

## COMMISSION MEMBERS

### KENOSHA COUNTY

George C. Berteau, Chairman - Kenosha  
Erwin W. Lange - Kenosha  
George L. Schlitz - Burlington

### MILWAUKEE COUNTY

Richard W. Cutler, Secretary - Milwaukee  
John P. Murphy - West Allis  
Prof. Henry J. Schmandt - Milwaukee

### OZAUKEE COUNTY

Ray F. Blank - Grafton  
Nick R. Didier - Port Washington  
James F. Egan - Mequon

### RACINE COUNTY

Lester Hoganson - Burlington  
Milton F. LaPour - Racine  
Wilfred Patrick - Racine

### WALWORTH COUNTY

Charles B. Coe - Whitewater  
Eugene Hollister - Williams Bay  
John D. Voss - Elkhorn

### WASHINGTON COUNTY

Dr. Carlton M. Herman - Allenton  
Joseph Schmitz, Vice-Chairman - Germantown  
Arthur Weiner - West Bend

### WAUKESHA COUNTY

Fortney Larson, Treasurer - Brookfield  
Lyle L. Link - Waukesha  
Maynard W. Meyer - Pewaukee

**REGIONAL BASE  
MAPPING PROGRAM**

RETURN TO:  
SOUTHEASTERN WISCONSIN  
REGIONAL PLANNING COMMISSION  
PLANNING LIBRARY  
CODE: \_\_\_\_\_

**SOUTHEASTERN WISCONSIN REGIONAL  
PLANNING COMMISSION**

The preparation of this report was financed in part through an urban planning grant from the Housing and Home Finance Agency, under the provisions of Section 701 of the Housing Act of 1954, as amended.

July, 1963

price: \$1.00

LIBRARY OF CONGRESS  
CATALOG CARD NO. 63-22076

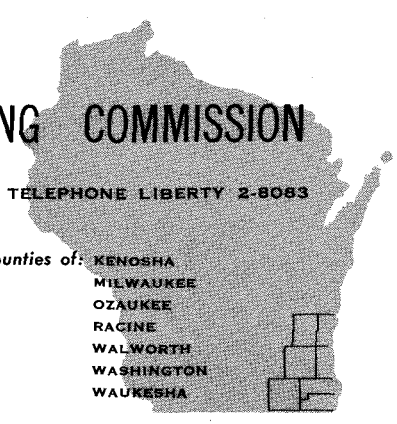
# SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

916 NO. EAST AVENUE

• WAUKESHA, WISCONSIN •

TELEPHONE LIBERTY 2-8083

Serving the Counties of: KENOSHA  
MILWAUKEE  
OZAUKEE  
RACINE  
WALWORTH  
WASHINGTON  
WAUKESHA




## STATEMENT OF THE EXECUTIVE DIRECTOR

This report is intended to present briefly the results of the base mapping program of the Southeastern Wisconsin Regional Planning Commission. The base mapping program was one of a series of planning studies performed under Planning Grant No. Wis. P-6(G) from the Housing and Home Finance Agency. The mapping program began in September of 1961 and was completed in July of 1963.

The maps produced under this program, while absolutely essential to the regional planning program, should also be extremely useful to county and local units of government and to private corporations and individuals within the Region. Selected samples of the maps are included in this report in order to make their existence more widely known. It is hoped thereby to encourage multipurpose use to the maximum possible extent and avoid any possible duplication of effort.

The finished maps represent a very high quality of workmanship due to the careful work of Planning Draftsmen Dallas Behnke, Ronald Humphrey, and Leroy Zocher. Acknowledgement is also due Mr. Daniel Kennedy, Regional Engineer, U. S. Geological Survey, for his thoughtful cooperation during the mapping program.

  
K. W. Bauer  
Executive Director

(This page intentionally left blank)

## TABLE OF CONTENTS

	Page
Chapter I. Introduction.....	1
Chapter II. Need for Base Maps.....	3
Chapter III. General Purpose Base Mapping Procedure.....	7
Chapter IV. Reproduction.....	13
Chapter V. Area Mapped.....	19
Chapter VI. Availability of Maps.....	21
Chapter VII. Conclusion.....	23
LIST OF MAPS AND TABLES	
Map 1.....	8
Map 2.....	9
Map 3.....	10
Map 4.....	11
Map 5.....	13
Map 6.....	14
Map 7.....	14
Map 8.....	14
Map 9.....	15
Map 10.....	16
Map 11.....	16
Map 12.....	16
Map 13.....	17
Map 14.....	19

Map 15.....20

Table 1.....21



## Chapter I

### INTRODUCTION

The Southeastern Wisconsin Regional Planning Commission represents an attempt to provide comprehensive, areawide planning services for one of the nation's large urbanizing regions on a voluntary, co-operative basis. This Region is comprised of seven southeastern Wisconsin counties: Kenosha, Milwaukee, Racine, Ozaukee, Walworth, Washington, and Waukesha. The Region consists of 2,628 square miles of land area or 5 per cent of the total land area of the State of Wisconsin. The Region, however, contains almost one half of the State's population and wealth. Over the last decade the Region accounted for 64 per cent of the total population increase of the State of Wisconsin.

Regional planning as conceived by the Commission is not a substitute for local planning which necessarily exists to solve local development problems. Rather, regional planning is conceived as a supplement to local planning and exists to solve areawide development problems, problems which cannot be resolved within the framework of a single municipality or even a single county.

The areawide problems which necessitate regional planning in southeastern Wisconsin all have their source in the Region's rapid population growth and urbanization. Under the effects of this growth and urbanization, the entire Region is becoming a mixed rural-urban area creating new and intensified areawide problems of unprecedented scope and complexity. These areawide problems include, among others, drainage and flood control, water supply and pollution, sewerage and sewage disposal, park and open space reservation, economic development and transportation.

(This page intentionally left blank)

## Chapter II

### NEED FOR BASE MAPS

The need to recognize a large region as a planning unit, together with the comprehensive nature of the Commission's planning activities are two factors having important implications for base mapping needs.

Accurate maps depicting the shape of the surface of the land and the precise location of its physical features, both natural and man-made, are essential basic planning tools. Such maps are necessary to the intelligent use and management of natural resources as well as to every phase of urban development. Their value extends not only to every level and agency of government, but also to all private individuals and corporations who are concerned in some way with the development and use of the land.

Accurate base maps are, therefore, an absolute prerequisite to any sound regional planning program. Such maps must perform a fourfold function with respect to such a planning program:

1. The first function of the base maps must be to provide definitive knowledge of the topographic features of the Region. Specific information is required on relief; on the location of such natural features as lakes, streams and watercourses, drainage divides, marshes and wetlands; on the location and extent of such man-made features as highways, railroads, airfields, canals and drainage ditches; and on the location and orientation of real property boundary lines.
2. The second function of the base maps is to provide a means for relating information collected in various planning studies to the geographic area from which it was taken, preferably mathematically, so as to permit geographic identification and correlation of such planning information by machine methods.
3. The third function of the base maps is to provide a medium for recording and presenting in graphic form, information descriptive of the Region and thereby useful for planning purposes.
4. The final function of the base maps is to provide an adequate basis for the administration of certain plan implementation devices.

Base maps of an accuracy and precision necessary to fulfill these four functions and covering a large area of the earth's surface cannot be constructed by the "plane" surveying and mapping techniques traditionally utilized by local engineers and surveyors. Instead, such base maps must be constructed on map projections which recognize the

curvature of the earth's surface and permit distances and areas to be accurately portrayed and measured. Adequate maps of this type were lacking for the Region and the several counties which comprise the Region when the Commission was created in August of 1960.

Careful analysis of the status of the existing mapping within the Region indicated that it would be necessary for the Commission to ultimately prepare at least two series of base maps suitable for planning use. The first series would be termed general purpose base maps and would encompass the entire Region plus certain selected areas outside the Region. These maps were required at once for regional planning studies, and their preparation is the subject of this report.

The second series would be best termed detailed planning maps and would be prepared for integral subareas of the Region, as for example, watersheds, major transportation corridors, or special purpose districts. These maps would be required as the Commission's planning activities reach a more precise and definitive stage, and as a program of local planning assistance is undertaken. They would provide an inventory of the physical facts relating to the land and its ownership to a much greater degree of accuracy and precision than that furnished by the general purpose maps. At the definitive planning stage, full and detailed information concerning two factors require constant attention if plans are to be sound and affective: the land itself with its topography and physical characteristics, and the boundaries of real property ownership. Base maps of required precision and accuracy providing this necessary inventory are lacking for many of the Region's small and medium-sized cities and villages and for most of the Region's rural areas.

#### SURVEY CONTROL

Any accurate mapping project requires the establishment of a basic system of survey control. This control consists of a framework of points whose horizontal and vertical positions and inter-relationships have been accurately established by field surveys; points to which the map details are adjusted and against which they may be checked. The control system used should be carefully designed to fit the specific needs of the particular mapping project being undertaken.

For definitive planning purposes it is essential that this control net meet two basic design criteria if the maps based upon it are to be effective planning and engineering tools. First, it must permit the accurate correlation of property boundary line information with topographic data. Second, the control net must be permanently monumented on the ground so that lines established on the map during planning may be accurately re-established on the ground during plan implementation. That is to say, for planning purposes the control system must be such as to provide finished maps which not only accurately reflect both topographic and cadastral field conditions, but maps the lines of which may be readily and accurately reproduced upon the ground as well.

In consideration of these needs, it is recommended that all detailed planning base maps be prepared for the Commission, as the need arises, by photogrammetric methods utilizing a unique system of horizontal control based upon the U.S. Public Land Survey

system as well as upon the national geodetic datum. This control system requires the relocation and permanent monumentation of all section and quarter-section corners in the area to be mapped, and the utilization of these corners in a second order traverse net tied to the national geodetic datum through the Wisconsin state plane coordinate system. Such a control system establishes the exact lengths and true bearings of all quarter-section lines, as well as the geographic position (state plane coordinates) of the public land survey corners themselves, and provides a basic horizontal control net for all subsequent topographic and cadastral mapping.

It is further recommended that these detailed planning maps should have scale ranges from 1 inch equals 100 feet (1" = 100') to 1 inch equals 200 feet (1" = 200') with 2 to 4 foot contour intervals. The finished maps, in addition to showing the usual contour information, spot elevations, planimetric and hydrographic detail, and coordinate ticks, should show in their correct position and orientation all quarter-section lines and public land survey corners. All real property boundary line data can then be readily and accurately superimposed on the topographic maps.

Although the emphasis placed in this report on methods of preparing detailed planning base maps may seem untimely, it should be noted that it was essential to determine at the outset of this project that all later mapping work could be correlated with the general purpose base maps. Moreover, large scale topographic maps of urban areas and their environs and of some rural areas are currently being prepared at an accelerated rate by photogrammetric engineers for local units of government. Relatively simple changes in the specifications governing the mapping operation could make these maps the truly effective planning and engineering tools they ought to be. Such changes could, moreover, save much needless duplication of survey effort by the Commission at a later date.

(This page intentionally left blank)

## Chapter III

### GENERAL PURPOSE BASE MAPPING PROCEDURE

In order to provide a basis for its function of preparing long-range plans for the physical development of the Region, the Commission immediately undertook a general purpose regional base mapping program to provide the first series of base maps previously referred to; (the small scale general purpose base maps.) This program was supported in part by an HHFA Section 701 Planning Grant (No. Wis. P-6) and resulted in the production of a highly versatile series of general purpose regional and county base maps.

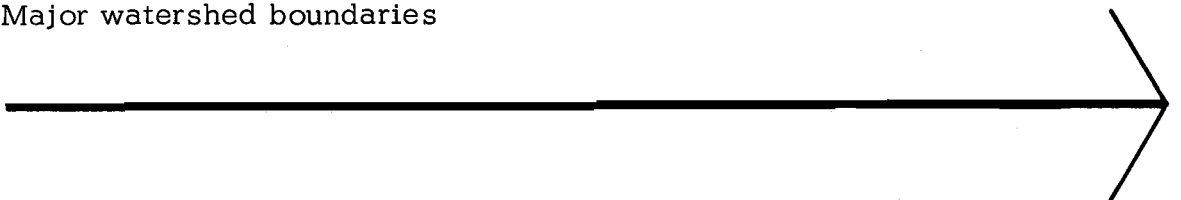
The maps compiled under this program utilize the Wisconsin state plane coordinate grid, south zone, as the basic map projection rather than a polyconic projection showing parallels of latitude and meridians of longitude directly. Since the state plane coordinate grid in Wisconsin is based upon a Lambert conformal conic projection and since all state plane coordinates are mathematically convertible to positions of latitude and longitude, such a grid serves admirably for regional base mapping purposes.

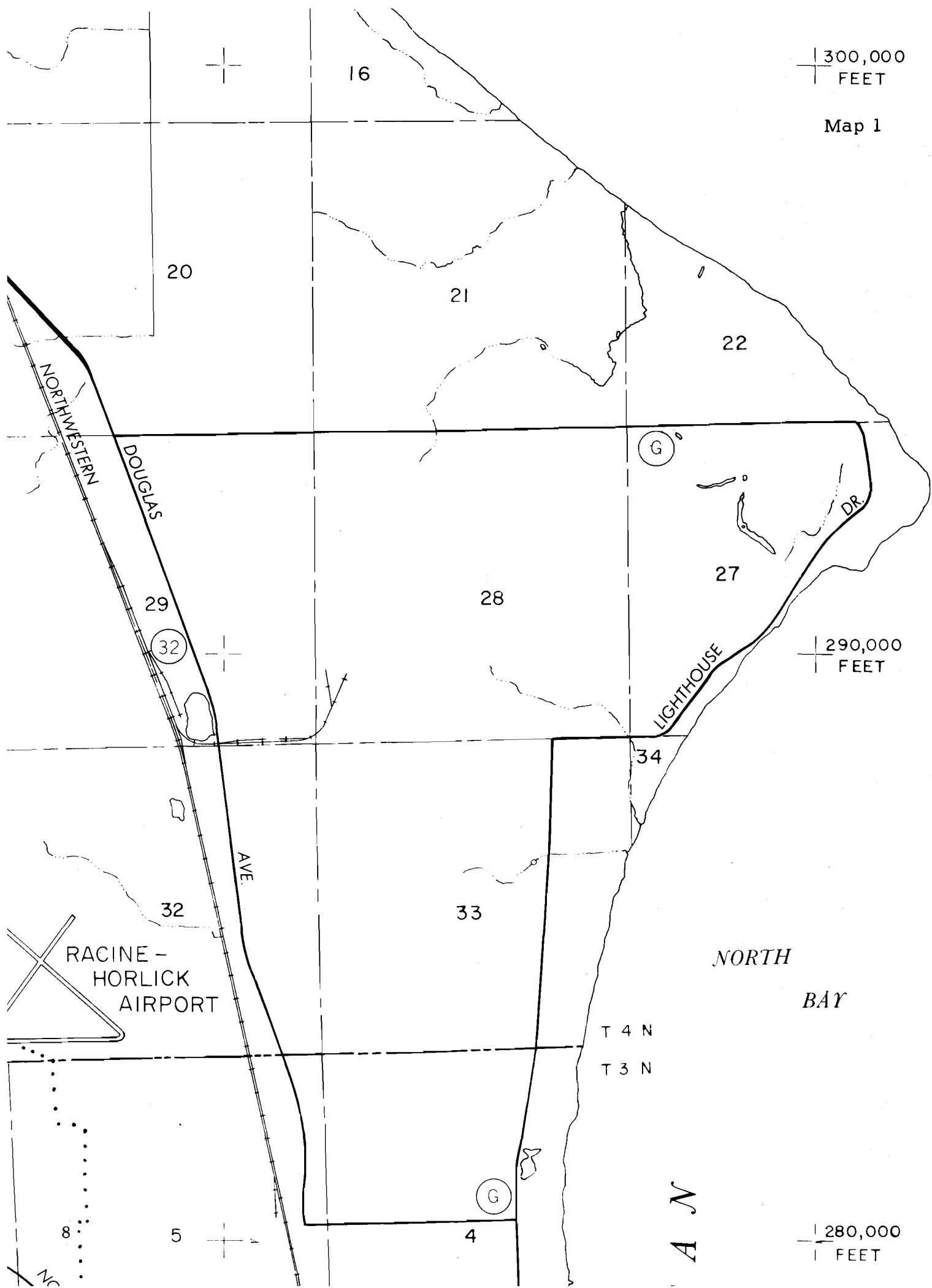
The maps were compiled to national map accuracy standards, in ink, on dimensionally stable mylar base material at a scale of 1:24000 (1" = 2000'). U.S. Geological Survey (USGS) 7 1/2-minute quadrangle maps provided the basic framework of survey control for the mapping work as well as the primary source of topographic data.

#### COMPOSITION

The general purpose base maps were compiled in four sheets, consisting of a base sheet and three overlay sheets. Each sheet depicts the following information:

1. Base Sheet (See Map 1)
  - a. State plane coordinate grid ticks
  - b. U.S. Public Land Survey township, range, and section lines and identifying numbers
  - c. All lake shore, stream and watercourse lines, all swamp and marsh areas 40 acres or larger in areal extent
  - d. State and county limit lines
  - e. Major trafficways (for example: federal, state, and county trunk highways, railroads, and airports.)
  - f. Major watershed boundaries





300,000  
FEET

Map 1

290,000  
FEET

280,000  
FEET

NORTH  
BAY

T 4 N  
T 3 N

A N

RACINE -  
HORLICK  
AIRPORT

8

5

4

33

34

32

29

27

28

22

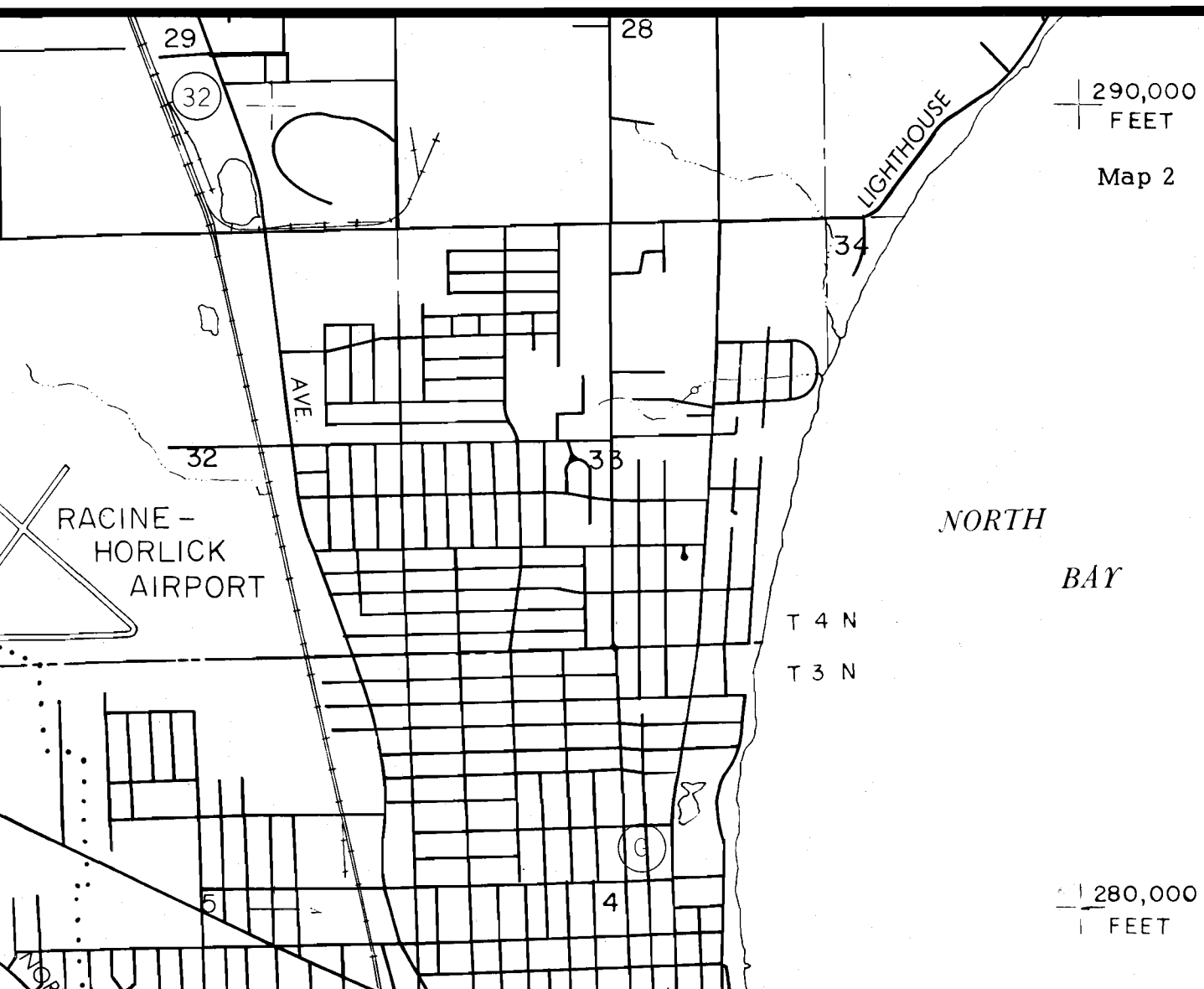
21

20

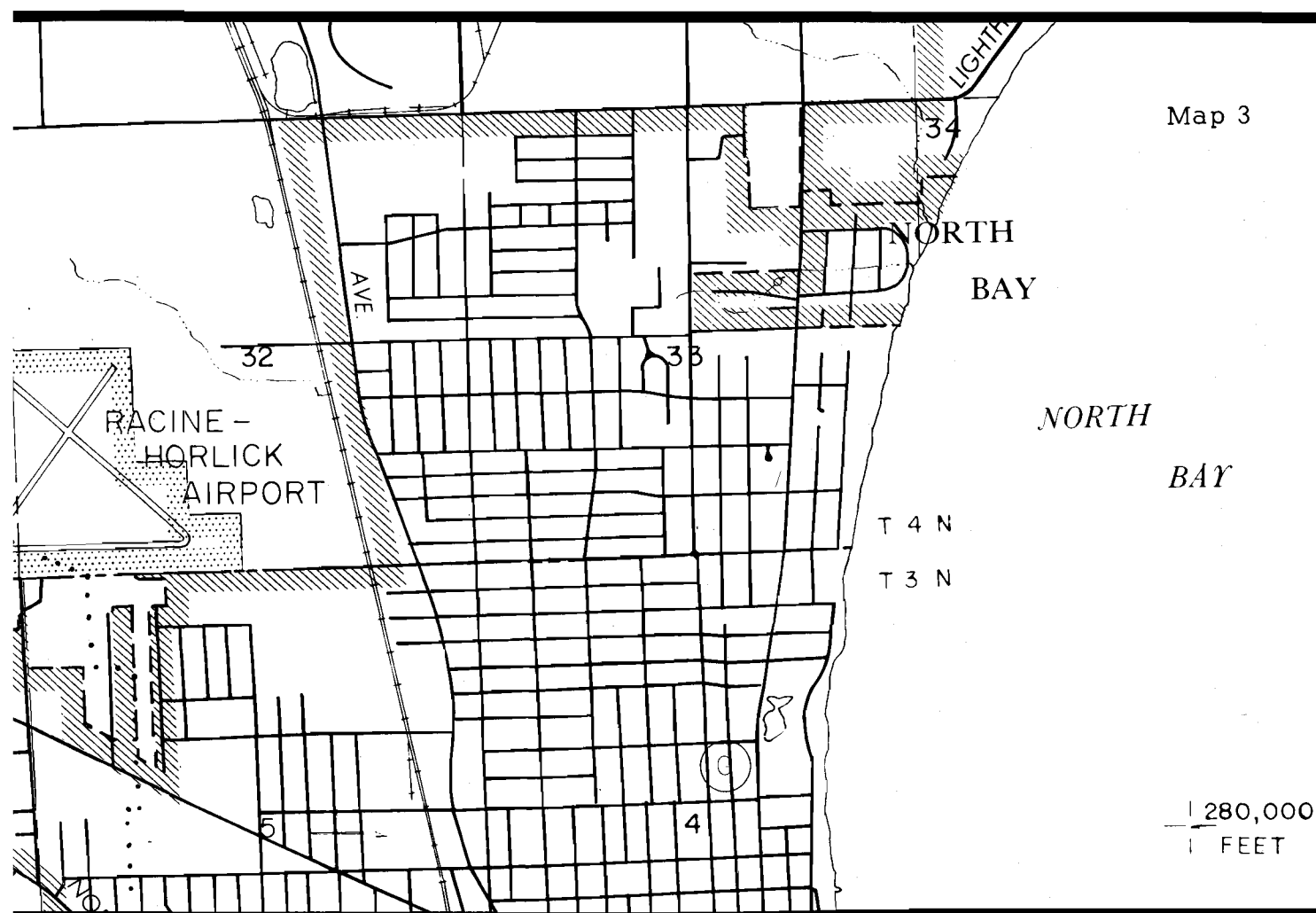
16



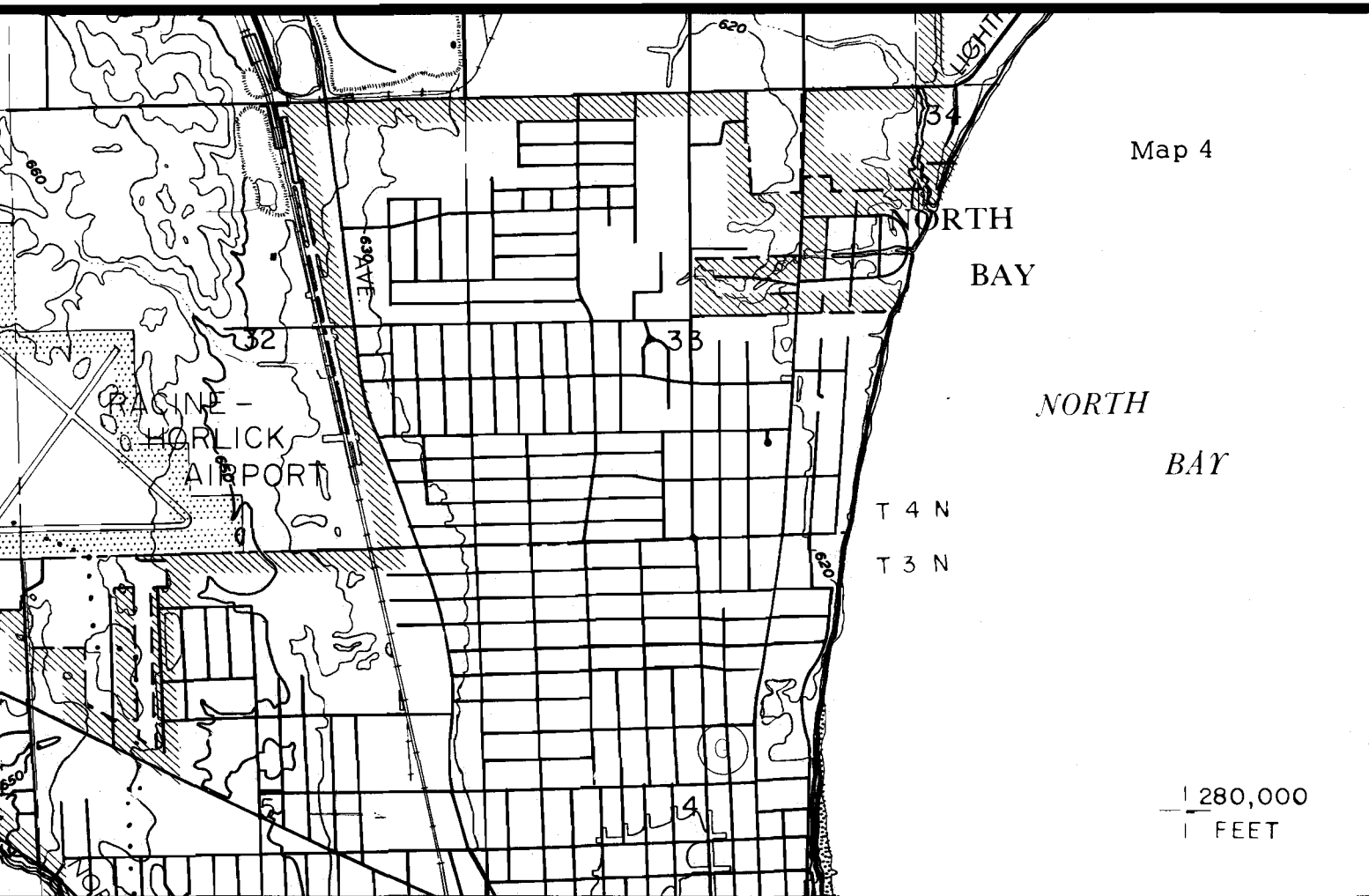
2. Base Sheet plus First Overlay Sheet (See Map 2)
  - a. State plane coordinate grid ticks
  - b. U.S. Public Land Survey township, range, and section lines and identifying numbers
  - c. All lake shore, stream and watercourse lines, all swamp and marsh areas 40 acres or larger in areal extent
  - d. State and county limit lines
  - e. Major trafficways (for example: federal, state, and county trunk highways, railroads, and airports.)
  - f. Major watershed boundaries
  - g. All streets and highways including complete urban street patterns
  - h. All major electric power transmission lines (138 KV or over)



3. Base Sheet plus First and Second Overlay Sheets (See Map 3)
  - a. State plane coordinate grid ticks
  - b. U.S. Public Land Survey township, range, and section lines and identifying numbers
  - c. All lake shore, stream and watercourse lines, all swamp and marsh areas 40 acres or larger in areal extent
  - d. State and county limit lines
  - e. Major trafficways (for example: federal, state, and county trunk highways, railroads, and airports.)
  - f. Major watershed boundaries
  - g. All street and highways including complete urban street patterns
  - h. All major electric power transmission lines (138 KV or over)
  - i. All city and village corporate limit lines
  - j. All major federal, state, county and municipal public land holdings (one quarter-section or larger in areal extent except within Milwaukee county where all such holdings are shown)



4. Base Sheet plus First, Second and Third Overlay Sheets (See Map 4)
  - a. State plane coordinate grid ticks
  - b. U.S. Public Land Survey township, range, and section lines and identifying numbers
  - c. All lake shore, stream and watercourse lines, all swamp and marsh areas 40 acres or larger in areal extent
  - d. State and county limit lines
  - e. Major trafficways (for example: federal, state, and county trunk highways, railroads, and airports.)
  - f. Major watershed boundaries
  - g. All street and highways including complete urban street patterns
  - h. All major electric power transmission lines (138 KV or over)
  - i. All city and village corporate limit lines
  - j. All major federal, state, county and municipal public land holdings (one quarter-section or larger in areal extent except within Milwaukee county where all such holdings are shown)
  - k. Hypsometry by contours. A vertical contour interval of 10 feet is used at the compilation scale of 1:24000 and 20 feet at the publication scale of 1:62500.
  - l. Selected additional planimetry



## SOURCE DATA

Source data for the base sheets consisted of published and advance prints of USGS 7 1/2-minute quadrangle maps, state and county highway maps and records, and city engineering maps and records.

Source data for the first overlay consisted of published and advance prints of USGS 7 1/2-minute quadrangle maps, public utility system plans and records, and current aerial photography. The aerial photography was obtained as a part of other Commission work programs at two scales: high altitude photography at a negative scale of 1 inch equals 6000 feet and low altitude photography at a negative scale of 1 inch equals 2000 feet. Rectified photographic enlargements of the high altitude negatives were prepared on dimensionally stable chronar base material at a scale of 1 inch equals 2000 feet using the base maps as control. Each such rectified enlargement is centered over a survey township, depicts the entire township, and may be readily used to compile and update the general purpose base maps. Ratioed photographic enlargements of the low altitude negatives were prepared on dimensionally stable, reproducible chronar base material at a scale of 1 inch equals 400 feet. Each such enlargement is centered over the common corner of four U.S. Public Land Survey sections. The enlargements are ideally suited for use as field sheets in the preparation of physical inventories and were employed only indirectly in the base mapping work.

Source data for the second overlay consisted of State Highway Commission urban area plats, State Conservation Department property boundary line plats and records, and local park department maps and records.

Source data for the third overlay sheet consisted of published and advance prints of USGS 7 1/2-minute quadrangle maps.

The importance of the USGS quadrangle maps to the successful completion of the base mapping program cannot be overemphasized. The existence of modern USGS 7 1/2-minute quadrangle map coverage of the Region greatly expedited the base mapping work, permitting both cost savings and quality improvements. These maps provided the basic framework of control as well as a basic data source for the regional mapping work. The completed general purpose base mapping program has cost approximately \$11,000. It is conservatively estimated that the cost of the same program, in the absence of modern USGS 7 1/2-minute quadrangle map coverage, would have cost \$536,000. Considering the limited budget of the Commission, such expenditures for base mapping would have been impossible; and the planning program of the Commission would have been severely restricted, if indeed at all possible.

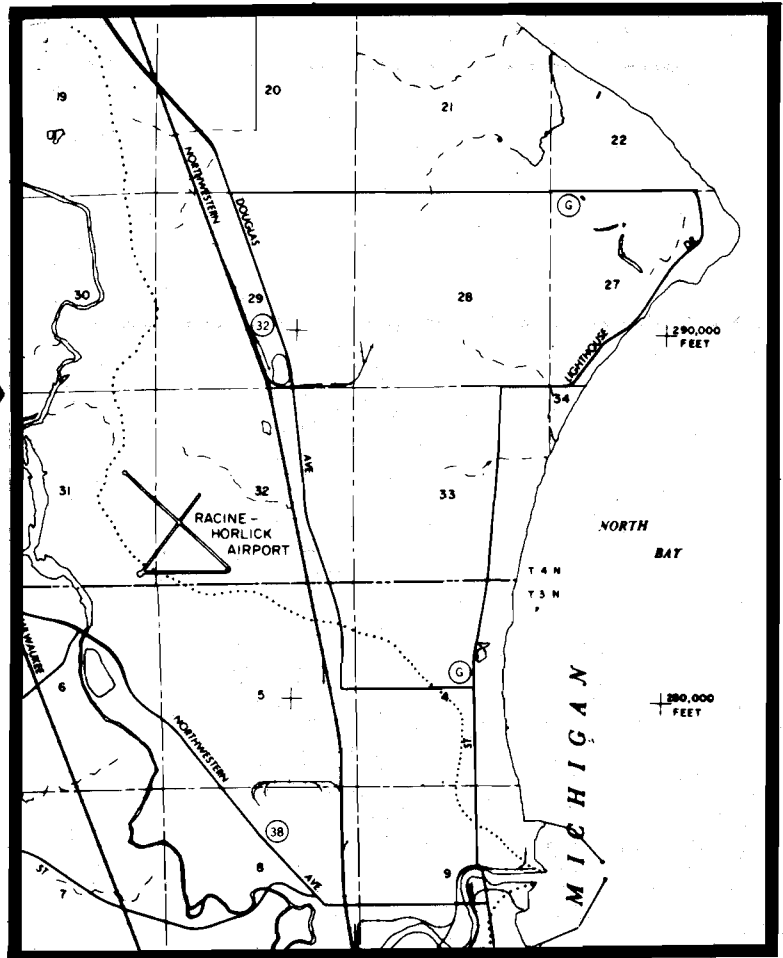
## Chapter IV REPRODUCTION

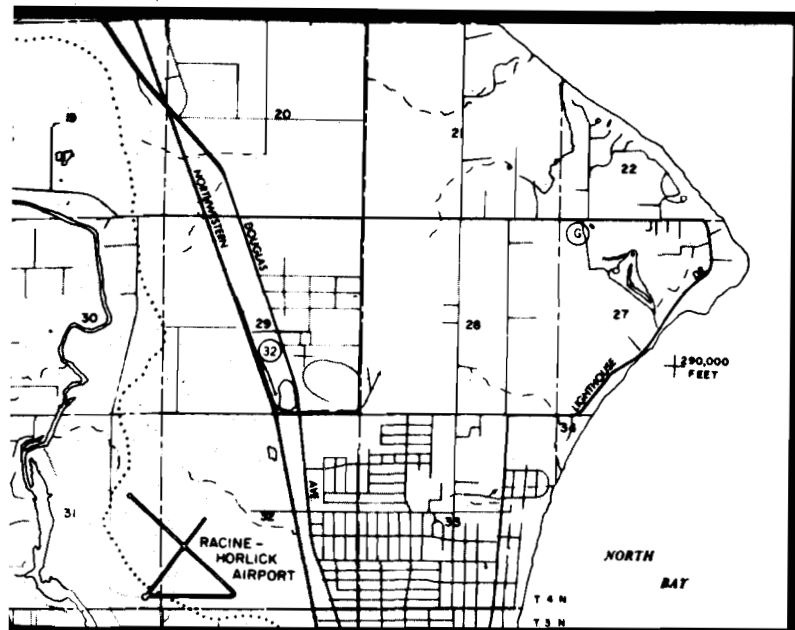
The base sheets can be printed with any combination of overlay sheets to permit ready preparation of maps for planning studies concerning natural resources, population, economic activity, land use, public utilities, and transportation. All sheets can be reduced to a scale of 1:62500, each such reduced sheet depicting an entire county. All such reduced sheets can be assembled by simple mosaic processes into a finished series of maps depicting the Region as a whole.

Maps 1 through 4 show an area of the Region as mapped at the compilation scale of 1:24000 (1" = 2000'), and illustrate the information which each overlay sheet adds to the base sheet. Maps 5 through 8 show the same area at the reduced scale of 1:62500 (1" = 5208'). The base sheet and overlays are readily adaptable to color separation, and five-color maps can be produced. (See Map 9).

Map 5

The Base Sheet at a scale of 1" = 5208' (See Map 1 for compilation scale.)



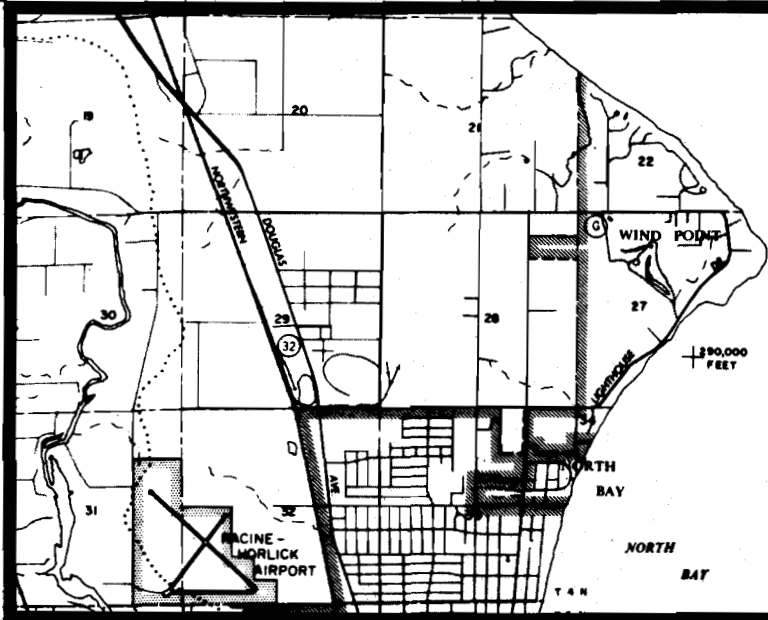


Map 6

Base Sheet plus First Overlay Sheet at a scale of 1" = 5208' (See Map 2 for compilation scale.)

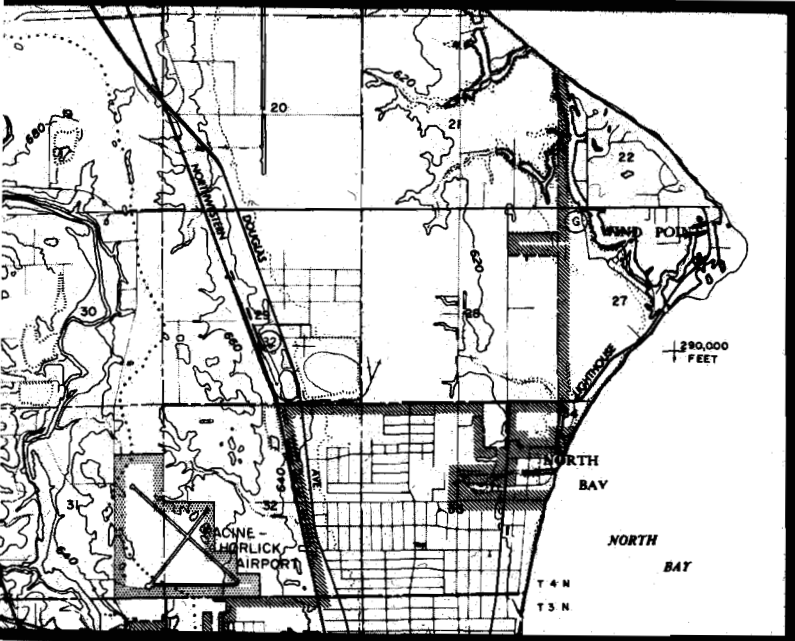
Map 7

Base Sheet plus First and Second Overlay Sheets at a scale of 1" = 5208' (See Map 3 for compilation scale.)

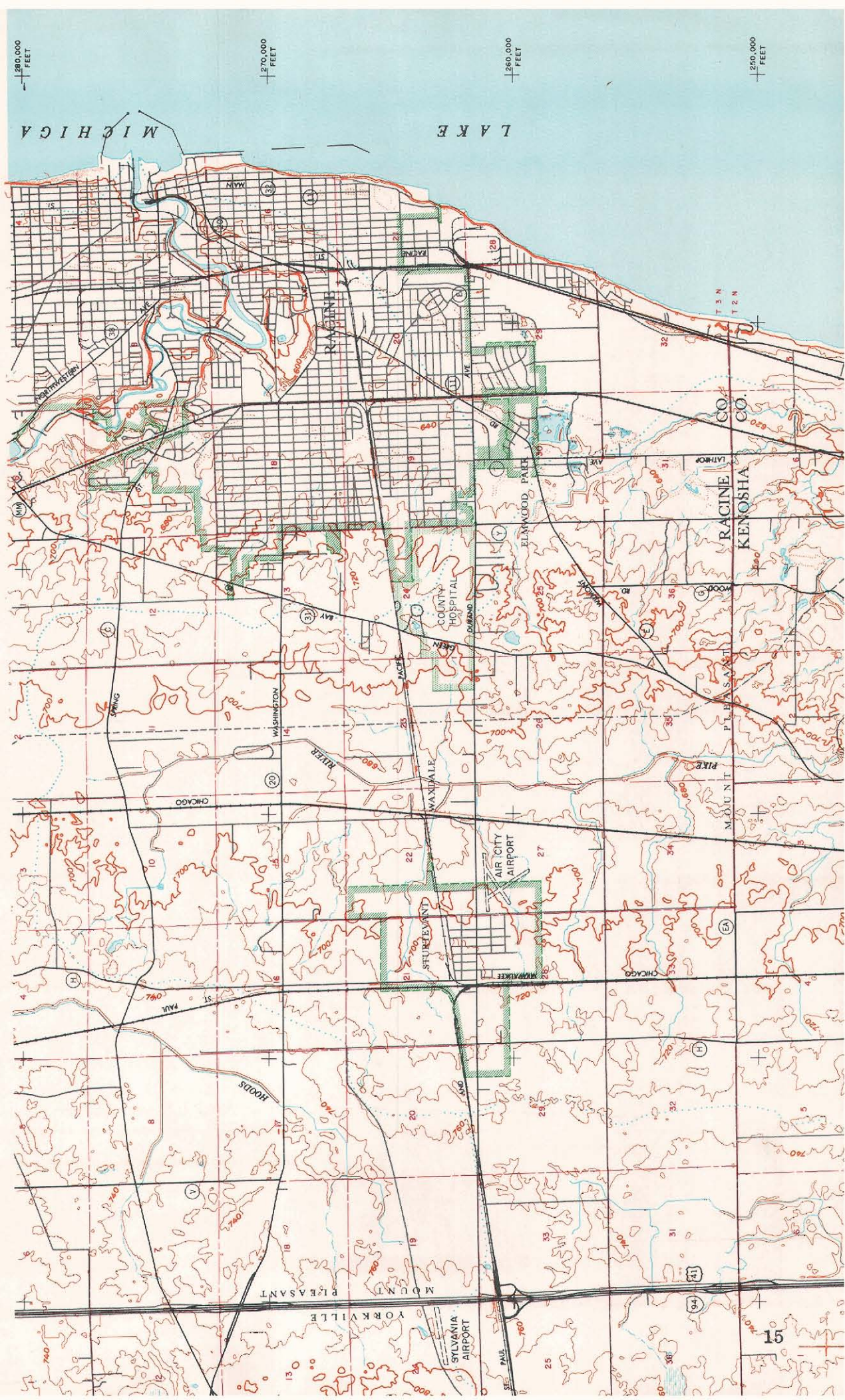


Map 8

Base Sheet plus First, Second, and Third Overlay Sheets at a scale of 1" = 5208' (See Map 4 for compilation scale.)

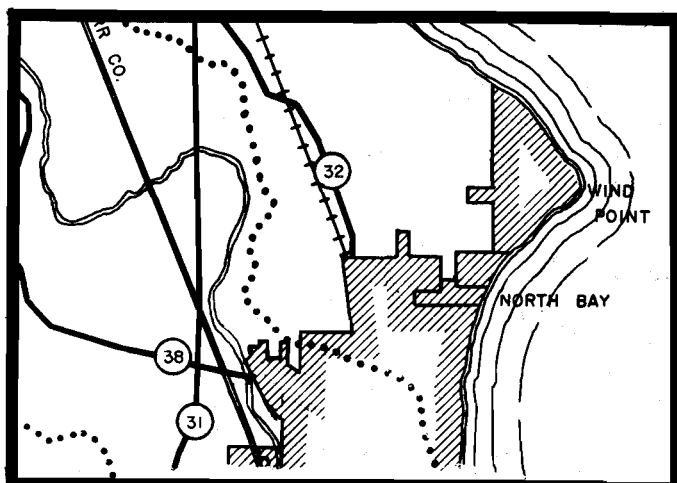








The general purpose base map sheets can be further reduced and combined by mosaic processes to give a series of base maps in a choice of scales ranging from 1:24000 to 1:500000 (see Maps 1 through 8 and Maps 10 through 12), and in a choice of sizes ranging from 7 by 9 foot wall maps to 8 1/2 by 11 inch hand maps.

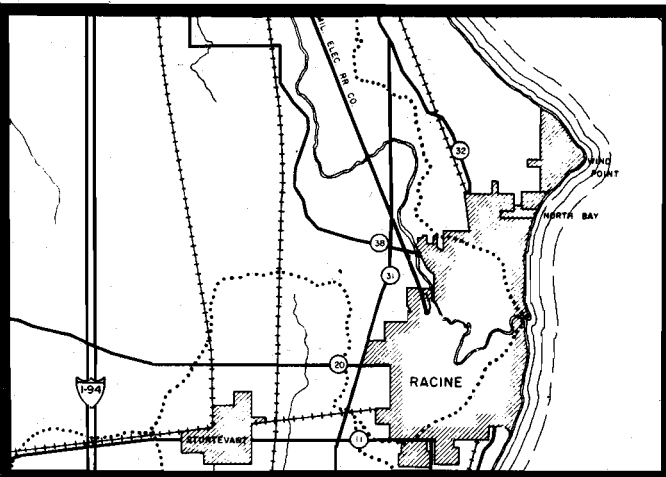


Map 10

Base Map at a scale of  
1:125000 (1" = 2 miles)

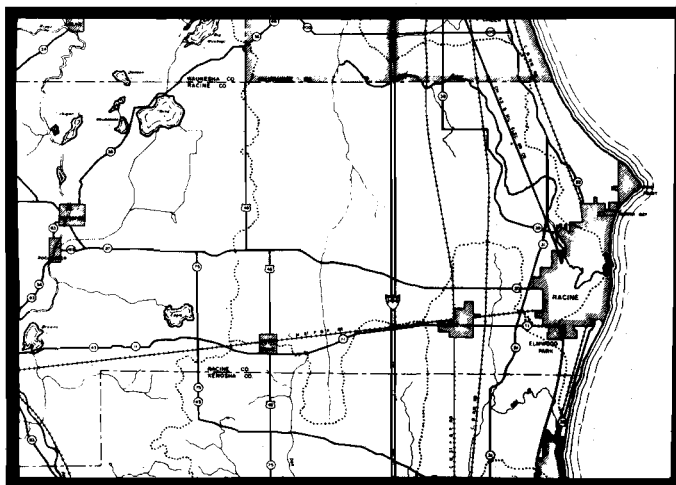
Map 11

Base Map at a scale of  
1:250000 (1" = 4 miles)



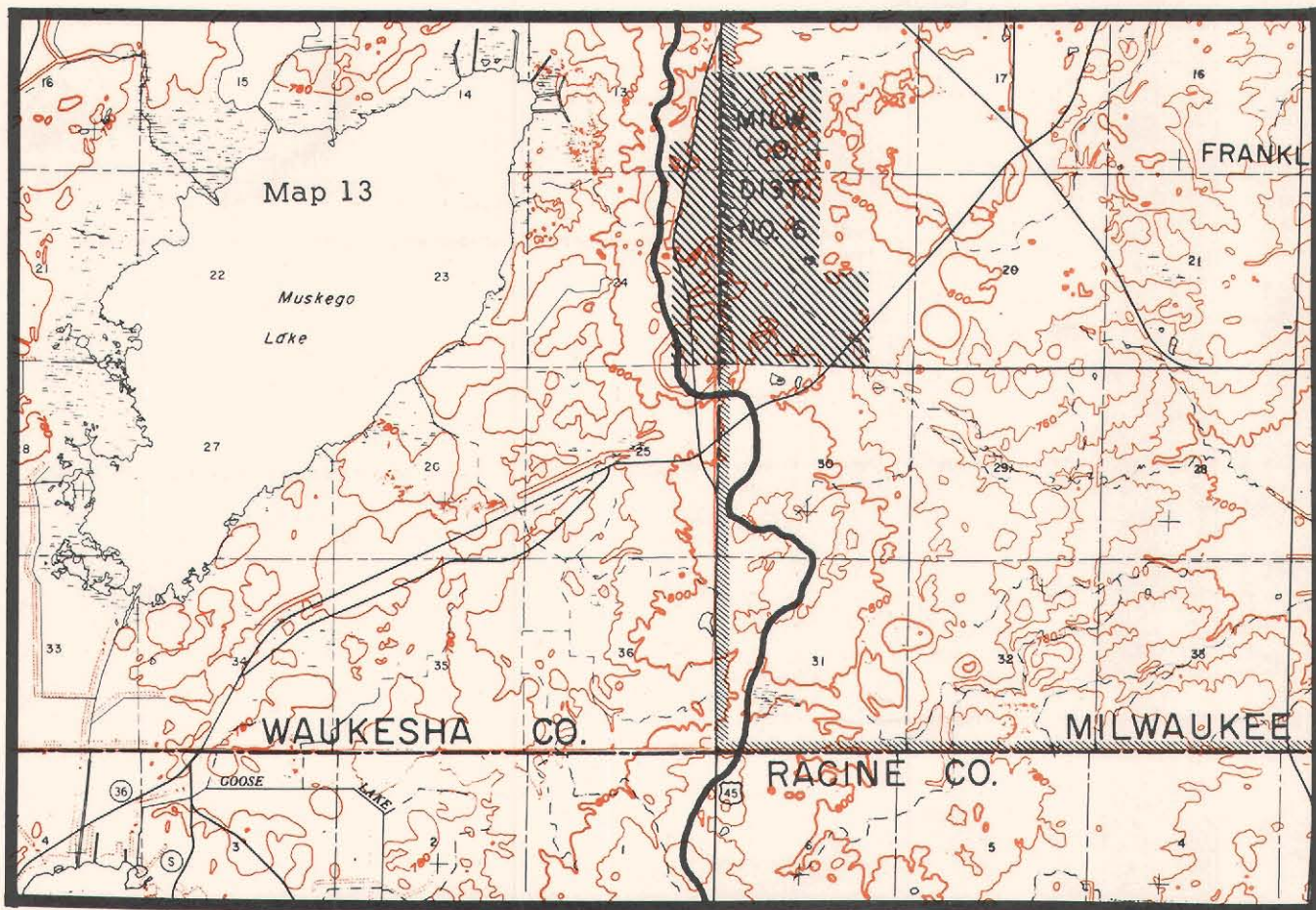
Map 12

Base Map at a scale of  
1:500000 (1" = 8 miles)





Certain combinations of base and overlay sheets are particularly suited to certain specific planning studies. For example, the base sheet when combined with the second and third overlay sheets is suitable for watershed planning purposes. Moreover, the base maps can be readily assembled by a simple mosaic process to depict in its entirety any natural or rational planning area, such as a watershed, special purpose district, or group of communities within the Region. (See Map 13)



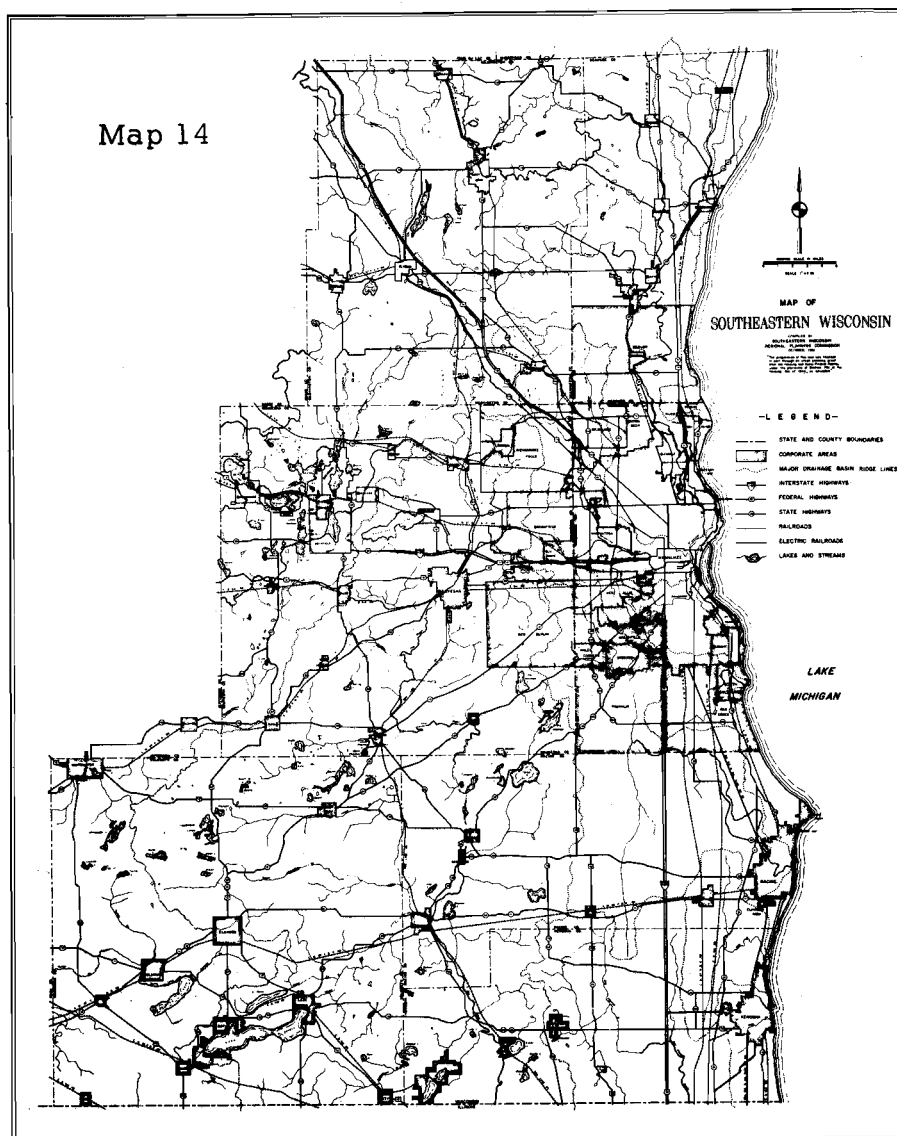
A mathematical grid location system based upon the U.S. Public Land Survey and state plane coordinate systems can be readily adapted to the base maps, thereby permitting geographic identification of planning data to a half mile grid (one quarter section). Where the half mile grid is a unit too large for any desired analysis, the system can be broken down into quarter mile grids, or, since all real property boundary line descriptions and plats in the Region are referenced to the U.S. Public Land Survey system, to individual parcels, blocks and lots, and coded for machine processing. Similarly, the basic half mile grid "building blocks" can be combined for analysis by larger units and areas, such as minor civil divisions, special purpose districts, or watersheds.

(This page intentionally left blank)

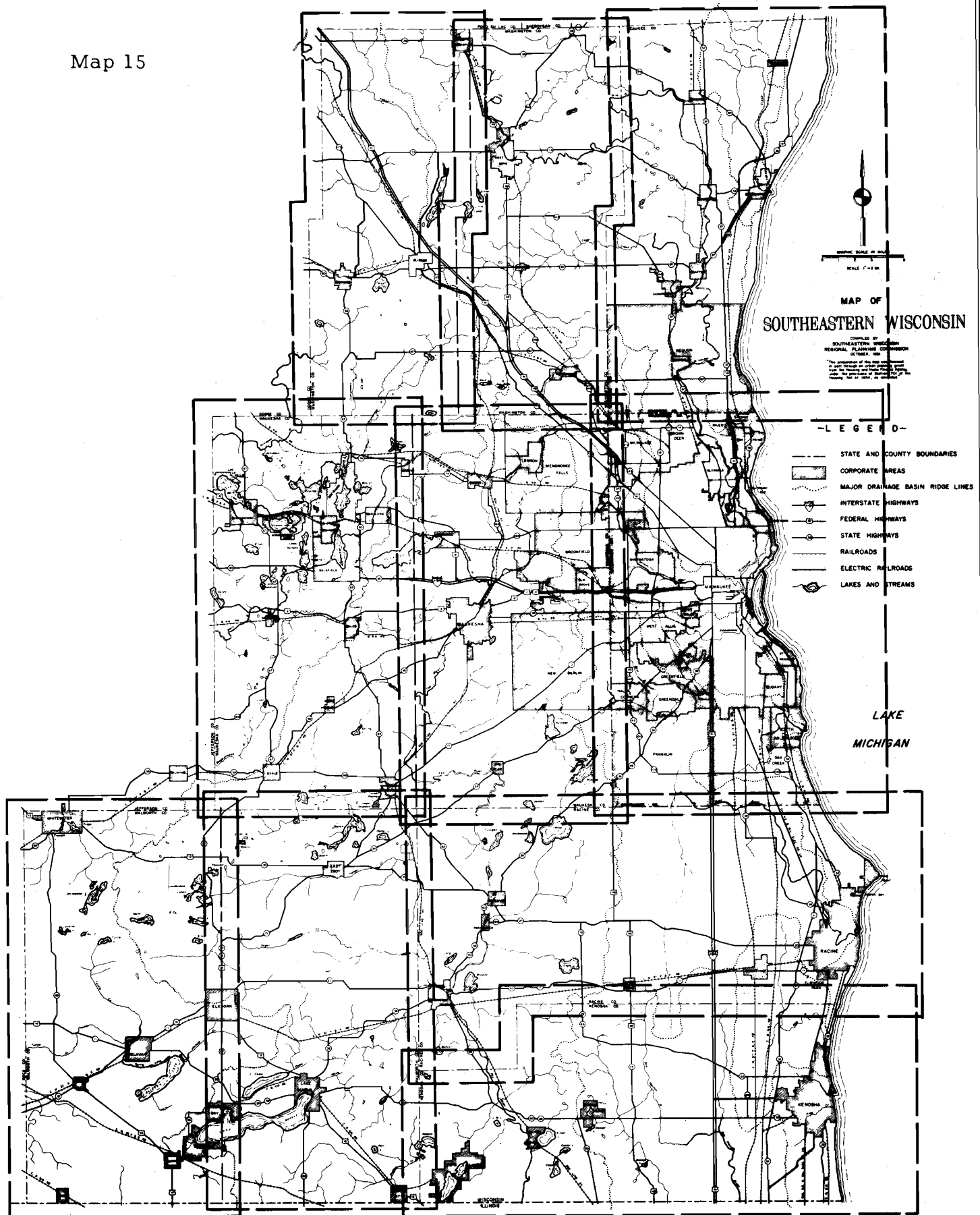
## Chapter V

### AREA MAPPED

The area mapped under the general purpose base mapping program is outlined on Map 14. This includes all of the seven-county Region plus an adjacent tier of sections along the south, west, and north boundaries of the Region. Standard compilation sheet outlines are depicted on Map 15.



Map 15





## Chapter VI

### AVAILABILITY OF MAPS

All of the maps prepared under this program are public documents, and copies are available to the public at the cost of printing. A partial price list is included in Table 1.

TABLE 1

#### SEWRPC BASE MAPS - TYPE, SIZES, PRICES\*

<u>MAP</u>	<u>SCALE</u>	<u>SHEET SIZE</u>	<u>TYPE OF PRINT</u>	<u>PRICE</u>
COUNTY BASE**	1:24000	54" x 86"	Black or Blue Line	\$10.00
(with or without any	"	"	Sepia	15.00
combination of overlays)	"	"	Cronar Positive	50.00
COUNTY BASE	1:62500	30" x 36"	Black or Blue Line	0.75
(with or without any	"	"	Sepia	2.00
combination of overlays)	"	"	Cronar Positive	15.00
REGIONAL BASE	1:250000	17" x 22"	Black or Blue Line	0.50
(with or without any	"	"	Sepia	1.00
combination of overlays)	"	"	Cronar Positive	7.00
REGIONAL BASE	1:500000	8 1/2" x 11"	Black or Blue Line	0.25
(with or without any	"	"	Sepia	0.50
combination of overlays)	"	"	Cronar Positive	2.00
GRAPHIC REGIONAL MAP	1:125000	32" x 42"	Black or Blue Line	0.75
	"	"	Sepia	2.50
	"	"	Cronar Positive	15.00
GRAPHIC REGIONAL MAP	1:250000	17" x 22"	Black or Blue Line	0.50
	"	"	Sepia	1.00
	"	"	Cronar Positive	7.00
GRAPHIC REGIONAL MAP	1:500000	8 1/2" x 11"	Black or Blue Line	0.25
	"	"	Sepia	0.50
	"	"	Cronar Positive	2.00

\* Prices subject to change after 1963.

\*\* Prints of Walworth, Washington, and Waukesha Counties can be obtained for 2 times the listed price.

(This page intentionally left blank)

## **Chapter VII**

### **CONCLUSION**

The completed general purpose base mapping program of the Southeastern Wisconsin Regional Planning Commission provides a highly versatile series of base maps for a broad range of planning and engineering purposes. These base maps provide the first true maps of the Region as a whole and of each of the seven counties within the Region, previous local maps having been based upon a flat earth assumption and various horizontal and vertical reference systems. The maps should prove useful to state, county and local planners; engineers; and surveyors, as well as being absolutely essential to the Regional planning program.

(This page intentionally left blank)



Kurt W. Bauer

Executive Director

### Central Office

David Fonseca, Jr.

Chief Resources Planner

Dallas R. Behnke

Chief Draftsman

William J. Kockelman

Chief Community Assistance Planner

### Land Use - Transportation Study Office

J. Robert Doughty

Study Director

Richard Sheridan

Acting Chief Transportation Planner

Harlan E. Clinkenbeard

Chief Land Use Planner

Kenneth J. Schlager

Chief Systems Engineer

Sheldon W. Sullivan

Administrative Officer

Wade G. Fox

Cartographic and Design Supervisor

### ACKNOWLEDGEMENTS

Special recognition should be given to Dallas R. Behnke, Leroy Zocher, and Ronald Humphrey for their significant contributions in the preparation of the Regional base maps.