# MANISTEE LAKE MANAGEMENT PLAN

## VOLUME I
## SUMMARY REPORT

# MANISTEE LAKE MANAGEMENT PLAN:
# SUMMARY REPORT

VOLUME I

OCTOBER, 1982

MPM Consulting
204 East Washington Street
Ann Arbor, Michigan 48104

## CREDITS

## MANISTEE LAKE MANAGEMENT STUDY

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### PLANNING CONSULTANT

MPM Consulting of Ann Arbor.

### FUNDING AGENCIES AND ASSISTANCE FOR THIS REPORT:

United States Coastal Zone Management Act, administered by the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration through the Michigan Coastal Management Program, administered by the Department of Natural Resources, Division of Land Resource Programs; and Manistee County through the Manistee County Planning Department.

PREFACE

The Manistee Lake Management Plan Request for Proposal of Services dated October 9, 1981 contained within its framework a unique and innovative approach to lake management and one which had not previously been attempted either by the State or County agencies involved.

Through the auspices of the Department of Natural Resource's Coastal Program Unit, Division of Land Resources Programs and the County Planning Department of Manistee County, MPM Consulting of Ann Arbor was asked to:

A. Inventory the existing natural features and data such as population, available utilities, land use, land ownership, physical resources, slope, wetland boundaries, historic areas, and existing planning, zoning, and economic development activities on the Lake in order to develop an understanding of the current situation related to Manistee Lake (i.e., establish the existing baseline).

B. Based on the existing baseline, the weaknesses and strengths of Manistee Lake in terms of various types of development, environmental protection, and existing government services were identified.

C. The next step in the program was to identify potential development options and present suitable recommendations for implementing these options. The development of the recommendations was to be a key part of the innovative process in that a county-wide citizen's advisory group was asked to play a major part at all stages of the program in assisting the consultant in identifying the problems, goals and strategies (plan of action) for implementation of the plan. The use of the advisory group was envisioned as playing two key roles: The first was reviewing early drafts of the consultant's work and providing local knowledge and insights into the problems faced. The second was to support the development of a cooperative dialogue between key governmental units in the County.

D. The key to the entire project was to be (and is) the manual for implementation. Basically, this report, a how-to-do-it manual, is designed so as to provide specific direction to local government personnel as well as the impacted general public, on how to carry out the recommendations and strategies for management of Manistee Lake. Simply producing recommendations is relatively easy. Too often these recommendations are lost because local governmental entities do not have the resources of trained individuals at their disposal to implement a plan. The intent of this project was to develop a product which provides instructions on how to proceed with the Manistee Lake Management Plan recommendations.

E. A final step in the project was to be local review of the draft and approval of the final plan. An accepted Management Plan was to be submitted to the Department of Natural Resources (DNR) no later than September 30, 1982.

The implementation manual of the Manistee Lake Management study, as was to be expected, became the key element of the study. By working closely with the committee and the sub-committee members, a first-of-its-kind report was produced; one which should be of considerable value in supporting the future economic development of Manistee County and particularly, those areas adjacent to Manistee Lake.

As is well understood, unemployment in Manistee County is a serious problem and it is our belief that this report will assist significantly in resolving that problem by establishing a strategy for economic development of the study area.

The results of the study itself are presented in two volumes. The first volume, entitled Summary Report, present a summary of the information, insights and analysis which as a composite resulted in providing the basic input into the Implementation Manual. Volume II, the Implementation Manual, is the key product of the study and represents the step-by-step actions to be pursued to develop the total capacity of Manistee Lake as a major economic force and how to accomplish this without jeopardizing the continually improving environmental condition of the Lake.

MANISTEE LAKE
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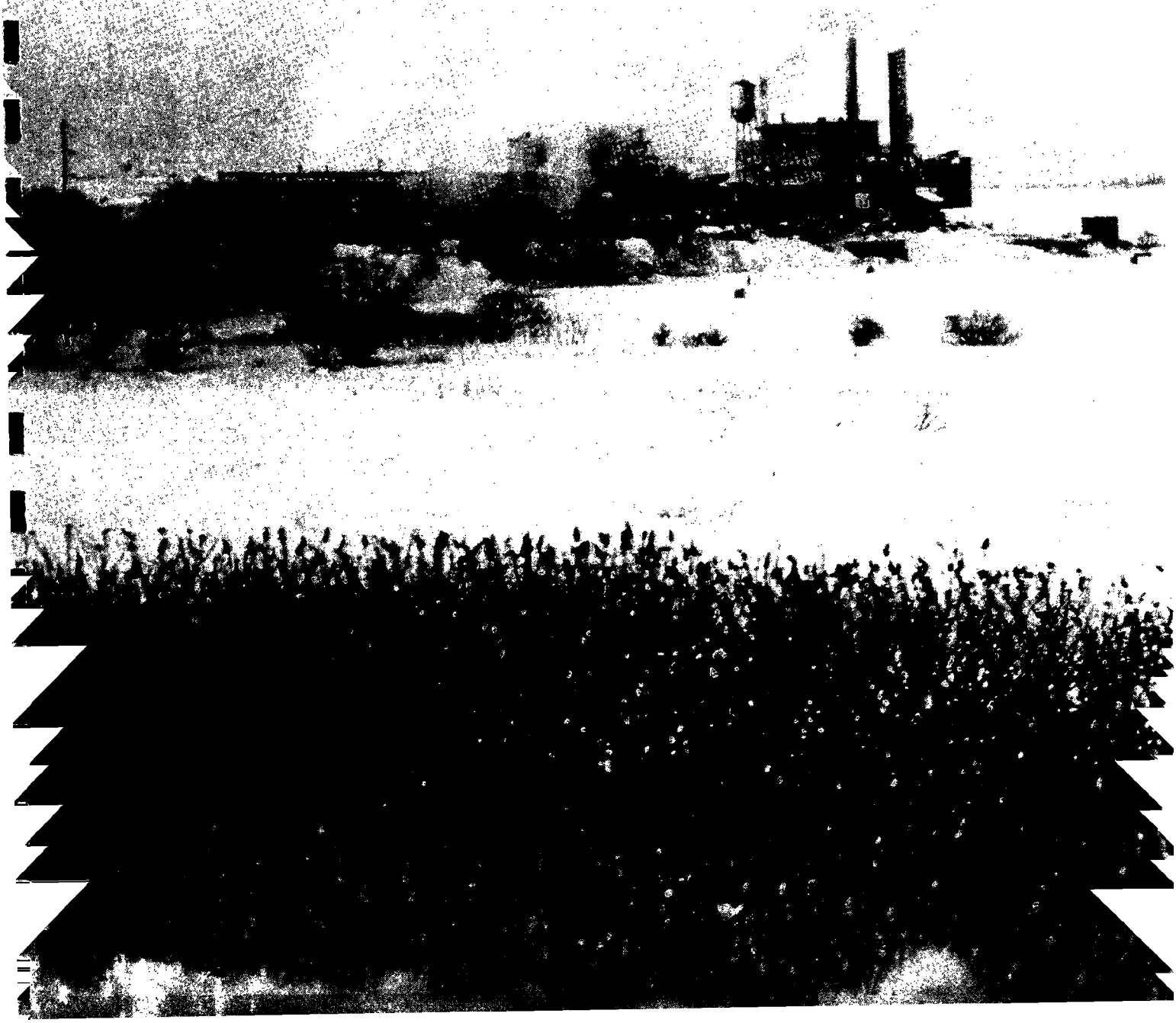
# INTRODUCTION



# SECTION I

# INTRODUCTION

# I. Introduction

## A. Purpose of Effort

This project, as stated in the Coastal Zone Grant Application to obtain funds to do this study, reads in part: "Development -- economic, tourism, environmental -- is needed in Manistee County. The Manistee Lake area is the population center for the county and is seen as being the major area of development potential."

Obviously, there is an urgency for and benefit from development of Manistee Lake. Manistee County's unemployment rate has averaged about thirteen (13) percent over the last ten years, with a median rate at about eleven (11) percent according to the Michigan Employment Security Commission (MESC). Currently, the unemployment rate hovers around twenty (20%) percent with the threat of even more layoffs and plant closing occurring. Compounding the problem is the highly seasonal nature of Manistee County's employment which fluctuates between summer-low unemployment and winter-high unemployment. Further, industrial growth, in terms of new industry and increased employment (MESC data) has been stagnant in the Manistee Lake area -- although physical plant expansion at existing industries has taken place in the recent past.

The overall economic picture is coupled with growth pressure in terms of population. In the last ten years, Manistee County saw almost a thirteen (13%) percent increase in population which underlines the need for economic development in areas of tourism, commerce and industry.

Manistee Lake has a natural economic development potential. Nearly every community in northern Michigan has an industrial park. However, it is a rarer resource to be able to offer a Great Lakes port, an inland lake with rail service, highway access to the potential development area as well as major environmental/wildlife areas. When this is combined with the quality of life represented by and available in Manistee County, the potential is unlimited. This type of asset should be capitalized upon and the Implementation Manual (Volume II) should be viewed as a major step in that direction.

In pursuing any course of action which changes and expands existing activities around the Lake, areas of particular concern must be identified and dealt with. The Lake has areas or activities which are particularly sensitive to alteration or disturbance. These include, but are not limited to, the wetlands and delta area of the Big Manistee River (State Game Area) as well as the delta area of the Little Manistee River, the numerous public and private marinas, watercraft, fishing, and historic sites associated with the area's lumber industry, early missionaries, and archeological sites.

It is understandable that as portions of Manistee Lake are further developed those areas of the Lake which are also environmentally sensitive, may encounter problems associated with intensive and conflicting uses.

Manistee City -- with shoreline on Manistee Lake and on both sides of the channel to Lake Michigan -- is the economic and population center of Manistee County. The remainder of the Manistee Lake area is subject to urban sprawl, placing pressures on existing uses associated with the Lake. There are also land use conflicts and other potential conflicts between existing lake uses, partly as a result of past uncontrolled development. Manistee Lake's shoreline supports heavy industries (paper, chemicals, metals) as well as tourist demands on the Lake (fishing, marinas, motels) as well as community/commercial businesses. Further, wetlands associated with the Lake must receive adequate management for water fowl and wildlife habitat and as a natural filter to maintain water quality.

Future uncontrolled development of the Lake could increase conflicts between uses and thus any future development must be accompanied by foresight and planning to insure that these conflicts are minimized.

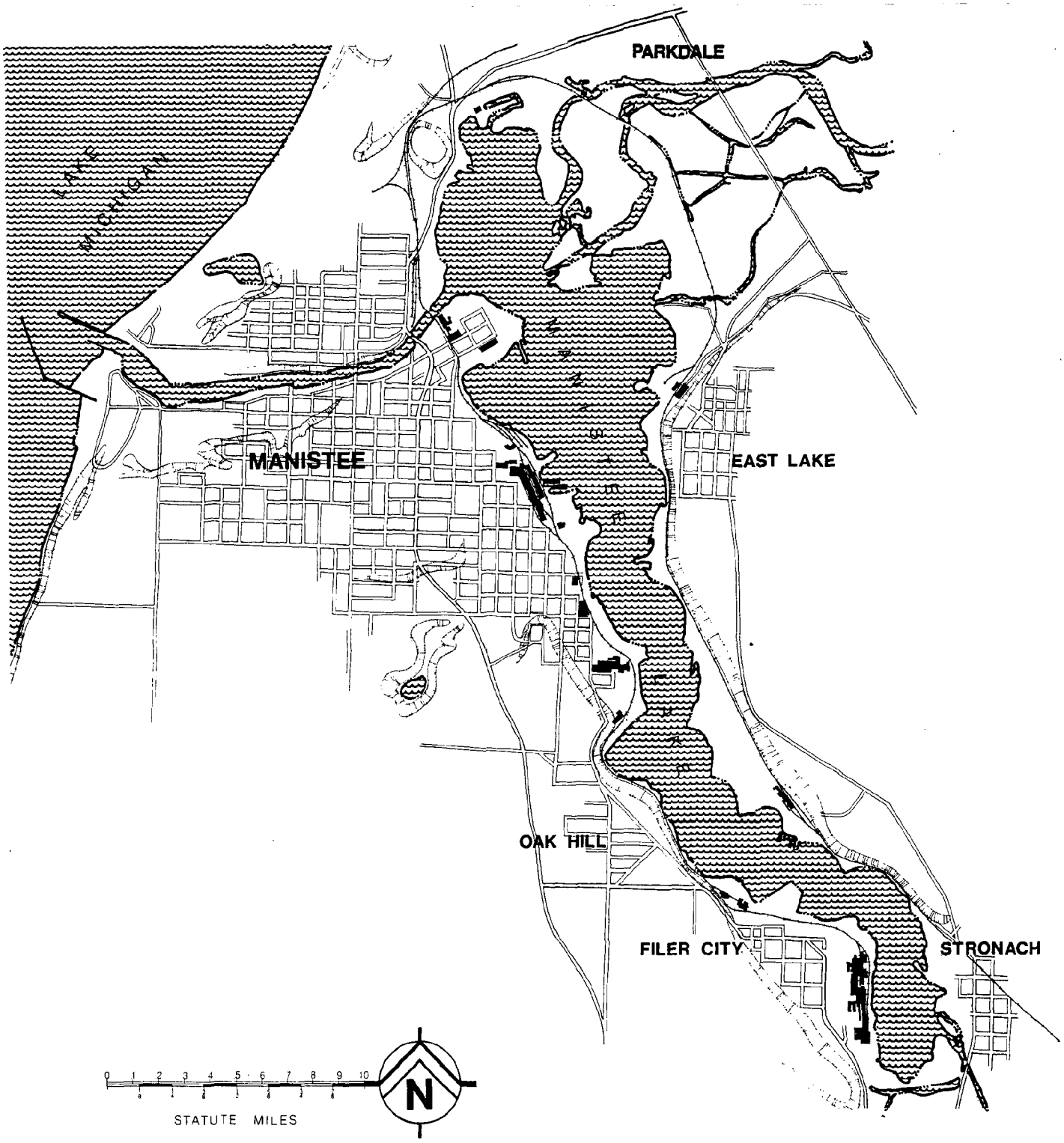
This study is but one of many coordinated efforts centering around economic development and its need in Manistee County. Re-organization of agencies with the addition of new departments like the proposed County Office of Economic Development, coupled with state, regional and county programs, are moving Manistee County towards economic recovery. Specific programs include, but are not limited to: (1) Project Facelift for city buiness district revitalization, (2) County Planning Commission Economic Development Strategy, done with the assistance of the Michigan Department of Labor, and (3) the Riverwalk study and development program for a boardwalk along the channel between Manistee Lake and Lake Michigan.

B. Study Area

The map which follows illustrates the study area. Specifically, the study area is the channel from Lake Michigan, including the Man-Made Lake, to Manistee Lake and including the riparian land ownership. The political units which are a part of the study are: Manistee City, Manistee Township, Eastlake Village, Stronach Township, Filer Township and Manistee County. The Manistee Lake shoreline represents the framework for the study area.

C. Methodology of Analysis

The methodology utilized for this study was primarily qualitative as distinguished from quantitative in nature. This was to be expected given the nature of the project and


PARKDALE
LAKE MICHIGAN
MANISTEE
EAST LAKE
OAK HILL
FILER CITY
STRONACH
0 1 2 3 4 5 6 7 8 9 10
STATUTE MILES
N

STUDY AREA

the anticipated output -- a series of recommendations aimed at economic development of Manistee Lake. Quantitative analysis, although appropriate in many situations where adequate statistical and numerical data is available and where well documented models regarding interrelationships of variables are known, was not appropriate for the needs of this study.

What was appropriate in this case was a qualitative, analytical approach which is best described as a logic paradigm; that is a series of logical decision and analysis steps, each of which results in information and input to the next step and which culminates in a series of recommendations to deal with the needs and problems addressed. Specifically, the logic paradigm as used in this study is presented schematically on the next page and in writing on the following pages.

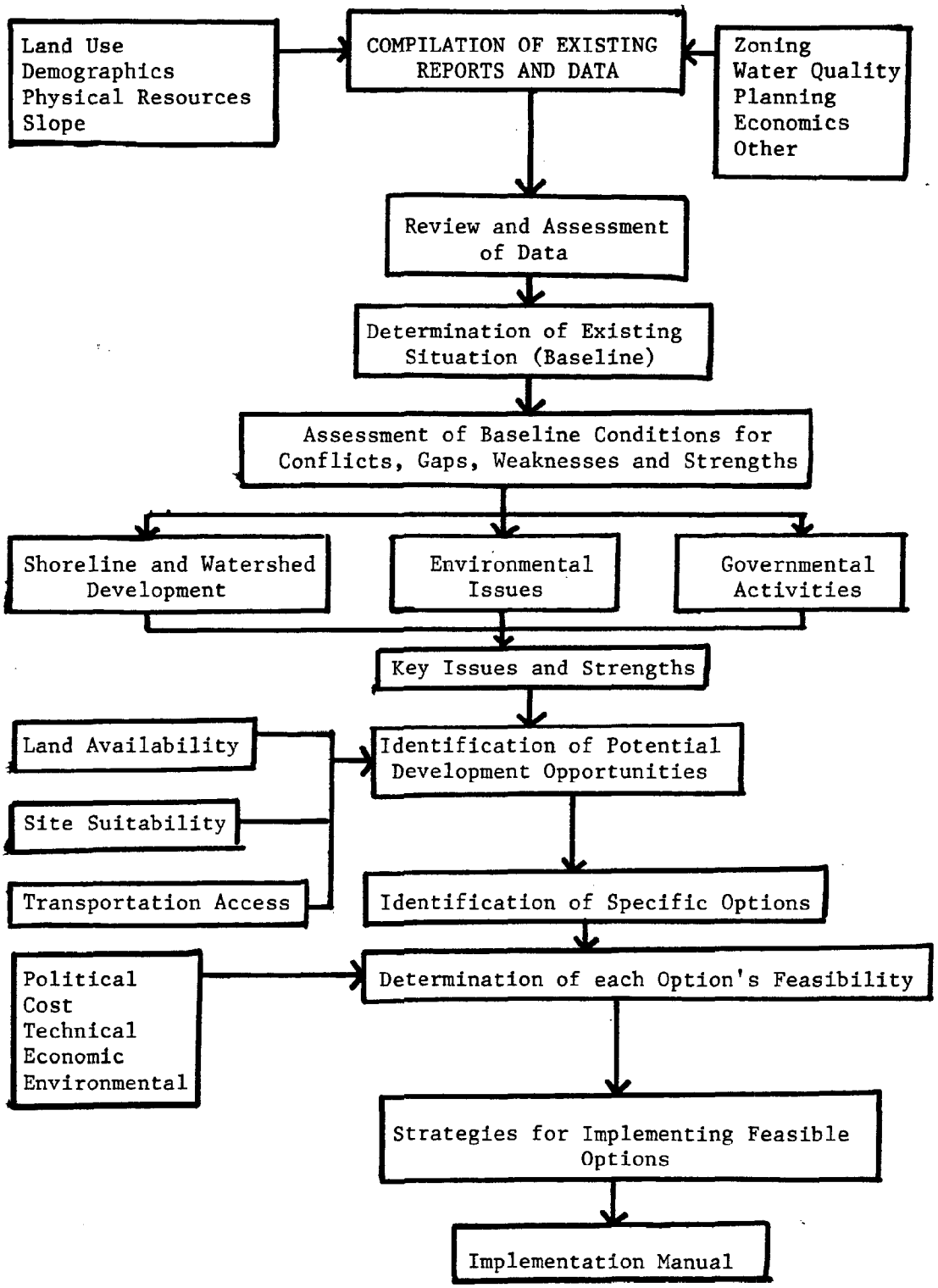
1. Inventory of Existing Conditions

   An overall need was an understanding of the local governmental units and how they interact or fail to interact. This was and remains critical to the project's success because it is apparent that successful implementation will require cooperative efforts by the governmental units within the study area. The study committee and local governmental personnel provided key insights in this area throughout the study effort and the cooperation exhibited has already resulted in a meaningful and significant improvement in intergovernmental cooperation.

   The basic purpose of this specific task was to determine the baseline condition for Manistee Lake and its surrounding environs. This included utilization of existing data whenever possible (much of which was compiled by the County Planning staff) and when needed, selected development of new data to fill the gaps if this was deemed necessary to develop an adequate understanding of Manistee Lake.

2. Assessment of Weaknesses and Strengths of Manistee Lake

   The purpose of the initial inventory and the establishment of the baseline condition for Manistee Lake was to allow the identification of the various types of development, environmental pressures and government actions which currently, positively or negatively, effect the overall condition of the Lake. This work in particular reviewed the trends that are occurring; that is, are the current conditions improving or deteriorating as time passes. It further attempted to identify, wherever possible, the key variables that are at play in determining the direction the trend is taking.




MANISTEE LAKE STUDY METHODOLOGICAL LOGIC PARADIGM

3. Identification and Presentation of Options

Manistee Lake's shoreline currently supports heavy industries, intensive water-oriented recreational use as well as community/commercial businesses. The key to the future of Manistee County and, in particular, to those communities located around the Lake is how the assets represented by the Lake can be developed to create more jobs, attract more tourists and increase the total dollars coming into Manistee County without destroying either the Lake itself or any of the existing entities now supported by it. It is possible that options for growth in one area will be in conflict with options for growth in other areas. Thus, the key concerns in this task were two-fold: (1) identify all potentially viable options and (2) determine the optimum mix of options which results in the greatest economic benefit with the least amount of detrimental environmental impact. This task, as presented, was the key task in the study. The project team used several qualitative methods to evaluate options. These included ranking of uses, and screening techniques (e.g., barriers, conflictual issues, physical weaknesses, a qualitative cost-benefit assessment and an evaluation of political acceptability and implementability).

4. Recommendations

Based on the output from the above work elements, specific recommendations were developed aimed at meeting the long-term needs of Manistee County and Manistee Lake. These recommendations were first presented to the Manistee Lake Management Committee and then upon completion of their revision to the County Planning Department for review and critique. The presentation of recommendations was comprehensive and structured so as to insure that input was received from both groups concerning problems, goals and strategies related to the implementation of the recommendations.

5. Manual for Implementation

The key to this study is the realism of the recommendations, that is, their implementability, and the effective communication to those who must take the next step of how to go about implementing them. As noted earlier, it is the Manual for Implementation which is unique to this study and it is this Manual that is the critical output of the study; thus a significant portion of the project effort was directed toward insuring that this Manual met the criteria established and would result in implementable recommendations that could be carried out at the local governmental level without the need for

additional expenditure of public funds for consultant support.

6. Local Review

Upon completion of the basic study, draft reports were made available for County Planning and County Commissioners as well as the general public. As a result of this review, final revisions to the draft report were made and the final Project Report (Volumes I and II) were printed with copies provided for further distribution to Manistee County and the Department of Natural Resources.

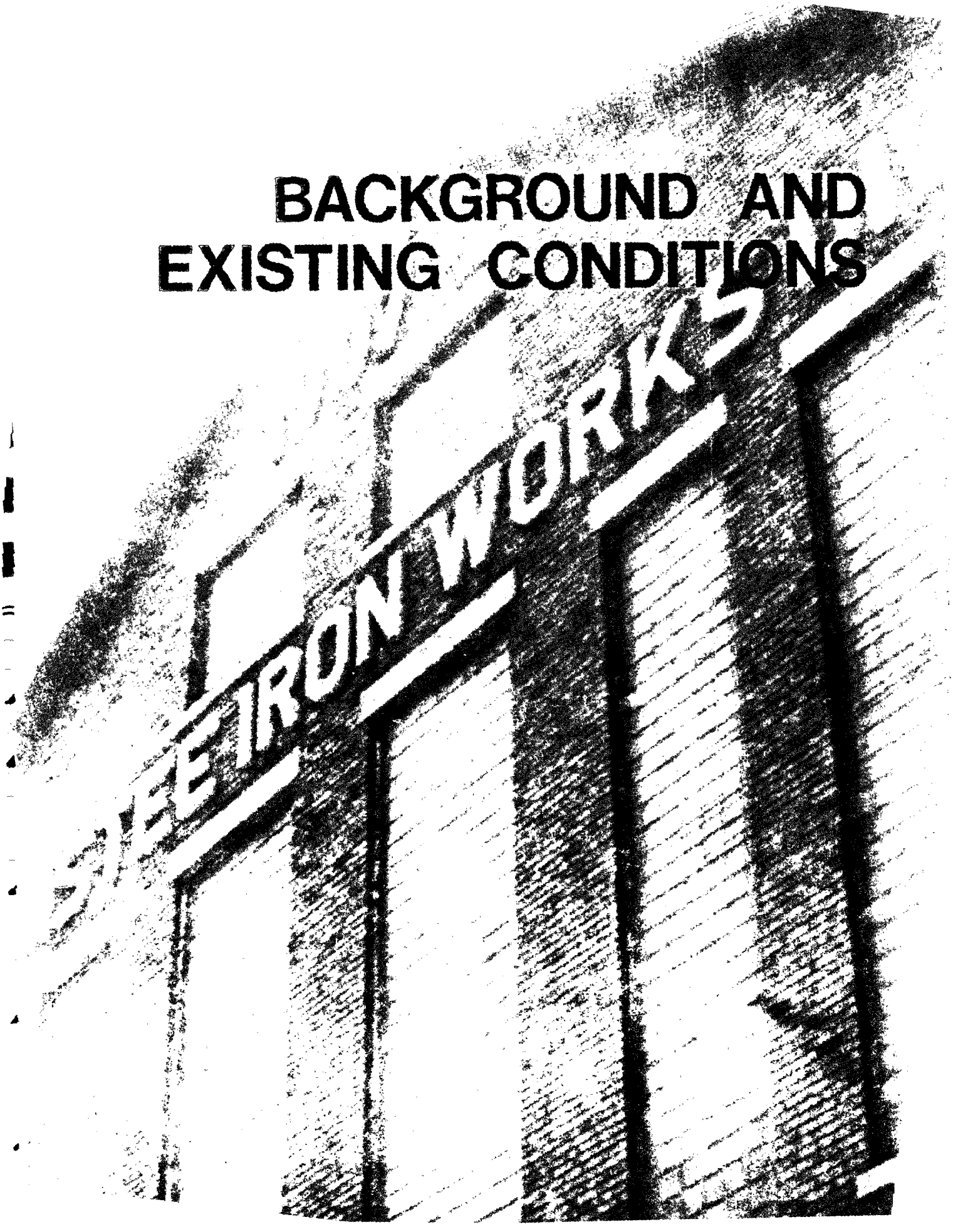
It should be noted that with the completion of local review and finalization of the Final Report, the effort has only begun. It is now that the work of the local governmental units begins and the process of implementation starts. This is the critical phase.

D. Structure of Report

The report on the Manistee Lake Management Plan consists of two volumes. Volume I is a summary report containing the information utilized during the analysis and planning effort. The final section of Volume I present the recommendations as agreed to by the lake study committee.

Volume II is the implementation manual. This volume reviews the selected options for implementation; outlines the general approach to implementation; and then presents the steps to be taken to implement each option.

# BACKGROUND AND EXISTING CONDITIONS



# SECTION II

# BACKGROUND AND EXISTING CONDITIONS

A. Manistee Lake -- Overview

1. Location

Manistee Lake is located just four and one-half hours from the major metropolitan areas of Chicago and Detroit. Major highways servicing the area are US-31 north and south and M-55 east (see following page for Location Map). Within a radius of 250 miles, there exists a market of almost 25 million people and within 400 miles it is over 50 million people. The latter represents over 20% of the U.S. population.

The Big Manistee River and the Little Manistee River flow into Manistee Lake. Manistee Lake empties into Lake Michigan through an outlet referred to in this plan as the channel.

Cities adjacent to the service area of Manistee County are Traverse City, Cadillac and Ludington. The metropolitan areas of Detroit, Grand Rapids and Traverse City are economic centers of influence over Manistee County.

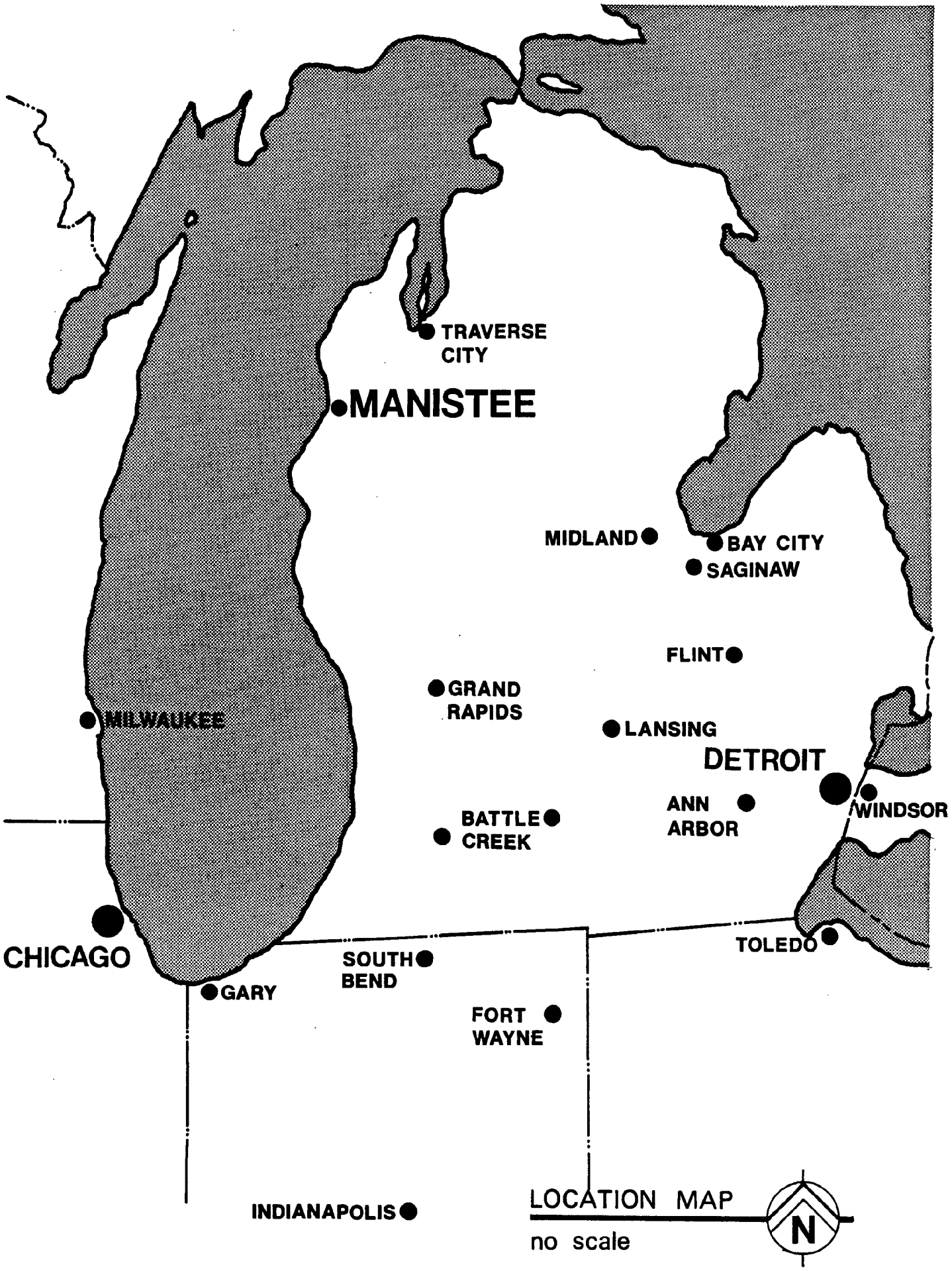
2. Economic Context

For most of its history, Manistee Lake has been used as a harbor. There are groins in Lake Michigan that serve as entry to the short channel (2.8 km) into the Lake. Manistee Lake itself is narrow and relatively deep with no natural beaches.

The first industry was lumbering, with the first saw mill erected in 1841. The industry lasted for 80 years, with a peak of 35 saw mills. Wood chips and organic matter are present at many locations in the bottom sediment. A natural outgrowth of the lumbering industry was a tannery and a pulp and paper mill. A pulp and paper mill has been in operation in this area since 1881 and is now owned and operated by the Packaging Corporation of American (PCA). For years, varying quantities of waste, including black-liquor, were dumped directly into the Lake. In 1951, a pipeline was laid under Manistee Lake to its terminus in the lagoons in Section 17, north of Stronach.

Condensate from the black-liquor recovery process were dumped into the ponds on the east side of Manistee Lake and held for infiltration. The process water is now treated and then pumped through an underground pipeline to an outlet in Lake Michigan. Condensation cooling water is pumped from and discharged into Manistee Lake.

Two other major industries have developed in the proximity of Manistee Lake. One is salt and the other is chemical brine. The salt industry, until 1954, used individual salt wells (down to 2,000 feet) which, historically have effected the waters of Manistee Lake. Since 1954, a gallery method (down to 3,800 feet) of mining salt has required back flushing,


TRAVERSE CITY
MANISTEE
MIDLAND
BAY CITY
SAGINAW
FLINT
GRAND RAPIDS
MILWAUKEE
LANSING
DETROIT
WINDSOR
ANN ARBOR
BATTLE CREEK
CHICAGO
TOLEDO
SOUTH BEND
GARY
FORT WAYNE
INDIANAPOLIS
LOCATION MAP
no scale
N

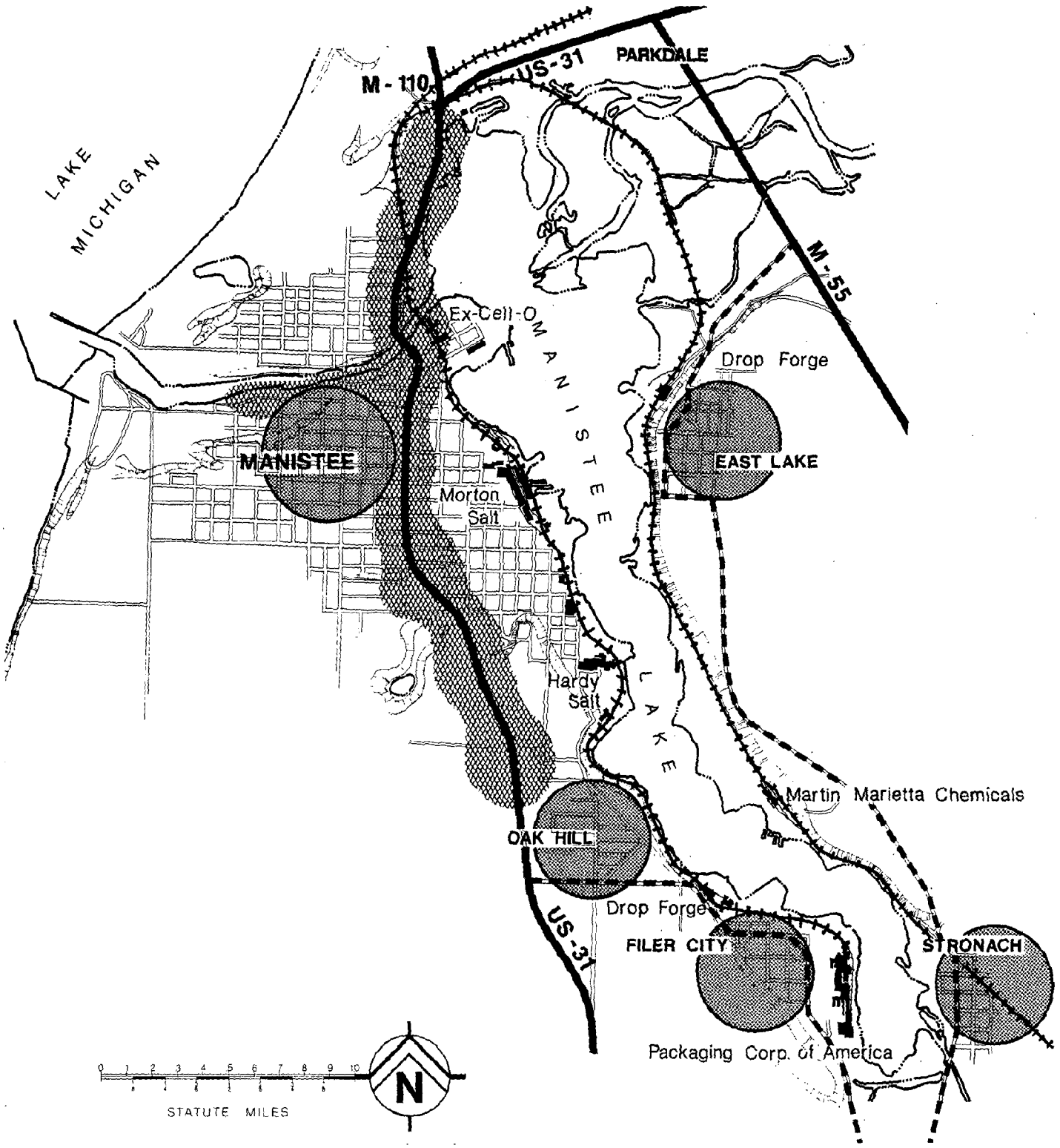
which is collected in pits. There isn't any new individual well mining underway. The ground water is fouled for water wells around the plants. It is also thought that the near surface ground water travels to Manistee Lake.

The second mining industry is the chemical brine industry. One of the elements extracted from the brine is magnesium. The brine field is between 2500-2700 feet deep. The well, when properly constructed and operated, does not contaminate the deeper ground water.

The potential for contamination of Manistee Lake exists in the monitored outfalls and in the unmonitored spills, salt gallery backflushings, overflow of lagoons and in leaks from the numerous pipelines crossing beneath the Lake. This contamination enters the near surface ground water and moves towards and into Manistee Lake. Childs (See Reference 24, Appendix A) presents a map of the near surface ground water pollution and the direction of movement. Since the breakline between Manistee Lake and Lake Michigan is west of the plants all the ground water pollution areas around the Lake move toward Manistee Lake. All areas east of Manistee Lake flow into the Lake, including the PCA lagoons.

The use of the Lake as an uncontrolled depository for waste has stopped. However, this does not mean that all pollution has stopped. Rather, it means that through Federal and State control of point sources, the amount of direct waste or detrimental environmental pollution sources entering the Lake has been greatly reduced. However, it can still be significantly polluted by accidents and piping and other failures which are not detected and corrected. Industry and other sources can still unfavorably affect the water and bottom sediment of Manistee Lake. The current industrial plants are shown on the map on the following page. A key point to be kept in mind when discussing total point source elimination is that the cost to a great extent is geometrically related to a decrease in pollution levels; that is to say that as you move closer to 100% removal of pollutants the costs for removal escalates rapidly and in all cases probably passes any reasonable cost-benefit point before 100% removal is achieved.

The area's industry includes two salt mining companies, two chemical brine mining and processing companies, a paper pulp manufacturing company, a steel forging company and a Waste Water Treatment Plant (WWTP) which are monitored by National Pollution Discharge Elimination System permits (NPDES). Smaller recreational services such as a boat company and marina area are also currently located on the Lake.




## TRANSPORTATION/INDUSTRY

- STATE TRUNK LINE
- COUNTY PRIMARY
- RAILROAD
- URBAN AREA
- COMMERCIAL

The following data summarizes key economic information related to the major governmental units involved in the Manistee Lake Study.*

MANISTEE COUNTY: T21N - T24N --- R13W - R17W

About 570 square miles.

See the Manistee County Land Use and Development Policy for physical description of the county. The county has 14 municipal townships (17 congressional townships), five villages and one city.

State Equalized Tax Assessment (1981)

Total: $282,458,255

Personal property: $62,649,753

Real property: $219,808,502

| | |
|---|---|
| Agricultural: | $21,251,959 |
| Commercial: | $21,450,978 |
| Industrial: | $20,437,189 |
| Residential: | $143,562,310 |
| Timber/Cutover: | $12,985,808 |
| Developmental: | $120,258 |

Millage:

Manistee Public Schools or Onekama Consolidated Schools, or Freesoil Schools or Kaleva-Norman-Dickson Schools or Bear Lake School or Mesick Schools or Benzie Central Schools; Manistee Intermediate School District (ISD) or Traverse Bay ISD or Wexford County ISD or Mason County ISD; Westshore Community College (WSCC); County; townships: millage ranges from 32.6123 to 47.5023 exclusive of city or village taxes.

County: 5.2 mills, operation
.35 mills, Dial-A-Ride voted
.4233 mills, West Shore Hospital, voted

Tax Collected: $1,468,782.93 on 5.2 mills
$1,686,925.44 on 5.9723 mills

MANISTEE TOWNSHIP: T22N-R16W and part of T21N-R16W and part of T22N-R17W

About 45.5 square miles.

The township has the highest spot (950 feet above sea level) in the west half of Manistee County. The Big Manistee River and delta are in the south portion of the township. It is the southern extent of the fruit (cherry, apple, peach) farm belt which extends north to the Traverse City area. Bar Lake and its large associated wetland separates a resort area along Lake Michigan from the inland agricultural region of the township. The population center is

* The primary source for the summary information concerning the government units around Manistee Lake is a Manistee County Planning Commission memo dated February, 1982.

located in the Parkdale area at the north end of Manistee Lake.
State Equalized Tax Assessment: (1981)
Total: $33,152,374
Personal property: $7,824,600
Real property: $25,327,774
Agricultural: $2,876,972
Commercial: $1,245,202
Industrial: $962,757
Residential: $18,185,280
Timber Cutover: $2,057,563
Developmental: $ 0
Millage Rate
Township, Manistee Public Schools, ISD, WSCC, County: 39.9223 mills
Township 1.5 mills county fixed allocation
Property taxes collected by the township: $49,728.56

EASTLAKE VILLAGE: Section 7 and part of Section 6, and part of Section 5, T21N, R16W

About 1½ square miles

The village is mainly scrub oak growing in sterile sand, with a small area in residential use and a small area within the Big Manistee River State Game Area. The village is mainly a bedroom community to the Manistee Lake area. The village maintains a park on a bayou just off Manistee Lake. The village has one commercial store -- a small party or neighborhood store -- and plant number two of the Manistee Forge Corporation. Large landowners in the village are the village, Manistee Forge (Manistee County Economic Development Corporation), and Hardy Salt Company.
State Equalized Tax Assessment: (1981)
Total: $3,414,485 (Breakdown by class for the village is not available)
Millage Rate:
Village, Township, Manistee Public Schools, ISD, WSCC, County: 47.9223 mills.
Village: 8 mills general operating (legal maximum 15 mills).
Property taxes collected by the village: $27,315.88

STRONACH TOWNSHIP: T21N-R15W and part of T21N-R16W

About 55.25 square miles

The township's main land area is to the east of the south end of Manistee Lake. The bulk of the township is characterized by flat sterile sand areas with pin/scrub oak secondary growth. There are three major exceptions: the Little Manistee River corridor; the Udell Hills, and large wetlands on the northwest side and southeast side of the Udell Hills. The Little Manistee River has been proposed as a state Wild and Scenic River. Ownership along the Little Manistee is mainly private, and inland further, by the U.S. Forest Service. The DNR maintains an egg take weir for trout,

salmon and steelhead on the Little Manistee River in the Township. Higher quality soils, clay, gravel and boulders are found in the Udells, resulting in large pine stands, mature beech-maple forests, and higher quality oak growths. The wetlands are associated with water systems which are predominantly outside Stronach Township -- not the Little Manistee River. The wetland northwest of the Udells are the source of Claybank Creek which flows north to the Big Manistee River. The wetland southeast of the Udells are associated with Lake-of-the-Woods in Norman Township.

The township's center of population is in the area of the community of Stronach near Manistee Lake. Just to the north of this community are Packaging Corporation of America dumping ponds. A significant wetland is associated with the delta area of the Little Manistee River at Manistee Lake.

Stronach's land area is about half in public ownership; the Manistee National Forest.

State Equalized Tax Assessment: (1981)
- Total: $26,856,831
  - Personal property: $14,368,702
  - Real property evaluations: $12,488,129
    - Agricultural: $199,190
    - Commercial: $79,094
    - Industrial: $5,508,999
    - Residential: $5,826,771
    - Timber/cutover: $874,075
    - Developmental: $0

Millage Rate:
- Township, Manistee Public Schools, ISD, WSCC, County: 36.9223
- Township 1.5 mills, county fixed allocation

Property taxes collected by the township: $40,285.25

FILER TOWNSHIP: T21N-R17W and part of T21N-R16W

About 17 square miles (pending city annexation disputes).

Filer Township is immediately to the south of Manistee City and experiences strip development to the south of the city. The north portion of the township is residential, with older established residential/commercial/industrial areas east of U.S. 31 and new residential areas to the west of U.S. 31 to Lake Michigan. Summer resort areas along Lake Michigan have "matured" to year-round residential neighborhoods. The central and southeast portions of the township are forested, mixed pine and oak interspersed with small inland lakes and small wetland pockets. A small area in the south part of the township and on the east side is in agricultural production.

State Equalized Tax Assessment: (1981)
- Total: $34,502, 705
  - Personal property: $9,868,900
  - Real property: $24,633,805

Agricultural: $12,500
Commercial: $3,060,923
Industrial: $5,086,237
Residential: $16,474,145
Timber Cutover: $0
Developmental: $0

Millage Rate:
Township Manistee Public Schools, ISD, WSCC, County: 38.9223
Township 1.5 mills county fixed allocation
1.0 voted for operation (swimming pool and solid waste)
1.0 voted for fire protection
Property taxes collected by the township (3.5 mills): $120,759.47

MANISTEE CITY: Section 1,2,11,12, part of 13, T21N-R17W and part of Section 18, T21N-R16W (pending annexation).

About 3 square miles

The city is the industrial and commercial center of Manistee County, as is the entire Manistee Lake area. It is the only city in the county. See the Manistee Downtown Preservation and Development Plan for further detail on the city's description.

State Equalized Tax Assessment: (1981)
Total: $55,624,885
Personal property: $8,570,420
Real property: $47,054,465
Agricultural: $ 0
Commercial: $10,388,605
Industrial: $3,583,435
Residential: $33,082,425
Timber/cutover: $ 0
Developmental: $ 0

Millage Rate:
Manistee Public Schools, ISD, WSCC, County: 35.4223 mills
Manistee City: 19 mills general operation
1 mill, solid waste
Tax collected: $1,112,497.91 (20 mills)

3. Political Context

Manistee Lake and the channel are affected by the rules and regulations of a number of local, state and federal jurisdictions including Manistee City, Manistee Township, Eastlake Village, Stronach Township, Filer Township and Manistee County. Each political subdivision has some impact upon the Lake and in some way will determine the success of the implementation program. The following description summarizes the current political structure of the relevant political entities:

MANISTEE COUNTY

Manistee County is not zoned. The County Planning Commission staff provides technical assistance to municipalities in the county for planning and zoning on a request basis.

Planning in the county has been spotty. Starting in 1975 the county started planning by adopting a County Sketch Plan. Since then, portions of the county comprehensive plan have been worked on, one component at a time. All the components are not done, and earlier components are now old enough to need updating. Some components have been published, and some of those formally adopted. Some components are reflected only in minutes and files in the Planning Department in the Courthouse.

The county maintains the full range of offices and services, except that there is no Department of Public Works and thus no parks system, no county water or sewer systems, fire service, and so on.

County services include bus transportation, hospital, road commission, planning, airport (shared with the city), library system, jail, Sheriff's Department, including Marine and Animal Control units, detective unit (shared with the city), county drains, tax billing and tax assessment office and staff, Department of Public Health (shared with Mason County), Cooperative Extension Service (shared with Michigan State University), Friend of the Court (shared with Michigan), Plat Board, Emergency Services (Civil Defenses) (shared with USA government), Medical Examiner (coroner), Mental Health (shared with State of Michigan and Benzie County), Social Services (predominantly Michigan funded), Medical Care Facility, Veterans services, Soil Conservation, Building Code Inspection, County Agricultural Fair, Substance Abuse. In addition, contributions are made for Manistee Recreation Association, Manistee County Historical Museum, and Manistee County Chamber of Commerce.

The county also finances elected officials and their offices. Voters in the county elect 11 commissioners (reapportionment will change the County Board to nine members in 1983) every two years; clerk; treasurer; prosecutor; sheriff; drain commissioner; register of deeds; circuit court judge, district court judge (shares with Benzie County and State of Michigan); and probate court judge.

MANISTEE TOWNSHIP

Manistee Township has a zoning board, not a planning commission. The township has been operating under its present zoning ordinance since 1956. That part of the township north of Manistee Lake and the Manistee River (along U.S. 31 in Parkdale) is zoned "Residential Commercial" allowing a mix of retail, commercial and houses to exist. The DNR Manistee River State Game Area is zoned "Heavy Industrial". The Oak Grove Cemetery and land to the west of the cemetery is zoned "Agricultural". The agricultural district allows single family housing indiscriminately in its agricultural area.

The township ordinance is not based on an adopted plan, nor is there record of an informal plan. The ordinance has not been kept up to date. It is currently out of step with the recent (1978) Zoning Enabling Act amendments and recent court decisions. The ordinance does not incorporate high risk erosion setbacks along Lake Michigan.

The present zoning board is working on zoning revision, but has not made a great deal of progress in the last 1 to 1½ years.

Manistee Township is a general law (Article VII, Section 18, Michigan Constitution) township. The township hires one custodian, volunteer firemen. Manistee Township is one of the best equipped fire departments in the county. Their volunteers are well trained, and some provide training to other volunteer fire departments in the county. The township elects a supervisor, clerk, treasurer and two trustees to four year terms.

EASTLAKE VILLAGE

Eastlake Village has a zoning board, not a planning commission. The village has been zoned since 1976. The portion of the State Game Area in the village is zoned "Public/Green Area". The Manistee Forge Corporation property is zoned "Industrial". The remainder of Eastlake's Manistee Lake shoreline is zoned "Agricultural" (the area does not have soil -- sterile sand -- suitable for farming).

The ordinance is not based on an adopted plan. A lawyer wrote the original ordinance. It has been updated by the village to comply with the 1978 Zoning Enabling Act amendments. There may be some problem concerning Eastlake's mobile home regulations in light of recent Michigan Supreme Court rulings.

Eastlake is a home rule village, with a charter. Voters elect a village president, clerk and treasurer each year and five council members every two years. The village hires a "Village Man" who works full time as the D.P.W. (parks, streets, custodian, snow plow driver), and maintains a village volunteer fire department.

STRONACH TOWNSHIP

Stronach Township just formed a planning commission and transferred all the powers and duties from its zoning board to the new planning commission. The township has been zoned since 1968. It is not based upon a formal plan, nor is there any record of informal planning. There is a serious question whether Stronach could produce the necessary documentation to show that the ordinance was properly enacted according to the enabling statutes in effect at that time. The ordinance does not comply with recent enabling act amendments (1978) and is in direct conflict with recent Michigan Court rulings, particularly dealing with mobile homes. Land use situations in Stronach have changed since the ordinance was adopted, and total revision of the ordinance is likely. The

township has contracted with the Manistee County Planning Commission to provide their planning commission with the necessary work for revising and updating their ordinance. Depending on the frequency of township meetings, the project could take a year or more.

"Heavy Industry" zoning exists from the township's north boundary on Manistee Lake south (including Martin Marietta) to Steinberg Road. South of Steinberg Road along Manistee Lake is zoned "Residential". Within the unincorporated Stronach town, there are blocks zoned "Commercial".

Stronach Township is a general law (Article VII, Section 18, Michigan Constitution) township. The township hires one custodian for building maintenance, cemetery and park maintenance and operation, and garbage collection. The township maintains a volunteer fire department and a large assembly hall. Elected officials are a supervisor, clerk , treasurer, and two trustees, serving four year terms.

FILER TOWNSHIP

Filer Township has a planning commission with all zoning powers. The township has been zoned since the mid 1950's and periodically updates its zoning ordinance. Filer's planning commission extends its activities by use of citizen committees for parks, development, special studies and so on. (Results of such studies led to the first Economic Development Corporation (EDC) formed in Manistee County, and one of the first in northwest Michigan; and the pending purchase of the Magoon Creek Natural area - ¼ mile of Lake Michigan shoreline.)

At present, Filer's zoning ordinance is out of date, in light of 1978 Zoning Enabling Act amendments and recent Supreme Court decisions. Also at present, the township has a draft revised ordinance which corrects the above deficiencies.

The township does not have a formal adopted plan which their zoning ordinance is based on. However sufficient minutes and public discussion, as well as oral explanation of a plan, exists. Filer has fought zoning cases successfully many times, including several in the Michigan Supreme Court.

Filer is a general law (Article VII, Section 18, Michigan Constitution) township. The township provides municipal water to Oak Hill, Filer City and U.S. 31 strip development areas. The township hires staff for custodial work, parks maintenance, water works maintenance and operation, and seasonally hires lifeguards, custodians, instructors to operate the township municipal swimming pool in Filer City. The township operates a volunteer fire department, also one of the best equipped in the county. Voters elect a supervisor, clerk, treasurer, and two trustees.

MANISTEE CITY

The city has a planning commission with zoning powers. The ordinance was adopted in 1958 and revised in 1963. The ordinance has a list of various zoning district boundary amendments, and most recently an amendment adding Planned Unit Development provisions to the ordinance. However, the ordinance is still out of date in terms of compliance with the 1978 Enabling Act amendments and recent Michigan Supreme Court decision. Planning in the city has been spotty, but informal plans have been done. In addition, planning efforts have resulted in published plans which are being implemented, but have not been formally adopted. The city's land use component of a comprehensive plan is old (1940's) and in part is the basis for the city zoning ordinance.

The city maintains full time city hall offices for clerk; treasurer; planning/building/tax assessment; department of public works including water and sewer, parks, grounds, streets, etc.; department of public safety including police and fire (and detectives jointly with the county); as well as numerous additional programs and activities such as financial support for Manistee Recreation Association, Chamber of Commerce, County Library, Airport, etc.

The city is a home rule city manager form of government. Voters elect seven council members at large, with each council member residing in one of seven districts. The council selects the mayor and a mayor pro-tem.

The current layout and land availability is not always equally divided among the political entities. However, it is important that on issues concerning the Lake, all the units agree and function as one for the betterment of all present and future residents of the Manistee area. Although this has not always been the case, there appears to be an increasing willingness on the part of all key parties to sit together and work out mutually acceptable solutions to problems. This trend must be supported and reinforced.

4. Potential - Generalized

Maintenance of a positive attitude toward future development will increase the chances for success economically. It is easy in face of adversity to cast stones at likely targets. These include, but are not limited to, existing industries, political units and labor unions. All have in the past contributed to real or perceived problems resulting in the economic climate which currently exists in the County. Many grievances will or may go unanswered until the economy begins to swing towards a more positive and healthy climate. Nevertheless, the success of the future depends on all cooperating and beginning the process now. The Manistee Lake resource is one that has been taken for granted in the past and it is now time to review and direct the potential of this

great water resource so as to maximize its future contribution to Manistee County.

B. Existing Industrial, Commercial and Recreational Use

1. Land Use

The "Existing Land Use" map which follows on the next page presents existing land use around Manistee Lake. As can be seen by a quick inspection of the map, the existing uses around the Lake fall into four major areas: commercial / business services primarily along the channel; industrial primarily along the west side of Manistee Lake; wetlands around the mouth of both the Little Manistee and Big Manistee Rivers; and rangeland along the middle and southeast side of the Lake. These uses reflect a significant problem when dealing with the Lake in that they show a developed body of water with limited unused land for future development. This factor results in a need to emphasize the reuse potential of existing facilities as well as the need to insure that those few vacant parcels that do exist are controlled so that they can be put to their highest and best use.

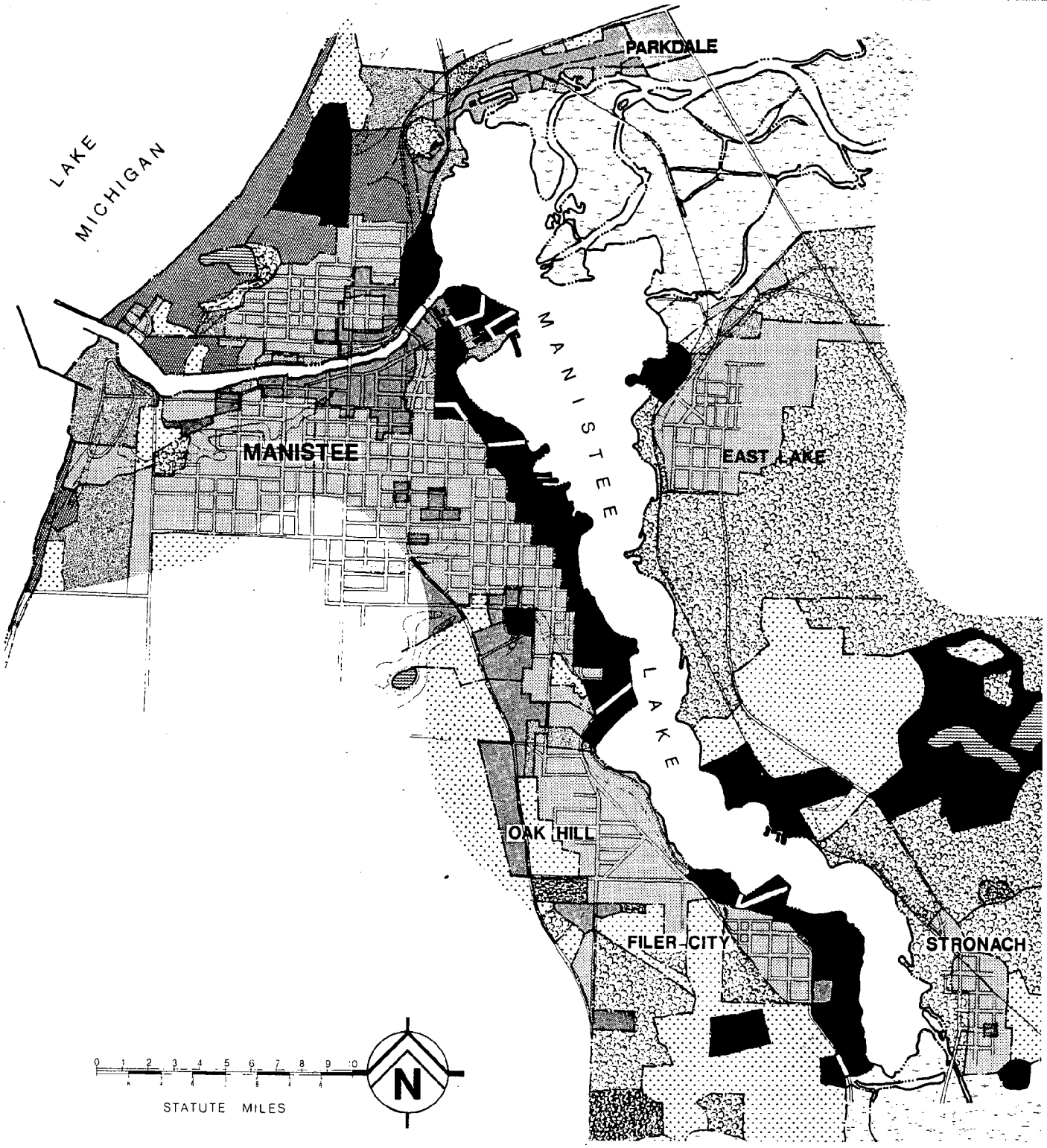
2. Zoning

A "Zoning Composite" map has been prepared to illustrate the zoning on land adjacent to the lake and channel. Each government unit may have slight differences in the working of each zone. However, for purposes of the map, all similar zones have been grouped together to illustrate overall zoning patterns.

It should be noted that large sections of land are inappropriately zoned for their current use. If one looks at the previous "Existing Land Use" map, for example, the delta area of the Manistee River is designated wetlands as it should be; however, as can be seen on the "existing zoning" map, it is zoned heavy industry. A similar problem exists for a part of the Eastlake's Manistee Lake shoreline which is zoned "agricultural" even though the area does not have soils suitable for agriculture as shown on the "Soils and Slopes" map which follow. These inconsistencies in zoning between the reality of what exists as reflected by existing land use and soils and slopes and the current zoning should be rectified with the zoning changed to reflect what exists and/or current and future need.

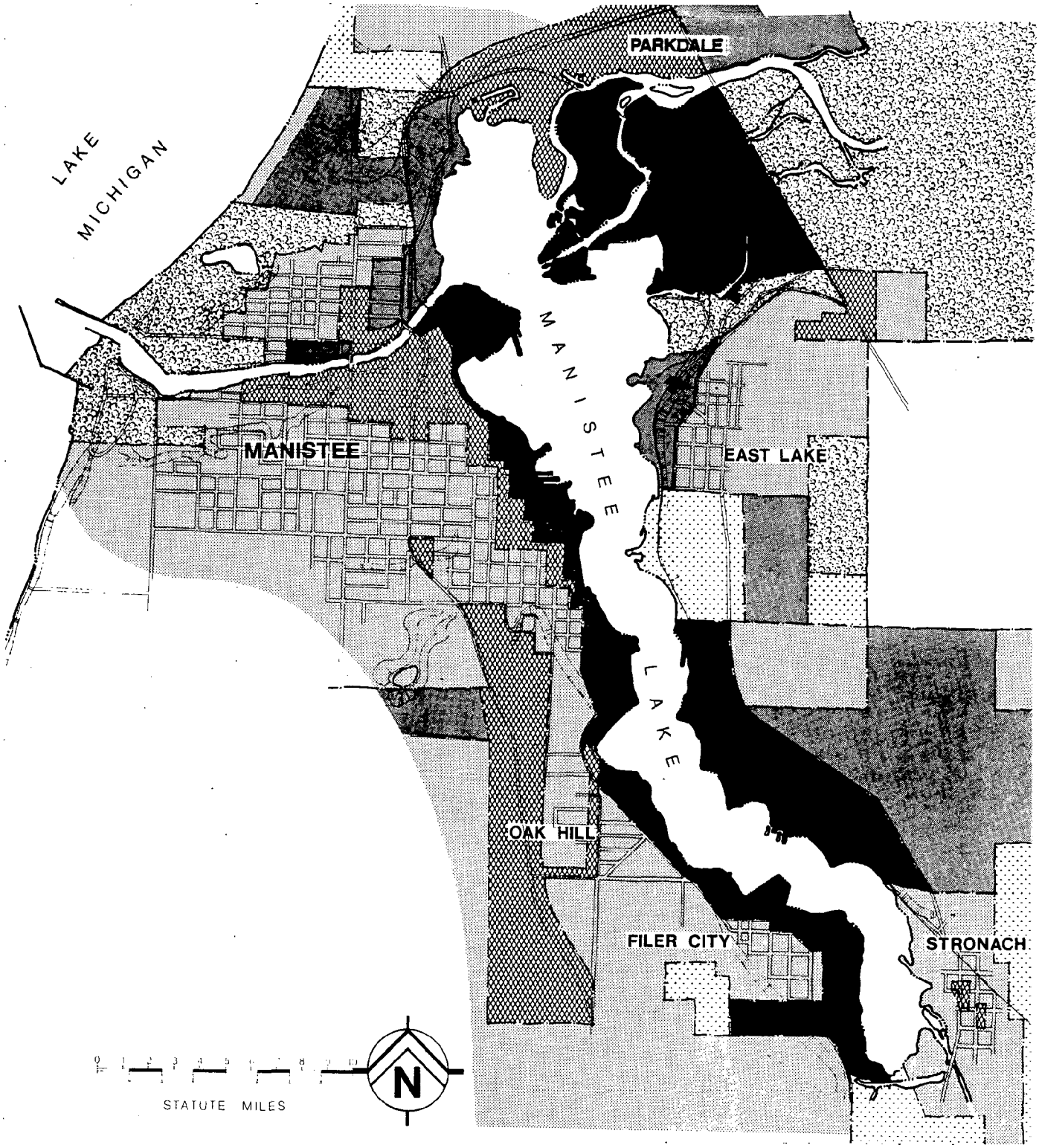
3. Ownership

As illustrated by the "Riparian Ownership" map, the majority of the land is held by private corporate ownership. In many ways this is a blessing because it provides the opportunity to work with a limited number of owners, many of whom are very interested in the Lake's development potential. The fact that



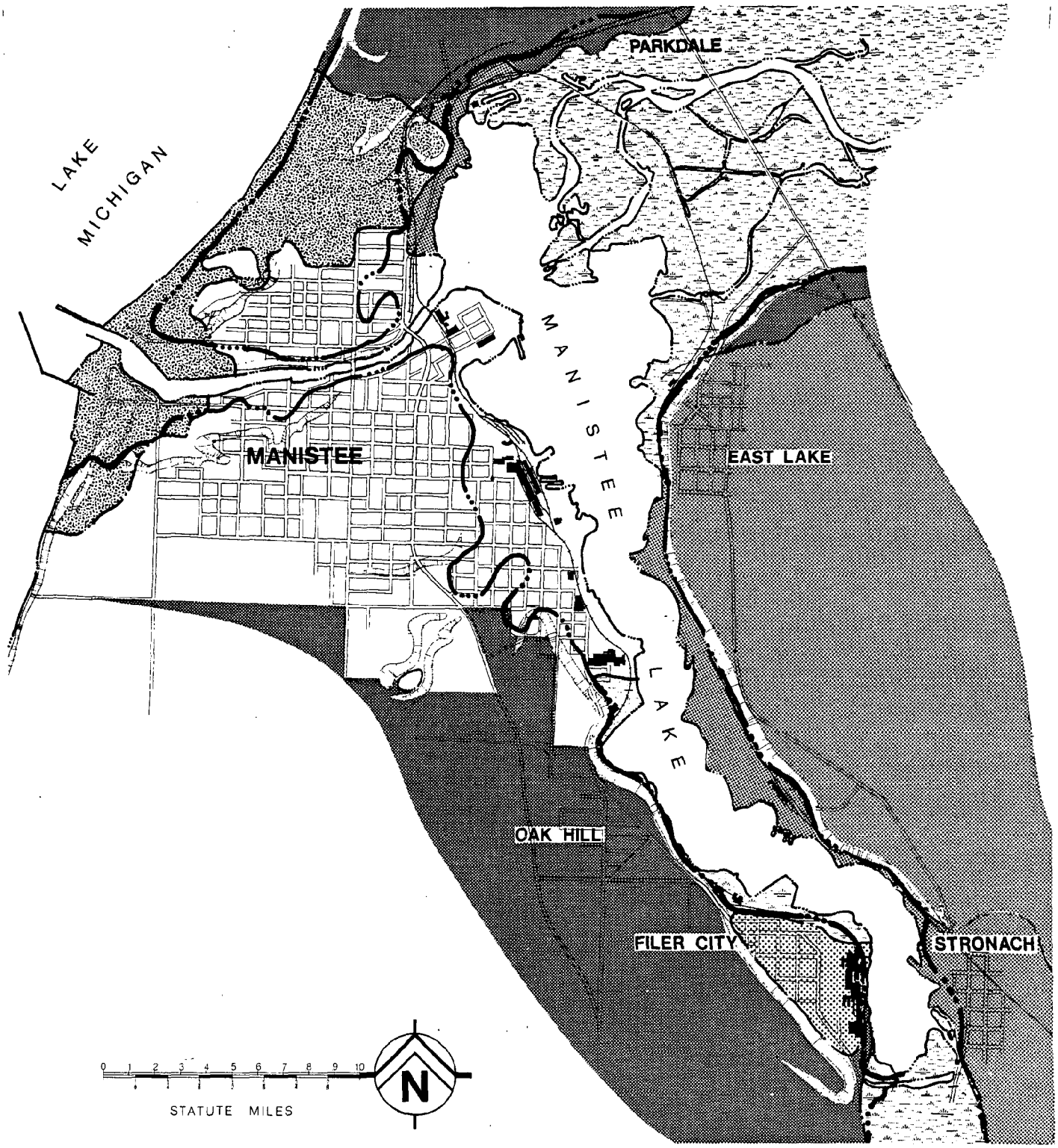

## EXISTING LAND USE

- RESIDENTIAL
- COMMERCIAL & SERVICES
- INDUSTRIAL
- TRANSPORTATION, COMMUNICATION, UTILITIES
- OPEN & OTHER
- AGRICULTURAL
- RANGELAND
- FORESTED
- CONIFEROUS
- RESERVIOR, DAM BACKWATER IRRIGATION POND
- BARREN
- WETLAND



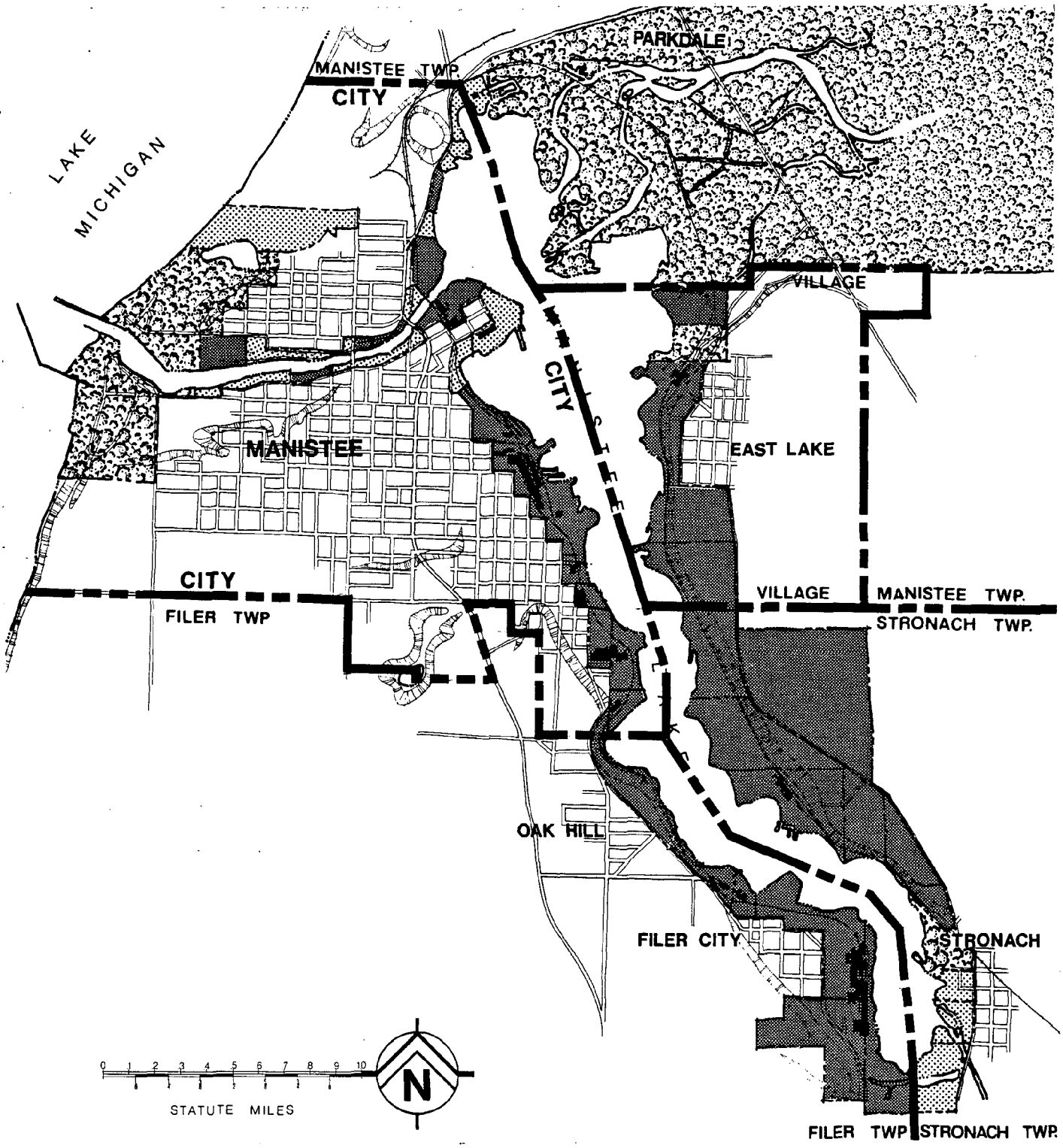

## EXISTING ZONING

- HEAVY INDUSTRY
- LIGHT INDUSTRY
- RESIDENTIAL
- AGRICULTURAL
- WATERFRONT, PUBLIC, FOREST
- COMMERCIAL




## SOILS AND SLOPES

- A-2: GRAY CALM
- B-1: RUBICON
- D-2: CROSWELL
- H-1: DUNE LAND
- H-6: ALLUVIAL LAND
- SLOPE OVER 15%
- SPECIAL FLOOD HAZARD




# RIPARIAN LAND OWNERSHIP

- CORPORATE
- PRIVATE
- PUBLIC
- MUNICIPAL BOUNDARY

those parcels that are available for potential development are controlled by a limited number of actors thus facilitates future possibilities rather than deters them (for a complete listing of ownership see Appendix C, "Manistee Lake Riparian Land Ownership").

4. Topography and Soils

The shorelands topography in the northern basin of Manistee Lake although characterized by modest slopes ( as shown on the "Soils and Slopes" map) is limited in development potential because of the large area of protected wetlands; in the southern basin, slopes are generally steep (15% or greater) and in many areas greatly restrict development potential because of their closeness to the shoreline, and/or their high erosion potential. The southern basin shore has been modified in places to reduce slopes and create industrial sites and to allow for storage of waste materials.

The key characteristics of the soils surrounding Manistee Lake are below. The distribution of these soils around the Lake is visually portrayed on the "Soils and Slopes" map presented earlier:

Gray Calm: This is a sandy soil with severe seepage characteristics.

Rubicon: This is a well drained soil with rapid permeability. Slope areas are very difficult to vegitate.

Crosswell: This is a wet soil with good to fair bearing capacity.

Dune Land: Sand soil with little vegitative bearing capacity.

Alluvial Land: This is a wet or marshy soil with little bearing capacity and with water presence.

5. Climatological Data

The climatological data presented is based on county-wide information and is not specifically Lake-related. It does, however, demonstrate the mild and acceptable climatological conditions which exist in the area and which are conducive to most, if not all, development options proposed for the areas surrounding Lake Manistee and the channel. Specifically, the influence of Lake Michigan on the climate of Manistee County is strong throughout most of the year. Because of the prevailing westerly winds, spring and early summer temperatures are cooler than would be normally expected at this latitude and cooler than those observed in central and eastern Michigan. Similarly, in the fall and winter, temperatures are milder. Changing weather patterns often bring easterly or northeasterly winds which produce clearing

skies with associated colder night-time temperatures. This gives the county a climate which alternates between semi-marine and continental in character.

Precipitation is well distributed throughout the year with the summer season receiving an average of 17.74 inches or 57% of the average annual total. September is the wettest month while February is the dryest. Summer precipitation is mainly in the form of afternoon showers and thundershowers.

The average annual snowfall for Manistee is 81.7 inches. Snowfall totals increase to over 120 inches at the higher elevations east of Manistee. These figures reflect the importance that lake moisture has in producing the lake snow belt since the amounts are more than twice the annual snowfall received over central and southeast Michigan. However, the heaviest snows do not normally effect the Lake area directly and those snowfalls that do occur during the winter are normally fairly evenly distributed over a two or three month period.

The length of the frost-free period for Manistee averages 153 days. This period is somewhat shorter in the eastern margins of the county where continental climatic conditions become more prevalent and Lake Michigan has less affect. However, these averages do apply to the Lake area.

It is this climatological character of Manistee which helps contribute to the "quality of life" which exists year around in the area and which is and can be increasingly a major factor in attracting both new businesses/industries and tourists.

Climatological Data for the Manistee Area (1940 - 1979)

Latitude - 44° 14'
Longitude - 86° 18'
Elevation - 585'
Annual rainfall - 31.03 inches
Annual days over 90° F - 7
Frost free period over 32° F - 153
Mean daily maximum temperature - 55.3°F
Mean daily minimum temperature - 37.8°F
Mean temperature - 46.6°F
Highest temperature - 100°F
Lowest temperature - -23°F

Source: Climatography of U.S. - Climatological Summary, Michigan.

C. Demographics

The Manistee County Planning Commission has provided the study team with a 1980 census package showing population summary counts as follows:

| | 1970 | 1980 | % Change |
|---|---|---|---|
| Stronach Township | 513 | 826 | +61.0% |
| Eastlake Village | 512 | 514 | + 0.4% |
| Manistee Township | 2,875 | 3,209 | +11.6% |
| Manistee City | 7,723 | 7,566 | - 2.0% |
| Filer Township | 1,921 | 2,143 | +11.6% |

This data highlights the importance of the Manistee Lake area to the County. The five political units which comprise the area surrounding the Lake account for sixty-two percent (62%) of the total population of the County. The distribution of population surrounding the Lake is visually presented on the "Population Density" map on the next page. It should also be noted that the three townships surrounding the Lake have and continue to exhibit growth curves while the Village of Eastlake and Manistee City have stayed the same or actually lost population over the last ten years. The 1980 U.S. Census, Advance Final Counts, indicate a county population of 23,019 residents. This represents an increase of 12.9 percent over the 1970 count of 20,393 or an annual increase of slightly over one percent (1%). Table 1 summarizes the 1980 census by unit of government, and also includes similar information for prior census years back to 1940.

As Table 1 demonstrates, there has been a slight shift of population from the urban to more rural areas with most out-county townships experiencing a higher growth rate than those contiguous to the Lake (exception is Stronach Township).

Like many rural locations, Manistee experiences fluctuations in its daily population count due to such factors as the influx or loss of seasonal residents and migrant labor, vacationers, and other transient traffic. For Manistee these fluctuations result in population counts which (on an annual average) exceed base census figures. During winter months, Manistee's population may dip below its census level of 23,019 residents. During the warmer months, however it rises well above that amount. Indeed, during the summer months of July and August, the population of the County on any given day may be as much as fifty percent (50%) higher than the actual census count because of the large influx of transient visitors (e.g., tourists and summer-time cottage dwellers).

Projections contained in Table 2 were developed by the Northwest Michigan Regional Planning and Development Commission. They depict population estimates to the year 2000. The estimates reflect a 20% growth in population during the twenty year period from 1980 to 2000 or basically a continuation of the past ten year growth rate of approximately one percent (1%). This, however, we believe is a conservative estimate based on an assumption that the status quo in economic development will continue.

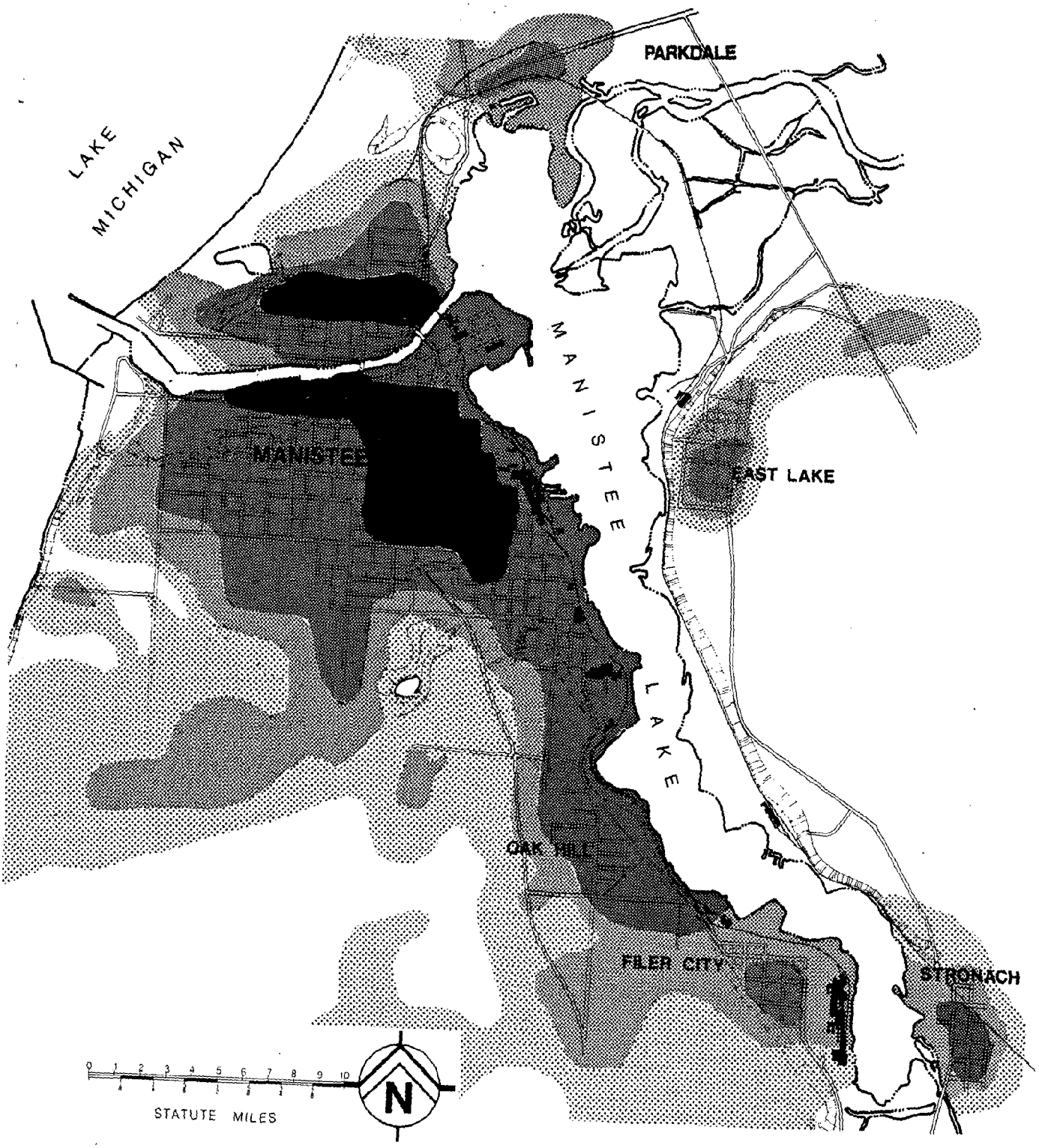

PARKDALE
LAKE MICHIGAN
MANISTEE
MANISTEE LAKE
EAST LAKE
OAK HILL
FILER CITY
STRONACH
0 1 2 3 4 5 6 7 8 9 10
STATUTE MILES
N
POPULATION DENSITY
5,001-10,000 PEOPLE/SQ.MI.
601- 5,000 PEOPLE/SQ.MI.
201- 600 PEOPLE/SQ.MI.
1- 200 PEOPLE/SQ.MI.

TABLE I

1980 CENSUS DATA

| | 1940 Pop. | 1950 Pop. | 1960 Pop. | 1970 Pop. | 1980 Pop. | 1980* Housing | % of Population Change 1970-1980 |
|---|---|---|---|---|---|---|---|
| Manistee County | 18,447 | 18,524 | 19,042 | 20,393 | 23,019 | 12,235 | +12.9% |
| Arcadia Township | 691 | 677 | 610 | 592 | 641 | 438 | + 8.3% |
| Bear Lake Twp. & Village | 1,228 | 1,162 | 1,101 | 1,444 | 1,658 | 825 | +14.8% |
| Bear Lake Village | 327 | 364 | 323 | 376 | 388 | 178 | + 3.2% |
| Brown Township | 521 | 513 | 507 | 689 | 631 | 291 | - 8.4% |
| Cleon Twp. & Copemish | 714 | 642 | 540 | 555 | 764 | 420 | +37.7% |
| Copemish Village | 241 | 255 | 232 | 237 | 287 | 122 | +21.1% |
| Dickson Township | 571 | 505 | 483 | 627 | 777 | 513 | +23.9% |
| Filer Township | 1,251 | 1,335 | 1,704 | 1,921 | 2,143 | 786 | +11.6% |
| (Filer City/Oak Hill) | | | | | (856) | (322) | |
| Manistee City | 8,694 | 8,642 | 8,324 | 7,723 | 7,566+ | 3,247 | - 2.0% |
| Manistee Township | 1,390 | 1,594 | 2,173 | 2,875 | 3,209 | 1,270 | +11.6% |
| Eastlake Village | 412 | 376 | 436 | 512 | 514 | 196 | + 0.4% |
| Maple Grove Township | 877 | 779 | 764 | 750 | 1,071 | 609 | +42.8% |
| Kaleva Village | | 346 | 348 | 377 | 445 | 255 | +18.0% |
| Marilla Township | 379 | 322 | 260 | 213 | 266 | 169 | +24.9% |
| Norman Township | 399 | 447 | 491 | 678 | 944 | 1,240 | +39.2% |
| Onekama Twp. & Village | 708 | 833 | 894 | 1,128 | 1,444 | 1,045 | +28.0% |
| Onekama Village | 340 | 435 | 469 | 638 | 582 | 317 | - 8.8% |
| Pleasanton Township | 451 | 487 | 469 | 486 | 627 | 514 | +29.0% |
| Springdale Township | 258 | 204 | 195 | 199 | 452 | 362 | +127.1% |
| Stronach Township | 315 | 382 | 527 | 513 | 826 | 506 | +61.0% |

* Figure 2.68 people per household (living unit). Housing counts include all maintained care for houses, apartments, cabins, summer homes, mobile homes, medical facilities, jails.

TABLE 2
POPULATION PROJECTIONS
Based on Advance Final Counts (April 1981)

| 1980 Census | 1985 Projection | 1990 Projection | 2000 Projection |
|---|---|---|---|
| 23,019 people | 24,378 people | 24,765 people | 27,626 people |

At the same time, the County was experiencing a 13% population growth (1970-1980), it experienced a 17% growth in number of people employed (1970-1980).

The Bureau of Census has estimated that 40 to 50 percent of people/families moving to nonmetropolitan areas do so for job related reasons. The percentage is higher for people moving to rural counties which are not next to metropolitan counties, such as Manistee County.

Demographers feel that traditional rural growth has been due to retirement and recreational opportunities. This seems to have been the case for Manistee County. However, in the past 10 years (1970-1980) the national trend for rural areas to lose population and urban areas to grow has reversed. Cities now lose people and rural areas are gaining. This is definitely true in Michigan. Northwest Michigan, in particular, has experienced population growth. Manistee county has shared in that growth. The traditional increase in retirees and recreation-oriented residents contributes to an increase in available jobs.

Data tends to verify this experience in Manistee County. The increased numbers of jobs in Manistee seem to be in sectors of the economy which are service, retail, tourist, real estate and finance oriented.

Increases in employment in Manistee County, in order of growth, have been in the following MESC job classifications: 1. local government (West Shore Hospital opened in this time period, increase in Manistee City employees and county/road commission employees); 2. retail jobs; 3. service jobs; 4. metals, transportation equipment and machinery (except for a dramatic drop from 1979 to 1982); 5. finance, real estate and insurance; 6. state government; 7. transportation, communications and utilities; 8. nonwage, self-employed and farm. The county lost job opportunities in areas of food processing, publishing, paper manufacturing, chemicals, lumber and furniture. It is important to note that the county's largest category of jobs falls in nonwage, self-employed, farm, manufacturing, retail and services.

One can generalize based on the data available that people moving to Manistee County which have come for employment related reasons have entered the retail, service, or self-employed segments of the economy. Heavy industry and manufacturing segments employ fewer people and indeed have reduced in total numbers since 1978. Possibly as a result of this, Manistee County's population growth has not kept pace with other northwest Michigan counties. Most

counties surrounding Manistee (except for Lake) have a growth of 20 to 40 percent. In many cases, that growth is accompanied by visible business and industrial growth such as seen in Grand Traverse County and major tourist, recreation growth similar to that experienced in Benzie County.

As noted in a recent planning department memo, the lack of available jobs in the manufacturing and industrial sector in all probability has contributed to Manistee County's slower population growth. This seems especially true if it is accepted that employment is a major reason for moving to nonmetropolitan areas.

Two other sources of population growth in Manistee County have been retirees and those who just wanted to get away from the City to an improved quality of life. Both of these sources have contributed to the County's population growth in the last ten years and will continue to in the next ten years. Manistee County is in an attractive area of Michigan which will continue to receive growth pressures; population growth, land use conflicts, excessive demands for government services, and a need for jobs.

It is not out of line to expect another 12 percent increase in Manistee County's population in the next 10 years (1980-1990). It is possible that that rate is conservative. A major breakthrough in economic development efforts -- such as new industry, better tourist promotion, or a major boost in agriculture -- will provide incentive and conditions for more growth.

A final point that should not be overlooked when discussing Manistee County's demographics and particularly the Manistee Lake area is that although we define Manistee as a rural county that statement in many ways is very misleading. It is to a large extent unique among the counties of the State in that physically (e.g. total land use) and in population total it exhibits ruralism but in criteria such as civilian labor force in manufacturing as a percent of the total civilian labor force and annual weekly earnings of the employed labor force it ranks with the more industrialized counties of the State.

D. Physical Characteristics of Lake and Channel

1. Lake Structure: Whole Basin

: Surface area: 929 acres
: Mean depth: Approximately 26 feet
: Maximum depth: ± 50 feet
: Volume: 1,251,391,063 cubic feet
: Hydraulic detention time: Varies with section

Source: United States Environmental Protection Agency, "National Eutrophication Survey, Working Paper Series, Report on Manistee Lake, "EPA Region V, Working Paper No.201, Pacific Northwest Environmental Research Laboratory, March, 1975.

2. Lake Structure: Basin Sections

For purposes of illustration the Lake has been divided into three sections. The morphometry of two of these sections is given below.

Southern Section

: Surface area: 393 acres
: Mean depth: 24.4 feet
: Maximum depth: 37 feet
: Volume: 419,711,963 cu. ft.
: Hydraulic detention time: 0.071 years

Source: See Appendix A, Source 20.

Central Section

: Surface area: 493 acres
: Mean depth: 29.4 feet
: Maximum depth: 49 feet
: Volume: 631,679,100 cu. ft.
: Hydraulic detention time: 0.107 years

Source: See Appendix A, Source 20.

The third section -- the northern section has a shorter hydraulic detention time than the other two sections. It is considered that the northern section water reflects the water quality of the Big Manistee River; that is, that the northern section is basically a continuation of the river itself and reflects its characteristics.

3. Tributary and Outlet

a. Tributaries

| Name | Drainage Area | Mean Flow |
|---|---|---|
| Manistee River | 1820 sq miles | 1,997.2 cfs |
| Little Manistee | 218 sq miles | 186.4 cfs |
| Minor Tributaries and Immediate Drainage | 14.5 sq miles | 19.9 cfs |
| Totals | 2052.5 sq miles | 2,203.5 cfs |

b. Outlet

| | | |
|---|---|---|
| Channel | 2059 sq miles | 2,203.5 cfs |

Water Depths/Water Level

Water depths are available from the Manistee Harbor chart. Transportation channel dimensions are also given on this chart. Depths presented on this chart are low water datum. Mean value depths 1969-1978 are approximately 2 ft. greater than mean water datum. Extreme values range from one foot less than mean water datum to between 4 and 5 feet greater than mean water datum. The maximum occurs in June/July and the minimum in January/February. The range in change of water depths, however, is not sufficient to have any negative impact on shipping or other potential water-related uses. The level of Lake Michigan does, however, have some impact on the water quality of Lake Manistee in that it controls the level of Lake Manistee's flow into the big lake and thus at times can restrict the rapid flushing of the Lake.

E. Lake and Channel Usage

1. Commercial Ship Transportation

The channel and Lake are currently capable of and do receive large lakers up to 600 feet in length. However, the capacity for this type of use is significantly greater than experienced. The channel's capacity is also, capable of handling the proposed tug barge operation that is currently under construction by the State.

2. Private Boat Usage

Private boat usage is heavy particularly during the summer months. Marinas, both private and public, and a series of public landings provide access to Manistee Lake and the channel. Boats can enter the Lake through the Manistee Channel. Recent information would indicate the boat usage continues to increase and it is certain that the demand for marina space during peak season is greater than that available.

3. Total body contact and other recreation

: Water skiing has been observed but is not prevalent. Safety is of concern because underwater hazards exist in parts of the Lake. In addition, Manistee Lake is not perceived (accurately so) nor promoted as a total body-contact lake.

: Swimming - no natural beaches exist on Manistee Lake. Additionally there are no cottages or riparian homeowners on the Lake. As noted, the Lake is not now and will not in the future be a total body contact lake.

: Fishing - Both warm and cold water fishing activity is intensive. Indeed, some of the finest fishing in the

State is available in Manistee Lake, its tributaries and Lake Michigan accessed by the channel. The use of the Lake for this purpose is heavy and will in all probability continue to increase in the future as the "quality of life" values of Manistee County are increasingly and more effectively promoted.

4. Water for Industry

Water is a proven asset for attracting new industrial development. This resource, as time passes, will become even more important as water availability takes on a more and more important role in site selection for industries. Those industries which have moved to the sunbelt and southwest in the sixties and seventies and are dependent on a reliable source of water for the operations will be increasingly frustrated by its lack and escalating price in the next few years. This will result in a strong and fairly rapid movement of these industries back to the Northeast and Midwest in the next ten years. Manistee County is in a unique position to take advantage of this movement.

F. Lake Water Quality

The water quality of the northern basin is almost totally determined by the flow of the Big Manistee River. This is due to the fact that the amount of river discharge is sufficient to rapidly fill this basin; thus, the "flushing time" and mean residue time (i.e., period of time during which pollutants remain in the basin) is short. This discharge originates outside the planning area. Moreover, it comes from forested and agricultural areas, and water quality from these kinds of lands is difficult to improve or control. In addition, there are not point sources (i.e., industrial discharges) in the northern basin. Thus, the water quality of the northern basin is for the most part not controllable by institutions within the planning area although obviously the County does have a role to play in determining the overall quality of the water under its jurisdiction.

On the other hand, the southern basin (consisting of those areas designated "central" plus "southern basins) has a water quality greatly impacted by point sources. Data developed by the Department of Natural Resources show that the Little Manistee River accounts for 39% of the total phosphorus loading which they have measured in the southern basin of Manistee Lake. This loading from the Little Manistee River is primarily from natural causes and thus is not controllable. Controllable sources (i.e., the WWTP, the sewer system, and the industrial sources) are responsible for only about 57% of the total phosphorus loading.

Significant improvement of the Manistee Lake fishery has occurred due to the reduction of point sources' discharges of

phosphorus and additional improvement will continue this trend. It is apparent that disagreements continue between the City of Manistee and the DNR regarding the performance of the City's WWTP. The key issue revolves around DNR's measurements of phosphorus loadings. The WWTP's NPDES Permit Final Limitations for total phosphorus is 1 mg/liter or 80% removal of phosphorus. Recent survey results (June 9-10, 1980) by DNR seem to indicate a loading of 2.3 mg/liter or only a 12% removal rates thus not meeting the NPDES Permit requirements (see Appendix A, source 48). However these results are being questioned by the City as being totally at variance with the WWTP's monthly operating report. It would appear that the City's questioning of the DNR results is valid based upon their on-going operating data. Final resolution of this issue is beyond the scope of this effort. Suffice it to say that the City has made significant improvements over the last ten years and that they continue to improve as time passes.

Additionally, the issue raised earlier of diminishing returns at high economic costs comes into play and must be addressed. It should be noted that much of the disagreement stems from the DNR classification of Manistee Lake as a "total body contact" lake. It has not been such in the past, it is not now and it will not be in the future. The activities on the Lake are recreational activities that do not require body contact with water The Lake is, as the committee correctly ascertained, a joint-use body of water; that is, it is a combination of uses. Those uses are recreational (non-body contact and primarily fishing); natural habitats and wetlands and industrial. The correct approach is not to try making the Lake what it is not and can never be (a total body contact lake) but rather it is to insure that the three "real" uses of the Lake continue and develop harmoniously with each other.

The emphasis in review of existing data on lake water quality that has occurred in this study is on water chemistry, and to a lesser extent on water biology. Data on physical parameters such as temperature, conductance and clarity, however, are also available if needed (see references in Appendix A).

The data reports or collections are summarized below and presented in chronological order with an assessment as to the usefulness and purpose of the data represent an extensive data base from which specific and in most cases quantitative determination as needed can be made in terms of potential impact of proposed action on lake water quality. Manistee Lake, fortunately, has been extensively studied and documented in terms of water quality data.

1. Water Chemistry

1967 Fish Taint Test, Manistee Lake, DNR, March, 1967.

Chemical analysis of water adjacent to fish cages collected at various sites offshore from industrial outfalls. DO, BOD, phenols and chlorides.

1970 Newton, Limnological Survey of Manistee Lake

Data was taken at 6 stations for 15 parameters at various depths. Compared earlier data from 1958 at 3 stations for DO, BOD, chorides and phenols.

1970 Hesse, Thermal Survey of Hardy Salt and PCA Discharge, DNR, September, 1970.

Dissolved oxygen data was taken at six stations with depth while measuring water temperature. Thermal plumes were developed.

1972 Report on Manistee Lake, EPA Region V, Working Paper No. 201, 1975.

Sampled 3 times during open water (from a helicopter) at two stations (north section to 22 feet) and southern section (to 38 feet). This is the only water chemistry taken at 3 different times of the year in the same year. They collected DO, calcium carbonate and nutrients (Nitrogents and phosphorus). Object of test was to determine trophic level (claims phosphorus limitation in November and nitrogen limitation in September; unclear for June).

1973 Grant, Water Quality and Biological Survey of Manistee
1975 Lake, 1973 and 1975. Report date 1977.

This was a most thorough survey. Twenty four stations at various depths for DO, BOD, chemical oxygen demand (COD), chlorides and phenols in 1973. Also, DO, nitrogens and phosphorus were tested at the surface and at bottom depth.

1980 Kenaga, Phosphorus and Chlorophyll A Survey, DNR, February 11, 1980.

Survey of total phosphorus and chlorophyll A was obtained at surface at 3 locations in Lake - one in southern section and two in central section.

Survey data of previous references was used to check model which provided calculations of phosphorus concentration in using measured phosphorus loadings from industrial, Manistee WWTP and tributary point source loadings.

1980 Kenaga, Revised Phosphorus Loading Analysis Using New Data in Vicinity of Manistee WWTP, DNR, September, 1980

New data for total phosphorus and chlorophyll A was collected April 24, 1980 at 4 locations. Model for phosphorus concentration was applied again and results were compared to the new data. Combined sewer overflows were added to the calculations. New tributary inlet data was also collected. This study provides (1) an assessment of the relative effect of the various phosphorus point sources, and (2) a method of estimating the effect of measuring added point sources with projected phosphorus loadings.

1981 Kenaga, Water Quality Survey of Manistee Lake - Phosphorus and Chlorophyll A, DNR, April 10, 1981

Water quality data was collected at the same approximate locations as in April 1980. In addition, Orthphosphate was collected.

NOTE: The last three studies, all by Kenaga, are controversial and are the major point of disagreement between the City and the DNR.

2. Biological Surveys

The first type of surveys consisted of obtaining the types and numbers of macro-invertebrates in the benthos by collecting dredge samples. Surveys were conducted by Serber 1953, 1954, Fetteroff 1975 and Grant in 1973, 1975. There was a marked improvement from 1957 to 1973 and some improvement from 1973 to 1975.

A second type of biological survey are taint tests of fish. Such tests are conducted by a panel eating cooked fish from selected locations. A series of such taste tests were conducted from 1966 through 1969. These tests were in response to complaints about the taste of the fish. It was established that the fish tasted poorer in Manistee Lake than in Lake Michigan and better in Manistee Lake near the tributary inlets. It was demonstrated that the tainted fish were off Packaging Corporation of America's outfall. The company made appropriate changes in its production process and the problem was eliminated. Fish taint tests in 1976 verified that the fish in Manistee Lake no longer tasted poorly.

3. Sediment Chemistry

Sediment biology was reported as part of the biological surveys. The only sediment chemistry available lakewide was the survey conducted in 1973 at 23 of the 24 stations (reported by Grant, 1977). Seventeen parameters were tested which included six heavy metals, two organic toxics, oil, phenols, solids, nutrients and BOD and COD.

Basch, 1971 (DNR) surveyed the bottom sediments in the vicinity of the outlet of the Packaging Corporation of America paper mill.

G. Point Source Water Quality

In determining lake capacity it necessary to measure the contaminant content of the current point sources. These are tributaries, industrial/WWTP NPDES outfalls and Combined Sewer Overflows (CSO) (when they exist). Measurement of tributary water quality has been conducted for many years. Industrial wastewater surveys were started by DNR in 1975. There exists a need for current sampling and analysis of dissolved oxygen (DO) to determine the lower level DO ranges.

1. Tributaries

Storet (EPA's computerized data base of point source water quality data) and the publication "Water Resources of Michigan" are two initial points for collection of tributary water quality (Big Manistee and Little Manistee). "Water Resources of Michigan" automatically includes data at the USGS stream gage stations. The Storet includes the stream gage stations and an occasional special study if conducted by the Federal Government.

Previous references of lake water chemistry have included measurements of the two tributaries and the channel. Recent DNR measurements include:

| | |
|---|---|
| 1970 Newton | Big and Little Manistee Rivers, Channel |
| 1973 Grant | Little Manistee, Channel |
| 1980 Kenaga | Big and Little Manistee Rivers |
| 1981 Kenaga | Big and Little Manistee Rivers |

The EPA also surveyed the Big and Little Manistee Rivers in 1972 and this data is included in the Storet data base.

Flow rate and physical parameters have all measured daily during each year at the USGS sampling (gaging) stations.

2. Industrial/WWTP Point Sources

The point sources from industry and the Manistee WWTP have been surveyed in 1975, 1976 for the parameters declared in the NPDES by the DNR of the State of Michigan. Some of the outfalls are monitored annually by the State and one, the WWTP, is reported to be monitored every three years. All relevant data from the initial series of surveys are presented in Grant. Upon completion of each subsequent survey DNR has issued a report which included survey procedure, findings and comments for further action.

3. Combined Sewer Overflows

CSO's were measured by McNamee, Porter and Seely in 1976 for the City of Manistee. The measurements were taken in both the CSO system and the receiving waters of Manistee Lake, the river channel and Lake Michigan. The fecal coliform standard of 200 MPN/100 ml was not exceeded in Manistee Lake or in its waters at the beaches.

The following summarizes pollution sources and waste loads:

a. Numerous residences within the study area utilize on-site sewage disposal facilities. While the chance of ground and surface water contamination is minimal in the dry upland areas with low population densities and away from the Lake, it increases in the more highly populated areas along Manistee Lake and Lake Michigan. Problems with such systems, for example, have been reported in the community of Parkdale.

b. Martin Marietta

This industrial use is located between the communities of Stronach and Eastlake along the eastern shore of Manistee Lake and the estimated flow of waste from the 200 employees is 7,600 gallons per day or approximately twenty two times the amount generated by a single family residence. Treatment is presently via a septic tank-tile field system and meets all NPDES requirements. Martin-Marietta shares use of an inductor system with Morton and Hardy Salt Companies behind the Chamber of Commerce and deep well injection system for disposal of their processed water.

c. Drop Forge (Plant Number 2)

This company is located in the northwest sector of Eastlake Village. Treatment occurs via 800 and 1,500 gallon septic tanks with a tile field.

d. Westshore Hospital

This facility is located two miles east of Manistee, in Manistee Township on U.S. 31. The wastewater flow generated by this facility is approximately 16,500 gallons per day. Sewage from the hospital and the Manistee County Medical Care Facility is pumped via a 6 inch force main to the City of Manistee's sewer system. During rainstorms, the wastewater may be diverted to a nearby tile field to prevent additional flow into Manistee's combined sewer system which outfalls to Manistee Lake. The diversion occurs very rarely.

e. Insta Launch

This recreational campground is located south of Parkdale and has a capacity of one-hundred and eighty (180) campsites. The campground also acts as a dumping station for trailers. The number is as high as 40+ per week during the peak season. The Insta Launch campground has just installed a 10,000 gallon capacity septic tank system.

f. Park in Southeast Area of Manistee Lake

Department of Natural Resources boat launch has a parking capacity of 161 and a 1,000 gallon septic tank for disposal.

H. Ground Water

The concern of ground water quality is two-fold. The first is available water supply. The City of Manistee has sunk four new wells in the last few years and is now drawing at about half capacity. The second concern is the contamination of Manistee Lake by ground water.

The concern of groundwater contamination is its entry into the Lake. A complete analysis of the impact of industry and the quality of ground water is presented in Childs' study, 1970 (See Appendix A for reference).

I. Existing Environmental Planning

Environmental planning has been conducted by Federal, State, Regional and local governments since the institution of the Clean Water Act in 1972. As is typical, these have included:

: Section 208 Wastewater Plans for point and non-point sources. These were developed by the Regional Council of Governments under State area EPA guidance.

: Section 201 Waste Water Treatment Plans conducted by local governments under the direction of the State.

: Harbor erosion mitigation and Manistee channel dredging reports by the Army Corps of Engineers (River Basins). The

latest being the "Maintenance Dredging of Unpolluted Harbor Sediments in Michigan", 1975.

J. Existing Strengths And Weaknesses Of Manistee Lake

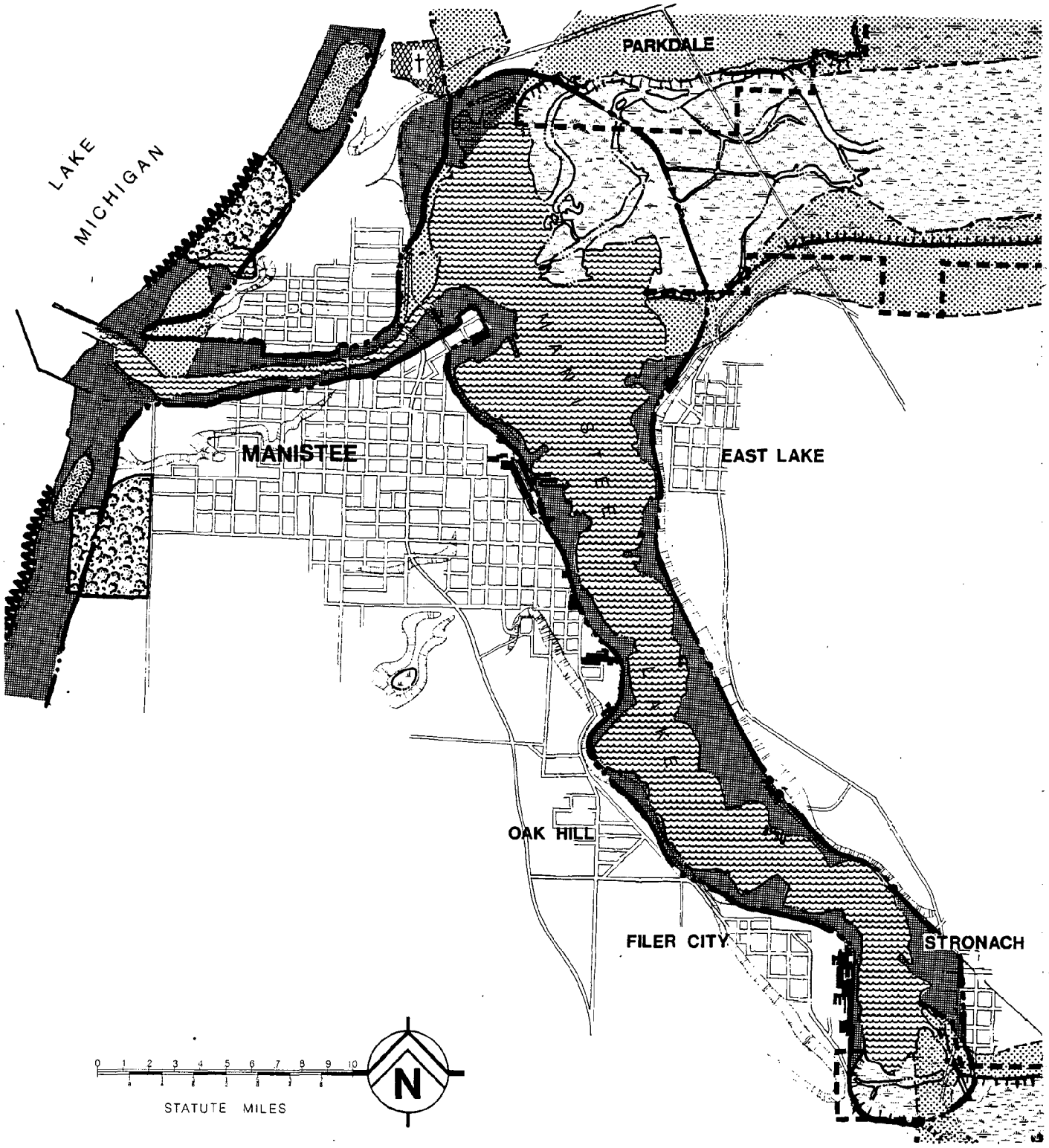
The Lake and the community has a mixture of strengths and weaknesses as expected. Many of the most important are visually represented on the "Significant Areas" map which follows on the next page. The following is a listing of first the strengths and then the weaknesses.

1. Strengths

: Physical characteristics of the Lake are positive because it is deep and is flushed reasonably quickly (65± days) by tributaries. This means that the water quality will improve quickly to adverse temporary impacts.

: The water quality of the Little Manistee River is good although, it does have naturally occurring phosphorus. Since it provides the source to a greater portion of the Lake, this means that the background level of the Lake has the potential of good quality. The Big Manistee River also has reasonably good water quality but does have the presence of phosphorus and nitrates from agricultural non-point source run off, primarily in the Big Bear Creek watershed. However, as the Big Manistee ONLY supplies the northern portion of the Lake and because the channel for the Lake is opposite the Big Manistee River, thus providing for rapid flushing the impact is not great.

: The water quality of the Lake is acceptable in the bacteriological counts to a depth of about 20 feet. The Lake was rated on roughly a scale of 6 at 4 by the EPA in 1973 for nutrient level. It ranked in the best quarter for nutrients of 35 lakes rated by EPA. It was in the middle of those lakes evaluated for dissolved oxygen (DO). This can be attributed to the Little Manistee River, the fairly rapid flushing rate and the twenty to forty-nine foot depth for most of the Lake. The Lake still has the potential to improve further in the Southern and Central sections in trophic level with improvement in industrial and wastewater treatment point sources. Related to water quality two additional items are of importance. The first is the importance of maintaining not only the integrity of the Lake's water quality but also that of the contiguous wetlands. These wetlands are important not only as open space, wildlife and recreation areas but also as an "oxygen factory" which assists in balancing the oxygen demand; that is, improving the Lake's dissolved oxygen. The second item of importance is that under all circumstances, care must be taken not to disturb the bottom sediments particularly in the central and southern basins of the Lake.




## SIGNIFICANT AREAS

### ENVIRONMENTAL

- Wetland Under Michigan Statute
- Wetland Not Under Michigan Statute
- Sand Dune

### RECREATIONAL

- Wetland Managed and/or Highly Used
- Non-Wetland Managed and/or Highly Used

### COASTAL ZONE MANAGEMENT

- 1000 Ft. Landward Boundary
- Environmental Concern
- Water Transportation Area
- High Risk Erosion

### CULTURAL & HISTORIC

- Archeological Potential and Known Sites
- Grave Yard

They are highly polluted and particularly toxic in heavy metals.

: There was a marked improvement in industrial point sources from 1958 to 1973 and a continuing overall improvement in total phosphorus concentration since that time but at a slower rate than prior to 1973. The slowing of the rate of improvement is not surprising in that an immediate improvement occurs once significant sources of pollution are reduced. Once this initial improvement occurs then continued improvement is incremental and at a much slower rate.

: The Lake has developed and is maintaining an improving overall water quality under a variety of potentially severe usages. These include six point source discharges under the NPDES permit program (i.e., Packaging Corporation of America, Morton Chemical Company, Hardy Salt Company, Martin Marietta Chemicals, Morton Salt Company and Manistee Waste Water Treatment Plant); commercial shipping docks on the Lake and heavy pleasure boat usage for fishing during the April - October period.

: Although the groundwater moving towards the Lake is not acceptable the ground water outside of the lakeward movement is acceptable for domestic usage.

: The availability of an almost unlimited supply of freshwater for industrial processes from the Lake provides great opportunities for attracting those industries heavily dependent on this resource.

: The existence of a harbor capable of handling large commercial lakers for shipping provides an opportunity to attract industries heavily dependent on the extensive utilization of raw materials in their manufacturing process. The same opportunity exists for those industries whose finished products are easily and more inexpensively shipped by water.

: The area surrounding the Lake is adequately served by rail services providing transportation in and out of the area using this transportation source.

: The existence of numerous vacant factories/buildings presents opportunities to new industries to move into well located and useable space at very competitive rates (See Appendix B for listing of vacant buildings located in study area).

: The existing natural resources (e.g., National Forest, River, Lake, Lake Michigan, fishing) provide a marketable package capable of attracting large numbers of additional tourists.

: The commercial/retail base for the area surrounding the Lake is strong as a basic asset albeit significantly under utilized, packaged and promoted (see "Manistee Downtown Preservation and Development Plan" June, 1981, for an extensive discussion of this matter).

: The existence of a skilled/semi-skilled work force provides a labor pool from which new industries can draw most of the skills needed in a new venture. As noted earlier, the Manistee area is unique in that it has characteristics of both a rural and an industrial county. One of the benefits to be derived from its long history of industrialization is an available work force which has the skills with appropriate training to handle most jobs that might be created.

: Available training programs to assist new industries in developing a well trained work force to meet their specific needs exists both at the State and Federal levels especially for areas which suffer from high unemployment as is now the case in Manistee County .

: There exists financial and tax incentives that are available from the Federal government, from the State and from local governmental units to assist new commercial and industrial activities during their start-up and development stage.

2. Weaknesses

: The extremely poor quality of the bottom sediment in the profundal zone (i.e, water in the lowest layer of a thermally stratified lake) and water in the deep water areas create a weakness. The nutrients and the high oxygen demand of the sediment will take many years to correct itself. The heavy metals in the bottom sediment are likely to remain far longer. The adverse effects of this situation is primarily in lowering severly the Dissolved Oxygen (DO) in the deeper water and the toxics affecting the fish. The potential exists to have a tremendous release of COD and BOD from the bottom throughout the Lake and this could cause major fish kills.

: As discussed earlier on page 44, the performance of the Manistee WWTP in removing phosphorus is in question by the DNR. However, even if DNR results are accepted because the influent contained less phosphorus the net result was a decrease in the total daily load of phosphorus. This may be attributed to the State phosphate ban in detergents, soaps, etc. The decrease was about one-third when compared to a survey in 1976. The current controversy between the City and DNR in continuing with the WWTP improvement program is a serious weakness in any Manistee Lake plan until it is resolved.

Economic expansion serviced by Manistee will discharge to the WWTP. The use of combined sewers and additional infiltration has at times caused flows exceeding the WWTP capacity. Separation and grouting will reduce the influent flow and that program is under way in some areas of Manistee City.

: The ground water in the region in which it moves towards Manistee Lake has elevated levels of chlorides. The high level has caused such fouling as to require the abandoning of wells. This is a weakness in that expansion in to areas in the greater Manistee region not served by the City may have to obtain water from remote wells. The groundwater on the east side of the Lake is most likely to be affected for domestic and process water. Cooling water is pumped from the Lake by most of the currently operating industries.

: The variety of Lake usage presents problems more than it is a weakness. The DNR views it as a recreation lake and institutes lake water quality restrictions such as total body contact. Yet the Lake is viewed as a harbor by the Army Corps of Engineers and as a significant economic area by the Coastal Zone. This is a conflict in intent, usage and restrictions. Specifically, this is a conflict between the Corps and Coastal Zone on one side and Michigan Department of Natural Resources on the other; the latter calling the Lake a total body contact lake. A further perceived conflict of usage is industry on the shoreline which both uses the lake water and discharges into it. The WWTP uses the Lake as a receiving body. This again conflicts with the DNR concept of a full body contact lake. The surprising aspect to all of this is that the Lake is of sufficient quality in coliform content to be accepted as total body contact. It is also heavily used for fishing and pleasure boating. It is used as a recreation lake. The only conflict that is missing is between swimmers/cottage or home owners and boaters. There are no riparian cottages or homeowners and few swimmers.

: In order to effectively deal with many of the problems and opportunities existing, cooperation between all government units is critical. One of the purposes of this study is to facilitate that process by creating an Implementation Manual which all units of government around the Lake can agree upon and cooperate to work toward. Hopefully, such cooperation will become a habit. It should be understood that while there will be disagreements, the governmental units must be able to have a major disagreement in one area, while at the same time cooperating on issues of common agreement.

: The lack of availability of local capital for investment either in the public or private sector is a major weakness. Many of the needs and opportunities for

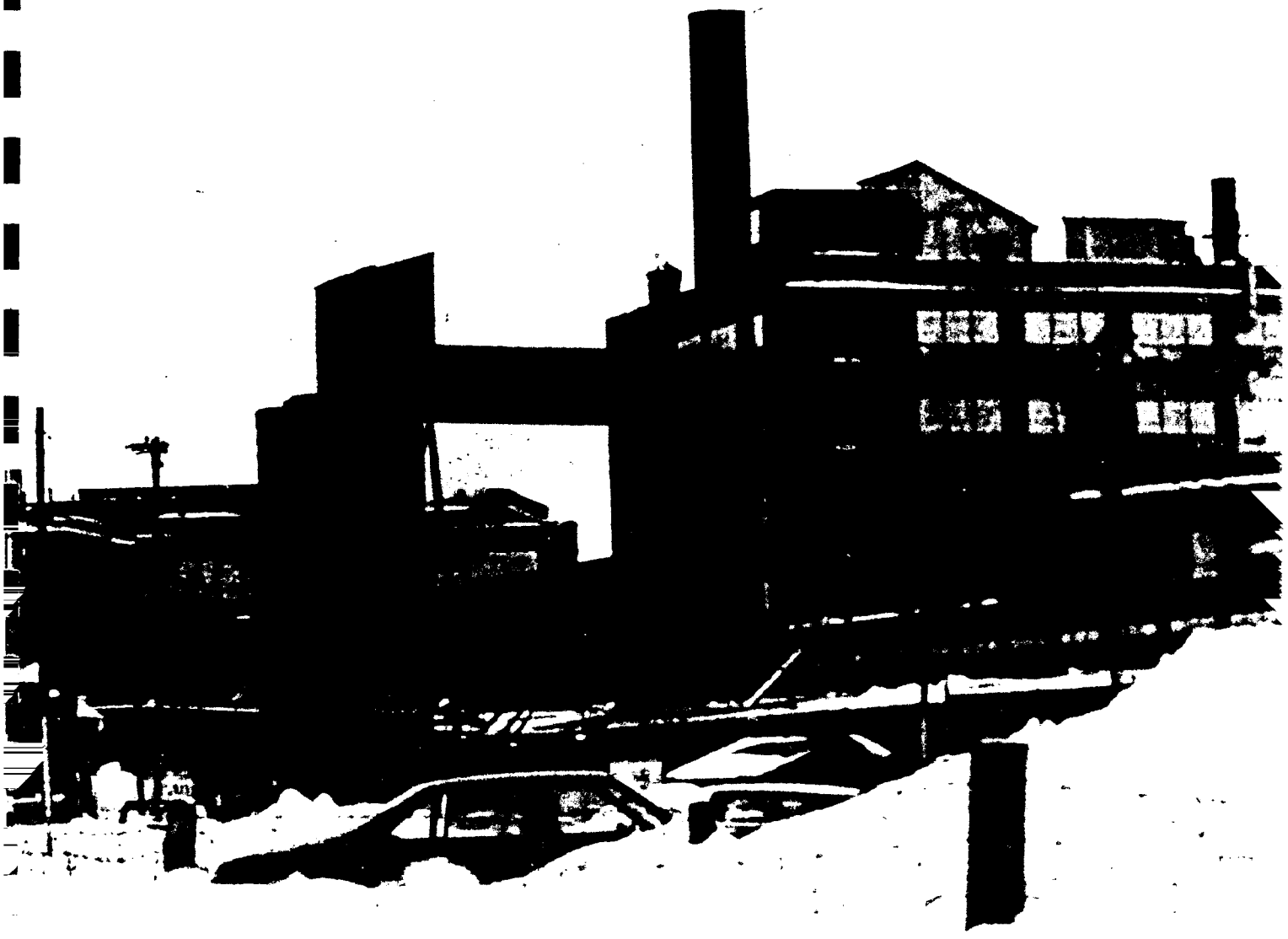
improvement require expenditure of either private and/or public sector investment dollars.

: Failure to agree on a coordinated program for attracting tourists including the failure to take advantage of State enabling legislation providing for a 2% room tax which could be used to promote the county is a weakness.

: A lack exists of a sufficient number of marina slips for pleasure boats (particularly of the larger size) during the summer.

: A lack of standard zoning, inappropriate zoning in many areas around the Lake, and zoning that is ill-founded in terms of being based on planning all exist in the study area and is a weakness.

# DEVELOPMENT ISSUES AND OPPORTUNITIES



# DEVELOPMENT ISSUES AND OPPORTUNITIES

# III

## A. Shoreline And Watershed Development

### 1. Shoreline

The shoreline of Manistee Lake and the channel is dotted with a wide variety of uses. Primarily the channel is lined with the rear elevation of commercial establishments and large areas of vacant land near the inlet and outlet. Much of the land area adjacent to Lake Michigan is flat with some tree cover. Most of the area north of the channel outlet was used for sand mining operations which have now left the area.

The north section of Manistee Lake contains small industrial areas and commercial marina operations. Also the delta of the Big Manistee River is a wetland, and managed as a State Game Area with dike controlled water levels.

Manistee Lake on the east side contains two residential areas and a major industrial site, Martin Marietta, which is in the process of cleaning up and stabilizing the banks. The high bluffs at the south side of this portion of the Lake in the past have been heavily used for industrial dumping.

The heaviest concentration of industrial development mixed with residential and commercial operations is located along the west side from the channel to Packaging Corporation of America.

### 2. Lake

The Lake is deep and flushes frequently due to the volume of water entering from the two rivers. The Lake contains many underwater hazards which should be removed prior to any development of the Lake as a major shipping port. Strong positive elements which support this potential use of the Lake include: (1) areas can be serviced and controlled in case of massive environmental accidents (e.g., oil spills), and (2) the Lake is deep adjacent to shore and, with minimal negative effect, will allow dock facilities to be built. However, due to the contaminated nature of the sediment, any construction must minimize disturbing this layer.

### 3. Greater Manistee

This area is rich in history, culture and potential. Industry must be encouraged to resettle in this area, and if currently here, it must be encouraged to stay and expand. The industrial growth under this plan can and must co-exist with recreational development and complement each other.

### 4. Watershed

It can be expected that development will occur at Manistee Lake because of its traditional role in the area's industrial

growth. Highways, railroads, shipping, airport and other services point to Manistee Lake as a center for industrial and recreational activity and provide the links necessary to service that expected growth.

B. Environmental Protection Requirements

The pollution problems or potential pollution problems in Manistee Lake are:

: The DNR data places the cause of the phosphorus loading on the Big and Little Manistee Rivers and the Manistee Waste Water Treatment Plant. A minor contribution is attributed to the industrial outfalls and combined sewer overflows. As noted earlier, this issue remains unresolved.

: Dissolved oxygen is quite low in the deep basins. (Affects cold water fish).

The cause is thought to be the excess BOD and COD in the sediment and high COD in the deep water. If the sediment continues to release a BOD and COD after the industrial outfalls are reduced in BOD and COD, the elevation of DO in the deeper water will probably take a long time to alter.

: Organic and organic toxics in the sediment.

Sediment is considered extremely polluted. Metals, DDT and PCB's are elevated throughout the lake bottom. The source of pollution was the industrial outfalls over the many years, previous to 1970. The outfalls are now under NPDES permits.

: Chlorides are elevated in excess of EPA standards.

The source of the chlorides (and other brine chemicals) is the salt and brine mining. In addition, the near surface groundwater has a high chloride content around the mining facilities. The groundwater direction is towards the Lake for these localized groundwater areas. The groundwater may continue to contribute chlorides to the Lake.

: Highly localized pollution from oil spills, combined sewer outfalls and pipeline leaks.

The lake water quality is good above about 20 feet. Below 20 feet the quality falls off until it is extremely poor in the deep basins. The bottom sediments are highly polluted in the profundial zones. However, the sediments are much improved above a depth of twenty feet, provided the location is not near industrial outfalls. The groundwater adjacent to the lake is rich in chlorides in several locations.

If Manistee Lake had not been used and abused by man up to 1970, it would be a high quality lake to the bottom. The

bottom itself would not be the toxic burden that it is now. However, the Lake has been abused and a method had to be devised to assess future man-made impacts as to whether or not they are environmentally acceptable.

The method devised has two steps to it. The first is to determine if a proposed use will have an environmental impact and what kind. The magnitude is not considered, because, if the pollutants that are introduced do not affect priority recreational uses, then the amount is not of prime interest. In some cases, bad or harmful pollutants are introduced, but the quantities are known to be small. The second step is to examine quantity of impact on pollutants that are elevated now and to test if the proposed use typically elevates the pollutants significantly.

Development of an office building in Manistee is a form of expansion that is likely to have little discernible impact because it does not discharge directly into the Lake. Its effluent is processed first by the WWTP. Addition of another salt plant would have to be evaluated for its quantitative impact on chloride, COD, solids and total phosphorus levels in the Lake and chloride levels in ground water. Its consideration would be quantitative.

The first step must be developed and applied to sort out those economic expansion opportunities that affect the capacity of the Lake to maintain its current quality.

The method requires the matching of the requirements in water quality pollutants of each use to the pollutants impacted by each of the other uses and its own use.* The following three tables display the basis of the method. Table 3 shows the interaction of the uses through water quality parameters.

Table 4 adds the affects of non-user impacts on the uses through water quality parameters. These are tributaries; the WWTP, combined sewer overflows and surface water. Table 5 presents the currently stressed water quality pollutants and the uses they affect.

The candidate economic expansions by location to be developed will be evaluated by Tables 3 and 4 to see which parameters and, hence, conflicting uses they affect. Those uses that are not compatible are placed in a second set. The second set is further subdivided as to whether the economic expansion affects the stressed pollutants in Table 5. Thus there are three sets of expansion opportunities with different levels of environmentally acceptability.

* Industry requires low concentration of certain chemicals in use of lake water that it introduces itself. Lakes or reservoirs with many popular beaches have had the fecal coliforms count/100 hcl rise to unacceptable levels due to high attendance.

TABLE 3
INTERACTION OF USES

| USES | PARAMETERS OF CONCERN BY | PARAMETERS IMPACTED BY | USES AFFECTED ADVERSELY |
|---|---|---|---|
| Water for industry | Chlorides, toxics, hardness, pH, Lake level, toxics, solids, ions | COD, BOD, solids, phosphorus, nitrogens, chlorides, sulphates calcium sodium, magnesium, heavy metals, phenols, oil and grease | - Fishing (DO, BOD, COD, Chlorides, toxics, oil and grease)<br>- Industry (chlorides, toxics, solids<br>- Aesthetics (solids, phosphorus, nitrogens)<br>- Swimming and water skiing (toxics)<br>- Fish spawning (toxics in sediment)<br>- Boating (toxics) |
| Recreation<br>Boating - partial body contact | Bacteria, toxics, strep | Oil and grease, BOD*, bacteria,* strep* | - Fishing (oil and grease) |
| Water skiing & swimming-total body contact | Bacteria, toxics, strep | Bacteria,* strep* | None |
| Fishing (fish) | Water: DO, BOD, COD, toxics, temperature, pH<br>Sediment: BOD, COD, Chlorides, toxics, oil and grease | See boating | - Fishing (fish) |
| Fish spawning/water Fowl Nesting | Marsh and bottom based macrophytes. Need nutrients for plant life. Non-toxic sediment. Oil and grease | | None |
| Shipping/Docking for industry | Shipping channel dimensions and Lake level | Oil and grease | - Fishing (fish) |
| Aesthetics | Color, turbidity (suspended solids) Nutrients (algae, plankton blooms) | | None |

* Only with heavy usage

TABLE 4
IMPACTS OF NON-USER FACTORS ON USERS

| BACKGROUND AND OTHER WATER QUALITY POLLUTERS | PARAMETERS IMPACTED BY | USES AFFECTED ADVERSELY |
|---|---|---|
| Big Manistee | Elevated nutrients - particularly phosphorus (farmland in watershed) | - Aesthetics |
| Little Manistee | Background | |
| Manistee WWTP | BOD (major source), COD, Phosphorus, nitrogen, zinc | - Fishing (fish)<br>- Aesthetics<br>- Fish spawning |
| Combine sewer overflows Manistee | BOD, COD, Phosphorus, nitrogen, oil and grease | - Fishing (fish)<br>- Aesthetics<br>- Fish spawning |
| Surface water Ponds/ground water contamination by industry | Sulphates/sulphites, chlorides | - Industry intake<br>- Fishing (fish) |

TABLE 5
STRESSED WATER QUALITY PARAMETERS THAT AFFECT USES

| LAKE ELEVATED PARAMETERS | USE ADVERSELY AFFECTED | TREND | COMMENTS |
|---|---|---|---|
| Water | | | |
| DO (Too low in deep areas below 20') | Coldwater fish | Improving | |
| BOD (Acceptable except for one deep station) | Coldwater fish | | |
| COD (High in deeper basins) | Coldwater fish | | |
| Chlorides (Acceptable except for same station for 1300 and several others at depth) | Industry intake water | Improving | |
| Nutrients | | | |
| Phosphorus: Concentration Classifies Lake as eutrophic. Northern end elevated from Big Manistee. | Aesthetics | Total P improving from 1973 | Current controvery over cuase and solution of elevate phosphorus concentration |
| Ammonia: High in bottom waters | Coldwater fish | Not known | |
| Nitrates: Elevated, particularly in Northern end. | Aesthetics | Improving | |
| Bottom sediment (extremely high in BOD, COD, heavy metals, oil and grease - really poor) | Coldwater fish<br>Warm water fish spawning in littoral zone<br>If sediment releases quickly, a fish kill will occur | Not known | Might collect some limited sediment data |

1. Environmentally acceptable expansion opportunities

2. Probably environmentally acceptable opportunities because they do not impact stressed parameters.

3. Environmentally unacceptable opportunities

Set one is included as expansion options as is. Set two is cursorily checked to see that it does not elevate the unstressed parameter to a level of stress. Set three is not eliminated entirely. Some opportunities might have a major economic benefit and then the quantitative extent of the impact is desired if a low cost elimination of the impact is not possible. Thus step 2, quantitative impact analysis might be used for a few economic expansion opportunities only if the economic benefit merits the analysis.

Some examples are in order. A salt mining industry added to the shoreline would be of primary economic benefit, would adversely affect stressed pollutants and a quantitative analysis might be required.

The office building in Manistee is environmentally acceptable.

Opening up the Little Manistee to more canoeing and fishing by providing better tourist access might be questionable in its impact on the Little Manistee water quality and in turn on Manistee Lake.

It is believed that the environmental protection filtering techniques of Tables 3 and 5 can be applied rapidly and effectively. The application becomes more meaningful if uses are ranked in order of priority and economic benefits are determined. The quantitative analysis of Step 2 will only be applied in this program if it becomes absolutely essential.

The three tables provide some insight as they stand in the relationship of uses and the stressed parameters.

Industry with outfalls into Manistee Lake affects the majority of other uses of the Lake as can be seen in Table I. The use most commonly impacted by other uses in fishing (fish). This means that industrial impact is of primary concern and the parameters of primary interest are those affecting the fish.

The stress on coldwater fish is caused by warming waters forcing the fish to cooler water which is in the deeper zone with less DO. The warm fish which spawn in the littoral zone are stressed by the poor quality of the sediment. They can, however, spawn in the marsh at the north end. Both types of fish are under severe stress if the extremely high BOD and COD levels in the bottom sediment is released rapidly.

Table 4 presents the effect of factors impacting the Lake water quality which are not users of the Lake water. These are Manistee WWTP, combined sewer overflow, river inlets and polluted surface water affecting the groundwater moving toward the Lake. Once again, fishing is the primary use impacted. Lake aesthetics are also affected.

Table 5 relates the individual pollutants to the uses adversely affected. The parameters selected are those that are beyond a good water quality level. This represents the receiving water quality for the tributaries, the WWTP, CSO's and industry and relates through each parameter whether their output adversely affects a parameter with no capacity for further elevation. Similarly, in-site use can be assessed for its effect on each elevated water quality parameter. The parameters of concern from potential pollution sources are BOD, COD, chlorides, total phosphorus and types of nitrogen compounds. The bottom sediment is particularly poor with high concentration of BOD, COD, heavy metals, and oil and grease.

C. Key Issues Affecting Future Lake Development

A key issue implies that it is a problem area. A barrier to an obviously important improvement might become a key issue in that a concerted effort of many to overcome it is initiated. An opportunity might become a key issue because significant attention is given to its best exploitation.

Key issues exist now. Barrier and opportunity key issues are likely to develop as the Manistee Lake Plan is formulated. A barrier is a weakness of the highest order and a strength is an opportunity for exploitation.

Key issues in conflict that are apparent at this time are discussed briefly below:

1. The Controversy of the Phosphorus Level in the Lake.

As discussed earlier, adversary positions have been taken by the City of Mansitee and Michigan DNR over the impact of the WWTP on total phosphorus concentration in the Lake. Much discussion has evolved over the use of a trophic level estimation model using a single parameter, total phosphorus. Since there are fundamental questions, such as whether the Lake is phosphorus limited and why the industrial effluents in the southern section were not used (one is 2 to 4 times the size of the WWTP loading) in calculation, the discussion should be reopened as to which model is applicable,then use of recent loading data for all point discharges should be made and the new analysis should be carried out.

2. Priority Uses of the Lake

One part of the Federal Government classifies the Lake as part of a harbor. The State of Michigan considers it a recreational lake. These conflicting differences in government classification have a major cost impact for some users of the Lake while highly verbal and emotional opinions on environmental protection is likely to impede effective implementation. The issue is such that concensus priorities in the future uses of the Lake should be reached locally. One of the purposes of the Implementation Manual is to assist in this process. The second issue closely tied to the first, is the conflict over the intended use of the Lake by the Federal Government and the State of Michigan. The first key issue is local and should and will be resolved. The second is external to the County and is not under local control. Therefore, it is important that there is local concensus as to how to view the Lake -- viewing it as both a lake and a harbor thus a "joint use" lake.

3. Overview of Key Issues

Resolution of the first two key issues will prevent or mitigate other problems that may appear as development of the Lake and the surrounding land area takes place. Each development that either uses the shoreline and the Lake or affects the Lake will have opposition concerned with impact on the Lake. For example, another industrial plant will become controversial unless its regional priority is established and minimum protection requirements set forth. Installation of a park and bathing beach at either the southern or northern end of the Lake will create opposition even though a park and bathing beach has less impact than another industrial development.

4. Resolution and Correction of Zoning Inconsistencies as Recommended

It is important that inconsistent zoning of parcels surrounding Manistee Lake be addressed and that where and when appropriate the zoning be changed to a category which is consistent with the desired future use of the parcel.

D. Development Opportunities - Summary

1. Land Availability

Land ownership around the Manistee Lake and channel to Lake Michigan can be categorized into three types. The categories are:

a. Public ownership
b. Corporate ownership

c. Private ownership (See Appendix C for a listing of Manistee Lake riparian land ownership)

This review illustrates the necessity for cooperation between the governmental agencies and the private land holders due to the (1) lack of available land for redevelopment and (2) the close proximity of public and private land.

Property ownership information was reviewed in conjunction with the vacant building inventory of April, 1982 and field-checked in June, 1982. A copy of the vacant building inventory is included in Appendix C.

Review of existing property ownership and vacant buildings illustrate that only a small percentage of the lakeshore riparian area and the channel including the man-made lake area was available for potential development and/or redevelopment.

Coupled with the property/building inventory, the soil type was analyzed. The soil assessment established the critical wet areas and the unstable soil areas located within the study area. (See soils map in Section II of this report.)

Topography also placed site location and land availability limitations on future development and redevelopment areas.

The overlaying of these elements began the process of establishing the framework for recommendation of sites, keeping in mind the final goal of a realistic program.

Regardless of ownership, a 10% availability of land can be assumed, (excluding the low intensity use wetland areas). Dividing the proposed uses into industrial, commercial and recreational classification excluding wetland areas, the following sites are potential areas for development:

a. Man-made lake area.
b. North shore of the channel west of apartment area.
c. Consumer Power's vacant parcel.
d. Area between U.S. 31 and Manistee Lake, north of public boat ramp.
e. Drop Forge area (Eastlake industrial area).
f. Martin Marietta land north of plant.
g. Bultma Dock and dredge site.
h. Ben-Mar Marina site.
i. Former EX-CELL-O industrial complex.

Each of the above parcels meet one or more of the following criteria for development.

a. Vacant.
b. Available for purchase or lease.
c. Access.
d. Servicable.

e. Former industrial use.
f. Compatible use.

2. Site Suitability

After each site was placed through the land availability screen, it was then reviewed for site suitability.

Based upon the recommended use for each site, and including the wetland area and the river-walk, the sites were analyzed under the following categories:

a. Industrial
b. Recreational (low intensity)
c. Recreational (commercial)
d. Commercial

Generally, it was found that the north section of the Lake (Eastlake Village park to the channel opening) including the channel was suitable for recreation (commercial and low intensity) and that the southern section of Manistee Lake was generally suitable for industrial uses. There is some mixing of that generalization on both sides. In general, however, the division is accurate.

The individual sites have been reviewed based upon the land availability section and suitability of each site. To assist in subdividing the area for development of the options, the Lake and channel were divided into the following sections:

a. River/Channel section
b. Northwest section of Manistee Lake
c. Northeast section of Manistee Lake
d. Middle section of Manistee Lake
e. Southeast section of Manistee Lake

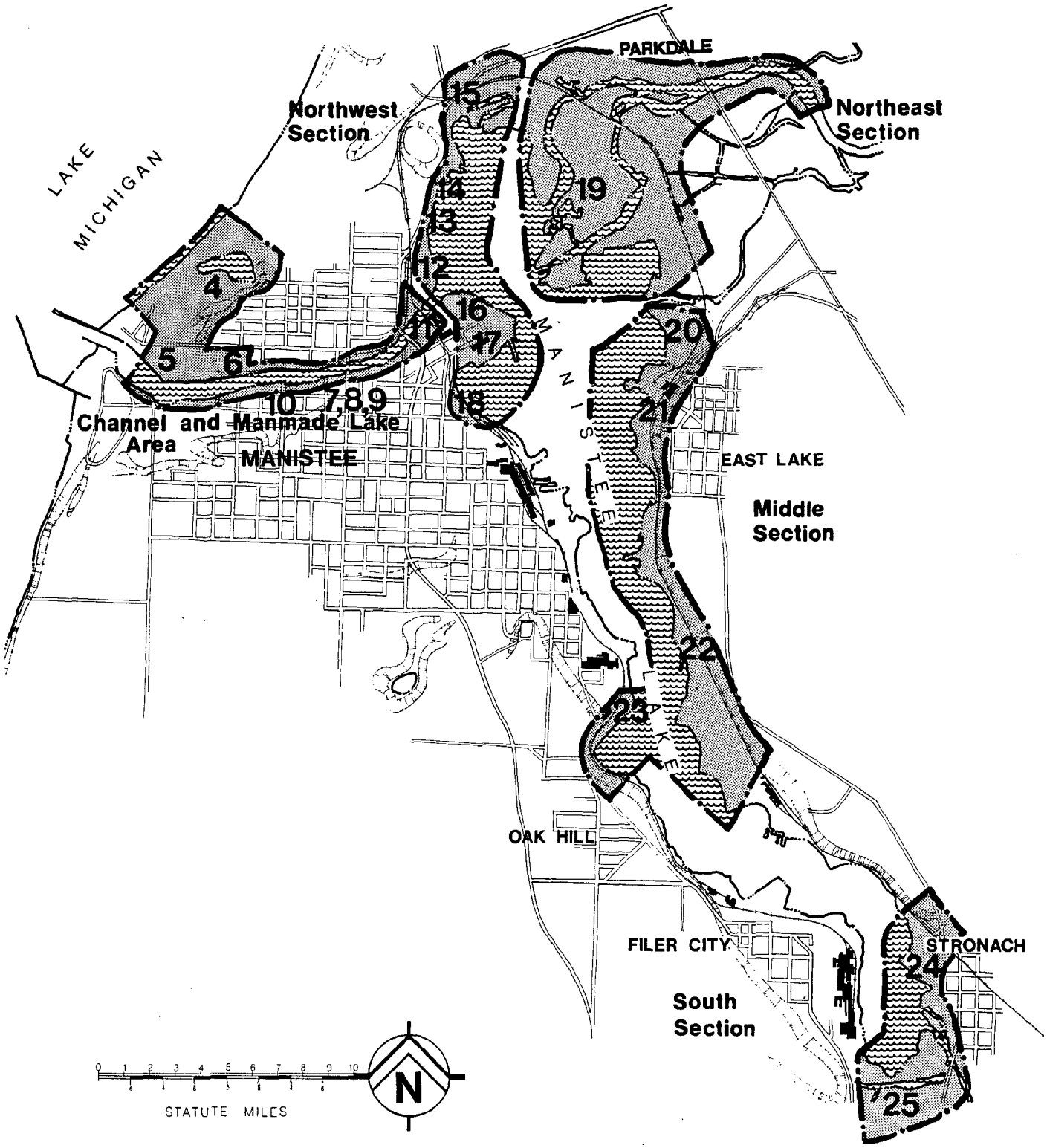
The sites found suitable for development are as follows (see map on following page for location):

(1.) Man-made Lake

This area is currently under partial ownership by the City of Manistee and that area that is not under ownership of the City is under the governmental control of the City (Option 4 on map).

(2.) The Sand Products Company site south of Fifth Avenue and west of the apartment units located in Manistee City; N.W. ¼ of Section 11, (Tax Parcel Identification Number, 41-41-211-200-01 with additions).

The site is generally rolling and sandy with no buildings and little vegetation and has historic and archeological site potential (Option 5/6 on map).




## IMPLEMENTATION OPTIONS

NOTE: Numbers on map are cross-referenced to options presented on following pages.

(3.) Riverfront Walk Development

This is a project under study by the Downtown Development Authority and should be endorsed here, but pursued in a separate study effort (Option 10 on map).

(4.) Consumers Power Company site located between the channel, the Lake and the railroad yard area.
This site is listed as Consumers Power site, (Tax Parcel Identification Number, 51-51-101-30001). The site is gently rolling with a steep topographic change to the river. Additionally, access is difficult and a major power line and tower traverse the site. The site has possible historic significance. A mix of uses is possible due to varying topography (Option 12 on map).

(5.) The public marina access to Manistee Lake (Option 13 on map).

(6.) The site between the public boat launch and the Moonlite Marina (Tax Identification Parcel Number 51-51-101-275-05). This site is currently vacant. The area is narrow and rectangular in shape with U.S. 31 on the west and Manistee Lake on the east. Topography rises to meet U.S. 31 from the Lake (Option 14 on map).

(7.) Former EX-CELL-O Complex

An existing industrial complex currently vacant (Tax Identification Parcel Number 51-51-448-702-02). Some buildings eligible for historic designation. Area has rail service and the buildings appear structurally sound (Option 16 on map).

(8.) Ben-Mar Marina

(Tax Identification Parcel Number 51-51-448-734-05). Gradually sloping to the Lake with installed bulkheads. The existing building is being used as a warehouse with no dock activity (Option 17 on map).

(9.) Glen of Michigan does not have riparian access to Manistee Lake. Glen of Michigan is a vacant (except for general office and an outlet store) manufacturing building. Adjacent to the structure are other outlets and ample land for parking (Option 18 on map).

(10.)Eastlake Village Park and Campgrounds. The site provides a boat launch ramp and camping facilities (Option 20 on map).

(11.)Drop Forge complex (Tax Identification Parcel Number 51-41-007-030-00). This site is located on the main line of the railroad and contains existing buildings which are currently being used for warehouses (Option 21 on map).

(12.)Vacant land north Martin-Marietta. (Tax Identification Parcel Number 51-14-118-003-01). One of many continuous parcels. The area is devoid of buildings and if lease arrangements with Martin Marietta could be negotiated, good sites for warehousing and manufacturing could be made available (Option 22 on map).

(13.)Bultama Dock and Dredge Company

The existing facility is being used to store material of neighboring companies. This is a the best available site with dock space for ship-oriented facilities. The site is the best place to put an industry or bulk storage yard on the Lake because it is in a bay which can easily be isolated to continue a spill to that area, it is at a narrow point on the Lake; it is most distant from both wetland areas; further on, Environmental Impact Statement will identify needs for further environmental safeguards (Option 23 on map).

(14.)Marsh area and boat ramp in Stronach is a good location for fishing (Option 25).

3. Transportation Network

Manistee Lake area is serviced by a varied transportation system. (See map in Section II).

Highways

Highways U.S. 31 and M-22 provide the north-south connection for service to the town-state area and the northern part of the State. M-55 is the east-west link to the center of the State and the inter-state system. These highways are two-lane black-top and are in good repair. U.S. 31 traverses Mansitee City in its north-south direction and is restricted in speed, site distance and safety. Problems have been noted along this road at the school site on the south side of Manistee, along the entire route from Eighth Street to the intersection of U.S. 31 and M-55; specifically, the intersection of M-55 and U.S. 31, U.S. 31 and M-110, at the bridge crossing the channel and at the rail crossings.

Recommendations

A series of minor intersection improvements with signal timing would assist in alleviating some minor portions of the problem. However, eventually the recommendations of the Michigan Department of Transportation, Manistee Lake small area study teams, and the local advisory board will have to be analyzed for implementation.

Rail - Regional

Service is provided around the total Manistee Lake proper by the Chesapeake and Ohio Railroad. Currently Manistee is the termination point of rail service to the northwest region of Michigan.

Rail - Local

Rail switching to service the west side of the Lake and to change cars and turn direction currently takes place at the rail intersection with U.S. 31 on the west side of the Lake, north of the channel. This rail movement causes traffic problems for the traffic travelling through Manistee as well as emergency vehicle movement.

Recommendations

The loop around the Lake should be reinstituted with relocation of the switching yard.

Air Service - Regional

Manistee County is serviced by the Manistee-Blacker Airport which has a 5,500 foot east/west paved runway and a 2,500 foot north/south runway. Ample facilities are available for private aircraft. A commuter airline services the area as well as charter company.

4 Political Overview

The study area is comprised of Manistee County, Manistee City, Manistee Township, Village of Eastlake, Stronach Township and Filer Township. Each group plus private industry, has had representatives on the study committee which in turn made a final recommendation to the County Planning Department for acceptance of the plan. Each unit of government may, if it chooses, adopt the plan officially through its own process.

Political implementation will be handled by using the existing governments with coordinated activities. Government cooperation and the ability to treat the Lake in a similar manner includes the issue of standardized zoning and uniform administration of zoning. If this system proves unworkable, then the establishment of a Manistee Lake Commission, a port authority or some other form of authority should be considered.

5. Environmental Overview

The Manistee Lake Study Area has been divided into two zones. The first zone is the northern basin, containing all the area north of a line between First Street and Manistee Forge Company, located in Eastlake. The second zone is the remainder of the Lake lying south of that line. These two basins reflect two different shorelands topography and uses, and water quality regimes, and therefore present both natural constraints and development opportunities. The "Conceptual Zoning" map presented later in the report presents a generalized zoning overlay for the area which takes into account these constraints and opportunities.

First, the shorelands topography in the northern basin is characterized by modest slopes; in the southern basin, slopes are generally steep. The southern basin's shore has been modified in places to reduce slopes and create industrial sites.

Second, most of the water-based recreation businesses in the planning area are located in the northern basin or in the channel. In addition, motel and restaurant locations within the northern basin are situated to take advantage of the Lake's visual appeal. On the other hand, the southern basin has a boat-launching area in Stronach, but the remaining parcels are industrial in character. Third, the water quality of the northern basin is almost totally determined by the flow the Big Manistee River. This is due to the fact that the amount of river discharge is sufficient to rapidly fill this basin; thus, the "flushing time" is short. This discharge originates outside the planning area. Moreover, it comes from forested and agricultural areas, and water quality from these kinds of lands is difficult to improve or control. In addition, there are no point sources (i.e., industrial discharges) in the northern basin. Thus, the water quality of the northern basin is not controllable by institutions within the planning area.

On the other hand, the southern basin has a water quality greatly determined by point sources. Controllable sources (i.e., the WWTP, sewer system, and industrial sources) are responsible for a significant portion of the total pollutant loading.

6. Technical Overview

Throughout the study period, the necessity of technical feasibility became a necessary criteria for each recommendation and option as well as each site. All sites were reviewed with the following technical criteria: (a) slope, (b) access, (c) water orientation, (d) existing conditions and (e) transportation service.

7. Economic Overview

Each site and its ultimate land use proposal was judged in relative terms under the following criteria: (a) creates jobs and encourages private development, (b) expands current specific recreational facilities which increase the tourist dollar into the area.

8. Cost Impact

Each action has some form of cost. Each option was reviewed for cost impact on private and public expenditures. The review was set in the following framework: (a) cost to general fund through public improvements, (b) special funds, and (c) major public or private financing programs.

## POTENTIAL USES OF MANISTEE LAKE, CHANNEL AND SHORELINE

### POTENTIAL LAKE USES

1. Recreational
2. Commercial
3. Industrial
4. Transportation
5. Wild Life Refuge

### BREAKDOWN OF POTENTIAL USES

1. Recreational

    a. Swimming
    b. Power boating
    c. Sailing
    d. Water skiing
    e. Fishing
    f. Campsites
    g. Launching ramps
    h. Scuba diving
    i. Yacht clubs

2. Commercial

    a. Fishing
    b. Marinas
    c. Restaurants
    d. Marine supplies and hardware
    e. Boat yards
    f. Charter boats
    g. Marine contracting
    h. Motels

3. Industrial

    a. Shipping
        (a) Raw materials
        (b) Finished products out
    b. Winter berthing
    c. Ship repair facilities
    d. Pumping facilities
        (a) Fire suppression systems
        (b) Condenser cooling water
        (c) Non-potable water
    e. Shipbuilding
    f. Boat building
    g. Unloading and storage
    h. Manufacturing facilities
    i. Reserve for manufacturing expansion

E. Development Options

The listing of development options on the following page represents those options developed through the study program. Keeping mind the desire to maximize the economic growth of the Lake while at the same time maintaining water quality, the options are evaluated and either discarded from further consideration or considered for implementation now. The options are also sorted by location and by type of option (recreational, commercial, industrial, and residential).

Development Options

Options were ranked as to feasibility based on cost, political, technical, environmental and economic (benefit) criteria. A ranking of one (1) is the most favorable. The rankings typically can be interpretted as follows:

Cost:

1. Either non-structural improvement or limited cost to general funds.
2. Requires special funds set aside or limited financing to complete project.
3. Requires major financing, special regional assessment or tax abatement.

Political:

1. Politically acceptable by all involved units of government.
2. A limited resistance which will require limited compromise.
3. Strong political resistance not likely to be resolved.

Technical:

1. No anticipated problems.
2. Technical problems are present but experience suggests a method of solution.
3. No apparent solutions for one or more technical problems.

Environmental:

1. Environmentally acceptable -- does not affect any parameters.
2. Probably environmentally acceptable -- does not affect stressed parameters.
3. Environmentally unacceptable - affects stressed parameters.

Economic:

1. Creates jobs (industry) - attracts numerous tourists or encourages private development high dollar return.
2. Expands and makes more efficient use of current specific recreational facilities and will attract a few more visitors to the area. Limited dollar return.
3. Controls a recreational operation but does not attract more visitors - no dollar return.

| DEVELOPMENT OPTIONS | FEASIBILITY RANKING | | | | |
|---|---|---|---|---|---|
| | Cost | Political | Technical | Environmental | Economic |
| **A. LAKE WIDE** | | | | | |
| 1. Develop a county wide plan | 1 | 2 | 1 | 1 | 2 |
| 2. Coordinating public/private boat ramps | 1 | 2 | 1 | 1 | 2 |
| 3. Program to expand shipping | 2 | 2 | 1 | 2 | 2 |
| **B. CHANNEL AND MAN MADE LAKE AREA** | | | | | |
| 4. Man made lake house and recreation | 3 | 2 | 3 | 2 | 1 |
| 5. Historic display | 3 | 1 | 1 | 1 | 2 |
| 6. Restaurant development (on pilings) | 3 | 2 | 2 | 2 | 2 |
| 7. Riverfront walk | 3 | 2 | 2 | 2 | 1 |
| 8. Outdoor eating area on riverfront | 2 | 1 | 2 | 1 | 2 |
| 9. Building access from riverwalk | 2 | 3 | 3 | 1 | 2 |
| 10. Expand public marina | 2 | 1 | 2 | 2 | 2 |
| 11. Farmers/crafts | 2 | 2 | 1 | 1 | 2 |
| **C. NORTHWEST SECTION OF LAKE MANISTEE** | | | | | |
| 12. Multi-use power company site | 3 | 1 | 3 | 2 | 3 |
| 13. Expand boat ramp | 2 | 1 | 1 | 1 | 2 |
| 14. Development/commercial north of boat launch ramp | 3 | 1 | 2 | 2 | 1 |
| 15. Expansion of public marina | 3 | 1 | 2 | 2 | 1 |
| 16. Re-use of Ex-Cell-O | 2 | 1 | 1 | 2 | 1 |
| 17. Ben-Mar Marina | 2 | 1 | 1 | 2 | 1 |
| 18. Factory outlet | 2 | 1 | 1 | 1 | 1 |
| **D. NORTHEAST SECTION OF MANISTEE LAKE** | | | | | |
| 19. Low intensity recreation | 1 | 1 | 1 | 1 | 3 |
| **E. MIDDLE SECTION OF MANISTEE LAKE** | | | | | |
| 20. Expand Eastlake Village Park | 2 | 1 | 1 | 1 | 2 |
| 21. Expand Eastlake Village Industrial Park | 2 | 3 | 1 | 2 | 1 |
| 22. Encourage heavy industrial use on the east side of Manistee Lake | 3 | 3 | 2 | 2 | 1 |
| 23. Encourage re-use of Boltema Dock and Dredge Company | 3 | 2 | 2 | 2 | 1 |
| **F. SOUTHEAST SECTION OF MANISTEE LAKE** | | | | | |
| 24. Promote Stronach boat ramp | 2 | 1 | 1 | 1 | 2 |
| 25. Protect marshland area | 1 | 1 | 1 | 1 | 2 |

SEE FOLLOWING MAP FOR LOCATIONS

4. Transportation

   a. Railroads
   b. Passenger vessels
   c. Ferries
   d. Barge operations
   e. Wild Life Refuge Areas

REVIEW OF SHORELINE OWNERSHIP

1. Available for Development

   a. Municipal
   b. State government
   c. Federal Government
   d. Private - individual
   e. Private - commercial
   f. Private - industrial

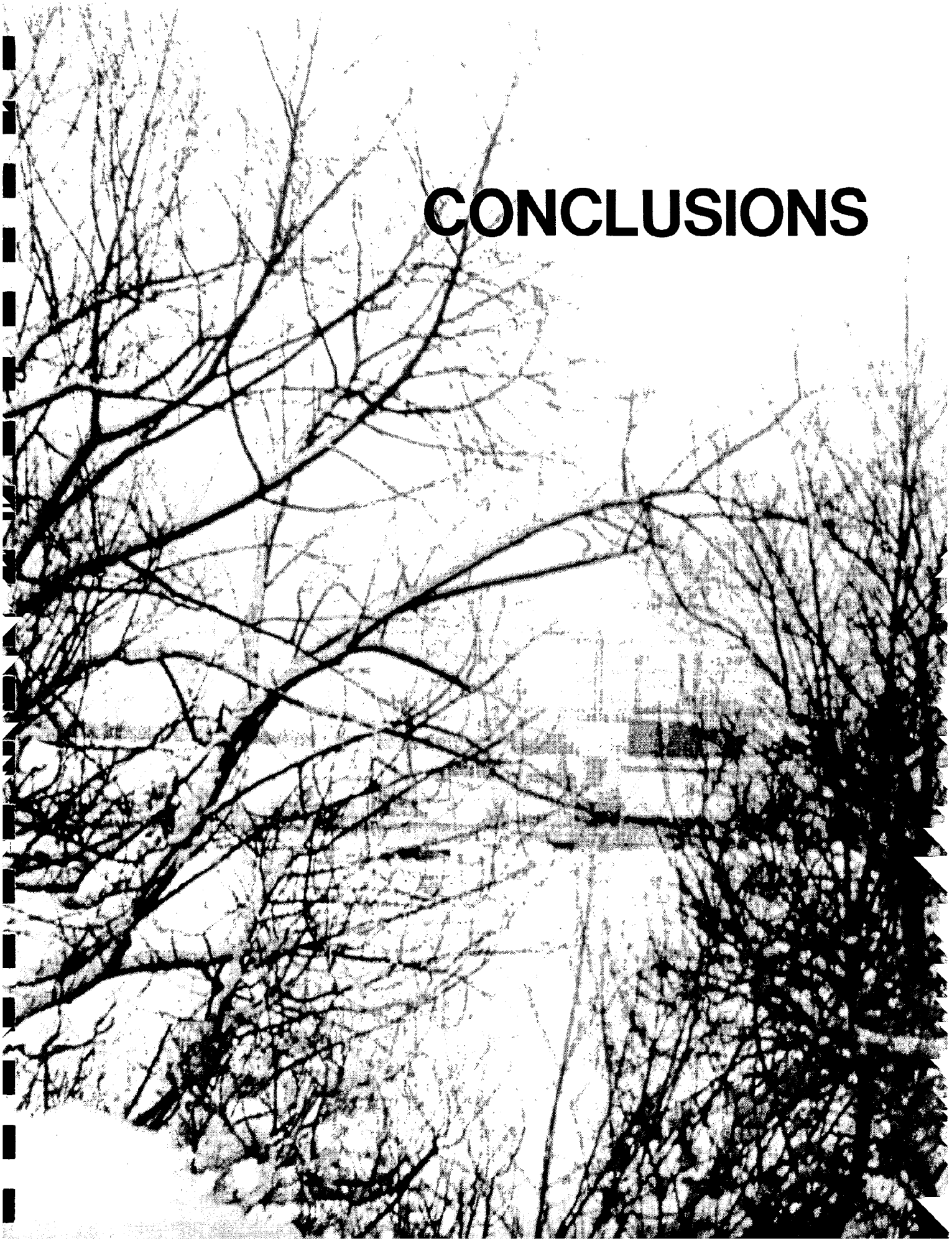
2. Not Available for Development

   a. Municipal
   b. State government
   c. Federal government
   d. Private - individual
   e. Private - commercial
   f. Private - industrial

POTENTIAL USES FOR AVAILABLE PROPERTY

1. After reviewing the potential areas and assessing the probability a medium to high use factor was assigned.
2. Assess each available property in order to determine for which uses it might be suited.
3. Identify these uses to the owner so they may be aware of the potential uses of the property, and determine if it is available for development.

# CONCLUSIONS



## IV CONCLUSIONS

Manistee Lake is a great natural resource for the Manistee Area and the State of Michigan. The people in the area are also a great resource.

With the implementation of the "joint-use" concept for the shoreline of the Lake and channel, the area can have a strong economic recovery. As with all micro- economic situations much of the recovery depends upon state and national trends. In the case of the Manistee Lake area, a cooperative program based upon achievable goals, which this program represents, coupled with the positive factors regarding the quality of life will assist and hasten the recovery.

The water is getting cleaner, the co-existence of recreation and industry is possible and desirable. Guidance from exterior sources is important. However, each unit of government must work cooperatively with the other to bring about the re-birth and change. County Planning should spearhead this effort. Political differences of opinion have to be placed as a second priority in order to achieve a strong image of cooperation and assistance in developing a new or expanding an existing industry. The working population (i.e., existing labor force) must display a positive attitude toward new business so that the environment and industry will be protected and encouraged to grow together.

The key conclusions and recommendations from this volume are expanded upon and the steps needed to implement them presented in Volume II - The Implementation Manual. Other recommendations of importance are summarized throughout this Volume and when appropriate, highlighted below. Although these recommendations and conclusions in and of themselves were not deemed sufficiently important to become part of the implementation manual itself, they are worthy of consideration. Many are part of one or more of the implementation steps or they assist in providing the proper framework and working environment within which the implementation process for the key options can proceed.

: The County Economic Development Office should work with local public and private entities in order to identify and coordinate utilization of all available funds and funding sources to assist the development process surrounding Manistee Lake.

: Throughout the report, tourism has been identified as one of the major areas of importance and one which needs to be expanded. Funding assistance in this effort can be forthcoming if the available two percent (2%) room tax on hotel and motels is passed by the County. This potential should be considered and if it is deemed necessary made contingent on completion of the Dunham House project. It is estimated that this project alone would bring in excess of

$20000 per year to assist the County in the promotion of tourism.

: The demand for additional marina slips has been discussed earlier and this need should be addressed as part of the riverwalk project and as part of Option 2 presented in the Implementation Manual.

: The need for continued and continuous inter-governmental cooperation cannot be overstated. This process is underway. It must be nurtured and expanded upon.

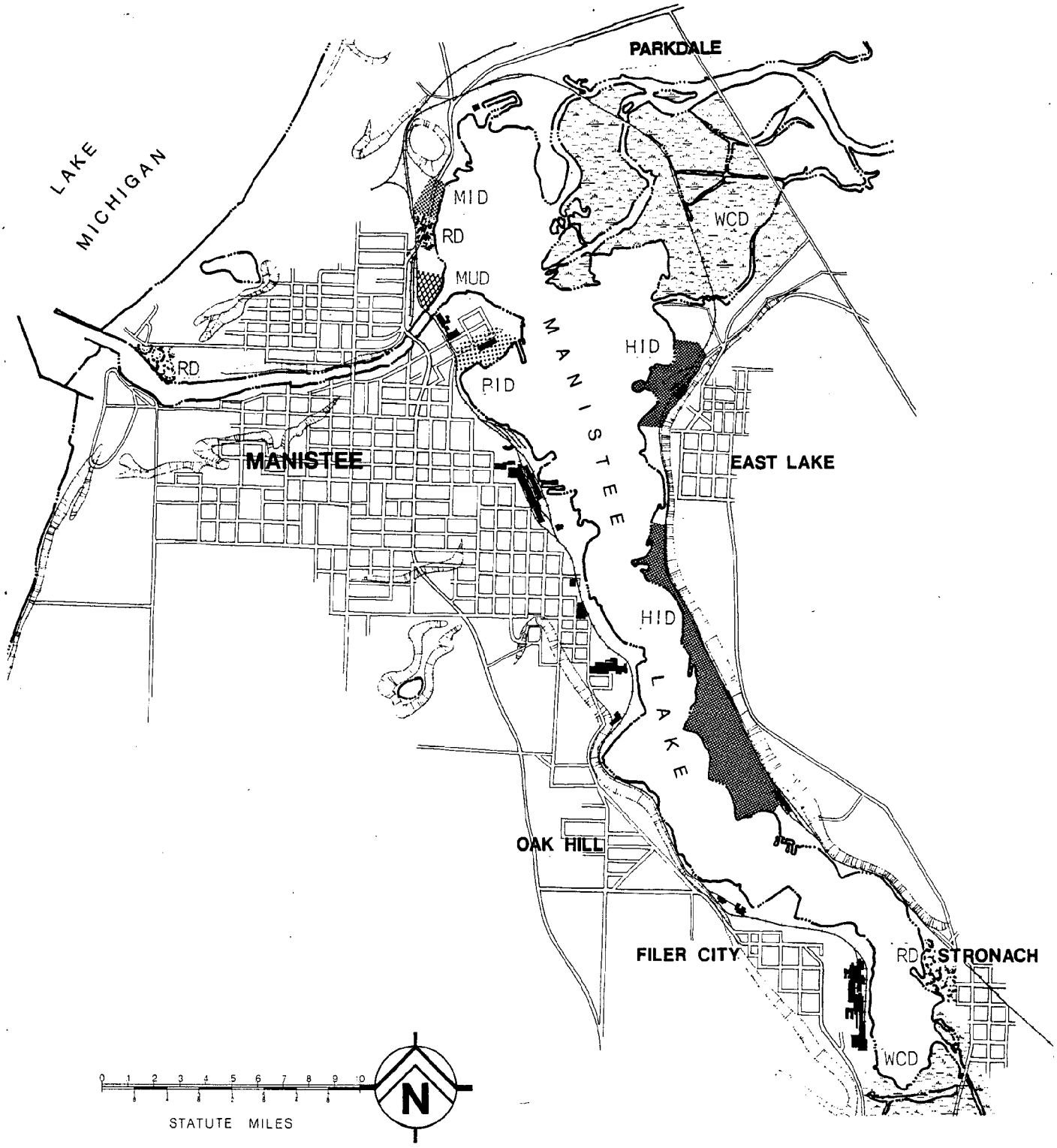
: As discussed earlier in this report, zoning inadequacies exist. The County Planning Commission should actively seek appropriate zoning amendments to rectify this situation, by assisting and petitioning local governments to change their zoning. As part of this process, local zoning should be modified so that it is uniform and consistent around the Lake. (See "Conceptual Zoning Changes" map on following page.) To insure consistent and uniform administration of the zoning, the County Planning Commission's advice and council should be required in local zoning for any discretionary decisions involving the Lake (See Volume II, Appendix A for recommended zoning language and requirements as well as the procedure for amending the township and city zoning ordinances). If the above does not work, only then should a harbor commission or port authority be considered.

: Existing industry and labor should be encouraged to participate in the development process and should take an active role in promoting the benefits and opportunities which exist in Manistee County.

: The joint-use concept of the Lake and channel should be further developed and expanded upon and should become the cornerstone upon which the future development of the Lake area occurs.

: The delta areas of both the Big Manistee and Little Manistee Rivers are fragile wetlands which are environmentally sensitive and which should be preserved. Special attention must be paid to these areas to insure that they are not adversely effected by proposed development activities around Manistee Lake.

: As noted throughout this report, the bottom sediments of Manistee Lake, particularly those in the southern basin, are highly polluted from past dumpings in the Lake. It is imperative that these sediments not be disturbed or if they are, that the impact of such action be completely understood. New data should be developed so that the total problem is documented and understood. Secondly, an environmental impact assessment or statement (depending on the severity of the potential impact) should be required for all activities that might disturb the bottom sediments.




## CONCEPTUAL ZONING CHANGES

| | | |
|---|---|---|
| | MID | MEDIUM INDUSTRIAL DISTRICT |
| | HID | HEAVY INDUSTRIAL DISTRICT |
| | RD | RECREATION DISTRICT |
| | WCD | WETLAND CONSERVATION DISTRICT |
| | PID | PLANNED INDUSTRIAL DISTRICT |
| | MUD | MULTI USE DISTRICT |

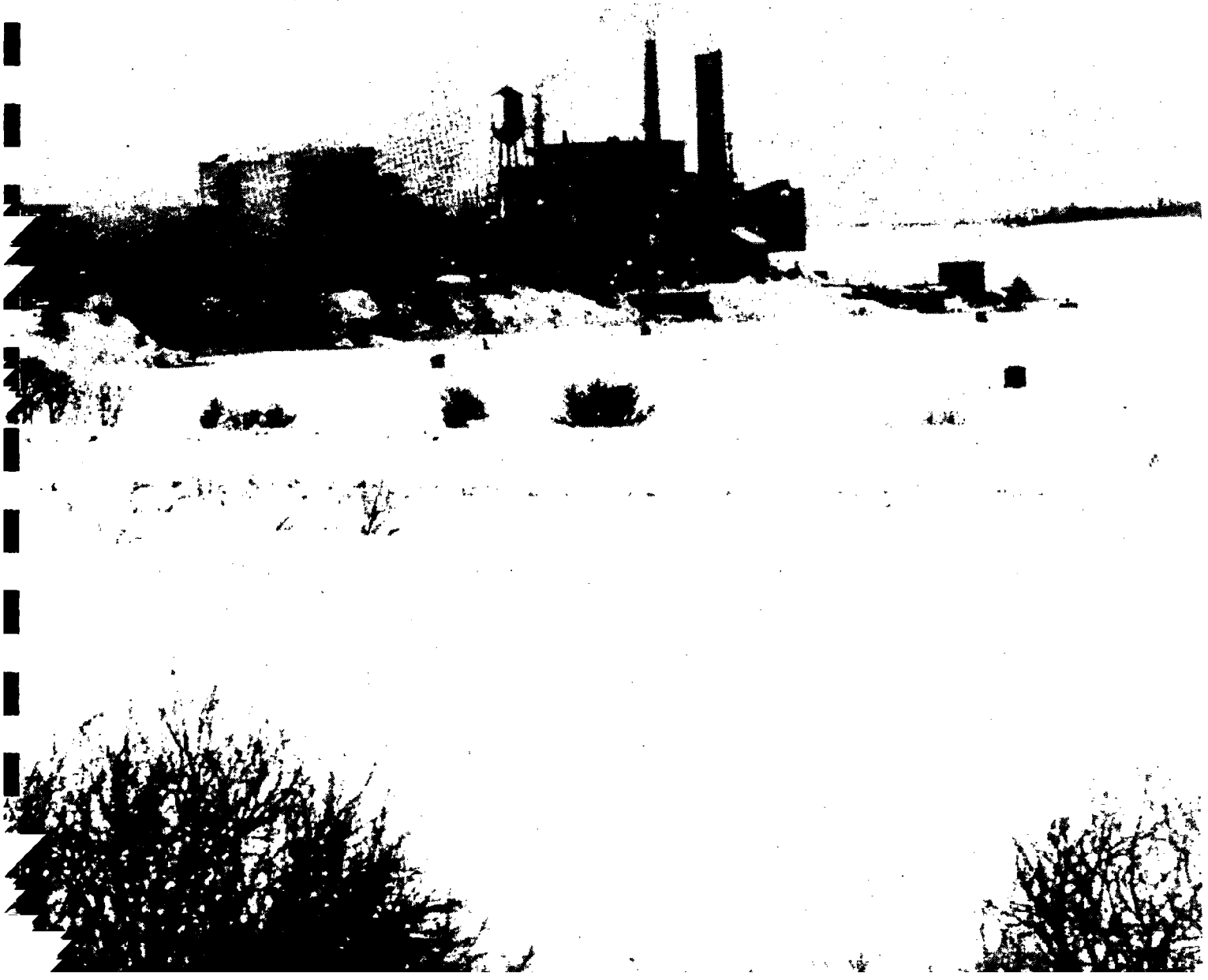
: The phosphorus issue has been and continues to be an issue which impedes the economic development of Manistee Lake. Every effort should be made to resolve the issue with DNR as quickly as possible so that the economic growth of the area can proceed uninterupted.

: Several water hazards exist throughout the Manistee Lake basin which are impediments to future development and dangerous to current boating activities. A coordinated program for their identification and removal should be developed and undertaken by the political units of government which surround the Lake.

: Local zoning as shown in Volume II , Appendix A includes provisions for a coordinated shoreline stabilization and greenbelt for the entire Manistee Lake shoreline. Further zoning detail will have to be developed by the County Planning Department.

: Technical assistance to local governments to adopt the zoning recommendations into specific language for each municipality should have a high priority for the County Planning Commission.

# APPENDIX



# APPENDICES

## APPENDIX A

## INFORMATION SOURCES


1. Manistee County Land Use and Development Policy, Manistee County Planning Commission, February, 1981.

2. Manistee Area Wastewater Collection and Treatment Facilities Plan, Volume II, Gove Associates, Inc., Kalamazoo, Michigan, May, 1975.

3. Municipal Water System Report, Village of Eastlake, Manistee County, Michigan, Gove Associates, Inc., May, 1972.

4. Draft of Manistee County Solid Waste Management Plan, Manistee County Solid Waste Management Committee, January, 1982.

5. Canoeing Activity in Michigan - Analytical Assessment, Michigan Department of Commerce, Travel Bureau, December, 1978.

6. Tourist Industry Growth Study - A Report to the Upper Great Lakes Regional Planning Commission, Programs and Administration Division, Travel Bureau, Michigan Department of Commerce, 1979.

7. Michigan Department of Transportation, Manistee Lake, Small Area Study Team, Local Advisory Board Recommendations, July, 1980.

8. Manistee County 1981 Overall Economic Development Program Update, February, 1981.

9. 1980 Census Package, November, 1981.

10. County Recreation Plan, Manistee Plan Area Segment, County Planning Commission, 1979.

11. Manistee Harbor, Navigation Chart, 1979.

12. Description of Government Units Around Manistee Lake, Manistee County Planning Commission, February, 1982.

13. Filer Township, Manistee County, Michigan, Permanent Zoning Ordinance.

14. Manistee Township, Manistee County, Michigan, Permanent Zoning Ordinance.

15. Village of Eastlake, Manistee County, Michigan, A Zoning Ordinance.

16. Stronach Township, Manistee County, Michigan, Permanent Zoning Ordinance.

17. Fishing Expenditures and Travel Activity in Manistee County, Current Estimates of Great Lake Fishing Values, Great Lakes Fishery Commission, 1979 (Talhelm).

18. Thermal Survey of the Hardy Salt Company and Packaging Corporation of American Discharges into Manistee Lake, Bureau of Water Management, Water Resources Commission, Department of Natural Resources, September 9, 1970 (Hesse).

19. Known & Suspected Groundwater Contamination Problems, Department of Natural Resources, Letter DNR, February, 1982.

20. Water Quality and Phosphorus Loading Analysis of Manistee Lake, Manistee County, Michigan, Water Quality Division, Michigan Department of Natural Resources, February, 1980 (Kenaga).

21. Water Quality and Biological Survey of Manistee Lake, Water Quality Division, Michigan Department of Natural Resources, 1973 and 1975, July, 1977 (Grant).

22. United States Environmental Protection Agency, National Eutrophication Survey, Working Paper Series, Report on Manistee Lake, Manistee County, Michigan, E.P.A. Region V, Working Paper No. 201, Pacific Northwest Environmental Research Laboratory, March, 1975.

23. Water Quality Station Inventory, A Guide to Michigan Water Quality, Data in STORET, Michigan Department of Natural Resources, Environmental Protection Bureau, Environmental Services Division, October, 1981.

24. History of Salt, Brine, and Paper Industries and Their Probable Effect on the Ground Water Quality in the Manistee Lake Area of Michigan, State of Michigan, Department of Natural Resources, Bureau of Water Management, June, 1970 (Childs).

25. Quality Criteria for Water, United States Environmental Protection Agency, July, 1976.

26. Water Resources Data for Michigan, Part 2, Water Quality Records, United States Department of the Interior, Geological Survey, 1972 and 1973.

27. Northwest Michigan Regional Planning and Development Commission, Overall Economic Development Program, March, 1978.

28. Manistee Lake Riparian Ownership, January, 1980 Tax Roll.

29. Results of a Biological Survey of Manistee Lake, September 22, 1974, (Serber).

30. Taint Test of Chinook Salmon from Manistee Lake, Manistee County, Michigan, Michigan Department of Natural Resources, October 21, 1969.

31. Fish Taint Test, Manistee Lake, Manistee County, Michigan, DNR, March, 1966.

32. A Biological Survey of the Effects of Pollution of Manistee Lake, September 15, 1953 (Serber).

33. Summary of Past Staff and Commission Activities in the Manistee Area and a Status Report on Manistee Lake and Discharge Thereto, Bureau of Water Management, Michigan Department of Natural Resources, July 24, 1970 (Fetteroff).

34. Limnological and Biological Survey of Manistee Lake, Manistee County, Michigan, February 26-28, 1957 (Fetteroff).

35. Limnological Survey of Manistee Lake and Connecting Waters, Manistee County, Michigan, Bureau of Water Management, Michigan Department of Natural Resources, July 13, 1970 (Newton).

36. Maintenance Dredging of Unpolluted Harbor Sediments in Michigan, United States Army District, Detroit, Corps of Engineers, March, 1975.

37. Organic Toxic Data Sediments, August 22, 1973, STORET.

38. Historical Bacteria Information - Channel, Little Manistee, Big Manistee River at High Bridge Road, USGS Station Data, STORET.

39. Analysis of Fish Tissue Manistee Lake, USGS Station Data, 1979 and 1980, STORET.

40. Organic Toxins in Channel to Lake Michigan, USGS Station Data 1971 - 1976, STORET.

41. Colored Maps - Manistee Lake Area, Transportation Study, Manistee County Planning Commission, 1981.

42. Fish Taint Test, Manistee Lake, DNR, March, 1967.

43. Collection of New Data in Vicinity of Manistee WWTP - Revised Phosphorus Leading Analysis, September, 1980 (Kenaga) (Revision of Reference 20).

44. Water Quality Data of Manistee Lake, DNR, April 10, 1981. Data received by telephone, February 11, 1982 (Kenaga).

45. Manistee Channel Survey, DNR, September 9, 1958 (Harvey).

46. Fish Taint Test, Manistee Lake, DNR, 1976 (Lundgren).

47. Survey of Bottom Sediments in Vicinity of Packaging Corporation of America, DNR, October 25, 1976 (Basch).

48. Michigan Department of Natural Resources, Environmental Protection Bureau, Point Source Studies Section, "Report of a Municipal Wastewater Survey Conducted at Manistee Wastewater Treatment Plant", All Outfalls No. 510037, Manistee County, Manistee, Michigan, June 9-10, 1980.

49. City of Manistee, Permanent Zoning Ordinance.

APPENDIX B

VACANT BUILDING INVENTORY
April 1982

This inventory does not include barns, houses, or other agricultural buildings. The inventory lists vacant buildings formerly used as commercial, industrial or warehouse establishments. Each building is listed with the following information:

- Description and location
  - Estimated building size, as measured from air photos
  - County tax parcel number
  - Owner and his address on April 1982 tax roll
  - Zoning

The list is organized by township and Manistee City.

Filer Township

Filer City

Store: Next to Post Office
- 
- 51-06-301-706-04
- Alvin F. Janowiak, 675 Hilty, Filer City, MI 49634
- Zoned Residential

Manistee Township

Jebavy-Sorenson (Section 21, T22N, R16W)
- 150 x 150 and 250 x 80 and 60 x 120
- 51-07-121-001-00
- Manistee Orchards, 2500 Dontz Rd. Manistee, MI 49660
- 

Parkdale

Former Brown's
- 70 x 50
- 51-07-780-055-00
- Henry & Gloria Brown, 777 E. Parkdale Ave., Manistee, MI 49660
- Zoned Residential - Commercial

Former Linke's Body Shop
- ?
- 51-07-800-007-00
- Liquid Dust Layer Truck Co., P.O. Box 188, Manistee, MI 49660
- Zoned Residential - Commercial

Gas Station: Across Street (s. side of U.S.31) of former Brown's
- 40 x 20
- 51-07-336-078-00
- Don & Wilma Diesing, 108 Clarke St., Scottville, MI 49454

CITY OF MANISTEE

Owner: Ex-Cell-O
Location: 254 River Street
Building Size: 115,224 sq. ft.
Land Size: 9 acres
Zoned: Heavy Industrial
Property No: 51-51-448-702-01

Owner: Ex-Cell-O
Location: Filer & Division Street
Building Size: 50,788 sq. ft.
Land Size: 132 x 224
Zoned: B-1
Property No: 51-51-453-709-07

Owner: C. Madson
Location: 24 Arthur Street
Building Size: 3,976 sq. ft.
Land Size: 81 x 155
Zoned: Light Industrial
Property No.: 51-51-146-709-09

Owner: Simfort Land Company
Location: 170 Memorial Drive
Building Size: 10,010 sq. ft.
Land Size: 1 acre
Zoned: B-1
Property No: 51-51-146-726-09

Owner: J. Bultema
Location: 1713 Main Street
Building Size: 2,930 sq. ft.
Land Size: 8 acres
Zoned: Heavy Industrial
Property No: 51-51-713-175-01

Owner: M. Edel
Location: 15 Lake Street
Building Size: 40,000 sq. ft.
Land Size: 6 acres
Zones: Heavy Industrial
Property No: 51-51-448-735-09

Owner: Glen of Michigan
Location: 15 Lake Street
Building Size: 4,940 sq. ft.
Land Size: 3 acres
Zoned: Light Industrial
Property No: 51-51-448-732-05

Owner: Jackpine Press
Location: 355 River Street
Building Size: 9,525 sq. ft.

Land Size: 122 x 168
Zoned: B-1
Property No: 51-51-453-708-11

Owner: R. Brunett
Location: 340 River Street
Building Size: 1,375 sq. ft.
Land Size: 22 x 112
Zoned: B-1
Property No: 51-51-452-703-15

APPENDIX C

## MANISTEE LAKE RIPARIAN LAND OWNERSHIP

January 1981 Tax Roll

This list starts in the northwest corner of Manistee Lake in Manistee Township, then goes clockwise around the lake listing riparian parcels and owners (follows the channel from Manistee Lake to Lake Michigan going west on the south side of the river and returning east on the north side).

*indicates parcels traversed by C&O Railroad right-of-way
#indicates inland parcels which may have significance in this study

W. Manistee Township Section 35

#51-07-336-077-00 (Solberg Boat Yard)
Solberg Boat Yard Inc. S.E.V. 13,757
267 Arthur Street
Manistee, Michigan 49660

#51-07-336-076-00
C&O Railroad Co. S.E.V. 7,617
c/o Gen. Tax Commissioner
P.O. Box 1254 1255
Richmond, Virginia 23210

#51-07-336-080-00 (Boat Launch and Campground)
Insta Launch Inc. S.E.V. 52,734
20 Park Avenue
Manistee, Michigan 49660

#51-07-336-087-00 (Big Manistee River State Game Area)
State of Michigan S.E.V. 1,708
2-19-51

S. Manistee Township Section 6

*51-07-006-002-00
Phoenix Petroleum Co. S.E.V. 6,056 5 acres
Box 95
Glendale, Arizona 85311

*51-07-006-001-00 (Big Manistee River State Game Area)
State of Michigan

*51-07-006-003-00
BIC Corp. S.E.V. 5,047 17.7 acres
P.O. Box 157
Manistee, Michigan 49660

Eastlake Village (Section 6 of S. Manistee Township)

#51-41-006-023-00 and -023-01
Village of Eastlake

*51-41-006-003-00 (Eastlake Village Park)
State of Michigan S.E.V. 40,997

Eastlake Village (Section 7 of S. Manistee Township)

*51-41-007-031-00
State of Michigan S.E.V. 5,125
5/72

*51-41-007-030-00 (Manistee Forge Corp. Plant #2)
Economic Development Corp. of Manistee S.E.V. 416,058
U.S. 31 and Mason Streets
Manistee, Michigan 49660

*51-41-007-032-10 (Vacant, Hardy Salt Co.)
Hardy T. Walter etals Trustees S.E.V. 49,927
P.O. Box 449
St. Louis, Missouri 63166

*51-41-007-033-00 (Vacant, Hardy Salt Co.)
Hardy, George T. & Hardy, T.W. Jr. & Hardy, L.T. Trsts. S.E.V. 74,890
P.O. Box 449 36 acres
St. Louis, Missouri 63166

West Stronach Township Section 18

*51-14-118-006-00
Hardy Salt Co. S.E.V. 31,017
P.O. Box 449 21.38 acres
St. Louis, Missouri 63166

*#51-14-118-004-00 (Brine Well)
Martin Marietta S.E.V. 14,039
P.O. Box 398 5.05 acres
Manistee, Michigan 49660

*#51-14-118-003-00
Martin Marietta Chemical Corporation S.E.V. 8,652
6801 Rockledge Drive 29.97 acres
Bethesda, Maryland 20817

*51-14-118-007-00
Martin Marietta Corporation S.E.V. 12,407
P.O. Box 398 24.12 acres
Manistee, Michigan 49660

#*51-14-118-004-00

*51-14-118-008-00 (Martin Marietta Factory)
Martin Marietta S.E.V. 5,163,073
P.O. Box 398
Manistee, Michigan 49660

*51-14-118-009-00
Martin Marietta S.E.V. 25,793
P.O. Box 398
Manistee, Michigan 49660

W. Stronach Township Section 17

*51-14-117-003-00
Martin Marietta — S.E.V. 13,060
P.O. Box 398
Manistee, Michigan 49660

#51-14-117-001-00 (Land disposal ponds)
Packaging Corp. of America Land Office — S.E.V. 25,793
P.O. Box 316
Manistee, Michigan 49660

#51-14-117-004-00 (Vacant)
Packaging Corp. of America Land Office — S.E.V. 3,449
P.O. Box 316 — 10 acres
Manistee, Michigan 49660

W. Stronach Township Section 20

*51-14-120-012-00
Packaging Corp. of America Land Office — S.E.V. 36,241
P.O. Box 316 — 30 acres
Manistee, Michigan 49660

#*51-14-120-013-00 (Powerline right-of-way)
Consumers Power Company — S.E.V. 979
c/o Region Controller
821 Hastings Street
Traverse City, Michigan 49684

51-14-120-014-00 (Part leased to DNR for Manistee Lake Access site and to Stronach Twp. for a park.)
Packaging Corp. of America Land Office
P.O. Box 316 — S.E.V. 979
Manistee, Michigan 49660 — 11.34 acres

#51-14-700-011-00 (home)
Baker, Edw. & Emaline — S.E.V. 7,369
R#3 2075 Water Street — Stronach Lumber Co. Add;
Manistee, Michigan 49660 — Lots 38, 39, 40 Blk A

#51-14-700-010-00 (Home)
Landis, Harold R. Etux — S.E.V. 10,527
2085 Water Street — Stronach Lumber Co. Add.;
Manistee, Michigan 49660 — Lots 35, 36, 37 Blk A

#51-14-700-009-00 (Home)
Landis, Harold R. Etux — S.E.V. 1,404
2085 Water Street — Stronach Lumber Co. Add;
Manistee, Michigan 49660 — Lots 31, 32, 33, 34 Blk A

#51-14-700-008-00 (Home)
Washneske, Frank Etux. — S.E.V. 7,193
R#3 2125 Water Street — Stronach Lumber Co. Add;
Manistee, Michigan 49660 — Lots 27, 28, 29, 30 Blk A

#51-14-600-002-00 (Home)
Svidron, Chas. & Arlene
R#3 2286 Water Street
Manistee, Michigan 49660

S.E.V. 7,018
Village of Stronach

#51-14-600-003-00 (Powerline)
Consumers Power Co.
c/o Region Controller
821 Hastings Street
Traverse City, Michigan 49684

S.E.V. 1,214
Village of Stronach

#51-14-600-004-00 (House)
Longcore, Milton
R#3 1384 2nd Avenue
Manistee, Michigan 49660

S.E.V. 10,702
Village of Stronach

#51-14-600-001-00 (House)
Zosczak, Steve & Jas.
R#3 1410 2nd Avenue
Manistee, Michigan 49660

S.E.V. 3,333
Village of Stronach

#51-14-700-017-00 (House)
Stendel, Aug. & Betty
R#3 1385 2nd Avenue
Manistee, Michigan 49660

S.E.V. 11,580
Stronach Lumber Co. Add.

#51-14-700-016-00 (House)
Cross, Harry V. & Beatrice
3837 Hull Road
Leslie, Michigan 49251
Mail tax bill to:
Thompson, Larry R. Etux
R#3 2332 Water Street
Manistee, Michigan 49660

S.E.V. 8,948
Stronach Lumber Co. Add.

#51-14-700-015-00 (House)
Stendel, Norma
R#3 2352 Water Street
Manistee, Michigan 49660

S.E.V. 8,948
Stronach Lumber Co. Add.
Lots 3 & 4 Blk B

#51-14-700-018-00 (House)
Patulski, James & Cora
R#3 2361 Lake Street
Manistee, Michigan 49660

S.E.V. 9,123
Stronach Lumber Co. Add.
Lot 10 Blk B

#51-14-700-019-00 (Residential area)
Patulski, Wm. & Miriam
R#3 2340 Main Street
Manistee, Michigan 49660

S.E.V. 1,404
Stronach Lumber Co. Add.
Lot 11 Blk B

#51-14-700-014-00 (House)
Pomeroy, Michael D.
R#3 2370 Water Street
Manistee, Michigan 49660

S.E.V. 9,123
Stronach Lumber Co. Add.
Lot 2 Blk B

#51-14-700-020-00 (House)
Szymanski, Patricia Etal — S.E.V. 13,159
R#3 1380 3rd Avenue — Stronach Lumber Co. Add.
Manistee, Michigan 49660 — Lot 12 Blk B

#51-14-120-015-00
Consumers Power Co. — S.E.V. 1,632
c/o Region Controller
821 Hastings
Traverse City, Michigan 49684

51-14-120-016-00 (Little Manistee River delta)
Packaging Corp. of America — S.E.V. 1,632
Land Office
P.O. Box 316
Manistee, Michigan 49660

51-14-120-017-00 (Little Manistee River Delta)
Township of Stronach

51-14-120-018-00
Packaging Corp. of America — S.E.V. 2,612
Land Office — 5.5 acres
P.O. Box 316
Manistee, Michigan 49660

#51-14-120-020-00
Laboda, Henry A. Etux. — S.E.V. 1,881
1603 Cass Avenue
Bay City, Michigan 48706

#51-14-120-021-00
Schudlich, Ernest I. Jr. — S.E.V. 1,568
3598 River Road — 3 acres
Manistee, Michigan 49660

E. Filer Township Section 19 & 20
51-06-019-100-03 through 05 (PCA factory and land around south end of Manistee Lake)
Packaging Corp. of America — S.E.V. 4,109,973
Land Office
P.O. Box 316
Manistee, Michigan 49660

#51-06-019-
C&O Railroad Company — S.E.V. 2,273
c/o Gen Tax Commissioner
P.O. Box 1254 1255
Richmond, Virginia 23210

#51-06-019-
Same as above

Filer Township Section 19 (Filer City - unincorporated)
#51-06-301-719-05 (Vocational Education, Manistee Public Schools)
Township of Filer — Lot 3 through 6 Blk 19

#51-06-301-719-02 (Parking lot)
Packaging Corp. of America — S.E.V. 3,920
Land Office
P.O. Box 316
Manistee, Michigan 49660

#51-06-301-719-01 (Parking lot)
Packaging Corp. of America — S.E.V. 653
Land Office
P.O. Box 316
Manistee, Michigan 49660

#51-06-301-716-09 (PCA Mill Yard)
Township of Filer — Lots 5 thru 8 Blk 16
Filer City, Michigan 49634

#51-06-301-715-02
Description not in tax roll.
Is part of PCA's parking lot.

#51-06-301-716-01 (Parking lot)
Packaging Corp. of America — S.E.V. 871
Land Office
P.O. Box 316
Manistee, Michigan 49660

#51-06-301-716-07 (Parking lot)
Packaging Corp. of America — S.E.V. 871
Land Office — Lot 4 Blk 16
P.O. Box 316
Manistee, Michigan 49660

#51-06-301-716-05 (Parking lot)
Packaging Corp. of America — S.E.V. 1,307
Land Office — Lot 3 Blk 16
P.O. Box 316
Manistee, Michigan 49660

#51-06-301-710-09 (PCA Mill Yard)
Packaging Corp. of America — S.E.V. 1,307
Land Office — Filer City Lot 5 Blk 10
P.O. Box 316
Manistee, Michigan 49660

#51-06-301-711-01 (House)
Racine, George — S.E.V. 7,897
P.O. Box 31 — Lot 1 Blk 11
Filer City, Michigan 49634

#51-06-301-708-01 (PCA Mill Yard)
Packaging Corp. of America — S.E.V. 10,453
Land Office
P.O. Box 316
Manistee, Michigan 49660

#51-06-301-707-07
Description not in tax roll.

#51-06-301-707-01 (House)
Franckowiak, Sally Etal. S.E.V. 8,189
Filer City, Michigan 49634

#51-06-019-100-03 (PCA Coal Dock)
Packaging Corp. of America S.E.V. 4,109,973
Land Office
P.O. Box 316
Manistee, Michigan 49660

#51-06-019-100-01
C&O Railroad Co. S.E.V. 2,273
c/o Gen Tax Commissioner
P.O. Box 1254 1255
Richmond, Virginia 23210

*51-06-019-125-01 (Manistee Drop Forge Factory #1)
Manistee Drop Forge S.E.V. 479,094
509 Falleen Street
Filer City, Michigan 49634

*51-06-019-200-01 (Former Great Lakes Chemical Co. factory site)
Manistee Drop Forge S.E.V. 54,443
509 Falleen Street 4 acres
Filer City, Michigan 49634

E. Filer Township Section 18 (Oak Hill - unincorporated)

*51-06-018-325-13 and 14
C & O Railroad Co. S.E.V. 17,050
c/o Gen Tax Commissioner
P.O. Box 1254 1255
Richmond, Virginia 23210

*51-06-018-325-01
BIC Corp. S.E.V. 3,049
Box 157
Manistee, Michigan 49660

Manistee City; NE¼ of Section 13

*51-51-713-175-01 (Quonset hut building, Manisteel, dock)
Bultema, John S.E.V. 137,120
625 Seminole Road
Muskegon, Michigan 49440

Manistee City; NW¼ of Section 18

51-51-712-475-04 (Hardy Salt Factory)
Manistee Salt Works S.E.V. 597,000
c/o Huck Wayne
P.O. Box 449
St. Louis, Missouri 63166

Manistee City; SE¼ of Section 12 (Maxwell Town)

51-51-712-475-02 (Century Boat Factory & Yard)
Century Boat Co. S.E.V. 150,000
Tenth Street
Manistee, Michigan 49660

51-51-712-475-01 (Electric Substation)
Consumers Power Co. S.E.V. 25,210
c/o Region Controller
821 Hastings St.
Traverse City, Michigan 49684

51-51-712-150-01 and 02 (large, multiple segments, in SE¼ and NE¼ of Section 12)
Morton Norwich Products Inc. (Morton Salt & Chem. Factory, yard & dock,
Morton Salt Drive Century Boat storage, City sewage
110 Wacker Drive treatment plant)
Chicago, Illinois 60606 S.E.V. 1,110,800

51-51-748-701-01 (Morton Salt & Chem. Factory Yard)
Morton Norwich Products Inc.
Morton Salt Drive
110 Wacker Drive
Chicago, Illinois 60606

Manistee City; NE¼ of Section 12

51-51-512-150-01 (Switch yard and round house)
Chesapeake & Ohio Railroad 7.25 acres

#51-51-560-702-01
Morton Norwich Products
Morton Salt Drive
110 Wacker Street
Chicago, Illinois 60606

Manistee City; NW¼ of Section 12

#51-51-112-732-05

Manistee City; NE¼ of Section 12

51-51-448-734-05 (Ben Mar Marina Building)
Edel, Margaret S.E.V. 112,360
3326 Grant Highway
Manistee, Michigan 49660

Manistee City; SW¼ of Section 1

51-51-448-734-05
Edel, Margaret S.E.V. 112,360
3326 Grant Highway Filer & Smith Add.
Manistee, Michigan 49660

#51-51-448-735-09 (Michigan Bell Servicing Building)
Edel, Margaret — S.E.V. 203,230
3326 Grant Highway — Filer & Smith Add.
Manistee, Michigan 49660

51-51-448-735-01 (S&W? Cement at east end of River Street)
Hamilton Auction Co. — S.E.V. 55,590
M-40 — Filer & Smith Add.
Holland, Michigan 49423

Manistee City; SW¼ of Section 1

51-51-448-702-01 (Ex-Cell-O factory)
Ex-Cell-O Corp. — S.E.V. 450,000
2855 Coolidge Tax Dept. — Filer & Smith Add.
Troy, Michigan 48084

51-51-448-736-01 (Mich. Secretary of State Office & parking)
Donald L. Gamache — S.E.V. 16,670
88 Maple Street — 5 acres
Manistee, Michigan 49660 — Filer & Smith Add.

"Slab Dock"
Not owned, an old dock, filled over.

51-51-474-701-01 (former Lakeside Beverage)
Fortier, Neva L. & Lawrence E. — S.E.V. 25,130
6175 Lakeshore Road — M.S. Tyson & Co. New Add.
Manistee, Michigan 49660 — Lots 1, 2, E17, 3

51-51-474-701-02
American Legion — M.S. Tyson & Co. New Add.
10 Mason Street
Manistee, Michigan 49660

51-51-474-701-07 (pipe discharge)
Morton Norwich Products Inc. — S.E.V. 1,100
Morton Salt Drive — M.S. Tyson & Co. New Add.
110 Wacker Drive
Chicago, Illinois 60606

#51-51-474-701-09 (American Legion Building)
Manistee Post #10 American Legion — M.S. Tyson & Co. New Add.
10 Mason Street
Manistee, Michigan 49660

51-51-474-701-11 (Parking behind Chamber)
City of Manistee — M.S. Tyson & Co. New Add.

51-51-474-701-13 (Chamber Building)
Chamber of Commerce — S.E.V. 20,060
31 Mason Street — M.S. Tyson & Co. New Add.
Manistee, Michigan 49660

Manistee City; NW¼ of Section 12 (City C.B.D.)

51-51-448-731-01 (House of Flavors)
West Bay Investments
402 W. Ludington Avenue
Ludington, Michigan 49431
S.E.V. 67,820

51-51-448-731-05 (Manistee Monuments)
Larsen, Kenneth & Marian
445 Cedar Street
Manistee, Michigan 49660
S.E.V. 17,340
Filer & Smith Add.

51-51-448-731-09 (Jach Floor Mart)
Jach, Joe Jr. Etux
3497 Maplewood Road
Manistee, Michigan 49660
Mail to:
Jach, Joseph C. Etux
3497 Maplewood Road
Manistee, Michigan 49660
S.E.V. 36,350
Filer & Smith Add.

51-51-452-704-23 (Hokanson's Camera Equipment)
Hokanson, Edwin I. Etux.
308 River Street
Manistee, Michigan 49660
S.E.V. 21,480
Green & Milmoe's

51-51-452-704-21 (wallpaper?)
Miklas, Vincent A. etal
714 Harbor Drive
Manistee, Michigan 49660
S.E.V. 2,100
Green & Milmoe's

51-51-452-704-19 (Multiple retail)
Economy Real Estate Inc.
P.O. Box 53
Manistee, Michigan 49660
S.E.V. 46,140
Green & Milmoe's

51-51-452-704-15 (Ross Refrigeration)
Ross, Theodore Etal.
259 5th Avenue
Manistee, Michigan 49660
S.E.V. 18,830
Green & Milmoe Add.

51-51-452-704-13 (Barber Shop)
Engstrom, John & Cora
560 Broad Avenue
Manistee, Michigan 49660
S.E.V. 9,650
Green & Milmoe Add.
Lot 38

51-51-452-704-03 (Credithrift)
Calcutt, Harry
1019 Peninsula Drive
Traverse City, Michigan 49684
S.E.V. 4,540
Green & Milmoe's Add.

51-51-452-704-01 (Thompson Insurance)
Gardner, Werner C. Etux. — S.E.V. 12,800
63 E. Kott Road — Green & Milmoe Add.
Manistee, Michigan 49660
Mail to:
Thompson, Thomas F. Etux.
240 Piney Road
Manistee, Michigan 49660

51-51-452-703-17 (Gamble's Warehouse/Montgomery Wards)
Badalamente, David — S.E.V. 17,570
334 River Street — Green & Milmoe's Add.
Manistee, Michigan 49660

51-51-452-703-15 (Vacant)
Brunette, Robert A. Etux. — S.E.V. 8,490
R#1 Box 208 — Green & Milmoe's Add.
Gaylord, Michigan 49735

51-51-452-703-13 (Jerry Lewis Photography)
Larsen, Alfred & Beryl — S.E.V. 12,000
342 River Street — Green & Milmoe's Add.
Manistee, Michigan 49660 — Lot 27

51-51-452-703-11 (Harbor Inn Tavern)
Jeruzal, Joseph A. — S.E.V. 7,480
407 Hancock Street — Green & Milmoe's Add.
Manistee, Michigan 49660

51-51-452-703-07 (Daul's Read-Mor)
Huntington National Bank — S.E.V. 22,280
P.O. Box 1558 — Green & Milmoe's Add.
Columbus, Ohio 43216

51-51-452-703-04 (Cove Bar)
Laskey, LaJuana — S.E.V. 15,750
324 1st Avenue — Green & Milmoe's Add.
Manistee, Michigan 49660

51-51-452-703-02 (Pillars Restaurant)
Rhodea, Erwin & Wilma — S.E.V. 16,930
19 Fowler — Green & Milmoe's Add.
Manistee, Michigan 49660
Mail To:
Haney, David R. Etux.
R#3 Box 88
Bear Lake, Michigan 49614

51-51-452-702-21 (Wilson's Whims)
Jones, Don Inc. — S.E.V. 22,040
513 Oak Street — Green & Milmoe's Add.
Manistee, Michigan 49660
Mail To:
Wilson, Paul Etux.
356 River Street
Manistee, Michigan 49660

51-51-452-702-15 (Vacant)
Lynch, Philip H. & Jean D. — S.E.V. 19,920
Lynch, Daniel L. & Mary Lee M. — Green & Milmoe's Add.
24 Fultonwood, S.E.
Grand Rapids, Michigan 49503
Mail To:
Gibbs, Bruce & Patsie
R#1
Beulah, Michigan 49617

51-51-452-702-14
Kolk, Harry Etux — S.E.V. 750
4028 College Avenue — Green & Milmoe's Add.
Manistee, Michigan 49660

51-51-452-702-01
Kolk, Harry O. — S.E.V. 83,730
4028 College Avenue — Green & Milmoe's Add.
Manistee, Michigan 49660

51-51-452-701-01
The Bette Trust — S.E.V. 43,860
529 Longwood Avenue — Green & Milmoe's Add.
Glencoe, Illinois 60022

51-51-452-701-15 (Alley)
City of Manistee — Green & Milmoe's Add.

51-51-452-701-11 (WinterHauf Ski Shop & Sagebrush)
Fox Jewelry Co. — S.E.V. 21,170
83 Monroe Avenue — Green & Milmoe's Add.
Grand Rapids, Michigan

51-51-452-701-09 (Kennedy's)
Kennedy, Mary L. — S.E.V. 10,230
415 Cedar Street — Green & Milmoe's Add.
Manistee, Michigan 49660 — Lot 5

51-51-452-701-04 (Woolworth's)
Fox Realty Co. — S.E.V. 65,220
83 N.W. Monroe — Green & Milmoe's Add.
Grand Rapids, Michigan

51-51-452-701-01 (J.C. Penney)
The Bette Trust — S.E.V. 43,680
529 Longwood Avenue
Glencoe, Illinois 60022

Manistee City; NE¼ of Section 11

51-51-349-701-01 (Milliken's)
Andrie, Stanley J. Etux. — S.E.V. 71,530
325 E. Circle Drive. — Filer & Tyson's Add.
N. Muskegon, Michigan 49445
Mail To:
Milliken Realty Co.
204 E. Front Street
Traverse City, Michigan 49684

51-51-349-701-05 (Milliken's)
Same as 51-51-349-701-01 — S.E.V. 4,790

51-51-349-701-07 (Milliken's)
Same as 51-51-349-701-01 — S.E.V. 300

51-51-349-701-08 (Just for Her)
Same as 51-51-349-701-01 — S.E.V. 3,490

51-51-349-701-09 (Parking)
Same as 51-51-349-701-01 — S.E.V. 11,130

51-51-349-702-01 (Elks)
BPO Elks No. 250
432 River Street
Manistee, Michigan 49660
S.E.V. 58,550
Filer & Tyson's Add.

51-51-349-702-05 (440 West Restaurant)
Economic Development Corp.
County of Manistee
440 River Street
Manistee, Michigan 49660
S.E.V. 49,040
Filer & Tyson's Add.

51-51-365-701-02 (City Marina) and 06.
City of Manistee
City of Manistee Marina
Sub. Blk 1 C.E. Marsh Add.

51-51-365-701-01 (Johnson Funeral Home)
Johnson, Robert & Reatha
480 Water Street
Manistee, Michigan 49660
S.E.V. 45,490
Sub. of Blk 1 C.E. Marsh Add.

51-51-365-701-12
City of Manistee
Sub. of Blk 1 C.E. Marsh Add.

51-51-365-701-13 (Manistee Charter Service
Gamache, Donald L.
c/o Manistee Charter Service
504 Water Street
Manistee, Michigan 49660
S.E.V. 12,350
Sub. of Blk 1 C.E. Marsh Add.

51-51-365-702-01 (Riverside Motel)
Hoxie, Arvine L. & Goldie A.
555 Cherry Street
Manistee, Michigan 49660
S.E.V. 80,360
Sub. of Blk 1 C.E. Marsh Add.

51-51-365-702-14 (School of Beauty)
Jones, D.
513 Oak Street
Manistee, Michigan 49660
Mail To:
Manistee Bank & Trust Co.
375 River Street
Manistee, Michigan 49660
S.E.V. 3,630
Sub. of Blk 1 C.E. Marsh Add.

#51-51-365-703-01
Konicki, John Jr.
2245 Grant Hwy.
Manistee, Michigan 49660
Mail To:
O'Dell, Allen D. etux
5855 Milarch Road
Manistee, Michigan 49660
S.E.V. 15,590
Sub. of Blk 1 C.E. Marsh Add.

51-51-365-703-02
City of Manistee
Sub. of Blk 1 C.E. Marsh Add.

51-51-365-703-03
Konicki, John Jr.
2245 Grant Highway
Manistee, Michigan 49660
Mail To:
O'Dell, Allen D. Etux.
5855 Milarch
Manistee, Michigan 49660
S.E.V. 15,590
Sub. of Blk 1 C.E. Marsh Add.

51-51-365-703-05
Same as aobve
S.E.V. 2,630

51-51-365-703-07
Allen, Robert P.
522 First Street
Manistee, Michigan 49660
S.E.V. 7,450
Sub. of Blk 1 C.E. Marsh Add.

Manistee City; NW¼ of Section 11

51-51-310-400-00 (First St. Beach Park)
City of Manistee
E. & J. Canfield's Add.

#51-51-370-701-01 (House)
Larsen, Grace L.
529 Fairview Avenue
Manistee, Michigan 49660
Mail To:
Sorensen, Alma
552 1st Street
Manistee, Michigan 49660
S.E.V. 19,520
Riverside Sub.
Lot 1

#51-51-370-701-03 (House)
Larson, Elsie E.
554 1st Street
Manistee, Michigan 49660
S.E.V. 18,410
Riverside Sub.
Lot 2

#51-51-370-701-05 (House)
Nowak, Ray & Suzanne
556 1st Street
Manistee, Michigan 49660
S.E.V. 22,160
Riverside Sub.
Lot 3

#51-51-370-702-01 (House)
Hughes, Lloyd & Ann — S.E.V. 24,980
560 1st Street — Riverside Sub.
Manistee, Michigan 49660 — Lot 5

#51-51-370-702-03 (House)
Skiera, Anthony J. Etux. — S.E.V. 24,660
562 1st Street — Riverside Sub.
Manistee, Michigan 49660 — Lot 6

#51-51-370-702-05 (House)
Robinson, Harold Etux. — S.E.V. 22,600
564 1st Street — Riverside Sub.
Manistee, Michigan 49660 — Lot 7

#51-51-370-702-07 (House)
Oleniczak, Jas. F. Etux. — S.E.V. 14,750
566 1st Street — Riverside Sub.
Manistee, Michigan 49660 — Lot 8

#51-51-311-250-02 (Lakeshore Motel)
Hill, R.G. — S.E.V. 167,660
301 Cypress Street
Manistee, Michigan 49660

#51-51-311-275-03
Gamache, Donald L. Etal. — S.E.V. 36,000
88 Maple Street
Manistee, Michigan 49660

Manistee City; SW¼ of Section 2

51-51-262-701-01 and Lots 1-183 (First St. Beach Park)
City of Manistee — Lake Michigan Heights

51-51-202-350-01 (U.S. Coast Guard)
United States

Manistee City; NW¼ of Section 11

51-51-211-200-01
Sand Products Corp. — S.E.V. 30,225
2489 1st National Building
Detroit, Michigan 48226

51-51-264-701-01
Sand Products Corp. — S.E.V. 36,250
2489 1st National Building
Detroit, Michigan 48226

Manistee City; NE¼ of Section 11

51-51-211-128-01 (former Bjorkquist commercial fishing dock)
Sand Products Corp. — S.E.V. 17,500
2489 1st National Building
Detroit, Michigan 48226

51-51-211-127-03
By Lake Corp. S.E.V. 5,530
77 Hancock Street
Manistee, Michigan 49660
Mail To:
Feagins, Harless
77 Hancock Street
Manistee, Michigan 49660

#51-51-211-127-01 (Chalet West II apartments)
Feagins, Harless W. Etal. S.E.V. 113,950
DBA Chalet West II
77 Hancock Street
Manistee, Michigan 49660

#51-51-211-127-02 (Chalet West Apartments)
Feagins, Harless W. Etal. S.E.V. 125,080
77 Hancock Street
Manistee, Michigan 49660

51-51-211-126-08 (House and marina)
Joslin, Irene H. S.E.V. 25,460
297 Sixth Avenue S.W. Fowler's Add.
Manistee, Michigan 49660 Blk 1

51-51-211-126-07
By Lake Corp. S.E.V. 3,250
77 Hancock Street
Manistee, Michigan 49660
Mail To:
Feagins, Harless
77 Hancock Street
Manistee, Michigan 49660

#51-51-211-126-05 (House)
Krueger, Harold S.E.V. 1,860
c/o Parker, Patricia L.
1308 Sierra Drive
Kalamazoo, Michigan 49004

#51-51-211-126-09 (House)
Henrichsen, Marlan Etux. S.E.V. 9,050
292 N. Water Street
Manistee, Michigan 49660

#51-51-211-126-10 (House)
City of Manistee Housing Commission
City Hall

51-51-211-107-01
Manistee Housing Commission
237 Sixth Avenue
Manistee, Michigan 49660

51-51-211-106-02 (Fortier Industries Factory)
Fortier, Lawrence & Neva S.E.V. 48,960
6174 Lakeshore Road
Manistee, Michigan 49660

51-51-211-106-01 (Century Terrace Senior Citizens Apartments)
Manistee Housing Commission
237 6th Avenue
Manistee, Michigan 49660

51-51-211-105-03 (House)
Chmielewski, Ray Etux. S.E.V. 14,770
229 6th Avenue
Manistee, Michigan 49660

51-51-211-105-01
City of Manistee

#51-51-211-105-02 (House)
Field, Clayton G. Etals. S.E.V. 16,510
219 6th Avenue
Manistee, Michigan 49660

51-51-211-100-03
Groves, Sylvia S.E.V. 2,950
704 Spruce Street
Manistee, Michigan 49660

51-51-211-100-02 (Manistee Furniture Store)
Manistee Manufacturing Co. S.E.V. 23,300
86 Washington Street
Manistee, Michigan 49660

Manistee City; SW¼ of Section 1

51-51-101-350-01 (Parking lot and Memorial Park)
City of Manistee

51-51-101-325-01 (Arthur Street Railroad Switch Yard)
C&O Railroad Co. S.E.V. 30,480
c/o Gen Tax Commission
P.O. Box 1254 1255
Richmond, Virginia 23210

51-51-101-300-01 (Consumers Power Company Service Building and vacant)
Consumers Power Co. S.E.V. 213,500
c/o Region Controller
821 Hastings
Traverse City, Michigan 49684

Manistee City; NW¼ of Section 1

51-51-101-375-06 (Arthur Street Boat Launch Ramp and Parking)
City of Manistee

51-51-101-
No description, no parcel #

51-51-101-275-05
By Lake Corp. S.E.V. 18,100
77 Hancock Street
Manistee, Michigan 49660
Mail To:
Feagins, Harless
77 Hancock Street
Manistee, MI 49660

51-51-101-275-02 (Moonlite Marina)
Lewis, James H. Etux. S.E.V. 41,800
111 Arthur Street
Manistee, Michigan 49660
Mail To:
DeHart, David
16590 Wayne
Livonia, Michigan 48154

51-51-101-275-01 (Moonlite Motel)
Lewis, James & Davenia S.E.V. 109,800
111 Arthur Street
Manistee, Michigan 49660
Mail To:
Beaudrie, James
111 Arthur Street
Manistee, Michigan 49660

51-51-101-704-19
Beaudrie, James J. Etal. S.E.V. 1,700
111 Arthur Street S.C. Thompson's Add.
Manistee, Michigan 49660

51-51-174-704-01 (Joslin Manufacturing)
Cosco Industries Inc. S.E.V. 80,060
P.O. Box 836 S.C. Thompson's Add.
Toledo, Ohio 43696

51-51-174-702-15 (Bar-B-Q)
Celestino, Phillip C. S.E.V. 22,750
1460 Princeton Road S.C. Thompson's Add.
Manistee, Michigan 49660

51-51-174-702-13
Schultz, Dora S.E.V. 1,050
220 Arthur Street S.C. Thompson's Add.
Manistee, Michigan 49660

51-51-174-702-09 (Car Wash and Muffler Man)
Perry, Harold & Virginia S.E.V. 55,100
c/o Manistee Bank & Trust Co. S.C. Thompson's Add.
375 River Street
Manistee, Michigan 49660
Mail To:
Stancroft, Ray G.
426 Stimson
Cadillac, Michigan 49601

51-51-174-702-05 (Fishermen's Center)

Jones, Dorothy
263 Arthur Street
Manistee, Michigan 49660
Mail To:
Walsh, Frank J. Etux.
263 Arthur Street
Manistee, Michigan 49660

S.E.V. 31,800
S.C. Thompson's Add.

51-51-174-702-01 (Solberg Boat Yard)

Solberg Boat Yard, Inc.
267 Arthur Street
Manistee, Michigan 49660

S.E.V. 67,000
S.C. Thompson's Add.