School District.

Hovland, K., University of Wisconsin Extension Service, Crandon.

Hyland, B., Executive Director, Rhinelander Chamber of Commerce.

Jacobson, B., Zoning Administrator, Forest County.

Jopek, J., University of Wisconsin Extension, Antigo.

Kelly, T., City Attorney, Rhinelander.

Klinger, J., City Inspector, Rhinelander.

Ludwig, W., Soil Conservation Service, Oneida and Forest Counties.

Mabry, J., Planning and Zoning Administration, Langlade County.

Marquardt, W., real estate loan officer, Merchant's Bank & Trust, Rhinelander.

Omernic, D., Soil Conservation Service, Langlade County.

Preboski, G., Chamber of Commerce, Antigo.

Predeth, L.S., Realtor, Crandon.

Schuette, J., Wausau Homes, Rhinelander.

Sharkey, J.J., President, Land-O-Lakes Bank, Rhinelander.

Shudell, G., Mayor, Rhinelander.

Smith, D., attorney and developer, Rhinelander.

Smith, J., owner, Century 21 Realty, Antigo.

Thayer, R., President, Wabeno Chamber of Commerce.

Tomchek, B., United Farm Real Estate Agency, Crandon.

Tradewell, W., Developer, Antigo.

Vanney, J., Planning and Zoning Administrator, Oneida County.

Warner, J., Suick Realty, Antigo.

Winat, R., Surveyor, Oneida County.

Wingenter, T., business specialist with area University of Wisconsin Extension Office, Rhinelander.