COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
OFFICE OF RESOURCES MANAGEMENT
JULY 1977

PRELIMINARY DRAFT

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PENNSYLVANIA COASTAL ZONE MANAGEMENT PROGRAM

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COMMONWEALTH OF PENNSYLVANIA

Milton J. Shapp, Governor

DEPARTMENT OF ENVIRONMENTAL RESOURCES

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OFFICE OF RESOURCES MANAGEMENT

C. H. McConnell, Deputy Secretary

PENNSYLVANIA COASTAL ZONE MANAGEMENT PROGRAM

PRELIMINARY DRAFT

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Prepared by

OFFICE OF RESOURCES MANAGEMENT

BUREAU OF RESOURCES PROGRAMMING

HARRISBURG, PA

JULY 1977

At the request of Governor Shapp, the Office of Resources Management of the Department of Environmental Resources has directed the Commonwealth's efforts to develop a plan for managing Pennsylvania's coastal resources in a sound and rational manner. This complex and innovative three year planning program has involved professional and coordinative assistance from the Delaware Valley Regional Planning Commission (Philadelphia, Pa.), the Erie Metropolitan Planning Department (Erie, Pa.), the Edinboro Foundation (Edinboro, Pa.) and the Marine Science Consortium (Millersville, Pa.), continuous cooperation with local governments, and consultation with the affected public. Special recognition should be given to those individuals who have provided guidance and assistance to the planning staff through their participation on State and Local coordinating committees (see Appendix B). While many professional and technical staff members of the aforementioned agencies contributed to the preparation of this document, the Coastal Zone Management staff of DER's Bureau of Resources Programming and the office of Enforcement and General Counsel, the Delaware Valley Regional Planning Commission and the Erie Metropolitan Planning Department were directly responsible for its contents.

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INTRODUCTION

"The key to more effective use of our coastline is the introduction of a management system permitting conscious and informed choices among development alternatives ...in order to insure both (the) management and sound utilization of (coastal) resources."

Our Nation and the Sea - A Plan for National Action
Stratton Commission, 1969.

Background

National concern over development pressures on the ocean, Great Lakes and estuarine shorelines led Congress late in 1972 to enact the Coastal Zone Management Act (P.L. 92-583). The Act encourages states to develop comprehensive programs to ensure wise and effective management of valuable coastal resources. In formulating their programs to comply with the Act, states may choose the management approach which is most appropriate for their particular problems and issues, from several possible alternatives.

The Coastal Zone Management Act makes it national policy:

- to preserve, protect, develop and, where possible, to restore our coastal resources
- to help states manage their coastal responsibilities wisely through the development of appropriate management programs
- for all federal agencies engaged in work affecting coastal areas to consult closely with the state agencies responsible for administering the coastal management programs
- to encourage cooperation among local, state and regional agencies

Although participation in the program is voluntary, all 30 eligible states and three territories are currently engaged in the coastal planning process.

Included within the coastal fringes of the participating states are:

- 9 of the 11 counties which had the fastest growing populations between 1960-1970
- the nation's 8 largest cities
- ½ of the U.S. population
- 60,000 miles of shoreline
- 50% of the manufacturing facilities in the U.S.

Two kinds of federal incentives to foster state participation are built into the Act:

- Financial assistance goes to states to help them meet costs of developing and administering coastal zone management programs, to assist in acquisition of estuarine sanctuaries and lands that improve beach access.

- Once the federal government approves the state management program, all federal agencies conducting or supporting activities in the coastal zone must make them confrom to the state plan to the maximum extent practicable.

Pennsylvania's Coastal Management Program

According to the definition in the Act, Pennsylvania qualifies as a "coastal state" because of two widely separated areas. The 63 mile long Lake Erie shoreline and the 57 mile segment of the tidal Delaware River in Pennsylvania are both eligible for Coastal Zone Management. Interestingly, Pennsylvania is the only state in the country, other than New York, with two, geographically distinct Coastal Zones. Figure I-1 indicates the position of Pennsylvania's two coastal zones relative to those of nearby Great Lakes, New England, and Mid-Atlantic states.

Although the Coastal Zone Management Act was passed by Congress, and signed into law late in 1972, funding was not available until 1974. In June, 1974, Governor Shapp designated the Department of Environmental Resources as the lead agency for Pennsylvania's Coastal Zone Program.

During the next three years, the Department of Environmental Resources worked with other State agencies, local study area consultants, elected officials, shorefront industries and interested citizens to produce the Coastal Management Program, described in this Draft Technical Record.

The first year of the program was devoted exclusively to inventory work and data gathering. During the second year, work progressed on resource analysis, and the development of working papers and technical memoranda on elements required by the Act and the Federal guidelines. Finally, the third year of the program was spent in preparing the Draft Technical Record and more than 60 accompanying maps.

The Act defines a management program as "a comprehensive statement in words, maps, illustrations, or other permanent media of communication...setting forth objectives, policies and standards to guide and regulate public and private uses of the land and waters in the coastal zone."

This draft document represents the first and most comprehensive statement to date by the Commonwealth of Pennsylvania regarding the protection and development of coastal resources.

Required Elements

The requirements of the Act focus on process and leave the details of the management programs to the individual states. However, there are specific elements which the Coastal Management Program must address, including:

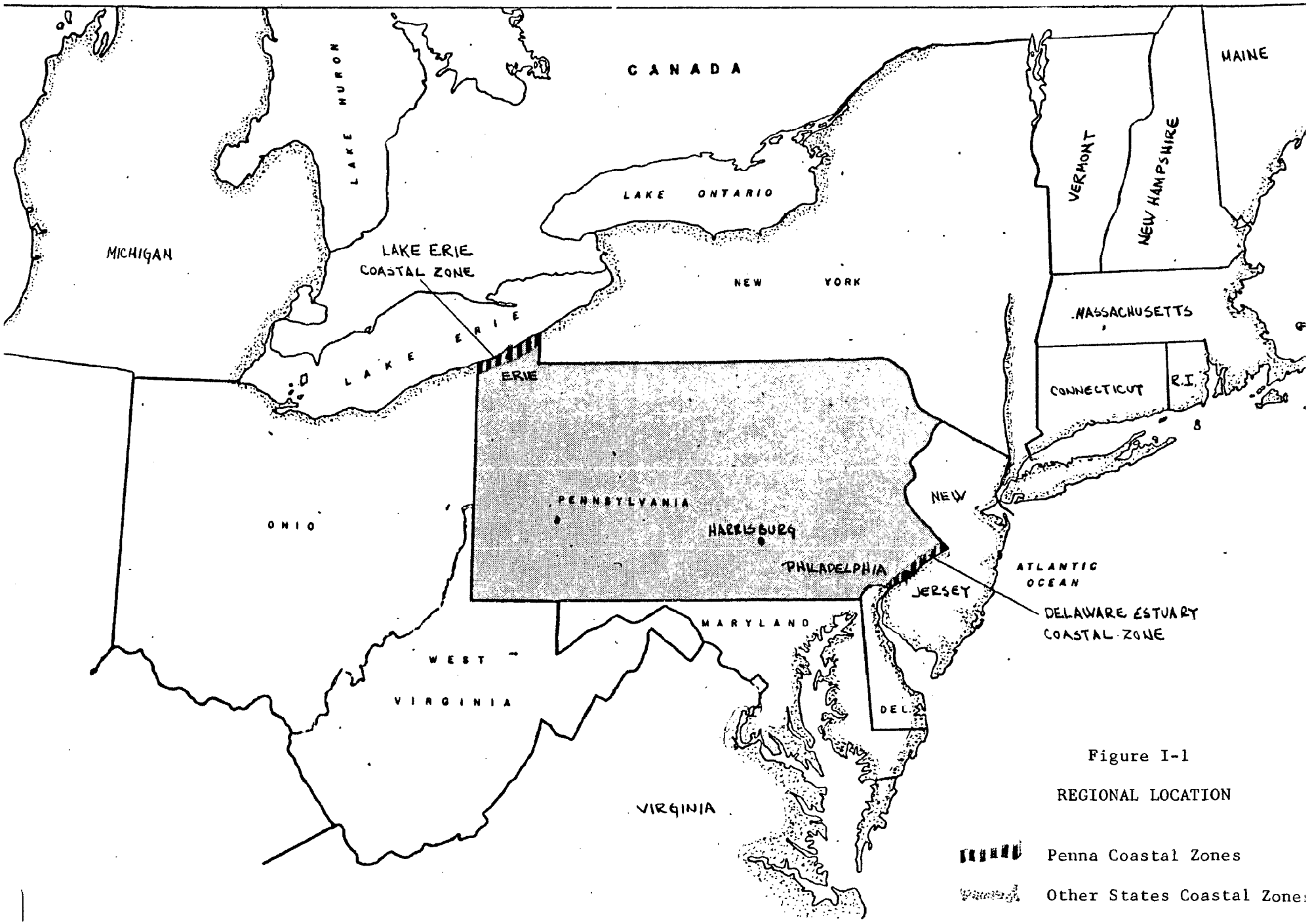


Figure I-1

REGIONAL LOCATION

1) identification of the boundaries of the coastal zone which will be subject to the management plan

2) a definition of permissible land and water uses within the coastal zone

3) an inventory of geographic areas of particular concern

4) broad guidelines on priority of uses in particular areas, especially those uses of lowest priority

5) the means by which decisions affecting the coatal zone will incorporate a broad statewide viewpoint

6) a description of the organizational structure that will implement the management program, including the interrelationships of local, areawide, state, regional and interstate agencies

The Act is unusual in that the implementation strategy must be developed and presented with the other elements of the program. Historically, many plans have been produced and presented to the public without a discussion of how to make the recommendations happen. The Coastal Management Program requires that all necessary legislative actions and executive authorities be developed before funding begins.

In the case of Pennsylvania (as with many states), it was necessary to conduct a detailed inventory of existing state authorities in order to determine if they were adequate to implement a Coastal Program. (The results of the inventory are described in Chapter IV.)

How to Use the Draft Technical Record

The Draft Technical Record and the accompanying maps cover both coastal zones in Pennsylvania - the Delaware Estuary and the Lake Erie shoreline. It is anticipated that most readers will be primarily concerned with only one of the two areas, considerably reducing the volume of material to be covered.

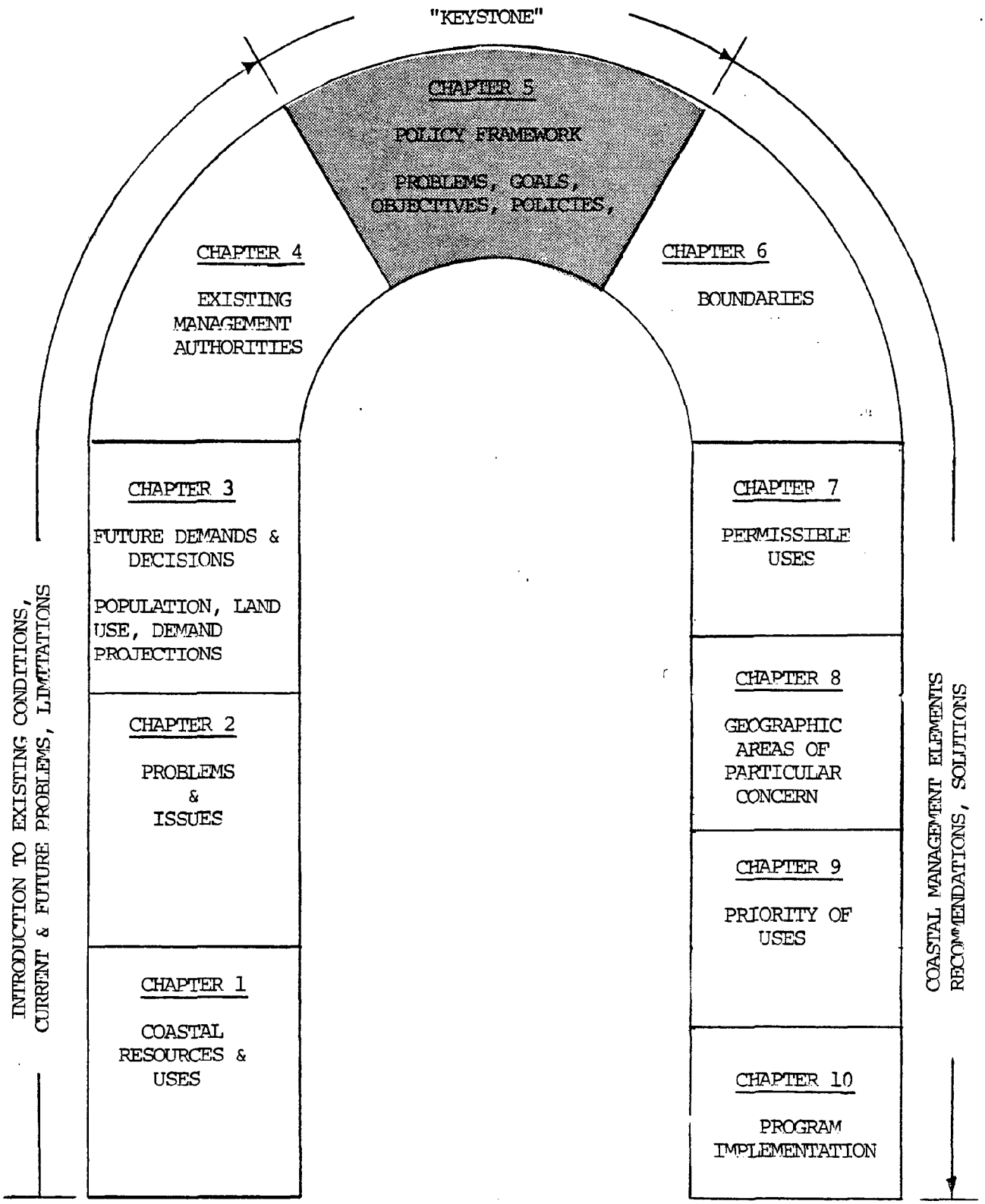
Readers are urged to review the general introduction to each chapter and then skip to the section of interest. In each case the specific information for the Delaware Estuary is presented first, followed by the section devoted to Lake Erie. Readers who examine the entire Draft Technical Record will find great similarity in the organization of the work for the Delaware Estuary and for Lake Erie. Occasionally differences in methodology occur but efforts were made to keep the general approach to problems as similar as possible.

Reviewers who do not have the time or the need to examine all 10 chapters in detail will benefit from the following discussion of organization and format, and will be able to concentrate on the chapters of greatest individual interest. This discussion is supported by figure I-2.

The Draft Technical Record, consisting of over 500 pages and more than 60 maps is divided into 10 chapters, with an appendix of four sections. The book is quite large and at first imposing but this results from the decision to include a good deal of background information and inventory data in the Technical Record. Other states have elected to publish the information

Figure I-2

ORGANIZATIONAL STRUCTURE: DRAFT TECHNICAL RECORD



COASTAL ZONE MANAGEMENT PROGRAM

as separate documents or to make it available in working papers. In Pennsylvania, however, it was deemed beneficial to include as much of this information as possible in order to support the conclusions and recommendations that are presented. Because this work is the first in the State to concentrate on coastal areas, there is no source of relevant information in a convenient "package." The Draft Technical Record has been designed to fulfill the need for a well organized, readily usable source of coastal information, as well as to present the Technical Elements and details of the proposed Coastal Zone Management Program.

Readers who are primarily concerned with background data and information may choose to concentrate on the first four chapters. These four chapters include information on existing conditions, projected trends, problems and issues and the present legal/institutional framework of the state's two coastal zones. Taken together these four chapters form a mini-encyclopedia of necessary background information, inventories and history. As in the case of an encyclopedia, many readers will prefer to use the table of contents to direct their attention to specific sections of interest, rather than reading straight through. Footnotes are provided throughout, for those who require more detailed information on particular topics.

The first four chapters contain most of the maps included within the report. These maps have been prepared specifically to support this document and most have never before been published. They provide a valuable service and must not be overlooked. In many cases the text has been considerably abbreviated because of the information presented visually on the maps.

Chapter IV will be of special interest to some readers because it includes the legal/institutional inventory of the coastal zone and determines that new legislation will be required In order for Pennsylvania to successfully implement a Coastal Zone Management Program. Some readers will choose to skip the detailed discussions of Chapter IV, and will simply accept the conclusions drawn at the end of the chapter.

Chapter V, the Policy Framework, summarizes the introductory four chapters, and presents goals, objectives, and policies for Coastal Management. This chapter serves as a transition between the background, inventory chapters and the technical elements and recommendations included in chapters six through ten. This chapter should be of interest to all readers and is fortunately, the shortest chapter in volume. Some may choose to begin with this chapter because it summarizes the first four sections and establishes a context for the following chapters.

Chapters VI, VII, VIII and IX are required by the Act and the federal guidelines. These chapters describe the detailed elements of coastal boundaries, permissible uses, geographic areas of particular concern and priority of uses in the coastal zone. These chapters contain the most specific recommendations developed in the Draft Technical Record. Detailed maps of each coastal zone are included in chapter VIII to enable the reader to determine the exact boundaries within which the recommendations apply.

Chapter X, one of the longer chapters in volume, is an important one for all readers. The major concepts of implementation are presented along with suggested roles for State and local governments and coastal zone steering committees.

Finally, the Appendices include a summary documentation of interagency co-ordination, public participation and interim products produced during the three year planning process. The last appendix includes an Environmental Impact Assessment required by the National Oceanic and Atmospheric Administration.

What Happens Next?

This volume, entitled Draft Technical Record, will be distributed widely throughout both Coastal Zones. It is called a "Draft" because revisions will be incorporated following a thorough review by federal and state agencies, local governments, shorefront industries, environmental groups and concerned citizens. This document will circulate for approximately six months during which time numerous public meetings and at least one formal, public hearing will be held in each coastal zone to gather comments.

At the same time, it is anticipated that a much shorter and more readable "Executive Summary" of this document will be prepared encompassing perhaps 40 pages. This document, printed in larger quantities than the Technical Record, will introduce the major concepts and refer readers with detailed questions to this document, or previously prepared working papers. It is hoped that the public education effort will be supplemented by a film and public service announcements prepared for television and radio.

By early 1978, it is expected that draft legislation will be introduced in the General Assembly to implement the concepts, goals, objectives and policies included in this document. Not until the necessary legislation is enacted by the General Assembly can the program be signed by the Governor and approved by the Secretary of the U.S. Department of Commerce allowing Coastal Management to begin in earnest.

INVENTORY OF COASTAL RESOURCES AND USES

1

1 INVENTORY OF COASTAL RESOURCES AND USES

INTRODUCTION

The Inventory of Coastal Resources and Uses is a summary of the information base used to prepare the Coastal Management Program in Pennsylvania. In accordance with guidelines[1] prepared by the National Oceanic and Atmospheric Administration (NOAA), existing sources of information have been used wherever possible in order to reduce costs and permit the Coastal Zone Management Program to be prepared in a relatively short time. Fortunately, a great deal of research, analysis and planning relevant to coastal management has preceded this study in each of Pennsylvania's two coastal areas.

The inventory of the two Study Areas is a significant section of the Management Program because it summarizes much of the information used to prepare the overall Policy Framework (Chapter V) as well as major Program Elements. These elements, described in chapters VI, VII, VIII, and IX, include:

- Final (inland) Study Boundary
- Permissible Land and Water Uses
- Geographic Areas of Particular Concern
- Priorities of Use for Particular Areas

In order to furnish interested parties with as much information as possible, the Inventory covers a wider strip of land than that which was ultimately designated as the Coastal Zone. In both coastal areas this wider strip, called the Preliminary Study Area, was chosen through a process described in Chapter VI (Boundaries). The parameters covered in the Inventory include:

- Socioeconomic Characteristics
- Land Uses and Resources
- Water Uses and Resources

DELAWARE ESTUARY COASTAL ZONE

Historically, the character of the Delaware Valley region has been affected by the dominant role of the Delaware River in the region's development. Early development occurred almost exclusively along the River. The Delaware was the reason for, and the means of, the region's rapid growth from the time of William Penn's settlement through industrialization in the nineteenth century. The counties bordering the Delaware River have traditionally been forerunners in regional expansion, and only recently has the pace of development slowed.[2]

Although much industrial growth is occurring inland because proximity to the Delaware is no longer essential for many manufacturing processes, the coast will continue to be the regional center for industry and commerce. Over a half-million people work in the Delaware Study Area, and over 100,000 jobs are directly tied to the Port of Philadelphia. The port is the largest freshwater port in the world, and handles over 80 million tons of cargo annually. The Riverfront has valuable historical sites, and, as water quality improves, the value of the Delaware for fish and wildlife propagation and recreational activity will complement the River's central economic role in the metropolitan region.

SOCIOECONOMIC CHARACTERISTICS

Historical Background -- In 1680, the white population of the entire Delaware Valley was approximately five hundred.[3] It was a homogeneous group, mostly Northern European males working as fur traders.[4] Beginning in 1682, William Penn's settlers arrived by the thousands, significantly changing the population's socioeconomic profile. Farmers soon outnumbered fur traders, and family units replaced the previously all male society.

By 1700, the area population was 20,000, divided almost evenly between city dwellers and farmers.[5] Settlements had spread out from the original site at the confluence of the Delaware and Schuylkill Rivers, following the shorelines of the Delaware and its tributaries.

Farming remained the principal occupation of the region until after the mid-nineteenth century when a combination of political and technological events triggered rapid changes in the Study Area's social and economic character. In 1860, the population of Philadelphia was over one half million, but the city was essentially a very large central market for agricultural goods.[6] By 1900, Philadelphia was a major industrial center with a large and rapidly growing skilled labor force.[7] In addition, industry was spreading to other parts of the Preliminary Study Area. Industrial expansion was most dramatic south of Philadelphia. Between 1860 and 1900, the population of Delaware County increased 210% (from 30,597 to 94,762), with most of this increase concentrated along the Delaware River corridor.[8]

World War I accelerated the growth of industry in the Study Area. Again, industrial expansion was predominantly southward into Delaware County.[9] Service industries and residential population, encouraged by improved transportation facilities, followed industry's lead and located just inland of the waterfront's emerging industrial corridor.

The socioeconomic character of the Study Area has been influenced by two waves of immigration. During the late nineteenth and early twentieth centuries, the region absorbed a steady stream of foreign immigrants. This new and ethnically diverse population, drawn to the

area in response to the expanding need for industrial labor, altered the region's relatively homogenous population. The influx ended in 1925 when federal laws severely restricted foreign immigration.

A second wave of immigration to the Study Area came from the southern states. During and after World War II, northern industries, including those of the intensely developed Study Area, attracted large numbers of rural southern blacks.[10] This influx was largely over by 1960, a year which marked the end of almost one hundred years of continuous social change and economic growth.

Socioeconomic Resources -- Resources are drawn upon to support the growth and maintenance of society. Early settlers relied on the Delaware River for transportation, on forests for lumber and on productive land for food and fiber. Man, through technological advance and innovation, was able to expand his physical resource base, using drills to extract oil and building rail systems to gain access to new forest and farm lands.

Modern society draws from a pool of resources much larger than the physical resource base. This pool contains socioeconomic resources which allow men to efficiently process raw materials and to coordinate a highly interdependent economic system. The following overview illustrates the essential role of socioeconomic resources along the Delaware estuary.

Industrial production capacity, a skilled labor force and efficient distribution systems are several of the vital socioeconomic resources sustaining coastal activities. Raw materials and semi-finished goods are transported by rail, ship and highway networks to coastal industries for processing, fabrication and assembly. Finished products, in turn, are distributed to large markets in the metropolitan region, as well as to national and world markets. The extensive transportation network is also responsible for bringing a skilled labor force to its work place each day.

Public services are important socioeconomic resources. Public water supply and waste disposal facilities, gas piplines and police and fire protection services are available to residents and workers alike. Industries choosing to locate along the coast may be able to take advantage of building sites offered by public agencies and access to publicly-managed marine terminals. In addition, government assistance is available to provide low-interest financing for construction and mortgage.

Businesses along the coast can draw on other resources. The aggregation of economic activity supports a wide variety of business and personal services, financial institutions and commercial establishments that offer specialized services not as readily available elsewhere in the metropolitan area.

The coast also performs a wide assortment of functions for the rest of the city and for the outlying metropolitan area. Food, machinery, and household furnishings, produced by coastal industries, are sold

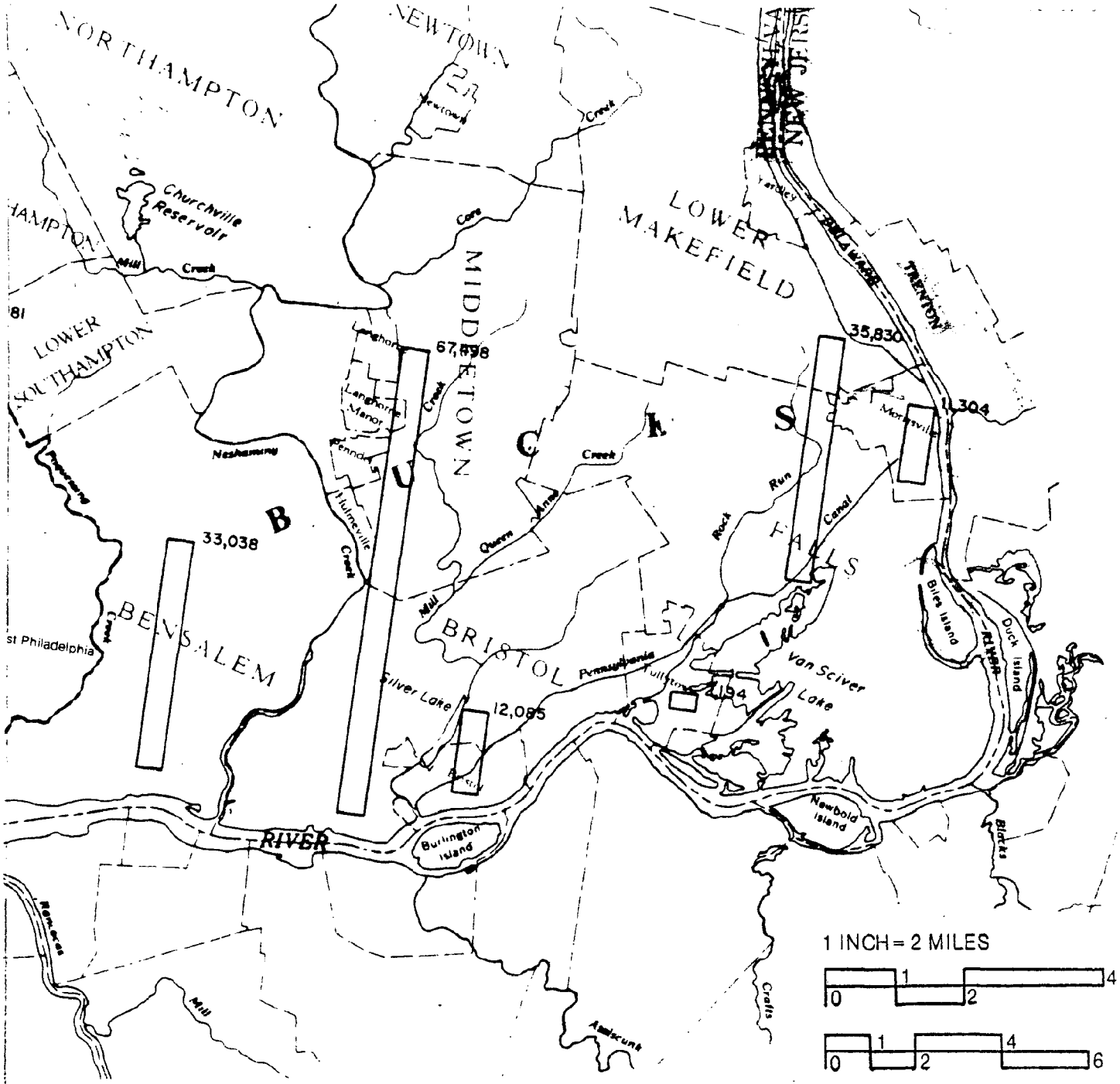
throughout the metropolitan region, and many intermediary products are sent to other industries in the region for further processing into finished goods. Such public services as sewage treatment, water supply and power generation are located on the coast but serve a much larger area. The concentration and diversity of economic activity along the coast, in addition to fostering a wide variety of business services, provides tax revenues for support of such services and amenities as museums, libraries, colleges, social services and the performing arts. Because the importance of the coast extends back to Colonial times, historical areas along the coast are cultural resources attracting interest from throughout the region and nation. Although presently deficient in recreational opportunities, the Delaware River also holds considerable potential as a resource for boating, sailing and fishing by the region's citizens. Chapter III contains an analysis of recreational demand and opportunities in the coastal zone. In short, the coast provides resources for local businesses and also offers many social, economic and natural resources to citizens throughout the region.

Population -- Several parameters are discussed below in order to portray the socioeconomic character of the Study Area. Of the various available parameters, the ones presented here include: population, median family income, and families with incomes below the poverty level. This information has been summarized in charts and maps in order to save space and simplify presentation.[11]

Population density in the Preliminary Study Area is high, and the general character of the area is urban. The Study Area population, which in 1970 was 677,428, is 5.7% of the total population of Pennsylvania, although the Study Area is less than 1% of the area of Pennsylvania. The three coastal Counties on the Delaware Estuary, Philadelphia, Delaware, Bucks, are, respectively, the first, fourth, and fifth most populous in the state.

The Preliminary Study Area includes the most developed sections of the three coastal Counties. The Bucks County Study Area, the most residential of the three, is only 8% of the County's total acreage but contains 27% of the County population. The Study Area of Philadelphia and Delaware Counties have, respectively, 23% and 18% of each County's population. In addition to large residential populations, the Study Areas of Philadelphia and Delaware Counties have major industrial concentrations.

Populations may have declined along the coast between 1970 and 1975, according to recent population estimates.[12] Philadelphia lost an estimated 108,196 people between the 1970 Census and April 1975, continuing a trend that began as early as 1950. However, for the first time, Delaware County's population declined from 603,456 in 1970 to an estimated 601,356 in 1974. Bucks County's population was estimated to have increased from 416,728 to 458,187, but much of this growth occurred inland beyond the Study Area.



1 INCH = 2 MILES

0 1 2 4

0 1 2 4 6

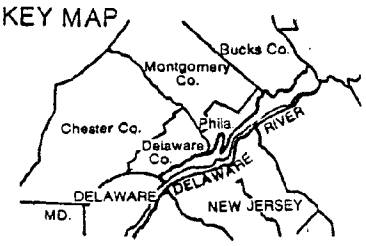
1 INCH = 3.2 KILOMETERS

4 SQ. MILE

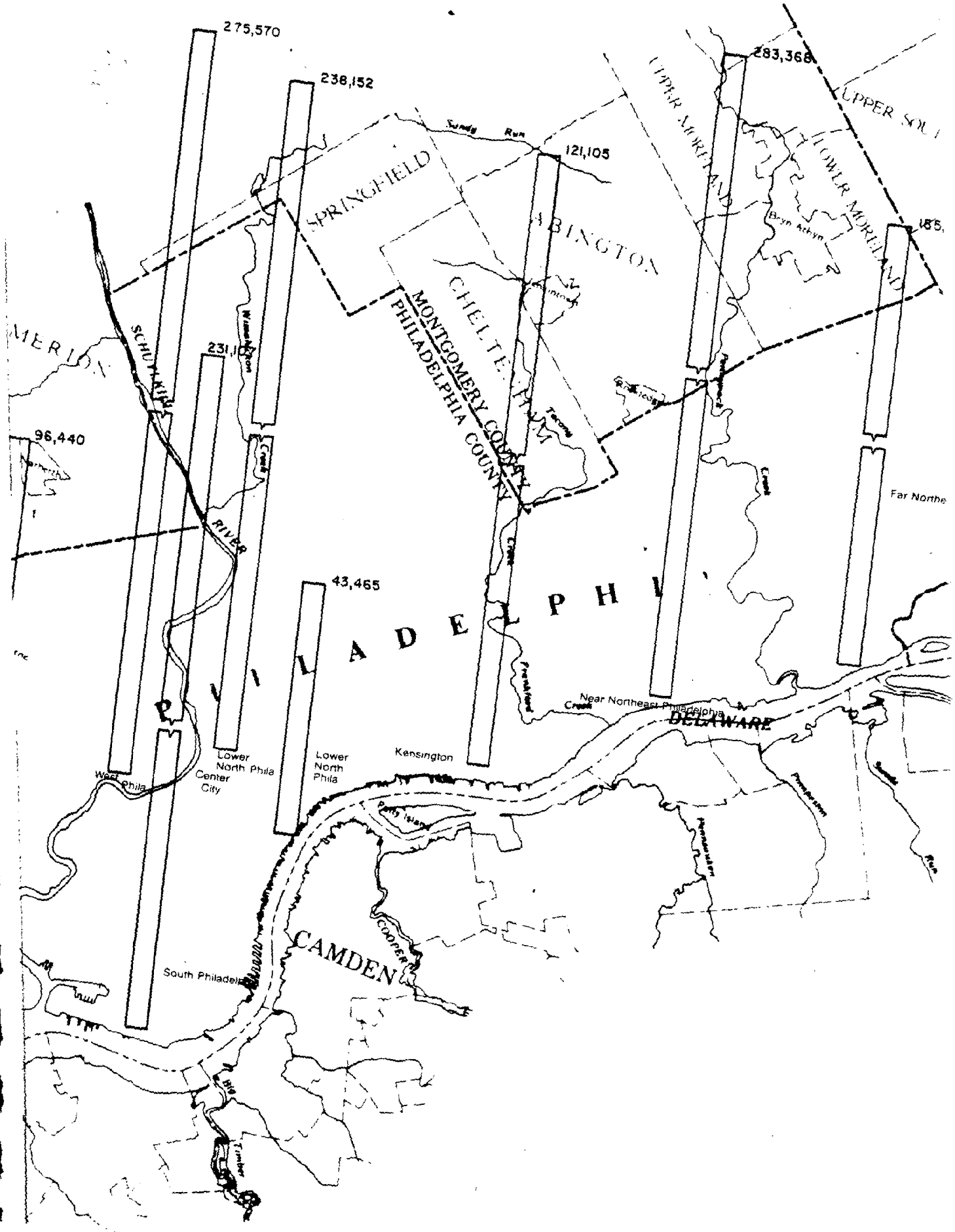
4 SQ. KM.

POPULATION - 1970

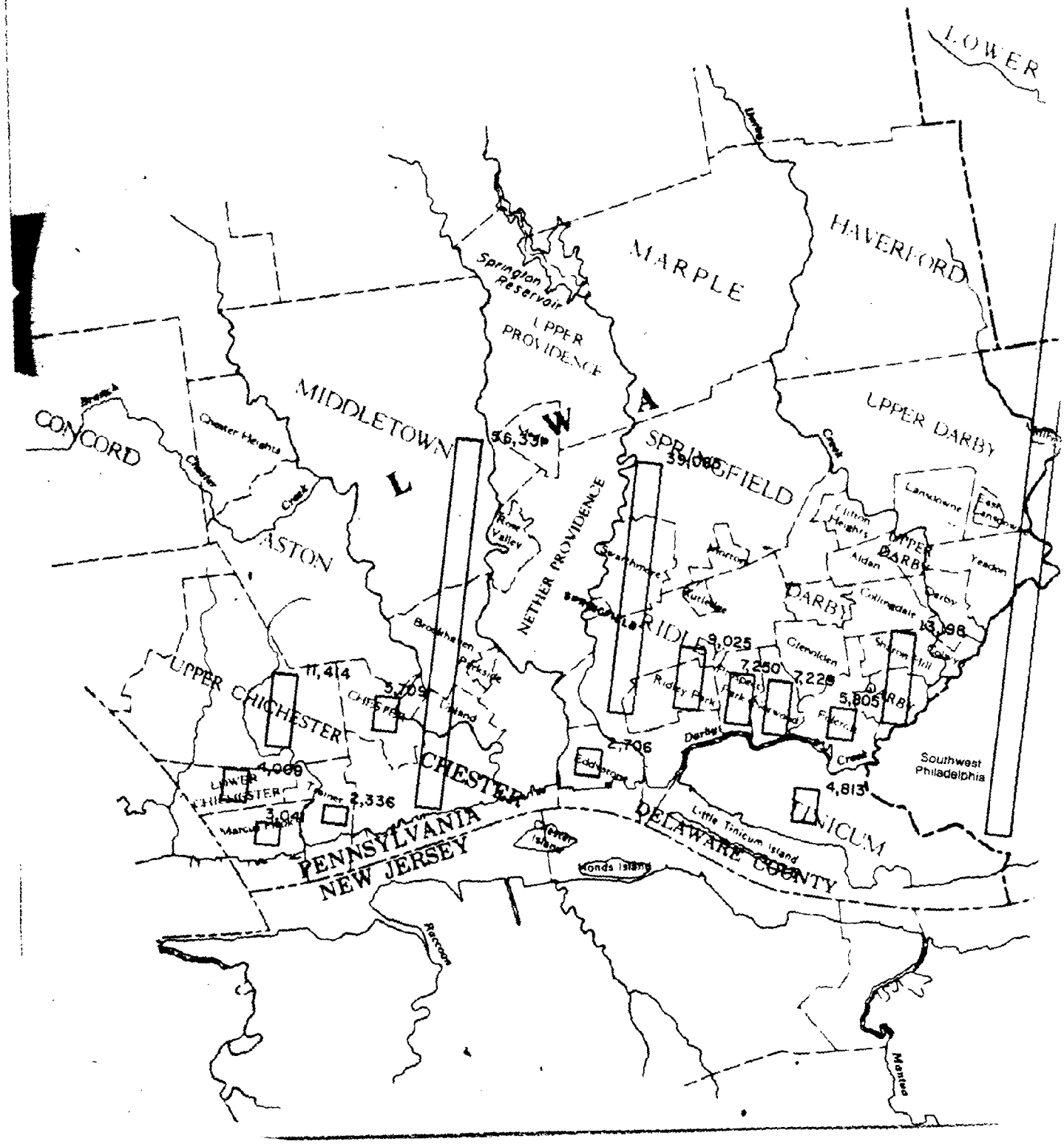
KEY MAP



DELAWARE ESTUARY COASTAL ZONE


275,570
238,152
283,368
121,105
185,
231,10
96,440
43,465
SPRINGFIELD
ABINGTON
CHELTENHAM
UPPER MORELAND
LOWER MORELAND
UPPER SOU
MONTGOMERY COUNTY
PHILADELPHIA COUNTY
SCHUYLKILL
RIVER
Sandy Run
Bryn Athyn
Far Northe
Near Northeast Philadelphia
DELAWARE
Lower North Phila
Center City
West Phila
Lower North Phila
Kensington
Petty Island
CAMDEN
COOPER
South Philadelp
Big Timber

[redacted]



LOWER
HAVERFORD
MARPLE
Springton Reservoir
UPPER PROVIDENCE
MIDDLETOWN
CONCORD
Chester Heights
Chester
Creek
ASTON
L
W
A
56,339
SPRINGFIELD
39,080
UPPER DARBY
Lansdowne
East Lansdowne
Clifton Heights
UPPER DARBY
Aldan
Yeadon
Darby
Collingdale
13,198
Rose Valley
NETHER PROVIDENCE
Swarthmore
Morton
Rutledge
DARBY
RIDLEY
9,025
Glenolden
Sharon Hill
7,250
7,228
5,805
Ridley Park
Folcroft
Darby
Creek
Brookhaven
Parkside
Upland
11,414
5,709
UPPER CHICHESTER
CHESTER
2,706
Eddystone
Southwest Philadelphia
4,813
TINICUM
4,009
LOWER CHICHESTER
Trainer
2,336
3,041
Marcus Hook
PENNSYLVANIA
NEW JERSEY
Chester Island
Little Tinicum Island
DELAWARE COUNTY
Honds Island
Raccoon
Mantua

In 1970, nearly 12% (81,897) of the Study Area population was black (Figure i-2). Over one-half of the black population in the Preliminary Study Area lived in Philadelphia, while only 6% reside in Bucks County. Perhaps a more significant factor is the proportion of each County's total black population residing in its Study Area. In Bucks and Delaware Counties, the majority of the Counties' black population is concentrated within the Study Area (See Figure i-2). Conversely, only 7% of Philadelphia County's black population lives in the Preliminary Study Area.

Because coastal communities tend to be the older areas and contain less expensive housing, median income tends to be lower in coastal areas than inland. While Delaware County as a whole has the highest median income ($11,822) of the three Counties, its Preliminary Study Area has the lowest median income ($9,978) of the three coastal areas.[13] In general, the median incomes for municipalities in the Bucks County Study Area are similar to the County-wide median income. In contrast to both Delaware and Bucks Counties, the Study Area in Philadelphia has a higher median income than the city as a whole ($10,180 vs. $9,366). This is due to the location of several new or restored residential districts, such as Society Hill and the Art Museum area, within the Philadelphia Study Area.

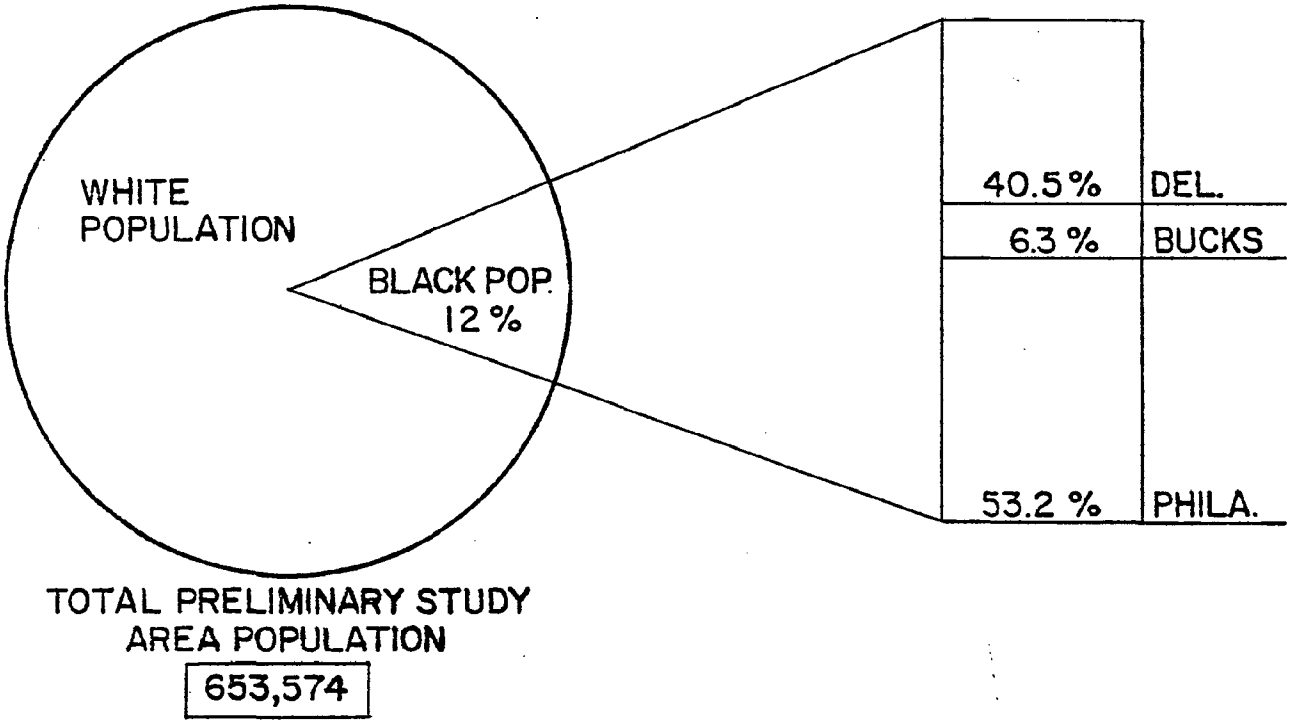
In 1970, 13,991 families, or 10.4% of all families, in the Preliminary Study Area were classified as below poverty level.[14] This percentage for the Study Area is approximately equal to the regionwide percentages. The Study Area in Philadelphia has the most families in the Study Area below poverty level and has the largest areas of poverty concentration. Kensington, lower North Philadelphia, South Philadelphia and Southwest Philadelphia are Philadelphia communities with a significant number of families below poverty level. The Study Area in Delaware County has a much higher percentage of families below poverty level than the County in general. Seventeen percent of Delaware County's coastal families are classified as below poverty level, while the County percentage is only 4.6%. Bucks county's Study Area has no particular section where families with poverty level income are concentrated.

Employment -- The Study Area is a major center of employment for the Philadelphia metropolitan area.[15] Study Area employment in 1970 was just over 550,000, which is about 32% of the 1,740,043 jobs in the five county metropolitan area of Southeastern Pennsylvania. A vast majority (74.8%) of the jobs in the Preliminary Study Area are in Philadelphia.

Even though only a very small portion of each coastal county is actually in the Preliminary Study Area, a relatively large proportion of jobs are located along the coast. Nearly half (43.5%) of all job opportunities in Philadelphia are in the Study Area, and the Study Areas of Bucks and Delaware Counties have, respectively, 31% and 36% of their counties' employment.

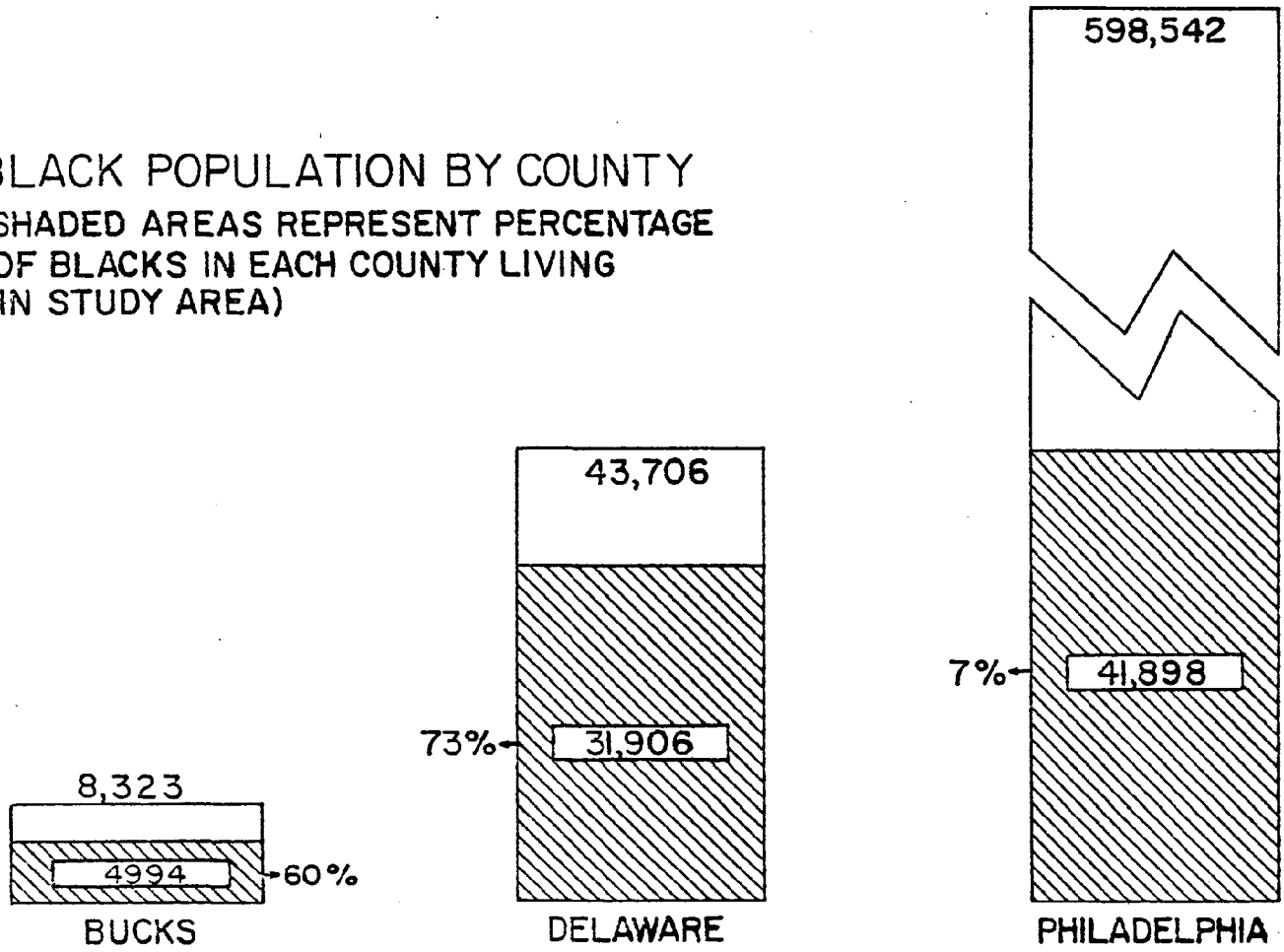
Manufacturing is the largest category of employment in the Study Area of Bucks County[16] (See Figure i-4). In Falls Township, the community

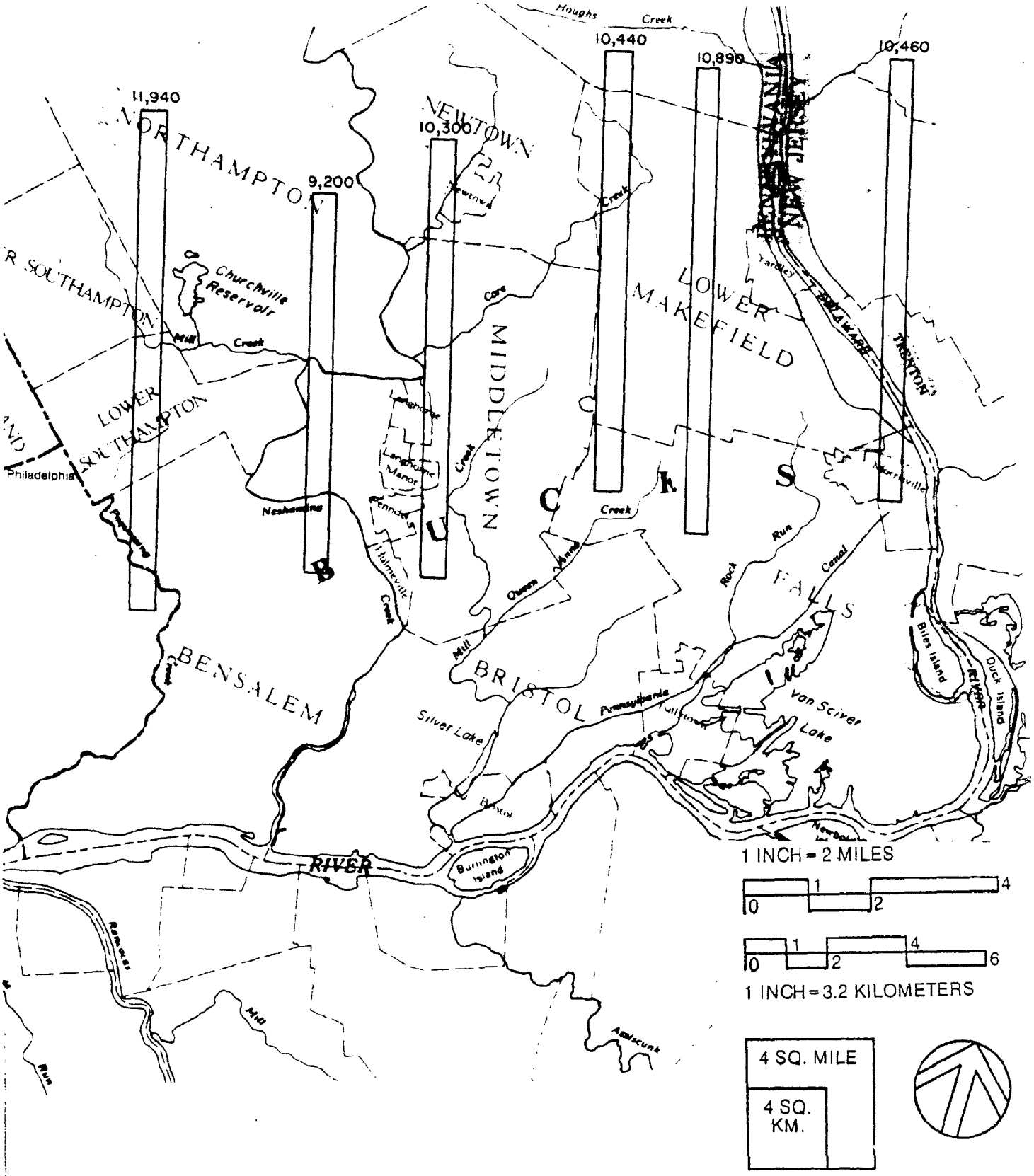
BLACK POPULATION DISTRIBUTION IN PRELIMINARY STUDY AREA



BLACK POPULATION BY COUNTY

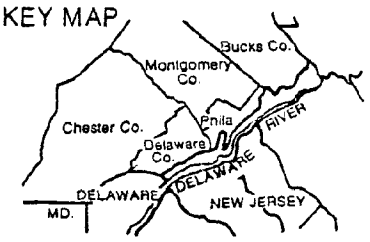
(SHADED AREAS REPRESENT PERCENTAGE OF BLACKS IN EACH COUNTY LIVING IN STUDY AREA)



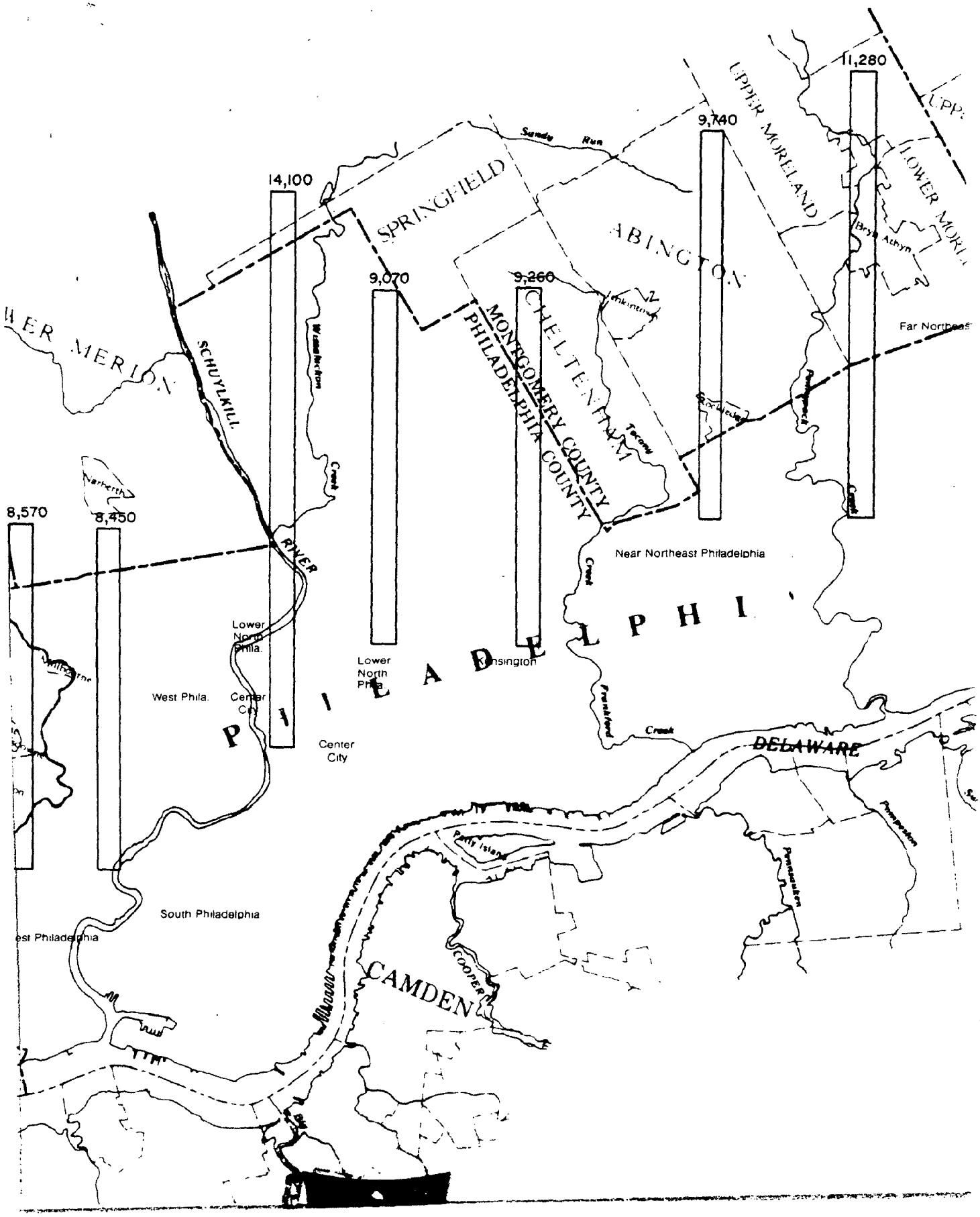


MEDIAN FAMILY INCOME

KEY MAP



DELAWARE ESTUARY COASTAL ZONE



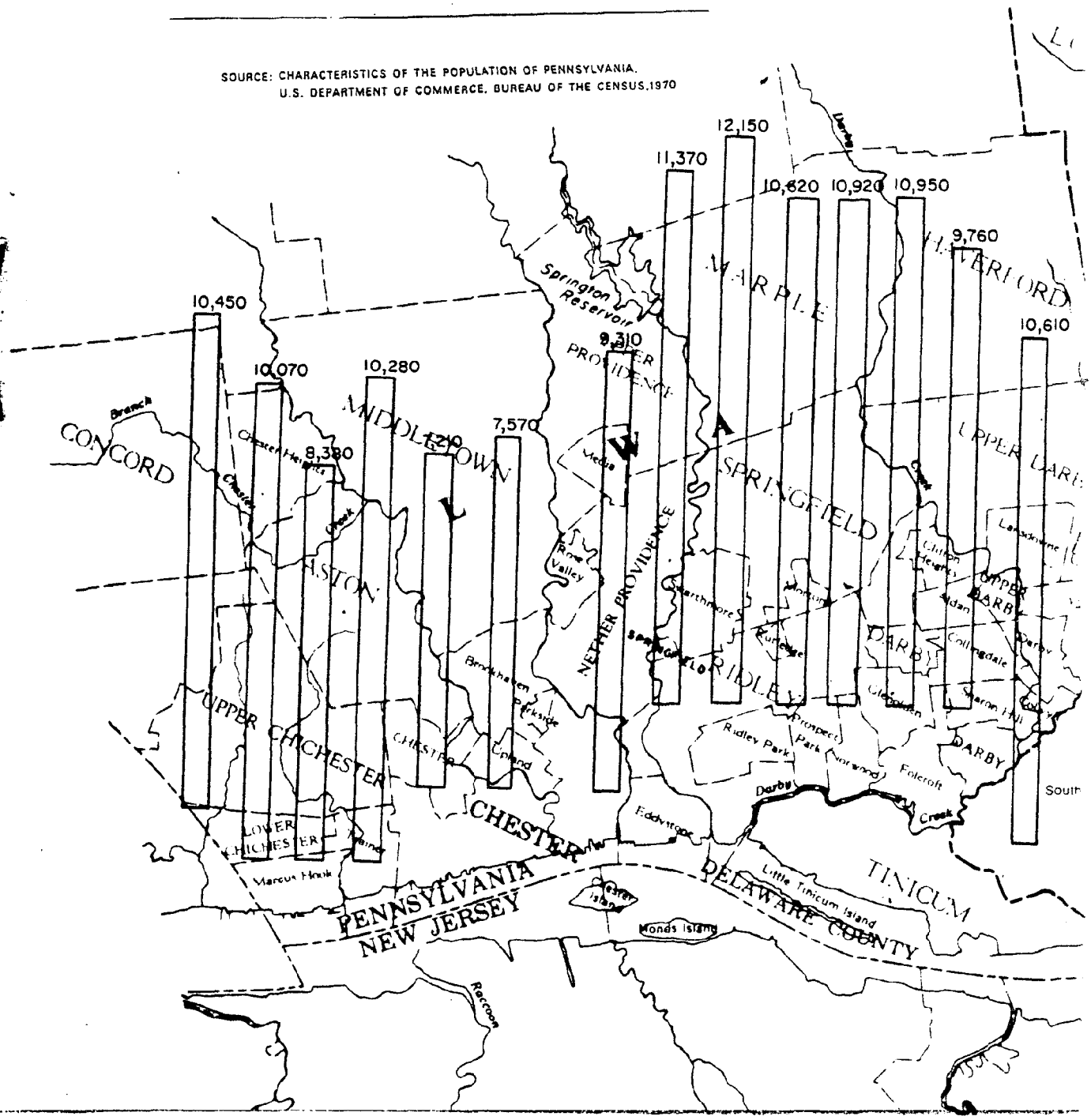
11,280
9,740
14,100
9,070
9,260
8,570
8,450
UPPER MORELAND
LOWER MORE
SPRINGFIELD
ABINGTON
CHELTENHAM
MONTGOMERY COUNTY
PHILADELPHIA COUNTY
WER MERION
SCHUYLKILL
RIVER
Sandy Run
Far Northeas
Near Northeast Philadelphia
Lower North Phila.
West Phila.
Center City
Lower North Phila.
Kensington
Center City
PHILADELPHI
DELAWARE
Petty Island
South Philadelphia
est Philadelphia
CAMDEN
COOPER

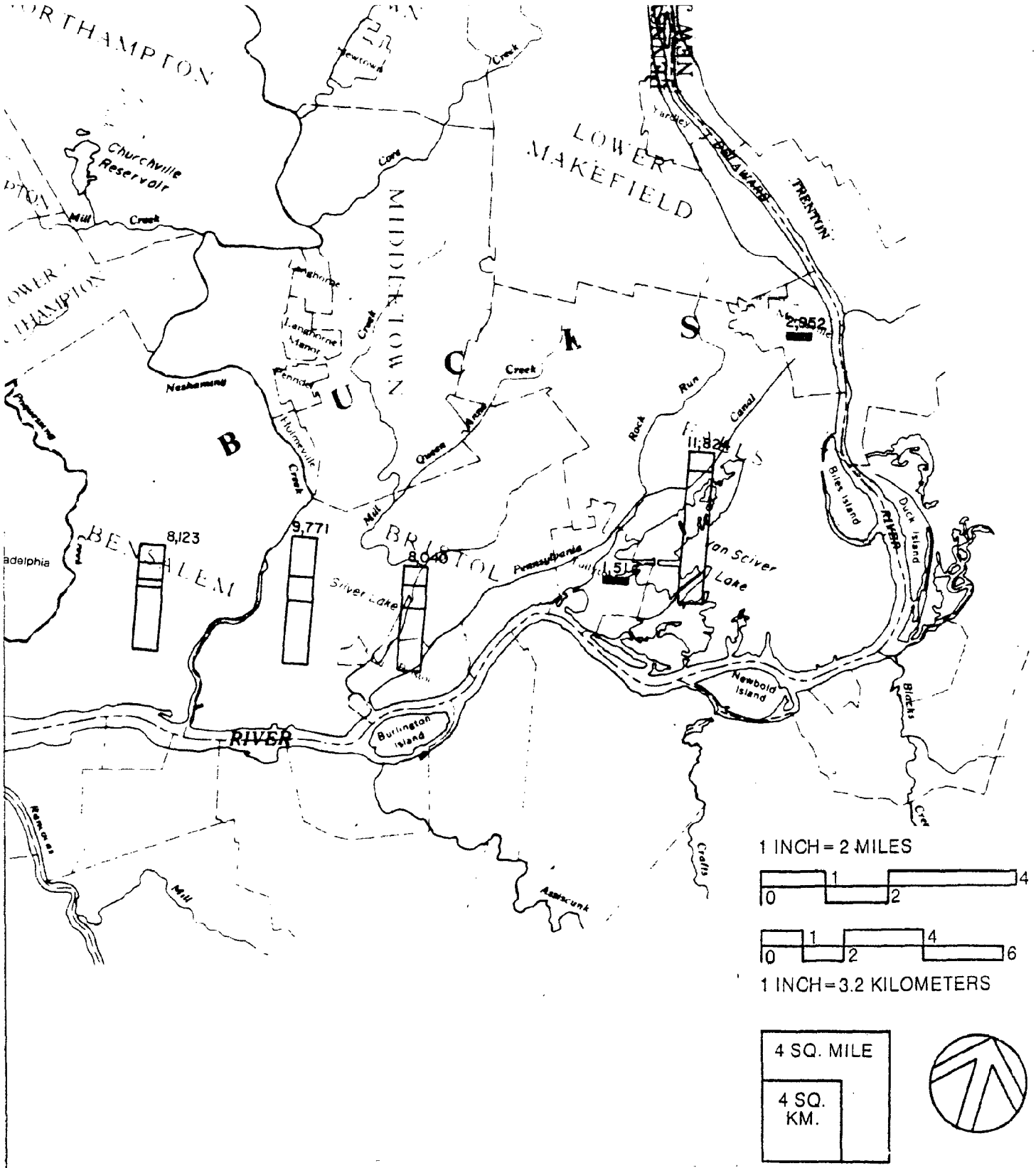
LEGEND

1'' = $3,000

- LESS THAN $9,000
- $9,000 – $11,000
- GREATER THAN $11,000

SOURCE: CHARACTERISTICS OF THE POPULATION OF PENNSYLVANIA.
U.S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS, 1970

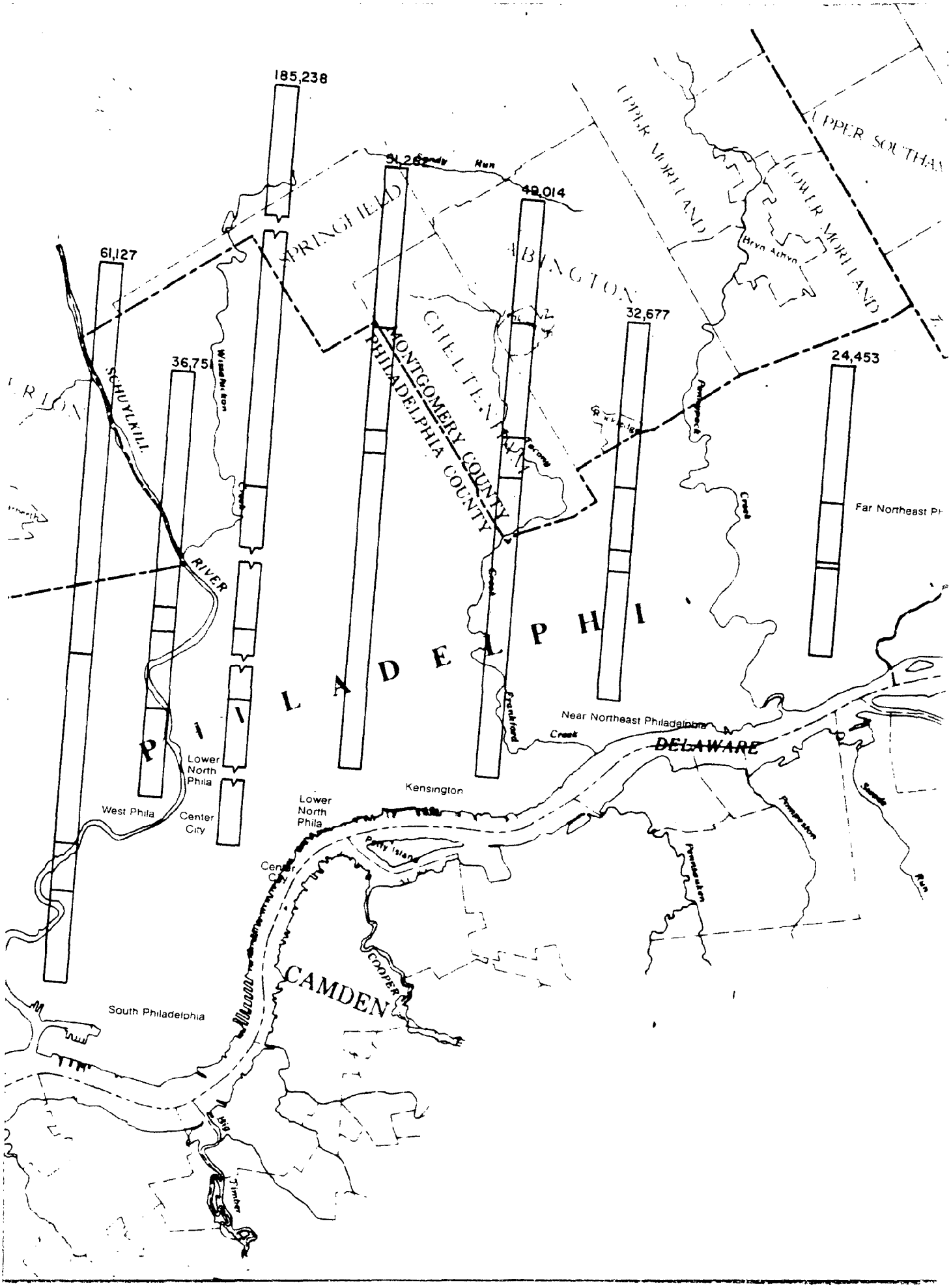




EMPLOYMENT

BY JOB LOCATION

DELAWARE ESTUARY COASTAL ZONE



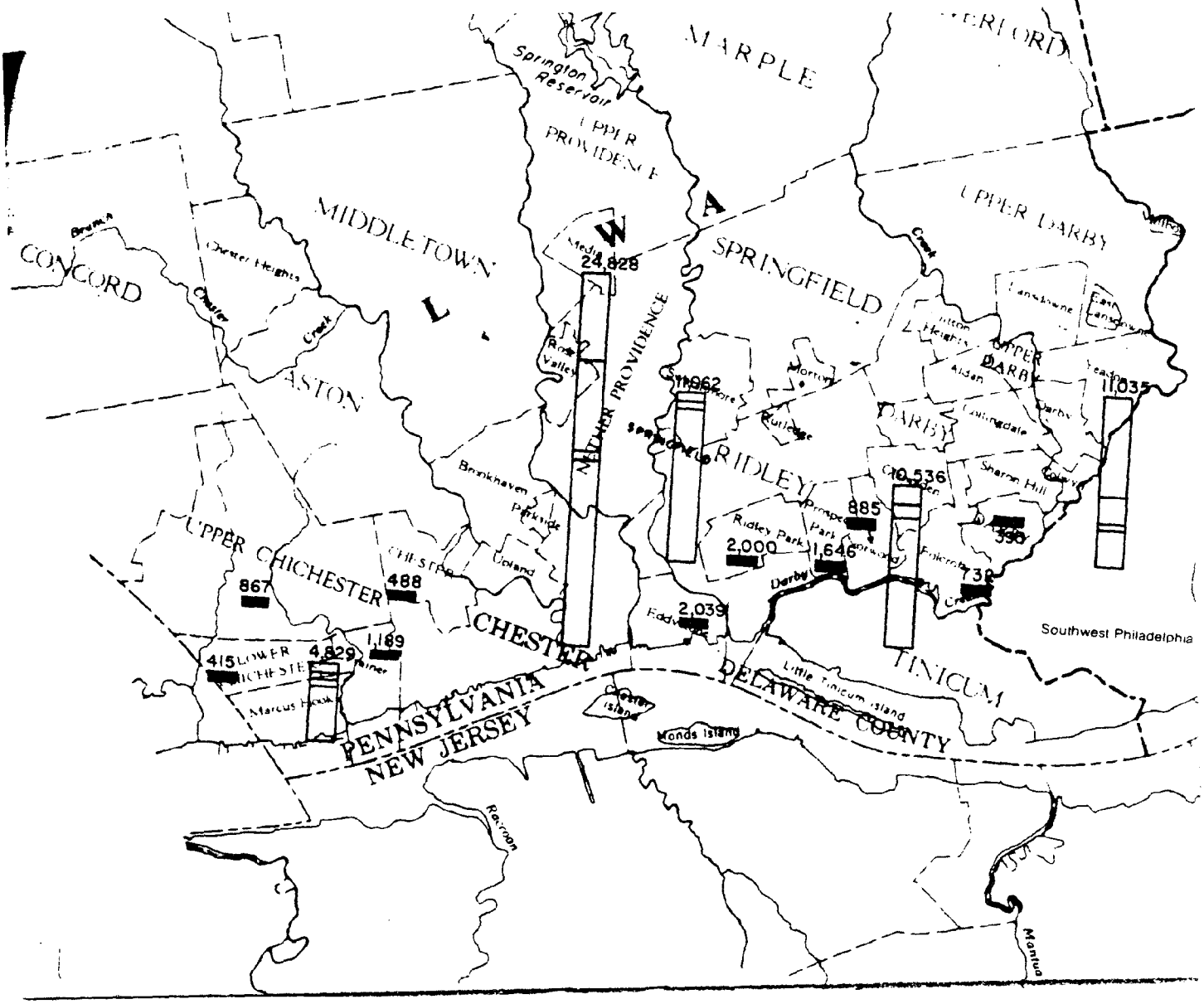
185,238
51,262
49,014
61,127
36,751
32,677
24,453
SPRINGFIELD
ABINGTON
CHELTENHAM
MONTGOMERY COUNTY
PHILADELPHIA COUNTY
UPPER MORELAND
LOWER MORELAND
UPPER SOUTHAM
Bryn Athyn
SCHUYLKILL
RIVER
Wissahickon
Tacony
Creek
Frankford
Pennypack
Far Northeast Ph
PHILADELPHI
Near Northeast Philadelphia
DELAWARE
Lower North Phila
West Phila
Center City
Kensington
Petty Island
Pennsauken
Pennypeston
Seeds Run
COOPER
CAMDEN
South Philadelphia
Big Timber

LEGEND

1'' = 1000 EMPLOYEES

- FINANCE, SERVICE, GOVERNMENT AND MILITARY
- WHOLESALE AND RETAIL
- TRANSPORTATION AND COMMUNICATION
- CONSTRUCTION AND MANUFACTURING
- FEWER THAN 4000 EMPLOYEES

SOURCE: 1970 STATISTICAL SURVEY OF EMPLOYMENT IN THE DELAWARE VALLEY REGION, DVRPC



with the largest number of employment opportunities (11,824), 88% of all jobs are in manufacturing. United States Steel's Fairless Works contributes most of the over 10,000 manufacturing jobs in Bucks County.

Wholesale and Retail is slightly larger than Finance, Service, Military, and Government (FSM&G) employment within Bristol, Tullytown and Morrisville Boroughs (See Figure i-4). However, in Falls, Bensalem and Bristol Townships the FSM&G category has substantially more jobs than does Wholesale and Retail. Transportation and Communications have a small, evenly distributed number of employees throughout the Bucks Study Area. As in the other two coastal Counties, there are very few Agriculture and Mining employees in the Bucks Study Area.

In the Delaware County Study Area, 84% (in 1970, around 31,500 jobs) of Construction and Manufacturing employment is in three municipalities, Tinicum and Ridley Townships and Chester City. These three municipalities are also the Delaware County Study Area leaders in total number of jobs (See Figure i-4). Wholesale and Retail employees outnumber Finance, Service, Government and Military employees in only three of the fourteen Delaware County municipalities. In Lower and Upper Chichester, Norwood, and Ridley Park, the largest employment category is Finance, Service, Government and Military.

In contrast to the other two coastal Counties, the Study Area in Philadelphia has the bulk (48.3% or 218,400 jobs) of its employees in the Finance, Service, Government and Military category. Construction and Manufacturing comprise 26.6% of Philadelphia's employment. This category is highest in Kensington and Lower North Philadelphia.

In summary, a large proportion of the regional employment is located within the Preliminary Study Area. For the five county area consisting of Philadelphia, Montgomery, Bucks, Delaware and Chester Counties, over one-quarter (26.3%) of all jobs are located in the Philadelphia Study Area, a very small portion of the total county land area. The other two Study Areas, while not having the enormous number of jobs which Philadelphia has, do have a significant concentration of jobs in their Study Areas.

<u>Unemployment</u> -- The sheer number of employees working the Study Area (562,200, or 41.7% of the three coastal Counties' 1,346,000 employees) attests to the Area's importance as an economic resource. But the Philadelphia region, like other Northeastern metropolitan areas, appears to be experiencing an outmigration of population to Southern and Southwestern cities of the U.S. Also, like the rest of the nation, the region has been hit in the last several years by high unemployment. The depressed economic situation of the region is reflected by the many recent plant closings and major layoffs. Some of the larger ones are:

- Boeing Virtol Corp. (Ridley Twp., Delaware County) layoff 600 employees (12/76)

- FMC Plant (Marcus Hook, Delaware County) closing 500 employees planned (1/77)

- Westinghouse Electric Co. (Lester, Del. County) layoff - 684 employees (1/77)

- Mobil Oil Corp (Philadelphia) closing - 325 employees (1/77 planned)

Within the Preliminary Study Area, there are several areas designated by the Pennsylvania State Employment Service of the Department of Labor and Industry, as "areas of substantial unemployment". Coastal areas that have sustained unemployment of over 6% or higher for at least two years include: parts of Bensalem, Bristol and Falls Townships and Bristol Borough in lower Bucks County; all Delaware County Study Area municipalities, except Tinicum Township; and Philadelphia.[17]

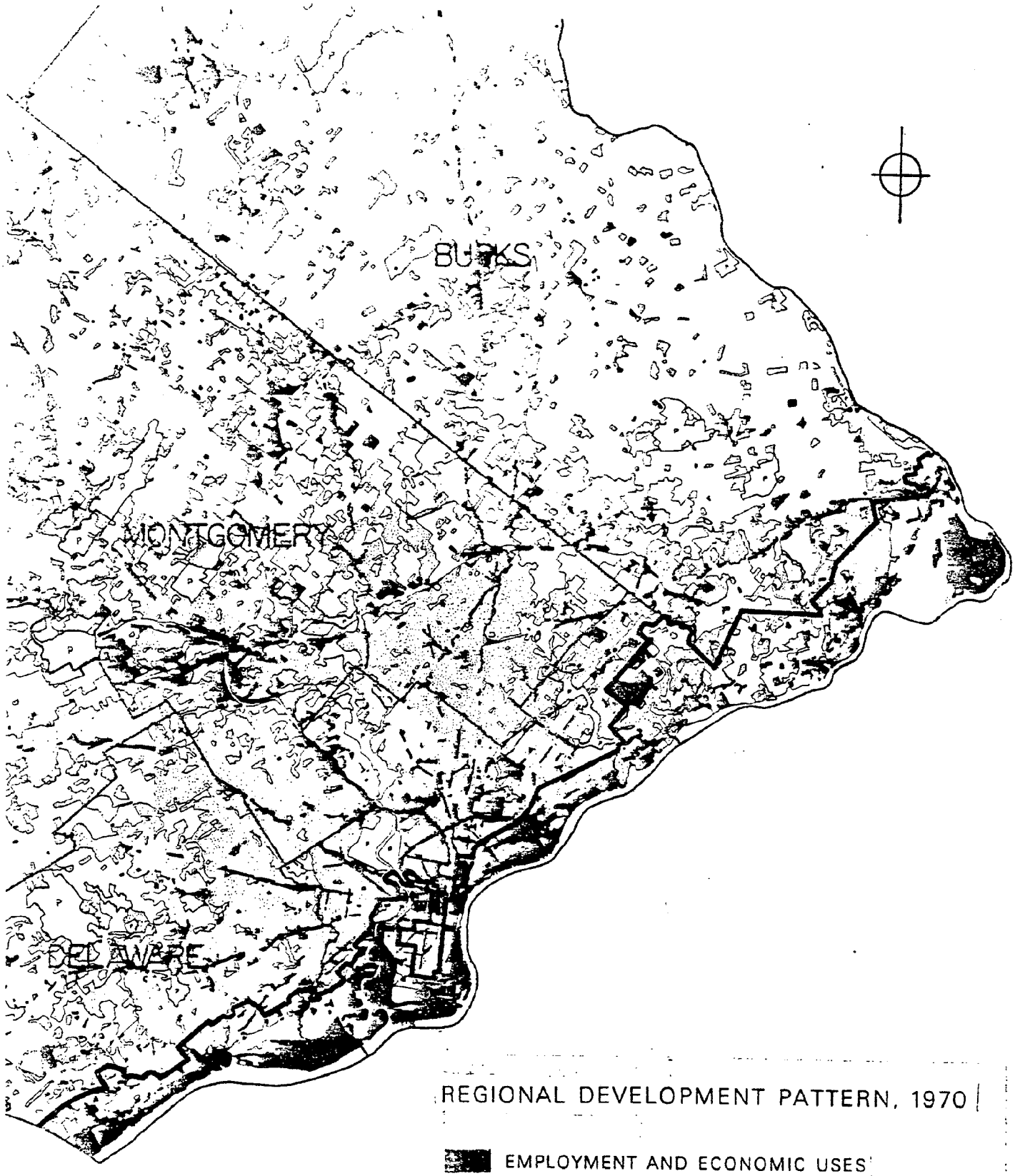
For the last two years, Chester City has had the highest rate of unemployment in the Study Area. Since February 1975, unemployment in Chester has not gone below 12%, and during several months in the past two years umemployment has been over 14%.

Other coastal areas have had radical rises in unemployment since 1970. Philadelphia, which had an unemployment rate of 4.6% in April 1970, has been hovering around 10% during 1976. Southeastern Delaware County has gone from a low 3.2% in 1970 to 10% in 1976. An increase in umemployment of nearly the same magnitude has occurred in lower Bucks County (3.7% to 10.3%). Like Chester City in Delaware County, Bristol Township in Bucks County is a municipality with Chronic high enemployment. Bristol Township, which had 4.2% unemployed in April 1970, topped 11% during several months in 1975 and 1976.

LAND USES AND RESOURCES

Introduction -- Present land use in the Study Area is the product of three centuries of incremental growth. Today, in spite of competition from the rest of the region, the Study Area remains the most intensely developed part of the Delaware Valley. Figure i-5 shows the regional development pattern in 1970. Past industrialization and development, while insuring a dominant role for the Study Area, have also solidified a pattern of land use which resists change and shapes future growth patterns.

The information on existing land use has been compiled and mapped using data from the Delaware Valley Regional Planning Commission (DVRPC). Land use information is from 1970 except where specifically



REGIONAL DEVELOPMENT PATTERN, 1970

EMPLOYMENT AND ECONOMIC USES

RESIDENTIAL AND RELATED USES

P REGIONAL PARKS

PRELIMINARY COASTAL ZONE BOUNDARY

1 INCH = APPROX. 5.5 MILES

SOURCE YEAR 2000 REPORT NO.4. DVRPC. 1976

noted otherwise. Although there has been considerable change in some instances since 1970, land use maps have not been updated for this study. Significant changes not reflected on the 1970 map are described in the text.

The inventory employs thirteen categories of land use:

1. single family detached residential
2. multiple unit residential
3. manufacturing
4. transportation
5. communications and utilities
6. commercial, wholesale and retail
7. community services (institutions)
8. military
9. recreational and cultural
10. agricultural
11. mining
12. forests and undeveloped land
13. water areas

As can be seen on the Existing Land Use maps (figures i-6, i-7 and i-8), agriculture is a minor land use in the Study Area. Mining and military uses are also very small, together comprising less than one tenth of one percent of total acreage. The only mining in the Preliminary Study Area takes place in the Van Sciver Lake area of Bucks County.

Delaware County -- Delaware County has an industrial corridor which stretches the length of the County along the Delaware River. The Delaware County Planning Commission's Delaware River Corridor Study characterizes the coastal area as densely populated with a heavy concentration of old, often obsolete, industrial development along the River.[18] The only exception to this band of industrial use is in Tinicum Township where there is undeveloped and residential land on the riverfront.

There is a clear residential division in the Study Area between the eastern and western parts of Delaware County. West of Ridley Township, residential land use is almost exclusively multiple unit housing (see Figure i-6); east of Ridley Township, single-family, detached residential use is dominant. Ridley Township is also the approximate dividing line between a high percentage of manufacturing land use in the western portion of the Delaware County Study Area and a much lower percentage in the eastern part of the County.

One of the largest tracts of undeveloped land within the Study Area boundary is in Tinicum Township. Much of this land is Tinicum Marsh, which is of particular interest because of its size (approximately 10% of the undeveloped land in the Delaware County Study Area) and its location on a tidal tributary of the Delaware River. Chester Township and Upper Chichester also have several tracts of undeveloped land in the Study Area, but unlike Tinicum Marsh, these are suitable for development and are not located on a waterway.

In light of the extent of industrialization and development in Delaware County, undeveloped land is surprisingly the single largest land use in the Study Area, accounting for about 33% of the total

Figure i-6

EXISTING LAND USE - DELAWARE COUNTY STUDY AREA

1" = 1 mile

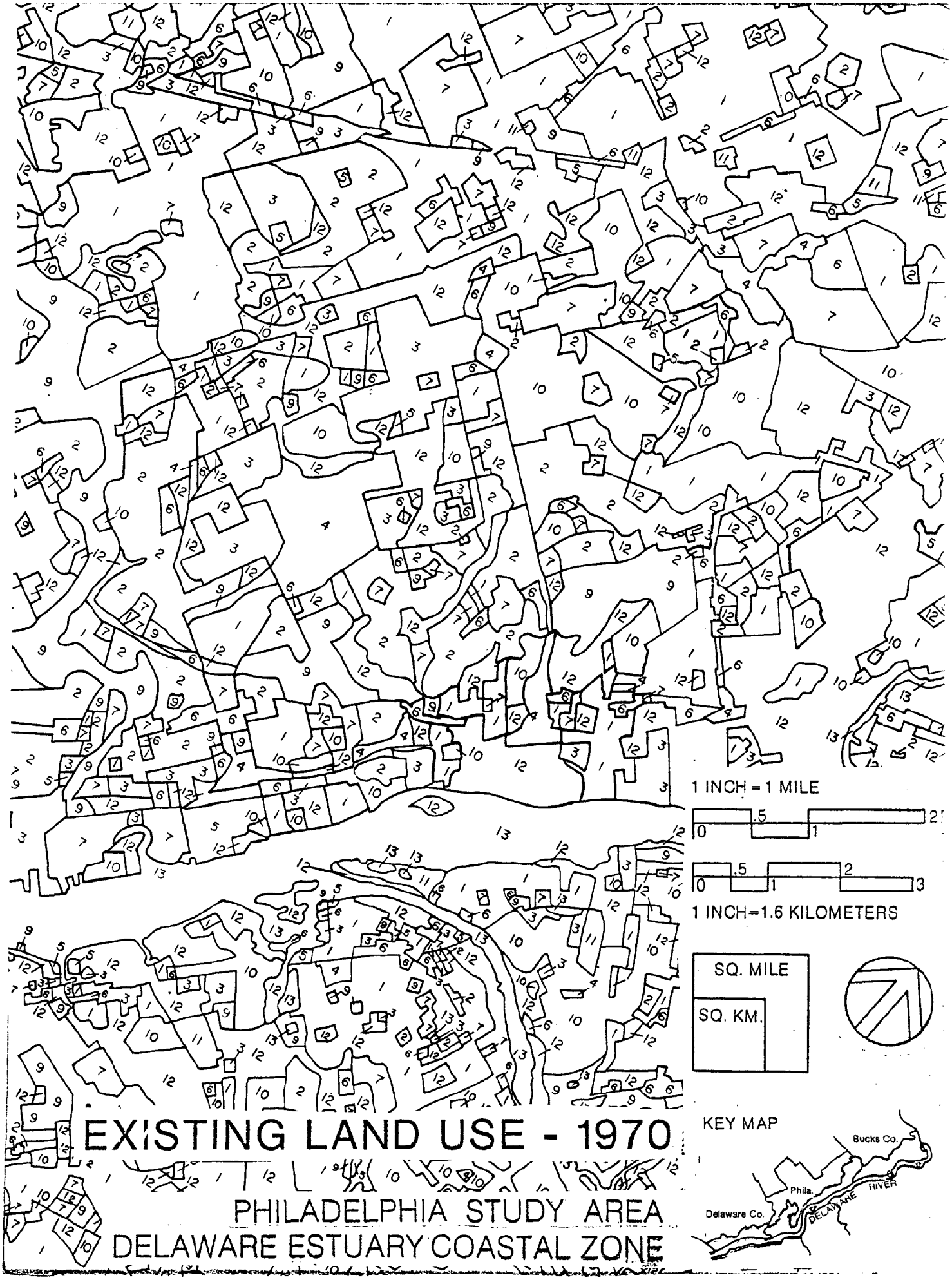
area. Transportation systems and residential areas, covering a combined 39% of the Delaware County Study Area, are other large land uses. There is very little commercial land use in the Delaware County Study Area; less than 1% of the land within the Study boundary in Delaware County is utilized for wholesale and retail commerce. This is very slight in comparison to the Study Areas of Philadelphia (6.1%) and Bucks (3.2%).

Philadelphia County -- In contrast to the other two coastal Counties, a large percentage of the land within Philadelphia's Preliminary Study boundary is devoted to commercial, institutional, and recreational--cultural uses (5.2% in Bucks County). Single family residential use is comparatively small in Philadelphia (See Figure i-7). The only area in Philadelphia with a significant amount of single family housing is the Far Northeast. Even there, multiple unit residences comprise a higher percentage of land acreage (13.8%) than do single family residences (7.7%). The Study Area in Philadelphia also has a smaller percentage of undeveloped land (17%) than Bucks and Delaware (each with about 33%).

Transportation is, by far, the largest land use in the Philadelphia Study Area, totaling approximately 26%. Land for transportation is distributed fairly evenly within the City's Study Area. Manufacturing, at approximately 10%, is another large use but is less evenly distributed. Southwest and South Philadelphia, in particular, have very little land devoted to manufacturing use. Unlike Delaware County, manufacturing in Philadelphia is not clustered exclusively on the waterfront. Occupying about 40% of the land in the Philadelphia Study Area, public facilities and utilities are the largest riverfront land use. Riverfront land utilized for manufacturing, wholesale commerce and transportation combined is about 37%, which is still less than the land utilized by Federal and municipal facilities (56%).

In light of the importance of the Philadelphia port, it is interesting that, in 1974 14.1% of riverfront land was classified as undeveloped[19] or vacant. Philadelphia's Riverfront Development Study found that previous users of Center City waterfront tracts have migrated within Philadelphia to South Philadelphia, the Near Northeast and Shackamaxon-Pt. Richmond.[20] The Riverfront Study also found that public access to the waterfront in Philadelphia is severely limited. Only 6.5% of total riverfront land is in retail, recreational or institutional use.

Bucks County -- The Bucks County Study Area has a wide mix of land uses. The Existing Land Use map (Figure i-8) shows large tracts of undeveloped land in the Study Area, particularly in Bensalem and Falls Townships. Since 1970, however, Bensalem has been extensively developed as single family residences. Falls Township, with well over one-half of all manufacturing land in the Bucks County Study Area, has experienced fewer recent changes, but plans are underway for future development, including residential. Falls Township also contains extensive man-made lakes created by sand and gravel mining. Bristol and Tullytown Borough are old urban industrial areas that



EXISTING LAND USE - 1970

PHILADELPHIA STUDY AREA
DELAWARE ESTUARY COASTAL ZONE

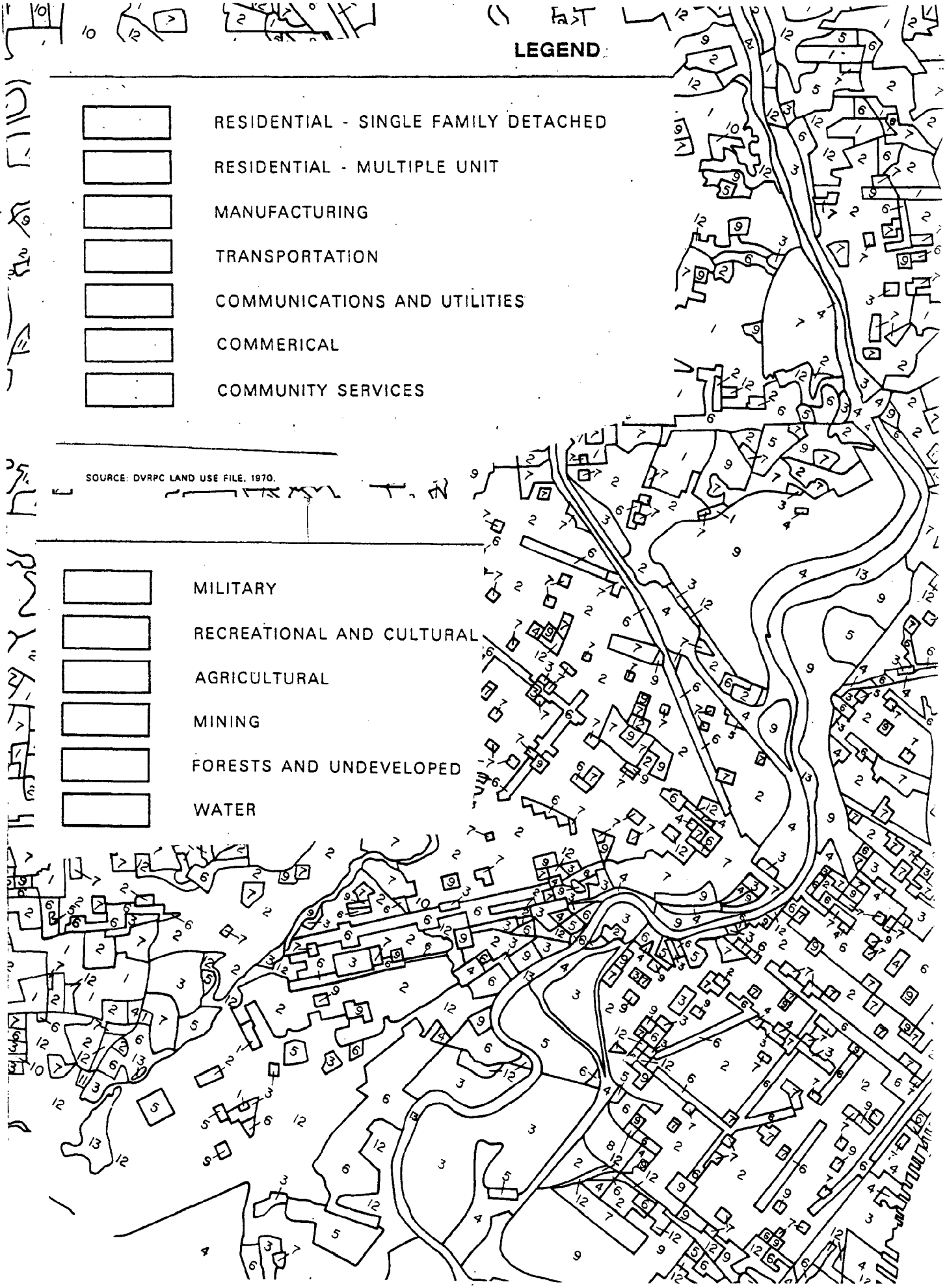

LEGEND
RESIDENTIAL - SINGLE FAMILY DETACHED
RESIDENTIAL - MULTIPLE UNIT
MANUFACTURING
TRANSPORTATION
COMMUNICATIONS AND UTILITIES
COMMERICAL
COMMUNITY SERVICES
SOURCE: DVRPC LAND USE FILE, 1970.
MILITARY
RECREATIONAL AND CULTURAL
AGRICULTURAL
MINING
FORESTS AND UNDEVELOPED
WATER

Figure i-8

EXISTING LAND USE - BUCKS COUNTY STUDY AREA

1" = 1 mile

have tended to lose jobs and residents in recent years, although considerable potential for redevelopment exists. Bristol Township, typified as a suburban community, experienced explosive single-family development (such as Levittown) in the 1940's and 1950's and remaining vacant parcels tend to be developed as multi-family residences.

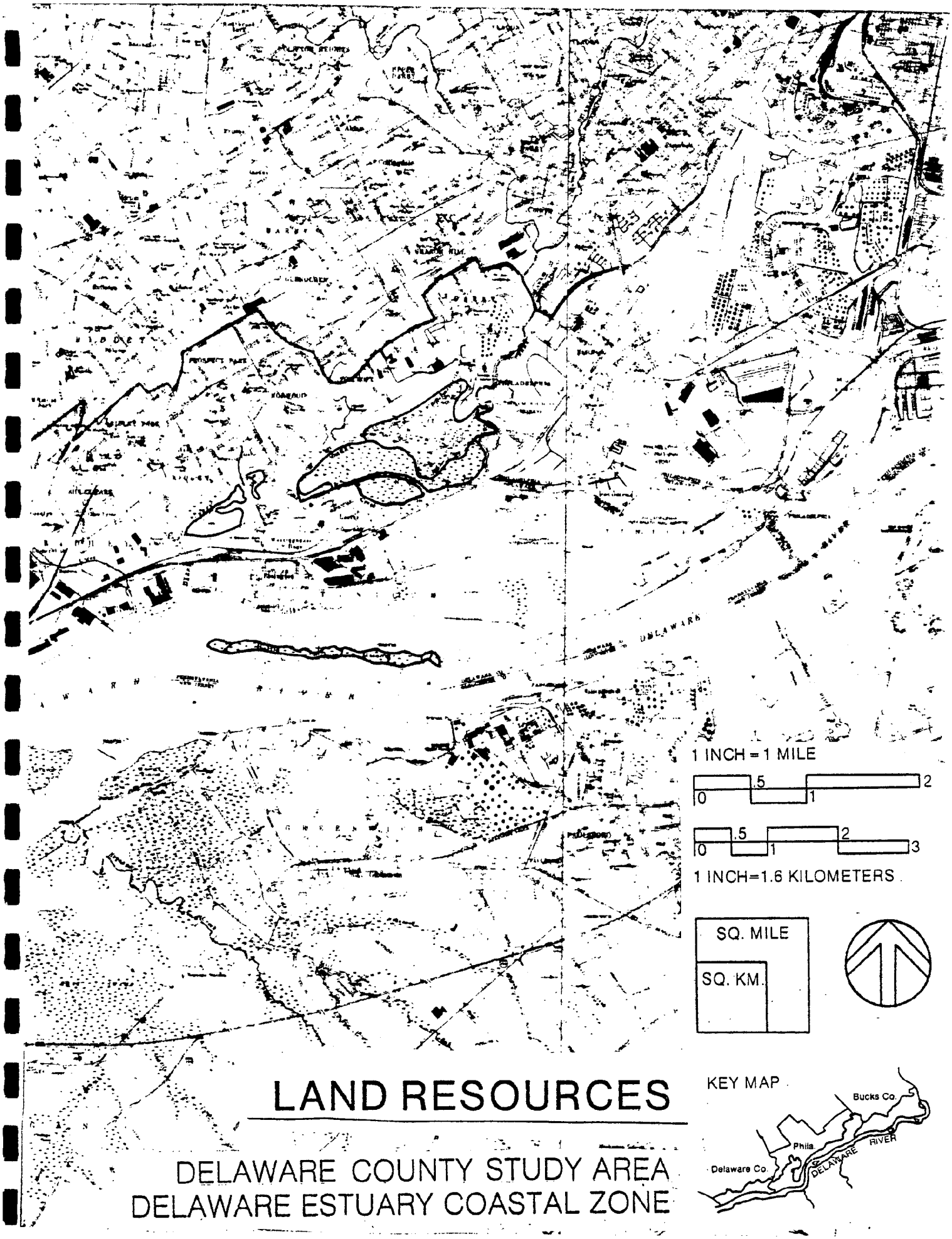
Land Resources -- Most Categories on the Existing Land Use Map imply the kinds of social and economic activities presently occurring in developed areas. But land (particularly land classified as forest and undeveloped areas) may also perform significant natural resource functions. Forests, wetlands and flood plains, three land resources of considerable ecological and social importance, are displayed on the Land Resources maps (Figures i-9, i-10 and i-11) and are discussed below.

Forest resources sustain wildlife, absorb noise, oxygenate the atmosphere, protect land from erosion, and provide a visual buffer between developed lands. At the edges formed by forests and open fields an especially diverse animal population can be supported. The largest forest areas are in Bucks County, both along the coast and scattered throughout the Study Area. Little Tinicum Island, Pennypack Park and Poquessing Creek Valley are significant woodlands in Delaware and Philadelphia counties.

The Land Resources map shows two other features, flood plains and wetlands, that perform significant natural functions. Flood plains are level streamside areas where the force of flood waters is dissipated. As long as floodplains are left undeveloped, floods are contained within the plain without threat to life or property. Moreover, undeveloped flood plains provide diverse kinds of food and cover for wildlife. Structures built in the flood plain, however, may not only aggravate potential flood hazards above and below the construction site, but are also subject to flood damage which only can be ameliorated with expensive, and sometimes unsuccessful, flood-proofing techniques.

Bulkheading and channelization of riverfronts in Delaware and Philadelphia Counties have extensively altered the natural configuration of flood plains, leaving only a few natural ecosystems. As a result, a considerable number of residential and economic-related land uses are within the 100 year flood plain (this area has a 1% chance of being flooded in any given year). A comparison of Existing Land Use and Land Resources maps can suggest (at least where flood plain data is available) the extent of potential flood damage to developed areas. Much flood plain in the Bucks County Study Area is unaltered, except around Bristol Borough and southern portions of the County. A comparison between flood plains on the Land Resources maps and the forest and undeveloped areas on the Land Use maps can give a general indication of where natural, undisturbed flood plains still exist.

Wetlands are lowlands covered with shallow water. They were once abundant along the coastal zone, but now consist of Tinicum Marsh in



LAND RESOURCES

DELAWARE COUNTY STUDY AREA
DELAWARE ESTUARY COASTAL ZONE

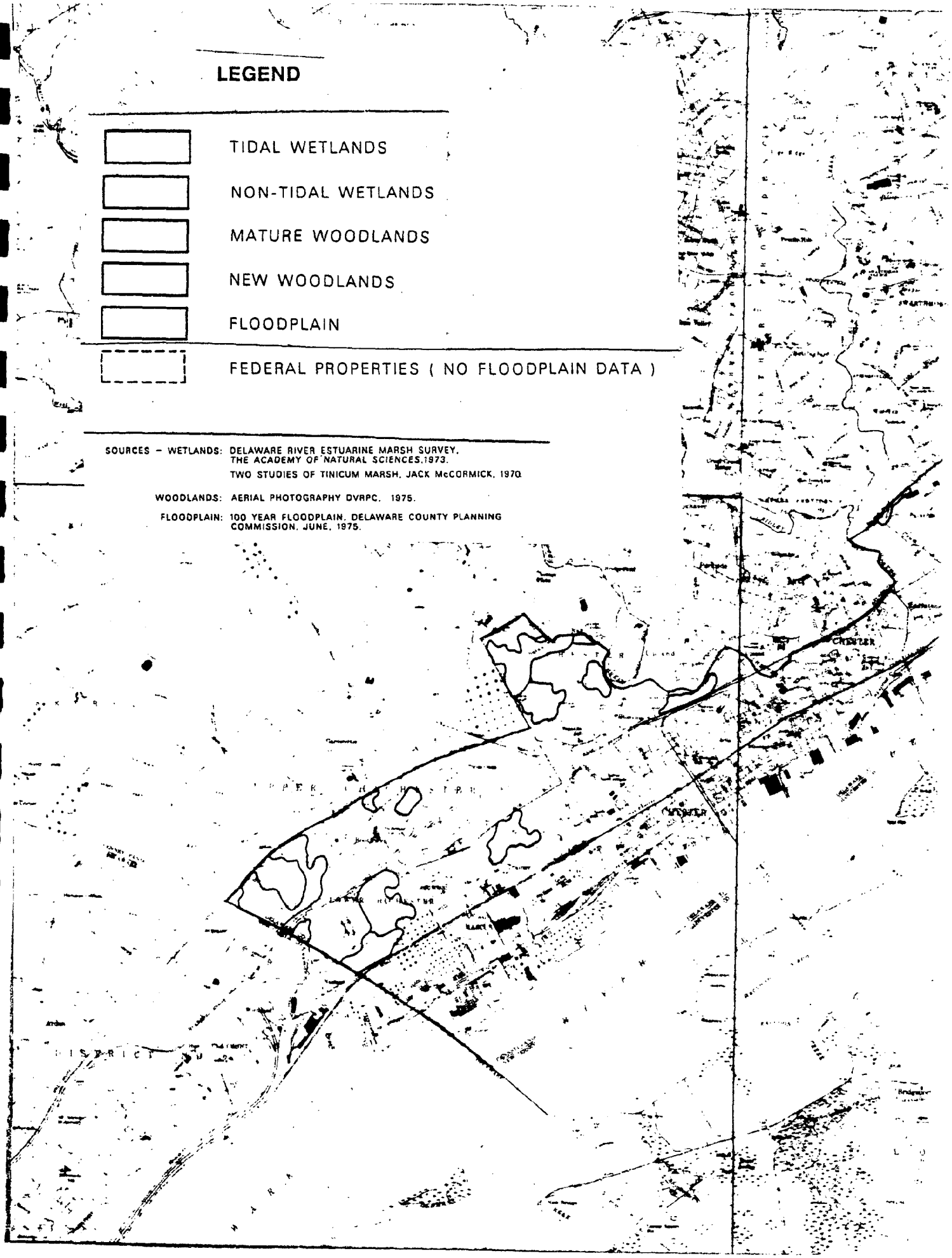

LEGEND
TIDAL WETLANDS
NON-TIDAL WETLANDS
MATURE WOODLANDS
NEW WOODLANDS
FLOODPLAIN
FEDERAL PROPERTIES (NO FLOODPLAIN DATA)
SOURCES – WETLANDS: DELAWARE RIVER ESTUARINE MARSH SURVEY. THE ACADEMY OF NATURAL SCIENCES.1973.
TWO STUDIES OF TINICUM MARSH. JACK McCORMICK. 1970.
WOODLANDS: AERIAL PHOTOGRAPHY DVRPC. 1975.
FLOODPLAIN: 100 YEAR FLOODPLAIN. DELAWARE COUNTY PLANNING COMMISSION. JUNE. 1975.

Figure i-10

LAND RESOURCES - PHILADELPHIA COUNTY STUDY AREA

1" = 1 mile

Figure i-11

LAND RESOURCES - BUCKS COUNTY STUDY AREA

1" = 1 mile

Delaware and Philadelphia Counties and a few small tidal wetlands along Neshaminy Creek, The Delaware River and Biles Creek. Wetlands absorb flood waters, cleanse polluted water, provide productive wildlife habitat, help augment stream flows in summer by releasing stored water, are spawning grounds for commercially valuable fish and are outdoor laboratories for educational and scientific activities. When wetlands are disturbed by development activities, many of these valuable functions can be lost. Wetlands are identified on the Land Resources map and are included within the forest and undeveloped areas category of the Land Use map.

Undeveloped land is a resource for a wide variety of possible activities, such as recreation, residential and economic development, and sand and gravel extraction. Undeveloped land adjacent to the shoreline is especially valuable as a land resource for future marinas, power plants, sewage treatment facilities and other uses requiring immediate access to the water. Residential developments and neighborhood parks, although not water-dependent, are greatly enhanced by the River's visual appeal. In Falls Township, Bucks County, a considerable amount of undeveloped land is adjacent to existing sand and gravel mining operations, and some of these areas one day may be converted to this economic use. In short, many land areas shown as forest and undeveloped on the Land Use map are valuable natural resources or are resources for potential economic-related activities.

Conclusion -- The Delaware riverfront is highly urbanized and, though each county has its own particular land use pattern, the counties have several features in common. Between 10% and 11% of the land in each county is devoted to manufacturing use, even though many of these industries are not directly dependent on the River. About 20% of each County's Study Area is occupied by residential communities. Communities in Philadelphia are predominantly multi-family residential, whereas in Bucks County single family homes dominate and in Delaware County residential types are more evenly mixed. Undeveloped land is the largest single category of land use in Bucks and Delaware County, accounting for about a third of all land in these two Study Areas. In Philadelphia, only 17% of the Study Area is undeveloped, but compared to Delaware and Bucks a much larger proportion is occupied by transportation uses (more than one-quarter of the Philadelphia Study Area). Philadelphia also has more than twice the percentage of land in the remaining four land use categories than do neighboring counties; 22% of the Philadelphia Study Area is taken up by commercial, communication and utility, community services, and recreation and cultural uses.

WATER USES AND RESOURCES

Introduction -- The Delaware River, which is the major water resource in the Study Area, originates in New York State, 330 Miles above Delaware Bay. At Morrisville, the fast, free-flowing river passes

its last series of rapids and becomes an increasingly broad, navigable estuary. The tidal Delaware and its tributaries are a resource for such diverse uses in the Preliminary Study Area as navigation, drinking water, waste assimilation, industrial cooling, fish propagation and recreation.

History and Concepts -- Conflict among water users is a relatively new phenomenon on the Delaware River. During the region's early development and into the nineteenth century, there was coexistence among uses as diverse as transportation, commercial fishing, swimming and waste disposal.[21] A small population and low density, combined with lack of industralization, permitted the Delaware to support a wide variety of uses, as well as to regenerate and renew itself.

Eventually, in the latter part of the nineteenth century, the assimilative capacity of the Estuary was strained beyond its regenerative ability. From the late 1800's through the 1940's, water quality in the Delaware River was severely degraded as a result of increased population density and extensive industrial development.[22] Simultaneously, the pattern of water use changed. Wells pumping groundwater for drinking water and industrial uses experienced declining yields and became grossly polluted as urbanization intensified.[23] Surface water was increasingly exploited once technology for large scale, efficient distribution was developed. The first Philadelphia Waterworks was completed in 1803. A century later, the urban population relied almost exclusively on surface supplies for drinking water. Ironically, the improved technology for pumping, which made surface water supplies available, also spurred industrial development which, in turn, contributed to subsequent degradation of surface water quality.

In the twentieth century, the Delaware Estuary has periodically experienced such indicators of pollution as low dissolved oxygen (DO) levels, high concentrations of heavy metals, and high chloride concentrations. The Estuary does not meet water quality standards established by the Pennsylvania Department of Environmental Resources. The presence of such heavy metals as iron (maximum values periodically exceed 1.5 mg/l) is a result of industrial discharge.[24] Due to organic loading, DO content is seasonally depressed below the levels necessary to sustain fish and their food chain[25]. Seasonal low flow conditions allow chloride concentrations to rise to values as high as 500 mg/l near Marcus Hook, Delaware County.[26]

Groundwater Resources -- The Delaware Study Area was naturally endowed with groundwater supplies of excellent quality and quantity. The characteristics of the coastal plain topography and climatic conditions provided adequate amounts of recharge. The geological features provided favorable conditions for the storage and circulation of the groundwater. This resource which was readily available became immediately exploited by the rapidly expanding population.

Those areas of groundwater recharge were developed, urbanized, and paved. The recharge waters were polluted by industrial and municipal

dumps, as well as sewage and cesspool leakage. In general, the whole groundwater hydrology was significantly and detrimentally changed, and by the late 1950's and early 1960's groundwater consumption dropped to almost nothing and all water consumption came from surface water supplies.[27]

Water use may be divided into two categories -- withdrawal uses and instream uses. Instream uses employ water resources without removing water, even temporarily, from the stream. Water-based transportation, fish and wildlife management, recreation, fishing and waste assimilation are major kinds of instream uses found in the Study Area. Withdrawal is the diversion of water from the stream for domestic and production uses. Except for water lost to evaporation or exported to other drainage basins, most withdrawn water is eventually returned to the stream as wastewater. The vast majority of withdrawals in the Study Area are by municipal authorities, self-supplied industries and electric utilities. The principle kinds of withdrawal and instream uses are described below.

Withdrawals - Utilities -- Electric generating stations withdraw more water than municipal and all self-supplied industrial users combined. One electric generating plant alone withdraws over a billion gallons daily.[28] Six of Philadelphia Electric Company's (PECo) eight stations are located within the Study Area boundary. The combined withdrawals of all municipal and self-supplied industrial users in the Study Area total less than half the withdrawals of these six stations. United States Steel, the largest industrial user in the Study Area withdraws less water than all but one of the generating stations. Figure i-12 compares the PECo plant withdrawals with those of the six largest industrial withdrawers.

Withdrawals - Agriculture and Export -- Compared to other uses, withdrawal of water for agriculture and export of water to other basins is a minor use of water resources in the Study Area. There is no export of water from the Tidal Delaware River to other basins. But, on the upper Delaware, diversions of up to 900 million gallons per day (MGD) by New York and New Jersey have potential for affecting flow rates in the Study Area, particularly in drought years.[29] Agricultural acreage in the Study Area is less than 4.5% of total land area, so water utilized for irrigation and livestock has minimal impact compared to other uses.

Withdrawals - Municipal and Industrial -- The Delaware River is the primary water resource for municipal and industrial use.[30] Municipal suppliers, while not the largest category of withdrawers, service a wide spectrum of users. Their customers are commercial, industrial, institutional and domestic users. Most municipal water in the Study Area is sold domestically. There are a few cases in which industry buys a large portion of a municipal supply. For example, the Chester Water Authority sells 49% of its supply to industry.[31] The Bristol Borough and Philadelphia Water Departments are two other municipal suppliers which sell a substantial portion of their water to industry.

Figure i-12

COMPARISON OF THE SIX LARGEST INDUSTRIAL

WITHDRAWERS WITH SIX PECo STATIONS

Company/Station	County	Source	Withdrawals (million gallons per day)
Philadelphia Electric Company (PECo)			
Richmond	Philadelphia	Del.	561.1
Eddystone	Delaware	Del.	552.5
Southwark	Philadelphia	Del.	350.5
Delaware	Philadelphia	Del.	287.0
Schuylkill	Philadelphia	Schuly.	274.7
Chester	Delaware	Del.	193.2
Six Largest Industrial Users			
U. S. Steel Co.	Bucks	Del.	237.9
Sun Oil Co.	Delaware	Del.	121.
Publicker Ind.	Philadelphia	Del.	49.3
Gulf Oil	Philadelphia	Schul.	46.4
Rohm & Haas	Philadelphia	Del.	32.0
Union Carbide	Delaware	Del.	30.3

Totals: PECo = 2219.0 million gallons per day
Others = 488.5 million gallons per day

* Source : D.R.B.C. (these are the latest complete intake figures available)

Most industries clustered on or near the riverfront withdraw their own water (i.e., they are self-supplied) rather than purchase water from municipal suppliers. Because high water quality is not essential for some industrial processes, Delaware River water may need little or no treatment when withdrawn for industrial uses.

Figure i-13 lists the municipal withdrawers and their intakes in terms of million gallons per day. Figures i-14, i-15, and i-16, identify municipal and industrial water intake points as well as municipal and industrial wastewater discharge points. New Jersey withdrawers and dischargers on the Delaware are also shown in order to complete the picture of demand for water resources in the Delaware River.

Instream Uses - Waste Assimilation -Quality is the primary water issue in the Delaware Estuary. A major factor affecting water quality is the use of water resources for disposal and assimilation of wastes. Assimilation of wasteloads by biological activity in the stream is classified as an instream use of water.

As early as the 1850's, dumping of urban and industrial wastes into the Delaware was overtaxing the River's assimilative capacity.[32] Water quality probably reached its lowest point in the 1940's when dissolved oxygen (DO) was "extremely low in large portions of the estuary."[33] In 1946, no DO existed in the twenty mile stretch between Chester and the Benjamin Franklin Bridge.[34]

The low quality period of the 1940's triggered an avalanche of protests from citizens, dock workers, and sailors over the foul smelling hydrogen sulfide gas emanating from the River.[35] The gas was a result of inadequately treated municipal and industrial sewage. Ship owners contended that their vessels were being damaged by the hydrogen sulfide. Paint was eaten away, brass and silver tarnished overnight and, more seriously, ships' equipment was ruined. Largely in response to the outcry over these conditions, Philadelphia upgraded its original (Northeast) treatment plant and constructed two new primary plants (Southeast and Southwest) in the early 1950's.

The construction of treatment plants by Philadelphia and other municipalities along the Delaware resulted in the water quality improvements demonstrated in Figure i-17, which shows the 100 year trend in water quality. The plants have significantly reduced the waste load the River had been carrying. Though discharges from storm sewers during heavy storms may periodically release large waste loads, continuous municipal and industrial discharges still remain the major cause of water quality problems in the Study Area. Figure i-18 illustrates this with a list of the four major water quality problems in the Estuary and their primary causes.

The three large Philadelphia plants, six smaller ones in Bucks and thirteen plants of varying size in Delaware County constitute the present municipal dischargers in the Study Area. In addition to servicing the Study Area population, they collect from all of Philadelphia and lower Bucks Counties, eastern Montgomery County, and

Figure i-13

MUNICIPAL AND INDUSTRIAL WITHDRAWALS AND DISCHARGES IN MGD

(numbers refer to map locations on Figs. i-14, i-15, i-16)

PA. Industrial and Municipal Withdrawals[1]

MAP #	NAME	MGD
1.	Philadelphia Electric Co. - Chester	(37.13)
2.	Allied Chemical Corp.	1.5
3.	FMC	4.4
4.	PECo - Eddystone	(1442.)
5.	BP Oil Corp.	N/A
6.	Sun Shipbuilding Corp.	(2.5)
7.	Union Carbide Corp. - Linde	(30.2)
8.	Sun Oil Co.	(109.1)
9.	Westinghouse Electric Corp.	(36.)
10.	Scott Paper Co.	20.6
11.	Pennsylvania Industrial Chemical	N/A
12.	Baldwin - Lima - Hamilton Corp.	.33
13.	Chester	N/A
15.	Kerr - McGee Chemical Corp.	.4
16.	Philadelphia Coke	(3.0)
17.	PECo - Southwark	(269.3)
18.	PECo - Richmond	(340.6)
19.	PECo - Delaware	(264.3)
20.	National Sugar Refining Co.	(17.1)
21.	HK Porter Co.	.6
22.	Publicker Industries Inc.	49.3
23.	Amstar Corp.	14.8
24.	Rohm & Haas Co.	(12.0)
25.	Cargill Chemical Products	(2.8)
26.	Liberty Corp.	.01
28.	United States Gypsum	(1.0)
29.	Celotex Corp.	(.3)
30.	E. I. DuPont De Nemours Co.	(3.7)
31.	Gulf Oil of Pennsylvania	(49.2)
32.	PECo - Schuylkill	(212.3)
33.	National Milling and Chemical Co.	.01
34.	Atlantic Richfield Co.	(9.4)
35.	Philadelphia City - Torresdale	217.6
36.	Philadelphia City - Belmont	169.3
37.	E.I. Dupont De Nemours Co.	(2.2)
38.	Pennwalt Corp.	.03
39.	Paterson Parchmont Paper Co.	(8.7)
40.	Purex Corp.	.4
41.	Rohm & Haas Co.	(11.)
42.	U. S. Steel Corp.	(300.5)
43.	Schutte & Koerting Co.	.006
44.	Warner Co. - Van Sciver	8.4
45.	Warner Co. - West Side	.03
46.	Bristol Borough	3.7
47.	Lower Bucks County Municipal Authority	7.5
48.	Morrisville Municipal Authority	1.8

PA Industrial & Municipal Discharges[2]

MAP #	NAME	MGD
100.	Allied Chemical	.277
101.	Amstar Corp. Philadelphia Refinary	22.785
102.	Atlantic Richfield Refinery	6.
105.	Cargill, Inc.	2.88
106.	Celotex Corp.	.110
107.	Eaton Corp.	.219
108.	E. I. Dupont DeNemours & Co.	4.230
109.	Liberty Corp.	.406
110.	Exxon Corp.	.330
111.	Gulf Oil Refinary	41.115
112.	Amerada Hess Corp. Terminal	.028
113.	J. D. Morrissey	.050
114.	Royal Petrolaum Co. Terminal	N/A
115.	National Sugar Refining Co.	17.846
116.	Naval Ship Engineering Center	.130
117.	Philadelphia Coke Co.	4.875
118.	PECo - Richmond	340.535
119.	Phila. Gas Works A - Passyunk	7.374
120.	Phila. Gas Works B - Richmond	12.128
121.	Torresdale Water Treatment Plant	N/A
122.	Publicker Industries	52.35
123.	Rohm & Haas	8.919
124.	U.S. Gypsum Co. - Main Mill	1.07
125.	U.S. Navy - Philadelphia Shipyard	28.921
126.	Warner Co. - Tyson St. Plant	.025
127.	Warner Co. - 51st & Schuylkill Plant	.056
128.	PECo - Delaware	264.382
129.	PECo - Schuylkill	212.0
130.	PECo - Southwark	269.498
131.	Philadelphia International Airport	4.25
132.	Getty Oil Co. Terminal	N/A
133.	Gulf Schuylkill Tank Farm	.256
134.	Phila. N E Water Pollution Control Plant	195.
135.	Philadelphia Southeast WPCP	127.
136.	Philadelphia Southwest WPCP	139.
137.	Alan Wood Coated Metals	.032
138.	Superior Zinc Co.	.03
139.	E.I. DuPont Co.	2.190
140.	Federal Steel Co.	.01
141.	Morrisville Filtration Plant	.014
142.	Patterson Parchmont Paper	8.660
143.	ConRail Morrisville Yard	.041
144.	Pennwalt Corp.	.025
145.	Rohm & Haas Co.	11.630
146.	Straightline Manufacturing	.050
147.	U.S. Steel Co.	294.050
148.	Vulcanized Rubber & Plastics	.340
149.	Grows Inc., Landfill	N/A
150.	Stauffer Chemical Co.	.01
151.	Warner Co. - Terminal Plant	.40
152.	Purex Corp. Ltd.	.288
153.	National Solvents, Inc.	N/A
154.	Meenan Oil Co., Inc.	.001
155.	Prior Coated Metals Co.	.044
156.	Bristol Boro Sewage Treatment Plant	1.4
157.	Bristol Twp. WPCP	1.8
158.	Levittown WPCP	8.7
159.	Morrisville Wastewater Treatment Plant	2.78
160.	Twp. Falls Authority WPCP	2.30
161.	BP Oil Refinary	120.72
162.	Baldwin - Lima - Hamilton Co.	.390
163.	Congoleum Corp.	.7460
164.	DelawareCounty Incinerator #1	.002
165.	Delaware County Incinerator #2	.821
166.	Eastern Flame Hardening Co.	.003
167.	FMC Corporation	5.609
168.	H.K. Porter Co., Inc.	.030
169.	Air Prod. & Chem. Houdry Lab.	.043
170.	Monroe Chemical Co.	.011
171.	PECo - Chester	37.1760
172.	PECo - Eddystone	1442.098
173.	Phil Quartz Co.	.001
174.	Reynolds Metal Inc.	.974
175.	Scott Paper Co.	25.04
176.	Scott Paper Co.	.79
177.	Boeing Vertol Co.	.545
178.	Sun Oil Co. Refinary	92.35

PA Industrial & Municipal Discharges[2] Continued

MAP #	NAME	MGD
179.	Sun Oil Co. Tank Farm 2	.014
180.	Sun Shipbuilding Co.	3.325
181.	Teledyne - Winz	.020
182.	Trans Co Energy Co. Gas Plant	N/A
183.	Union Carbide Linde Div.	30.15
184.	Westinghouse Lester Plant	36.023
185.	PECo Tilghman Gas Plant	1.476
186.	Sunoco Twin Oaks Terminal	N/A
187.	Borough Marcus Hook Sewage Treatment Plant	1.29
188.	Central Delaware County Authority STP	10.10
189.	Darby Creek Joint STP	15.81
190.	DELCORA Chester STP	10.30
191.	Eddystone Borough Wastewater Treatment Plant	.20
192.	Muckinpates STP	5.75
193.	Tinicum Township STP	.83

N.J. Industrial and Municipal Withdrawals[3]

200.	E.I. Dupont DeNemours	73.
201.	Texaco Inc.	2.9
202.	Olin Corp.	16.8
203.	Mobil Oil Corp.	29.7
204.	Cities Service Oil Co.	.1
205.	GAF Corp.	10.7
206.	Georgia Pacific Corp.	3.6
207.	Latex Fibre Int., Inc.	.4
208.	Kind & Knox Gelatin Co.	1.0
209.	Kewanee Oil Co.	.5
210.	John R. Evans & Co.	.1
211.	MacAndrews & Forbes	3.
212.	RCA Corp.	12.7
213.	C.F. & I. Corp. Roebling Plant	8.2
214.	P.S.E. & G. Co. Burlington Sta.	382.7
215.	Stephen Chemical Co.	.3
216.	Champale, Inc.	1.2
217.	P.S.E. & G. - Mercer Generator	550.6
218.	Trenton City	37.6

N.J. Industrial and Municipal Discharges[4]

300.	Texaco Eagle Point Plant	N/A
301.	Essex Chemical Corp.	N/A
302.	Exxon Co.	N/A
303.	Sun Oil Co.	N/A
304.	Mobil Oil	15.84
305.	Monsanto Corp.	N/A
306.	Texaco Inc.	N/A
307.	Hess Oil & Chemical	.0005
308.	Georgia Pacific Co.	2.
309.	City Service Oil Co.	N/A
310.	N.J. Zinc Co.	N/A
311.	Phillips Petroleum Co.	N/A
312.	Harshaw Chemical Co.	.005
313.	GAF Corp.	.20
314.	RCA Corp.	N/A
315.	MacAndrews and Forbes Industries	N/A
316.	Camden City Main Plant	3.6
317.	Stephen Chemical Corp.	N/A
318.	Warner Co.	N/A
319.	Roebling Steel	N/A
320.	Griffin Pipes Product Co.	.40
322.	Hercules Inc.	.144
323.	U.S. Pipe & Foundry Company	N/A
324.	Public Service Elec & Gas	N/A
325.	Tenneco Chemicals Inc.	.40
326.	Airco Industrial Gases	N/A
327.	Airco Industrial Gases	N/A
328.	Beverly Sewerage Auth.	.690
329.	Cinnaminson Sewerage Auth.	1.7
330.	Borough Riverton	.210
331.	Boro of Palmyra	N/A
332.	Gulf Oil Co.	N/A
333.	Public Service Elec. & Gas	.088
334.	City of Trenton	20.

1. DRBC, "Report on Surface Water Withdrawals, 1972" (unpublished). Numbers in parentheses are from "Areawide Wastewater Treatment Management Plan Inventory", Chester-Betz Engineers (in process).
2. CBE Inventory.
3. DRBC.
4. NPDES permits, 1975.

most of Delaware County. Also, any wastes not assimilated in upstream tributaries will, in the natural course of events, be carried into the tidal Delaware. Clearly, the Delaware River is a major resource for disposal and assimilation of municipal wastes.

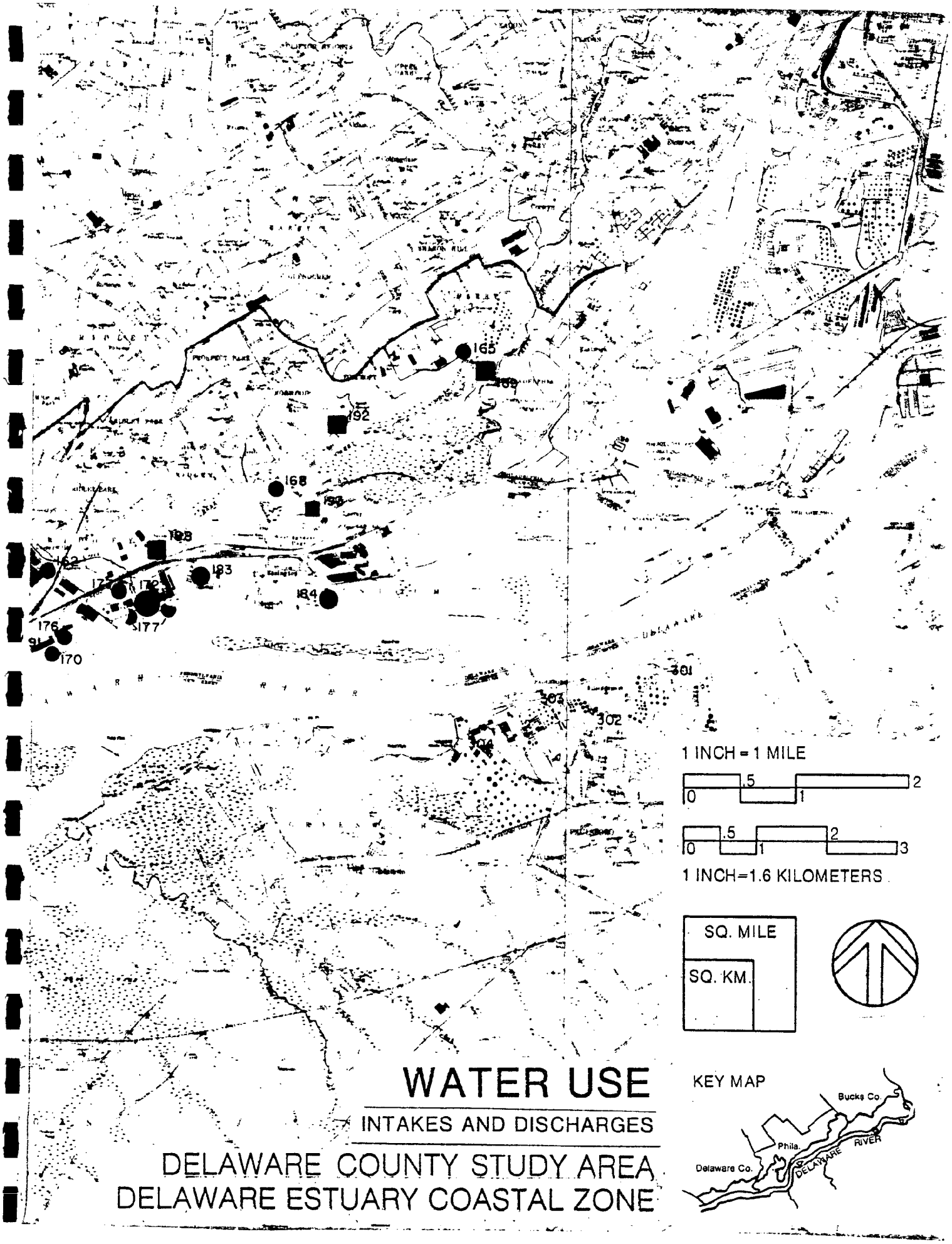
Besides municipal dischargers, the Study Area has numerous industrial waste dischargers. Because water is used for a wide range of industrial processes, industrial waste products often differ greatly from domestic wastes, thereby requiring special treatment processes. Although municipal facilities often treat industrial wastes, many industries must employ their own pretreatment technology, in order to comply with state and federal regulations.

Figures i-14, i-15, i-16 indicate the location and volume of both municipal and industrial waste dischargers in the Study Area, as well as water supply intake points. Because the map does not show treatment level or type of pollutant, water quality cannot be inferred from this map. Figure i-19 lists municipal dischargers, their level of treatment and effluent volume in MGD. This figure also summarizes recommendations for each plant made in response to Pennsylvania's Act 537, the Sewage Facilities Act.

Instream Uses - Navigation -- Commercial navigation is a major instream use of water resources. Historically, water transportation is the most significant use of the Delaware River. The "Ports of Philadelphia" (including, besides Philadelphia, berths south to Wilmington, Delaware, and from Camden up to Trenton on the New Jersey side) is the largest freshwater industrial port in the world. It is the second largest U.S. port in number of vessels handled, and the third busiest seaport in the world.[36] Five thousand cargo ships were loaded and/or unloaded between Trenton and Philadelphia in 1973; and in the same year, 10.4 billion ton-miles of commercial freight traffic passed between Morrisville and Philadelphia on the Delaware. That year, the port facilities in Delaware County (primarily in the Marcus Hook - Chester City area) handled over 26 million tons of cargo.[37]

Commercial shipping, both international and domestic, is a key factor in the Study Area and region-wide economy. Over 9000 manufacturing concerns and 100,000 job opportunities are directly dependent on Port activity.

In order to maintain the instream navigational capability of the Estuary, the Corps of Engineers dredges the Delaware and Schuylkill Rivers. The Delaware is dredged to maintain a depth of 40 feet and a width varying between 400 and 800 feet as far north as Newbold Island in Bucks County. Between Newbold and Morrisville the River depth is maintained to 35 feet. The Schuylkill River is dredged to depths between 26 and 33 feet six miles inland from its confluence with the Delaware. Above South Philadelphia, the width narrows and is only broad enough for small ships. It has been estimated that since 1836, over one billion cubic yards of dredge spoil has been removed from the Delaware River alone. Annually, about 10.5 million cubic yards



WATER USE

INTAKES AND DISCHARGES

DELAWARE COUNTY STUDY AREA
DELAWARE ESTUARY COASTAL ZONE

LEGEND

MUNICIPAL (SOME LOCATIONS ARE APPROXIMATE)

INTAKES	DISCHARGES	
□	□	0 - .99 MGD
□	□	1 - 50 MGD
□	□	OVER 50 MGD

INDUSTRIAL (SOME LOCATIONS ARE APPROXIMATE)

○	○	0 - .99 MGD
○	○	1 - 50 MGD
○	○	OVER 50 MGD
	○	NO DATA

OUTSIDE STUDY AREA

SOURCES. PA. INDUSTRIAL & MUNICIPAL INTAKES: DRBC PERMITS, CHESTER-BETZ ENGINEERS.
INDUSTRIAL & MUNICIPAL DISCHARGES: CHESTER-BETZ ENGINEERS.

N.J. INDUSTRIAL & MUNICIPAL INTAKES: DRBC.
INDUSTRIAL & MUNICIPAL DISCHARGES: NPDES PERMITS.

Figure i-15

WATER USE - INTAKES AND DISCHARGES - PHILADELPHIA COUNTY STUDY AREA

1" = 1 mile

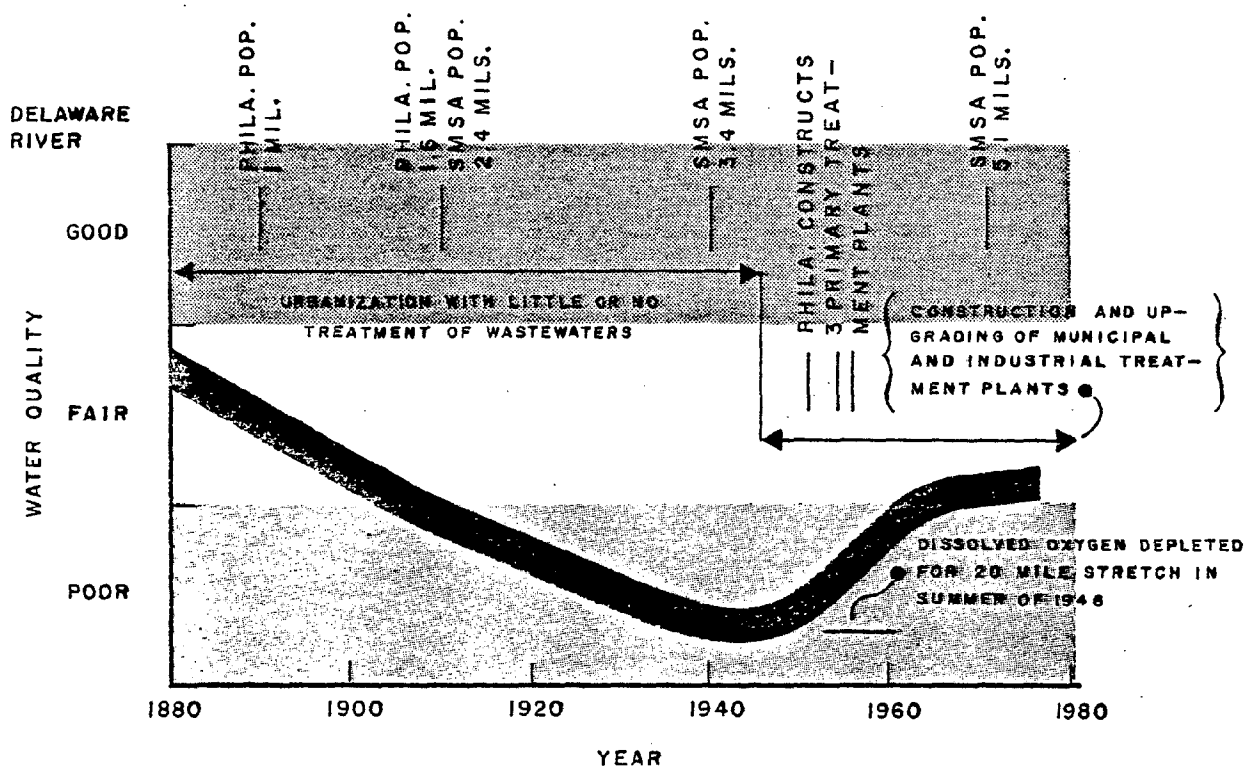
Figure i-16

WATER USE - INTAKES AND DISCHARGES - BUCKS COUNTY STUDY AREA

1" = 1 mile

Figure i-17

GENERALIZED TREND IN WATER QUALITY IN THE DELAWARE ESTUARY



Source: "Chapter VI,...Quality," Chester-Betz Engineers, 1975.

Figure i-18

Four Major Water Quality Problems and Their Primary Causes

Problems	Primary Causes
Dissolved oxygen depletion	Municipal and industrial discharges, algea respiration, urban/suburban runoff, benthic deposits
High ammonia levels	Municipal discharges, benthic deposits
High phosphate and nitrate levels	Municipal discharges, urban/suburban runoff, agricultural runoff
High concentrations of heavy metals	Acid mine drainage, industrial discharges, municipal discharges receiving significant industrial loads.

Source: "Chapter VI, ... Quality," Chester-Betz Engineers, 1975.

Figure i-19

Municipal Sewage Treatment Plants in the Study Area

FACILITY	TREATMENT LEVEL	MGD	ACT 537 RECOMMENDATION
Bucks			
Bristol Boro STP	Secondary	1.4	Expand 1980 (under construction)
Bristol Twp WPCP	"	1.8	Expand 1980
Levittown WPCP	"	8.7	No Change
Morrisville Wastewater Treatment Facility	"	2.78	Expand 1980 (under construction)
Twp Falls TPCP	"	2.3	No change
Philadelphia			
N.E. WPCP	Intermediate	195.	Expand & Upgrade 1980
S.E. WPCP	Primary	127.	Expand & Upgrade 1980
S.W. WPCP	Primary	139.	Expand & Upgrade 1980
Delaware			
Marcus Hook STP	Primary		
Central Del. Cty. Auth. TP	Primary		
Darby Crk STP	Secondary		
Delcora Chester	Primary (Secondary Under Construction)	10.3	Expand & Upgrade 1976, 1989, 1999, 2000
Eddystone Boro WTP	Primary	.2	Phase out by 1976
Muckinpates STP	Secondary	5.75	Phase out by 1981
Tinicum Twp STP	Secondary	.83	Phase out after 1981

Source: Chester-Betz Engineers questionnaires

of sediment are dredged from the Delaware, Schuylkill, and Christina Rivers.[38]

In addition to channel dredging, six deep water anchorage areas are maintained on the Delaware away from through traffic. Each of the anchorage sites is 40 feet deep. Three of these, Five-Mile Point, League Island and Thompson Point, are natural deep water areas; League Island and Thompson Point, are natural deep water areas; the Port Richmond anchorage has not needed dredging in recent years; but two anchorages, Marcus Hook and Mantua Creek, require continued dredging due to chronic shoaling from upstream sediment loads. Four or five 500 foot ships can anchor simultaneously in any one of the anchorage areas. Figures i-20, i-21, i-22 show the areas dredged and the location of the anchorage sites.

Within Philadelphia, there are fifty general use pier facilities with the capability of handling liquid bulk, bulk, containerized, refrigerated and roll on/roll off cargo. The riverfronts of Bucks and Delaware Counties generate only private industrial water traffic; industries import crude goods and ship products from their own facilities. Petroleum products constitute the greatest share, by far, of cargo handled in the Delaware Estuary.[39]

Instream - Recreation -- The volume of commercial shipping is a limiting factor for recreational use of Delaware River water resources. Water recreation includes fishing, boating, bathing, and sightseeing. Recreational use of the River is governed by water quality, by access to the water and by the extent of waterfront parkland. All three factors are limited in the Study Area. Poor water quality bars use of the River for bathing, and the highly urbanized character of much of the Study Area has traditionally restricted public access.

There are 23 marinas, including private and restricted facilities, in the Study Area. The great majority of boaters wishing access to the Delaware within the Study Area are dependent on the three public boat launching ramps. Locations of marinas and boat ramps are indicated on Figures i-20, i-21, i-22.

An instream use of water resources which enhances recreational opportunities is fish and wildlife propagation and management. A 1972 summer and early fall collection of fish in the Estuary within the Study Area counted twenty-eight different species.[40] The Estuary is especially important to anadromous fish which live most of their lives in salt water and ascend fresh water streams to spawn.

Fish, particularly shad, had a substantial economic importance in the nineteenth century. In 1896, nearly 20 million tons of shad were netted and 21 million tons of oysters were collected. Between 1900 and 1920, shad, oysters and many other commercial species virtually disappeared from the Estuary (Figure i-23). Pollution, dredging, sedimentation and dams destroyed spawning areas as well as feeding grounds of many fish. In recent years, some commercial species have begun a comeback, although in limited numbers.[41]

Figure i-20

WATER USE - CHANNELS, ANCHORAGES AND MARINAS - DELAWARE COUNTY STUDY AREA

1" = 1 mile

Figure i-21

WATER USE - CHANNELS, ANCHORAGES AND MARINAS - PHILADELPHIA COUNTY STUDY AREA

1" = 1 mile

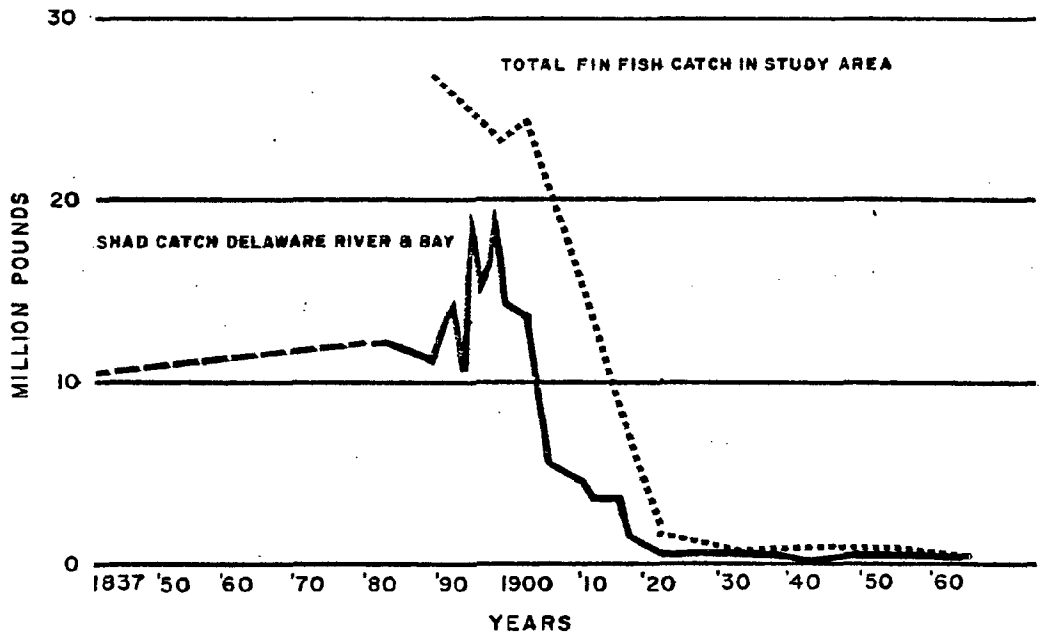
Figure i-22

WATER USE - CHANNELS, ANCHORAGES AND MARINAS - BUCKS COUNTY STUDY AREA

1" = 1 mile

Figure i-23

FISH CATCHES IN THE DELAWARE RIVER
1850—1965



Source: U.S. Department of the Interior, Federal Water Pollution Control Administration, Delaware Estuary Comprehensive Study (July 1966) p. 50

Over 250 species of birds are known to nest or migrate through the Delaware Valley.[42] Within the Study Area, Tinicum Marsh in Delaware County is the main stopover and nesting site for waterfowl. Tinicum Marsh and other wildlife areas, including Little Tinicum Island, Biles Island and the Warner Lakes area, are discussed in a separate indepth report, "Four Environmentally Sensitive Areas," produced in conjunction with the Coastal Zone Management study.

FOOTNOTES

1. Federal guidelines were published in the Federal Register on November 29, 1973 (15CFR 920) and August 21, 1974 (15 CFR 923). See also Report No. 94-1298, available from the U.S. Government Printing Office, for a report on Senate Bill 586, the 1976 amendments to the Coastal Zone Management Act.

2. Joseph Oberman and Stephen Kozakowski, History of Development in the Delaware Valley Region, (Philadelphia, Delaware Valley Regional Planning Commission, 1976), p.103.

3. Ibid., p.14.

4. Ibid., p.13.

5. Ibid., p.16.

6. Ibid., p.31.

7. Ibid., p.58.

8. Ibid., p.59.

9. Ibid., p.69.

10. Ibid., p.105.

11. Except where noted, the data used to provide this summary is from Characteristics of the Population of Pennsylvania, U.S. Department of Commerce, Bureau of the Census, 1970.

12. "Delaware Valley Data: 1974 Population Estimates for the Delaware Valley Region," (Philadelphia, Delaware Valley Regional Planning Commission, October 1975); these reported estimates were formulated by the National Planning Data Corporation, Ithaca, New York.

13. Data is from the 1970 Census.

14. Census Data for families with income below poverty level is based on Thresholds derived from a number of variables, including family size, sex and age of family head, and number of dependents. For example, the U.S. Census Bureau poverty cirterion for a family of four with a male head is $3,745 per year.

15. Information on employment is drawn from the "1970 Socio-economic, Employment, and Land Use Data by Census Tract for the Nine County Delaware Valley Region," D.V.R.P.C. computer files, updated 1975. This data is not drawn from U.S. Census information, which gives employment figures for persons residing in each census tract, but is based on figures for total number of employees working in a census tract, regardless of place of residence. With this method

(employment by place), figures are a function of the concentration and intensity of local industries and commerce.

16. DVRPC's twelve employment categories have been grouped for mapping purposes into five representative categories.

17. This information is derived from reports issued by the Pennsylvania State Employment Service, Bureau of Employment Security, Department of Labor and Industry. Reports for January and February 1976 and preliminary estimates for March 1976 are reflected here.

18. "Delaware River Corridor Study, "(Media, Pennsylvania, Delaware County Planning Commissions, 1976), pp. 3-5.

19. Nagle, John, Riverfront Development Study (Philadelphia, Philadelphia City Planning Commission, 1974).

20. Ibid.

21. The Delaware River Basin: An Environmental Assessment of Three Centuries of Changes, (Washington, D.C., Council of Environmental Quality, 1975).

22. Paul R. Kiry, An Historical Look at the Water Quality of the Delaware Estuary to 1973, (Philadelphia, Academy of Natural Sciences of Philadelphia, 1975), p.10.

23. David W. Greenman, et al, Groundwater Resources of the Coastal Plain Area of Southeastern Pennsylvania, Bulletin W-13, (Harrisburg, Topographic and Geologic Survey, Pennsylvania Department of Internal Affairs, 1961), p.3.

24. "Chapter VI, Existing Water Use and Quality," Comprehensive Water Quality Plan, Lower Delaware and Schuylkill River Basins, (Plymouth Meeting, Pennsylvania, Chester-Betz Engineers, 1975), p.VI-B200.

25. Water Management of the Delaware River Basin, (Trenton, N.J., Delaware River Basin Commission, 1975), p.I-43.

26. "Chapter VI, ... Quality," op. cit., pp. VI-B-186 to VI-B-200, summarizes water quality data from various sources of information.

27. Groundwater Resources of the Coastal Plain Area of Southwestern Pennsylvania, D. W. Greenman, D. R. Rima, W. N. Lockwood and H. Meisler. Commonwealth of Pennsylvania, Department of Internal Affairs, Topographic and Geologic Survey, 1961.

28. Officials at the Eddystone power plant estimated, in reply to a 1975-1976 questionnaire submitted by Chester-Betz Engineers, that the latest discharge figures are 1442.5 million gallons per day, as of 1971. The Delaware River Basin Commission estimated that

this facility consumes 0.7% of its withdrawals, suggesting that the intake rate would be about 1453 million gallons per day.

29. Water Management of the Delaware River Basin, (Trenton, N.J., Delaware River Basin Commission, 1975), p. 1-40. About 30 MGD, however, are imported into the Study Area from the Octoraro Creek in the Susquehanna Basin.

30. "Chapter VI, ... Quality,: op. cit., p.VI-13.

31. Ibid., p. VI-18.

32. The Delaware ... Change, op.

33. "Chapter VI, Quality," op. cit., p. VI-51.

34. Kiry, op. cit., p. 27.

35. Information in the remainder of this section was derived principally from, "Chapter VI, ... Quality," (Chester-Betz Engineers), op. cit.

36. Adam Tait, Ed., Bulletin Almanac, (Philadelphia, The Evening and Sunday Bulletin, 1976) p.417.

37. For additional information on marine transportation refer to Delaware Valley Transportation Facts and Facilities, annual editions, (Philadelphia, Penjerdel Corporation, 1975).

38. Final Composite Environmental Impact Statement, Project Maintenance, (Philadelphia, U.S. Army Engineer District, 1975), p.1-4.

39. For a recent analysis of the present and projected role of petroleum in the Port of Philadelphia refer to Oil Port UPdate, (Philadelphia, The Penjerdel Corporation, May 1975).

40. Kiry, op. cit., Table 8, for combined samples from Marcus Hook, Pa., and Florence, N.J.

41. The Delaware ... Change, op. cit.

42. Environmental Overview Statement for the Delaware Valley Region, (Philadelphia, Delaware Valley Regional Planning Commission, 1976).

LAKE ERIE COASTAL ZONE

Lake Erie has traditionally been the dominant force behind the development of the Erie County coastline. Early development resulted from the military significance of a harbor on the Great Lakes which provided access to the North Atlantic and was within a single day's journey from the headwaters of the Allegheny River system, a system which led to the Ohio River and the entire center of the North American continent. Long after its military significance ended this transportation system became the region's doorway to commerce and industry. The small port of Erie soon became a bustling center of trade because of easy ties with the other Great Lakes communities and with Pittsburgh through the Erie Canal System.

The Lake Erie Coast has caused the occurrence of a diverse development pattern in the coastal area. The coastal zone, which originally served as a strategic outpost to protect north-south trade and traffic, soon became part of a major arterial for east and west bound travelers who were bypassing the Lake Erie barrier. Thus the Lake, by serving as both an access route and a transportation barrier, initiated settlement of the port of Erie and other coastal communities as centers of trade. The intersection of access routes soon enticed industrial development which was accompanied by growth in population.

Today, as in the past, the Erie County Coastal Zone, is strongly influenced by its proximity to Lake Erie (see Figure i-24). The coastal study area, continues to attract diverse development. The Lake offers recreational opportunity to the public, particularly where access to the water is available. The Presque Isle Peninsula and a limited number of local public and private areas serve as access points along the coastal zone. Lake Erie is also a major source of water for both household and industrial users. This almost unlimited supply of water has encouraged recent siting proposals for both a major steel producing facility and a major power generating plant within the coastal zone. In addition, the climatic effect of Lake Erie affords the shoreline area an extended growing season and permits the production of special cash crops, such as grapes and other orchard crops, another extremely valuable economic resource.

Thus the Lake Erie coastal zone resources are greatly in demand. This demand is reflected by the variety of uses which the coastal lands can accommodate and indicates the need for special emphasis upon a balance between existing and proposed economic uses, as well as the need for preservation of the many significant environmental aspects of the coastal area.

SOCIO-ECONOMIC CHARACTERICTICS

Historical Background - The first European settlers in the Erie area were by the French, who, after years of expeditions built Fort Presque Isle and Fort LeBoeuf in 1753 for the purpose of protecting

Figure i-24

LAKE ERIE COASTAL ZONE LOCATION MAP

1" = 2 miles

the portage route between their St. Lawrence and Mississippi colonies.[1] This route was part of a supply chain between their major fortifications at what are now Pittsburgh and Buffalo. After these latter two fortifications were destroyed by the British, during the French and Indian War, withdrew from the region entirely in 1759. A year later the British arrived and reconstructed the two Erie County forts, but these too were destroyed in June, 1763 by an Indian uprising known as Pontiac's Conspiracy. White men did not settle the region until 1794-95 when American troops reconstructed these same two forts. Immediately thereafter the towns of Erie and Waterford were surveyed and layed out by General Andrew Ellicot who also planned the layout of Washington, D.C. Settlers, encouraged by land companies, began arriving in the late 1790's. The U.S. Census records the 1800 population of the town of Erie at 81 persons.[2]

Erie was one of the few American settlements on Lake Erie when the War of 1812 broke out with Great Britain. Its strategic importance became apparent, as naval control of Lake Erie would determine the fate of the Northwest Territories. With a population totaling about 400 people, the Borough of Erie became the shipyards for the American fleet. From the autumn of 1812 until August of 1813 the fleet was constructed in Presque Isle Bay. The Battle of Lake Erie occurred on September 10, 1813 with the resultant defeat of the British.

The development of the County continued at a steady pace after the war from 3,758 people in 1810 to 31,344 in 1840. This growth was aided by various improvements in transportation. The federal government dredged and improved the Erie harbor and in 1844 the Erie Extension Canal was completed, providing cheap transportation to the Pittsburgh region. This link in the Pennsylvania canal system remained in use until 1871, by which time the railroads had replaced it. By 1860, the port at Presque Isle was an active part of a flourishing lake trade. Locally owned schooners were engaged in the profitable enterprise of carrying agricultural products, raw materials for manufacturing plants, and finished products. More than 600 ships cleared the port in 1860 with total cargoes of 600,000 tons.[3] Despite the demise of the Extension Canal, port traffic increased steadily with 3.9 million tons of cargo passing through the port in 1890.

By the 1890's, Erie County with a population approaching 100,000 people, was a flourishing agricultural and manufacturing center. Apples, a new commodity, began to rival the cereals, grains, potatoes, livestock, and dairy products which predominated in the mid-1800's. Foundry and machine shops gained dominance among Erie's manufacturing industries and maintained this position well into the twentieth century. The principal manufacturing products included machinery, steam engines and metal products.

Commercial fishing, a third activity of substantial consequence in the development of Erie County, emerged in the mid-nineteenth century. Whitefish, salmon, trout, and sturgeon were among the main fish commodities netted by a fishing industry which rose steadily during the 1890's and peaked during the 1910's and 1920's. Employing

500 men, and operating 20 steam and 14 sail craft, the fishing industry represented an investment of $250,000 in 1893.[4] The more valuable species disappeared as a result of pollution in the Lake, and overexploitation of fishing stocks, resulting in the fishing industry decline to the present low point.

Between 1890 and 1920 the number of manufacturing establishments declined sharply. However, capital investment, number of employees, wages and salaries, and value added by manufacturing activity all rose sharply. The decline in number of establishments reflected the national trend toward concentration, and the growth of activity was, in part, the result of the stimulation of manufacturing during World War I.

The growth in manufacturing overshadowed the decline in the significance of agriculture in the decades after 1890. The number of farms, acreage and farm employment gradually declined in each decade. The value of land and buildings doubled between 1900 and 1920 and declined by the same proportion in the next two decades. Similarly, the value of farm products rose from $3.7 million in 1900 to $12 million in 1920, but declined to $5.9 million in 1940.[5] Only the steady growth of orchard produce countered an otherwise dark picture for agriculture.

The base of the Erie County economy had clearly been transformed with manufacturing industries assuming dominance. By the late 1920's many of Erie County's current major industries were established, including the General Electric Company, Hammermill Paper Company and numerous foundries. It was in this period that the expansion of manufacturing activity provided Erie with a reputation for the remarkable diversification in products that characterized its industrial base. These industries also induced population growth. From 1900 to 1930 the population grew from just under 100,000 to 175,277 people. Nearly half of this 78% increase in growth occurred in the dacade from 1910 to 1920.

World War II again increased Erie County's manufacturing significance. The resurgence in industrial activity during the war and the high consumer demand in the following years increased the population between 1940 and 1960 by over 38% from 180,889 to 250,682 people. During the 1960's and through the mid-1970's the County-wide population has continued at a slower growth rate. Most of this reduced rate of growth can be attributed to the outmigration which has affected western Pennsylvania as a whole.

The diversification of manufacturing and the resultant availability of jobs has continued to keep Erie County growth ahead of the State average and on par with the U.S. average. The County population has increased 168% from 1900 to 1970.[6] This compares with a 167% national growth rate and only an 87% growth rate in Pennsylvania. From 1960 to 1970, however, Erie County has grown by only 5.2%. This growth was significantly below the national 13.3% growth rate, but managed to outstrip the Commonwealth's growth rate which was only 4.2%.

Thus, the Erie area has established itself as a mid-sized and diversified manufacturing center providing expanded employment opportunities for a steadily growing community. Its location on Lake Erie adjacent to the Presque Isle Peninsula provided he initial impetus for this growth, and continues to offer an additional economic bonus as a center for tourist trade during the summer months.

Socio-economic Resources - The Erie Metropolitan area is characterized by an abundance of man-furnished resources which effectively serve to meet the requirements of the region's population. Such resources include a variety of public services such as water supply and waste disposal, power generation and distribution systems, and a transportation network including three major railroads, a port open to Great Lakes and worldwide shipments, and a complete highway arterial system linking Erie with other urban centers as well as its own rural hinterlands. Such services as these draw industry and commerce to the area, offering jobs to existing residents and attracting additional individuals in search of employment. The significant number and variety of manufacturing and commercial establishments in the Erie area supports the existence of a skilled labor force, which in turn makes use of the public services indicated above.

The concentration and diversity of economic activities along the coast and throughout the remaining metropolitan area provides the need for and consequent support of amenities such as colleges, libraries, social services, and the performing arts. Numerous recreational facilities, too, have been made available for use as part of the local and regional tourist trade.

Lake Erie has substantially influenced man's use of the shoreline for his own purposes. These uses have resulted in a variety of socio--economic resources which will continue to serve the needs of area residents.

Population - One indication of the socio--economic character of the Preliminary Study Area is population, density and growth (see Figures i-25 and i-26). Also significant are financial characteristics such as median family income and families with income below the poverty level. This information has been summarized, where possible, in chart and map form in order to save space and simplify presentation.[7]

The Preliminary Study Area population, which in 1970 was 214,157, is 1.8% of the total population of Pennsylvania, although comparatively, this Study Area is only .5% of the Commonwealth's area. The number of people per square mile ranges from 182 in the Western Study Area to 263 in the Eastern Study Area to a substantially higher figure of 3,221 people per square mile in the Central Study Area. The entire Preliminary Study Area supports an average number of 903 people per square mile.

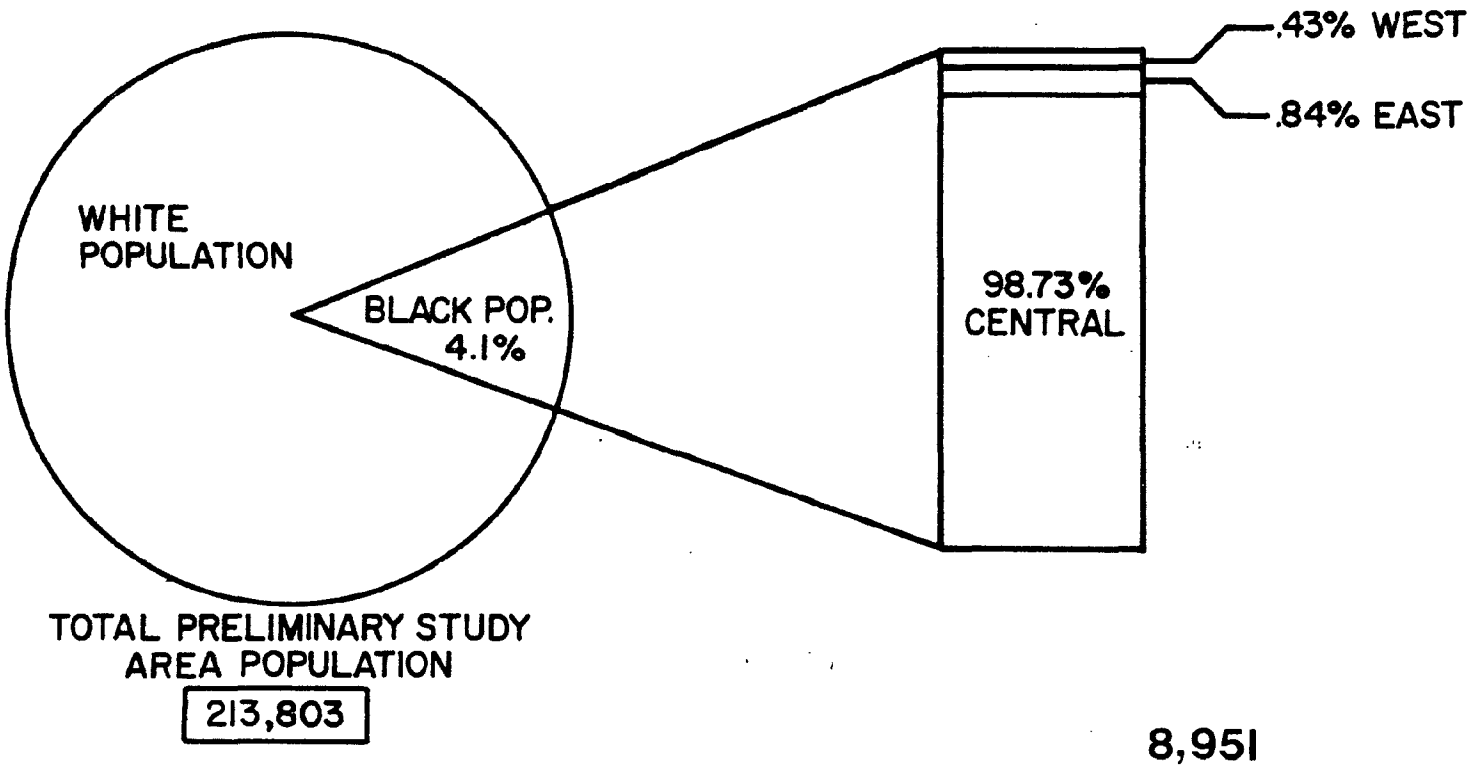
The 1975 Preliminary Study Area population was 215,863, up .8% from the 1970 population figure. This modest increase occurred solely in

Figure i-25

POPULATION BAR MAP

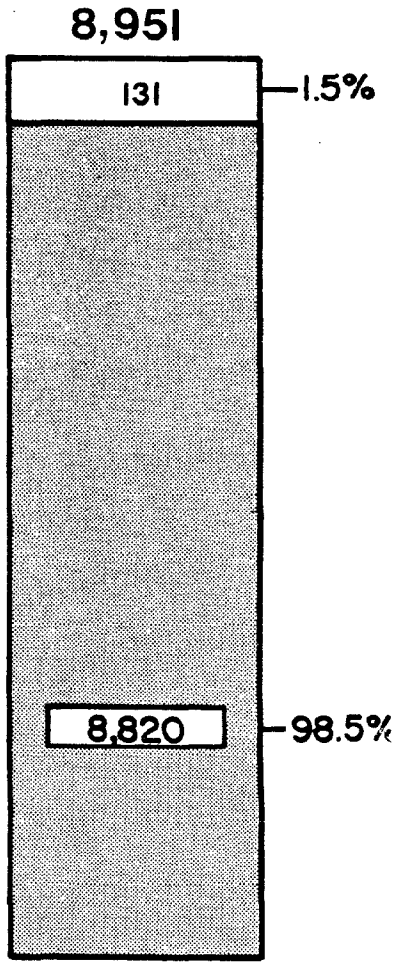
1" = 2 miles

BLACK POPULATION DISTRIBUTION IN PRELIMINARY STUDY AREA 1970



BLACK POPULATION IN ERIE COUNTY

(SHADED AREAS REPRESENT PERCENTAGE OF BLACKS LIVING IN STUDY AREA)



the West and East Study Areas which had an 11.3% and a 7% growth rate, respectively. The Central Study Area lost slightly over 1% of its population. The substantial growth within Millcreek Township did not balance the outflow of people from Erie City proper. Both Lawrence Park and Wesleyville accommodated a growth rate of about 5% and both communities are now densely developed.

The 1975 population of the Western Study Area was 21,326 or 9.9% of the entire Preliminary Study Area. Within the Central region resides a population of 172,754 or 80.0% of the population within the preliminary coastal boundary. The Eastern Region accounted for 10.1% of the Preliminary Study Area population or 21,783; a figure nearly identical to the Western Study Area.

The median income in the Preliminary Study Area was $9479 for 1970, somewhat higher than the County median income of $9363 (see Figure i-27). The Central Study Area accounted for the lowest median income of the three study areas. This figure was $9388, slightly higher than the County's figure. The more suburban East and West Study Areas had $9579 and a $10,182 incomes, respectively.

In 1970, 3546 families in the Preliminary Study Area were classified as having an income below the poverty level. This figure amounts to 6.6% of all families in this region. The Central and Eastern Study Areas had 6.8% of their families below the poverty level. In contrast, the Western Study Area had only 4.4% of its families below the designated 1970 poverty line. No significant concentration of poverty level families exists in the Preliminary Study Area. The City of Erie does have 2,475 families below the poverty level which accounts for 70% of the Preliminary Study Area total. Compared to the number of families residing in the City, however, only 7.7% exist at a lower than poverty level income.

Employment - In 1970, the Preliminary Study Area was the location of employment for 81,202 people or about 82% of Erie County's employed labor force. Over 66,000 of these jobs were within the Central Study Area. The East and West Study Areas employed about 7,800 and 6,700 people respectively. Due to the similarities of employment statistics in the East and West Study Areas, most of the employment figures for these two regions have been combined in the following write--up for an easy comparison with Central Study Area employment percentages[8]

Employment statistics have been divided into six categories of study (see Figure i-28). The largest category, manufacturing and construction, employed an overall average of 45.5% of the employed labor force in the Preliminary Study Area. The Central Study Area was slightly below this percentage with 44.7% of its working population employed in either manufacturing or construction. An average of 49.2% of the East and West Study Area's work force was designated as having employment under this classification.

Finances, Services and Public Administration was the second largest field of occupation in 1970. A total of 28.1% of the Preliminary

Figure i-27

MEDIAL FAMILY INCOME

Figure i-28

STUDY AREA EMPLOYMENT STATISTICS

Study Areas was employed in this category. The Central Study Area had a toal of 29.3% of its employed labor force in this classification compared with an average of only 22.6% in the remaining Study Areas. These percentages indicate the greater availability of service oriented jobs in the more urban Central Area municipalities.

The third largest occupational category, Wholesaling and Retailing, employed 18.7% of the working labor force in the Preliminary Study Area. This figure breaks down into 19% of the Central Study Area employed labor force and an average of 17.3% of the same force in the East and West Study Areas.

The forth employment category, Transportation and Communication, contains almost 5.6% of all employed individuals in the Preliminary Study Area. The Central Study Area figure is slightly over 5.6% of the total employed population and the East and West Study Areas average 5.3% of the total employed for this same category. Unlike the other employment categories mentioned so far, the East and West Study Areas do not have a similar proportion of employed in the Transportation/Communication category. Only 3.7% of the East Area is employed in these fields while 7.1% of the working labor force in the West Area is employed in this field. The number of transportation and communication employees in Springfield Township and East Springfield Borough amounts to over 15% of both municipalities' employed labor force, and this number, in turn, increases the Western Study Area average as well. This high percentage is probably due to the number of individuals who work at both the port facilities in Conneaut, Ohio, and the Bessemer and Lake Erie Railroad yard near Albion Borough and live in the Springfield area.

The fifth employment category is Agriculture. A total of .8% of the Preliminary Study Area's employed labor force is classified as farm laborers. Only .2% of the Central Study Area work on farms. The Western Study Area has 2.6% of its employed labor force classified as being agriculturally employed and the Springfield Area, with slightly over 5% of its employed populace classified in this category, pulls up the Western average for this classification. The Eastern Study Area has an average of 4.8% of its employed labor force working on farms. This high average is due to an agricultural labor force totaling nearly 17% of North East Township's population. The production of vineyard and orchard produce is thus, an activity of significant economic value.

About 1.3% of the remaining Preliminary Study Area labor force are employed in job classifications other than those mentioned above. This is an average of 1.2% of the Central Study Area's employed labor force and 1.8% of the same force in the East and West Study Areas.

<u>Unemployment</u> - the following write--up has been based on acquired statistics for the years 1970,1975 and 1976. It is interesting to note that Erie County has generally followed a similar pattern to the national trend during the 1970's, one which has been greatly affected

by both a major recession and the maturation of the post World War II "baby boom".

In 1970 Erie County had a labor force of 98,722. With 4,200 unemployed, the rate of unemployment totaled 4.3%. The Preliminary Study Area had a labor force of 81,202 with 3,474 unemployed, also a 4.3% unemployment rate. Through figures which were obtained for each municipality, the unemployment rate for the West, Central and East Study Areas was calculated at 8.5%,4% and 3.2%, respectively.

By 1975, the Countywide labor force had risen to 120,700, a 22.3% increase over 1970 and the unemployment rate had reached 9.0%. The City of Erie had a 59,916 labor force and with 5,422 out of work, also had a 9.0% unemployment rate. The remainder of the County had a labor force of 60,784 and also a 9.0% rate of unemployment.

In 1976, the Countywide labor force had reached 121,600 or a rise of .75% over the previous year and the rate of unemployment had dropped to 8.6%. The City of Erie's labor force was 60,362 and, with 5,223 out of work averaged an 8.7% rate of unemployment. The remainder of the County had a labor force of 61,238 and an unemployment rate of 8.6%.

LAND USES AND RESOURCES

Introduction -- The Preliminary Study Area of the Lake Erie Coastal Zone covers the entire range of man's utilization of land from intensely urban developed areas to completely undeveloped natural areas. The various land use patterns within this coastal area are noted on the Existing Land Use Maps (Figures i-29, i-30 and i-31). Land use information has been compiled from aerial photos and is based on 1975-76 data.[9] These maps should provide the visual reference needed to comprehend the current land use situation in the Lake Erie Coastal Zone.

The following inventory is based on fourteen categories of land use:

1. single family detached residential
2. multiple unit residential
3. seasonal dwellings
4. manufacturing
5. transportation
6. communications and utilities
7. commercial, wholesale and retail
8. community services (institutions)
9. military
10. recreational and cultural
11. agricultural
12. mining
13. forests and undeveloped land
14. water areas

Figure i-29

EXISTING LAND USE - WESTERN STUDY AREA

1" = 1 mile

Figure i-30

EXISTING LAND USE - CENTRAL STUDY AREA

1" = 1 mile

Figure i-31

EXISTING LAND USE - EASTERN STUDY AREA

1" = 1 mile

Western Study Area -- Residential land use in the Western Study Area is almost exclusively devoted to single family homes. A few areas of cottage development occur along the lakeshore at points having easy access to the water's edge. Developmental patterns center around the boroughs and otherwise are spread out along local roads. The highest concentration of urban-related land uses exists in an area east of Elk Creek and north of Interstate 90. Most of this region is still predominantly agricultural, forested or undeveloped land but developmental pressures are intensifying. The several major single family subdivisions which have recently been constructed are evidence of a development trend which is in its early stages. The remaining lands in the Western Study Area are at a very low stage of development and probably rank among the least developed areas along the southern shore of Lake Erie. The initiation of a major U.S. Steel Corporation industrial complex would dramatically alter the rural character of much of this area.

Chart i-32 categorizes the land uses of the Western Study Area by acreage and percent and indicates the rural character of this region:[10]

Central Study Area -- The Central Study Area is the most densely developed area of the Lake Erie Coastal Zone. Residential and other urban related land uses predominate in this region. Portions of this region still remain largely undeveloped, specifically Presque Isle State Park, and the southeast and southwest corners of Millcreek Township. A significant amount of Millcreek's lakefront also remains sparsely developed. Development of this Township is occurring at a continuing, if not accelerating pace.

The City of Erie, Lawrence Park Township and Wesleyville Borough are entirely urbanized, except for a minor area in the southeast corner of the City of Erie and the many public parks located in these communities. One other large undeveloped area is the Lawrence Park Golf Course, a 147.2 acre parcel located along the lakefront in Lawrence Park Township.

Chart i-33 categorizes the land uses of the Central Study Area by acreage and percent:[11]

Eastern Study Area -- The East Study Area consists primarily of prime agricultural and undeveloped lands, much like the land use pattern in the West Study Area. The difference between the study areas lies in the type of agricultural activity which occurs. Unlike the dairy farming which predominates in the West, the Eastern Study Area is best suited for vineyard and orchard produce. As one travels south of Interstate 90 the major land use activity gradually changes to dairy farming and undeveloped land.

Two principal urban areas exist in the Eastern region. The western half of Harborcreek Township accomodates much of the exodus from the City of Erie. The urban pattern which has developed thus far is one in which the residential areas have branched out into the Township

Figure i-32

LAND USE CHART - WESTERN STUDY AREA

Figure i-33

LAND USE CHART - CENTRAL STUDY AREA

along its principal access routes, leaving large blocks of undeveloped and agricultural areas within their midst.

Northeast Borough is a second urban concentration within the Eastern Study Area. Some residential growth has begun to extend into North East Township along the lakeshore and along access routes, but, thus far, the high cost of vineyard land has retarded major urban expansion.

Chart i-34 categorizes, by acreage and percentage, the land uses of the Eastern Study Area:[12]

Land Resources -- Land resources have been divided into two categories, areas having beneficial natural features and areas where natural restrictions place limitations on development. Both of these resource categories have been mapped (Figures i-35 through 40) to better familiarize the reader with the more significant natural functions of the Lake Erie Coastal Zone.

In this presentation natural features include forested lands, flood plains and wetlands, and agricultural lands. Forested lands provide numerous recreational, aesthetic and economic benefits which suffer from poorly regulated use. Likewise the destruction or deterioration of woodlands negatively affects the ability of forests to moderate climatic phenomena, flooding and high winds, siltation of watersheds and erosion. The forest floor also acts as a filter to water percolating into groundwater reservoirs, and the forest itself can improve air quality by absorbing some air pollutants.

Within the preliminary boundary of the Lake Erie Coastal Zone, one-third of the total acreage of this region is designated as open or undeveloped land. Most of this land is forested or in the process of reforestation. Thus the very amount of forested land indicates the significance of this natural resource.

Flood plains have been determined and mapped according to the U.S. Department of Housing and Urban Development designated 100 year flood plain.[13] Flooding is by no means an unnatural phenomenon; it occurs regularly to some extent in all streams during periods of heavy precipitation and melting. An increase in impervious structures, such as roads and buildings, concentrates runoff through the storm sewer systems and increases the runoff entering streams. Impervious structures inhibit the infiltration of water into the soil while storm sewer systems transport the runoff much faster than natural drainage patterns.

Flooding in the Lake Erie Coastal Zone is usually minimal. The lack of developed areas adjacent to local streams and creeks is the reason for this phenomenon. This is not to say that flooding does not exist, but rather that flooding cannot damage structures and property which are not located within a flood plain.

Destruction of property due to flooding in Erie County is more apt to occur along the Lake Erie shoreline. Much of the port and waterfront

Figure i-34

LAND USE CHART - EASTERN STUDY AREA

Figure i-35

NATURAL FEATURES - LAND RESOURCES - WESTERN STUDY AREA

1" = 1 mile

Figure i-36

NATURAL FEATURES - LAND RESOURCES - CENTRAL STUDY AREA

1" = 1 mile

Figure i-37

NATURAL FEATURES - LAND RESOURCES - EASTERN STUDY AREA

1" = 1 mile

district of the City of Erie is subject to high water damage during Lake Erie storms. These same storms also damage cottages along the shoreline by two methods; 1) by high water during storms, and 2) by erosion of the sandy soils on which many lake cottages rest.

Wetlands, too, are a local natural feature. The most noticeable wetlands occur on the Presque Isle Peninsula. Virtually all other coastal wetlands occur in the Western Study Area between the Ohio boundary and Elk Creek. The predominant cause of the occurrence of wetlands in this area is the extremely small slope (often less than 3%) and poor soil drainage conditions.

Wetlands are significant natural areas which require protection. Their benefits are many and include the protection of water quality, the retention of water during floods, and the provision of essential nesting and feeding grounds for many forms of wildlife.

Agriculture is also a significant land use activity which cannot truly be considered as a natural process, but rather as an initial stage of mankind's development. Nonetheless, agriculture has a significant impact upon natural areas and is the most natural of all forms of man-made development. Economically, it provides an important areawide income by employing a significant number of people, particularly in the Eastern Study Area. Other important aspects of agriculture include both ecologic and aesthetic values with its most obvious and significant value, being the provision of food and fiber products.

Within the Preliminary Study Area boundary, about 37% of the total land area is being farmed. As is indicated on the Natural Features Maps, agriculture has been divided into three segments for clarification purposes. These include: 1) vineyards, 2) orchards, and 3) all remaining agriculture.

Slightly over 2% of the Western Study Area is devoted to raising fruit products. The Central Study Area has no production of orchard or vineyard crops. The Eastern Study Area, however, devotes almost 33% of its acreage to fruit production. North East Township utilizes almost 53% of its entire acreage for production of fruit products alone. Thus, fruit production in much of the coastal zone ranks as the most significant farming activity.

<u>Development Considerations</u> -- A second group of natural features are those phenomena which act as limitations upon development. These include slopes of 25% or more, prime agricultural soils, soils with severe limitations for on-site septic systems, and mineral excavation sites.

Slopes of 25% or more occur throughout the Lake Erie Coastal Zone and are located along the shoreline and adjacent to the numerous streams and creeks which have cut gorges through the lakeplain en route to Lake Erie.[14] Over 85% of the Western Study Area shoreline consists of bluffs which reach heights of up to 120 feet above the water's edge. There are three principal stream systems in this area which have cut

Figure i-38

NATURAL FEATURES - DEVELOPMENT LIMITATIONS - WESTERN STUDY AREA

1" = 1 mile

Figure i-39

NATURAL FEATURES - DEVELOPMENT LIMITATIONS - CENTRAL STUDY AREA

1" = 1 mile

Figure i-40

NATURAL FEATURES - DEVELOPMENT LIMITATIONS - EASTERN STUDY AREA

1" = 1 mile

steep slopes within the otherwise relatively flat lake plain. These are Crooked Creek, Elk Creek and its tributaries of Halls Run and Little Elk Creek, and Walnut Creek.

The Central Study Area has bluffs fronting the Lake which vitually extend along the entire lakeshore and bayfront. Over 80% of these bluffs have a slope of 25% or more. Walnut Creek and Mill Creek have formed most of the remaining steep slopes in the Central region.

In the Eastern Study Area about two-thirds of this coastline consists of steep escarpments, some of which reach 170 feet above lake level. Creeks which have developed major gorges with banks having a 25% slope or higher include: Fourmile, Sixmile, Eightmile, Twelvemile, Sixteenmile and Twentymile Creeks.

Prime agricultural soils are a second phenomena which have been categorized under the "development limitations" classification.[1 5] Unlike other phenomena being discussed, prime agricultural soils do not at all limit development but rather require protection from urban development so that such soils can be continually utilized for agricultural purposes.

The most fertile soils in Erie County occur along the Lake Erie coastal plain extending the length of Erie County. In Springfield and Girard Townships, the greatest concentration of these soils occur in an area north of Interstate 90. One major exception is north of the Conrail tracks in Springfield Township. In Fairview Township there are still large blocks of prime agricultural soils immediately north of I-90 but the highest concentrations of these soils are found in a more narrow band to the north of Route 20. This pattern continues through Millcreek and the City of Erie where urban development has completely enveloped some of the largest blocks of prime agricultural soils in the coastal zone. Through Lawrence Park Township and western Harborcreek Township prime agricultural soils are limited to a strip immediately adjacent to both sides of Route 20. Beginning in eastern Harborcreek Township and extending to the New York State line is a band of prime agricultural soils from Route 20 north to the Lake.

It is an unfortunate occurrence that these soils may well become completely and irretrievably utilized for urban-related purposes before the significance of the agricultural industry which bases much of its productivity upon such soils is realized. A foresighted land management program is required to retain this essential resource as a unique agricultural area.

A third phenomenon which limits development in the coastal zone occurs where soils have severe limitations for the use of on-site septic systems. Such soils are usually composed of silt and clay which impede the percolation of materials through the soil. Within much of the East and West Study Areas, soils having limitations on standard on--lot septic systems roughly occur between an area about one mile south of Route 20 and the Preliminary Study Area boundary. In the Central Study Area soils south of 38th Street predominantly

consist of silt and clay materials which place limits on standard septic systems. Since such a large land area within the Lake Erie Coastal Zone supports soils with severe limitations for the use of on-site septic systems, only those areas supporting soils suitable for the use of on-site septic systems have been mapped.

The fourth and last phenomenon which limits urbanized development is the extraction of minerals. The Preliminary Study Area does not contain an abundance of mineral resources. There are, however, some sizeable deposits of sand and gravel having commercial value, and some areas where natural gas has been located although its commercial exploitation has been limited. Proper planning must be exercised so that future exploitation of these natural resources is not excluded by sprawling development patterns.

Sand found both on and offshore is probably the most important mineral resource within the coastal area. It does not pose major limits upon the utilization of land but is nonetheless a major mineral resource of the area. An average of 125,000 tons of sand is dredged per year. The excavation is done in a twelve square mile area, slightly over seven miles northwest of Presque Isle.[16] This area designated for Commercial dredging is located on Figure I-
.

Gravel is a second important mineral. There are at least 20 gravel pits in the Preliminary Study Area. Most of these are located along the Route 20 beach ridge in the West and East Study Areas. The largest gravel pit consists of about 180 acres and is located north of Route 20 on the Fairview/Girard Township line.

The third resource of the Lake Erie Coastal Zone is natural gas.[17] Serious land exploration for commercial gas began in 1954, but has met with only limited success for commercial purposes. In 1975 there were six gas fields in the Preliminary Study Area as well as 19 other producing or potentially producing gas wells. Since their discovery they have produced over fifteen billion cubic feet of gas. The average home will utilize approximately 180,000 cubic feet of natural gas for heating purposes annually. The fifteen billion cubic feet taken cumulatively would therefore have sufficiently heated approximately 83,000 homes for one year. Almost 99% of the gas discovered thus far was from three fields in Springfield Township.

Two offshore exploratory wells were drilled in Lake Erie in the 1950's. One, off the shore of Springfield Township, was completed in 1958 and produced up to 190,000 cubic feet per day. The well has since been abandoned. The second well off the shore of North East Township was completed in 1959 and subsequently abandoned after a good show of gas.

Conclusion -- Pennsylvania's Lake Erie coastline is a uniquely diversified region which, while encompassing the City of Erie and most of its suburban reaches, still remains as a rural, developing area. The largest single land use classification is agriculture with 37.2% of the entire Preliminary Study Area under cultivation. The

second largest land use category is the forest and undeveloped classification which comprises 33.0% of the land in the region. About 12.5% of the region is a combination of all residential land use and a very high percentage of this figure is under the single family residential classification. All remaining land use total 17.3% of the coastal zone area.

The following chart designates by acreage and percent the land use classifications of the Lake Erie coastal zone.[18]

WATER USES AND RESOURCES

Introduction -- Lake Erie, lying on the international boundary between the United States and Canada, is the southernmost of the five Great Lakes. It is about 240 miles in length and is 57 miles wide at its broadest point. It is the most shallow of the Great Lakes, only 210 feet at its deepest point and is 9,940 square miles in size.[19] The Lake serves many essential requirements of the Preliminary Study Area, most notably as a water supply for drinking and manufacturing purposes, as well as a resource utilized for navigation, recreation, the fishing industry and for dispersement of wastes.

Water Quality -- The waters of Presque Isle Bay and the near--shore zone of Pennsylvania's Lake Erie waters have been degraded over recent decades and are in various stages of eutrophication although recent trends have indicated that some improvements in water quality have occurred. For example, the beaches of Presque Isle have not been closed due to pollution for several years. The water quality of the beach areas along the north side of Presque Isle is good. Presque Isle Bay suffers from significant bacteria contamination.[20]

The causes of contamination are many. Principal waste sources in the study area include: residential and industrial wastes, combined sewer overflows, urban and rural runoff, and agricultural wastes. In addition, accidental spills of toxic and hazardous chemicals and road deicing compounds contribute some waste loads. Water quality which is so seriously affected by waste products from these sources will improve provided that water quality management plans throughout the Lake Erie basin are implemented.

Groundwater Resources -- Subsurface water supplies in the Lake Erie Basin of Pennsylvania are small to moderate. Small springs are utilized in locations where they are convenient and of high quality. Many dug wells are still in use but, they are gradually being abandoned because of their unreliability in the dry season and their vulnerability to contamination. In many areas high sodium chloride concentrations make the available groundwater supplies unusable. Sand and gravel areas of the glacial drift are by far the largest producers of groundwater. There are areas such as valley bottoms or buried and filled valleys where the sand and gravel areas produce very little water. Soft formations above the sand and gravel often cave into the wells resulting in their abandonment. Modern methods of well finishing have decreased the incidence of well abandonment.

The shale and sand formations found in the study area yield small quantities of groundwater. In some sections of the study area water under artesian pressure is encountered in the bedrock formation.

The quantity and quality of water resources varies depending upon the proximity to Lake Erie. The water supplies closer to the Lake produce sufficient water but the quality of the water does not meet drinking water standards. Subsurface water supplies in this area are often located near the surface because deeper wells often strike salt deposits, sulphurous water, or possibly natural gas. Wells nearer the surface are often contaminated by the percolation of polluted surface waters. Farther back from the Lake, the population is less dense, the water table is deeper and therefore the water quality is higher.

Withdrawals - Utilities -- The Pennsylvania Electric Company (Penelec) is by far the largest water consumer in the Lake Erie Coastal Zone. It withdraws approximately 126 million gallons per day from Presque Isle Bay for use in cooling steam generators.[21] The withdrawal site is located in the East Canal Basin directly north of the main plant at the foot of French Street. There is also a back-up intake in a slip east of the Grain Dock for use in emergencies. This water is discharged into the West Canal Basin of the Bay.

Withdrawals - Municipal and Industrial -- There are four other water withdrawal systems in the study area which use Lake Erie as a water source. Two of these are municipal systems and two are industrial systems.

The Erie Bureau of Water has two underwater pipelines which reach across the Presque Isle Peninsula and into Lake Erie. One of these begins approximately 1.2 miles offshore from Presque Isle and carries water through a 72 inch intake to the Sommerheim Filtration Plant located adjacent to Presque Isle Bay at the foot of Sommerheim Drive in Millcreek Township. This plant has a rate capacity of 56 mgd (million gallons per day). The other is a 60 inch intake which begins approximately one mile offshore from Presque Isle and goes to the Chestnut Street Plant, located adjacent to Presque Isle Bay at the foot of Chestnut Street. This plant has a rate capacity of 32 mgd. In 1973, these two plants combined pumped a record 18.67 billion gallons from Lake Erie, about 58% of their capacity.[23]

A fourth major withdrawer is Koppers Company, Inc., a manufacturer of metallurgical coke, located at the foot of East Avenue in the City. The withdrawal intake is located in Lake Erie, a few hundred feet east of Presque Isle Bay. Approximately 400 million gallons per year are withdrawn here and used in the coke production process.

The fifth intake pipe is owned by the Hammermill Paper Company and is located approximately 1,800 feet offshore from its plant. This intake withdraws an approximate average of 400 million gallons per year for use in paper production.

Waste Assimilation -- The major source of waste which finds its way into the coastal waters of Lake Erie is from sanitary sewers. Included in this category are municipal, industrial and private sewage discharges (Figure i-41). All permitted sewage treatment plants that discharge into surface waters that find their way to Lake Erie have been mapped on Figures i-42, i-43 and i-44. (These Figures also locate the five water withdrawers mentioned above.)

A total of 56 permitted sewage discharges are located in watershed tributaries to Lake Erie.[24] Of these, six (6) go directly into Lake Erie and the remainder discharge into streams which flow into Lake Erie or Presque Isle Bay. Included within the total number are eight (8) municipally owned facilities, 20 industrial facilities, 27 privately owned wastewater facilities, and one (1) power generating discharge facility.

The total number of waste water discharges into streams and Lake Erie on a daily basis amounts to some 207.48 million gallons. Of this, 60.1 million gallons are discharged via municipal systems. The City of Erie treatment plant accounts for nearly all of this municipal discharge with approximately 58 million gallons per day being discharged directly into Lake Erie.

The City of Erie wastewater treatment plant began operation in 1975 and has been plagued with legal and technical problems since. The Environmental Protection Agency has filed civil suit in Federal Court against the City of Erie, charging that the treatment plant is unable to sufficiently treat effluents to meet permitted standards. Although the suit is still in litigation the fines are in excess of 2.3 million dollars.

The technical problem associated with the Erie treatment plant involves the inability to properly remove suspended solids, biological oxygen demand and phosporous. The bacteria used in the treatment process are not heavy enough to settle in the plant basins, and therefore escape with the effluent into the Lake.

Though there are 27 private wastewater discharges throughout the Watershed area they only account for approximately 440,000 gallons per day, or .2 percent of the total Study Area discharges. Industrial facilities (including Penelec) account for approximately 146.94 million gallons per day of discharge, or 70.8 percent of the total. Some of this is untreated water used for cooling purposes. Penelec is by far the largest contributor of industrial wastewater discharge, with 126.05 million gallons per day. This water, used in their cooling process, goes directly into Presque Isle Bay and alone accounts for 60.8 percent of all wastewater discharge in the Preliminary Study Area.

Navigation -- The Erie harbor is completely surrounded by the Presque Isle Peninsula except for the channel entrance, a man-made inlet about 400 feet wide and about 3,600 feet in length (see Figure i-45). The harbor itself averages 4.5 miles in length and more than a mile

Figure i-41
WASTEWATER DISCHARGES

ACTUAL AVERAGE DAILY FLOW (mgd) BREAKDOWN

INDUSTRIAL DISCHARGERS	Industrial Waste	Cooling or Backwash Dischargers	Sanitary Waste	RECEIVING WATER
WESTERN STUDY AREA				
1. Gunnison Brothers	.035	--	--	Brandy Run
2. Parker White Metal Co.	.016	--	--	Stored in Lagoons to evaporate or seep into ground water
3. Pennsylvania Fish Commission	.200[b]	--	--	Unnamed Tributary to Trout Run
4. Erie Suburban Water Co.	--	.001[a]	--	Unnamed Tributary to Trout Run
5. Erie Suburban Water Co.	--	.004[a]	--	Bear Run to Walnut Creek
6. Erie Bronze Co.	.003	.049	--	Unnamed Tributary to Walnut Creek
CENTRAL STUDY AREA				
7. Ervite Corporation	--	.017[d]	--	Presque Isle Bay[d]
8. American Sterilizer	.200	.001	--	Unnamed Tributary to Cascade Creek
9. Lord Manufacturing	--	.263	--	Unnamed Tributary to Cascade Creek
10. Reed Manufacturing	.016[c]	.019	--	Cascade Creek
11. National Erie Forge	--	1.100	.030[c]	Cascade Creek
12. Erie Malleable Company	--	.152[d]	--	Presque Isle Bay[d]
13. United Erie Inc.	.000[c]	.006[d]	--	Lake Erie[c]-Presque Isle Bay[d]
14. Erie Brewing Company	.420[c]	--	--	Lake Erie[c]
15. Pennsylvania Electric	--	126.049	--	Presque Isle Bay
16. Koppers Iron Co.	.025[c]	.972	--	Lake Erie
17. Hammermill Paper Co.	12.800[c]	--	--	Lake Erie
18. General Electric Co.	.440[a]	3.620[a]	--	Unnamed Tributary to Lake Erie
EASTERN STUDY AREA				
19. Welch Grape Juice Factory	--	.219[e]	--	Sixteenmile Creek[e]
20. Electric Materials Co.	.115[e]	.096	--	Lagoons-evaporation & ground water
21. North East Water Works	--	.072	--	Sixteenmile Creek
MUNICIPAL DISCHARGERS				
WESTERN STUDY AREA				
1. Lake City Borough Service Area	--	--	.520	Elk Creek
2. Girard Borough Service Area	--	--	.237	Elk Creek
3. White Swam Subdivision North	--	--	.017	Walnut Creek
4. White Swam Subdivision South	--	--	.040	Walnut Creek
5. Greenbrier Hill	--	--	.028[c]	Walnut Creek
CENTRAL STUDY AREA				
6. City of Erie Service Area	--	--	58.000	Lake Erie
EASTERN STUDY AREA				
7. South Shore Service	--	--	.060[a]	Lake Erie
8. North East Borough Service Area	--	--	1.200	Sixteenmile Creek
OTHER PRIVATE DISCHARGERS				
WESTERN STUDY AREA				
1. Talarico Truck Stop	--	--	.008	Unnamed Tributary to Raccoon Creek
2. Ashland Service	--	--	.006	Unnamed Tributary to Crooked Creek
3. Lucman Land Corp.	--	--	.080[a]	Unnamed Tributary to Lake Erie
4. Erie County Home	--	--	.093	Trout Run
5. White Consolidated	--	--	.003[a]	Trout Run
6. Pioneer Tavern	--	--	.001[a]	Trout Run
7. Alpine Manor	--	--	.010[a]	Trout Run
8. Whitehall Village	--	--	.035[a]	Unnamed Tributary to Trout Run
9. Fairview School	--	--	.006	Trout Run
10. Willis Co.	--	--	.004[a]	Unnamed Tributary to Brandy Run
11. Wenners Humble Oil	--	--	.005[a]	Unnamed Tributary to Brandy Run
12. Commodore Downs	--	--	.020[b]	Unnamed Tributary to Brandy Run
13. Top Roc Precast	--	--	.001	Walnut Creek
14. Kahkwa Club	--	--	.010[c]	Unnamed Tributary to Walnut Creek
15. Harman Electric Co.	--	--	.0001	Unnamed Tributary to Walnut Creek
16. Lake Shore County Club	--	--	.010[a]	Lake Erie
CENTRAL STUDY AREA				
17. Presque Isle Park	--	--	.001[b]	Lake Erie
18. Ramada Inn	--	--	.017	Unnamed Tributaty to Mill Creek

WASTEWATER DISCHARGES (cont.)

ACTUAL AVERAGE DAILY FLOW (mgd) BREAKDOWN

INDUSTRIAL DISCHARGERS	Industrial Waste	Cooling or Backwash Dischargers	Sanitary Waste	RECEIVING WATER
OTHER PRIVATE DISCHARGERS				
EASTERN STUDY AREA				
19. Behrend Campus of Penn State Univ.	--	--	.050	Unnamed Tributary to Fourmile Creek
20. Clark Elementary School	--	--	.012 (a)	Sevenmile Creek
21. Wilson Motel	--	--	.018 (a)	Unnamed Tributary to Sixteenmile Creek
22. Sunoco Station	--	--	.002 (a)	Unnamed Tributary to Sixteenmile Creek
23. Lake View Development	--	--	.010 (a)	Sixteenmile Creek
24. Family Affair Campgrounds	--	--	.009 (a)	Unnamed Tributary to Sixteenmile Creek
25. Larry's Econo Station	--	--	.012 (a)	Unnamed Tributary to Lake Erie
26. PA-N.Y. Truck Stop	--	--	.010 (a)	Unnamed Tributary to Twentymile Creek
27. Mums Motel	--	--	.007 (a)	Unnamed Tributary to Twentymile Creek

WATER INTAKE FROM LAKE ERIE AND PRESQUE ISLE BAY

INDUSTRIAL INTAKE	AVERAGE DAILY INTAKE	AVERAGE YEARLY INTAKE
1. Pennsylvania Electric Co.	126.049 million gallons	46.0 billion gallons
2. Koppers Iron Co.	1.095 million gallons	.4 billion gallons
3. Hammermill Paper Co.	12.868 million gallons	4.7 billion gallons

MUNICIPAL INTAKE	AVERAGE DAILY INTAKE	AVERAGE YEARLY INTAKE
1. Sommerheim Plant 2. Chestnut Street Plant	combined intake of 51.116 million gallons	combined intake of 18.67 billion gallons

SOURCES: Erie Metropolitan Planning Department and Erie County Health Department
(a) Comprehensive Waste and Water Quality Management Study of the Pennsylvania Portion of the Erie Basin and the Erie Standard Metropolitan Statistical Area, March, 1974
(b) Actual Daily Average during Seasonal Use
(c) Discharge into Erie City Sanitary Sewer System
(d) Discharge into Erie City Storm Sewer System
(e) Discharge into North East Borough Sanitary Sewer System

Figure i-42

WATER USE - INTAKES AND DISCHARGES - WESTERN STUDY AREA

1" = 1 mile

Figure i-43

WATER USE - INTAKES AND DISCHARGES - CENTRAL STUDY AREA

1" = 1 mile

Figure i-44

WATER USE - INTAKES AND DISCHARGES - EASTERN STUDY AREA

1" = 1 mile

in width and is maintained at a 28 foot depth by the Army Corps of Engineers.

The Erie harbor is currently not used to capacity. The principle existing shipping and docking facility in the port is the Erie International Marine Terminal. This facility is owned and operated by the Erie--Western Pennsylvania Port Authority and is located in the East Bay Area immediately west of the channel entrance. Basic facilities include: Three docking berths, three portable cranes with capacities of a 125 tons, a 140 tons and a 300 tons respectively, a railroad siding, a 50,000 square foot storage shed and a bulk storage area.[25]

There are also two petroleum storage facilities utilizing the Erie harbor. The Gulf Oil Company maintains an off--loading pipeline for tankers on the Lake side of the channel entrance near the foot of Pennsylvania Avenue. Petroleum is temporarily retained at this location in six storage tanks prior to further distribution. United Oil Manufacturing Company maintains a 5.5 million gallon storage tank capacity near the foot of Cascade Street at the western end of the harbor. A fleet of twenty tankers dock and unload their cargo at this location during the shipping season.

Shipbuilding and repair services are a third major activity of the Erie harbor. The most modern shipbuilding facility on the Great Lakes is located immediately north of German Street. This site has been leased by a division of Litton Industries. This firm has recently constructed the two largest ships on the Great Lakes, the Stewart J. Cort, a lake freighter, and the Presque Isle, a self-propelled taconite barge, both of which are over 1,000 feet in length. This shipbuilding complex includes fabrication and assembly facilities as well as dry docking berths.[26]

Other smaller shipbuilding facilities include two firms located on the East Canal Basin which specialize in custom building of sail and power pleasure craft. A firm specializing in ship repair services is Perry Shipbuilding, located at the foot of Cascade Street. This firm leases berthing facilities in order to maintain and repair lake freighters such as those mentioned above.

A fourth navigation--related industry is commercial fishing. This industry, although only a fraction of its former significance continues at a small scale. The fishing season lasts from March to December. During this time, the largest company, Munch Fisheries, processes approximately 200 tons of its Lake Erie catch. This company utilizes a fleet of eight vessels, all of which berth in the West Canal Basin. Several smaller fishing companies also exist along the coastal zone.[27]

Recreation -- Recreation is by far the greatest use of coastal waters in Erie County. All types of recreation associated with water are to be found along the shore of Lake Erie and Presque Isle Bay. Some of these include: swimming, sail and power boating, water skiing, fishing, ice fishing, skating and ice boating.

Pleasure boating of all types is found during the summer months all along the lake shore of Erie County and in Presque Isle Bay. The Bay Area has the largest concentrations of population because of its accessibility to large concentrations of population and its natural shelter. There are three major marinas in the Bay Area which afford shelter for thousands of private boats (see Figures 45 through 47). The largest is the Erie Yacht Club, located on the southern shore of the Bay approximately 1.2 miles east of the neck of the Peninsula. This private facility has a large club house, berths for over 600 boats, launching and storage facilities, and a fueling dock.

The Presque Isle Marina is maintained by the Commonwealth as part of Presque Isle State Park. This large man-made bay in the south central portion of Presque Isle has a direct connection with Presque Isle Bay, and has berths for some 430 boats, as well as launching and fueling facilities.

Presque Isle Yacht Club is another private marina located at the foot of Peach Street in the West Canal Basin. It maintains berthing facilities for approximately fifty boats as well as a club house and launching and fueling facilities. Many other pleasure craft are kept at smaller sheltered and unsheltered commercial and private docks all along the southern shore of Presque Isle Bay, and near the Public Dock.

The State Park at Presque Isle also leases marine facilities to private firms at two sites within the park. One on the Bay near the Red Cross Station is inoperative at this writing due to flooding caused by high lake levels. When in operation, one can rent small outboard motor and row boats for fishing and pleasure on Presque Isle Bay.

The other, located at the eastern end of the Peninsula's lagoon near Misery Bay, is open during the summer months. Patrons may rent canoes, small motor and row boats, and paddle boats.

All along the shore of the Coastal Zone there are private launching sites for small boats as well as individual moorings. There are also unorganized marina facilities within the sheltered estuary portion of the mouth of Elk Creek in Girard Township.

Public boat launching sites include the following: Raccoon Creek County Park, Springfield Township;Pennsylvania Fish Commission site at the mouth of Walnut Creek, Fairview Township; several sites on the bay side of Presque Isle State Park; two ramps operated by the City of Erie; Shades Beach County Park, Harborcreek Township; and Dalrymple Beach operated by the Pennsylvania Fish Commission in North East Township.

Sport fishing is a year--round activity in the waters of the Erie County Coastal Zone. Presque Isle and Misery Bays are particularly active spots where fish are caught throughout the year. Lake fishing is also actively pursued especially near the mouths of streams where spawning fish are found. The Pennsylvania Fish Commission stocks the

Figure i-45

WATER USE - CHANNELS, ANCHORAGES AND MARINAS - WESTERN STUDY AREA

1" = 1 mile

Figure i-46

WATER USE - CHANNELS, ANCHORAGES AND MARINAS - CENTRAL STUDY AREA

1" = 1 mile

Figure i-47

WATER USE - CHANNELS, ANCHORAGES AND MARINAS - EASTERN STUDY AREA

1" = 1 mile

Lake and streams with game fish. One of their more successful programs has been the stocking of coho salmon, an excellent game fish. Other species of game fish found in coastal waters are: trout, walleye, small mouth bass, perch, and smelt. Muskellunge and northern pike are sometimes caught in Presque Isle Bay.

Fish and Wildlife Propagation -- There are about 30 fish species found in Pennsylvania's portion of Lake Erie coastal waters.[28] These fish can be broken down into three main classes: rough fish (carp, suckers, etc.), forage fish (shiners, alewife, etc.), and sport fish. Sport fish include yellow perch, white bass, walleye, trout and salmon. Fish which live close to the beaches closely resembly the open--lake fishery. Many of these sport fish are bred and stocked by the Pennsylvania Fish Commission.

Presque Isle Bay and the lagoons of Presque Isle are fertile fishing waters. Ice fishing is a popular sport on these waters during winter months and gives way to bow fishing during the rest of the year. The Presque Isle sport fishing is composed of the following species: bullheads and catfish, yellow perch, northern pike, largemouth bass, bluefull, crappie, sunfish and muskellunge.

Erie's commercial fishing industry reached its peak in the 1910's and 1920's with catches averaging about 800,000 pounds per year.[29] In the 1960's Pennsylvania's Lake Erie fish catch had declined to less than 90,000 pounds per year. Thus far in the 1970's the trend seems to have improved slightly to about 110,000 pounds annually (see Figure i-48).

Wildlife is also abundant in the Preliminary Study Area. The Pennsylvania Game Commission has published a list of mammals in Western Pennsylvania.[30] This list, which includes forty wildlife species, is probably representative of the coastal zone. Predatory animals are few and most of the remaining mammals are scavengers.

A large variety of birds exist in the coastal area. A total of 237 species of birds have been seen on Presque Isle and its immediate vicinity, a larger number than have been identified in any other area of comparable size in Western Pennsylvania.[31] Seventeen of these species are permanent residents of Presque Isle, 88 are summer residents and 25 visit Presque Isle in the winter only. The remainder are transient species which are not common in the vicinity.

Figure i-48

LAKE ERIE FISH CATCH (POUNDAGE)

FOOTNOTES

1. Erie County Historical and Architectural Preservation Plan, (Erie, Erie Metropolitan Planning Department, 1976), p.21.

2. Population Analysis, City of Erie, (Erie, Erie Metropolitan Planning Department, 1972, p.2.

3. Erie County Industrial Study, (Erie, Erie Metropolitan Planning Department, 1973), p. 23.

4. Erie County Economic Study, (Erie, Erie Metropolitan Planning Department, 1971), p.2.

5. Ibid., p. 3.

6. Erie County Population Analysis, (Erie, Erie Metropolitan Planning Department, 1972), p. 6.

7. Except where noted, all data regarding population and median income are derived from the 1970 Census of Population and Housing for Erie, Pennsylvania, U.S. Department of Commerce, Bureau of the Census, 1970.

8. Except where noted, all data regarding labor force, employment and unemployment have been obtained from the Bureau of Employment Security.

9. Real Estate Data Inc., Miami, Florida, 1975, 1976.

10. Acreage totals have been derived from Erie County Tax Assessment records, Erie County Courthouse.

11. Ibid.

12. Ibid.

13. Data regarding the 100 year flood plain is current and relatively accurate. Engineering must still be finalized by HUD before detailed and accurate flood maps are available.

14. U.S. Department of Agriculture Soil Conservation Service, Erie County Soil Suvery (Washington, D.C., 1960). Index beginning on page 121.

15. "Prime" agricultural soils are not necessarily Class I and II soils as determined by the U. S. Department of Agriculture Soil Conservation Service. These soils quality under a complicated formula dealing with slope and permeability.

16. Information obtained from the Erie Sand and Gravel Co.

17. Information obtained from the National Fuel Gas Co.

18. Acreage totals have been derived from Erie County Tax Assessment records, Erie County Courthouse.

19. Garland, John H., The World Book Encyclopedia", Volume XII, p. 40.

20. U.S. Army Corps of Engineers, Cooperative Beach Erosion Project at Presque Isle Peninsula, (Buffalo, 1973), P. 12.

21. Erie Metropolitan Planning Department and the Pennsylvania Department of Environmental Resources, Comprehensive Waste and Water Quality Management Study Interim Report, Cleveland, 1974), p. VII-16.

22. Ibid., Figure VI - 1.

23. Data obtained from the City of Erie Bureau of Water.

24. Erie Metropolitan Planning Department and the Department of Environmental Resources, Comprehensive Waste and Water Quality Management Study Interim Report (Cleveland 1974), p. VII-8 and VII-9, VII-16 through VII-19, VII-23 through VII-28.

25. Data obtained from the City of Erie Port Authority.

26. Ibid.

27. Ibid.

28. U.S. Army Corps of Engineers, Cooperative Beach Erosion Project at Presque Isle Peninsula, (Buffalo, 1973), p. 34-36.

29. Data obtained from the Pennsylvania Fish Commission.

30. U.S. Army Corps of Engineers, Cooperative Beach Erosion Project at Presque Isle Peninsula, (Buffalo, 1973) p. 22.

31. Ibid., p. 23.

CURRENT AND PAST PROBLEMS AND ISSUES

2

2 CURRENT AND PAST PROBLEMS AND ISSUES

Introduction

Many of the problems and issues in the Delaware Estuary and Lake Erie coastal areas result from conflicts between land and water uses and coastal resources. Problems were discovered and documented from many sources, including local governments, the business community, interested citizens, county and local planning commissions, and members of the coastal zone steering committees. Both county and regional planning commission files were reviewed. Existing reports such as the Riverfront Development Study produced by the Philadelphia City Planning Commission, the Delaware River Corridor Study by the Delaware County Planning Commission, the Erie County Comprehensive Plan by the Erie Metropolitan Planning Department, and the Erie Port Development Plan prepared by the Port Commission of Erie were useful in identifying problems. In addition, many of the problems emerged from research conducted during the Inventory of Coastal Resources and Uses (Chapter 1). The problems documented in this chapter were identified and discussed in earlier draft working papers produced by the coastal zone staff and reviewed by the steering committees and interested citizens. A complete listing of the problems and issues identified in each coastal zone is contained in the Coastal Zone Policy Framework (Chapter 5). Some of the most important are described below, with illustrative examples provided where appropriate.

The problems and issues discussed in this section are longstanding and chronic ones which, given present programs and regulations are difficult to solve. These problems were used to establish the coastal management goals and objectives which serve as the foundation of the Policy Framework, around which the Pennsylvania Coastal Zone Management Program is structured.

It is clear that many of the problems and issues involving the use, management, and protection of resources, are not unique to shoreline areas, but exist throughout the Commonwealth. They have been presented because they can be significantly improved or eliminated through the implementation of a carefully prepared, well-conceived Coastal Management Program.

While the list of problems and issues is quite broad, it is not a complete catalogue of "all problems" in waterfront areas. Coastal Management cannot attempt to solve all the environmental, social and economic problems that exist in each study area. These are important problems in the coastal areas as well as the Commonwealth as a whole. However, they will have to be the focus of other studies and programs.

Coastal problems and issues have been categorized under four major headings:

- Land Use, Resources, and Environment
- Economic Health and Revitalization

- Public Involvement and Education
- Government Regulation and Responsibility

Unfortunately, due to the close interrelationship among the problems and issues, they rarely fit into any single category. For example, problems of undeveloped recreation potential (identified in the section on Land Use, Resources and Environment) overlap with issues of public education and appreciation of the coastal area. Each of those problem areas will require attention if the situation is to be improved.

DELAWARE ESTUARY COASTAL ZONE

LAND USE, RESOURCES, AND ENVIRONMENT

Many of the resource and environmental problems that have been identified relate to the use of land along the Delaware River. Some of these are more obvious while others are not as readily apparent. One significant problem that has received little attention involves industries and public facilities which occupy prime shoreline locations, yet no longer use or require access to the river. The force which keeps these uses in their present location is sometimes described as "historical inertia" - a combination of tradition, convenience, and the inability or lack of incentive to profitably relocate.

This trend is especially common in the City of Philadelphia. The Riverfront Development Study found that 60% of all riverfront industries classified themselves as not river dependent.[1] Throughout the Study Area this trend is a problem which will be very difficult to resolve. Clearly, it would be impossible to relocate existing non--river--dependent uses to inland locations. On the other hand, steps must be taken to insure that in the future waterfront sites are available to the industries and facilities that require them. If prime shoreline sites which are currently available (or which will become available) are not designated and reserved for the potential future activities which depend on them, such activities will be forced to locate elsewhere. This loss can, and must, be avoided through sound planning.

Another critical problem identified in the Delaware Estuary Study Area is dredging and spoil disposal. Dredging itself cannot really be considered a debatable issue since this activity will be required on a continuing basis if the collective "Ports of Philadelphia" are to remain viable and competitive. However, steps can be taken to minimize the adverse impacts that result from dredging (See Chapter 1, Water Use, for more detail). Spoil disposal is the major problem resulting from dredging. Historically, wetlands were used as convenient spoil disposal sites, but increased awareness of their

natural and ecologic values has led to the prohibition of spoil disposal in wetlands. Sites which are convenient and economically attractive are increasingly ruled out for social or environmental reasons. As a result, economically feasible disposal sites are in increasingly short supply.

There are numerous adverse physical and biological impacts upon the immediate area of a dredge spoil disposal site.[2] Physically, spoil disposal can cause chronic turbidity in water adjacent to the site, change natural land drainage patterns, destroy the natural and biologically productive inter-tidal areas, and potentially contaminate aquifers through leaching.

In addition to the environmental impact, economic and social concerns are part of the dredge spoil disposal problem. The opportunity costs associated with the loss of scarce and valuable riverfront lands used as spoil disposal sites can be high. Until the site is stabilized enough to be reclaimed for future uses, it can serve few other purposes, and access to the river is lost. This loss of shoreline access (even if temporary) can be a problem for potential industry as well as citizens seeking recreation opportunities. Finally, disposal sites are usually stripped of vegetation and diked, resulting in areas of low aesthetic appeal.[3]

Like dredge spoil, sewage sludge generated in the Study Area presents many environmental, social, and economic problems. As treatment plants are upgraded in response to State and Federal water pollution control programs, increasing amounts of sludge will be generated and require disposal. Smaller plants in municipalities with fewer industrial customers can generally dispose of their sludge in landfills or as fertilizer. However, larger, industrialized municipalities have the dual problem of generating more sludge than they can easily sell, or even give away, and of having less desirable sludge due to the potentially toxic materials it may contain.

Philadelphia is facing a crisis over the disposal of 155 million gallons of sludge its sewage treatment plants generate annually. The three regional sewage treatment plants in Philadelphia generate the majority of the sludge in the Study Area.[4] By 1981, with the current mandated upgrading of treatment plants, the City can be expected to generate approximately 228 million gallons of sludge per year. A recent EPA ruling requires the City to stop dumping sludge in the Atlantic Ocean by 1981. Various schemes as far ranging as barging the sludge to the Bahamas have met with regulatory obstacles which have led to their eventual abandonment. Attempts by Philadelphia to buy or lease land for sludge disposal sites in nearby counties have met with continuing local opposition. Since its storage lagoons are nearly full and land available within the City for disposal is scarce, a solution involving some sort of regional cooperation appears to be urgently required.

The highly industrialized riverfront in the Study Area presents considerable potential for <u>accidents</u>. The concentration of petroleum

related industries and the congestion of river traffic in the channel have created an environment in which frequent oil spills, serious fires, explosions, rammings, collisions, and groundings occur. In the first week of 1977, two oil tankers went aground in the Delaware River, with one of them, the Olympic Games, spilling well over 100,000 gallons of oil into the Estuary (Figure ii--1 illustrates the location of tanker casualties in the Delaware Estuary between 1969-74). Unfortunately, many of these accidents only come to the public's attention when they are sufficiently large or tragic.

Since 1970, a series of major accidents in the Study Area have attracted widespread attention.

- On August 17, 1975, a major fire at the Gulf Refinery killed eight firemen and resulted in the loss of numerous pieces of fire equipment and $10 million dollars in damage to Gulf facilities.
- On January 31, 1975, the Edgar M. Queeny collided with the tanker Corinthos off Marcus Hook, killing 25 persons.
- On April 9, 1974, the tanker Elias exploded and burned while unloading at the ARCO docks adjacent to the Philadelphia airport, killing 12 persons.
- On May 11, 1970, the explosion of a 13--story catalytic unit at the ARCO refinery killed 7 persons.

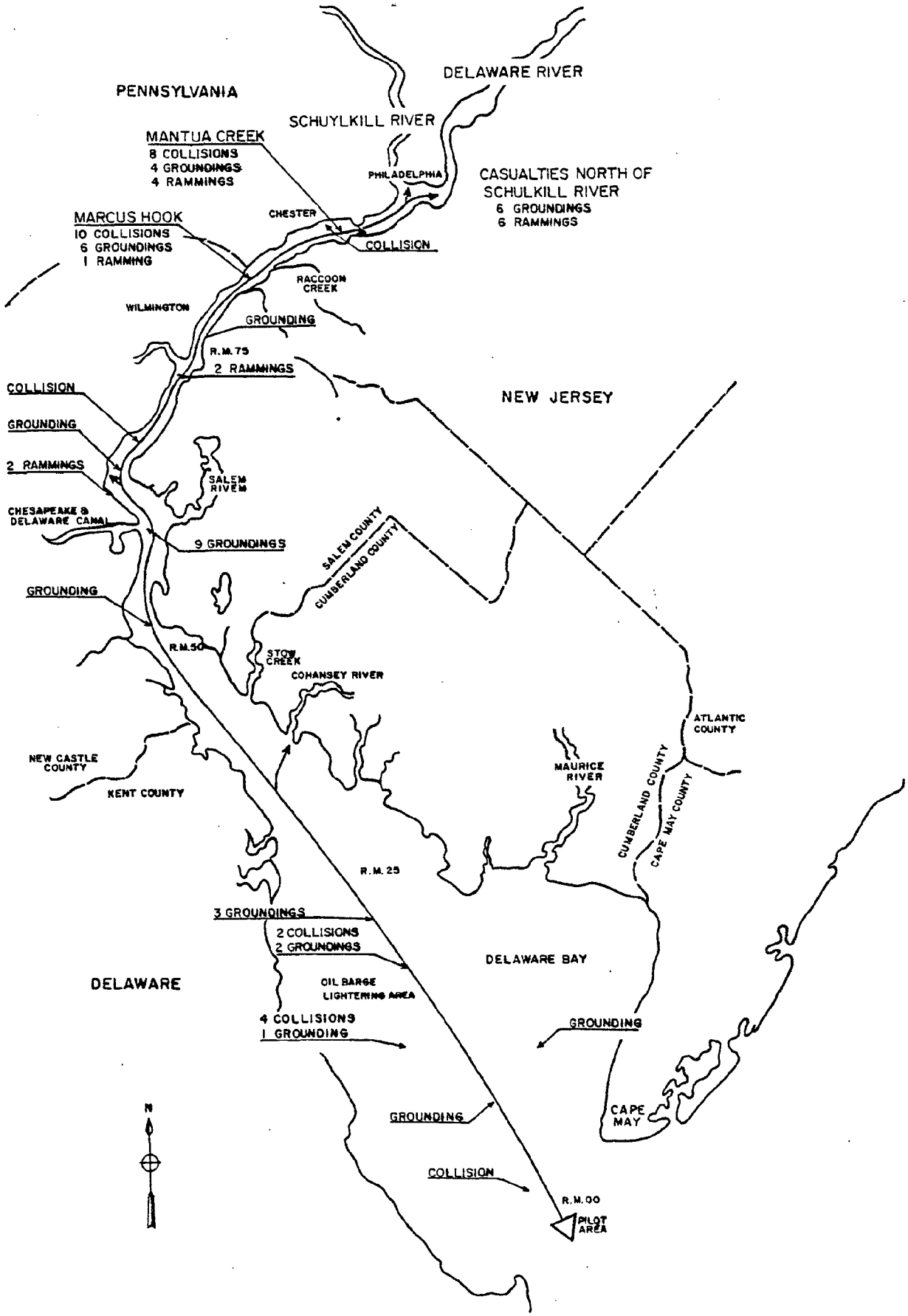
While large scale tragedies such as these are uncommon, the problem of smaller persistent accidents in the study area poses a threat to the natural environment (especially water quality), public and private investment, and to human welfare.

Another problem identified in the Delaware Study Area is flooding. The problem is made especially severe by the concentration of population, jobs, and facilities along the Delaware River and its tributaries in flood-prone areas. Pennsylvania has no statewide floodplain law and at this time only a few coastal municipalities have adopted floodplain regulations in accordance with the Federal Flood Insurance Program sponsored by the Department of Housing and Urban Development (HUD). (This is a good example of a problem that overlaps two general areas - Land Use, Resources, Environment and Governmental Regulation.)

Since the effectiveness of floodplain regulations in a municipality is partially dependent upon its neighboring municipalities developing floodplain ordinances in conformance with federal guidelines, municipalities are vulnerable to the impacts of unregulated development in the floodplains of other coastal communities. Also, the extensive channelizing, bulkheading, and filling along streams and rivers in the Study Area increases the severity and extent of flood damage (See Chapter 1 for further discussion).

The lack of an adequate planning process for dealing with issues and problems that cross municipal and county boundaries is a problem throughout the State of Pennsylvania - not just in the two Coastal Zones. Certain land and water uses affect traffic flow, air and

Figure ii-1



LOCATION OF TANKER CASUALTIES 1969-1974
DELAWARE RIVER

water resources, or the "quality of life" outside the jurisdiction (municipality or county) which has the planning or regulatory responsibility for the activity. In many cases neighboring areas suffer negative impacts but are powerless to intervene or demand changes either before or after a facility or development is built. Problems of this type frequently occur with facilities near municipal boundary lines. In some cases there may be recourse through the courts, but litigation is slow, expensive, and uncertain. Within the Coastal Zone an overall management framework is needed to enable neighboring municipalities or counties to jointly plan for and accommodate uses which are of "regional benefit" and which must locate near the river. Such locational decisions are too significant to be determined by one group acting alone.

An example may be drawn from the sewage sludge disposal problem discussed previously. Because the City of Philadelphia treats sewage from many surrounding jurisdictions, its major treatment plants should be recognized as uses of "greater than local concern," or "uses of regional benefit." The facilities not only serve many municipalities but because of the tidal action of the Delaware River, their effluent can potentially affect the quality of the water in the Delaware upstream and downstream for many miles beyond the City's borders. For this reason the treatment plants and the sludge they generate should not be viewed as Philadelphia's problem alone. Issues of this type can be of concern throughout the Coastal Zone.

The inseparable relationship between the quantity and quality of both surface and ground water supplies makes water resource problems particularly acute in the Delaware Study Area. The water quality of the Delaware and its tributaries does not currently meet State standards. The Department of Environmental Resources has identified the Delaware River in the Study Area as "water quality limited." In particular, dissolved oxygen (DO) levels are low, and coliform bacteria counts (an indicator of pollution from organic wastes) exceed State standards in various portions of the estuary. Although the quality of the water has improved drastically since the mid-1940's allowing many species of fish to return and prosper in the river, significant problems still remain.

Water quality is not the only concern within the Delaware Estuary Study Area. The future availability of adequate quantities of surface and ground water is an important issue. During periods of extensive drought, flow in the river is not sufficient to hold back the intrusion of salt water. In the summer of 1962, salt water intrusion threatened to curtail operations at the Torresdale Water Treatment Plant - the largest in the Study Area. The effects of even a temporary shut-down would have been extremely serious, since it provides a substantial portion of Philadelphia's water supply.

Geologically, the Delaware Study Area is considered to be an area of groundwater recharge. However, the potential for groundwater recharge has been reduced due to additional development adding to an already high percentage of impermeable surface areas.[5] There is some evidence that the normal flow of groundwater to surface water has

been reversed due to increased use of groundwater. This "induced recharge" of groundwater supplies is a serious problem, since the polluted and slower--moving groundwater does not have the flushing capabilities of surface waters. The anticipated future development and accompanying population growth in this area will compound the problem, since there will be a greater demand upon the water supply systems and a decrease in the recharge areas. Polluted ground water is therefore a serious problem, but one that is more strongly felt in the New Jersey counties across the Delaware River than in the Study Area, which is largely dependent on surface supplies (See "Water Use" in Chapter 1).

Like water resource problems, air pollution issues also defy local boundaries and become regional in nature. Large portions of the Coastal Study Area fail to meet EPA air quality standards. Quantities of some pollutants (sulphur oxides, hydrocarbons, and carbon monoxide) have been decreasing over the last several years. But others, particularly oxides of nitrogen, are increasing. A 1973 study of the nine county DVRPC region (plus Salem County in N.J. and New Castle County in Delaware) indicated that Delaware and Philadelphia counties were the two highest in percentage of total air pollutants, measured in annual average tons per day. Bucks County tied for fourth.[7] The Study Area still has problems with air quality in spite of some recent improvements.

Water related recreational opportunities in the Study Area are limited for both local and regional populations. County reports indicate that the River has not been developed to its full potential for open space or recreation. The Delaware River Corridor Study states "Public open space is generally unavailable on the river shoreline"[7] while Philadelphia's Riverfront Development Study notes that "....very little riverfront land (6.4%) is presently devoted to residential, recreational, institutional, or commercial use."[8] Bucks County has more undeveloped land in the Study Area than the other counties, but access is limited since little of the land is publicly owned. One of the problems with expanding waterfront recreation opportunities is that the favored traditional approach has been fee simple acquisition. But this method has become prohibitively expensive in this region. Alternative approaches, such as easements across private land, need to be pursued for the Study Area. (This problem is covered in more detail in the "Recreational Deficiencies" section of Chapter 3).

In addition to the problem of lack of open space areas available for public access, the waters of the Study Area do not currently provide much opportunity for water related recreation. Swimming in the Study Area streams is limited by the low water quality levels, while recreational boating and fishing are plagued by lack of access points. In the main channel of the Delaware and Schuylkill, recreational boaters must be watchful of commercial river traffic. (Recreation is discussed in greater detail in the section on "Water Use," Chapter 1 and in "Recreation Demand," Chapter 3).

The Delaware Study Area has a significant number of areas which are historically, environmentally, or aesthetically unique. Most of these areas are subject to frequent damage due to a lack of public interest and awareness and uncoordinated planning. Even where there is public interest in the protection or preservation of such areas, Tinicum Marsh being a prime example, acquisition is too expensive for local governments or private interest groups. In addition, historical and architectural preservation goals are often viewed as a desirable luxury that must be sacrificed to more acute or pressing economic interests. This need not be the case, since successful programs have been adopted throughout the country to achieve such goals and could be utilized within the Delaware Study Area.

ECONOMIC HEALTH AND REVITALIZATION

Both Philadelphia and Delaware Counties are concerned with declining populations and job opportunities. The Delaware River Corridor Study states "(the) corridor has seen the beginning of decline in recent years."[9] Between 1965 and 1976, Philadelphia lost almost 85,000 jobs while between 1970 and 1974 the population dropped by 108,197 persons (5.5%). Recently, Delaware County's population dropped from 603,456 in 1970 to 589,400 in mid-1974 (both 1974 figures are Federal-State Cooperative Program estimates).

Economic problems are not confined to the waterfront alone, but a general urban decline is affecting the overall economic health of the Study Area. The recent layoffs at the Boeing-Vertol plant in Delaware County and at Bucks County steel plants combined with the announcement of the closing of the FMC plant in Marcus Hook are serious blows to economic vitality in the Study Area. The early development of the riverfront relative to other parts of the region has meant earlier obsolescence for much of the infrastructure and many of the services within the Study Area. For example, the development of containerized shipping facilties has resulted in lower utilization and the eventual obsolescence of the many finger piers on the Delaware. Roads and railroads also need more maintenance as they age. Under utilization and abandonment of facilities reduce the tax base. Ironically, the presence of some of the obsolete facilities prevents utilization by other, potentially more beneficial, uses. For example, rail use by the Port of Philadelphia industries has declined as trucking has appropriated increasing portions of commercial traffic. Yet railroads continue to occupy 11% of the Philadelphia riverfront, sometimes preventing the land from being utilized by alternative facilities which could benefit from the location.

PUBLIC INVOLVEMENT AND EDUCATION

Many of the preceding problems are, at least partially, caused or intensified by the lack of public knowledge concerning the Delaware Estuary. The improvements in the Delaware since its "black" days of the 1940's are not generally well known. As a result, the River's potential as a recreational resource is often overlooked by many who could possibly benefit from its proximity.

Because of the lack of public awareness of the Estuary's problems and potential, there has been no strong, public mandate for a Coastal Management program in Pennsylvania as there has been in other "coastal" states. Among those who are aware of the program's existence, there is often confusion about its goals and potential benefits. For many worried about costs, there is an erroneous fear that increased recreation is the dominant goal of the program.

GOVERNMENTAL REGULATION AND RESPONSIBILITY

Many of the problems identified in the Study Area and described above can be traced directly to a lack of a comprehensive, coordinated, and uniform approach to governmental regulations, laws, and administrative procedures along the water's edge. Many separate authorities have responsibility for separate areas or actions along the riverfront. For years the regulation of water quality in Pennsylvania has been viewed by government as separate and distinct from land use regulations. It is now understood that the use of land and the use of water are closely related, and programs that attack single problems, without considering related issues, are doomed to failure.

The overlapping, competing regulation by various agencies within the coastal zone, coupled with the absence of clearly defined, mutually agreeable goals, has led to:

- the siting of incompatible uses near one another, especially near boundary lines.
- the progressive degradation of air and water quality through the cumulative impacts of facilities that would be acceptable in limited quantities.
- costly delays when multiple permits and environmental statements are required.
- loss of economically beneficial uses to areas that have completed advance planning and preparation.

The problems and issues covered in this chapter are part of the background for the more complete picture the Policy Framework will give in Chapter V. These problems are the input into the "Goals and Objectives" from which the policies of the Coastal Management Program will be drawn. The following chapters will discuss anticipated problems and the existing means of controlling land and water uses in the Study Area.

FOOTNOTES - - PROBLEMS AND ISSUES

1. Philadelphia City Planning Commission, Riverfront Development Study, December, 1974.
2. U.S. Army Engineers District, Philadelphia, Pennsylvania, Delaware River, Trenton to the Sea and Schuylkill River and Wilmington Harbor Tributaries New Jersey, Pennsylvania, Delaware (Final Environmental Impact Statement) 1975.
3. Ibid.
4. Chester-Betz Engineers, Comprehensive Water Quality Management Plan Lower Delaware and Schuylkill River Basins (Draft) 1975.
5. Geraghty and Miller, Inc., DVRPC 208 Areawide Waste Treatment Planning, Ground Water, Description of Ground Water System, October, 1976.
6. Delaware Valley Regional Planning Commission, Environmental Overview Statement for the Delaware Valley Region 1975.
7. Delaware County Planning Commission, Delaware River Corridor Study June, 1975.
8. Philadelphia City Planning Commission, op. cit.
9. Delaware County Planning Commission, op. cit.
10. Philadelphia City Planning Commission, op. cit.

LAKE ERIE COASTAL ZONE

LAND USE, RESOURCES AND ENVIRONMENT

In terms of complexity and cost, probably the single most important problem in the Lake Erie Coastal Zone Study Area, involves maintenance of the Presque Isle Peninsula. Presque Isle, a Pennsylvania State Park, is a 3,000 acre peninsula (more accurately a large sandspit with a neck connecting it to shore) that is both a recreation and natural area. Presque Isle possesses within its boundaries various fragile eco-systems containing many unique plant and animal species (both land and water varieties) which can be easily destroyed or irreplaceably altered. At the same time, Presque Isle provides over seven miles of beaches, boating facilities, etc. for recreational use which attracts over three million visitors a year. Finally, the peninsula encloses and shelters one of the finest natural harbors on the Great Lakes. This significant natural area and economic mainstay of the Erie metropolitan area is constantly threatened by severe erosion of the beaches on its exposed lakeward side. Due to higher than average water levels in Lake Erie over the last several years, storms (especially in winter) decimate the beaches and flood the neck of the peninsula, Such storms constantly threaten to sever this narrow neck and thereby ruin tourism, the harbor and the significant natural aspects of the area. Already, large amounts of Federal and State money have been spent on holding the beach line until a permanent solution can be effected. The U.S. Army Corps of Engineers is in charge of coordination efforts to develop a solution to this problem. They addressed various

alternative solutions to the problem and the environmental impact of each. As a result of the Corps investigations, a "partial breakwater" device was found to be the most feasible solution; this concept calls for the construction of an offshore broken breakwater at three key locations. It is hoped that this would cut erosion in half and still allow wave action to reach the beaches in order to preserve the shoreline ecosystems. Unprotected areas would still erode and be artificially replenished with sand. The basic problem is to protect the economic value of the peninsula, while at the same time allowing the natural forces, which create and maintain the peninsula as a significant natural area to operate relatively unhampered.

A problem similar to the Presque Isle erosion is the natural and accelerated (man caused) erosion of the Lake banks and bluffs which exist along most sections of the Erie County shoreline. There are 40 miles of lakeshore excluding Presque Isle Peninsula, most of which are being affected by the higher than average lake levels. The clearing of trees on the lakefront (in order to provide scenic vistas) has disrupted normal drainage, thus accelerating bluff erosion. The use of groins by individuals protecting their property has accelerated erosion by adversely affecting the shoreline farther to the east. In addition homes and cottages have been constructed generally too close to the Lake or the top of the bluffs. Over two dozen cottages have been destroyed and over 100 damaged, while hundreds of other existing structures are perrenially threatened.

Also related to shoreline flooding is the periodic stream flooding in the Lake Erie Study Area. Most streams within the coastal zone are quite short causing a very unpredictable difference in water stages between normal conditions and periods of intense or extended precipitation. Stream flooding has caused some property damage, and current development is encroaching upon flood hazard areas along stream corridors.

A water pollution problem of constant concern is the suitability of soils for on-lot sewage disposal (septic). This greatly affects development patterns in rural areas where there are no public sewer systems. Thus many municipalities in the Coastal Study Area are directly affected. Generally soils in these municipalities are poorly suited to on-lot disposal due to high water tables and poor permeability. In recent years, a suburban/rural municipality in the Coastal Study Area experienced a major problem with groundwater supplies due to the contamination of wells used for water sources by many septic systems that were located in areas of poor soil drainage.

An inter-related problem concerns the City of Erie and the surrounding suburban area. The Erie metropolitan area has developed through the common method of suburban sprawl and strip development along major highway corridors. While this method has produced a diversified metropolitan area, scattered pockets of development have been inter-mixed with substantial tracts of land remaining agricultural or open space uses. While this situation is not as dramatic in scope as the Delaware Estuary area, such extremely low

overall density development makes extension of water and sewer facilities very impractical from a cost efficiency standpoint. Thus, this situation forces many "suburban" areas to rely on groundwater (wells) and on-lot septic systems leading to the pollution problems just mentioned. Agricultural lands in and around this overly large metropolitan area are therefore under constant development pressure. Agricultural lands are often good for septic systems therefore compounding the problems of suburban sprawl, inability of public sewer and water extensions, as well as the loss or irreplaceable prime agricultural lands to development.

The present system of vehicular access to the shore areas of Lake Erie is inadequate, especially in terms of recreational resources. In the western and eastern portions of the Erie Study Area there is highly limited public access to the shore making several good beach areas inacessible by car. In addition, boat launching sites are limited in these rural areas. In general, the availability of water dependent facilities, such as boat ramps, marinas and fishing and beach access points falls far short of the demand for such recreational facilities.

Water pollution, both in Lake Erie and the streams that discharge into the lake, has been a problem in Erie Study Area for many years. Due to past extensive pollution levels of Lake Erie as a whole and probable over-harvesting in the early 20th century, over harvesting, commercial fishing in the Pennsylvania portion of Lake Erie has steadily declined until annual tonnage in the 1970's in only 13% of that in the 1940's and a mere 40% of that in the 1910's.

Other water pollution problems include: Presque Isle Bay (harbor), greatly affected by untreated urban runoff, has difficulty cleansing its waters due to impeded movements, water currents and a small entrance to the bay; non-point source stream pollution from agricultural fertilizers; soil erosion from farms and construction sites; and the introduction of salt into streams and storm sewer systems through extensive use deicing compounds on roadways during severe winter conditions.

Although natural gas drilling in Lake Erie is a topic that could be placed in the other three problem and issue categories it will be discussed in this category for natural gas is a natural resource. As of this time, there has been no development of this potential offshore natural resource in the Pennsylvania portion of Lake Erie. This is undoubtedly due to the fact that the question of offshore drilling is a controversial environmental issue. However, the resource could be of great economic potential to the Erie Study Area and the Commonwealth especially considering the current home heating fuel cutbacks experienced in this area of the State.

ECONOMIC HEALTH AND REVITALIZATION

The major economic natural resource in the Coastal Study Area is Presque Isle Bay. It is one of the finest natural harbors on the Great Lakes providing excellent storm protection and winter layover areas. The Port of Erie marine terminal boasts the largest capacity crane facilities on the U.S. side of the Great Lakes. The major problem is one of vast underdevelopment. Specific lesser problems include: location of non-water dependent industries on the bayfront, which could be put to better use by facilities which depend upon a waterfront location for operational and transportation needs; under-utilization and abandonment of facilities (grain elevators, coal and ore docks) and in a small degree, overuse of lands by rail facilities. An immediate problem is the lack of reasonable highway transportation facilities in the immediate bayfront area and the absence of a major and direct connection between the bayfront/port area and the interstate highway system two miles to the southwest of the harbor.

PUBLIC INVOLVEMENT AND EDUCATION

Several of the problems and issues just discussed are in part caused by or at least aggravated by the general public's misconceptions concerning coastal resources. In these problems or issues, complete lack of knowledge of available information or inability to recognize the magnitude of the problems by the public is a direct contributing factor to their solution. Presque Isle for example, is not generally recognized as the extremely sensitive and unique natural area that it is. The excellent recreational value of the beach, fishing and boating areas is recognized as important in the public mind, therefore making the protection of these facilities paramount. However, the natural forces that tend to destroy the recreational uses, are the very essence to the continuation and maintenance of the significant natural aspects of the peninsula, which the general public does not fully appreciate. To fully protect the recreational assets would surely contribute to the elimination of natural assets and vice-versa. This highly complicated trade-off is not well understood by the public, and consequently, public measures to reach a compromise solution to this problem have been viewed with disfaction by many people.

Other problems where the general public does not fully appreciate the magnitude or consequences are: the building of structures too close to shoreline and bluff crests susceptible to storm and erosion damage; flood plain encroachment and flood insurance availability to those residing on or near flood prone areas of the shoreline and streams; soil suitability for on-lot septic systems and ground water pollution; the need to conserve agricultural land; attitude concerning the potential pollution problem of developing the natural gas resources in Lake Erie. A conservative attitude exists despite little or no adverse environmental damage experienced by the more than 800 offshore gas wells in the Canadian portion of the Lake.

An overall public education problem is that of the Erie Study Areas's national public image in terms of water quality and associated recreation. The stigma of the commonly referred to phrase that "Lake Erie is dead" seriously affects the creditability of the area as a recreational site. Although in years past the lake was in serious trouble, the remarkable recovery of Lake Erie water quality, due to advanced treatment of many lakefront urban sewage and industrial wastes was not brought to the attention of the general public. Therefore, the erroneous belief, that Lake Erie is dead causes continuous harm to the economic health of the area which is only locally known for its truly prime water recreational facilities for both vacationer and fisherman alike.

GOVERNMENTAL REGULATION AND RESPONSIBILITY

Local governmental controls have, up to this time, not been effective in assuring the best possible use for the types of land involved. The nature of this problem is that local land use controls (zoning, subdivision ordinances, etc.) existing in the Erie Study Area have not been oriented toward management of coastal land or water resources. Some municipalities along the coast do not have comprehensive plans to guide development, and other municipalities which have them do not necessarily follow them and fall prey to development pressures.

In relation to this point, it is interesting to note that during the period from 1970 to 1976 the local governments in the Lake Erie Coastal Zone approved 62% of the total zoning map amendments that were proposed. Hence, it can be observed that the official land use control tool (zoning) is often subject to change within the Lake Erie Coastal Zone. Also, there is a need for uniform requirements regarding setback regulations for bluff development for all the local municipalities on the Lake in the Coastal Study Area. Finally, a policy must be formulated regarding prime agricultural land management and protection throughout the Study Area.

FOORNOTES

1. Coastal Zone Resource Analysis for Lake Erie; September, 1975.
2. Identification and Analysis of Lake Erie Coastal Hazard Areas; June, 1975.
3. A Lake Erie Offshore Ecological Investigation; July, 1976.
4. Areas of Natural Value, Erie County Coastal Zone; January, 1976.
5. Cooperative Beach Erosion Project at Presque Isle Peninsula, Erie, Pennsylvania, Summaryof Environmental Considerations; May, 1973.
6. Port of Erie Waterfront Development Plan; April 1968.

FUTURE DEMANDS AND DECISIONS

3

3 FUTURE DEMANDS AND DECISIONS

DELAWARE ESTUARY STUDY AREA

PROJECTED POPULATION CHANGE AND LAND REQUIREMENTS

Introduction and Overview -- A major issue in all coastal management programs is whether there is enough land to meet future demand. Determination of potential demand for land within the Preliminary Study Area is based on DVRPC's Year 2000 projections of population, employment and land use.[1] In this chapter, future land requirements, based on Year 2000 data, are summarized and compared within the Preliminary Study Area.

Areas which are especially appropriate for future development, identified in Chapter VIII as Development Opportunity Areas, are compared with projected demand. While Development Opportunity Areas are not the only parcels available for development in the Study Area they have been studied and analyzed in terms of development potential. Priorities have been assigned within these areas. (The process and recommended priorities are described in Chapter 9.)

By comparing the acreage of Development Opportunity Areas to projected land requirements, a rough approximation of future competition, scarcity and overall availability of land can be obtained.

The Year 2000 projections forecast population increases in most parts of the Preliminary Coastal Study Area. The majority of the increases are small, although there are several areas where substantial gains in population are projected between 1970 and 2000. The smallest increases, as well as some areas of absolute population loss, are projected for the immediate riverfront. As can be seen in Figure iii-1, the municipalities which are projected to have large increases are those which extend substantially inland. Most of their expected population is in inland census tracts.

The lack of projected population growth in riverfront census tracts is primarily due to the industrial character of the immediate riverfront. There are very few residential neighborhoods on the riverfront. For instance, two of Chester City's three riverfront census tracts are nonresidential and are, therefore, not projected to add population. The third riverfront census tract has the smallest projected increase of Chester's remaining study area census tracts. Even though Chester's Study Area is projected to have an overall increase in population (see Figures iii-1 and 2), its riverfront will not be affected due to its industrial orientation. This pattern is followed throughout the Study Area.

Within the entire Preliminary Study Area, projected change of both residential and industrial land follows a consistent pattern. Residential expansion is projected to occur within and around existing residential areas. Industrial expansion, when it occurs, is expected in existing industrial areas, but in many cases this acreage is projected to decrease within the Preliminary Study Area. The decline of industry within the Coastal Study Area (discussed previously in Chapter 2, Problems and Issues, and in this chapter in the following section) is not caused by a lack of available land.

Where industrial acreage is expected to decline, it is more than compensated for by expected increases in acreage devoted to commerce and services. Figure iii-2 gives a municipal breakdown of projected population and land-use change between 1970 and 2000. The following sections will summarize the changes indicated on this chart.

Delaware Study Area -- This area has a projected population growth of 17,000 by 2000, which represents a 15% increase. The population increase is concentrated in the western part of the Study Area (see Figure iii-1). In particular, Chester City is projected to have a 34% increase in population between 1970 and 2000, all of it inland. In sharp contrast, the eastern part of the Study Area in Delaware County is expected to experience no change or population losses.

In spite of these projections of population decline, every municipality in the Delaware Study Area is projected to have an increase in residential acreage. Again, it is inland communities which have the greatest future demand for residential land. The inland municipalities of Lower Chichester and Chester Township lead the Study Area in percentage of residential land use increase, with 85% and 82% respectively.

Industrial acreage increases are much smaller than residential increases in the Delaware County Study Area (Figure iii-2). Most of the projected 148 acres of future industrial demand are in the western portion of the Study Area. The only projected losses in industrial land are in eastern municipalities.

The total Year 2000 demand for industrial, residential, and commercial and services land use in the Delaware County Study Area is 1240 acres (an increase of 13%). Development Opportunity Areas alone total 716 acres, and these are all within the narrow, final inland boundary (Chapter 6). Since most of the demand within the final boundary will be for industrial acreage there appears to be an ample supply of land to meet the demand.

Philadelphia Study Area - The projected population increase of 49,123 in the Philadelphia Study Area represents a 11.5% increase from 1970 to 2000. Almost all of the growth is in three areas; Southwest Philadelphia, Lower North and the Far Northeast (Figures iii-1 and 2). Of these three sections, Southwest

Figure iii-1

POPULATION CHANGE

1" = 2 miles

Figure iii - 2

CHANGE IN POPULATION AND LAND USE: 1970-2000

COASTAL ZONE STUDY AREA

MUNICIPALITY	POPULATION CHANGE	LAND USE ACREAGE CHANGE			
		Residential	Industrial	Commercial and Services	Land Use Totals
Delaware					
Trainer	216	30.3	107.6	3.1	141
Marcus Hook	0	0	16.5	0	16.5
Lower Chichester	649	91	7.3	.7	99
Upper Chichester	658	92.2	14.8	130.	237
Chester City	15,127	127.8	-4.2	82.6	206.2
Chester Township	640	89.7	9.8	40.8	140.3
Eddystone	-1	7.9	29.7	11.6	49.2
Ridley Township	-115	36.6	-16.7	5.6	28.5
Ridley Park	-91	29.2	-1.3	7.7	35.6
Prospect Park	-74	28.3	-.8	1.4	28.9
Tinicum	9	76.3	-13.3	58.1	121.1
Norwood	3	25.3	0	13.3	38.6
Folcroft	0	35.5	-.9	31.6	66.2
Darby	0	23.5	-.8	9.4	32.1
Totals	17,021	693.6	147.7	395.9	1240.2
Philadelphia					
Center City	6136	38.9	2.9	47.2	89
Southwest	14,135	326.7	115.	621.4	1063.1
South Philadelphia	-923	71	-141.6	224.6	154
West Philadelphia	2603	15.5	-10.7	30.4	35.2
Kensington	-2941	98.9	-45.9	103.	156
Lower North	14,385	57.6	-5	14.7	67.3
Far Northeast	24325	816.6	42.8	877.5	1736.9
Near Northeast	-8597	32.7	-27.2	109.	114.5
Totals	49,123	1457.9	-69.7	2027.8	3416
Bucks					
Bensalem	15,145	692.5	-34	216.7	875.2
Bristol Boro	-2584	131.8	-7	23.7	148.5
Bristol Twp.		400.8	54.7	161.1	507.2
Tullytown	23,176	170.2	1.6	30.2	202
Falls		140.3	30.3	82.5	253.1
Morrisville	-269	21.3	-2.	16.3	35.6
Totals	35,468	1556.9	-65.8	530.5	2021.6

Philadelphia stands out for several reasons. The population growth in the Lower North and Far Northeast is expected to occur in inland census tracts within established residential areas. Southwest Philadelphia, because of the enormous Eastwick redevelopment project, is the only area in the entire three county Study Area which is projected to shift from predominantly industrial to residential in character.

Even though the Philadelphia area is projected to lose 70 acres of industrial land by Year 2000 and gain 1458 residential acres, the Study Area will still be predominantly industrial, especially near the riverfront. This is because industrial acreage is currently far greater than residential in the Study Area (Refer to Existing Land Use map, Chapter 1, figures i-6,7,8).

Within the Philadelphia Study Area the greatest demand for land will be generated by commercial and service uses (2028 acres). This represents an increase of 49%. The net demand will be for 3416 acres, most of it concentrated in census tracts inland from the River. Since the Philadelphia Study Area has about 2300 acres of Development Opportunity Areas on the Delaware (identified in Chapter VIII), there should be a wide range of available sites for various types of future riverfront development.

Bucks Study Area -- In Bucks, as in the rest of the Delaware Estuary Study Area, the areas of greatest population growth are expected to be inland, within the large municipalities. The overall population increase of 35,470 represents 31% increase, the largest percentage gain of the 3 counties. Smaller riverfront municipalities, such as Bristol and Morrisville Boroughs are projected to have small decreases in population by 2000 (Figure iii-2).

Between 1970 and 2000, the Bucks Study Area is projected to have the largest residential acreage increase of the three Study Areas (Figure iii-2). Much of this growth has already taken place in Bensalem and Bristol Townships (see Chapter 1-Land Use). The Bucks County Study Area has the greatest abundance of development opportunities in the entire Study Area. With a total projected demand of 2022 acres (Figure iii-2), there are over 3000 acres of Development Opportunity Areas. This abundance of suitable areas indicates that future growth can be easily accomodated and carefully sited in order to preserve valuable natural areas. Based on the projections of demand for land there appears to be no excuse for siting future development in hazardous areas or in locations where coastal resources will be jeopardized.

In addition to the 3000 areas classified in Chapter 8 as Development Opportunity Areas there are 1428 acres identified as "Overlap Areas" which have high amenity value and which could support sensitive future development. Based on the abundant supply of development locations compared to acreage demands, it would seem appropriate to use Overlap Areas rather sparingly and

sensitively, with full awareness of natural emenity values. (Further elaboration on Priorities is provided in Chapter 9.)

Conclusion - Most of the population growth and much of the demand for land projected for the Study Area will be occurring within inland census tracts which are not adjacent to the riverfront. As a result, within the narrower, river oriented final boundary (Chapter 6), there appears to be ample land for projected growth. Since the riverfront area is predominantly industrial, it is important to appreciate and take maximum advantage of the opportunities for development which the shoreline possesses. There is land available, over and above the projected requirements for industrial growth, and some of the areas are suitable for other types of development.

In summary, the Preliminary Study Area presently has a pattern of an industrial riverfront with inland residential neighborhoods. That balance is not projected to change (except in the one instance of the Eastwick redevelopment project). Finally, the projections indicate that there are more than adequate riverfront development sites, and, therefore, a great deal of opportunity and potential exists for development through the Year 2000.

FUTURE PORT VIABILITY

Although total population levels have remained mostly static, the U.S. Bureau of the Census has reported that Pennsylvania, like the rest of the Northeast, has experienced a rate of net out-migration of -1.5% from 1970 to 1975.[2] There has been a notable decline in population in urban areas, a redistribution of people to outlying suburbs and an apparent out-migration of population to the South and Southwestern portions of the U.S.

Urban areas have also lost jobs. Although employment in Central Philadelphia has increased as a result of more service industries, manufacturing throughout the City has declined sharply over the last several decades. In March 1977, an article in The Evening Bulletin reported a loss of 121,200 blue collar jobs in Philadelphia between 1969 and 1976. Communities in Delaware County have also lost employment as well as population. (Refer to Chapter 1, Population and Employment).

The Region has a large manufacturing sector, but these manufacturing facilities are old and relatively costly to operate. During periods of sluggish national economy, unemployment in these old, marginally-profitable facilities rises rapidly. During periods of economic recovery, increases in employment lag behind the national rate. The efforts of the private and public sector to stimulate manufacuring and halt the loss of manufacturing jobs in urban areas have not, unfortunately, been able to reverse these trends.

Against this fairly gloomy backdrop, there are reasons for optimism. A major reason is the "Ports" of Philadelphia, one of the Region's major assets. Very few ports have the ability to handle the volume of bulk imports that Philadelphia can. Ore, cocoa, coffee, petroleum and sugar will continue to be major import items. There will be, however, major competition with other North Atlantic ports for future general cargo trade, and it is general cargo that generates the most income for the metropolitan area.

Recent projects to revitalize the port have given Philadelphia a relative competitive advantage over New York, as well as the two other nearby ports, Baltimore, Md. and Hampton Roads, Va. About ten years ago the non-profit Philadelphia Port Corporation was formed, and in several years this group had built two major facilities, the Tioga and the Packer Avenue Marine Terminals.[3] The Delaware River Port Authority established The World Trade Division to promote the port, and the seven county Southern Jersey Port corporation has begun a wharf expansion project.

Many variables will influence the economic vitality and competitiveness of the Ports in the future. Improvement to facilities in New York, Baltimore and Hampton Roads may draw trade away from Philadelphia. The adequacy of existing facilities, for containerized shipping and for bulk cargo as well, will influence the volume of trade. Improvements to the supporting infrastructure system, especially the railroads, would permit more efficient distribution of goods. Some analysts feel that more industries utilizing petroleum and chemical products, presently produced along the coast, should be actively attracted to the Philadelphia area. If Outer Continental Shelf (OCS) oil is developed, some existing industries might benefit from related activities. Finally, the publicly-assisted redevelopment of vacant riverfront lands to mixed-use developments such as Penn's Landing, could be the focal point for further revitalization of shoreline properties.[4]

As mentioned previously, one of the most important variables influencing the attractiveness of the Port is the adequacy of facilities to handle containerized and general cargo. A "Port Facilities Study" is now being prepared for Philadelphia's Department of Commerce to evaluate what actions, if any, the City should take to expand the level and quality of port facilities. A major objective of the study is to determine whether a third marine terminal should be built and to give recommendations on appropriate design, location and cost of a new marine terminal for the port.[5]

The whole metropolitan region has a stake in the viability of the Port. Although many of the demographic and economic factors which have been catalogued are beyond the scope of Coastal Zone Management, it should be noted that some important steps have already been taken and will continue to be developed by various groups to improve the efficiency of the port. Numerous public

and private groups have direct or indirect impact on port development: Philadelphia, Bucks and Delaware Industrial Development Corporations, Chambers of Commerce, The Port Corporation, Delaware River Port Authority, Overall Economic and Development Council, City and County agencies, housing and neighborhood associations, unions, and others. Effective action results both from aggressive leadership within public and private sectors and the many groups working in concert to achieve the common goals for a stronger Port.

WATER RESOURCES

Background -- There has long been competition among various water users for the resources of the Delaware River. The U.S. Supreme Court decision in 1954 gave New York and New Jersey the right to divert up to 900 million gallons a day (MGD) from the Delaware Basin. The decision also inspired the creation of the Delaware River Basin Commission (DRBC) to help balance competing water demands in the four-state basin.[6]

The severest recorded drought in the Northeast, spanning 1960 to 1964, further highlighted the need for programs to reduce water loss, increase water storage and improve waste management throughout the basin. In general, however, communities along the Delaware River have not had difficulty obtaining water for domestic or industrial use. Rather, the major concern has been the quality of water and the kinds of uses to which it could be put.

In response to federal and state water pollution regulations, standards were set for water quality throughout the Basin. To achieve these standards, many sewage treatment plants have been or are scheduled to be built, upgraded or expanded. In the Upper Delaware Basin (above Trenton), for example, the goal is to reduce waste loads to a level consistent with swimming, conservation and fish propagation. Although water quality standards in the Delaware Estuary are not so strict, extensive water quality improvements were required in order to permit safe boating, fishing and passage of migratory fish.[7]

A second critical water management goal in the Basin is to assure that sea salts do not contaminate water supplies at the Torresdale intake for the City of Philadelphia. The DRBC goal is to not exceed a 50 mg./liter concentration of chlorides in the vicinity of the intake point.[8]

In order to ensure that water remains uncontaminated, the flow of freshwater must be strong enough to bar the inflow of sea water from the ocean up the Delaware River. Recognizing the importance of maintaining adequate flows during dry summer seasons, the U.S. Supreme Court, in its 1954 decision, required New York to assure

a minimum flow of 1750 cubic feet per second at Montague, New Jersey. (For location see figure iii-3.) Subsequently, the Delaware River Basin Commission recommended that River flows at Trenton not fall below 3000 cubic feet per second (cfs).[9]

Achieving the goal for minimum low flow will require that a system of reservoirs be installed in the Delaware Basin to retain storm runoff for later release during dry, low-flow periods. There are now some 21 major reservoirs in the Basin that may be used to augment flows. There are plans for about a half-dozen additional facilities, although some of these projects, like Tocks Island Lake, may never be developed. (See the following section, "External Decisions Influencing the Coastal Zone".)

Future Water Supply and Water Quality Problems. A major aspect of water resource planning is the projection of future demands for water. Demand for water expands in response to increases in households and industries within the basin and also to growth in adjacent basins where supplies are more limited. Because adequate supplies are essential regardless of yearly changes or variations in weather conditions, critical periods of water shortage are the yardstick for designing systems to meet water demand. Major public investments in reservoirs, water supply systems and sewage treatment plants are made with the goal of supplying present and future needs, even in drought periods, without intolerable impacts on fish and other aquatic life.

Projections for future water demand depend on two levels of projections, 1) projections of population and economic growth and 2) projections of future water use characteristics.

It is difficult to reliably predict future population growth. For example, recent population projections used by agencies with on-going water planning projects within the Delaware River Basin differ by more than 2 million people for the year 2000 (the present population is about 7 million).[10] These differences in population projections account, in part, for similar wide disparities in projected water demand. But projecting water demand requires additional assumptions that also vary, notably the per capita use of water, the proportion of water withdrawn from the ground compared to surface supplies and industrial demands. When these factors are all considered, it is not difficult to understand why projections of future water demand differ by several hundred per cent.[11]

Although total water demand is an important factor, a more critical concern is the increase in the consumptive, or depletive, use of water. Most water used by households is returned to nearby streams or recharged back to groundwater as wastewater, thereby helping to maintain natural stream flow conditions. But such activities as power generation and irrigation are consumptive uses that fail to return large portions of their water back to the ground or stream. (See the discussion of water use presented in Chapter 1.) As consumptive

water uses increase in the basin, downstream flows decline. This situation is of great concern to the Delaware Estuary, in particular, because it makes goals for water supply and quality in the Delaware Estuary more difficult to achieve.[12] Anticipating significant losses of water in the future because of new consumptive uses, DRBC, together with state and federal agencies, have planned the construction of reservoirs that could be used to compensate for the anticipated increase in consumptive loss of water, in addition to augmenting natural low flow conditions.

The difficulty in projecting consumptive use, as with population projections, is demonstrated by the wide disparity among projections. For example, URS/Madigan-Praeger projected consumptive losses in 2025 of 605 million gallons per day (MGD), and DRBC projects for 2020, a 1353 MGD depletion. both of these figures may be too high. Because recent statistics suggest even lower rates of population growth than these studies used, there would be a proportional reduction in projected industrial activity and energy generation. Therefore, even lower projections of future consumptive losses might be appropriate.

Electric generating stations consume large amounts of water through evaporation during the cooling process. About 40% of the increase in consumptive losses projected in URS/Madigan-Praeger study is attributable to losses from energy generation. The URS/Madigan-Praeger and DRBC reports cited above, however, used out-of-date plans for expansion and siting of power facilities. The 1975 Master Siting Study reveals that two proposed nuclear plants and one fossil-fuel plant, as well as three proposed expansions, were dropped from the 1974 study used in these two reports.[13] This major change in planned withdrawals for power generation could dramatically scale down projections of future consumptive losses. The 1975 Master Siting Study does contain plans for expansion of the Chester and Eddystone stations in Delaware County. It is projected that these plants will consume a total of 9.1 cfs, a loss which appears to have no significant impact on water resources in the Estuary.

Because development of reservoirs is, in part, justified by the need to compensate for future consumptive losses, changing demographic and water consumption patterns might reduce the need for already planned reservoirs. A new planning effort is now underway to reevaluate past reservoir plans.

Federal and state laws require that streams meet certain water quality standards by 1983. In order to properly design waste treatment facilities to achieve these standards, two pieces of information are needed: 1) a projection of the number of residents to be served (and consequently, the volume of waste generated), and 2) a prediction of how much waste may be discharged to streams without violating water quality standards. Because the stream's assimilative capacity is reduced when the streamflow is low, treatment plants are designed to release effluent of high enough quality that even during drought

conditions stream standards are met. The drought condition used as the basis for most waste management plans is called Q7-10, a flow that is so low that it occurs, on the average, only once in ten years.

The water in the Upper Delaware, subsequently entering the Delaware Estuary at Trenton, generally meets standards and will continue to do so because treatment facilities will control wastes generated by existing and new residents and industry.[14] However, the Delaware Estuary is severly polluted, failing to meet state standards. The pollution is generated from existing sources; population growth will not have a noticeably detrimental effect on future water quality in the Estuary. Major efforts have been made to reduce waste loads discharged by existing industries and municipalities along the riverfront, but improvements to water quality have come slowly.[15] (See Chapter 1, figure i-17).

On the basis of an early water quality modeling effort, waste dischargers to the Estuary were required to reduce their waste loads to levels set by DRBC. These waste load allocations, however, were not based upon achieving standards during Q7-10 drought conditions, but rather upon an assumption that a flow of 3000 cfs would be maintained at Trenton. At present, the flow of the River at Trenton falls below 3000 cfs about 15% of time, and this flow rate is more than twice the flow that occurred at times during the drought in 1963.[16] Moreover, existing and actively proposed reservoirs above Trenton do not have the capacity to release sufficient water during droughts to achieve the full 3000 cfs goal.[17] In practical terms, unless the flow of the Delaware is augmented by releases from reservoirs during commonly dry seasons, the River cannot be expected in the future to consistently achieve water quality objectives.[18]

In the future, two water quality issues may be raised: 1) In light of changing demographic conditions and public debate concerning low-flow augmentation and large reservoir systems, is the goal of a 3000 cfs minimum flow too high?; and, 2) should the water quality standards be tightened in the Delaware Estuary[19] in order to permit fish maintenance and propagation? An affirmative answer to either of these questions would indicate that present waste load allocations be reduced and levels of waste treatment be increased.

The 3000 cfs goal for stream flow at Trenton, besides influencing waste assimilation, is designed to prevent salt water contamination that is hazardous to health and coosive to pipes and industrial equipment. At this flow rate, DRBC feels that chloride concentrations will not exceed 250 mg./liter at the Schuylkill River confluence and will not exceed 50 mg./liter at Torresdale water supply intake.[20] Additionally, augmented flow would flush oyster beds in the Bay with sufficient freshwater that predators could not invade even during low flows.

But considerable debate has centered on whether the 3000 cfs flow rate is a necessary goal for controlling salinity.[21] A special study, incorporating mathematical and physical modeling, will soon be underway to reevaluate the relationship between flow and salinity levels in the Estuary. Some observers feel the present, high-flow objective at Trenton will prove to be unjustifiable because the potential salinity hazard is very small even without augmentation.[22]

EXTERNAL DECISIONS AFFECTING COASTAL RESOURCES

Introduction -- The inventory in Chapter I summarized the distribution and use of land, water and socioeconomic resources in the Preliminary Study Area. Chapter 2 describes historical and current problems in the Study Area related to land use, resources and environmental quality, and in this chapter future problems have been presented. But major projects outside the Study Area, either beyond the tidal reach or not within the State, also have a potential to affect Pennsylvania's coastal resources. Three such "external" developments which may have impacts on Pennsylvania's coast are discussed below. There are:

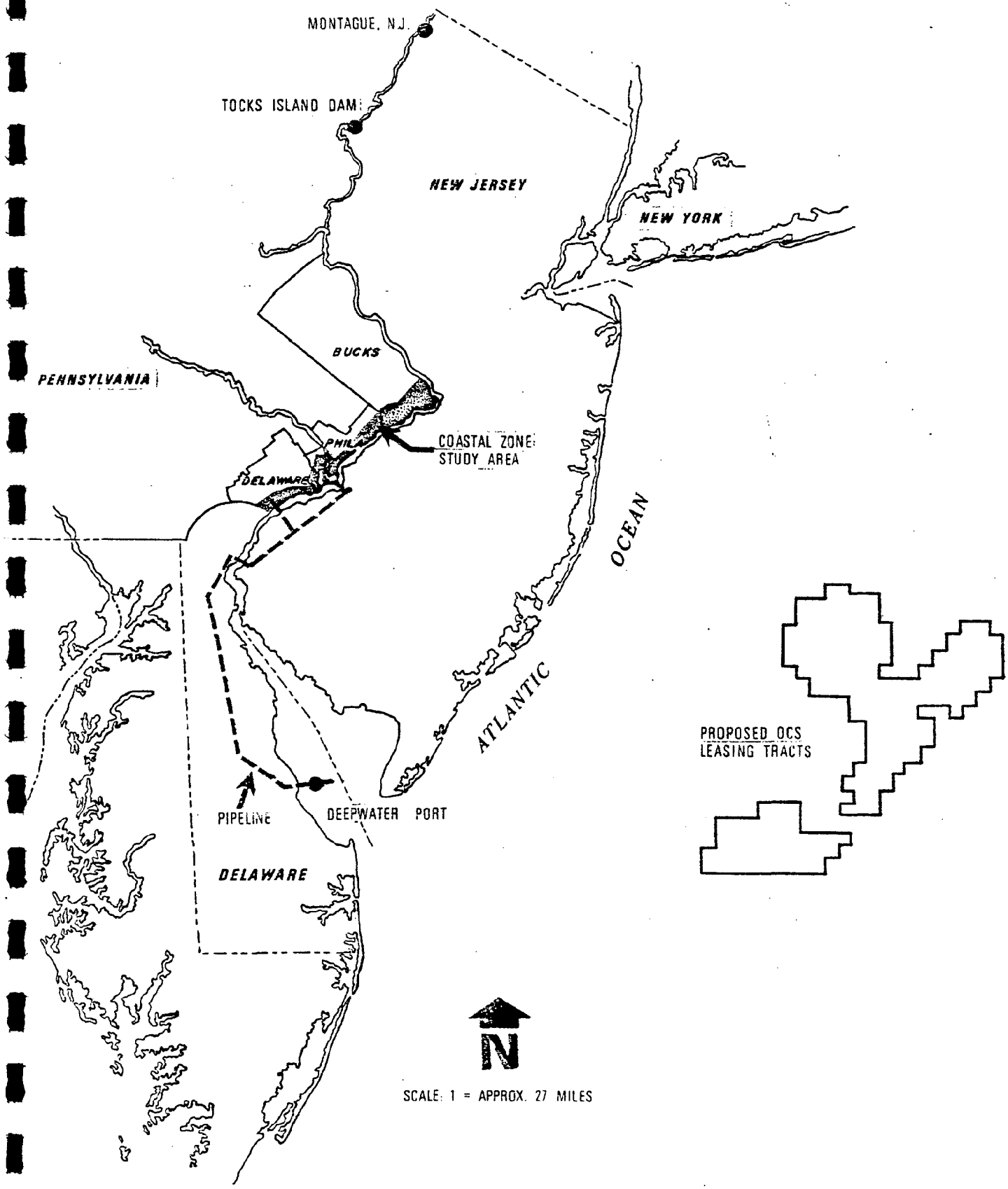
- The Tocks Island Dam
- Outer Continental Shelf (OCS) Development
- Deepwater Port/Pipeline

None of the three is yet a reality, and future impact on coastal resources are, therefore, hard to predict. The relationship of the 3 projects to the Pennsylvania Study Area is indicated in Figure III-3.

Tocks Island Dam -- In 1962, seven years after the worst floods in the history of the Delaware River basin, the Delaware River Basin Commission (DRBC) adopted a comprehensive plan for water resources management prepared by the U.S. Army Corps of Engineers. The plan was based on projected increases in the levels of population, industrial employment, production, demand for outdoor recreation opportunities and electric power demand.[23] Included in the plan were nineteen major control projects and thirty-nine smaller projects. The Tocks Island project, the keystone of the program, involved the construction of a dam on the Delaware River five miles above the Delaware Water Gap. The dam would create a reservoir extending thrity-seven miles upstream to Port Jervis, N.Y.

The Tocks Island project was designed to carry out a number of functions, many of which would impact the Delaware Estuary Coastal Zone. The dam was to provide flood control for the particularly flood-prone stretch of the river between Tocks Island and Burlington, N.J., protecting much of the Bucks County Study Area. In addition to flood control, a constant water

EXTERNAL DECISIONS AFFECTING THE COASTAL ZONE



supply for municipal and industrial users in Bucks and Philadelphia counties would be assured. Control over the flow in the River would alleviate the threat of salt water intrusion and excess pollution in the area of Philadelphia. The dam would also provide a source of hydro-electric power for New Jersey, while the reservoir would become the focus of the Delaware Water Gap National Recreation Area (DWGNRA). This federally operated facility was expected to draw 13% of its annual visitors from the Philadelphia, Camden, Wilmington area.

In the early 1970's, public concern for the environment grew, and the fate of the Tocks Island project became increasingly uncertain. In 1974, a new comprehensive study was ordered by Congress in response to public demands. Following completion of the study in July, 1975, the DRBC recommended that Congress not appropriate funds for construction.[24] Although the study concluded that the overall benefits of the project outweighed the negative impacts, three of the four basin state governors opposed construction,[25] and the Corps of Engineers suggested that the project be deauthorized so that other alternatives could be pursued. Congress has not yet acted to deauthorize the Tocks Island dam, (as of early 1977) but it is no longer a factor in long-range planning for the basin. A basinwide comprehensive study is presently being undertaken by DRBC to review the needs of the basin in terms of both water quality and quantity. The study is expected to become the basis for a new comprehensive plan for water management.[26]

The deauthorization of the Tocks Island project has several implications for the Coastal Zone Study Area. During the drought of the early and mid-1960's, the salt front in the River intruded upstream to within a few miles of Philadelphia's water supply intake at Torresdale. Although the Tocks Island reservoir was originally considered a necessity to control salinity during periods of low flow, recent projections show that the probability of significant intrusion is low and that additional low flow augmentation may not be required.[27] (See the above section on future water supply and water quality problems for additional discussion of this point.)

Planning for flood control will proceed in the direction of nonstructural measures. However, Pennsylvania has not adopted statewide flood plain management regulations, so that damage to structures in the flood plain will continue to be a threat in the absence of structural methods of control.

The original estimate of 10.5 million visitors per year to the DWGNRA was reduced to 4 million, and the most recent management plan, (currently being prepared by the National Park Service) predicts only 1.5 - 2.5 million visitors per year. The new plan proposes only limited increases in water recreation opportunities. Since 13% of the original estimate of 4 million users were expected to come from the Philadelphia, Camden and Wilmington area, a continuing demand for water-related recreation

can be expected from the Study Area population. (See Recreation Analysis, the next section in Chapter 3.)

Outer Continental Shelf (OCS) Development - During the past decade, the idea of tapping oil and gas deposits off the coasts of the U.S. has become a reality in some parts of the country. Due to a decline in domestic production of oil and gas, the Arab oil embargo of 1973 and escalating prices of crude oil since 1974, exploration of the outer continental shelf (OCS) for oil and gas has accelerated.

The middle Atlantic region, also known as the Baltimore Canyon, is one of five OCS frontiers in the U.S. Although the United States Geologic Survey has continued to downgrade estimates of potential oil and gas reserves, the Bureau of Land Management is presently selling leases on mid-Atlantic tracts.

Onshore impacts of OCS development in the Baltimore Canyon region would not be limited to those states immediately adjacent to the drilling fields. This fact appears to have been overlooked in many of the studies concerning this issue. Onshore facilities such as oil refineries, petro-chemical complexes, gas processing facilities and service operations are necessary to support OCS development. The Delaware Estuary Coastal Zone already has a petroleum-oriented industrial infrastructure, including refineries, port facilities, petroleum bulk storage facilities and access to air, road and rail transportation networks. There is, therefore, a possibility that some of the onshore OCS facilities will locate in the Coastal Zone.

Existing studies are limited in the scope of their impact analysis because of several key factors which are still unknown. The uncertainties surrounding the exact location of the OCS deposits, their potential yield and relative proportions of oil and gas make it difficult to predict what onshore facilities will be needed and where they will be located. Before the impacts of OCS development on the Delaware Estuary Coastal Zone can be adequately discussed, the attitudes of neighboring coastal states towards the siting of onshore facilities must be made more clear.

Some states which were originally opposed to the development of the Baltimore Canyon are beginning to look more favorably upon the prospect of attracting the necessary onshore support industries (for example, New Jersey has recently taken a more supportive attitude). This trend reduces the chance that OCS development will significantly affect the Study Area because Pennsylvania is over 60 miles removed from onshore locations nearest to the tracts.

It seems unlikely that development of additional petroleum refineries will occur in the Coastal Zone. The total refining capacity of the facilities which are presently located in the Delaware Valley region is sufficient to process the largest volume of oil estimated to be produced at the Mid-Atlantic

drilling sites.[28] However, if the existing refineries continue to process oil from foreign sources as well as OCS oil, additional refinery facilities may be required. If these facilities were concentrated around existing operations where a service infrastructure and work force are already established, social and economic impacts would not be severe.

The use of oil tankers in the Delaware River will decline if OCS oil is refined in the Coastal Zone. It is expected that most of the oil will be transported by pipeline to the refinery, and tankers will only be used where the drilling site is far offshore. Thus, there will be less danger of oil spills from collisions, groundings or accidents arising from unloading cargo on the River. (For a summary of recent accidents see Figure ii-1, Chapter 2.)

No processing plants for natural gas exist in the Mid-Atlantic region, but from three to eight plants will be needed when OCS gas is tapped.[29] If these plants are sited in the Coastal Zone, both economic and environmental impacts can be expected to follow. Economic impacts include changes in employment, earnings and land use patterns. The environmental impacts of gas processing plants vary with the quality of gas being used. Plants processing gas containing large amounts of hydrogen sulfide may become major sources of sulfur oxide pollution. These economic and environmental impacts are very difficult to quantify because no site specific analysis involving the Coastal Zone has been completed and the quality of OCS gas is still unknown.

Further analysis of potential onshore impacts of OCS development on the Delaware Estuary is required. In response to this need, the Governor's Energy Council is currently preparing a report for Pennsylvania's Department of Environmental Resources. Partial funding has been supplied by the National Oceanic and Atmospheric Administration (NOAA). When completed in the summer of 1977, the report will describe the range of impacts that may be anticipated depending on the location, size, timing and quality of offshore oil and gas.

<u>Deepwater Port/Pipeline</u> -- The construction of a deepwater oil port and pipeline facility in the Delaware Bay has been under consideration for the past fifteen years. Each time a study has been published, it has quickly become outdated by new economic and political developments in the energy field. For example, construction and operation costs are subject to such a high rate of inflation that the use of new deepwater facilities may prove to be more costly than the present use of barges and small tankers. Also, the federal policy of reducing imports of foreign crude oil may limit the number of oil tankers using the new port to the point that the cost will be too high to compete with present methods of delivery. High yields of OCS oil could significantly reduce the need for a deepwater port, though not the need for pipeline construction. Because of these

uncertainties, the most recent study[30] does not recommend development of a deepwater port at the present time.

There may be, however, several reasons to build the port at a later, more favorable time. The relatively small tankers which serve the region's refineries presently transfer some of their cargo into barges for delivery, and the shallower draft of the "lightered" ships permits navigation of the Delaware River and direct delivery of the remaining oil. The huge tankers (with drafts up to 90') which are transporting increasingly large proportions of foreign crude oil cannot ascend the river and will be delivering to refineries outside of the United States unless deepwater ports are developed near this nation's refineries. The port and pipeline facility would decrease the likelihood of oil spills by 1) reducing the number of couplings and uncouplings involved in unloading a tanker, and 2) reducing the traffic density and collision hazard in the Delaware River.

Despite national goals calling for reduced oil consumption brought on by Project Independence, it is anticipated that the demand for refined petroleum products in the region will exceed the production capabilities of local refineries by 1990.[31] Refinery expansion could provide the necessary economic incentive to build the port/pipeline facility.

The negative impacts of the development of a port/pipeline facility would be minimal for the Delaware Estuary Coastal Zone. A major portion of crude oil deliveries to the local refineries would be a land-based pipeline if the facility were developed. Delivery by barge and shallow-draft tankers would continue, though at a declining rate. There would probably be less traffic and danger of collision in the River if the deepwater port were built.

RECREATION DEMAND

The Delaware Estuary, like all coastal areas, presents unique sites for recreation opportunity. People are attracted to a natural water area for active recreation as well as passive recreational activities. The dense population in the Lower Delaware River Area has generated the largest demand for outdoor recreation facilities in the Commonwealth. In order to analyze coastal recreation activities it is necessary to inspect the problems which occur in the coastal area. The second step is to analyze data on supply and demand to uncover recreation trends. The final step is to identify and recommend sites to meet the anticipated need.

At the present time, Delaware Riverfront land is almost totally occupied by public utilities, manufacturing, warehousing and trucking, and rail or water transportation facilities resulting

in high competition for vacant land. Since most of the riverfront is in private ownership and use, public access to the river is available at only a few points. Even when access is achieved, the conflict between recreational boating and commercial traffic can create a potentially hazardous situation. As a result of the industrialized uses, the quality of the shoreline is very low in many areas being asthetically unattractive and in generally poor maintenance. In addition to the access and shoreline problems, pollution of the river from point and non-point sources seriously limits or precludes water contact activities.

The proximity of this area to the Atlantic Coast and the Chesapeake Bay results in an outmigration for most water related activities. An estimated 40% of the resident population[32] leaves the area to satisfy all their outdoor recreation needs. There is; however, a recreation influx created by tourist attractions. These include historic sites as well as waterfront activities, provide passive recreational, educational and social experiences.

DELAWARE ESTUARY RECREATION FACILITY

VISITOR SUMMARY[33]

Facility/Site	1976 Attendance
Governor Printz Park	30,823
Independence Hall National Historical Park	1,360,812
Liberty Bell Pavillion	3,633,041
Pennsbury Manor Park	51,546
Neshaminy State Park	416,948*

*Includes 18,500 visitors for boating activities

According to the Region I date compiled by the Pennsylvania State Recreation Plan, less actual participation for picnicking, fishing, hiking/nature walking and camping occurs than would be expected for the population. The expected rates were projected by using statewide participation figures with demographic characteristics (age, sex, income etc.). The lack of available sites could have discouraged participation and if more facilities were available, the actual rates might rise to Statewide levels. The catagory of swimming could be used to support this contention. Since swimming participation is actually higher than expected, swimming may have more than adequate facilities.

% of Participation of Persons 5 Years and Over[35]

Activities	Actual	Expected
Picnicking	65.7	70.5
Fishing	26.9	32.2
Camping	20.2	26.7
Hiking/Nature Walking	37.3	41.0
Swimming	75.2	70.4
Boating/Canoeing/Waterskiing	34.8	34.8

Bicycling	51.1	50.2

Projections of recreation participation figures for Region I indicate that by 1990 a supply deficit will occur for all major activities, including swimming at beaches and pools, picnic tables, boat launching ramps, hiking/biking trails and camp sites. These projections are detailed in figure iii-5.

Because this data encompasses a large area relative to the actual coastal zone, these statistics can be deceptive. The majority of the beach areas and boat launch ramps are located at reservoirs and lakes in the northern reaches of the Planning Region; therefore, these facilities are not representative of the coastal zone. Similarly it must be recognized that the large differences between supply and demand cannot be met in the coastal zone due to resource limitations and conflicting uses.

Determining local needs is essential in order to develop a complete picture of the demand for recreation in the study area. Future needs have been determined by comparing the current inventory of park and recreation areas with the acreage that will be required, based on population forecasts and standards for local open space.[36] The standards were developed and adopted by DVRPC with input from the Technical Advisory Committee on open space, composed of individuals from entire region.

Traditionally, recreation standards have suggested a certain number of acres per 1000 persons to be provided for recreation. DVRPC's standards incorporate several other variables such as population density and open space availability. Although the most densely populated areas generally show the greatest need for recreation opportunities, standards there have been relaxed in order to realistically reflect the scarcity of land available for recreation. Higher acreage standards in the surrounding, lower density municipalities make up the difference, since more land is potentially available there.[37]

Projected local recreation needs for the Study Area Municipalities in the year 2000 have been mapped in figure iii-6. The figures assume no new recreational areas beyond what existed in 1974. (The acreage standards and inventory of facilities do not deal with water related activities). The map shows that severe deficiencies in park and recreation acreage will exist for all but one of the eight Philadelphia districts, as well as half of Bucks County.

It has recently been suggested that deficits shown in Philadelphia may be slightly overstated. Large regional parks such as Fairmount, Cobbs Creek and Pennypack are used by neighborhood residents and portions could be considered available to offset some of the local deficit. Normally none of the acreage in these regional parks is included in the inventories of local facilities. The only municipalities which show a surplus

Figure iii-4

RECREATION PLANNING AREA

Figure iii-5

DEMOGRAPHIC BASED PROJECTED RECREATION PARTICIPATION AND SUPPLY[35]

Region 1 (Delaware, Philadelphia, Bucks, Montgomery, Chester Counties)

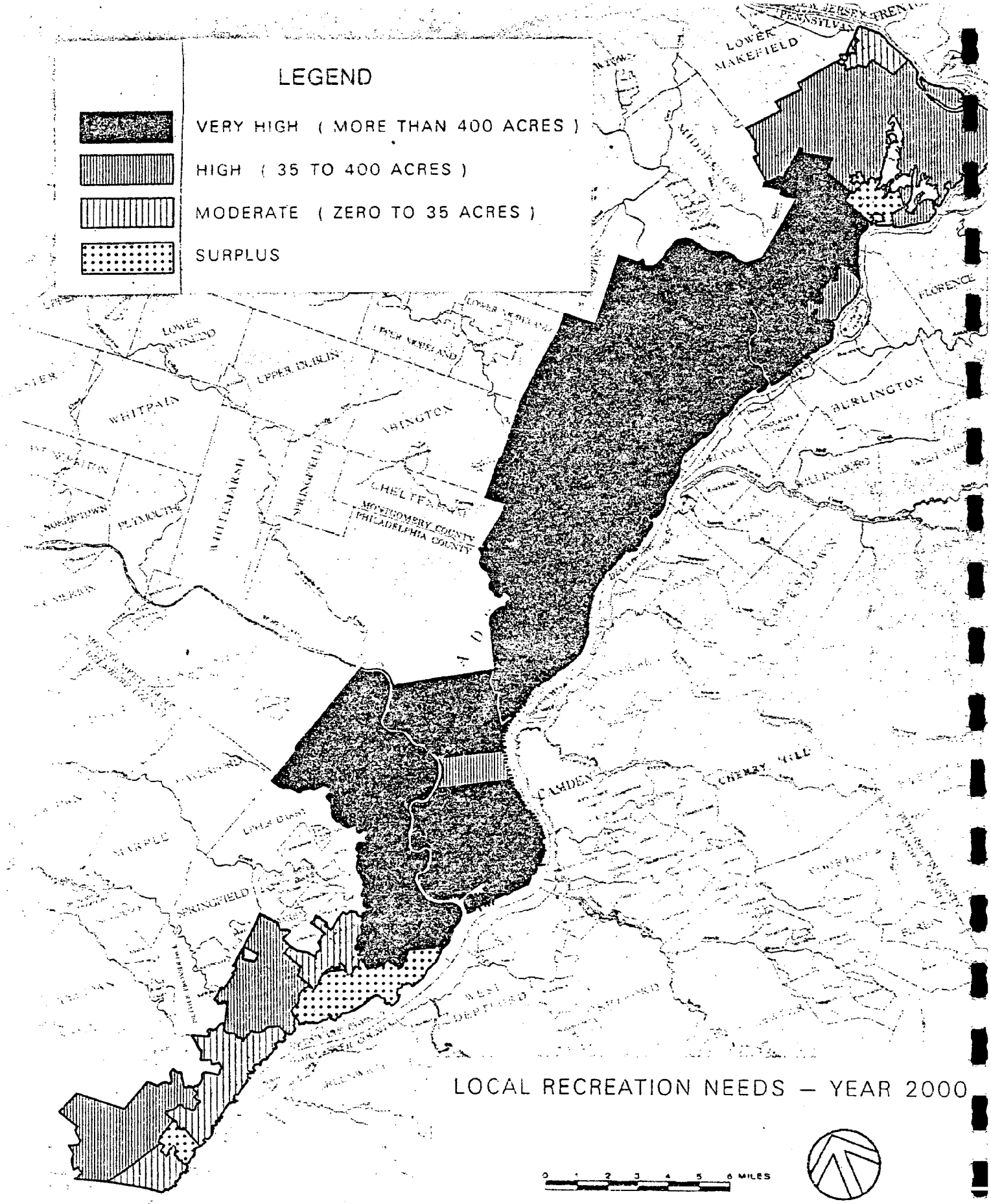
ACTIVITY	1974 ACTIVITY DAYS** (000's)	1990 PROJECTED ACTIVITY** DAYS (DEMAND) (000's)	PERCENT OF INCREASE 1974-1990	1974 SUPPLY OF REC. (FACILITIES)	1990 PROJECTED DEMAND	1990 DEFICIT
Swimming	87,341	112,097	28.3%	26,400 linear ft. beach*	33,884	-7,484
				2,528,000 sq. ft. pool	3,244,625	-716,625
Picnicking	22,076	25,548	15.7%	10,440 picnic tables	12,083	-1,643
Boating/Canoeing/ Water Skiing	11,212	18,045	60.9%	111 boat launch ramps*	178	-67
Hiking/Nature Walking	25,853	33,032	27.8%	464 miles hiking	593	-129
Camping	10,708	16,642	55.4%	2,435 camp sites	3,784	-1,349
Fishing	17,106	23,319	36.3%			
Sightseeing/ Pleasure Driving	61,776	69,548	12.6%			
Bicycling	114,922	134,604	17.1%	71 miles (inventoried)		

* The majority of the facilities are found at water impoundment structures within Planning Region I.

** Activity Day - participation in an activity on a particular day regardless of the length of time involved in the activity.

Based on population figures below

1974	1990	
3,630,000	4,041,000	11.3%



LOCAL RECREATION NEEDS — YEAR 2000

of recreation land by the year 2000 are Trainer, Tinicum, and Tullytown.

Because the study area is extensively developed, recreation deficiencies cannot be completely alleviated using traditional methods of locally furnished facilities or even with the provision of large regional parks. This seems especially apparent in those areas showing deficiencies in excess of 400 acres. Because of the scarcity of recreation opportunities, alternative planning techniques must be used in this highly competetive and industrialized coastal zone. Some of these techniques include:

- More small parks closer to home instead of large ones located at considerable distances.

- Designating areas for leisure time to include noncompetetive innovative neighborhood activities, such as community gardens, art and craft exhibits, flea markets, etc.

- Multipurpose use, where appropriate, for active or passive recreation at water and wastewater treatment facilities, airport flight paths, and vacant lands adjacent to industrial plants, bridge right-of-ways.

- The use of less than fee acquisition methods such as easements and leases to gain access to the waterfront.

Such leasing of private, municipal and corporate lands for public access and use has been successfully carried out by the Pennsylvania Fish Commission and the Pennsylvania Game Commission.

The multiple use concept is one possible solution to ease the highly competetive and conflicting use problem. Multiple use should be considered whenever recreation can occur in combination with industrial or commerical sites as well as other areas such as sewage treatment plants. Public access to the river is another possible multiple use site. This access may be physical, or possibly even visual, but must be accorded high priority in all future plans.

In order to establish a priority of sites, various sites with recreation potential were evaluated. Three types of recreation potential ratings were established. The first classification is "Existing" (E). These sites are privately a publicly owned sites currently in public recreational use. They are to be considered for improved maintenance or future expansion as the available funding permits. The second rating is "Immediate Potential" (IP). These sites are publicly or privately owned areas which can help to fill present needs, but require immediate investigation and action through acquisition or other method to preserve the resource. Both of these site classifications

correspond to natural GAPC's or recreational, cultural, historical GAPC's (as discussed in Chapter 8).

The third rating is "Reserved Potential" (RP). These sites are privately owned areas with existing facilities or recreation potential to serve future public recreational needs but present economic conditions prevent their development or acquisition. These sites generally correspond to the Development Opportunity GAPC's or the Overlap GAPC's.

The following chart is a brief listing of the sites, their municipality, ownership, potential recreation activities, and the assigned rating. A more indepth description of most of the sites can be found in the GAPC Chapter (8). A description of all the sites classified can be found in the Coastal Recreation Analysis Paper as summarized in Appendix C.

Name	Municipality	Ownership	Potential Activities	Recreation Status
		DELAWARE COUNTY		
McClure Park	Marcus Hook	Public	PR	E
Commodore Barry Bridge Area	Chester City	Private	PR,O,BA	IP
Chester Creek Mouth	Chester City	Public	BA,PR	IP
Governor Printz S.P.	Tinicum Twp.	Public	HS,PR,O	E
Essington Waterfront	Tinicum Twp.	Private	BA,M,F	IP
Little Tinicum Island	Tinicum Twp.	Private	NSA,F,PR,O	IP
Tinicum Marsh	Ridley Twp. Prospect Pk. Norwood Folcroft Tinicum Twp.	Private	NSA,F,BA, PR,O	IP
Folcroft Landfill	Folcroft	Private	PR	IP
		PHILADELPHIA COUNTY		
Tinicum National Environmental Center	Philadelphia	Public	NSA,PR,F,O	E
Fort Mifflin	Philadelphia	Public	HS,PR	E
U.S. Army COE Property	Philadelphia	Public	BA,PR	RP
Schuylkill River Park	Philadelphia	Public	PR,O,F	IP
Independence Nat'l. Historic Park	Philadelphia	Public	HS,PR	E
Penn's Landing	Philadelphia	Public	HS, PR,O	E
Penn Treaty Park	Philadelphia	Public	PR, O, F	E

Pennypack Park	Philadelphia	Public	NSA,O,F,PR	IP
Pleasant Hill	Philadelphia	Public	BA,F,O,PR	E
Poquessing Creek Mouth	Philadelphia	Private	NSA,F,PR,O	IP
	BUCKS COUNTY			
Biddle Estate	Bensalem Twp.	Private	NSA,HS	IP
Bucks Co. Delaware River Access Area	Bensalem Twp.	Public	BA,F,O,PR	E
Creek Road South	Bensalem Twp.	Public	PR	IP
Neshaming S. Park	Bensalem Twp. Bristol Twp.	Public	M,S,O,BA	E
Radcliffe Street	Bristol Boro	Public & Private	HS,PR,O	E
Pennsylvania Canal	Bucks Co.	Public	F,O,PR,HS	IP
Money Island	Tullytown Falls Twp.	Private	F,O,NSA,PR	RP
Bordentown Causeway	Falls Twp.	Private	O,PR	E
Van Sciver Lake	Falls Twp.	Private	BA,F,NSA	RP
Pennsbury Manor State Park	Falls Twp.	Public	HS,PR,O	E
Falls Twp.Delaware River Access Area	Falls Twp.	Public	BA,F,O	IP
Biles Island	Falls Twp.	Private	NSA,PR,O	RP

Activities

F - Fishing
S - Swimming
PR - Passive Recreation
HS - Historical Site
BA - Boat Access
O - Other (Picnicking)
(Ball Fields)
(Hiking, Biking)
M - Marina
NSA - Natural Scenic Area

Status

E - Existing
IP - Immediate Potential
RP - Reserved Potential

FOOTNOTES

1. The year 2000 model simulates regional growth and development for nine county, bi-state regional planning. Regional population and unemployment totals for year 2000 are the basis for making future land use allocations. The regional totals for future population are based on a combination of past and current trends (from a standard demographic model utilizing cohort-survival statistics) and county level policy decisions.

   Several points should be noted in the use of Year 2000 projections for the coastal Study Area. The model is intended to be used on a regional scale as an indicator of directions and pace of growth for policy planning. There are many unstated assumptions (such as future regional improvements and national trends) incorporated into the projections which may not be reflected at the scale of the Coastal Zone Management program.

   Finally, the projected population figures, on which output is initially based, appear in some respects to be contrary to documented Study Area trends which show at least a five year decrease in population in Philadelphia and Delaware Counties, and a slowing down of lower Bucks County's 1960's growth rate.

   In spite of these factors, the Year 2000 projections are the most up-to-date, comprehensive source of available date on future land use in the Study Area, and have been endorsed by the individual counties for regional planning purposes.

2. For an indepth discussion of nation-wide population shifts over the last five years refer to Population Estimates and Projections, Estimates of the Population of States with Components of Change, 1970 to 1975. (Washington, D.C., Bureau of the Census, November 1976). Series P-25, No. 640.

3. For a general summary of accomplishments of The Philadelphia Port Corporation, refer to Adam Tait, ed., 1976 Bulletin Almanac, (Philadelphia, The Evening and Sunday Bulletin, 1975), p. 419. The Tioga Marine Terminal and Packer Avenue Marine Terminal are the two container-handling projects completed to date.

4. The variables mentioned here are taken from Joan Ominsky, "Not a Lazy River," Region, December 1975, pp. 4-6, 18.

5. The scope of Philadelphia's new study is given in "Request for Proposals: Port Facilities Study for City of Philadelphia." (Philadelphia: Department of Commerce, August 1976).

6. For a good summary of the Supreme Court decision in 1954, see James F. Wright, Water Management of the Delaware River Basin, (West Trenton, New Jersey, Delaware River Basin Commission, April, 1975).

7. The uses that standards are designed to achieve are set forth in regulations adopted by the Department of Environmental Resources in "Water Quality Criteria," (Title 25, Park 1, Subpart C, Article II, Chapter 93).

8. Although the U.S. Public Health Service recommends a less restrictive chloride concentration of 250 mg./liter, at this level water may have a distinctively brackish taste, water may have an associated sodium concentration that poses a hazard to citizens with heart conditions or high blood pressure, and industrial equipment could be damaged by salts. Hence, 50 mg./liter is considered the better standard.

9. Under natural conditions, flows at the Delaware River are likely to fall below these two values approximately 15% of the time. This is estimated from tables contained in W. F. Busch and L. C. Shaw, Water Resources Bulletin No. 1, Pennsylvania Streamflow Characteristics, low-flow frequency--flow duration. (Harrisburg, Department of Forest and Water and Health, Prepared cooperatively with the U.S. Geologic Survey, 1966). DRBC acknowledged that the requirement of 1,750 cubic feet per second (cfs) at Montague "has the effect of augmenting natural flows during the periods of lower rates of runoff, and coincidentally, highest rates of water demand," (Wright, op. cit., p. I-68).

10. The Delaware River Basin Commission, op.cit., p. I-77, projects a basin-wide population in 2000 of 10.1 million and a 2020 population of 12.6 million. In URS/Madigan-Praeger, Comprehensive Study of The Tocks Island Lake Project and Alternatives, (New York, 1975), high medium and low growth rates are offered--9.6, 8.9, and 7.8 million, respectively, for the year 2005. The rate of growth used by the Pennsylvania Department of Environmental Resources, Program and Planning for the Management of the Water Resources of Pennsylvania, November 1971, p.xi, would suggest a basin-wide population in 2000 of roughly 8.8 million.

11. A startling discrepancy was encountered in comparing DRBC, (op. cit.) estimates of 1970 gross water demand with URS/Madigan-Praeger 1970 estimates of basic demand. In this case, the DRBC figure was 12.9 billion gallons per day and URS/Madigan-Praeger's was 3.5 billion gallons per day. Although not explicitly stated, the presumed discrepancy may arise from DRBC's considering both ground and surface supplies and the other study considering only surface supplies.

12. These goals, as explained in the background section above, are to maintain at least a 3000 cfs flow at Trenton and less than 50 mg./ liter chloride content at the Torresdale water intake.

13. Plans for new and expanded electric generating facilities are prepared annually for DRBC by a consortium of electric utilities within the Basin. The changes in recent plans can be observed by comparing the 1974 study with the 1975 study. The latest study is, Delaware River Basin Electric Utilities Group, Master Siting Study--Major Electric Generating Projects, Delaware River Basin 1975-1989, June 1975, prepared for DRBC.

14. Although water passing Trenton is of good quality, there is a "sag" in the concentration of dissolved oxygen. As reported in Chapter VI, (p. VI-B-189), COWAMP/208 plan report by Chester-Betz Engineers, this sag may be due, in part, to decomposition of plant biomas that has settled out at Bristol after being discharged from the Upper Delaware.

15. The worst Delaware Estuary water quality observed in summer of 1976 was 2-3 mg./liter of dissolved oxygen (DO) near Marcus Hook. The long-term (1962-1972), average summer DO in this stretch had been about 1 mg./liter.

16. The minimum recorded flow of the Delaware River at Trenton was 1,180 cfs, on October 31, 1963. (see Water Resources Data for New Jersey, (any water year), U.S. Geologic Survey Water Data Report, prepared by the U.S.G.S. and U.S. Department of Interior, in cooperation with state and local agencies.) Similarly the minimum recorded flow at Montague, N.J., was 412 cubic feet per second on August 23, 1954, less than one-quarter the target flow of 1750 cfs). See footnote 9 also.

17. Tocks Island was the only reservoir under consideration that could have assured that the 3000 cfs goal would be attained. The other reservoir projects have a combined safe yield that is less than half of the Tocks Island yield. See Delaware River Basin Commission, op. cit., p. II-35.

18. Considerable debate has revolved around water quality models of the Delaware Estuary, and a significant new data gathering and modeling effort is now underway in connection with 208 Areawide Waste Treatment Planning. But results will probably not be ready until 1978. During some years, such as 1976, flow rates never fall below 3000 cfs. But one observer noted that if precipitation patterns in early 1977 are any indication, the flow criterion may be violated in 1977.

19. Unlike the Delaware River above Trenton, the water quality standards in the Estuary are not strict enough to encourage propagation of warm water or migratory fish nor to allow

body-contact sports. The standards applied to the Estuary are the most lax available standards for pH, dissolved oxygen, fecal coliform and other parameters.

20. This conclusion is supported by W. B. Kerighton, Fresh-Water Discharge--Salinity Relations in The Tidal Delaware River, Geologic Survey Water-Supply Paper 1586-G (Washington: U.S. Geologic Survey, U.S. Government Printing Office, 1966).

21. See URS/Madigan-Praeger, Inc., op. cit., study on Tocks Island for an analysis which questions the need for flow augmentation. The authors conclude, "It is important to question whether any minimum flow, 2300 or 3000 cfs, is required given that there are so few exceedances of the thresholds when no minimum flow is maintained (III-66)." As these authors pointout, the drought in the early sixties was so extreme that it has a recurrence interval of several hundred years, yet 50 mg./liter of chloride was not violated at Torresdale, and Camden well fields were also not seriously threatened. They question whether special augmentation should be practiced as a rule when the hazards appear to have an exceedingly small chance of occurring.

22. However, in a telephone conversation with Patrick Cairo, Philadelphia Water Department, February 22, 1977, Mr. Cairo said that the URS/ Madigan-Praeger study understated the hazard; although their analysis could be right, he preferred to wait for results of more reliable modeling and analysis that is forthcoming. An argument in favor of low flow augmentation and stressing the potential salinity problem was prepared by C.H.J. Hull, "Comments on "The Salinity Problem" in the Delaware Estuary," (West Trenton, DRBC, June 25, 1976), mimeo, 18 pgs.

23. Delaware River Basin Commission, Water Management Plan of the Delaware River Basin, April 1975, p. I-1.

24. URS/Madigan-Praeger, Inc. and Conklin & Rossant, A Comprehensive Study of the Tocks Island Lake Project and Alternatives, June 1975.

25. The governors of New Jersey, New York and Delaware voted to not proceed with the project, Pennsylvania supported the project, and the United States abstained.

26. Donn Mitchell, "Looking at the Delaware; Or the Ghost of Tocks Island", Region, vol. 3, no. 1, Jan. 1977, p. 12.

27. URS/Madigan-Praeger, Inc., op. cit., p. ii.

28. Woodward Clyde Consultants, Mid-Atlantic Regional Study; An Assessment of the Onshore Effects of Offshore Oil and Gas Development, October 1975, p. 51.

29. Resource Planning Associates, Inc., Identification and Analysis of Mid-Atlantic Onshore OCS Impacts, p. 2-6.

30. Penjerdel Corporation, Oil Port Update, May, 1975.

31. Ibid., p. 13.

32. Outdoor Recreation Horizon, 1969 Pennsylvania Department of Forests and Waters.

33. Based on 1976 State Park attendance figures.

34. Region I includes 5 counties: Chester, Montgomery, Delaware, Philadelphia and Bucks - see map.

35. State Recreation Plan, March 1976, Governor's Office of State Planning and Development.

36. Population Forecast--Preliminary yr. 2000 projections, DVRPC 1/19/77. Standards--"Open Space Standards and Criteria for the Delaware Valley", 2nd Draft, DVRPC 1/26/76. Current Inventory--DVRPC Open Space Inventory, 1974 Update.

37. Most of the municipalities except Philadelphia are in density category 2 or 3 and therefore use a standard of 7.67 or 9.5 acres per thousand population respectively.

LAKE ERIE COASTAL ZONE

PROJECTED POPULATION CHANGE AND LAND REQUIREMENTS

Introduction --The Lake Erie Coastal Study Area differs substantially from the Delaware Estuary Study Area in land requirements, future demands and Coastal Zone Management decisions. The major difference between the two is a matter of scale. The population of the entire Lake Erie Preliminary Coastal Study Area was 214,157 in 1970 located along 43.57 miles of coastline (a straight line from the Ohio border to the New York border). The Lake Erie Coastal Study Area consists of substantial agricultural and open lands in the western and eastern portions with one major metropolitan area in the central portion and a number of boroughs and villages scattered throughout the Study Area. Industrial usage of the coastline is limited, as are areas in the process of redevelopment. As a result of the generally low density development, the issue of whether there is enough land to meet future demand within the prelimimary study area of the Pennsylvania portion of Lake Erie is not of paramount importance, although it still will be addressed. The major issue here lies in whether proper and desirable utilization of undeveloped available land will take place in the future which will, by the very nature of the future development, minimize the basic problems in the Preliminary Study Area (discussed previously in Chapter 2, Problems and Issues.

Projected population changes were developed for: Erie County; the Preliminary Study Area; the remainder of the County; the Western, Central and Eastern portions of the Study Area; and for each of the 15 individual municipalities that comprise the Preliminary Study Area.[1] These changes were determined for the Year 2000 with actual and percent increase over 1970 with 1960 populations, actual and percent change to 1970 to give the reader insight into the trends that lead to the projections for 2000 (figures iii-7 and iii-8). The population data has also been summarized in map form (figures iii-10) to indicate more easily the future population trends. References will be made to open land availability obtained from data presented in Chapter 1, Inventory of Coastal Resources and Uses.

Erie County Preliminary Study Area and Remainder of Erie County--The Year 2000 projections forecast population increases for all parts of the County including the Preliminary Study Area. Although a few municipalities in Erie County are projected to lose population by the 1980's, it is expected that the population loss will be recovered and some increase shown in every Erie County Municipality by the Year 2000[2]. The County as a whole, will continue a steady increase pattern with a 17.3% increase by the Year 2000 from a population of 263,654 to 309,385. When comparing the Preliminary Study Area with the remainder of the

County, the Coastal Zone percent increase is only half that of the rest of the County, 14.8% vs. 28.2%. However, the actual population increase of the Coastal Zone is well over double, 31,757 vs. 13,974. This is due to the fact that over four times as many people in 1970 resided in the Coastal Zone than in the remaining portion of the County.

Migratory trends are clearly indicated within the County for this period of time. The percentage of population increase within the Preliminary Study Area is less than that of the County as a whole. The bulk of the difference between the two will be caused by the relocation of a portion of the population from the Preliminary Study Area to locations within the remainder of the County, primarily that area beginning immediately south of the Central Study Area, then south to the County line.[3]

Figure iii-7

POPULATION CHANGE
1960, 1970 - 2000

AREAS	1960 POPULATION	1970 POPULATION	ACTUAL CHANGE	PERCENT CHANGE	2000 POPULATION	ACTUAL CHANGE	PERCENT CHANGE
ERIE COUNTY	250,682	263,654	12,972	4.9%	309,385	45,731	17.3%
PRELIMINARY STUDY AREA	208,588	214,157	5,569	2.7%	245,914	31,757	14.8%
REMAINDER OF COUNTY	42,094	49,497	7,403	17.6%	63,471	13,974	28.2%
WESTERN STUDY AREA	14,891	19,160	4,269	28.7%	30,366	11,206	58.5%
CENTRAL STUDY AREA	174,818	174,648	170	.1%	190,215	15,567	8.9%
EASTERN STUDY AREA	18,879	20,349	1,470	7.8%	25,333	4,984	24.5%

Source: Erie County Population Analysis, 1972

Figure iii-8

POPULATION CHANGE
1960, 1970 - 2000

INDIVIDUAL MUNICIPALITIES

AREAS	1960 POPULATION	1970 POPULATION	ACTUAL CHANGE	PERCENT CHANGE	2000 POPULATION	ACTUAL CHANGE	PERCENT CHANGE
SPRINGFIELD TOWNSHIP	2,132	2,446	314	14.7%	3,533	1,087	44.4%
EAST SPRING-FIELD BOROUGH	511	593	82	16.0%	953	360	60.7%
GIRARD TOWNSHIP	2,432	3,074	642	26.4%	5,287	2,213	72.0%
LAKE CITY BOROUGH	1,722	2,117	395	22.9%	3,331	1,214	57.3%
GIRARD BOROUGH	2,451	2,613	162	6.6%	3,366	753	28.8%
PLATEA BOROUGH	357	354	- 3	-.8%	505	151	42.7%
FAIRVIEW TOWNSHIP	3,887	6,256	2,369	60.9%	10,900	4,644	74.2%
FAIRVIEW BOROUGH	1,399	1,707	308	22.0%	2,591	884	51.8%
CITY OF ERIE	38,440	129,231	-9,209	-6.7%	131,470	2,239	1.7%
LAWRENCE PARK TOWNSHIP	4,403	4,517	114	2.6%	4,731	214	4.7%
MILLCREEK TOWNSHIP	28,441	36,980	8,505	29.9%	49,714	12,734	34.4%
WESLEYVILLE BOROUGH	3,534	3,920	386	10.9%	4,300	380	9.7%
HARBORCREEK TOWNSHIP	10,569	12,038	1,469	13.9%	15,861	3,823	31.8%
NORTH EAST TOWNSHIP	4,217	4,465	372	9.1%	5,451	986	22.1%
NORTH EAST BOROUGH	4,093	3,846	-371	-8.8%	4,021	175	4.6%

Source: Erie County Population Analysis, 1972

Western, Central and Eastern Study Areas-Western, Central and Eastern Preliminary Study Areas are quite distinct from one another in land utilization (Chapter 1, figures i-29, i-30, i-31). Future population projections and land requirements are highly affected by those differences.

Of the three, the Western Study Area will experience a 58.5% increase in population, the greatest percent population increase by the Year 2000. This represents a total population of 11,206 in actual population. Many factors contribute to this increase. There are twelve distinct population centers (7 villages[4] and 5 boroughs) and the western tip of the Erie metropolitan area which will be available to accomodate what appears to be a national trend for an increasing segment of the population to move to small towns.[5] The predominant use of agricultural land is devoted to cropland/pasture production which, if past trends continue, is highly susceptible to suburban developmental pressures. only a small amount of the available agricultural land is considered unique which is most in need of protection[6] Sewer and/or water facilities are available in some parts of the Area with a greatly increasing service area likely by the Year 2000. Also, a large amount of land has minimal development limitations outside sewered areas concerning on-lot septic systems (Chapter 1, figure i-38). A large increase in land utilized for industrial purposes is expected, especially on the lakeshore due to two future large-scale industrial projects. They are the construction of a regional electric generating plant to serve the tri-state area which will eventually replace the current plant in the City of Erie, and the development of a major steel plant complex which may be one of the largest single employers in Erie County by the Year 2000 (both of these projects are discussed in detail in Chapters 8 and 9). Residential acreage should also increase greatly due to the large population increase and the large minimum lot size requirements that prevail (up to one acre for a single family dwelling) in the Western Study Area.[7]

The Eastern Study Area will experience less than half the percentage of population increase of the Western Study Area by the Year 2000 with 24.5% representing 4,984 in actual population. It is interesting to note that the present acreage percentages of the various land use functions are nearly the same for both the Western and Eastern Study Area. For example, the agricultural, forest and undeveloped land for the Western and Eastern Study Areas are 82.7% and 81.6%, respectively (Chapter 1). However, the probable development that will occur in these two Study Areas is quite different considering the following factors regarding the Eastern Study Area versus those factors outlined above for the Western Study Area. There are only four distinct population centers (3 villages[8] and 1 borough) and the eastern tip of the Erie metropolitan area. The predominant use of agricultural land is devoted to orchard/vineyard production which traditionally is highly resistant to suburban developmental pressures. A large amount of available agricultural land is considered unique which is most in need of protection from any development other than

agricultural.[9] Sewer and/or water facilities are available in some parts of the Area. However, only a moderate expansion of service is expected by the Year 2000 and the majority of that expansion will be in the eastern tip of the Erie metropolitan area. Also, only a moderate mount of land outside the sewered areas has minimal development limitations concerning on-lot septic systems (Chapter 1, figure i-40). Industrial acreage increase is expected to be minimal. Although residential acreage increase will be moderate, the percent increase should be greater than the percent increase in the population due once again to the somewhat large minimum lot size requirements that prevail (up to one acre).

The Central Study Area will experience a population increase of 8.9% by the Year 2000, this represents an actual population of 15,567. This is the largest actual population increase in any of the Study Areas as well as the remainder of Erie County. The Central Study Area encompasses the bulk of the Erie metropolitan area and, as such, is reflected in present acreage percentages of the various land functions. In comparison with the Western and Eastern Study Areas' over 81% in the agriculture, forest and undeveloped land, the Central Study Area in the same categories is 31.5% (Chapter 1). However, even with this low percentage, it is not likely that all of the undeveloped land will be utilized as a result of future demand by the Year 2000. Residential acreage should increase proportionately to the population increase and industrial acreage should increase moderately.

Individual Municipalities -- The City of Erie was the only municipality within the Preliminary Study Area that had a population decrease since 1970. The City, from 1970 through 1975, experienced a yearly decline in population - a trend that began after an all-time high of 138,440 in 1960. The Year 1960 was the last decennial year of continual population increase since the beginnings of an Erie settlement in 1800. As can be seen in figure iii-9 however, the rate of decline has steadily decreased to only .4 of one percent decrease in 1975.

Figure iii-9

POPULATION CHANGE
1960,1970 - 1975, 2000

CITY OF ERIE

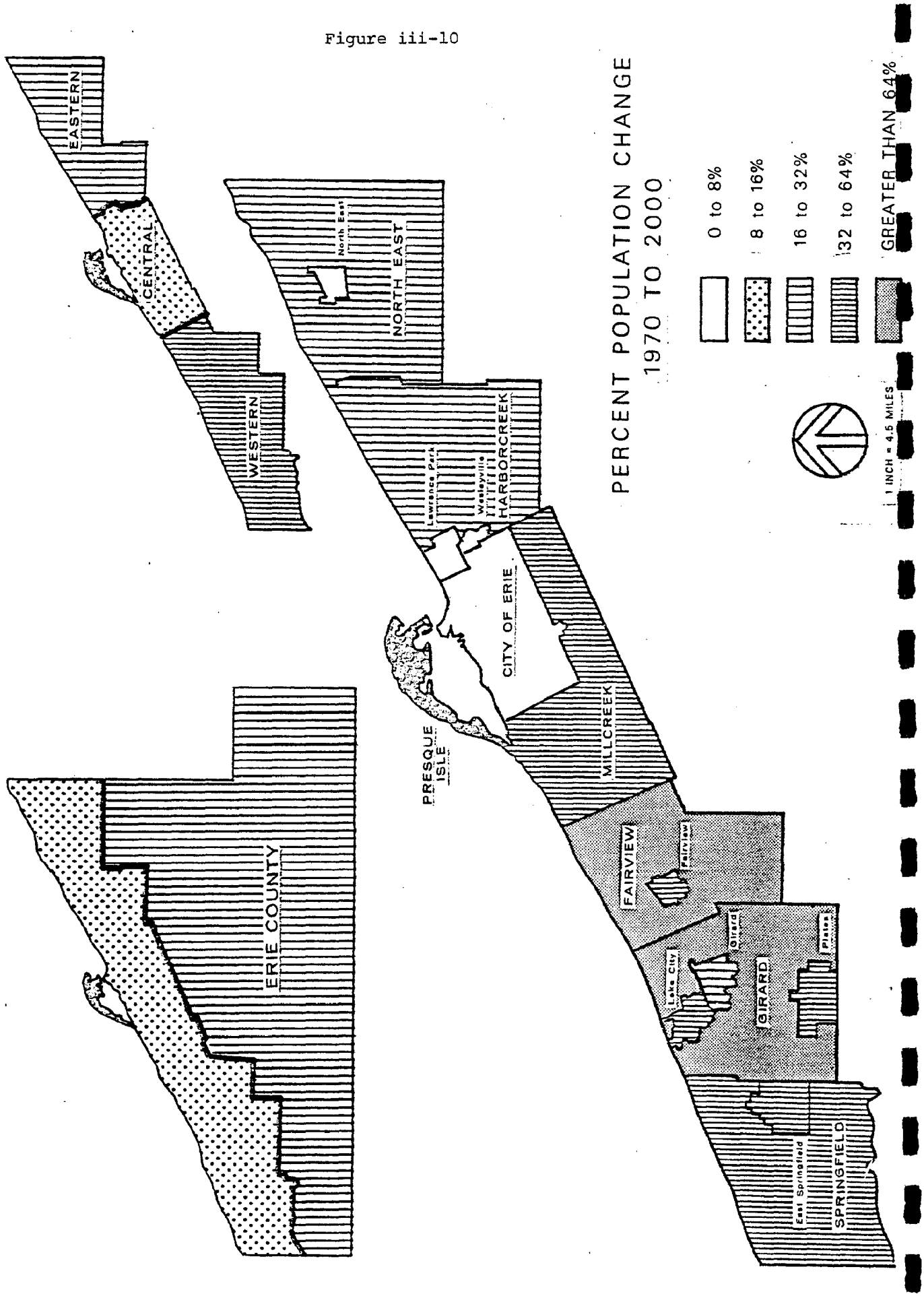
	1960	1970	1971	1972	1973	1974	1975	2000
POPULATION	138,440	129,231	126,132	122,503	118,503	118,084	117,560	131,470
ACTUAL CHANGE		9,209	3,099	3,629	3,597	842	504	13,910
PERCENT CHANGE		6.7%	2.4%	2.9%	2.9%	.7%	.4%	11.8%

Source: Population Analysis, City of Erie, 1972
City-wide Neighborhood Analysis, 1976

A zero population change was likely in 1976 due to the construction of a medium-rise apartment complex (12 story) in the Erie central business district in that year which brings the total medium-rise residential structures in the City of Erie to seven. This recent trend in land utilization to medium-rise apartments, the majority of which are in center City, should continue and accelerate in the future.[10] This factor reversed a 16 year population decline trend in the City and will assist in maintaining a steady increase in population from 1977 to the Year 2000. This will result in a net gain of 2,239 population increase over 1970 while a population gain of 13,910 should be expected from 1975 to the Year 2000.

Figure iii-10 illustrates the socio-economic impact (land use requirements) and the migratory trends of the population projections down to an individual municipal level. The Percent Population Change Map indicates that the western half of the Preliminary Study Area will, by the Year 2000, expand or newly create community services such as schools, parks, and road systems, as well as public utilities such as sewer and water facilities which will have a direct impact on land use requirements. The Erie metropolitan area will shift westward on the whole, with diminishing influence and population increase from one municipality to the next moving west. In like manner, little population increase is expected eastward with corresponding land use requirements and is also clearly indicated.

Figure iii-10



FUTURE PORT VIABILITY

Before the St. Lawrence Seaway was opened in 1959, the Erie harbor was a busy port of call. Shipments of grain, iron ore and coal accounted for the bulk of the Port of Erie's volume and prosperity. Due to major changes in regional and world trade trends, increasing utilization of rail transportation and the opening of the St. Lawrence Seaway, a heavy decline in the cargo movement of these products was realized through the Port of Erie. Grain shipments went the all-water route to the Atlantic seaboard, bypassing Erie. Iron ore became imported through such ports as Baltimore and Philadelphia and then transshipped by rail to the Pittsburgh area, thus reducing southern Pennsylvania's dependence on the Great Lakes region. A major Erie port-dependent waterfront industry, which produced pig iron, was drastically reduced because of the less costly imported pig iron obtainable through the St. Lawrence Seaway. And finally, the volume of coal exported through the Port of Erie eventually was diverted to direct rail service or to other ports better equipped to handle coal.[11]

In less than a decade, it became clear that changing industrial patterns, relocation of maritime trade routes, and a debilitating lack of efficient and direct highway access from the Port and bayfront area to the Interstate system and other problems (Chapter 2) diminished Erie as a Great Lakes port. Initial steps were taken to revitalize the Erie harbor area in the late 1960's. Emphasis was placed on realistic future port facilities, as well as utilization of the harbor area as a water related industrial center and recreational site, all tied together with proper highway access.

By the early 1970's, many of the factors that influence the revitalization process had already been dealt with directly. The first and most important step was the formation of the autonomous body, known as the Erie-Western Pennsylvania Port Authority which became the Port and bayfront area. In just a few years since the creation of the Port Authority the original marine terminal was totally replaced and relocated to the mouth of the harbor (entrance channel to Presque Isle Bay). Known as the Erie International Matine Terminal, the Modern facilities include: three ship berths, transit shed, protected storage areas, convenient rail sidings and a north/south access highway. Recently, one of the largest capacity cranes on the Great Lakes was put into service, further enhancing the attractiveness of the Port.[12] A ship building firm relocated to the old marine terminal site and began operations. To date it has constructed the two largest and modern lake ore carriers on the Great Lakes in use today. The ship building site is now utilized for winter layover, maintenance and repair of the two ships.[13] Other recent activities by the Port Authority include the active pursuit of purchasing waterfront properties especially unused railroad facilities and the preparation of a study for recreational uses

of the port area[14] (The bayfront area can be seen in Chapter 1, figure i-46).

Several portions of the revitalization process are still to be accomplished. The attraction of water dependent industries to Authority-owned land will require diligent promotion of the Port Authority. The eventual removal of the several industries along the western portion of the bayfront that are not water related or dependent to an industrial park elsewhere in the City of Erie will take many years. These industries (and currently vacant land in this area) will be replaced by recreational and commercial projects directly associated with waterfront activities.[15] If offshore drilling for natural gas in Lake Erie blossoms into a major industry in the future, the Port facilities could be utilized. Also, related industries for processing and distribution of natural gas could easily be accomodated in the Port area.

There is, however, one major factor which is needed to accelerate progress in the revitalization process. The total lack of adequate highway access along the entire length of the bayfront is hampering all efforts to renewed bayfront prosperity (Chapter 2). Federal, State, County and City agencies have a coordinated and planned port access road that will connect the bayfront area to: the Interstate system to the southwest; several points in the local highway system in the central area; the north/south marine terminal access highway in the east (Port area); and to the local highway system to the southeast. Although in the planning stage, actual construction is far from beginning. At this time, the port access road, fully completed and open to traffic, does not seem likely until the late 1980's or 1990 (10 to 12 years from now).[16] Such delay will, very likely, postpone an accelerated revitalization during that time period. A completed port access road will provide the most important attraction point for bayfront and Port development, since the completion of the new marine terminal facilities. Efforts in both the public and private sector of the community continue to strive for the earliest completion of this vital transportation link and will continue to implement through the Port Authority, the industrial, commercial and recreational plans and projects to create a viable bayfront and Port for the Erie metropolitan area.

WATER RESOURCES

Background -- The Lake Erie Coastal Study Area adjoins one small part of the largest concentration of fresh water in the world - the Great Lakes. The quantity obtainable is, for all practical purposes, limitless. The quality of water today, concentrating on the Pennsylvania portion of Lake Erie, is well within the majority of state standards. Water quality is considered excellent for all water contact activities (boating, fishing,

swimming, etc.) and a minimum of treatment is required for domestic (drinking) and industrial use.[17] The other major body of water within the Coastal Study Area is Presque Isle Bay and harbor. This area does not fare as well as the Lake in general, and swimming is not recommended, however fishing and boating is still good. The Bay has only a single entrance which slows the flushing process needed for cleansing. Incoming and outgoing water must pass through the same narrow channel. Therefore, pollutants tend to accumulate rather than dissipate in the Bay waters. Also, a portion of the storm sewer system of the Erie metropolitan area drains into the Bay instead of into the Lake.

Within the 50 major and minor watersheds in the Preliminary Study Area,[18] the creeks and runs possess varying levels of water quality, and several can be considered as excellent for all uses. A great deal of progress has been made in improving the water quality of Erie County streams. An exception to this is Mill Creek which is located in the Central study Area. Mill Creek runs through a large underground tube for much of the distance that it travels through the City of Erie to its mouth in Presque Isle Bay. Portions of the storm sewer system connect directly to the Mill Creek tube causing a substantial amount of the associated pollution problems mentioned above concerning the Bay.[19] Two municipalities are served by surface water sources and are located in the Eastern Study Area. One hundred percent (100%) of the population of North East Borough and 44% of the population of North East Township are served by a single, though many faceted, system. The source of water which supplies the system comes from three impoundment reservoirs located in the Township which store water from several sources, including a number of streams and springs.[20]

Groundwater supplies (individual, small private and municipal system wells) are the only source of water for the entire Western Study Area, one third of the land area in the Central Study Area and four-fifths of the land area in the Eastern Study Area.[21] This represents 100%, 9%, and 36% of the populations of the three Study Areas, respectively.

There are three municipal central well water systems in the Preliminary Study Area, all of which are in the Western Study Area. Ninety-two percent of Fairview Borough residents, and 98% of the residents of Lake City and Girard Boroughs are served by three independent systems solely supplied by three wells each. Groundwater availability is generally either fair or unreliable in the areas other than the three just mentioned throughout the Preliminary Study Area. There are several reasons for this. One reason is that the actual watershed areas are quite small. The divide between the Great Lakes basin and the Mississippi River basin runs quite close to Lake Erie along the Pennsylvania portion. So close that the southeasternmost tip of the Preliminary Study Area has the basin divide running through it, just seven miles from the Lake Erie shoreline. This situation

greatly limits watershed size and as groundwater supplies are primarily developed throug filtration of stream water and rainfall into the subsoil, the small watersheds do not form groundwater supplies of any great consequence.[22] Another reason that groundwater supplies are not generally reliable is that the geologic formations along Lake Erie in the Preliminary Study Area are such that nearly no filtration of Lake water into the subsoil occurs. This is apparent in that the most unreliable wells are located immediately adjacent to the lakeshore.[23]

The majority of the population residing in the Preliminary Study Area (over 77%) are served by the Erie central water system supplies by water intakes about one mile offshore in Lake Erie. The City-owned and operated system supplies all of the water needs of the City of Erie, Wesleyville Borough and Lawrence Park Township, 60% of the population of Harborcreek Township and 58% of those who reside in Millcreek Township. The average daily consumption during the summer months is 44 million gallons per day (MGD) with a rated treatment capacity of 88 MGD. A portion of this system involves the bulk sale of City owned water to several outlying small private and municipal authority systems.[24]

A report which inventories the existing water supply situation, and proposes alternatives for future water requirements in Pennsylvania portion of the Lake Erie Drainage Basin and the remaining portion of Erie County is the Comprehensive Water Quality Management Plan (COWAMP), published September 1976. This study inventories existing conditions with regard to population, land use, economy, water use and water quality and general environmental condition. The existing water quality management program, including existing facilities was reviewed and evaluated, future water quality management needs were projected, finally a recommended plan was selected. This plan consists of method to control municipal, industrial, and non-point sources of pollution, recommends management programs, evaluates the programs financial feasibility and indicates water quality monitoring and surveillance methods which are in compliance with current state regulations.

One of the main objectives of the Coastal Zone Management Program is the safeguarding of coastal lands which have direct and significant impacts on coastal waters. The goals of the COWAMP Study closely parallel many of these objectives and hence the recommendations of COWAMP should be taken into consideration and relevent proposals should be incorporated into the final CZM document.

Future Water Supply and Water Quality Problems -- The surface water central system and the three goundwater central systems in the Preliminary Study Area are adequate for the present population that they serve. Conversion to Lake Erie as a source is likely to take place by the Year 2000 if the projected population increases are to be adequately served by that time in and around these four areas. When built in the early part of

this century, it was more economical to utilize surface water from streams and springs and groundwater from shallow dug and drilled wells than to extend water intakes into Lake Erie for the small populations that were to be served. In the future, however, it appears inevitable that Lake Erie water will be used solely for or at least supplementary to the present systems by the Year 2000 in these areas.

The City of Erie water system, regarding its surrounding suburban area, presently handles extension of service in a cumbersome and somewhat unplanned manner through the Public Utility Commission (PUC). There are portions of the suburbs that are in need of public water supplies due to overuse of the groundwater supplies. This situation exists when Lake Erie is only 5 to 6 miles from these water-scarce areas. Development of the suburban areas has therefore occured where groundwater supplies are adequate causing a number of problems associated with the following: scattered development intermixed with agricultural land causing loss of these prime lands due to taxation and development pressures; groundwater supplies being periodically exhausted and/or contamination of these supplies due to the proliferation of on-lot septic systems; the scattered development pattern later makes extension of water and sewer utilities expensive, resulting in a "catch 22" effect where more developments rely on groundwater sources in a more scattered land use fashion making eventual utility extension more expensive and even less likely to occur. This process has created a very low density metropolitan area. The suburban pattern and an understandable reluctance on the part of the City of Erie to extend service to industrial and residential developments, where City officials fear a declining taxbase, (the City is not yet fully developed and has available industrial and residential land for development) have combined to form a baffling situation that in a coastal area with abundant water resources, residences and businesses go wanting for reliable supplies just a few miles from a major source, Lake Erie.

What has long been needed and must become a reality well before the Year 2000 is an Erie Metropolitan Area Water Authority which is promoted in the latest water study for the Erie area.[25] The following is taken from that study:

> "The conclusion has been reached...that there should be one agency responsible for furnishing water to the consumers in the Erie Metropolitan Area ...In order to implement this conclusion, it is recommended that an Erie Metropolitan Area Water Authority be created with ample capitalization to acquire and operate all the treatment and distribution facilities within the service area. This Metropolitan Authority would be charged with the responsibility to acquire all the local municipal authorities and private companies or other organizations that are presently serving any portion of this area with water and to expand the system as population and land use developments warrant... The basic premise of

the Authority is that ultimately it would acquire and operate, as one large system, all existing water systems within the Metropolitan Area...The advantages of a Metropolitan Authority are: (1) there will be one areawide organization geared to one job, i.e. provide potable water to the consumer (instead of the possibility of two or more agencies which might create conflicts in the operation of the system); (2) the system will not be under the jurisdiction of the Public Utilities Commission which presently must approve rates and valuations creating additional expenses and inefficiencies which are paid for by the consumer; (3) the planning for an orderly expansion of the system can be performed on need and population trends without outside governmental and political influence; (4) a rate structure can be established which will be fair and reflect the true costs to supply water to any consumer; (5) the advantages of having all connections metered can be obtained without having unnecessary political repercussions to those presently in office in the City of Erie; (6) this method will allow the recuitment and training of an expanded force necessary to operate the larger system using the present Bureau of Water employees as a nucleus of operation; and (7) as a result of the sale of the system, and with subsidy, and/or assistance from municipalities requesting service, the long overdue improvements to the City's system could be constructed."

Although many of the problems within the Erie metropolitan area mentioned above are out of the realm of CZM jurisdiction, the resolution of these problems would fall within the objectives of the program concerning proper water resource use and prime agricultural land protection.

If present trends continue, future stream and lake water quality in the Erie Coastal Zone will progressively improve due to increasingly better regulatory practices of local governmental agencies. Tertiary treatment of industrial and municipal sewage will continue to have positive effects on the water quality of Lake Erie. In recent years the water quality of Presque Isle Bay has also improved due to investigation and cessation of many illegal discharges of the storm sewer system in the City of Erie and will undoubtedly improve in the future. And finally, the major future industrial sites which will locate along the shoreline in the Western Study Area will be subject to very stringent pollution regulations for new construction and should have few detrimental effects on the current water resources in the Lake Erie Coastal Zone, if State requirements are closely adhered to.

EXTERNAL DECISIONS AFFECTING COASTAL RESOURCES

There are or could be events taking place outside the immediate boundaries of the Lake Erie Coastal Zone that would have a direct effect on the coastal resources of the area. There are three future industrially related projects that may develop in the Coastal Zone - a major steel plant complex, a large power generating plant complex and natural gas drilling the Pennsylvania portion of Lake Erie. However, the actual impact of these projects will be controlled from outside the Coastal Zone. Federal and State governmental decisions will decide to what extent, if any, these projects will adversely affect the existing coastal resources.

The States of Ohio and Pennsylvania are competing with other areas to attract a huge steel plant complex planned by the U.S. Steel Corporation on the Ohio/Pennsylvania border at the western end of the Preliminary Study Area. Decisions, basically political, involving the relaxation (or the non-enforcement) of established Federal Environmental Protection Agency and State Department of Environmental Resources standards, should not be part of the inducement process. It should be noted here that there is absolutely no basis in fact that this hypothetical situation exists. However, unanimous local concern for environmental protection should not be lost in the enthusiasm to locate such massive industrial project in these two States which understandably need to attract such enterprises. A somewhat similar external decision interpretation can be applied to the future Penelec power plant complex in the center of the Western Study Area on the lakeshore which will have four to five times the generating capactiy of the present plant. Recent and future federal energy policies to promote the use of fossil fuel (coal) for electric utility plants could also be developed around the loosening of air pollution standards for the national goal of petroleum independence. Even if such an unlikely situation did not arise for this utility or the steel plant, the special climatic conditions, which help to produce the unique farm lands[26] to the east (directly downwind) of these future projects, should be given special considerations when State and federal permits are approved. The third "future project" is the possible development of natural gas production facilties in the Pennsylvania portion of Lake Erie. State energy policies are similar to those of the nation to develop all the possible energy sources (reserves) within the country. The State government has not resolved the question of possible pollution versus the economic benefits. The environmental and economic effects, whether good, bad or minimal, will be most apparent in the Lake Erie Coastal Zone rather than Pennsylvania as a whole, therefore making the final resolution primarily an external decision on a presently unutilized coastal resource.

The three above mentioned projects together will have a beneficial impact on the economic climate of the Coastal Zone in

terms of jobs, industrial diversification and possible increased Port of Erie usage. However, the prime resources of the Lake Erie Coastal Zone are recreational and agricultural which are directly dependent on the generally good (and still improving) water and air quality that this area enjoys today. Care should be taken, concerning these and other industrial projects, to assure the continuance and maintenance of high quality environmental standards in the future, while at the same time progressing economically.

RECREATION DEMAND

The Lake Erie Coastal Zone provides a natural water area with a great recreation potential. There is a great attraction to a natural lake with its related activities. There is a significant influx of visitors attracted to the Erie Coast to satisfy their outdoor recreation demand. This high demand creates a substantial pressure on the Coastal recreation resources.

One major problem which faces the Lake Erie Coastal Area is the lack of public access. Characteristic of most of the U.S. Shoreline, private ownership is a major factor in limiting access. In most areas, natural barriers such as bluffs and marshes further limit access to the Lake. Another major problem faced by the residents is that of shoreline erosion and bluff recession. Two major causes of erosion and recession are abnormally high lake levels along with increased subsurface flow and man's action on the bluffcrest and bluffbase.[27]

Additionally, certain areas have problems with the quality of water, beaches, and shoreline. Frequently these areas fail to meet D.E.R. water quality standards. This problem may limit or possibly preclude water contact activities.

An analysis of the recreational activities, including future supply and demand projections, was used to determine recreation trends. Two sources of data were used in the analysis. The first set of data was taken from the State Recreation Plan which used planning regions (figure iii-11). The second set of data, taken from the State Water Plan, considers a much smaller relative area (watershed subbasin 15) and utilizes a set of recreation standards. These standards were developed on a people per unit basis for recreational facilities. The standards are then applied to participation rates and expected populations to determine recreation trends.

The tables below and on the following page show the actual recreation supply and demand figures. The regional data (figure iii-12) shows bigger deficits than the subbasin because of the larger population taken in account. These figures projected for 1990 are based on the assumption of no supply increase but

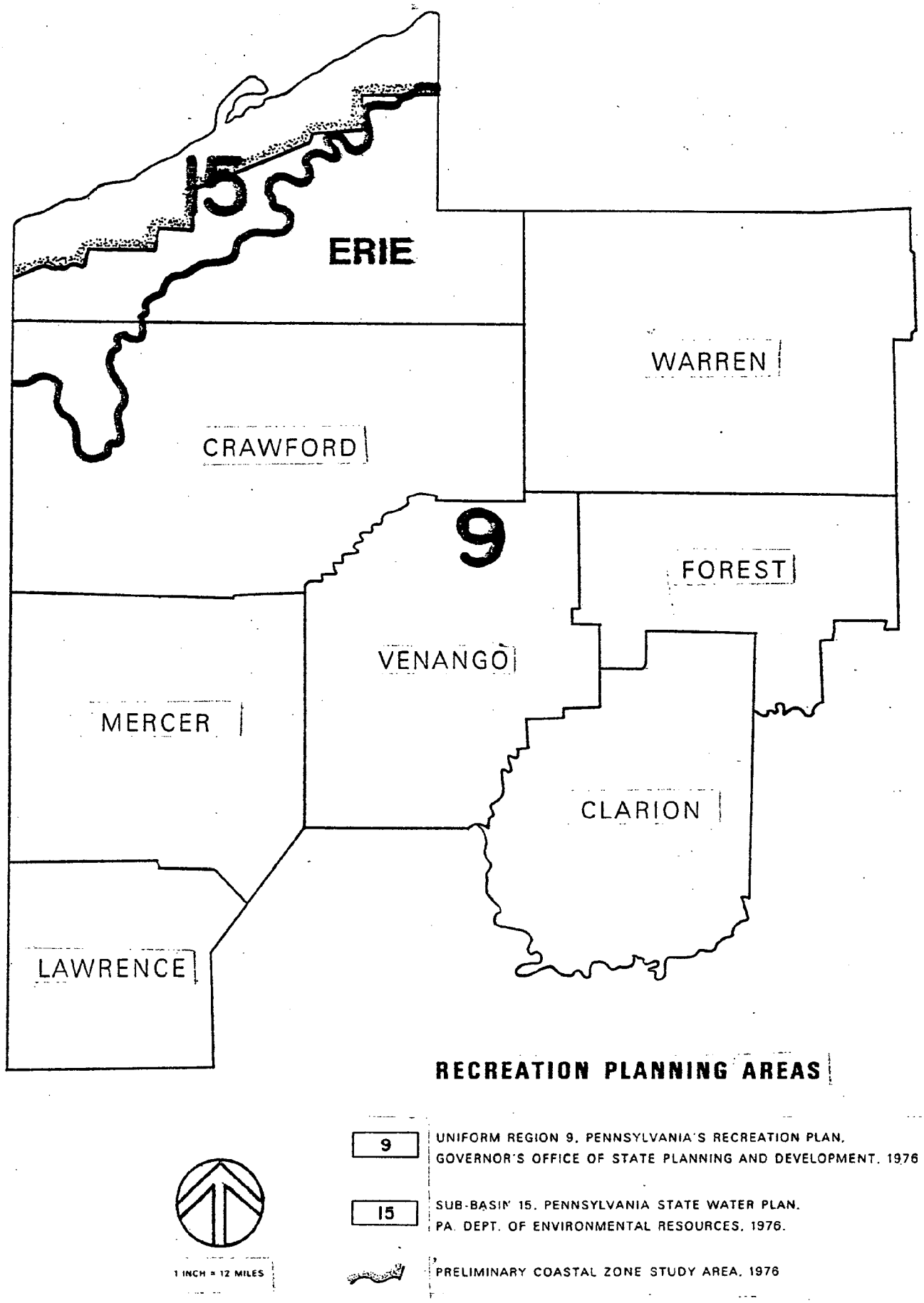
Figure iii-11

REGION 9 (Erie)*[29]

ACTIVITY	1974 ACTIVITY DAYS (000's)	1990 PROJECTED ACTIVITY DAYS (DEMAND) (000's)	PERCENT OF INCREASE 1974-1990	1974 SUPPLY OF REC. (FACILITIES)	1990 PROJECTED DEMAND	1990 DEFICIT
Bicycling	21,810	25,188	15.5%	39 trail miles (Inventoried)		
Boating/Canoeing/ Water-Skiing	1,950	3,259	67.1%	258 boat launch ramps	431 boat launch ramps	-173 boat l. ramps
Camping	1,981	3,089	55.9%	8,859 campsites	13,814 campsites	-4,955 campsites
Fishing	3,230	4,374	35.4%	-	-	-
Hiking/Nature Walking	5,290	6,058	14.5%	449 trail miles	514 trail miles	-65 trail miles
Picnicking	4,104	4,667	13.7%	10,677 picnic tables	12,141 picnic tables	-1,464 p. tables
Swimming	15,345	20,318	32.4%	830,000 sq. ft. pool	1,098,985 sq. ft. pool	-268,985
			11.3%	42,300 linear ft. beach	56,008 linear ft. beach	-18,708
Sightseeing/ Pleasure Driving	11,486	12,784				
	1974	1990				
Population	678,000	744,000	9.7%			

* Region 9 consists of 8 counties: Erie, Warren, Forest, Clarion, Venango, Crawford, Mercer, Lawrence

Figure iii-12



certain population changes by age group and number. Because the subbasin data considers a smaller area, the deficits are smaller or even show up as surpluses. Both plans agree that some deficits of recreation facilities will occur in the future.

Subbasin 15[28]
Lake Erie

Activity	*Demand 1970	Supply 1970	*Demand 1990	1990 Surplus of Decifit
Picnic tables	2,062	1,569	2,159	-590
Beach linear ft.	896	25,409	1,247	+24,162
Pool square ft.	89,261	60,729	76,166	-15,432
Power boating	7,580	31,998	13,790	+18,208
Power acres (1 mi. lake limit)*				
Nonpower boating nonpower acres (1/4 mi. lake limit)*	1,196	999	1,940	+7,059
Fishing activity days per year (thousands)	259,613	1,117,606	308,762	+857,993
Assuming Population	232,500		253,100	8.9%

*Developed by the State Water Plan Staff.

Although the coastal zone cannot be expected to alleviate the recreation deficiencies it can help to relieve the pressure. Multiple use is a concept which must be given consideration. Multiple use sites should be developed so recreation can coexist with other uses such as industry, agriculture or residential. Public access to the Lakefront would be made available, where appropriate, at Port facilities, power plants, and the like. When possible consideration should be given to serving public recreational needs, and access whether it is physical or visual must be accorded high priority in all future plans.

In order to establish a priority of sites, various sites with recreation potential were evaluated. Three types of recreation potential rating were established. The first classification is

"Existing" (E). These sites are privately or publicly owned sites currently in public recreational use. They are to be considered for improved maintenance or future expansion as the available funding permits. The second rating is "Immediate Potential" (IP). These sites are publicly or privately owned areas which can help to fill present needs, but require immediate investigation and action through aquisition or other method to preserve the resources. Both of these site classification correspond to natural GAPC's or recreational, cultural, historical GAPC's (as discussed in Chapter 8).

The third rating is "Reserved Potential" (RP) these sites are privately owned areas with existing facilities or recreation potential to serve future public recreational needs but present economic conditions prevent their aquisition or development. These sites generally correspond to the Development Opportunity GAPC's or the Overlap GAPC's.

The following chart is a brief listing of the sites, their municipality, their ownership, the potential activities, and the assigned rating. A more in depth description of most of the sites can be found in the GAPC Chapter 8. A complete description of all the sites classified is found in the Coastal Recreation Analysis Paper as summarized in Appendix C.

SITE	MUNICIPALITY	OWNERSHIP	ACTIVITIES	RATING
		WEST STUDY AREA		
Raccoon Creek County Park	Springfield Twp.	Public	S,BA,F	E
Eagle Twp. Park	Springfield Twp.	Public	S,BA	E
Crooked Creek	Springfield Twp.	Private	S,NSA	IP
Elk Creek	Girard Twp.	Private	S,BA,M,F	IP
Lake Erie Community Park	Girard Twp.	Public	S	E
Trout Run	Fairview Twp.	Private	S,NSA	IP
Walnut Creek (Manchester Beach)	Fairview Twp.	Public	BA,M,F	E
		CENTRAL STUDY AREA		
Presque Isle	Millcreek Twp.	Public	S,BA,M,O,NSA	E
Scott County Park	Millcreek Twp.	Public	O	IP
Commodore Perry Yacht Club	Millcreek Twp.	Private	BA,M	E
Erie Yacht Club	Millcreek Twp.	Private	BA,M	E
East Side Marina	Millcreek Twp.	Public	BA,M	IP
		EAST STUDY AREA		
Sixmile Creek	Harborcreek Twp.	Private	S,,BA	IP
Sevenmile Creek	Harborcreek Twp.	Private	S	RP
Shades Beach County Park	Harborcreek Twp.	Public	S,BA	E
Freeport Beach	Northeast Twp.	Public	S	E
Sixteenmile Creek (Orchard Beach)	Northeast Twp.	Private	S,O	RP
Darymple Beach	Northeast Twp.	Public	S,BA,F	E
Twentymile Creek	Northeast Twp.	Private	S	IP

ACTIVITIES	RATING
S-Swimming	E-Existing
F-Sport Fishing	IP-Immediate Potential
BA-Boat Access	RP-Reserved Potential
M-Marina	
O-Other (Picnicking)	
(Hiking)	
NSA-Natural Scenic Area	

FOOTNOTES

1. Erie County Population Analysis, Erie Metropolitan Planning Department, 1972.

   The methodology selected for projecting future population levels in Erie County is the Cohort-Survival method. Past reliability on a comparative basis of projection has proven this procedure to be the most satisfactory in the past.

   Moreover, the Cohort-Suvival Method is more comprehensive than other population projection alternatives, in that the selection makes use of basic projection variables, i.e., past birth, death, and migration rates, in addition to fertility ratios. The method entails the utilization of numerous refined calculations and judgements in many factor areas. Among the factors stressed as being of prime importance in making these judgements were 1) industrial employment opportunities and the unemployment curve, 2) transportation and highway construction schedules, and in the light of these, 3) anticipated urban growth, and 4) planned public utility extension.

   This technique is procedurally more thorough and technically more intricate and complex than other available projection alternatives practiced today. The figures obtained, although slightly dated, are the most up-to-date statistics available for the Preliminary Study Area that are on a comparative basis, municipality by municipality.

2. See footnote #1.

3. See footnote #1.

4. The term "village" is used here, and will be used in this chapter, as a distinct population center of local importance rather than a minor civil division. There are no political boundaries, nor are there any governmental functions. The seven villages are: West Springfield and North Springfield in Springfield Township; Fairplain in Girard Township; and Manchester, Swanville and Sterrettania in Fairview Township.

5. Information obtained from the U.S. Bureau of the Census.

6. U.S. Department of Agriculture, Soil Conservation Service, Land Inventory and Monitoring Memorandum - 3, October 15, 1975.

   Unique farmland is prime farmland that is used for the production of specific high-value food and fiber crops. It has the special combination of soil quality,

location, growing season, humidity, air drainage, air temperature, elevation, aspect, or other conditions needed to produce sustained high quality and/or high yields of a specific crop when treated and managed according to modern farming methods.

7. Information obtained from local municipal zoning ordinances.

8. The three villages are: Harborcreek and Mooreheadville in Harborcreek Township; and Orchard Beach in North East Township.

9. Actually, other than in the Eastern Study Area, there are no unique agricultural lands, as defined in footnote #6, in the Central Study Area, nor in the remainder of Erie County, with the exception of a single location in the Western Study Area.

10. Information obtained from Population Analysis, City of Erie, Erie Metropolitan Planning Department, 1972 and City-Wide Neighborhood Analysis, City of Erie Office of Policy Planning and Management, 1976.

11. Port of Erie, Waterfront Development Plan, Parsons, Brinckerhoff, Quade & Douglas, Inc., 1968.

12. Information obtained from Erie-Western Pennsylvania Port Authority.

13. Information obtained from Litton Industries. The two ships are the Stewart J. Cort and the Presque Isle.

14. Feasibility Study - East Side Boat Launching Ramp, Parking and Marina, Erie, Pennsylvania, D'Appolonia Consulting Engineers, Inc., 1976.

15. These contemplated projects can include: combination luxury and outboard boat marinas; boating and fishing equipment and accessory-manufacture, sales, rental and service shops; seafood restaurants; waterfront hotel/motels; combination parks and swimming pool sites, etc.

16. Information obtained from the Erie Area Transportation Study (EATS). EATS is not a single report, but a continual program of transportation planning through a four phase process: data collection, analysis and forecasts, plan development, and project implementation.

17. Information obtained from Erie County Health Department, Bureau of Environmental Services.

18. For locations of the watersheds and streams, see Pennsylvania Coastal Zone Resources Analysis for Lake Erie, Erie Metropolitan Planning Department, 1975, pages 43, 44, 45, 95, 96 and 97.

19. See footnote #17.

20. Erie County Water Supply and Distribution Plan, Part II - The Non-Metropolitan Area, Erie Metropolitan Planning Department, 1976.

21. Pennsylvania Coastal Zone Resources Analysis for Lake Erie, Erie Metropolitan Planning Department, 1975, pages 110, 111 and 112.

22. See footnote #18.

23. See footnote #21.

24. Erie County Water Supply and Distribution Plan, Part I - The Erie Metropolitan Area, Erie Metropolitan Planning Department, 1976.

25. See footnote #24.

26. See footnotes #6 and #9.

27. A Summary of the Erosion Study can be found in Appendix C.

28. State Water Plan.

29. State Recreation Plan - OSPD.

EXISTING MANAGEMENT AUTHORITY

4

4 EXISTING MANAGEMENT AUTHORITY

INTRODUCTION

Chapters 1, 2, and 3 have provided an introduction to existing conditions, current and future problems, and changes that are expected to occur in Pennsylvania's two coastal study areas. This Chapter examines the existing legal and institutional arrangements which will be utilized to implement Pennsylvania's Coastal Zone Management Program. Regulations adopted under the Coastal Zone Management Act require that "the management program...contain a list of relevant constitutional provisions, legislative enactments, regulations, judicial decisions and other appropriate official documents or actions which establish the legal basis for (Coastal Management)". (15 CFR sec 923.21 (a)). State and local statutory authorities are analyzed for their potential to properly implement the provisions of the Coastal Zone policy framework (Chapter 5). Regional and interstate agreements and federal statutes are also considered. Pertinent judicial decisions are incorporated as required to support specific legal propositions.

Chapter 4 is organized into five major sections. For the sake of simplicity and continuity, the first four are identical to the sections developed in Chapter 2, Problems and Issues, and Chapter 5, Policy Framework, and include Land Use, Resources, and Environment; Economic Health and Revitalization; Public Involvement and Education; and Governmental Regulation and Responsibility. Existing state authorities in these areas are analyzed for legal sufficiency in implementing the program. The last section, "Local Controls", is devoted to a discussion and analysis of existing local comprehensive plans and zoning ordinances and their ability to implement the goals, objectives and policies of the coastal zone management program. of the management program.

Chapter 4 concludes that although existing state authorities are adequate in some areas to implement the Coastal Zone Management Program, authorities either do not exist or are inadequate in several very critical areas. These include control of land use to assure compliance with the management program; assurance that uses of regional benefit will not be arbitrarily restricted or excluded by local governments; protection of historic and archaeological resources, significant natural resources, and critical areas; and resolution of conflicts between competing land and water uses. Because of these weaknesses additional legislation must be sought if Pennsylvania's Coastal Zone Management Program is to be implemented in a manner that is consistent with federal program requirements.

I. LAND AND WATER USE, RESOURCES AND ENVIRONMENT

A. Land and Water Use

The use of Coastal Zone land is subject to both state and local control. The Municipalities Planning Code (53 P.S. sec 10101) and the Philadelphia Home Rule Charter (351 Pa. Code sec 4.4-600) authorize municipalities to control development through the adoption and enforcement of zoning, subdivision and land development ordinances, although such enactments are not mandatory. Under the Administrative Code of 1929 (71 P.S. sec 670-101), the Department of Community Affairs can provide funding for the preparation and development of ordinances, but it cannot require the adoption or amendment of ordinances or otherwise mandate consistency with state policies and programs.

The Department of Environmental Resources has authority to control the dumping of sludge and dredge spoils into the waters of the Commonwealth (excepting the tidal waters of the Delaware River and its navigable tributaries) under the Water Obstructions Act (32 P.S. sec 681; 25 Pa. Code sec 105.1) and the Clean Streams Law (35 P.S. sec 691.1; 25 Pa. Code sec 91.1). Disposal of sludge and dredge spoils is also regulated by the Department under the authority of the Solid Waste Management Act (35 P.S. sec 6001; 25 Pa. Code sec 75.1), but has been restricted to land disposal.

The location and operation of potentially hazardous facilities and activities are controlled in part through state and local regulations. Siting of such potential hazards may be controlled by local governments under the Municipalities Planning Code and the Philadelphia Home Rule Charter. The construction, maintenance and operation of dyeing and dry cleaning plants are controlled by the Department of Labor and Industry (35 P.S. sec 1269.1; 34 Pa. Code sec 23.71). The Department of Labor and Industry may also regulate the construction of buildings in cities other than the first class for the purpose of fire prevention (35 P.S. sec 1221). Among the items subject to regulation are explosive materials and fuel storage within factories and power plants, as well as other types of buildings. The discharge of any polluting substance into the waters of the Commonwealth is regulated by the Department of Environmental Resources under the Clean Streams Law (35 P.S. sec 691.1; 25 Pa. Code sec 101.1). Although this law and regulations promulgated thereunder it do not control the location or operation of hazardous facilities and activities, they do mitigate actual damages which may result by requiring preparation of Pollution Incident Prevention Plans for the operation and maintenance of the facility.

The Federal Interstate Commerce Act (49 U.S.C.A. sec 1) and Natural Gas Act (15 U.S.C.A. sec 716) give the Federal Department of Transportation power to regulate the construction and operation of oil and gas pipelines. The existing authority of the Pennsylvania Public Utility Commission under the Public Utility Law (66P.S. sec

1101), when coupled with the federal consistency provisions, can be utilized to reduce hazards and assure pipeline safety.

Placement of oil and natural gas pipelines under, along or across streams within the Commonwealth is regulated by the Department of Environmental Resources under the Water Obstructions Act (32 P.S. sec 681; 25 Pa. Code sec 105.141). The Department is also authorized by the Administrative Code (71 P.S. sec 194 to grant easements, rights-of-way, licenses or other interests in dry or submerged Commonwealth land to public service companies for the placement of public service lines.

B. Air and Water Quality and Water Supply

Pennsylvania has broad authority to regulate air quality. The Air Pollution Control Act (35 P.S. sec 4001; 25 Pa. Code sec 121.1, 143.1) provides for the prevention, control, reduction and abatement of air pollution through the use of required permits, coupled with civil and criminal penalities for non-compliance. The Commonwealth is also empowered to control air quality under the provisions of the federal Clean Air Act (42 U.S.C.A. sec 1857). The Uniform Interstate Air Pollution Agreements Act (35 P.S. sec 4101) authorizes the establishment of agreements with state and local authorities of other states for cooperation in controlling air pollution extending beyond the jurisdiction of the Commonwealth. Air pollution control or abatement equipment is exempt from Pennsylvania's capital stock tax (72 P.S. sec 7602.1).

Pennsylvania has similarly broad authority to regulate water quality and supply. The Clean Streams Law (35 P.S. sec 691.1; 25 Pa. Code sec 91.1 to 107.1) prohibits the discharge of "sewage, industrial waste or any other substance which causes or contributes to pollution" of the waters of the Commonwealth, unless authorized by the Department of Environmental Resources. Pennsylvania has not been delegated the authority to administer the National Pollutant Discharge Elimination System (NPDES) Program under the Federal Water Control Act (33 U.S.C. sec 1342). The Pennsylvania Sewage Facilities Act (35 P.S. sec 750.1; 25 Pa. Code sec 71.1, 73.1) gives the Department authority to review and approve or disapprove all municipal sewage plans and local actions under approved plans and establishes standards for the installation and operation of on-site disposal systems. Supplemental authority under the Solid Waste Management Act (35 P.S. sec 6001; 25 Pa. Code sec 75.1) prohibits the dumping of any solid wastes into the waters of the Commonwealth without first obtaining a permit from the Department. The Open Spaces Lands Act (32 P.S. sec 5001) gives the Department the power to acquire property in order to protect and conserve water resources.

Under the Delaware River Basin Compact (32 P.S. sec 815.101), the Delaware River Basin Commission is authorized to regulate water quality in the Delaware River and its tributaries, and regulations have been adopted (18 C.F.R. sec 410.1).

The Administrative Code (71 P.S. sec 510--1) gives the Department of Environmental Resources the power to regulate the acquisition or expansion of sources of water and water storage facilities, and to determine water conservation and distribution policies through the development of a State Water Plan. The Department is authorized to regulate waterworks construction as well as the potability and treatment of water supplies (35 P.S. sec 711). Regulations governing waterworks have been promulgated at 25 Pa. Code sec 109.1. The Water Rights Act (32 P.S. sec 631) governs the acquisition of surface water rights by public water supply agencies. The Department administers a system of water allocation permits which empowers supply agencies to use eminent domain for the appropriation of water and water rights. The statute is narrow in scope, however, and most water uses in Pennsylvania are allocated according to the common law of riparian rights.

The Pennsylvania Public Utility Commission regulates the operation of all water supply companies with respect to customer services under the Public Utility Law (66 P.S. sec 1101; 52 Pa. Code sec 65.1). The Department of Commerce has authority under the Site Development Act (73 P.S. sec 361) to make grants for the construction, rehabilitation, alteration, expansion or improvement of water supply facilities, including pumping and distribution facilities.

In the Delaware Estuary Coastal Zone, the Delaware River Basin Commission has the power to control the use of the basin's waters, and to regulate the construction and operation of projects and facilities for the storage and release of the basin's waters (32 P.S. sec 815.101).

Pennsylvania's air and water pollution control authority is adequate for purposes of Coastal Zone Management since it provides a firm basis for regulating air and water quality within the Coastal Zones. The Commonwealth's CZM program comports with sec 307 of the Coastal Zone Management Act by effectively incorporating the requisite federal pollution control programs.

C. Historical and Archeological Resources

Pennsylvania's power to protect unique historical and archeological resources is basically limited to state-owned lands. The Administrative Code of 1929 (71 P.S. sec 716) establishes the Pennsylvania Historic and Museum Commission in order to provide for the preservation, care and maintenance of the historic and archeological resources owned by the Commonwealth. The Open Spaces Lands Act (32 P.S. sec 5001) authorizes the Commonwealth to acquire interests in historic sites to preserve, develop and maintain them. Article I, Section 27 of the Pennsylvania Constitution declares the Commonwealth to be the trustee of the "historic values" of the environment; this provision has been amplified by Executive Order 1975-6, which requires all state agencies to assure that historic

resources owned or acquired by the Commonwealth are adequately protected.

The bulk of the power to preserve and protect historical and archeological resources which are not state-owned is vested in local governments. The Historic Districts Act (53 P.S. sec 8001) authorizes political subdivisions, in their discretion, to regulate construction, destruction or alteration within designated "historic districts" in order to protect the historic character of these areas. A local historic zoning ordinance has recently been upheld in First Presbyterian Church of York v. York City Council, 360 A.2d 257 (Pa. Commonwealth Ct. 1976). Although the Pennsylvania Historic and Museum Commission must certify the historical significance of an area prior to its designation as an "historic district", the Commonwealth has no direct authority to override local regulations and land use decisions which may adversely affect historic and archeological resources. The Commonwealth may challenge the local approval of the project before the courts or administrative agencies in order to preserve a particular historic site, since such decisions are subject to the constitutional limitations contained in Article I, Section 27 of the Constitution.

D. Significant Natural Areas: Regulation

The authority of various Commonwealth agencies and political subdivisions to acquire interests in property for the conservation of scenic and natural resources is set out below in a separate section dealing with the requirements for administrative grants under sec 306 of the Coastal Zone Management Act. The regulation of development in and around sites of significant natural quality, however, presents problems which require solutions other than acquisition.

To the extent that the need for control is recognized as a local problem, municipalities can control development under the Municipalities Planning Code and the Philadelphia Home Rule Charter. To the extent that municipalities fail to act on their own initiative, however, the Commonwealth has limited authority to affect local decisions i.e. institution of original legal actions pursuant to Article I, Section 27 against particularly offensive projects. It cannot mandate that local regulations be amended to be in accord with the CZM program.

The Administrative Code also authorizes the Environmental Quality Board to develop a statewide Environmental Master Plan to set goals and policies to guide the actions of the various levels of government (71 P.S. sec 510-20 (a)). Although development of the plan progresses, implementation is still an open question, and may be dependent upon the passage of supplemental legislation.

E. Hazardous Areas

The Department of Community Affairs can establish criteria and develop model ordinances to control development in hazardous areas under the Administrative Code of 1929 (71 P.S. sec 670-101), but it cannot require municipalities to adopt ordinances as strict as or stricter than the state criteria and models. Under the Municipalities Planning Code (53 P.S. sec 10601), municipalities have unrestricted authority to develop and enact zoning ordinances to control development in order to protect the public health, safety, morals, or general welfare. Stricter enactments are encouraged, however, by the National Flood Insurance Act (42 U.S.C.A. sec 4001; 24 C.F.R. sec 1909), which requires the adoption of such ordinances as a prequisite for a community's eligibility for federal flood insurance and mortgage money.

1. Flood Plains

The hazards of flooding can be minimized by structural measures and land use controls. The Department of Environmental Resources is also authorized to make flood control improvements (32 P.S. sec 653). The Delaware River Basin Commission is authorized to design, construct and operate flood control facilities and projects on the Delaware River and its tributaries under the Delaware River Basin Compact (32 P.S. sec 815.101). The Department of the Army, Corps of Engineers, is also vested with that power at the federal level (33 U.S.C.A. sec 701).

Municipalities have the power to minimize flood damage by enacting ordinances which control development within flood plains under the Municipalities Planning Code (53 P.S. sec 10101) and the Philadelphia Home Rule Charter (351 Pa. Code sec 4.4-600). The validity of such ordinances has been upheld by the courts. Solomon v. Whitemarsh Township, 92 Montg. 114 (Pa. C.P. 1969). The U. S. Department of Housing and Urban Development encourages the adoption of flood plain ordinances by providing financial and professional assistance to municipalities to help them achieve compliance with the flood insurance program, and by withholding assistance for acquisition or construction in flood plain areas to municipalities that don't comply with the Flood Insurance Act (42 U.S.C.A. sec 4001).

The Delaware River Basin Commission is authorized by the Delaware River Basin Compact (32 P.S. sec 815.101) to adopt flood plain zoning standards for the Delaware River and its tributaries, and may provide technical and financial aid for administration and enforcement to communities which enact zoning ordinances effecting such standards (41 Fed. Reg. 24910 (1976)).

2. Steep Slopes and Bluffs

Regulating development in order to preserve the esthetic and environmental value of steep slope areas, and to protect life and property, is within the general regulatory authority of municipalities under the Municipalities Planning Code and the Philadelphia Home Rule Charter. The Commonwealth has no means of insuring that municipalities consider steep slope characteristics in their land development plans, but it is able to indirectly regulate such practices under the Erosion Control Regulations (25 Pa. Code sec 102.1).

3. Erosion and Recession

Municipalities have the power to prevent development practices that will endanger life and property and accelerate erosion and recession rates in hazardous bluff areas under the Municipality Planning Code and the Philadelphia Home Rule Charter. The Commonwealth has no means of insuring that municipalities prevent such development practices, but preventive measures are encouraged by the National Flood Insurance Act (42 U.S.C.A. sec 4001; 24 C.F.R. sec 1909), which requires restrictions upon development in erosion areas as a prerequisite to eligibility for federal flood insurance, development assistance and loans.

The Commonwealth, acting through the Department of Environmental Resources, can minimize erosion by two means. Under the Clean Streams Law, the Department has the authority to control earth moving activities which create accelerated erosion or the danger thereof. The Erosion Control Regulations (25 Pa. Code sec 102.1) adopted under that law require that anyone undertaking any earth moving activity have an erosion and sedimentation control plan and, in some circumstances, obtain a permit. Under the Water Obstructions Act (32 P.S. sec 681), the Department has authority to regulate the placement of structures and fill material in waters of the Commonwealth, except in the tidal portions of the Delaware River, through a permit process.

Further, the Department has specific power to prohibit dredging operations that result in siltation and pollution of the Schuylkill River and its tributaries, and to remove accumulations of such material (32 P.S. sec 751.1). On Lake Erie, the Great Lakes Basin Commission has authority to make recommendations for erosion control under the Great Lakes Basin Compact (32 P.S. sec 817.1). Researching and monitoring erosion rates is the responsibility of the Commission under the Compact, and of the Department of Environmental Resources under the Administrative Code (71 P.S. sec 510-9).

4. Unsuitable Soils for Sewage Disposal

The Sewage Facilities Act, the Clean Streams Law, and the regulations promulgated under both (25 Pa. Code sec 71.1, 73.1) require municipalities to submit official sewage facility plans to the Department of Environmental Resources for approval. Such plans are required to describe existing community sewage disposal problems, and to provide for an orderly extension of community interceptors throughout each ten year period. The object of the program is to ensure the existence of adequate sewage treatment facilities to prevent the discharge of untreated or inadequately treated sewage into the waters of the Commonwealth.

The plans must also contain a survey and evaluation of soil suitability for individual on-lot sewage disposal systems. Prior to the construction of any such system, a permit must be granted by the municipality, and no permit may issue if the system specifications are not in compliance with Department regulations and the local sewage facility plan. The regulations state explicit standards for on-lot sewage systems in order to protect surface and groundwater quality.

The Department of Environmental Resources administers the Commonwealth's responsibilities for areawide waste treatment management plans under sec 208 of the Federal Water Pollution Control Act (33 U.S.C.A. sec 1288). The development of priorities for the extension of sewer systems will be coordinated through these sec 208 plans.

F. Natural Resources

1. Commercial Fishing

The Pennsylvania Fish Commission has general authority to administer all laws relating to the promotion and development of fishery interests, as well as the protection, propagation and distribution of fish. Under the Fish Law of 1959 (30 P.S. sec 1), the Commission regulates fishing practices on inland and boundary lakes and rivers of the Commonwealth. The Great Lakes Basin Commission has the power to consider and recommend means of maintaining and improving the fisheries of the Basin, but not to regulate fisheries. The power of the Fish Commission is sufficient to meet coastal zone objectives. It may also be noted that the reduction of pollution by the Clean Streams Law (35 P.S. sec 691.1; 25 Pa. Code sec 91.1, 101.1) has resulted in a significant increase in the quantity and diversity of fish in the waters of the Commonwealth.

2. Mineral Extraction

The Department of Environmental Resources has the power and the duty under the Administrative Code (71 P.S. sec 510-1) to administer all mining laws. As to offshore mining, it has the authority under the Administrative Code to sell, lease or otherwise dispose of any minerals, sand, gravel or silt deposits in or beneath beds of waters owned by the Commonwealth, as well as to regulate all mineral extractions or other alterations in the course, current or cross section of streams under the Water Obstructions Act (32 P.S. sec 681; 25 Pa. Code sec 105.1). Although the water obstructions Act exempts the tidal waters of the Delaware River and its navigable tributaries from its coveragege, the Commonwealth may prohibit or limit exploitation of mineral resources in the tidal streams by exercising its propriety powers pursuant to 1908-A of the Administrative Code (71 P.S. sec 510-8). The Department also has authority to sell or lease the minerals beneath the beds of navigable streams or other bodies of water owned by the Commonwealth (71 P.S. sec 510-8). This has the effect of giving the Department the power to restrict or exclude the removal of such minerals. Warren Sand and Gravel, Inc. v. DER, 20 Pa. Commonwealth Ct. 186, 341 A.2d 556 (1975).

As to onshore mining, the Department controls surface mining and reclamation by issuing licenses to all operations under the Surface Mining Conservation and Reclamation Act (52 P.S. sec 1396.1; 25 Pa. Code sec 77.1), and controls discharges from mines into the waters of the Commonwealth by issuing permits under the Clean Streams Law (35 P.S. sec 691: 25 Pa. Code sec 99.1).

3. Gas and Oil Drilling

The Department of Environmental Resources is authorized to issue permits for all natural gas wells penetrating below given levels, to regulate well spacing and drilling units, and to promulgate regulations to prevent waste in the drilling, casing, operation and plugging of wells under the Oil and Gas Conservation Law (58 P.S. sec 401: 25 Pa. Code sec 79.1). The Gas Operations Well-Drilling, Petroleum and Coal Mining Act (52 P.S. sec 2101) defines the rights and duties of coal mine operators and well operators in cases where the boundaries of their operations overlap, and regulates the underground storage of gas, especially within two-thousand linear feet of an operating coal mine. Implicit in the Department's powers under the Administrative Code (71 P.S. sec 510.8) to sell, lease or otherwise dispose of oil, gas and other minerals beneath the beds of navigable streams or other bodies of water owned by the Commonwealth is the power to withhold the sale of State owned property. See Warren Sand and Gravel, Inc. v. DER, 20 Pa. Commonwealth Ct. 186, 341 A2d 556 (1975).

4. Farmlands

Through the Municipalities Planning Code and the Philadelphia Home Rule Charter, municipalities have the authority to encourage farmland preservation by maintaining agricultural zones in their zoning ordinances and fostering compatible uses around them. Counties can also encourage farmland preservation by publicizing and utilizing the Clean and Green Act (16 P.S. sec 11941). Under the Act, counties can assess farmland at its restricted, rather than highest use value, if the owner agrees to allow the land to remain as farmland for a period of five, or sometimes ten years.

Neither the Clean and Green Act nor the Municipalities Planning Code give the Commonwealth authority to participate in farmland preservation.

G. Recreation

Special interest recreational facilities can be developed by state, county and municipal governments. The Department of Environmental Resources has the authority to improve parks for outdoor recreation under the Administrative Code (71 P.S. sec 510-1). Pursuant to this authority, the Department has developed and promulgated a comprehensive State Outdoor Recreational Plan. Under the Open Spaces Lands Act (32 P.S. sec 5001), the Department of Environmental Resources, the Department of Agriculture and county governments have the authority to acquire interests in land for open space benefit, including recreational uses. Acquisitions are subject to two conditions: (1) the county must approve all acquisitions by the Commonwealth within its jurisdiction, and (2) neither the county nor the Commonwealth may hold land in fee simple for more than two years without offering it for resale. The Pennsylvania Fish Commission has authority under the Administrative Code (71 P.S. sec 691) to acquire land for access sites on lakes and other waterways for fishing and boating purposes. The various municipal codes (53 P.S. sec 1) enable municipalities to acquire and develop recreational facilities.

Assistance to local governments in the selection and acquisition of local access and recreation areas can be provided by the Department of Community Affairs (DCA) and the Department of Environmental Resources. The Department of Community Affairs has the general authority under the Administrative Code (71 P.S. sec 670-101) to provide technical assistance to local governments, and DER has authority to advise them on the development of park land (71 P.S. sec 510-1). Financial assistance can be provided indirectly through State or county acquisition and resale to local governments under the Open Spaces Lands Act (32 P.S. sec 5001). The resale price would normally be lower than the acquisition price because the land would be restricted to open space use after the sale.

Assistance to local governments in planning and executing demonstration rehabilitation programs for recreational areas can be provided by both the DCA and DER under the Administrative Code (71 P.S. sec 670-101, 510-101). Financial assistance is available under the Open Spaces Lands Act.

The Public Utility Commission has authority under the Public Utility Law (66 P.S. sec 1101; 52 Pa. Code sec 21.1, 35.1) to regulate service provided by common carriers by granting certificates of convenience for the operation of bus, trolley, taxi, and railroad service to coastal areas. utilities. In this way, service to coastal areas during weekends as well as non-peak hours can be improved.

No specific authority is needed to encourage local governments to publicize recreational opportunities in coastal areas or to clearly post the location of access points to such areas. Both the DCA and DER can do so under their general advisory powers in the Administrative Code. Financial assistance can be provided by the Coastal Zone Management Program.

Providing recreational opportunities on non-recreation land can be fostered by the Department of Community Affairs by providing information and technical assistance on the multiple use concept to local governments.

H. Esthetics

Article I, Section 27 of the Pennsylvania Constitution provides that "The people have a right to... the preservation of the ... esthetic values of the environment." Executive Order 1973-9 is consistent with the spirit of this provision, and requires all State agencies within the Governor's jurisdiction to ensure that governmental facilities and activities are planned and operated in compliance with all relevant environmental laws and regulations. Although Article I, Section 27 may potentially be extended to require that private developers take esthetics into consideration, it has not yet been so interpreted.

Private planning and development is now regulated by local governments under the Municipalities Planning Code (53 P.S. sec 10101, 14751). These provisions give municipalities complete authority to make all local land use decisions. There is no requirement that esthetics be considered in arriving at such decisions, and the state government has no authority to impose such a requirement, absent legislative amendment of the statutes.

II. ECONOMIC HEALTH AND REVITALIZATION.

A. Information Systems

The Administrative Code provisions relating to the powers and duties of the Department of Commerce (71 P.S. sec 669) and of the Department of Community Affairs (71 P.S. sec 670-101) form the legislative framework for the development and dissemination of information about coastal zone areas of economic opportunity. Such information will be presented to development and commerce related agencies and organizations in order to increase awareness of existing and potential opportunities for optimal use of coastal resources. The present authority of these two Departments is adequate for the operation of this type of information program. Additional funds under sec 306 of the Coastal Zone Management Act will augment existing funds to allow for the expansion of this program.

B. Financial Incentives for Economic Development

The Pennsylvania Department of Commerce is authorized to support the development of commercial and industrial facilities in the economic opportunity areas of the coastal zone. The Industrial and Commercial Development Authority Law (73 P.S. sec 371) provides for the creation of local municipal development authorities for the purpose of developing business opportunities. Each authority may accomplish its purpose through the issuance of bonds and through grants from the Department of Commerce under the Pennsylvania Industrial Development Assistance Law (73 P.S. sec 351; 13 Pa. Code sec 3.1).

The Pennsylvania Industrial Development Authority Act (73 P.S. s 301) establishes the Pennsylvania Industrial Development Authority in order to stimulate and assist industrial growth through the issuance of its own bonds and through participation in federal economic assistance programs as authorized by the Pennsylvania Redevelopment Area Economic Cooperation and Implementation Act (73 P.S. sec 331). Under the Site Development Act (73 P.S. sec 301; 13 Pa. Code sec 9.1, 13.1), the Secretary of Commerce is authorized to make grants to municipalities and industrial development agencies in specified circumstances for the construction or improvement of water and sewage facilties, or for acquisition of land located in impoverished urban areas.

When combined with implementation funds available under sec 306 of the Coastal Zone Management Act, Pennsylvania has adequate authority to provide financial incentives for development of commerical and industrial facilities in economic opportunity areas.

Under present authority, however, there are no means of assuring that funds will be allocated to particular CZM projects. Such assurance can be provided by a legislative mandate that the appropriate

agencies and departments cooperate with and contribute to the management effort.

C. Ports and Transportation Facilities

The Department of Environmental Resources is authorized under the Administrative Code (71 P.S. sec 510-1) to construct, maintain and operate works for channel improvement, and to acquire property for the construction, maintenance, improvement or development of a port or harbor. The Department also has the power to manage, control, protect, maintain and develop public lands for the improvement of Erie harbor.

The Navigation Commission for the Delaware River has power to license the construction or alteration of harbor structures and to remove or ensure the removal of vessels or other materials blocking the channelways of the Delaware River and its navigable tributaries outside of Philadelphia (55 P.S. sec 6, 341). The Philadelphia Department of Commerce exercises similar powers within the city limits under the Philadelphia Home Rule Charter (351 Pa. Code sec 4.4-500 (b)). The Delaware River Port Authority Agreement (36 P.S. sec 2502) and the Third Class City Port Authority Act (55 P.S. sec 571) create organizations for planning, acquiring, operating and maintaining port facilities in the respective coastal zones.

Under the Administrative Code (71 P.S. sec 512), the Department of Transportation has powers and duties relating to the planning and development of land transportation facilities, including roads, commuter rail systems and motor bus operations within the Commonwealth. The Public Utility Commission is authorized under the Public Utility Law (66 P.S. sec 52;1101;1101; 52 Pa. Code sec 21.1, 35.1) the operation of public transportation. Together, these agencies have sufficient power for the planning, development and operation of land transportation facilities to serve the ports of Pennsylvania. The federal consistency provisions of the Coastal Zone Management Act and regulations under it, coupled with the complementary consistency provisions of Pennsylvania's program and the establishment of a state level coordinating body form the framework for coordination between state and federal agencies whose activities support the port and related coastal economic activities.

The Department of Community Affairs is authorized by the Administrative Code (71 P.S. sec. 670-101) to develop model zoning ordinances which could give shorefront siting priority to coastal dependent uses. Unfortunately, the Municipalities Planning Code (53 P.S. sec. 10101) and the building regulation provisions for first class cities (53 P.S. sec. 14751) give local governments unrestricted authority to adopt comprehensive land use plans and zoning ordinances. Thus, the Department has no power to ensure adoption of model ordinances by local governments.

III. PUBLIC INVOLVEMENT AND EDUCATION

The goals, policies and objectives of public involvement and education may be implemented without any specific legislative authority. The Department of Environmental Resources and the Department of Community Affairs already engage in extensive educational programs designed to increase public awareness and involvement in their decision making processes. These programs, can be expanded with sec. 306 implementation funds.

IV. GOVERNMENTAL REGULATION AND RESPONSIBILITY: SECTION 306 REQUIREMENTS.

A. Administration, Control and Conflict Resolution: SECTION 306 (d) (1).

Existing systems for the reporting and monitoring of proposed federal, interstate, regional, areawide, state and local actions with potential coastal zone impact include participation in the A-95 Clearinghouse process (41 Fed. Reg. 2052) and monitoring of the Federal Register and Pennsylvania Bulletin. Although these systems are adequate for discovering potential state and federal actions which may have coastal zone impacts, they are insufficient for the other levels of governmental actions. These schemes are not coordinated for purposes of selectively reporting only proposals with such impacts, and not all proposals at the interstate, regional, areawide, state and local levels are required to be reported through these mechanisms. No state legislative authorization is necessary to develop an information system for apprising local governments of coastal zone management activities. Such a system could be established and implemented utilizing sec 306 funds.

Coastal land use is controlled both directly and indirectly by state and local government agencies. The diversified and varying levels of control exercised by these agencies under existing authorities are generally inadequate for purposes of meeting the "state" control provisions of sec 306 (d) (1) of the Coastal Zone Management Act. Although a mechanism could be established under existing authorities which would facilitate informal resolution of conflicts among local, state, areawide, regional, interstate and federal jurisdictions on coastal zone management decisions, such resolutions would have no binding effect upon the governmental agencies involved. Thus such a mechanism would be inadequate to meet the requirement that the "state" be empowered to resolve conflicts among competing land and water uses in the coastal zone.

The Department of Community Affairs also encourages intergovernmental coordination in local planning decision making. Two or more

municipalities are authorized to enter into joint agreements for the performance of their respective governmental functions (53 P.S. sec 481). In addition, the Regional Planning Law (53 P.S. sec 491) provides for the creation of regional planning commissions by two or more political subdivisions for similar purposes.

The coastal zone coordinating body (Chapter 10) may be utilized to coordinate interstate, regional, areawide, state and local planning decisions of less that statewide significance. This would be adequate, since no formal policy making body is essential to achieve coordination alone. The Administrative Code (71 P.S. sec 181) requires cooperation and coordination among the various administrative departments, boards and commissions of the Commonwealth. Further, present authority encourages cooperation among municipalities in the performance of their respective governmental functions, powers or responsibilities, and authorizes them to enter into appropriate joint agreements (53 P.S. sec 481).

The Department of Environmental Resources Office of Environmental Protection has a policy of coordinating the processing and issuance of permits within the Department. No such mechanism currently exists, however, for coordinated processing of permits issued by local government agencies or other Commonwealth agencies. Such cooperation could be implemented through the use of legislation, executive orders, or interagency agreements establishing appropriate coordination procedures.

Local governments are authorized to establish Environmental Advisory Councils to identify existing and potential environmental problems, and to recommend plans and programs for the promotion of conservation and the protection and improvement of environmental quality (53 P.S. sec 11501). The Department of Community Affairs encourages the establishment of these councils and provides some financial and technical assistance. Further incentive could be provided through the use of sec 306 funds.

The Department of Community Affairs also encourages intergovernmental coordination in local planning decision making. Two or more municipalities are authorized to enter into joint agreements for the performance of their respective governmental functions (53 P.S. sec 481). In addition, the Regional Planning Law (53 P.S. sec 491) provides for the creation of regional planning commissions by two or more political subdivisions for similar purposes.

B. Acquisition: Section 306 (d) (2)

Powers of acquisition have been statutorily delegated to the various agencies of the Commonwealth based upon the particular need for such powers to ensure adequate performance of their duties. The magnitude of the power vested in an individual agency varies according to its functions and responsibilities, ranging from authority to accept

gifts of property to the power of taking through eminent domain proceedings.

The Department of Environmental Resources has been given the broadest range of acquisitionary powers. Authority to acquire particularly fragile areas of the coastal zone is conferred by the Administrative Code (71 P.S. sec 510-1) which gives the Department power to act within its discretion to acquire by purchase, gift, lease or condemnation any lands which should be held, managed, controlled, maintained or utilized as state forests or park lands, or any land, buildings or appurtenances which are necessary for the construction, maintenance, improvement or development of a port or harbor. The Department is also authorized to acquire land for state forest reservations by eminent domain (32 P.S. sec 31), acquire land sold for taxes (32 P.S.sec 161), and exchange of forest land (32 P.S. sec 131).

The Scenic Rivers Act (32 P.S. sec 832.2) provides for the acquisition by eminent domain of scenic and other easements reasonably necessary for public access to rivers designated as Wild and Scenic Rivers. The Open Spaces Lands Act (32 P.S. sec 5001) authorizes the Department of Environmental Resources, the Department of Agriculture and county governments to acquire lands for open space benefits, including the protection and conservation of natural and scenic water resources, forests, and areas of historic, geologic or botanic interest. Acquisition by state agencies is contingent upon approval of the county in which the land is located, and acquisitions in fee simple by either the Commonwealth or the counties must be offered for resale within two years of the date of acquisition, subject to restrictive covenants or easements.

The Department of Environmental Resources possesses further powers to acquire property within specific geographic areas. The Prevention and Control of Floods Act (32 P.S. sec 653) authorizes the acquisition of property or easements for flood protection and control, and the Schuylkill River Pollution Act (32 P.S. sec 751.1) authorizes similar acquisitions for pollution control projects to prevent the accumulation of wastes in the Schuylkill River.

Various other State agencies have been granted acquisitionary powers for specific purposes. The Pennsylvania Game Commission has the power under the Administrative Code (71 P.S. sec 671) and the Game Law (34 P.S. sec 1311.1) to acquire land for game refuges, preserves, farms and propagation areas. The Pennsylvania Fish Commission is authorized by the Administrative Code (71 P.S. sec 691) to set aside and close certain waters of the Commonwealth as nursery waters, and under the Fish Law (30 P.S. sec 1), may acquire property for the management of aquatic life or for public fishing and boating access sites.

The Department of General Services is authorized by the Administrative Code (71 P.S. sec 1571) to acquire property to add to existing public lands or parks, or for sites on which to construct arsenals, hospitals, prisons or other institutions. The General

State Authority Act (71 P.S. sec 1707.1) authorizes acquisitions of property interests for the construction, improvement, maintenance and operation of sewage treatment facilities, public buildings and state institutions. The Department of Agriculture is authorized under the Open Spaces Lands Act (32 P.S. sec 5001) to acquire property for the protection and conservation of farmland and other open space uses. The Department of Community Affairs may make acquisitions under the State Planning Code (71 P.S. sec 1049.1) of property which is needed to carry out its duties.

Although not, strictly speaking, a power of acquisition, the authority granted to counties by the Clean and Green Act (16 P.S. sec 11941) can serve the same purpose. Counties are authorized to covenant with owners of farm, forests, water supply and open space land that the land will remain in such open space uses for a period of five and sometimes ten years in return for lower tax assessments during that period. Municipalities have the power to acquire lands for municipal open space use under the various municipal codes and the Philadelphia Home Rule Charter.

Pennsylvania's power to acquire fee simple and less than fee simple interests in order to achieve conformance with the management program is sufficient to meet the requirements of sec 306 (d) (2) of the Coastal Zone Management Act if the property falls within or can be tied to one of the enumerated categories. Under existing authority, however, there are no means of assuring that the various agencies exercise their discretionary powers of acquisition consistently with the program. This deficiency can be cured by a legislative delegation of acquisition powers to the coastal zone management agencies, or a mandate that existing agencies with such authority exercise it in cooperation with the management effort within the limits of their fiscal resources. If property is beyond the scope of such authority and its acquisition is necessary to ensure compliance with the management program, the Commonwealth's power would be insufficient to meet the requirement.

C. Uses of Regional Benefit: section 306 (e) (2)

Pennsylvania's authority to prevent local governments from imposing exclusions or unreasonable restrictions upon land and water uses of regional benefit is extremely limited. The Municipalities Planning Code (53 P.S. sec 10101) gives municipalities (except first class cities) virtually un-restricted authority to develop comprehensive plans, adopt zoning ordinances and make all other land use decisions within their respective geographic areas. The Philadelphia Home Rule Charter (351 Pa. Code sec 4.4-600) gives similar authority to Philadelphia.

Zoning ordinances are presumed to be valid, but this presumption may be overcome by showing a total exclusion of an otherwise legitimate use, one which is not so particularly objectionable that its

exclusion appears on its face to be designed to protect the public interest. General Battery Corp. v. Zoning Hearing Board of Alsace Township, 371 A. 2d 1030 (Pa. Commonwealth Ct. 1977). It is possible, however, for a municipality to establish the validity of a total exclusion by showing a substantial relationship between the ban and the health, safety, morals or general welfare of the community. So long as such an exclusion is not capricious, and is imposed under standards and criteria requiring reasonable considerations of suitability of an area for a particular use, it would be in accord with regulations under the Coastal Zone Management Act (15 C.F.R. sec 923.17).

The Commonwealth may challenge local zoning decisions in certain circumstances. If the Commonwealth has an interest in land which is affected by a zoning decision, it may appeal to the zoning hearing board of the municipality in which the land is located (53 P.S. sec 10914). Similarly, if the Commonwealth owns or leases property in the immediate area of the land affected, it has standing as a "person aggrieved". Intervention in an existing zoning appeal before the courts is allowed to any owner or tenant of property directly involved in the action appealed from (53 P.S. sec 11009). Intervention by the Commonwealth in pending litigation is also permitted under Rule 2327 of the Pennsylvania Rules of Civil Procedure where the public interest is affected.

The power of intervention is limited in several respects. First, the opportunity to appear is no guanantee that decision will be rendered for the Commonwealth. If a decision is not appealed by the principal party affected, there is no action in which to intervene. Finally, intervention by the Attorney General is purely discretionary.

Thus, the power of the Commonwealth to prevent exclusion or unreasonable restriction of uses of regional benefit is inadequate to meet the requirements of sec 306 (e) (2) of the Coastal Zone Management Act. There is presently no authority to administratively override local land use decisions, and the mechanisms of direct appeal or intervention provide only limited means to influence land uses of greater than local benefit.

V. LOCAL CONTROLS

The strongest tools available at the local level to implement concepts of Coastal Management are comprehensive plans and zoning ordinances. The following section outlines the current status of local comprehensive plans and zoning ordinances in each study area.

It is anticipated that once a Coastal Zone Management Program is implemented in Pennsylvania, local communities will utilize federaland state funds to examine their plans and ordinances and,

Figure iv-1

SUMMARY OF PROBLEMS AND ADEQUACY OF AUTHORITY

GENERAL PROBLEMS	SPECIFIC LOCAL PROBLEMS*	PRINCIPAL AUTHORITIES	ADEQUACY
I. LAND AND WATER USE, RESOURCES AND ENVIRONMENT			
A. Land and Water Use	Sludge and dredge spoil disposal Hazardous facilities and activities Oil and gas pipelines	Sewage Facilities Act 35 P.S. sec 750.1 Solid Waste Management Act 35 P.S. sec 6001 Clean Streams Law 35 P.S. sec 691.1 Department of Labor and Industry 35 P.S. sec 1269.1-1221 Interstate Commerce Act 49U.S.C.A. sec 1 Natural Gas Act 15 U.S.C.A. sec 716 Public Utility Law 66 P.S. sec 1101	Adequate
	Suburban sprawl and strip development(E) Construction of large industrial facilities(E) Concentrated commercial and industrial activities(D) Shorefront siting of non-dependent uses(D)	Municipalities Planning Code 53 P.S. sec 10101 Philadelphia Home Rule Charter 351 Pa. Code sec 4.4-600	Inadequate
B. Air and Water Quality and Supply	Substandard watercourses and ground water recharge Competition for ground and surface water Degraded air quality(D) Thermal pollution, diminished dissolved oxygen, toxic wastes and low flow(D)	Air Pollution Control Act 35 P.S. sec 4001 Interstate Air Pollution Agreements 35 P.S. sec 4101 Capital stock tax incentive 72 P.S. sec 7601.1 Clear Air Act 42 U.S.C.A.sec 1857 Clean Streams Law 35 P.S. sec 691.1 Public Utility Law 66 P.S. sec 1101 Site Development Act 73 P.S. sec 361 Public Water Supply Law 35 P.S.sec 711 Water allocations 32 P.S. sec 631 DER water supply reg. 71 P.S. sec 510-1 Delaware River Basin Compact 32 P.S. sec 815.101 Federal Water Pollution Control Act 33 U.S.C.A.sec 1251	Adequate
C. Historical and Archeological Resources	Resources not widely recognized Alteration and destruction	Historic Districts Act 53 P.S. sec 8001 Historic & Museum Comm. 71 P.S. sec 716 Open Spaces Lands Act 72 P.S. sec 3946 Pa. Constitution, Article I, sec 27 Executive Order 1975-6	Limited

* (E): especially in Erie Coastal Zone
(D): especially in Delaware Coastal Zone

GENERAL PROBLEMS	SPECIFIC LOCAL PROBLEMS*	PRINCIPAL AUTHORITIES	ADEQUACY
D. Significant Natural Areas: Regulation	Unique and fragile features easily destroyed Tinicum Marsh (D) and Presque Isle(E)	Environmental Master Plan 71 P.S. sec 510-20(a) Dept. of Community Affairs 71 P.S. sec 670-101 Dept. of Environmental Resources 71 P.S. sec 510-6	Inadequate
		Municipalities Planning Code 53 P.S. sec 10601 Dept. of Community Affairs 71 P.S. sec 670-101	Limited
E. Hazardous Areas 1. Flood Plains	Damage to existing structures Prevention of future flooding potential	Natural Watercourse Improvements 53 P.S. sec 2801, 2861, 16 P.S. sec 1947, 5147 DER flood control Improvements 32 P.S. sec 653 Delaware River Basin Compact 32 P.S. sec 815.101 National Flood Insurance Act 42 U.S.C.A. sec 4001 Army Corps of Engineers 32 U.S.C.A. sec 701	
2. Steep Slopes and Bluffs	Soil erosion and excessive property damage from improper development (E)	Erosion Control Regulations 25 Pa. Code sec 102.1 Municipalities Planning Code 53 P.S. sec 10101	Inadequate
3. Erosion and Recession	Accelerated erosion and major property damage	Erosion Control Regulations 25 Pa. Code sec 102.1 Water Obstructions Act 32 P.S. sec 681 Municipalities Planning Code 53 P.S. sec 10101 Clean Streams Law 35 P.S. sec 691.1 DER research and monitoring 71 P.S. sec 510-9 Schuylkill River pollution/siltation 32 P.S. sec 751.1 Great Lakes Basin Compact 32 P.S. sec 817.1 Nat'l. Flood Insurance Act 42 U.S.C.A. sec 4001	Limited
4. Unsuitable soils for sewage disposal	Pollution of ground water and public health hazards	Sewage Facilities Act 35 P.S. sec 750.1 Clean Streams Law 35 P.S. sec 691.1 Federal Water Pollution Control Act 33 U.S.C.A. sec 1288	Adequate

GENERAL PROBLEMS	SPECIFIC LOCAL PROBLEMS*	PRINICPAL AUTHORITIES	ADEQUACY
F. Natural Resources 1. Commercial Fishing	Pollution and commercial overfishing(E)	Clean Streams Law 35 P.S. sec 691.1 Pennsylvania Fish Commission 71 P.S. sec 691 Fish Law of 1959 30 P.S. sec 1	Adequate
2. Mineral Extraction	Sand and gravel mining (E)	Surface Mining Conservation and Reclamation Act 52 P.S. sec 1396.1 Water Obstructions Act 32 P.S. sec 681 DER Mining Regulation 71 P.S. sec 510-15 DER Sale or lease of minerals 71 P.S. sec 510-8 Clean Streams Law 35 P.S. sec. 691.1	Adequate
3. Gas and Oil Drilling	Possible adverse impace on shore(E)	Oil and Gas Conservation Law 58 P.S. sec 401 Gas Operations Well-Drilling, Petroleum and Coal Mining Act 52 P.S. sec 2101	Adequate
4. Farmlands	Irreversible conversion to intensive use	Clean and Green Act 16 P.S. sec 11941 Municipalities Planning Code 53 P.S. sec 10101 Phila. Home Rule Charter 351 Pa. Code 4.4-600	Inadequate
G. Recreation	Maintenance and equipment deficiencies Inadequate water-dependent facilities Underutilization of the coastal zone Acquisition lags behind demand Limited Access for urban residents(D)	State Outdoor Recreation Plan 71 P.S. sec 510-1 Penna. Fish Commission 71 P.S. sec 691 Open Spaces Lands Ace 32 P.S. sec 5001 Municipal Codes 53 P.S. sec 1 Department of Community Affairs 71 P.S. sec 670-101 Public Utility Law 66 P.S. sec 1101	Adequate
H. Esthetics	Unattractive waterfront development	Pa. Constitution, Article I, sec 27 Executive Order 1973-9 Municipalities Planning Code 53 P.S. sec 10101	Inadequate

GENERAL PROBLEMS	SPECIFIC LOCAL PROBLEMS*	PRINCIPAL AUTHORITIES	ADEQUACY
II. ECONOMIC HEALTH AND REVITALIZATION	Loss of industrial jobs(D) Abandoned or non-dependent uses(D) Rail freight decline; excess facilities (D) Unimproved land access to port(E) Decline in shipping(E)	Dept. of Commerce 71 P.S. sec 669 Dept. of Community Affairs 71 P.S. sec 670-101 Industrial and Commercial Development Authority Law 73 P.S. sec 371 Industrial Development Assistance Law 73 P.S. sec 351 Industrial Development Authority Act 73 P.S. sec 301 Redevelopment Area Economic Cooperation and Implementation Act 73 P.S. sec 331 Site Development Act 73 P.S. sec 301 DER Port Improvements 71 P.S. sec 510-1 Navigation Comm. for Delaware River 55 P.S. sec 6,341 Phila. Dept. of Commerce 351 Pa. Code sec 4.4-500b Delaware River Port Authority Agreement 36 P.S. sec 2502 Third Class City Port Authority 55 P.S. sec 571 Dept. of Transportation 71 P.S. sec 512 Public Utility Law 66 P.S. sec 1101	Adequate
III. PUBLIC INVOLVEMENT AND EDUCATION	Coastal improvements not generally known Environmental potential unrecognized(D) Environmental protection viewed as incompatible with economic growth	Dept. of Environmental Resources 71 P.S. sec 510-1 Dept. of Community Affairs 71 P.S. sec 670-101	Adequate
IV. GOVERNMENTAL REGULATION AND RESPONSIBILITY A. Administration Control and Conflict Resolution: sec 306(d)(1)	Overtoning for industrial use(D) Incompatible land use developments(D) Variances and zoning changes(E)	A-95 Clearinghouse 41 Fed. Reg. 2052 Municipalities Planning Code 53 P.S. sec 10101 Zoning Hearing Board 53 P.S. sec 10901 Local Agency Law 53 P.S. sec 11301 Administrative Agency Law 71 P.S. sec 1710.1 Environmental Hearing Board 71 P.S. sec 510-21 Environmental Advisory Councils 53 P.S. sec 11501 Joint Agreements 53 P.S. sec 481 Regional Planning Law 53 P.S. sec 491	Inadequate

GENERAL PROBLEMS	SPECIFIC LOCAL PROBLEMS*	PRINCIPAL AUTHORITIES	ADEQUACY
B. Acquisition: sec 306(d)(2)	Limited Statutory Authorization Large scale acquisitions in fee are prohibitively costly (D) Consistency with CZM Program not assurred	DER: Parks, forests and ports 71 P.S. sec 510-1 Eminent Domain 32 P.S. sec 31 Purchase of land sold for taxes 32 P.S. sec 161 Exchange of Forest Land 32 P.S. sec 131 Scenic Rivers Act 32 P.S. sec 821.1 Open Spaces Lands Act 32 P.S. sec 5001 Prevention and Control of Floods Act 32 P.S. sec 653 Schuylkill River Pollution Act 32 P.S. sec 751.1 Pennsylvania Game Comm. 71 P.S. sec 671 Game Law 34 P.S. sec 1311.1 Pennsylvania Fish Comm. 71 P.S. sec 691 Fish Law of 1959 30 P.S. sec 1 Dept. of Gen. Services 71 P.S. sec 1571 Gen. State Authority Act 71 P.S. sec 1707.1 State Planning Code 71 P.S. sec 1049.1 Clean and Green Act 16 P.S. sec 11941	Adequate
C. Uses of Regional Benefit sec 306(e)(2)	No administrative override of municipal land use decisions by Commonwealth Overlapping and competing regulation	Municipalities Planning Code 53 P.S. sec 10101, 14751 Phila. Home Rule Charter 351 Pa. Code 4.4-600 Zoning Hearing Board Appeals 53 P.S. sec 10914, 11009 Intervention by the Commonwealth Rule 2327, Pa. Rules of Civil Procedure	Inadequate

where necessary, update them to incorporate coastal goals, objectives and values.

DELAWARE ESTUARY COASTAL ZONE

Comprehensive Plans - Pennsylvania's coastal municipalities (except Philadelphia) are empowered by the Pa. Municipalities Planning Code to create planning agencies and to prepare comprehensive plans to guide future development. While the establishment of a planning agency and the development of a plan are not mandatory, the process can be used to produce a comprehensive plan which includes the following basic elements:

(1) A statement of objectives of the municipality concerning its future development;

(2) A plan for land use, which may include the amount, intensity, and character of land use proposed for residence, industry, business, agriculture, major traffic and transit facilities, public grounds, flood plains and other areas of special hazards and other similar uses;

(3) A plan for movement of people and goods, which may include expressways, local street systems, parking facilities, mass transit routes, terminals, airfields, port facilities, railroad facilities and other similar facilities or uses;

(4) A plan for community facilities and utilities, which may include public and private education, recreation, municipal buildings, libraries, water supply, sewage disposal, refuse disposal, storm drainage, hospitals, and other similar uses; and

(5) A map or statement indicating the relationship of the municipality and its proposed development to adjacent municipalities and areas.[1]

In Delaware County only half of the municipalities in the Preliminary Study Area have prepared comprehensive plans. Although some communities are in the process of preparing and adopting plans, at the time of this study Eddystone, Folcroft, Norwood, Marcus Hook, Trainer and Ridley Park Borough, and Lower Chichester Township did not have comprehensive plans. Philadelphia has a plan, as do five out of the six coastal communities in Bucks County. The difference in the rate of plan preparation between Bucks and Delaware Counties reflects the fact that the municipalities in Delaware County are already extensively developed (and have been for a long time). For additional information refer to Chapter 1. Patterns of land use are less likely to change in these smaller boroughs than in the townships of Bucks County, where large undeveloped tracts of land still exist

making the need for a comprehensive plan more obvious. Of the thirteen plans completed by communities in the Preliminary Study Area, six were prepared before 1969, while four have been prepared since 1975. Some of the earliest plans were prepared by communities in order to qualify for federal funds to be used for urban renewal, open space, historic preservation, water supply and sewage treatment. (Figures iv-2, 3, 4 are composite maps of locally prepared comprehensive plans. The date that each plan was prepared is indicated in the source information).

A review of the composite maps of local plans indicates that some municipalities have proposed extensive open space greenways along stream corridors and the Delaware River. Bensalem, Bristol, Chester and Upper Chichester townships are four examples that are easily identified on the maps. Falls Township has planned open space buffers around the man-made "Warner Lakes", while Ridley Township has planned the narrow riverfront and the Delaware River itself for open space/recreation.

Much of the riverfront in Chester City and Philadelphia is planned for industrial and utility use, while Bensalem, Bristol, and Falls Townships have large industrial areas planned just back from the Delaware. (See figures iv-2, 3, 4 The plan for Tinicum Township is unusual in its use of large, generalized areas, but it is the only plan in the Preliminary Study Area that has a special category describing waterfront industry. The plans developed for communities such as Chester City, Prospect Park, Darby Township, Philadelphia, Bristol Borough and Morrisville were developed after most development had already occurred and therefore, these plans reflect existing land use patterns displayed in Chapter 1. The most significant difference between the existing land use maps (figures i-5, 6, 7) and the comprehensive plans is that areas in the plans appear more homogenous. The land use plans suggest the replacement of "strip commercial" areas by clustered shopping areas. (The long red strips on the land use maps of Chapter 1 are replaced by larger red areas on the plans). The plans for Chester City and Philadelphia demonstrate this philosophy especially well. (See fig. iv-2, 3).

Most of the natural resource areas identified in Chapter 1 seem to be reflected in the local plans which have been prepared. Little Tinicum Island, portions of Tinicum Marsh, the mouth and stream valley of the Pennypack Creek, the Poquessing and the Neshaminy Creeks and fringe areas around Biles Island and Money Island are planned for future open space and recreation. The Tinicum Township plan proposes development for some areas of Tinicum Marsh, while Folcroft and Norwood Boroughs have not yet prepared plans that indicate the future use of the marsh. Many of these natural resource areas are not presently protected by appropriate zoning ordinances and inconsistencies of this type will be described below.

<u>Zoning</u> - The Penna. Municipalities Planning Code and the Philadelphia Home Rule Charter allow local governments to enact, amend and repeal zoning ordinances. Zoning ordinances typically are designed to promote the public health, safety, morals and general welfare of the

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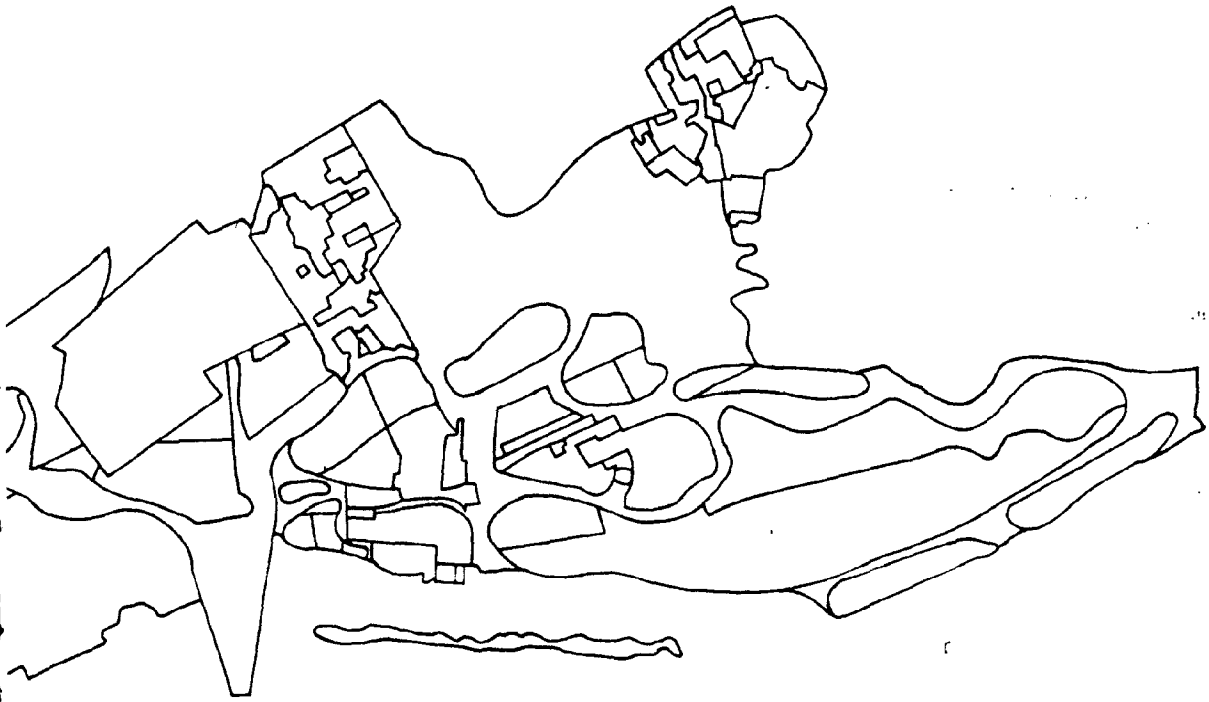


1 INCH = 1 MILE

0 .5 1 2

0 .5 1 2 3

1 INCH=1.6 KILOMETERS

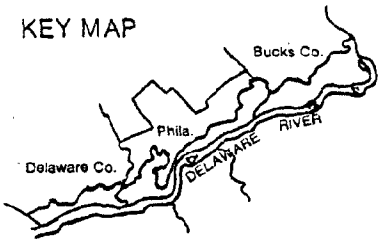
SQ. MILE

SQ. KM.

LOCAL LAND USE PLAN

DELAWARE COUNTY STUDY AREA
DELAWARE ESTUARY COASTAL ZONE

KEY MAP



LEGEND

- LOW DENSITY RESIDENTIAL (LOT SIZE GREATER THAN 30,000 SQ. FT.)
- MEDIUM DENSITY RESIDENTIAL (LOT SIZE 5500-30,000 SQ. FT. OR LESS THAN
- HIGH DENSITY RESIDENTIAL (LOT SIZE LESS THAN 5500 SQ. FT. OR MORE THA
- COMMERCIAL
- INDUSTRIAL
- INSTITUTIONAL
- TRANSPORTATION AND UTILITIES
- OPEN SPACE

SOURCES: LOCAL COMPREHENSIVE PLANS:

UPPER CHICHESTER TWP.	1966
CHESTER TWP.	1972
CHESTER CITY	1972
RIDLEY TWP.	1975
PROSPECT PARK BORO.	1967
TINICUM TWP.	1968
DARBY TWP.	1975

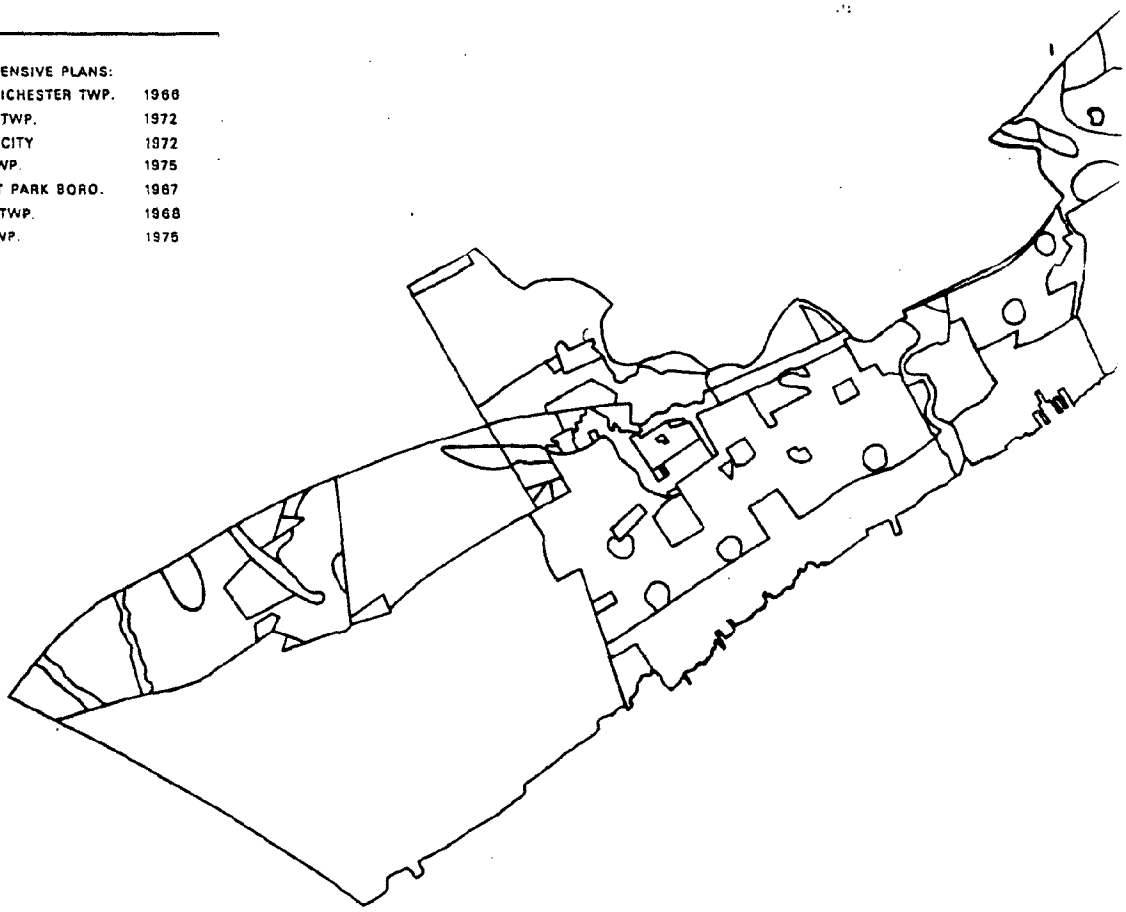


Figure iv-3

Local Land Use Plan - Philadelphia County

1" = 1 mile

Figure iv-4

Local Land Use Plan Bucks County

1" = 1 mile

community. To accomplish these ends zoning ordinances are designed to regulate, prohibit and restrict:

(1) Uses of land, watercourses and other bodies of water;

(2) Size, height, bulk, location, erection, construction, repair, maintenance, alteration, razing, removal and use of structures;

(3) Areas and dimensions of land and bodies of water to be occupied by uses and structures, as well as areas, courts, yards, and other open spaces and distances to be left unoccupied by uses and structures;

(4) Density of population and intensity of use.[2]

While zoning is not mandatory, it has been utilized by local governments to regulate development for a longer period of time than comprehensive plans. Zoning has been popular since the early 1930's and Chester City and Norwood Borough have had ordinances since 1927. Only one community in the Preliminary Study Area, Marcus Hook, has not adopted a zoning ordinance. Therefore, in accordance with the Municipalities Planning Code, Delaware County has zoning authority in Marcus Hook Borough.

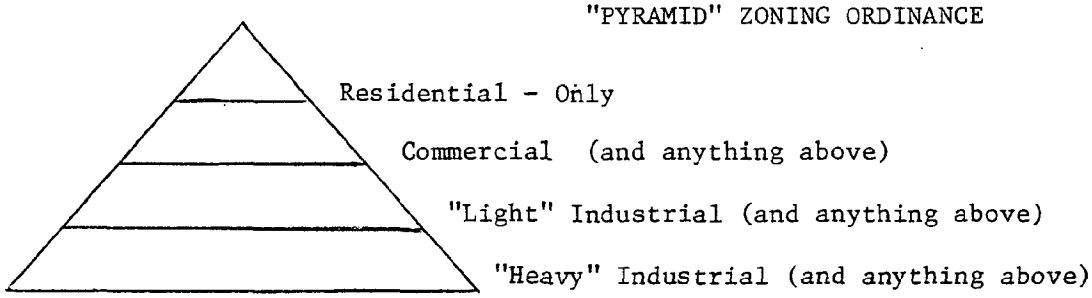
There is a wide range of sophistication and complexity among the twenty zoning ordinances in the Preliminary Coastal Study Area. The simplest ordinances are found in some of the small boroughs of Delaware County, such as Trainer, Prospect Park and Norwood. Norwood's zoning ordinance has only two categories of residential use and one commerical category. Prospect Park and Trainer have two residential classifications and one industrial district. In contrast, the zoning ordinance for the City of Philadelphia is a book of 328 pages including more than twenty-five residential districts, ten commercial districts, eight industrial districts as well as special districts regulating recreation, trailer camps, sports stadiums, and institutions. Philadelphia is the only municipality in the Study Area to enact a special "Port Industrial" district regulating "the erection, construction alteration and use of docks, wharves, piers, transit sheds and related facilities." The average zoning ordinance in the Preliminary Study Area contains three or four residential categories, two or three commercial classes and two or three industrial districts.

Some of the ordinances have been updated to include performance standards for industrial uses which regulate permissible levels of odor, noise, particulates, and smoke emissions. Such standards are included in industrial ordinances for Tinicum and Bristol Townships and Morrisville, Tullytown, and Bristol Boroughs.

Interestingly, the industrial districts in some municipalities are not designed to segregate residential from industrial uses. While industrial uses are usually not allowed in residential districts, residential uses are allowed in industrial districts. This situation

results in a zoning ordinance described as "pyramidal" because districts toward the bottom of the pyramid, permit every use mentioned above.

"PYRAMID" ZONING ORDINANCE



Zoning ordinances of this type were quite popular in the 1930's and 1940's but are now considered to be potentially troublesome since they may encourage or allow incompatible uses to locate in close proximity to each other.

Chester City, Ridley, Bensalem and Falls Townships, and Folcroft and Ridley Park Boroughs have ordinances of this type.

In spite of the widespread flooding which has occurred in recent years and the incentives of the National Flood Insurance Program sponsored by the Department of Housing and Urban Development (HUD), few municipalities in the study area had adopted floodplain zoning ordinances by the end of 1976. In Delaware County only three communities of the fourteen in the study area had enacted ordinances regulating development in flood prone areas. In Bucks County three of the six communities have adopted floodplain districts. Philadelphia requires setbacks from streams and swales in the Wissahickon Watershed, which, while not a true floodplain ordinance does serve to keep floodplains open and structures safe from damage. For other areas the City has not yet adopted floodplain controls. In time it is anticipated that all communities in the Coastal Zone study area will adopt a set of development control strong enough to satisfy HUD requirements, in order to allow residents to qualify for federally subsidized flood insurance.

Figures iv-5, 6, 7, are generalized zoning maps of the Preliminary Study Area. The categories have been standardized for the purposes of comparison with one another, and therefore may not correspond exactly to municipal definitions. For example, low density in a borough (20,000 square foot lots) may very well correspond to medium density in a township. Districts have been coded by lot size requirements and not titles for the sake of ready comparison.

An examination of figure iv-5, indicates that most of the Preliminary Study Area in Delaware County, including the entire riverfront, is zoned industrial. Marcus Hook is not zoned. The intentions of the local comprehensive plans to eliminate "strip commercial" are not supported by the adopted zoning ordinances, which still indicate linear strips of commercial uses along major highways. Tinicum Marsh

and Little Tinicum Island are zoned industrial, as is Philadelphia International Airport.

In Philadelphia (fig. iv-6) the predominant category is also industrial. The entire riverfront is zoned industrial except for a very small residential area north of the Torresdale Water Treatment Facility.

The zoning ordinance supports the comprehensive plan and discourages strip commercial areas in favor of larger blocks of commercial uses. Compare figure i-7, Existing Land Use, Philadelphia with figure iv-3, Comprehensive Plan and iv-6 Generalized Zoning).

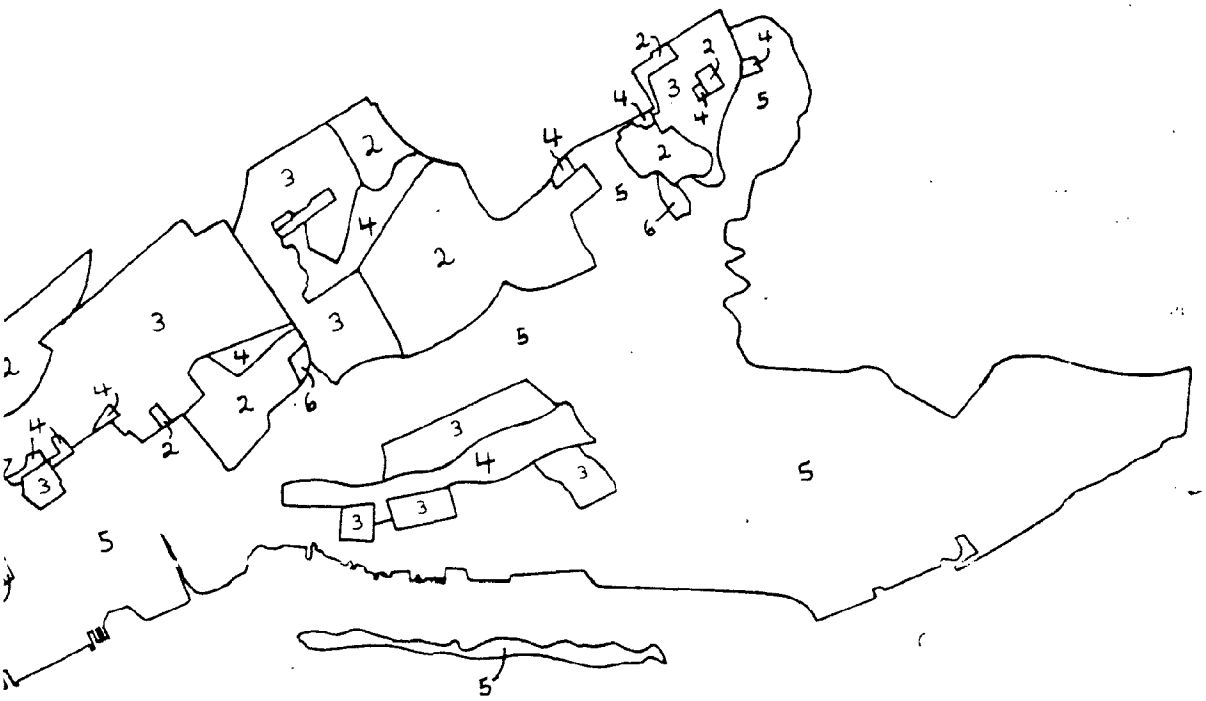
Bucks County (figure iv-7) is quite different from Philadelphia and Delaware Counties. While much of the riverfront in the Preliminary Study Area is zoned industrial, vast interior areas are zoned for medium density residential uses. Several areas zoned for low density residential use are indicated in Bensalem Township and in Bristol Township. Commercial zoning is largely confined to existing commercial areas along Route 13 in Bristol Township with smaller areas in other communities.

The most striking contrast which is apparent when viewing all three zoning maps is that the open space and recreation areas indicated on the comprehensive plans are not visible on the zoning maps. Municipalities which have expressed a desire through the comprehensive plans to preserve stream corridors have not yet enacted floodplain zoning. In addition, very few communities have used open space or institution districts for publicly owned and institutional lands. This technique provides additional protection for these areas and should be encouraged. Philadelphia has used the open space category for Roosevelt Park, Liberty Bell Race Track and some smaller city parks, but has not zoned the Tinicum Environmental Center, the mouth of the Pennypack Creek, or the institutions in the vicinity of Holmesburg on the State Hospital ground for open space or institutional use. The zoning categories currently in effect in these areas do not appear to support the ideas of the comprehensive plan.

Similarly in Bucks County, the stream valley of the Neshaminy is zoned residential instead of floodplain, and the existing parks in Bristol are not indicated on the zoning maps, but are zoned residential and commercial. Neshaminy State Park is zoned for low density residential use and none of the municipal ordinances reflect the concept of the open space buffer along the Delaware expressed in the local comprehensive plans. Finally, one of the most striking differences is that the buffer strips around the Warner Lakes indicated in the comprehensive plan for Falls Township are absent from the zoning map.

) D.U. / ACRE)

9 D.U. / ACRE)



1 INCH = 1 MILE

0 .5 1 2

0 .5 1 2 3

1 INCH=1.6 KILOMETERS

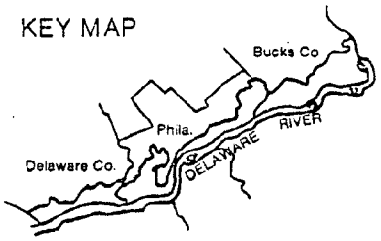
SQ. MILE

SQ. KM.

GENERALIZED ZONING

DELAWARE COUNTY STUDY AREA
DELAWARE ESTUARY COASTAL ZONE

KEY MAP



LEGEND

- LOW DENSITY RESIDENTIAL (LOT SIZE GREATER THAN 30,000 SQ. FT.)
- MEDIUM DENSITY RESIDENTIAL (LOT SIZE 4500-30,000 SQ. FT. OR LESS THAN
- HIGH DENSITY RESIDENTIAL (LOT SIZE LESS THAN 4500 SQ. FT. OR MORE THAN
- COMMERCIAL
- INDUSTRIAL
- INSTITUTIONAL
- OPEN SPACE

SOURCES. LOCAL ZONING ORDINANCES AND MAPS

LOWER CHICHESTER TWP.	1968	RIDLEY TWP.	1970
UPPER CHICHESTER TWP.	1973	RIDLEY PARK BORO.	1970
TRAINER BORO.	1962	TINICUM TWP.	1970
MARCUS HOOK BORO. (NOT ZONED)		PROSPECT PARK BORO	1970
CHESTER TWP.	1951	NORWOOD BORO.	1927
CHESTER CITY	1971	FOLCROFT BORO	1969
EDDYSTONE BORO.	1968	DARBY TWP.	1967

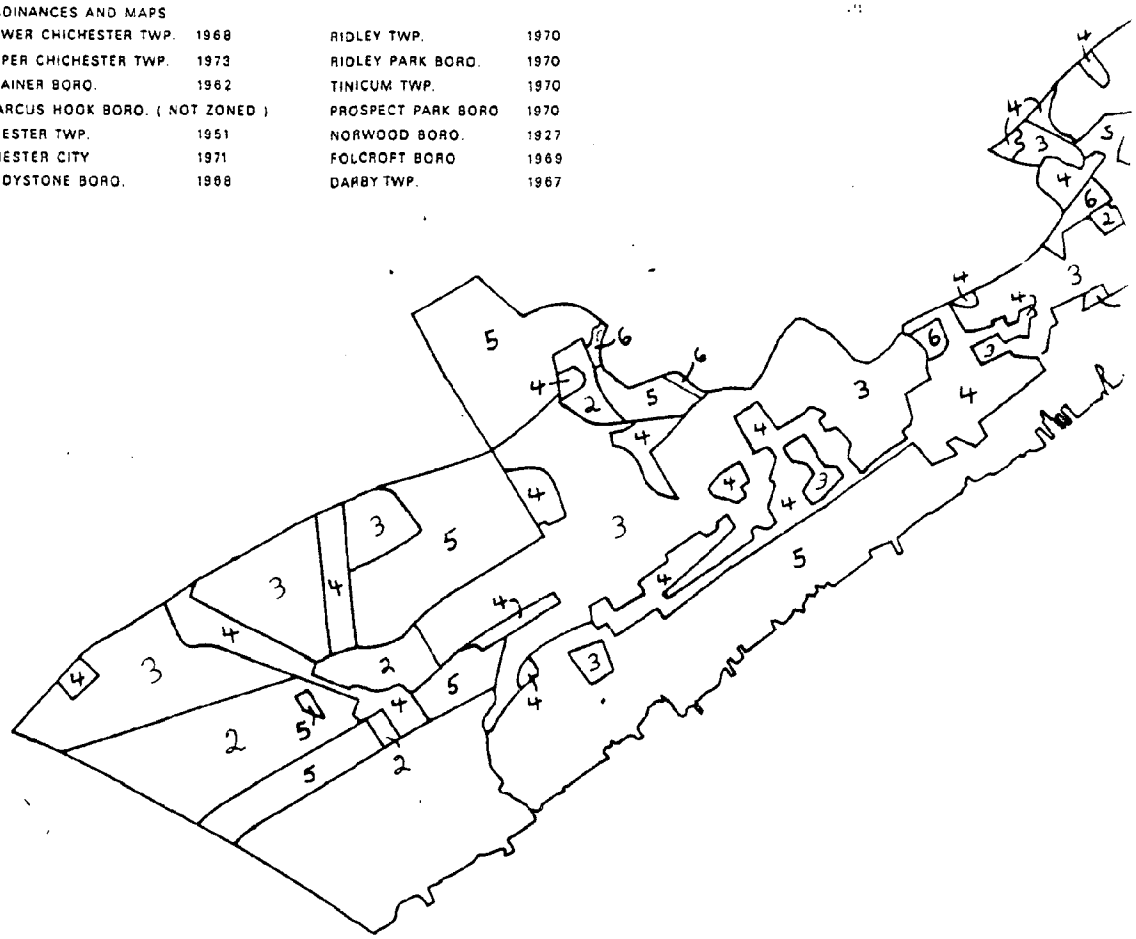


Figure iv-6

Generalized Zoning Philadelphia County

1" = 1 mile

Figure iv-7

Generalized Zoning Bucks County

1" = 1 mile

Comprehensive Plans - Eight of the ten Erie County municipalities that extend into the final coastal zone boundary have adopted comprehensive plans. A ninth municipality, Springfield Township, has recently completed a comprehensive plan and it is scheduled for adoption before the end of 1977. Girard Township is the only municipality that has not yet initiated comprehensive planning, however, local officials will shortly begin initial steps toward a comprehensive plan. All existing comprehensive plans were adopted between 1961 and 1972.

A review of the composite maps of local plans indicates that Fairview and Harborcreek Townships and Lake City Borough have proposed extensive open space greenways along stream corridors. Harborcreek Township has proposed an agricultural district along its border with North East Township. A large agricultural district is proposed in the North East Borough-Township Plan which is basically located between Routes 5 and 20.

Three areas within the final coastal zone boundary are proposed for industrial development. One is located in the port and waterfront area of the City of Erie. A second area is immediately south of the Village of Harborcreek in Harborcreek Township. The third industrial district is located in North East Borough along the ConRail right-of-way and extendn for about one mile into North East Township on both the east and west sides of the Borough.

Lands proposed for commercial development are nearly always areas which have already been developed for commercial uses. Within the final coastal zone boundary most municipalities call for clustered commercial development when in actuality strip zoning predominates, particularly in Millcreek and Harborcreek Townships. Resort commercial areas have been proposed in Lake City Borough and Harborcreek Township. The City of Erie has only one commercial district proposed in its official plan which is located on State Street north of where it intersects 2nd Street.

Comprehensive planning can serve as a means for proposing logical growth patterns in those undeveloped and developing areas of the coastal zone. Many of the plans are either outdated or are not technical enough to be reliable guides for establishing sensible zoning practices. Natural resource areas and prime and unique agricultural soils are not protected from urban-related development. Spot zoning is another problem which could be alleviated if comprehensive plans were better utilized.

Zoning - All of the communities located in the Erie County coastal zone have adopted a zoning ordinance. Half have been adopted since 1974 and the oldest was adopted in 1965. Zoning restrictions upon developments occurring in natural areas are evident in Springfield, Fairview, Lawrence Park and Harborcreek Townships. Only in

Figure iv-8

Local Land Use Plan-Western Study Area

1" = 1 mile

Figure iv-9

Local Land Use Plan-Central Study Area

1" = 1 mile

Figure iv-10

Local Land Use Plan-Eastern Study Area

1" = 1 mile

Springfield and Harborcreek do these regulations effect a very significant part of the natural areas which exist. All restrictions on natural areas that do occur are located in flood plains and stream valleys. In no community are lake bluffs restricted from development.

Agricultural districts are located in Girard, Harborcreek and North East Townships, however, no zoning ordinance accurately reflects those areas where undeveloped prime and unique agricultural soils exist. Many of these soils have already been zoned for residential purposes including some farmlands that are currently agriculturally productive and which will not be in the path of substantial urban-related development for many years.

Zoning as a local control often does not follow the proposals which were established in municipal comprehensive plans. Strip and spot commercial zoning often occur in the more rapidly developing municipalities. The granting of variances by zoning hearing boards are a common occurrence. Only when unnecessary hardships are inflicted by the provisions of the zoning ordinance are variances to be approved. It is commonly misconstrued for unnecessary hardships to be those which are financially related.

Zoning is still the single most commonly used legal device available for implementing the land-use plan in a community. Ordinarily in the past, zoning has only been indirectly concerned with achieving environmental goals. While environmental protection standards can be legally built into local zoning ordinances, such practices have not been advanced locally.

Subdivision Ordinances - Subdivision regulations are locally-adopted laws governing the process of converting raw land into building sites. This is normally accomplished through plat approval procedures, under which a developed is not permitted to make improvements or to divide and sell his land until the governing body and local planning commission has approved a plat (map) of the proposed design of the subdivision. The approval or disapproval of the governing body and planning commission is based upon compliance or non-compliance of the proposal with development standards set forth in the subdivision regulations. In the event that the developer attempts to record an unapproved plat in the county Recorder of Deeds Office or to sell lots by reference to an unapproved plat, he would be subject to various civil and criminal penalties.

Seven of the Erie County coastal zone's ten municipalities have adopted subdivision regulations. Lake City Borough's was adopted in 1956. The remaining six municipalities which have adopted subdivision regulations have enacted them within the past six years. A seventh coastal zone community, Springfield Township, will be adopting subdivision regulations this year. Another coastal community, Girard Township, has indicated that they are interested in adopting such regulations in the near future. Lawrence Park Township is the only coastal community htat has not adopted subdivision

Figure iv-12

Generalized Zoning-Western Study Area

1" = 1 mile

Figure iv-12

Generalized Zoning-Central Study Area

1" = 1 mile

Figure iv-13

Generalized Zoning-Eastern Study Area

1" = 1 mile

regulations and is not likely to do so in the future as the Township is nearly fully developed and has determined that subdivision regulations would not be necessary. The Erie County Land Subdivision Regulations, amended in 1972, which are administered by the Erie County Metropolitan Planning Commission carry a review and recommendation role for all communities having already adopted local subdivision ordinances, and carry full decision making power in those instances when a local government has not adopted.

Act 537 - Act 537, the Sewage Facilities Act, unlike comprehensive planning, zoning, and subdivision regulations, is not a regulatory control available for use by municipal level governments but rather is a state regulation which acts to restrict local governments and individuals alike. The purpose and scope of this state act is to provide for the planning and regulation of community and individual sewage disposal syl systems; to require municipalities to submit plans for sewage systems in their jurisdiction; to authorize grants to municipalities; to require permits for persons installing such systems; to authorize the Department of Health to adopt rules, regulations, sta standards and procedures; to create an advisory committee; and to provide remedies and prescribe penalties.

Summary - Comprehensive plans, zoning ordinances, and subdivision regulations are documents that can be utilized by local level governments to establish a policy guide as well as a legal process to decisions about the physical development of a community. They indicate how a community will develop over the next 10 to 20 years. It is unfortunately evident that local communities have not always utilized these documents as practical methods for land management of sensitive environmental areas. Thus, the Coastal Zone Management Program holds the potential to control development and resolve conflicts among competing land uses in coastal communities. The objective of the Coastal Zone Management program is to motivate communities to utilize existing controls to accomplish practical goals for management of coastal lands. Alternatives are available for the state to adopt other methods of control as they have with State Act 537. It is apparent that if the goals of the Coastal Zone Management program are to be realized then enactment of additional controls will be required, if not at the local level, then through state controlled techniques.

CONCLUSION

Pennsylvania's existing authority for implementation of a Coastal Zone Management Program is adequate in a number of areas. Sludge and dredge spoil disposal, as well as sewage treatment operations, are subject to direct control. Air and water quality and supply are protected by an extensive regulatory programs and planning processes. Extraction of minerals and related activities are also controlled by a comprehensive regulatory program. The conservation of natural

resources used for commercial fishing and recreation can be assured by present administrative authority.

Various agencies have a broad range of powers to acquire land when necessary to achieve conformity with coastal zone management policies. Economic incentives for continued health or revitalization of commerce and industry are provided in existing legislation. Through the establishment of a public information network, Pennsylvania can assure the citizen education and involvement which is essential to the success of coastal management efforts.

Pennsylvania's existing legal and institutional arrangements, however, are generally insufficient for the proper implementation of a Coastal Zone Management Program. Under the provisions of the Municipalities Planning Code, local governments have largely unrestricted authority to make land use decisions, and the State government is unable to exercise the regulatory powers required by section 306 of the Coastal Zone Management Act. Although the Commonwealth has adequate acquisitionary powers to help achieve conformance with a management program, it lacks adequate power to "administer land and water use regulations, control development in order to ensure compliance with the management program, and to resolve conflicts among competing uses." Neither is there presently sufficient power to override local regulations which "unreasonably restrict or exclude land and water uses of regional benefit." Legislative adoption of one or more techniques of control presented in Chapter 10 of this document will be necessary to give Pennsylvania the management capability required by the Coastal Zone Management Act.

COASTAL ZONE POLICY FRAMEWORK

5

5 COASTAL ZONE POLICY FRAMEWORK

INTRODUCTION

Chapters 1 through 4 have provided extensive background information on environmental, social and economic characteristics, past and present problems, future expectations, existing legal and institutional arrangements in Pennsylvania's two coastal areas, the Delaware Estuary and Lake Erie. This background information has been incorporated into the Policy Framework which forms the keystone of the Coastal Zone Management Program.

The Policy Framework provides a convenient summary of important issues identified in the four introductory Chapters and identifies goals, objectives, and policies that have been developed in response to coastal problems. The Policy Framework also establishes a context for the final five Chapters 6 through 10, which describe the detailed elements of the Coastal Zone Management Program. These detailed elements outline techniques to implement the goals, objectives and policies in order to reduce or eliminate identified problems.

The first step in developing the Policy Framework was the identification of coastal problems and issues. General problems common to both coastal areas and specific local problems were compiled from many sources including local governments, waterfront industries, county planning commissions, interested citizens and members of the Coastal Zone Steering Committees. (For additional background see Chapter 2, Problems and Issues.)

The goals and objectives included in the Policy Framework were formulated directly from the problem statements. Goals are general statements of purpose that will guide the overall Management Program. These goals describe desirable end results or targets, but they only provide minimal guidance in achieving these ends.

Objectives are more specific statements which can be used to measure progress towards accomplishing goals. Each goal is likely to have several specific objectives which help to further identify or define the target.

Policies are developed as courses of action which the Coastal Zone Program will utilize in achieving the goals and objectives. Policies are the most specific recommendations in the Policy Framework.

The Policy Framework on the following pages divides coastal zone problems, goals, objectives and policies into four separate categories representing the major concerns expressed during the preparation of the Draft Technical Record.

The largest area of concern, "Land Use, Resources and Environment" is subdivided into ten general areas which are specifically related to local problems in each Coastal Zone. The other three areas of concern, Economic Health and Revitalization, Public Involvement and Education, and Governmental Regulation and Responsibility, follow the same format, outlining general problems, local problems, goals, objectives and policies. The number of problems within a category or the order of category or problem in the Policy Framework does not necessarily reflect relative importance.

The Policy Framework should provide a quick reference guide to the overall Coastal Zone Management Program, and was extensively reviewed prior to the appearance of this document.

LAND USE, RESOURCES, ENVIRONMENT

GENERAL PROBLEMS	SPECIFIC LOCAL PROBLEMS	GOALS	SPECIFIC OBJECTIVES	POLICIES
1. LAND USE There are no comprehensive guidelines for land and other resource management in the Coastal Zone. Consequently, development is incremental and uses which should be protected or restored are often destroyed or damaged.	Land uses that are not dependent on riverfront or other shoreline locations are consuming valuable coastal locations. Dredge disposal activities have caused adverse environmental effects. Areas suitable for disposal of dredge spoil are extremely limited and may temporarily exclude other coastal activities. Higher levels of sewage treatment produce greatly increased amounts of sewage sludge. Disposal of sludge in the coastal zone requires land and facilities. The concentration of large industrial and commercial activities along the Delaware and Schuylkill River increases the likelihood of accidents, fires, explosions, ship collisions, spills and other disasters. (D) Suburban sprawl and strip development along transportation corridors have resulted in the inefficient utilization of land resources. (E) Construction of large scale facilities could change the rural character and land use patterns in Erie County. (E)	Establish comprehensive land and water use plans which provide for both the protection and development of the coastal zone. Improve the environmental and aesthetic quality of the coastal zone for the future benefit and enjoyment of all citizens.	Provide information on impacts associated with land use patterns and suggest ameliorative measures to reduce adverse impacts. a. Implement a system of permissible and priority uses to maximize the efficient utilization of coastal land and water resources. b. Establish development priorities for areas to be serviced by public facilities. c. Encourage multiple use of coastal lands. Identify suitable sites for sludge and dredge spoil disposal, and indicate sites where disposal is not appropriate. Discourage suburban sprawl and strip development trends in favor of more concentrated development patterns which take advantage of existing infrastructure. (E) Minimize the occurrence and effects of industrial spills, leaks, fires and other disasters through sound planning and wise development practices.	Provide Coastal Zone Management funds and/or professional services to coastal municipalities to improve and strengthen regulatory tools. Have local governments review, and revise where necessary, their plans and ordinances for compatibility with Coastal Zone Management goals, objectives and guidelines; subject to approval. Adopt special criteria for granting permits for sludge and dredge spoil disposal, including an environmental assessment of the disposal. Coordinate the CZM Program with all ongoing resource planning program. (e.g., COWAMP, 208 planning, air basin planning, State Land Use Policy Program, etc.) Set criteria and standards for priority and permissible uses to guide future development in coastal areas. Develop guidelines for the location and operation of potentially hazardous facilities and activities.

KEY

(D) indicates problems in the Delaware Estuary Coastal Area.

(E) indicates problems in the Lake Erie Coastal Zone.

Problems not specifically noted are common to both Coastal Areas.

LAND USE, RESOURCES, ENVIRONMENT

GENERAL PROBLEMS	SPECIFIC LOCAL PROBLEMS	GOALS	SPECIFIC OBJECTIVES	POLICIES
2. USES OF REGIONAL BENEFIT				
There is no coordinated method for locating uses of "regional benefit." The public is often not involved in the planning and consequently, opportunities for development are lost through lack of communication.		Plan to accomodate uses of "regional benefit" which serve or impact more than a single municipality.	Provide guidelines for identifying suitable locations for uses of regional benefit. Ensure that uses of regional benefit are neither arbitrarily excluded nor included.	Set criteria for siting uses of regional benefit. Amend comprehensive plans, zoning ordinances, and subdivision regulations as required to accommodate uses of regional benefit compatible with the CZM program.
3. AIR & WATER QUALITY & SUPPLY				
Various land uses in coastal areas degrade air and water quality.	The Delaware Estuary, Lake Erie, and many tributary streams do not meet existing State and Federal water quality standards. The Philadelphia area has continuing air pollution problems. (D) There is competition in the coastal zone for water. In certain areas, groundwater use is dependent upon recharge from the river. Thus, the quality and quantity of ground and surface water are closely related. The installation of septic systems in rural areas with unsuitable soils has created water pollution and public health hazards. (E)		Identify areas where air and water quality do not meet existing standards. Ensure that existing and future coastal development complies with applicable air and water quality standards. Encourage the long range allocation of ground and surface water to assure adequate supplies for all water uses. Prevent water pollution and public health problems associated with the installation of on-lot septic systems. (E)	Preserve surface and groundwater supplies by prohibiting the construction of on-lot septic systems on unsuitable soils, and by protecting recharge areas thru regulation of uses according to CZM guidelines. (E) Protect clean airsheds while preventing additional degradation in areas not currently meeting air quality standards. Develop priorities for the extension of sewer systems into areas with soil limitations for on-lot septic systems in conformance with CZM, COWAMP, State Land Use Policy Plan, and local objectives.(E) Conserve and protect surface and groundwater supplies by preventing pollution, protecting recharge areas and regulatory uses.
4. HISTORIC & ARCHEOLOGICAL RESOURCES				
Valuable archeological and historic areas are not widely recognized and consequently, are often destroyed or damaged by insensitive development.			Protect unique historic and archeological resources through local, state and national recognition and regulation.	Promote increased use of historic districts identified and controlled at local level. Provide technical and financial assistance in identifying and preserving historic and archeological resources, through a sound planning process.
5. SIGNIFICANT NATURAL AREAS				
Coastal areas of significant natural value which possess unique and fragile features are threatened by incompatible uses.	Natural areas, such as Tinicum Marsh and Presque Isle, are especially sensitive to incompatible adjacent uses.	Identify and protect areas of significant natural value.		Develop criteria and model ordinances for local governments which regulate sensitive natural areas, and take account of priorities for GAPC's. Acquire particularly fragile areas.

GENERAL PROBLEMS	SPECIFIC LOCAL PROBLEMS	GOALS	SPECIFIC OBJECTIVES	POLICIES
6. HAZARDOUS AREAS				
Areas which are hazardous for development are subject to uncontrolled and improperly designed development, thereby endangering life, property and environmental quality. Derelict docks, piers, watercraft and storage buildings poses a hazard to public health, safety and navigation.	Many coastal areas have experienced recurring, predictable flooding problems. Development on steep slopes can cause excessive property damage and soil erosion. (E) Development near bluff areas results in major property damage and accelerated erosion problems. (E)		Minimize damage to life, property and the environment in flood plains by encouraging those land uses which minimize flood damages. Protect life, property and environmental quality in steep slope areas by instituting development practices that prevent steep slope disturbances, especially in areas of high aesthetic and natural value.(E) Reduce erosion and recession rates in bluff areas by avoiding the placement of groins and other structures in such a manner that accelerates erosion and recession rates. (E) Protect public safety and enhance shorefront productivity by restoring, converting or eliminating derelict facilities.	Protect undeveloped flood plain areas (100 yrs.) by encouraging only those land uses minimally affected by flooding. Encourage flood-proofing and flood warning in developed hazard areas. Set coastal criteria for local governments to institute development practices that prevent steep slope disturbances and protect steep slopes designated as Areas of Significant Nathral Value.(E) Develop local regulations in accordance with CZM that prevent future development practices which accelerate erosion and recession rates in hazardous bluff areas.(E) Under the CZM guidelines, develop model ordinances for local governments to utilize with respect to shorefront rehabilitation. Maintain the regional planning process of studying and monitoring the effects of erosion and of evaluating and controlling impacts.
7. NATURAL RESOURCES				
Areas with economically exploitable natural resources are not always properly managed.	Water pollution and excessive fishing have seriously decimated once flourishing commercial fishing. Mining of sand and gravel without adequate controls may potentially cause adverse environmental problems. (E) Natural gas drilling, if improperly controlled, can cause adverse onshore and offshore impacts. (E) Prime agricultural soils are a valuable resource which cannot be reclaimed once disturbed.(E) Tidal and non-tidal wetlands are valuable areas that have been reduced to a fraction of their original size.		Protect existing fish species while restoring indigenous commercial fish populations. Control onshore and offshore aggregate extraction activities to minimize environmental impact.(E) Investigate the feasibility of developing the natural gas reserves in Lake Erie. (E) Establish safeguards that will minimize onshore and offshore impacts of offshore drilling. (E) Protect prime farmland by encouraging the continuation of viable farming activities. (E) Protect wetland areas that still exist.	Support ongoing State, Federal and International efforts to restore and properly manage commercial fishing in Lake, including research and fishery management activities. (E) In the CZM Program, provide guidelines for strengthening regulation of onshore and offshore aggregate extraction activities. Support legislative and other initiatives on the resumption of offshore gas drilling activities on Lake Erie. Within the CZM program develop guidelines for natural gas drilling to minimize onshore and offshore environmental impacts. Protect prime farm land by developing guidelines which support the economic viability of agriculture in the coastal zone. Identify wetland areas in local comprehensive plans and develop ordinances to protect these valuable areas. Use priorities and permissibility to keep wetlands from being filled.

GENERAL PROBLEMS	SPECIFIC LOCAL PROBLEMS	GOALS	SPECIFIC OBJECTIVES	POLICIES
8. RECREATION				
Recreational opportunities in the coastal areas are insufficient to meet local and regional demands. Public accessibility to shoreline areas is severely limited.	Existing recreation facilities are often poorly maintained and under-equipped. There are deficiencies in special interest recreational facilities, especially water dependent facilities such as boat ramps, marinas and fishing access points. Shoreline areas (especially in the Delaware River) have not been developed to realize their recreational potential. Recreational areas have not been acquired in proportion to their demand. Urban coastal zone residents have limited access to recreational facilities. (D)		Develop needed special interest recreational facilities. Acquire shoreline access through easements, leases, fee simple acquisition, and other techniques. Maintain and upgrade to full potential existing recreational facilities. Publicize existing opportunities for recreation and riverfront/stream access and post clear directions to access points and recreational areas. Acquire public recreation areas accessible to urban residents.	Provide incentives in the CZM Program for local governments to clearly post and publicize the locations of access points and recreational areas. Provide funding and technical assistance to local governments to help them develop and encourage local recreational opportunities. Encourage and popularize the concept of multiple use of shoreline areas. Encourage new and existing facilities to make under-utilized land available, even on a temporary, short-term basis.
9. ACQUISITION				
Fee simple acquisition, the most common way to protect fragile environmental areas and to provide open space and recreational areas, is often too costly for large scale use.			Promote the use of dedication, acquisition of less than fee simple interest to control land use and preserve open space and recreational uses. Promote the concept of multiple use in commercially developed lakefront areas to increase public access to and use of those areas.	Develop model ordinances for local governments to help them preserve open space and encourage private industry to open available land for public use.
10. AESTHETICS				
Aesthetic values have not been taken into account in the development of coastal resources.	Many portions of the existing waterfront environment do not enhance aesthetic values. (D)		Encourage attractive design in coastal development to enhance scenic and natural qualities. Preserve natural amenities.	Conduct an extensive education program to increase public awareness of aesthetic values. Develop guidelines which will preserve areas with high aesthetic value and reclaim areas identified as aesthetically degraded. Incorporate aesthetic considerations in the planning and development of coastal resources.

ECONOMIC HEALTH AND REVITALIZATION

GENERAL PROBLEMS	SPECIFIC LOCAL PROBLEMS	GOALS	SPECIFIC OBJECTIVES	POLICIES
There is outmigration of jobs and population with resulting loss of tax base and lag in personal income growth in the Coastal Zone.	Industrial jobs have been lost because of changes in technology and the geographic factors affecting industrial locations.(D)	Promote rational socio-economic growth, reasonable use of resources and an optimum level and variety of employment opportunities within the coastal zone.	Promote the economic productivity of Commonwealth port facilities.	Provide information to commerce related agencies and organizations to increase awareness of coastal areas of economic opportunity.
Urban decline and infrastructure obsolescence, particularly of coastal transportation, limits the economic capacity of the Coastal Zone.	Finger piers have been abandoned and prime waterfront sites have been or are marginally used. Tax revenues and economic vitality have decreased.(D)		Support research and planning activities of agencies responsible for economic, and particularly port, development.	Work with State and Federal agencies whose activities support the port and related coastal economic activities.
	Some shorefront areas are currently being occupied by non-coastal dependent uses.		Promote the establishment of economically viable coastal dependent uses on abandoned or vacated waterfront areas.	Develop model ordinances that give shorefront siting priority to coastal-dependent uses.
	Rail transportation of freight has declined creating unused or excessive facilities such as rail yards and stations.(D)		Encourage the improvement of port services and alleviation of infrastructural deficiencies (transportation arteries (roads, railroads), power facilities, terminal facilities, etc.).	Establish criteria which will provide financial incentives for development of commercial and industrial facilities in areas of economic opportunity.
	Unimproved transportation access to port facilities has decreased the economic feasibility of shipping activities. (E)			Work with transportation agencies and other public utilities to improve port and other economically vital services.
	Even though Presque Isle Peninsula provides the Erie area with the finest natural harbor on the Great Lakes, shipping activities have annually decreased. (E)			

PUBLIC INVOLVEMENT AND EDUCATION

GENERAL PROBLEMS

Since there is no coordinated program to publicize the Coastal Zone Program most Pennsylvanians are unaware of or have erroneous ideas about its potential.

A multitude of coast related programs and efforts compete for the public's attention. As a result, the CZM Program which lacks a strong public mandate in Pa. is often either confused with other programs or viewed as one more "big" government intrusion.

The importance of the port facilities are often overlooked, even by municipalities which benefit from its activities. Most Pennsylvanian's are unaware of the value of, or the pressures on our coastal resources.

SPECIFIC LOCAL PROBLEMS

Most people are generally unaware of improvements in the quality of their coastal environments or the coast potential.

- The Delaware, long polluted by raw sewage, has been steadily improving since the late 1940's. A wide variety of aquatic life can now be found.
- Lake Erie, once considered dead, has recovered remarkably and now supports the coho salmon.

The public does not perceive the potential of the Delaware for environmental enhancement and improvement. The river has been largely forgotten even by those who work and live nearby. Lack of current information aggravates the problem.

Recreation and aesthetics are viewed as goals that compete with jobs in the coastal zone. These goals are compatible with growth and vitality. The choice is not limited to industry or tax exempt regulations. Examples of compatible uses are needed.

GOALS

Promote ongoing citizen participation to insure inclusion of citizen needs and aspirations in coastal decisions.

SPECIFIC OBJECTIVES

Encourage a concerned constituency and maximum public participation in each study area by making CZM information easily accessible.

Sponsor a demonstration clean-up highlighting problems and suggesting alternatives.

Chart the functional responsibilities of various participating agencies in order to clarify their roles for the public.

Ensure public participation and feedback during program implementation.

Sensitize policy makers to current public values and preferences relative to coastal resources.

POLICIES

Conduct frequent, widely publicized meetings in the coastal zone to discuss progress of current land and water issues.

Appear before elected officials to explain the program and offer assistance during implementation.

Establish statewide/regional citizens advisory committees and define their functions.

Utilize the media, repository libraries and public programs, as well as school programs, to increase awareness of the Coastal Zone, its value, benefits, and potential.

GOVERNMENTAL REGULATION AND RESPONSIBILITY

GENERAL PROBLEMS

Uncoordinated regulatory responsibility at the local, regional, state, interstate, and federal levels leads to non-uniform regulation of coastal resources and inconsistent planning for public investments, particularly uses of greater than local concern.

Public investments, such as sewerage, transportation, water supply, public buildings, and other strong determinants of growth and development patterns in coastal areas, are often not coordinated with on-going planning efforts.

Multiple permit requirements and poorly coordinated administrative procedures result in costly delays.

SPECIFIC LOCAL PROBLEMS

Local zoning ordinances may not adequately address the problems of managing coastal land and water resources.

Local governments control land use patterns in an uncoordinated fashion which has resulted in overzoning for industrial purposes and incompatible land use developments on the Delaware. (D)

Local land use plans are not being adhered to because local governments have granted incompatible requested zoning changes and variances. (E)

GOALS

Provide a workable management program which delineates the roles and responsibilities of the various levels of government with respect to the coordination, planning and regulation of coastal land and water uses.

SPECIAL OBJECTIVES

Coordinate and integrate the plans of all agencies, including Federal (to the maximum extent), to optimize the improvement, protection and use of coastal resources.

Utilize the federal consistency requirements to assure that federal actions are consistent to the maximum extent possible with the management program.

Simplify administrative procedures with regard to projects and activities in coastal areas.

Co-ordinate Pennsylvania's management program with neighboring states on Lake Erie and the Delaware Estuary.

POLICIES

Establish a reporting, monitoring and information dispersal system for proposed federal, state, interstate, regional, areawide, and local actions which may impact the coastal zone.

Within the CZM program, develop mechanisms to implement federal consistency requirements; to resolve conflicts; and to coordinate planning decisions (including permit regulations) among state, interstate, regional, areawide, local and federal agencies and governmental units.

Promote the establishment of Environmental Advisory Councils.

Establish a permanent coastal zone management advisory committee and define its function.

Establish criteria for regulation of coastal land and water uses of greater than local concern.

COASTAL ZONE MANAGEMENT BOUNDARY

6

6 COASTAL ZONE MANAGEMENT BOUNDARY

INTRODUCTION

The Delaware Estuary is 134 miles long, extending from the mouth of Delaware Bay to the falls at Trenton (Morrisville, Pennsylvania). Three states border the Estuary, and each is participating in the Coastal Zone Management Program. Pennsylvania's coastline, about 56 miles long, is the most heavily urbanized of the three. Pennsylvania's Lake Erie coastline, 63 miles in length, stretches from the boundary line of Ashtabula County, Ohio on the west, to Chautauqua County, New York on the east. Unlike the Delaware Estuary Coastal Zone, the Lake Erie Coastal Zone is largely rural in nature with the exception of the City of Erie and an occasional strip or cluster settlements.

All coastal states must define seaward and inland boundaries for their coastal area. Pennsylvania's Delaware Estuary Coastal Zone seaward boundary is the State border with New Jersey near the middle of the Delaware River. The extent of tidal influence defines the upstream limit of the Delaware Estuary and, hence, the limit of the Coastal Zone Management Program. Tidal influence in the Delaware River reaches to the falls at Trenton and along the Schuylkill River to the Fairmount Dam below the Philadelphia Art Museum. The northern lakeward boundary of the Lake Erie Coastal Zone is the international boundary line between the United States and Canada and lies approximately 14 miles off Pennsylvania's Lake Erie shoreline. The eastern and western offshore coastal zone boundaries coincide with eastern and western lakeward boundaries of Ohio and New York respectively. Two inland boundaries have been developed for each Coastal area, the preliminary and final boundaries. The initial inland boundary circumscribes the Preliminary Study Area, the area for which an extensive social and physical inventory was compiled in early 1975. The final inland boundary, developed in the Fall of 1976, defines the Coastal Zone, the area which will be subject to the management plan.

In accordance with an August, 1976, ruling of the United States Department of Justice, federal lands along the coast have been identified and excluded from the boundaries of the Coastal Zone. Although federally owned lands are not officially subject to Pennsylvania's Management Program, guidelines and recommendations resulting from the study will be made available to federal agencies whose activities take place in the Coastal Zone. It is hoped that they will attempt to recognize and implement sound Coastal Management objectives whenever possible.

PRELIMINARY STUDY AREA

The main purpose of the Preliminary Study Area was to establish an area for which social and environmental data would be inventoried.

The initial boundary was purposely drawn broadly so that subsequent analysis of the Study Area could be used to define a narrower zone subject to the management plan. The inventory developed for the Preliminary Study Area has been summarized in Chapter 1.

Before selecting a way to define an intitial inland boundary along the Delaware Estuary, and Lake Erie the approaches of different states were reviewed. California and Wisconsin have chosen an arbitrary setback from the shoreline. The State of Delaware has used a system of coastal highways, and, similarly, the City of Philadelphia has set Route I-95 as the limit for their riverfront study. Virginia and Texas have utilized political (county) boundaries. A fourth approach, used by Florida, forms an inland boundary out of census tracts. This census tract approach was selected as the best technique for the Delaware Estuary Study Area, and the utilization of political (municipal) boundaries was selected as being most applicable to the Lake Erie Study Area.

The major advantage to forming a Study Area from census tracts is the ready availability of land use, housing, population and employment data. Census tracts also permit flexibility in choosing a Study Area boundary. They may be aggregated in such a way as to follow municipal boundaries and to roughly approximate urban neighborhoods. Those census tracts containing land uses with potentially major impacts on the River can be readily included in the Study Area.

Some steering committee participants felt that the Study Area should have been large enough to include major upstream and downstream projects and facilities with the potential to impact the coastal zone. It was judged impractical to stretch the definition of the Study Area to include these projects and in addition the program was limited to areas within Pennsylvania. Major projects, however, were considered in the Chapter 3 discussion of external decisions of external decisions affecting the coastal area.

Many considerations were brought into the mapping of the Preliminary Study Area. Clearly, all riverfront census tracts must be included in the Study Area. But many inland census tracts in close proximity to the riverfront contain major industries and utilities of importance to citizens throughout the metropolitan area. Refineries and tank farms, rail freight yards, waste treatment and water filtration plants, and airports are some of these land uses of "greater-than local" concern included in the Study Area. These activities have impacts which spill over beyond the boundaries of one municipality. Census tracts near the River with significant natural resource values, such as wildlife habitats, flood plains and wetlands, were also made part of the Study Area. Some residential census tracts adjacent to riverfront properties were included in the Study Area even though it was recognized that these areas might eventually be eliminated from the management program.

After a review by the Coastal Zone Steering Committee a Preliminary Study Area was selected, incorporating several additional areas suggested by the committee. The Preliminary Boundary has been seen

on the maps in all chapters up to this point. A detailed presentation of the initial inland boundary appears in Chapter 8, Figures viii-1 to viii-6.

The selection of the southern or inland boundary of the Lake Erie Study Area was established following extensive analysis and evaluation by State, county and local planners, citizens and officials. The preliminary study boundary was drawn so that all coastal-related activities and the areas supporting them were included. This study area was delineated so that information could be easily obtained for analysis and so that all direct and significant impact sources and areas of particular concern were included. This preliminary study area included all municipalities abutting Lake Erie, and consequently, the study boundary was coincident with the southernmost boundaries of these municipalities.

To catalyze the development and local coordination of the Program, State and local planners divided the Lake Erie Study Area into three sectors on the basis of geography and similarity of interests and problems. In each of the three sectors, Steering Committees comprised of two elected officials for each local government and the chairman of each municipal planning commission were organized to review and monitor program activities. The preliminary study boundary was found by each of the three steering committees to be logical and acceptable within their respective areas of concern. The preliminary boundary has been mapped in all chapters up to this point. A detailed presentation of both the preliminary and final Lake Erie Coastal Zone boundaries appears in Chapter 8, Figures Viii-7 to viii-11.

DEFINING THE COASTAL ZONE BOUNDARY

After the Preliminary Study Area boundary was determined and an inventory prepared, it was necessary to define the final inland boundary for the Coastal Zone.

The Coastal Zone Management Act defines the Coastal Zone, with the exception of federal lands, as:

> coastal waters...and the adjacent shorelands....including transitional and intertidal areas, salt marshes, wetlands, and beaches. The zone extends inland from the shoreline only to the extent necessary to control shorelands the uses of which have a direct and significant impact on the coastal waters (Section 304 (a)).

This is a more difficult task in the Delaware Estuary, than in the Lake Erie Coastal Zone. Many of the familiar approaches for defining a final inland boundary are based on measuring changes to the quality of coastal waters. This approach may be suitable for rural areas, but in urban areas natural features have been obliterated, and

biological and physical conditions of coastal waters are already substantially altered. NOAA has recognized that in urban areas "relationships between land and water may be extremely complex."[1] Instead of relying on an analysis of these relationships for defining the zone, NOAA suggested that "the state may define inland boundaries on the basis of other factors relating to the strong influence of the waters upon the land, including, dependency of use upon water access or visual relationships between land and water."[2]

Urbanized coastal areas also face a different set of political realities than areas with primarily undeveloped shores. Whereas the management strategy for undeveloped coastlines is primarily one of developing controls or plugging gaps in existing regulations, urban areas already have an abundance of overlapping regulations and responsibilities. Along urban coastlines, the coordination of policies and programs needs to be emphasized, and programs aimed at the revitalization of underutilized areas are especially important. Because factors affecting land use are complex in urban areas, Coastal Zone Management should be confined to those lands most directly linked to port and water related activities. This view that the Coastal Zone should be rather narrowly defined is supported by the legislative history of the Act, as well as recent papers and reports.

A United States Department of Justice ruling required that all federal land be excluded from the Coastal Zone. Figures viii-1 to viii-11 show federal land in the vicinity of the coast. Although federal lands are contained within the area outlined by the inland boundaries, they are not subject to the Management Program. Federal agencies, however, are subject to the consistency requirement specified in the Act (Section 307 (c)) that federal activities having a "spillover effect" on lands in the Coastal Zone must be consistent with provisions of the management program.

As with the Preliminary Study Area, the Pennsylvania Coastal Zones rely on State boundaries and extent of tidal influence to determine seaward boundaries. Delineation of the inland boundary, as the above passage suggests, should be guided by an operational definition of "direct and significant impact." Because the interpretation of this phrase largely determines the configuration of the Coastal Zone, a detailed discussion of direct and significant impacts is included in this chapter.

Direct and significant impacts may be interpreted as measurable changes to physical, chemical or biological conditions of coastal waters. Although this interpretation is somewhat supported by the legislative history of the Act and various reports and papers, biophysical measures of impact alone are <u>not</u> adequate. For some coastal states, maintenance of water quality may be a prime thrust of coastal management, but in Pennsylvania this task is the province of '208' or Areawide Waste Treatment planning now underway. For the Delaware Estuary and Lake Erie coastal areas, the thrust of impact analysis is based on how land is affected by proximity to coastal

waters as well as how water is affected by land use. The Delaware River is a resource for industrial uses, marine transportation, and fishing and recreation, and the concentration of economic activity within the port is important to workers and residents throughout the metropolitan area. Similarly, Lake Erie contributes greatly to the economy of the Lake Erie Coastal Zone. The agricultural industry supported by this area is very dependent upon the climate modifying effects of the Lake. Therefore, when impacts are discussed all social and natural resources along the coast must be examined, not only those related to water quality. (Chapter 1, Inventory, discusses environmental and socioeconomic resources of the Coastal Zone.)

In the most general terms, impacts are the positive and negative consequences of using resources. Impacts can be broadly classified as either opportunities or constraints. Opportunities arise when resources are available to support a land-use activity or resources are able to absorb consequences of its use. For example, wetlands provide opportunities for wildlife habitat, bird watching and scientific investigations. The River is also able to assimilate some waste loads. A constraint is posed by the destruction of a resource, such as wetlands, by land development. A second constraint to development arises from natural hazards, as in risk of flood damage to structures on flood plains.

The analysis of direct and significant impacts was concurrent with another aspect of the Coastal Zone program, permissibility analysis, discussed in detail in Chapter 7. Permissibility analysis looked at the many ways in which a single land use affects a large array of physical and social resources along the coast.

Even after a great deal of study, permissibility analysis could describe only general kinds of impacts because of inherent difficulties in quantifying impacts. There is not much information available about actual impacts of industries and other activities upon coastal resources. Generalized, average pollution loads were found in environmental impact statements and engineering handbooks, but there is no way to apply these factors with certainty to existing coastal industries. Impact analysis must address the probability of future direct and significant impacts. Because new industrial processes and pollution control technologies are likely to make loading factors out-of-date, these quantifiable measures of impact are not appropriate for this analysis. Impacts relevant to defining the final inland boundary, therefore, can be stated in only broad terms.

Impacts from land--use activities will not have the same magnitude or importance at all locations along the coast. For example, residential development located in flood plains or wetlands would seriously disrupt these resource areas but would have negligible impacts on buildable upland sites. Similarly, such land resources as marshlands, are so sensitive to disturbances that any urban use would have negative consequences. Therefore, not only is it impossible to quantify land-use impacts, but the impacts vary from place-to-place.

Because land-use impacts are not uniform along the coast, the unique characteristics of different land areas must be assessed during direct and significant impact analysis. Fortunately, a study of areas of significant natural value along the coast had been previously completed, leading to a report on Geographic Areas of Particular Concern (see Chapter 8). Four types of Geographic Areas of Particular Concern (GAPCs) were identified within each coastal area: "areas of significant natural value," "development opportunity areas," "areas of significant recreational, historic or cultural value," and "overlap areas." Forty-five individual Delaware Estuary sites and twenty Lake Erie sites are discussed in Chapter 8. The process leading to the identification of GAPCs included inventory and analysis of undeveloped or marginally-used land, site visits to selected areas, interviews with property owners and local officials, public meetings at which citizens could recommend additions or deletions to the list and maps of potential GAPCs and review by county planners and the steering committee. The determination of Geographic Areas of Particular Concern, because of its detailed and site specific analysis, provided a strong departure point for the delineation of the Coastal Zone boundary.

The principal tools for analysis of direct and significant impacts were detailed aerial photographs at the 1" to 800' scale, detailed land use maps and environmental resource maps. Textbook values for impacts from different industrial activities and maps of Geographic Areas of Particular Concern were also available. To draw the inland boundary, land use, water use, development potential and natural resource characteristics were simultaneously examined for each parcel of land along the coast. A first-cut at the boundary resulted in the formation of five guiding principles for drawing the boundary. These principles are, in effect, statements about where direct and significant impacts are now occurring or could occur in the future. In addition, all federal lands were excluded from the Coastal Zone, and where feasible Geographic Areas of Particular Concern were included.

The boundary guidelines, described in the following section, were closely followed. But special conditions along the coast required that judgments be made about the location of the boundary where guidelines could not be followed in a clear-cut fashion. This occurred, for example, where residential communities were surrounded by industries and, therefore, included in the Coastal Zone. Such residential areas are unlikely to be subject to provisions of the management program.

GUIDING PRINCIPLES FOR THE COASTAL ZONE BOUNDARY

Use of Shoreline Properties. The shoreline is heavily urbanized and the concentration of industrial activity on the shoreline contributes to the strength of the port economy. Some vacant and marginally developed lands have a potential for new development that could further strengthen the port. The most desirable use of these properties would be for economic activities dependent on shore access or river water. Shoreline properties also have a strong visual and aesthetic link to the River, but the lack of access has severely limited public enjoyment of the River. The high amenity value conferred by proximity to the River is also a major advantage for residential developments. Finally, activities at the water's edge have a potential for generating pollutants that could be directly discharged to the River.

.Boundary Principle--All shoreline properties extending to the first right-of-way are included in the Coastal Zone, including residential areas, industrial and commercial properties and vacant or marginally-used sites.

Direct Use of River Water. Direct users of river water (such as marine terminals, petroleum refineries, sewage treatment plants, water filtration facilities and marinas) are dependent either on direct access to the dredged channel or to large volumes of water. These users may (1) consume shoreline space, (2) alter the quality of river water, or (3) be negatively affected by reduced quality or quantity of water as a result of upstream uses. (Many of these users can be seen on maps in Chapter 1.)

.Boundary Principle--All direct users of River or tidal tributary waters are included in the Coastal Zone, including major water withdrawers, major waste dischargers (including those discharging waste heat), and marine shipping facilities.

Use of Flood Plain. Any use in the flood plain, except natural resource management, risks potential flood damage and may, in turn, aggravate flood damage up and downstream by increasing the height of flood waters.

.Boundary Principle--All flood plains of the Delaware and Schuylkill Rivers and their tidal tributaries, developed or undeveloped, are included in the Coastal Zone. (Those tidal streams found during the inventory to extend beyond the Preliminary Study boundary are also included in the Coastal Zone.)

Development of Vacant or Marginally Used Land. Vacant land at the shoreline or in close proximity to the River has the potential to be

developed for uses dependent on access to the shore or to large quantities of River water. Other potential uses may also contribute substantially to the economic vitality of the port. There is some risk that development of vacant shoreline by non-dependent uses might preempt activities that are water-dependent. Projections of future economic activity suggest that conflicts may not be serious (see Chapter 3). Industrial and commercial development of vacant shorelands may also reduce the potential for recreation activities at the shore, unless a special effort is made to provide for a variety of uses. Alternatively, multiple use of certain sites could allow recreational activities to occur on residential, commercial or industrial property at appropriate times.

.Boundary Principle--All vacant parcels at the water's edge and large parcels in close proximity to the shoreline (especially those identified in Chapter 8 as development opportunity GAPCs) are included in the Coastal Zone.

Infrastructure Facilities and Ancillary Industrial Services. Highways, railroads and communication and utility rights-of-way are essential infrastructure facilities for the support of marine, industrial, commercial and residential land uses along the riverfront. Also, many manufacturers and business services are closely associated with principal coastal industries and port facilities. These land uses contribute to the vitality and economic efficiency of the port.

.Boundary Principle--Principal highways, railroads, rights-of-way, and other infrastructure should be included within the Coastal Zone, as should business-serving and ancillary industries in close proximity to coastal industires.

DESCRIPTION OF THE COASTAL ZONE

Delaware County Coastal Zone. The 12 mile long Delaware Coastal Zone varies from 1/4 to 2--1/2 miles in width. Figures viii-1 and viii-6 show an exact delineation of the Coastal Zone for Delaware County as well as for Philadelphia and Bucks Counties. (These maps are in Chapter 8, Geographic Areas of Particular Concern.)

The six Delaware County municipalities bordering the River are Marcus Hook, Trainer, Chester City, Eddystone, Ridley Township, and Tinicum. The Coastal Zone comprises all of Marcus Hook and Tinicum, the majority of Trainer and Eddystone and those portions of Chester City and Ridley closest to the River and tributaries. Small portions of several inland municipalities are also within the Coastal Zone.

A large portion of the Coastal Zone in Delaware County consists of industries and utilities. Tank farms and refineries are abundant in Marcus Hook and Trainer, and Chester and Eddystone have large industries and a variety of utilities, such as sewage treatment and

power plants. Tinicum, besides having major industries, has the Philadelphia International Airport. Lower and Upper Chichester have industrial areas contiguous to coastal industries, and these areas are included within the zone.

Tinicum Marsh, Pennsylvania's largest tidal wetland, is mostly within Tinicum Township, but small portions of Norwood and Folcroft Township border on the marsh and are included in the Coastal Zone. Cobbs, Darby, Ridley and Chester Creeks are major tidal streams; their flood plains and some adjacent lands are included in the Coastal Zone.

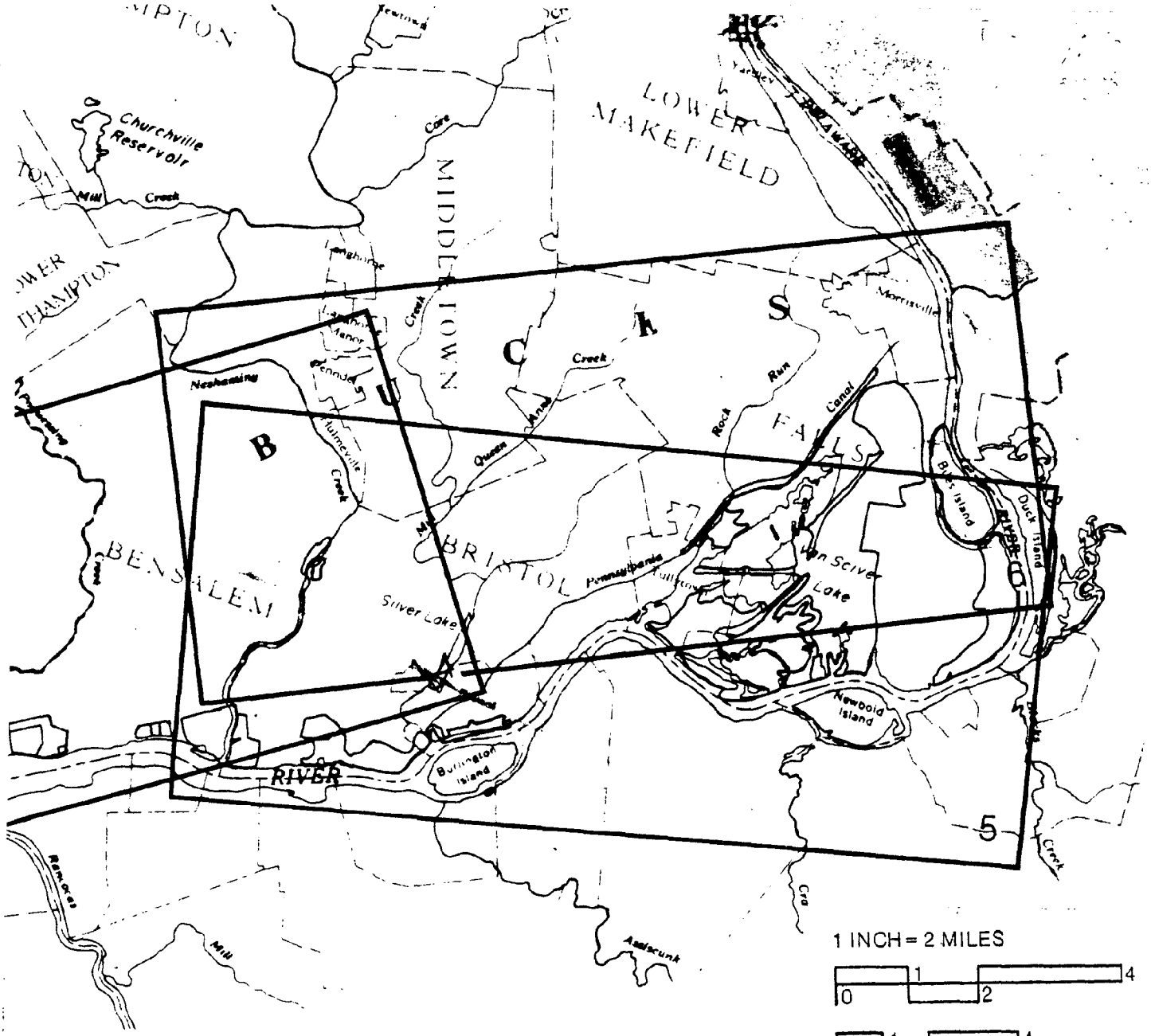
Philadelphia Coastal Zone. Philadelphia's Coastal Zone spans about 21 miles along the Delaware River, extends 8 miles up the Schuylkill River and is around Eastwick, however, the Coastal Zone is as deep as 3 miles inland, and in the vicinity of Frankford the boundary is about 1-3/4 miles inland. In some locations, such as near the Benjamin Franklin Bridge, the Coastal Zone is only about 1/8 mile wide.

The expansive coastal area in South and Southwest Philadelphia includes many land uses of greater than local concern-Tinicum Marsh, Eastwick redevelopment area, economic--related land along the Schuylkill River, Philadelphia International Airport, extensive tank farms and refineries and Roosevelt Park. The U.S. Naval Base, although a dominant feature of the waterfront, is formally excluded from the Coastal Zone. North of the Walt Whitman Bridge, Route I-95 is the principal boundary because the highway separates industrial areas along the River from residential and commercial uses to the west. The boundary is set back deeper than I-95, however, around the historical district in central Philadelphia and around important industrial areas in Bridesburg and Frankford neighborhoods. Natural areas along tidal reaches of the Pennypack and Poquessing Creeks are Geographic Areas of Particular Concern in the Philadelphia Coastal Zone.

Bucks County Coastal Zone. Bucks County's 24 mile stretch of riverfront is the longest in the Coastal Zone. The width of the Zone is generally less than 3/4 of a mile. Two prominent features of the zone include the narrow band protruding 6 miles inland along Neshaminy Creek and a 4 mile deep "bulge" at the bend in the River. The six municipalities in the zone, each touching the River, include Bensalem, Bristol and Falls Townships and Bristol, Tullytown and Morrisville Boroughs.

The inland boundary follows I-95 through Bensalem until it is diverted around the tidal portion of Neshaminy Creek. In Bristol Township and Borough the inland boundary largely follows the first major right-of-way, and includes the Radcliff Street historical district. In Tully town Borough and Falls Township, the Coastal Zone includes the Warner Lake system created by sand and gravel mining. The old Pennsylvania Canal is the major boundary for this stretch of the Coastal Zone. The portions of Morrisville south of the Penn

Central railroad and east of route 32 are included in the Coastal Zone.



1 INCH = 2 MILES

0 1 2 4

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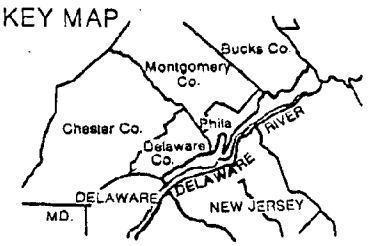
1 INCH = 3.2 KILOMETERS

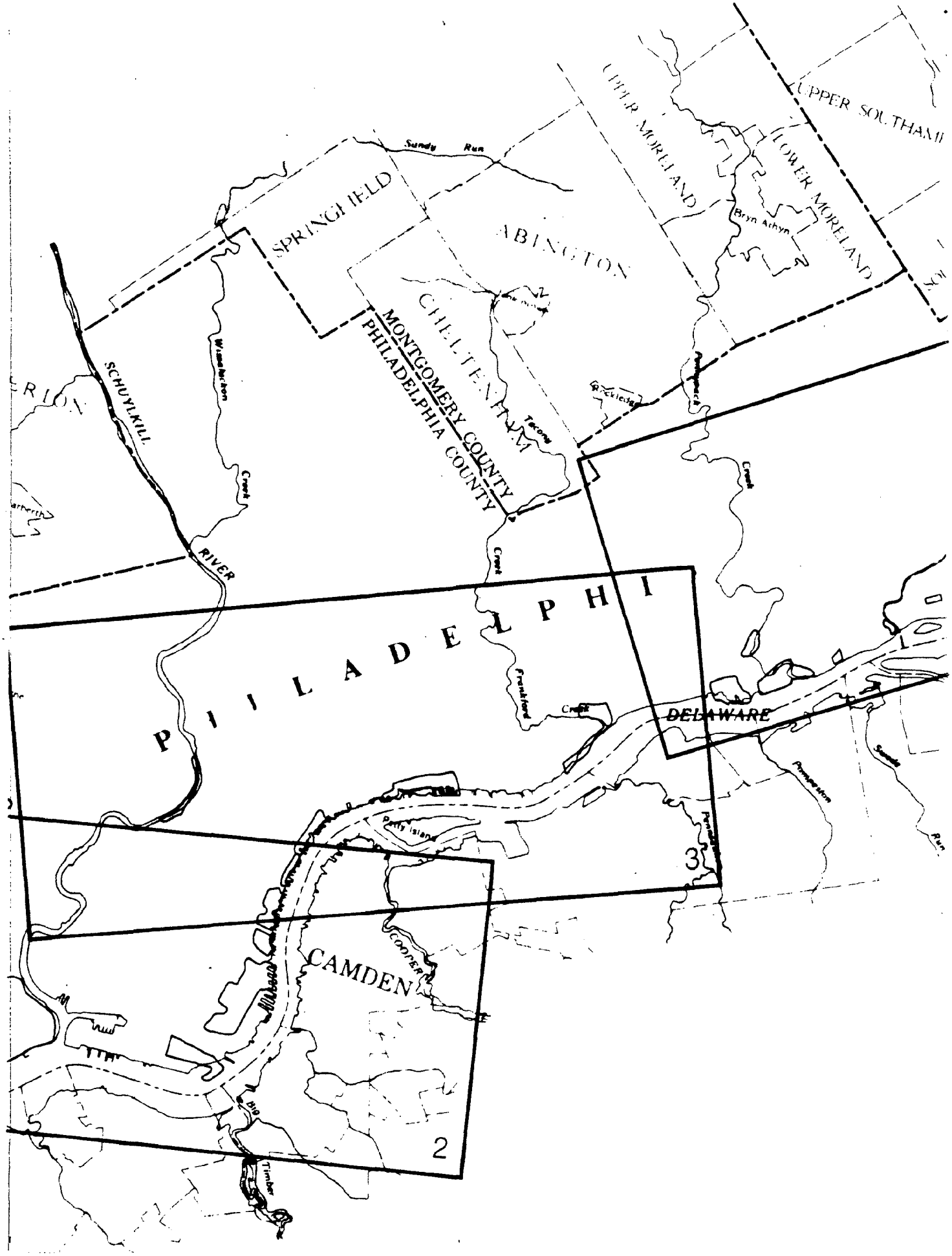
4 SQ. MILE

4 SQ. KM.

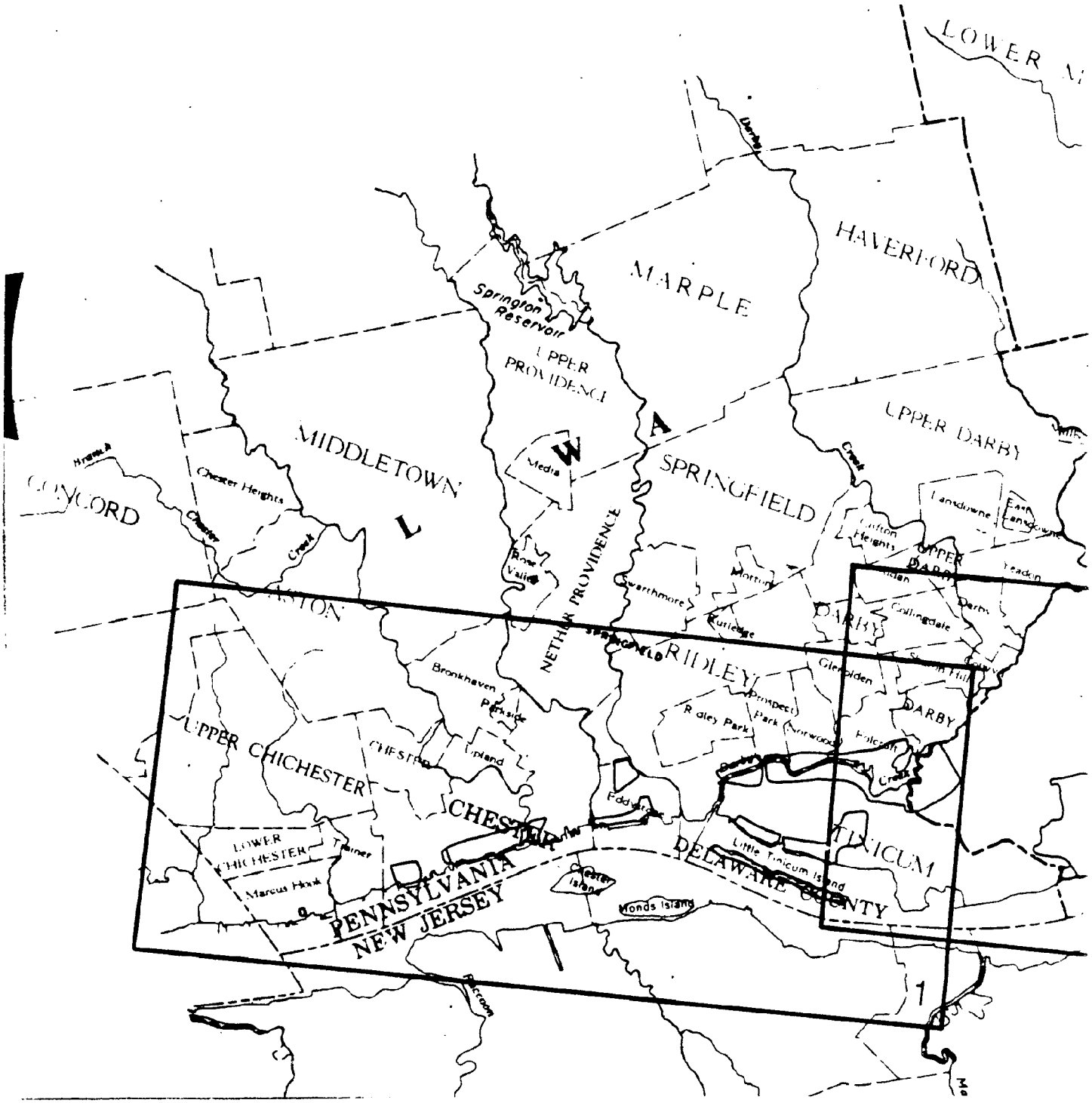
KEY MAP



DELAWARE ESTUARY COASTAL ZONE



UPPER SOUTHAMI
UPPER MORELAND
LOWER MORELAND
Sandy Run
SPRINGFIELD
ABINGTON
Bryn Athyn
CHELTENHAM
MONTGOMERY COUNTY
PHILADELPHIA COUNTY
Tacony
Rockledge
SCHUYLKILL
RIVER
Wissahickon
Creek
Frankford
Creek
PHILADELPHI
DELAWARE
Pompeston
Petty Island
3
CAMDEN
COOPER
Big
Timber
2


LOWER M
HAVERFORD
MARPLE
Springton Reservoir
UPPER PROVIDENCE
UPPER DARBY
MIDDLETOWN
L
W
A
SPRINGFIELD
CONCORD
Chester Heights
Media
Rose Valley
NETHER PROVIDENCE
Swarthmore
Rutledge
Lansdowne
East Lansdowne
Clifton Heights
UPPER DARBY
Yeadon
Collingdale
DARBY
RIDLEY
Glenolden
Prospect Park
Ridley Park
Norwood
Folcroft
Bronkhaven
Parkside
Upland
UPPER CHICHESTER
CHESTER
Eddystone
LOWER CHICHESTER
Trainer
Marcus Hook
PENNSYLVANIA
NEW JERSEY
Chester Island
Monds Island
Little Tinicum Island
DELAWARE COUNTY
TINICUM
Raccoon
1

LAKE ERIE COASTAL ZONE

GUIDING PRINCIPLES FOR THE COASTAL ZONE BOUNDARY

Data inventories within the Lake Erie Preliminary Study Area boundary was closely scrutinized before the final coastal zone boundary could be determined. This data, listed in the document entitled the Pennsylvania Coastal Zone Resources Analysis for Lake Erie, included much information regarding the physiographic and socio-economic history of the coastal area.

Direct and Significant Impacts on Coastal Waters. In addition to the aforementioned first year report, specific guidelines were utilized for the final boundary designation. It was essential to include all areas where the utilization of land had the most direct and significant impact upon coastal waters. Both beneficial and adverse impacts were recorded. Examples of beneficial impacts include non-polluted waters entering Lake Erie, undisturbed vegetation protecting lake bluffs from accelerated erosion rates, and non-development (except for agricultural purposes) of prime and unique agricultural soils. Examples of adverse impacts include concentrated and untreated urban runoff; thermal, chemical or other pollution of Lake Erie waters; and lake, channel or harbor dredging.

Geographic Areas of Particular Concern (GAPC's). The second guideline was to include all coastal geographic areas of particular concern (GAPC's). There are twenty of these areas in the Lake Erie Coastal Zone and they have been categorized as being particularly valuable as natural and aesthetic lands, development opportunity areas or as recreational, cultural or historic sites of significance. GAPC's are discussed in much greater detail in Chapter 8.

Physical Features. A third guideline for determining the final boundary designation is the utilization of easily identified physical features. The Lake Erie Coastal Area is a combination of undeveloped, developing and urban lands. In order to determine a final boundary it initially becomes necessary to locate some sort of development barrier. These barriers usually include the first major developmental obstacle as one travels inland from the coastline. Some examples are railroad lines, major highway arterials and concentrated urban development. These barriers are not absolute, however. If a GAPC extends beyond the first inland feature, a further inland alternative feature was utilized as the boundary for that particular segment of the coastal zone.

Extent of Lake Modification on Inland Climate. Climate plays a significant role in the agricultural productivity of the Lake Erie Coastal Zone. Throughout the year temperatures are moderated by Lake Erie. In the fall and winter, temperatures are affected by the warm water of the Lake. This warming effect is most noticeable within 5 miles of the shoreline and disappears within 10 to 15 miles inland.

For this reason vineyards and orchards are concentrated along this narrow strip of lakeshore. The slow warming of the lake water surface during the spring delays the start of the growing season, thus tending to keep vegetation in the lakeshore area from early budding. This cooling effect protects agricultural fruit production by reducing the chances of the debilitating effects of an early frost. As a result, the inland coastal zone boundary includes all concentrations of prime and unique agricultural land within the area of climate modification.

DESCRIPTION OF THE COASTAL ZONE

Beginning in western Erie County, the coastal boundary follows two principle physical features. The first such feature is the ConRail right-of-way which extends from the Ohio State line to Lake City Borough. Most of the coastal boundary from Lake City to the City of Erie follows West Lake Road, otherwise known as Route 5 (west of Asbury Road) and Alternate Route 5 (east of Asbury Road) with the exception of an area located in portions of Girard and Fairview Townships. Immediately east of Lake City Borough the boundary extends southward to Middle Road between the Lake City Borough line and Avonia Road in Fairview Township in order to include a GAPC noted for its prime agricultural capabilities.

Beginning in Millcreek Township and extending into the City of Erie the coastal zone narrows to a strip sometimes reaching a width of only 400 feet. Here the coastal boundary predominantly follows South Shore Drive and West Second Street, thus excluding much residential development of limited coastal significance. One exception is an area near Cascade Creek where the boundary is extended to West Sixth Street. This area is as yet a predominantly undeveloped portion of the City. In east Erie the coastal boundary follows East Second Street, and at Ash Street jogs south to follow East Third Street for several blocks. At Hess Avenue the boundary turns south to East Sixth Street (East Lake Road). From this point the coastal boundary follows East Lake Road for seven miles through Lawrence Park Township and then midway into Harborcreek Township.

The coastal boundary turns south and follows Bartlett and Depot Roads to a point which is over three miles inland. At McGill Road the boundary turns eastward and follows a line roughly parallel to the Lake Erie shoreline until it reaches the New York State line. This east-west boundary extends a distance of over ten miles and predominantly follows both Sidehill Road and the 1050 foot ridge line. Concentrated within the bounds of Erie County from Bartlett Road to the New York State line is some of the most productive farmland in Erie County on which are grown many of the County's most vital cash crops.

A total of ten municipalities and Presque Isle State Park (officially an unorganized territory) encompass the final Lake Erie Coastal Zone.

Together this area totals approximately 52,800 acres or about 83 square miles. The population of the final CZM area in 1970 was 22,898. By 1975, it had grown to 23,569 people, an increase of 2.9%. The projected Lake Erie Coastal Zone population by the 2000 is 28,337 people, an increase of 23.8% over the 1970 figure.

The western Lake Erie Coastal Zone area includes portions of Springifeld, Girard and Fairview Townships and Lake City Borough. The 1975 population of this 15,964 acre area was 3,729 people, a population density of .2 persons per acre. This low overall density is an indication of the rural character of this part of the coastal zone.

The central Lake Erie Coastal Zone area includes portions of the City of Erie, Millcreek and Lawrence Park Townships and all of the Presque Isle State Park. With 5,914 acres and a 1975 population of 9,566 people, there was a density of 1.6 people per acre. This density is actually quite low due to the fact that Presque Isle, which is basically uninhabited, is included in this density figure. Excluding Presque Isle, the population density of the central area registers 3.6 persons per acre.

The eastern Lake Erie Coastal Zone area includes portions of Harborcreek and North East Townships and all of North East Borough. This region is 30,966 acres in size with a total 1975 population of 10,274 persons. Accordingly, there is a .3 person per acre density, a figure which closely compares with the density of the western Lake Erie Coastal Zone area.

The table following this Chapter indicates acreage and population figures for the final coastal zone boundary by study area and community.

FINAL COASTAL ZONE BOUNDARY

Coastal Zone Communities	Acreages	Population 1970	1975	2000
Western Study Area	15,964	3,347	3,729	5,633
Central Study Area	5,914	9,396	9,566	10,702
Eastern Study Area	30,966	10,155	10,274	12,002
TOTAL	52,844	22,898	23,569	28,337
Springfield Township	7,997	404	422	584
Girard Township	4,126	552	588	949
Lake City Borough	508	386	418	607
Fairview Township	3,333	2,005	2,301	3,493
Millcreek Township	1,457	3,967	4,180	5,135
Presque Isle	3,242	34	34	34
Erie City	843	3,883	3,821	3,949
Lawrence Park Township	372	1,512	1,531	1,584
Harborcreek Township	6,276	2,888	3,022	3,805
North East Township	23,463	3,421	3,485	4,176
North East Borough	1,227	3,846	3,767	4,021

Figure vi-2

LAKE ERIE COASTAL ZONE
1" = 2 miles

PERMISSIBLE LAND AND WATER USES

7

7 PERMISSIBLE LAND AND WATER USES

INTRODUCTION

The Federal Rules and Regulations for the Coastal Zone Management Program require participating states to develop a procedure for defining permissible uses within specific coastal areas. This procedure can take a variety of forms based upon existing coastal conditions. For this reason, the procedures for defining permissible uses within the Delaware Estuary and Lake Erie Coastal Zones are different.

Within each coastal zone, capability, suitability and compatibility analyses were completed using slightly different techniques. Within the Delaware Estuary coastal zone a subjective matrix analysis was used to determine use permissibility. An overlay technique similar to that promoted by McHarg and utilized by the State of California has been used to determine permissible uses within the Lake Erie Coastal Zone.

Because similar techniques have been used to complete all previous chapters of this report, it is imperative to emphasize both how and why different techniques were used in the development permissible uses within the Commonwealth's coastal areas.

DELAWARE ESTUARY COASTAL ZONE

Introduction

Section 305 of the Coastal Zone Management Act requires the management program to include "a definition of what shall constitute permissible land and water uses within the coastal zone..." (Section 305 (b) (2)). To satisfy this requirement, Chapter 7 makes recommendations for permissible uses in the coastal zone and describes the impact analysis on which these recommendations are based.

Recommendations for permissible uses in the coastal zone are stated in general terms. Future land and water uses may fall into one of three permissibility categories:

- <u>uses to be actively encouraged</u>
- <u>uses to be discouraged</u>, and
- <u>uses to be conditionally permitted, subject to special consideration.</u>

Because land use and development patterns vary considerably along the riverfront, separate recommendations are made for four kinds of

areas. These four "area types," present along the Delaware Estuary, are:

- .urban residential--existing developed areas characterized by predominantly residential uses.

- .urban non-residential--areas devoted primarily to industrial, commercial, utility and port facilities.

- .vacant developable--open land available for development.

- .natural areas--areas with a high concentration of natural resources and amenities.

The kinds of resources that comprise each of these four area types are different. Therefore, future uses are apt to have very different impacts in each of the different area types. For example, the impacts resulting from a new petroleum refinery will be different in a natural area than in an urban non-residential area. The key to this chapter, therefore, is a permissibility matrix that arrays 15 land and water used against four area types. For each area type, uses are recommended to be either encouraged, conditionally permitted or discouraged.

Chapter 7 is important for two reasons: The permissibility matrix, with its identification of uses to be encouraged, conditionally permitted, or discouraged, can be used as a "yardstick" by local officials to help determine the degree to which local plans and zoning ordinances support the objectives of the Coastal Management Program. Secondly as local officials begin to use "pass-through" monies of the Coastal Program to update plans and ordinances, the methodology described cts arising from the use of coastal resources.

PERMISSIBILITY OF USES

Overview--Chapter 7 makes recommendations on the permissibility of land and water uses in the coastal zone, satisfying a major requirement of the Coastal Zone Management Act. The basis for these recommendations is an analysis of how different land and water uses impact coastal resources. In general terms, those uses with negative impacts and few compensating benefits are judged as least permissible; and, conversely, uses which have minimal adverse impacts and important benefits should be encouraged.

Impact Analysis, which will be described in detail later in this chapter, was both the basis for making recommendations on permissibility and the major instrument for defining the coastal zone boundary, a process described in Chapter 6. Two important conclusions influencing both the coastal zone boundary and permissibility were derived from the Impact Analysis: Vacant lands in the vicinity of the riverfront have a potential for supporting uses

with major beneficial or adverse impacts on coastal resources (in other words, "direct and significant" impacts). All uses, within the coastal zone boundary at the level of detail dealt of this study, have a potential for creating major impacts, beneficial or adverse, depending on their location. (for example, industrial development would probably have major positive impacts in industrial areas, but major adverse impacts within fragile tidal wetland areas.

The Impact Analysis ties the definition of the coastal zone boundary closely to the identification of permissible uses. Chapter 6, Boundaries, uses Impact Analysis to identify areas where uses might have important impacts on coastal resources. In Chapter 7, Impact Analysis is carried a step further to identify four area types, which uses have major beneficial impacts, important adverse impacts or a mixture of adverse and beneficial impacts.

Definitions--The definitions given below illustrate the conceptual nature of the Impact and Permissibility Analyses described in this Chapter. Because the familiar kind of Environmental Impact Statements (EIS), drafted for very specific facilities and sites, are laden with technical data, it would be easy to mistakenly anticipate that the Impact Analysis described in this Chapter would use a similar approach. The impact analysis, however, views the coastal zone as a single unit and focuses, not on a specific facility, but on a wide variety of potential land and water uses. Analysis with this broad scope requires a conceptual approach, not a technical one, because there are severe limits to the availability of information on impact processes and to the projection of future technology and economic activity.

For each of four area types, the permissibility of 15 land and water uses have been evaluated. Area types are generalized categories of coastal lands classified according to the present mix of resources and existing land uses. The four area types delineated along the Delaware River are urban non-residential areas, urban residential areas, vacant developable areas and natural areas. Most of the coastal zone in Delaware and Philadelphia counties are urban non-residential areas characterized by heavy investments of private and public capital and by economic and public-service activities. Urban residential areas, more common in Bucks County than in the other counties, are lands with existing homes and related facilities (such as local commercial areas, schools, institutions and roads). Both of these urban area types include vacant lots suitable for infilling and marginally used sites available for improvement and revitalization. Vacant developable and natural areas are two categories of undeveloped land. Natural areas are defined as areas of ecological importance for sustaining fish, wildlife and waterfowl and as areas of notable scenic and amenity qualities with potential for recreation. Land in the vacant developable areas include both prepared development sites in industrial parks and open land that, having no unique natural features, is slated for future residential or economic development in local plans and ordinances. Area types have not been mapped for the coastal zone. Using the general

definitions presented here, local communities will divide the coastal portions of their municipalities into area types.

The range of potential land uses in the coastal zone have been divided into 15 general categories (See figure vii-1). Most of these categories are development uses, reflecting the heavily urbanized character of the Delaware River shoreline. Not only does this coast have land that could support a wide range of development uses, but the shoreline and water resources have been so altered that few conservation-oriented uses are feasible.

Three levels of permissibility are assigned to uses in this analysis: uses to be actively encouraged, uses to be conditionally permitted (subject to special considerations) and uses to be discouraged. Potential beneficial impacts are balanced against adverse impacts to arrive at a judgment of overall acceptability of impacts upon resources in an area type. Uses that are to be encouraged have benefits strongly outweighing negative impacts and are defined as "permissible." Uses to be discouraged would seriously disrupt or degrade the resources in an area type without compensating benefits, and are, in general, non-permissible. Uses that are conditionally permitted have a number of potential adverse impacts but are also beneficial in some respects. These uses should only be permitted if the adverse impacts can be ameliorated through site design practices or additional technological equipment. The municipality will be the ultimate judge of whether enough reduction of negative impacts can be achieved to allow the proposed use to be built in the coastal zone. Those uses that are suggested as "conditionally permissible" should be considered carefully by the municipality in order to see that the most effective steps possible are taken to safeguard and wisely utilize coastal resources. These "conditionally permissible" uses may well be the most troublesome and controversial for a coastal municipality since the need for the use may be immediate, while the impacts are substantial. An example of this conflict is the disposal of dredged spoil in most area types.

The suggested guidelines presented in the Permissibility Matrix may be modified by municipalities when adopting their local controls, if the locally proposed projects and site conditions suggest that these recommendations are inappropriate. For the most part, the recommendations made below should not generate much controversy and will serve to reinforce a common sense approach to siting uses in coastal communities.

Permissibility Matrix--A summary of the impact analysis and the recommendations for permissible uses in each area type are given on the Permissibility Matrix, Figure vii-2. For most uses, there is at least one area type in which the use is to be encouraged. However, for a few uses such as air transportation, the choice of sites is so limited and the impacts so substantial that the use has been assigned a conditional or discourage rating for all area types. In the relatively narrow Delaware Estuary Coastal Zone, air transportation activities will realistically have to be confined to limited expansion within areas already devoted to this use.

FIGURE vii-1

Land and Water Uses to be Tested for Permissibility

1. Residential	Single family and multiple unit residential neighborhoods.
2. Land Transportation	Highway, road and railroad rights-of-way and rail yards.
3. Air Transportation	Runways, terminals, hangars and other facilities directly related to operations of airports.
4. Marine Transportation	Piers and marine terminals and the shipping channel of the Delaware River.
5. Energy Refining	Petroleum processing plants, tank farms and special dock facilities.
6. Energy Generation	Electric power plants, and associated fuel storage and water intake facilities.
7. Utility & Communication R.O.W.s	Rights-of-way for subsurface pipe and cable lines as well as overhead electric power lines.
8. Manufacturing	Industrial operations of all kinds, e.g., chemical, textile, primary metals, food processing, machine.
9. Solid Waste Disposal	Public and private landfill facilities, transfer stations, incineration equipment, open dump sites for scrap metal, etc.
10. Sewage Treatment and Water Supply	Public facilities for the treatment and disposal of wastewater or for filtration of domestic and industrial water supply.
11. Land Transformation	Dredge spoil disposal areas and extraction areas for sand and gravel.
12. Natural Resource Management	Areas where wildlife, fish and water fowl habitat are protected from human interference.
13. Developed Waterfront Recreation	Marinas and boat launching facilities for water-related activities and and parkland along the shoreline.
14. Wholesale Trade &	Facilities for the wholesale trade

Storage	and land and buildings used for storage, including export and import items.
15.Commercial & Community Service	Neighborhood stores, regional shopping centers business services; schools, hospitals and similar public facilities.

FIGURE vii-2

PERMISSIBILITY GUIDELINES MATRIX

		URBAN NON-RESIDENTIAL	URBAN RESIDENTIAL	VACANT DEVELOPABLE	NATURAL
1.	RESIDENTIAL	Conditional	Encourage	Encourage	Discourage
2.	LAND TRANSPORTATION	Conditional	Conditional	Encourage	Discourage
3.	AIR TRANSPORTATION	Conditional	Discourage	Conditional	Discourage
4.	MARINE TRANSPORTATION	Encourage	Conditional	Encourage	Discourage
5.	ENERGY REFINING	Encourage	Discourage	Encourage	Discourage
6.	ENERGY GENERATION	Encourage	Discourage	Conditional	Discourage
7.	UTILITY/COMMUNICATIONS R.O.W.	Conditional	Conditional	Encourage	Conditional
8.	MANUFACTURING	Encourage	Conditional	Encourage	Discourage
9.	SOLID WASTE DISPOSAL	Conditional	Discourage	Conditional	Discourage
10.	SEWAGE TREATMENT WATER SUPPLY	Encourage	Discourage	Encourage	Discourage
11.	LAND TRANSFORMATION	Conditional	Discourage	Conditional	Discourage
12.	NATURAL RESOURCE MANAGEMENT	Discourage	Discourage	Discourage	Encourage
13.	DEVELOPED WATERFRONT REC.	Encourage	Encourage	Encourage	Conditional
14.	WHOLESALE TRADE & STORAGE	Encourage	Conditional	Encourage	Discourage
15.	COMMERCIAL & SERVICE	Encourage	Encourage	Encourage	Discourage

Permissibility analysis is primarily an evaluation of the appropriateness of new development activities within the four area types. Because most open land is in natural and vacant developable area types, permissibility evaluations are most relevant to these areas. Urban non-residential and residential area types have space available for "in-filling" and construction that represents development opportunities. In addition, the permissibility evaluations reflect those uses whose economic viability and social importance should be maintained and promoted in each area type.

Summary of Permissibility Guidelines by Area Type: Urban Non-residential Areas--Manufacturing, energy generation, energy refining, wholesale trade, commerce, public utilities and marine transportation are uses to be actively encouraged in this area type. In fact, more of the 15 uses are to be "encouraged" in this area type than in any of the other three. About half of the uses are recommended to be conditionally permitted, because they are constrained by existing land use patterns. Natural resource management is the only use category that is "discouraged" from this area type. Residential development may be appropriate in mixed-use developments if the impacts of neighboring activities can be rendered unobtrusive. Solid waste disposal might be an appropriate activity on industrial lands with strict environmental safeguards.

Urban Residential Areas--Residential, recreation, commercial and community services are uses encouraged in these are types. Airports, utilities (water supply, waste treatment, energy generation and solid waste disposal), energy refining and generation are to be discouraged. Although the list of discouraged uses is long and may appear restrictive, there are abundant sites in the non-residential and vacant developable area types where these uses are to be actively encouraged. Highways, port facilities, manufacturing, and wholesale trade and storage are uses that might be fitted to residential area types; but, specific local conditions would influence the amount of disruption that could be allowed in residential neighborhoods. Natural resource management is not a feasible activity in this area type due to the absence of undisturbed habitats.

Vacant Developable Area Types--Lands in this area type are available for future residential, economic-related or public uses. Resource conditions vary considerably between lands in this area type so not all uses characterized as "encouraged" will be appropriate in all locations. Such uses as the airport and energy generation are most apt to locate new or expanded facilities on the same land as existing facilities; in such cases the use is labeled "conditionally permitted" for this area type. Natural resource management is not a feasible use in this area type because all vacant land worthy of management will be included in Natural Areas, the fourth area type discussed here.

Natural Area Types--Natural areas are those undeveloped lands most suited for management as preserves for wildlife, Therefore, only

limited development activity permitted in this area type. Only natural resource management is to be actively encouraged. Developed waterfront recreation is conditionally permitted with only non-disruptive kinds of recreational use of natural areas being acceptable.

PERMISSIBILITY METHODOLOGY

Definitions--The following discussion of the permissibility methodology is quite detailed and may not be of interest to casual readers. It has been included primarily for those who feel the need to understand the technical aspects of the program.

The flow chart in figure vii-3 is a schematic representation and summary of the methodology for permissibility analysis. The core of the methodology is the Impact Analysis, and most of the discussion in this chapter deals with the various components of this analysis.

Impact Analysis, the foundation for evaluating permissible uses, introduces many expressions and concepts. In the above section, area types, land uses and permissibility categories were defined. To explain permissibility analysis, such terms as resources, impacts, capability, suitability, and compatibility also need to be defined.

Resources are those items required to support social or natural processes. Economic resources, for example, include raw materials and distribution systems. Natural resources include woodlands, wetlands and streams that supply food and shelter for wildlife. Social resources, such as police and fire protection help maintain a cohesive community structure and are inducements for industrial locations. Two principal categories of resources were defined, physical resources, which include land and water resources, and socio-economic resources. Figure vii-4 is the list of coastal resources, and Chapter 1 includes a discussion of these resources in the preliminary study areas. A major effort has been made to give at least as much emphasis to social and economic resources as is given to physical resources. Even though physical resources are the prime focus of coastal management in other states, socio-economic resources, arising from private and public investments, are of major significance to the Delaware Estuary.

Impacts are defined here as the consequences of resource use and may be either beneficial or adverse. Beneficial impacts indicate that resources provide an opportunity for use while adverse impacts suggest that there are constraints to resource use. Beneficial impacts resulting from the use of vacant developable land for industrial development would be the increase in tax ratables for the community. An adverse impact from industrial development might occur, however, should scarce tidal wetlands be disturbed. Stated differently, vacant developable land provides opportunities for

FIGURE vii-3

FLOW CHART OF PROCEDURE FOR MAKING PERMISSIBILITY RECOMMENDATIONS

Step I

INVENTORY

- o 15 Land and water uses (fig. vii-1)
- o Coastal Resources
  - 11 physical resources
  - 9 socio-economic resources (fig. vii-4)
- o 4 Area types (defined by typical set of resources) (fig. vii-7)

→

Step II

IMPACT ANALYSIS (fig. vii-6)

- o Define major "Impact categories"
  - 6 opportunity categories
  - 7 constraint categories (fig.vii-5)
- o Capability & Suitability Analyses (recorded on an "Impact Matrix"
  - capability assess land and water use impacts on physical resources
  - suitability assesses use impacts on socio-economic resources
- o Compatibility Analysis assesses the "fit" between proposed uses and existing conditions in area types
- o Count up impacts, both opportunities and constraints, on resources relevant to each area type

→

Step III

EVALUATION

Make recommendations on permissibility of land and water uses in terms of:

- o encourage use
- o conditionally permit
- o discourage use

based on balance of opportunities and constraints shown in the Impact Analysis

summarized in:

PERMISSIBILITY GUIDELINES MATRIX
(see figure vii-2)

FIGURE VII-4

COASTAL RESOURCES*

LAND AND WATER RESOURCES	SOCIOECONOMIC RESOURCES
Water for Municipal & Industrial Supply	Trained Labor Force
Water for Disposal of Waste Effluent	Production Capacity
Water for Transportation	Energy Availability
Water for Recreation	
Water for Fish & Wildlife Habitats	Transport--Water Based
Woodlands	Transport--Land Based
Wetlands	Police & Fire Protection
Buildable Sites	Water & Sewerage Infrastructure
Flood Plains	Historic & Cultural Sites
Shoreline Access	Tax Revenues & Ratables
Sand & Gravel	

(*) See Chapter 1, Inventory of Coastal Resources and Uses, for definition of these resources.

industrial use, and tidal wetlands pose constraints to industrial use.

The analysis needed to support permissibility recommendations deals with generalized statements about impacts. Opportunity and constraint impacts have been classified into thirteen major impact categories. There are seven constraint categories and six opportunity categories. This classification is expecially important as a tool for communicating the findings of the impact analysis. These thirteen categories are summarized in figure vii-5.

Methodology for Determining Permissible Uses--There are three major steps, shown in Figure vii-3 to the process of determining permissible uses:

- .Inventory--During the inventory stage, informational inputs necessary for making permissibility recommendations are defined.

- .Impact Analysis--Impact analysis examines the impacts of resource use.

- .Evaluation--Permissibility Guidelines, based on the findings of the impact analysis, are determined for each of four area types.

These three steps are discussed in the following sections, and Figure vii-3 provides assistance in examining this methodology.

FIGURE - vii-5

IMPACT CATEGORIES

Constraints

C 1	Use causes loss of habitats and natural areas, coastal-related historic and cultural sites, or potential recreation sites.
C 2	Use possibly preempts water dependent uses from vacant or marginally-used shoreline sites.
C 3	Use either seriously degrades water quality or is seriously impaired by degraded water quality.
C 4	Use poses major hazards to coastal waters and shoreline uses due to fires, spills, explosions, or collisions.
C 5	Use either causes loss of flood plains, thereby increasing flood hazards downstream, or may risk potential flood damages by locating in a flood plain.
C 6	Use may potentially conflict with residential, recreational, and natural areas of coast by affecting air quality, noise levels or visual quality.
C 7	Use imposes a cost that must be borne out of government funds raised by taxes.

Opportunities

O 1	Use directly employs coastal waters for transportation, water supply, or waste assimilation.
O 2	Use has potential major benefit to water-based recreation or to preservation of shoreline natural areas.
O 3	Use derives important locational advantages from access to water, amenity value of water, or existing coastal industries.
O 4	Use draws on existing infrastructure resources, such as water supply and sewer systems, prepared sites, transportation and distribution systems, and present production capacities.
O 5	Use takes advantage of such social resources as trained labor force, police and fire protection, and community services.

o 6 Use is a major contributor to port vitality by affecting economic efficiency, tax base, access, job opportunities, etc., or by providing essential goods or services (such as energy).

Land and water uses, coastal resources, area types and impact categories are the various elements defined during the inventory stage. These elements have been described in Chapter 1 and in this Chapter. The inventory step is important for establishing the scope of the subsequent impact analysis. In particular, the way impacts, land use activities and resources were defined had to be carefully matched with the level of detail needed to make permissibility recommendations.

Impact analysis, the second step in determining permissibility, is designed to explore the complex relationships between coastal resources and land and water uses. The impacts of use on resources are generally not all good or bad; rather, both adverse and beneficial impacts may be associated with resource use. Water represents both opportunities and constraints for waste disposal, for example. Industries use water to assimilate their wastes, but water may be degraded if the assimilative capacity of a stream is degraded. The task of impact analysis, therefore, is to systematically account for the opportunities and constraints that each land use may have on coastal resources. Only through such an accounting procedure can tradeoffs between economic benefit and environmental cost be demonstrated.

Impact analysis, as shown in Figure vii-3, is a three-part process:

.Capability analysis explores the ability of land and water uses to support future uses or to absorb negative consequences of use.

.Suitability analysis assesses the ability of social and economic resources to sustain uses.

.Compatibility analysis evaluates the "fit" between possible future uses and the existing uses and conditions in the area types.

Capability and suitability analyses are handled in similar ways. A matrix is formed by arraying 15 land use categories against resources. For capability analysis uses are arrayed against 11 physical resources, and for suitability analysis 9 socio-economic resources are arrayed against land and water uses.

The "impact matrix" used during capability and suitability analyses employ the 13 impact categories defined in Figure VII-5. Each cell in the matrix represents a "relationship" between a resource and a land use that can be typified by one (or more) of the impact categories. If a particular resource supports a land use or successfully absorbs its impacts, the resource provides an opportunity, and the appropriate impact category is assigned to that cell in the impact matrix. Conversely, if a use potentially degrades of diminishes the value of a resource, a constraint impact category is assigned to the matrix cell.

Figure vii-6 shows the completed impact matrix for capability analysis and suitability analysis.

The impact categories have been symbolized by O's standing for opportunities and C's representing constraints. The numbered subscripts refer to the specific categories of opportunities and constraints on Figure vii-5. In addition, lower case letters indicate that the impact represented on the matrix is comparatively minor.

Up to this point, the impact analysis has accounted for nearly all possible impacts resource use may have. But resources are not uniformly distributed along the coast; for example, industrial coastal lands have a preponderance of economic resources, while tidal marshes have mostly natural resources. To understand the probable consequences of a land use in a particular area, the resources at that location must be known. Such an assessment of resources by location has been made for area types, making area types the appropriate areal unit for permissibility recommendations.

Translating the Impact Matrix, which arrays uses against resources, into a matrix of uses and area types is a straight forward process. Figure vii-7 is a summary of those resources comprising each area type. When analyzing a single area type, only those opportunities and constraints relevant to that area type as shown on Figure vii-7 are counted and recorded. But before this information on probable impacts is used to recommend permissible uses, the third aspect of impact analysis, compatibility analysis, must be undertaken.

Compatibility analysis evaluates the conformance or conflict (in other words the "fit") between the uses and conditions existing in an area type and the requirements of potential future uses. Such factors as traffic, noise, air emissions, odor, amenity and pre-emption of land are considered in compatibility analysis. On a "compatibility matrix" an area type containing land uses which are "good neighbors" for a proposed use would be rated as an opportunity, and those areas containing uses for which conflict is likely pose a constraint. The product of compatibility analysis is a matrix of 15 land uses arrayed against four area types, with Os and Cs in the matrix cells evaluating the "fit" between potential and existing areas. Figure vii-8 shows the results of the compatibility analysis.

The final step of permissibility analysis is making recommendations based on an evaluation of the impact analysis. Using the previous step, the impacts of land and water uses on coastal resources had been summarized for area types in terms of opportunities and constraints. Also, the compatibility of potential uses with existing conditions had been assessed. During this evaluation step, the opportunities and constraints (which can also be thought of as advantages and disadvantages or benefits and costs) need to be balanced.

Figure vii-6

CAPABILITY AND SUITABILITY OF COASTAL RESOURCES TO SUPPORT USES

	PHYSICAL RESOURCES												SOCIOECONOMIC RESOURCES								
	WATER FOR MUNICIPAL & INDUSTRIAL SUPPLY	WATER FOR DISPOSAL OF WASTE EFFLUENT	WATER FOR TRANSPORTATION	WATER FOR RECREATION	WATER FOR FISH & WILDLIFE HABITATS	WOODLANDS	WETLANDS	BUILDABLE SITES	FLOOD PLAINS	SHORELINE ACCESS	SAND & GRAVEL	TRAINED LABOR FORCE	PRODUCTION CAPACITY	ENERGY AVAILABILITY	TRANSPORT-WATER BASED	TRANSPORT-LAND BASED	POLICE & FIRE PROTECTION	WATER & SEWERAGE INFRASTRUCTURE	HISTORIC & CULTURAL SITE	TAX REVENUES & RATABLES
RESIDENTIAL	X	X	X	O_2	X	C_1	C_1	O_4	O_2 C_5	O_3 C_2	X	X	X	O_6	X	O_4	O_5	O_4	O_2	O_6 C_7
LAND TRANSPORTATION	X	X	X	X	X	C	C_1	X	C_5	c_2	X	X	O_6	O_6	O_3	$O_{6,9}$	O_5	X	c_1	C_7
AIR TRANSPORTATION	X	X	X	X	X	C_1	C_1	X	X	c_2	X	O_5	O_6	O_6	X	O_4	O_5	O_4	X	O_6
MARINE TRANSPORTATION	c_3	X	X	$c_{3,4}$	$C_{3,4}$	X	C_1	O_4	X	O_3	X	O_5	O_6	O_6	$O_{3,4}$	O_4	O_5	O_4	c_1	O_6
ENERGY REFINING	O_1	O_1	O_1	$c_{3,4}$	$C_{3,4}$	C_1	C_1	O_4	C_5	O_3	X	O_5	O_6	O_6	$O_{3,4}$	O_4	O_5	X	c_1	O_6
ENERGY GENERATION	O_1	O_1	O_1	c_3	C_3	C_1	C_1	O_4	C_5	O_3	X	O_5	$O_{4,6}$	O_6	$O_{3,4}$	O_4	X	X	c_1	O_6
UTILITY AND COMMUNICATION RIGHT OF WAY	X	X	X	X	X	c_1	c_1	X	O_2	X	X	X	O_6	O_6	X	X	X	X	X	X
MANUFACTURING	O_1	O_1	X	c_3	c_3	C_1	C_1	O_4	C_5	O_3 C_2	X	O_5	$O_{3,4}$ O_6	O_3	O_3	$O_{3,4}$	O_5	O_4	c_1	O_6
SOLID WASTE DISPOSAL	X	X	X	X	X	C_1	C_1	C_2	C_5	C_2	X	X	X	X	X	O_4	X	X	c_1	c_7
SEWAGE TREATMENT AND WATER SUPPLY	O_1C_3	O_1 C_3	X	C_3	C_3	X	X	O_4	c_5	O_3	X	X	X	X	O_1	X	X	O_4	c_1	c_7
LAND TRANSFORMATION	X	X	O_1	O_2c_1	O_2C_3	C_1	C_1	C_2	c_5	O_3c_2	O_4	O_5	O_6	O_3	$O_{1,3}$	O_4	X	X	c_1	O_6
NATURAL RESOURCE MANAGEMENT	X	X	X	O_3	O_2	O_2	O_2	X	O_2	$O_{3,2}$	X	X	X	X	c_6	c_6	X	X	O_2	C_7
DEVELOPED WATERFRONT RECREATION	X	X	X	O_2 c_3	O_2	O_2	O_2	O_4	O_2 c_5	O_3	X	X	X	O_3	$O_{2,3}$	O_4	O_5	O_4	O_2	O_6
WHOLESALE TRADE & STORAGE	X	X	O_3	X	X	C_1	C_1	O_4	c_5	O_3 C_2	X	O_5	O_3	O_3	O_4	O_4	O_5	c_4	c_1	O_6
COMMERCIAL AND COMMUNITY SERVICE	X	X	X	X	X	C_1	C_1	O_4	C_5	O_3 C_2	X	O_5	O_3	O_3	O_4	O_4	O_5	O_4	O_1 c_1	O_6 c_7

"O" indicates opportunity and "C" indicates constraint. Lower case letters signify a minor constraint or opportunity. The numbered subscripts refer to the categories of impact.

"X" indicates that the use bears no significant relationship to the resource.

FIGURE VII-7

RESOURCES COMPRISING EACH AREA TYPE

LAND AND WATER RESOURCES	URBAN NON RESIDENTIAL	URBAN RESIDENTIAL	VACANT DEVELOPABLE	NATURAL
Water for Municipal & Industrial Supply	●		●	
Water for Disposal of Waste Effluent	●		●	
Water for Transportation	●		●	
Water for Recreation	●	●	●	●
Water for Fish & Wildlife Habitats				●
Woodlands				●
Wetlands				●
Buildable Sites	●	●	●	
Flood Plains				●
Shoreline Access	●	●	●	
Sand & Gravel				●
SOCIO-ECONOMIC RESOURCES				
Trained Labor Force	●		●	
Production Capacity	●		●	
Energy Availability	●	●	●	
Transport-Water Based	●		●	
Transport-Land Based	●	●	●	

Police & Fire Protection	●	●	●	
Water & Sewerage Infrastructure	●	●	●	
Historic & Cultural Sites		●	●	●
Tax Revenues & Ratables	●	●	●	

FIGURE VII-8

MATRIX OF COMPATIBILITY OF POTENTIAL USES IN EACH AREA TYPE

	URBAN NON-RESIDENTIAL	URBAN RESIDENTIAL	VACANT DEVELOPMENT	NATURAL
RESIDENTIAL	c	0	-	C
LAND TRANS-PORTATION	o	o	o	c,-
AIR TRANSPOR-TATION	o	C	-	C
MARINE TRANS-PORTATION	o	c	0	C
ENERGY REFINING	o	C	c	C
ENERGY GENERA-TION	o	C	c,-	C
UTILITY/COMMU-NICATION R.O.W.	o	o	o	o,c,-
MANUFACTURING	0	c	0	C
SOLID WASTE DISPOSAL	c	C	C,o	C
SEWAGE TREAT-MENT & WATER SUPPLY	o	C	0	C
LAND TRANSFOR-MATION	c	C	C	0,C
NATURAL RESOURCE MANAGEMENT	C	o	o,c	O
DEVELOPED WATER-FRONT RECREATION	o	o	o	o,c
WHOLESALE TRADE & STORAGE	0	c	0	C
COMMERCIAL & COMMUNITY SER.	0	0	0	C

.the number of O's and C's and the relative balance between them, and

.the number and balance of O's and C's in one area type compared to the other area types.

Permissibility was evaluated in a flexible manner. Two kinds of comparisons were used when judging the permissibility of a use in an area type:

"Encourage" or "discourage" designations were given when there appeared to be clear-cut evidence that a preponderance of impacts were either opportunities or constraints. Common sense judgments were used in some instances when one adverse impact appeared to overshadow a number of benefits and be more persuasive than other impacts. For this reason, an evaluation based on simple summation of O's and C's could be misleading. For example, industrial development of tidal marsh would provide a number of opportunities such as jobs and allow easy access to transportation; but loss of scarce natural resources appears unjustifiable in light of the abundance of vacant developable land available in the Coastal Zone. The "conditionally permitted" evaluation was assigned when it was apparent that use of an area type may be appropriate under limited circumstances. For example, when location is particularly suitable,if buffering is provided between incompatible uses or technology is employed to ameliorate impacts then circumstances could justifiably permit that use.

The permissibility matrix, presented previously (Figure vii-2) is the product of this evaluation of opportunities and constraints. The encourage, conditionally permitted and discourage ratings should be regarded as general recommendations. The information employed throughout the permissibility analysis is generalized. Because categories of resources, land and water use and impacts are broad, more specific information needs to be applied when local governments implement a permissibility analysis for their particular communities and perhaps, later when specific proposed facilities are subject to review.

LOCAL IMPLEMENTATION

The permissibility recommendations presented in this chapter are designed as guidelines for local officials implementing the Coastal Zone Management Program. Findings made by local governments on permissible uses will be incorporated into management controls to influence new coastal development. It is expected, that the thrust of a local permissibility analysis will be compatible with the one presented in this Chapter, but may not need to be as extensive. For example, local analysis should recognize the regionwide scarcity of significant natural areas and evaluate tidal wetlands as posing strong constraints.

Municipalities choosing to perform their own permissibility analysis may use the information presented in this chapter. The resources available in different land areas, especially large vacant areas, within the Coastal Zone are first inventoried. This inventory will help to define area type classes that better reflect the local

situation. Information on development impacts needs to be collected and evaluated, with special attention to those kinds of impacts of greatest concern to citizens. The final and most difficult step is to evaluate the full range of potential land and water uses for permissibility within area types of the municipality's coastal zone. Those responsible for preparing local controls will have to balance the anticipated opportunities or benefits with the expected constraints or negative impacts. The trade-offs that will have to be made are likely to largely reflect local goals for municipal development, however, regionwide needs must also be considered. This Chapter, and such key chapters as Policy Framework (Chapter 5) and Special Considerations (Chapter 9 provide guidelines as to regionwide needs and goals for coastal resource use.

Once the permissibility analysis has been completed, local governments will be encouraged to develop, review or update their comprehensive plans and zoning ordinances to implement the concepts embodied in the analysis. Federal funds to support these activities will be "passed-through" to local governments as part of the Coastal Zone Management Program.

Uses that are to be "encouraged" according to the locally prepared permissibility analysis, should be described (and possibly mapped) in the local comprehensive plan. Once completed, this plan will be subject to a review for "consistency" with the goals of the Coastal Program by a Coastal Review Board, through a process described in Chapter 10.

In addition, goals and policies for coastal management should be reflected in the "Statement of Community Development Objectives" contained in most zoning ordinances.[1] Since local resources will be able to absorb the "encouraged uses", the community should allow these uses "by-right" in the appropriate zoning districts. Of course, uses to be "discouraged" should NOT be permitted "by-right" in the zoning ordinance. "Conditional" uses may be selectively accomodated through devices such as "Special Exceptions" or "Conditional Use" provisions, where specific standards and criteria have been established by the governing body. In order to be permitted, "conditional uses would have to demonstrate that adverse impacts (constraints) were modified by technology, site design considerations, or a combination of efforts.

Some municipalities may prefer to use the "overlay district" concept to attach special provisions and conditions within the coastal zone. It is anticipated that the applicability of such devices will be further explored and reports or working papers will be made available to interested municipalities as part of the continuing Coastal Zone Management Program.

FOOTNOTES

1. Act 93 of 1972 amended the Pa. Municipalities Planning Code to require a "Statement of Community Development Objectives" as part of every zoning ordinance. (Article VI, Zoning, section 606) the Planning Code applies to all coastal municipalities except Philadelphia.

SOURCES OF INFORMATION FOR IMPACT ANALYSIS (DELAWARE ESTUARY)

Residential

Regional Science Research Institute. "Environmental Study of the Poquessing Watershed." (Philadelphia: RSRI for the Philadelphia City Planning Commission, January 1976).

This study investigated residents' perceptions of this Delaware tributary and made recommendations to protect the Creek from impacts of future growth.

Tourbier, J. and Westmacott, R. Water Resource Protection Measures in Land Development — A Handbook. (Newark, DE: Delaware University Water Resources Center, April 1974).

This report gives an extensive review of techniques to ameliorate negative impacts of residential and other kinds of development.

Real Estate Research Corporation. The Costs of Sprawl. (Washington, D.C.: RERC for the CEQ, HUD and EPA, April 1974).

For different kinds of residential development patterns, this study gives typical impacts on water, air, energy, capital investment, and finances for the university.

Land Transportation

Leedy, D.L. Highway-Wildlife Relationships, PB 253421/FHWA-RD-76-4, (Washington, D.C.: Urban Wildlife Research Center, Inc. for the Federal Highway Administration, December 1975).

Although primarily addressing natural environments, this report details the impacts of highways on fish and wildlife through air and water quality and accidents.

Federal Highway Administration (Region 3). L.R. 1078-Pulaski Highway, Draft EIS. (Philadelphia: U.S. Dept. of Transportation, Federal Highway Administration, March 1976).

This EIS exhaustively discusses the impacts of a proposed highway near the Delaware Estuary on transportation, socioeconomic character, air, noise, water, ecology, historical areas, and energy.

Air Transportation

Winfrey, Corradino, Schimpeler. "Developing an Environmental Assessment Report for a Regional Airport-Industrial Complex," Air Travel and Aviation Facilities Planning. (Washington, D.C.: Transportation Research Board Record 524, 1975).

Provides a detailed breakdown of impacts arising from construction and operation of large airport facilities.

Marine Transportation

Tibbetts-Abbett-McCarthy-Stratton. Port Development Plan for the Delaware River. (New York: TAMS for the Delaware River Port Authority and Philadelphia Port Corporation, June 1968).

Although materials is dated and a new report on marine facility needs is being prepared, this report gives background information on the obsolescence of existing berths and piers and the role of containerized shipping in the port economy.

Energy Refining

Factbook: Onshore Facilities Related to Offshore Oil and Gas Development. (Boston: New England River Basin Commission for the Resource and Land Investigations Programs, U.S. Geological Survey, November 1976).

The Factbook, the best available source of accurate information, is an encyclopedia reference for onshore facilities related to offshore oil and gas development. Most relevant for the Delaware Estuary are sections on gas processing, oil marine terminals and refineries, Chapters 3, 5 and 6, respectively.

Environmental Research and Technology. Environmental Report on the Proposed Modernization of the Paulsboro Refinery. (Paulsboro, New Jersey: ERT for the Mobil Oil Corporation, April 1974).

This report discusses the impcts of proposed improvements and new refinery facilities on the Delaware Estuary water quality, air quality, groundwater quality, noise, river traffic and visual quality.

Energy Generation

Master Siting Study — Major Electric Generating Projects, Delaware River Basin, 1975-1985. (Delaware River Basin Electric Utilities Group, a report to the Delaware River Basin Commission, June 1975).

This report gives the consumptive water losses attributable to existing and planned generating facilities on the Delaware and Schuylkill Rivers. Background information on types of generation and cooling processes is presented.

Philadelphia: Electric Company. Environmental Statement, Eddystone Generating Station, Units No. 3 and No. 4. (Philadelphia PECo, June 1971.

The impact of additional generating units on air, water, noise and traffic are included in this report. A special study of thermal impacts on the Delaware was prepared.

Utility and Communication R.O.W.

Delaware River Basin Commission. Draft Environmental Impact Statement for the Proposed Interstate Energy Company Pipeline, (Delaware County, north to Northampton County). (Trenton: DRBC for the Gulf Interstate and Pennsylvania Power and Light Company, January 1974).

Manufacturing

Lund, Herbert F. (Ed.). Industrial Pollution Control Handbook. (New York: McGraw Hill Book Co., 1971).

For each major manufacturing category, this textbook discusses the generation and control of air and water pollutants.

Stevens, B.H., Brackett, C.A., Coughlin, R.E. An Investigation of Location Factors Influencing the Economy of the Philadelphia Region. (Philadelphia: Regional Science Research Institute, March 1967).

This study analyzes the role of the Port, existing industries and labor resources in attracting future manufacturing growth in Philadelphia.

Solid Waste Disposal

Chester-Betz Engineers. "Landfill Non-Point Sources of Pollution, Background Information and Best Management Practices Approach, BMP No. 9" (Plymouth Meeting, PA: CBE for the DVRPC and Penn DER, May 13, 1977).

This report presents a general discussion of leachate and runoff contamination from landfills.

Sewage Treatment and Water Supply

Wright, James F. (ex. dir.). Water Management of the Delaware River Basin (Trenton: Delaware River Basin Commission, April 1975).

This report reviews water quality and water supply in the Delaware River, addressing the issue of salinity control and depletive water uses in the Delaware Basin.

Chester-Betz Engineers. Chapter VI and Chapter VII, COWAMP, Lower Delaware and Schuylkill River Basins, (Plymouth Meeting, PA: CBE for the DVRPC and Penn DER, June 1975).

These chapters include a thorough inventory of waste dischargers and water supply withdrawals within the Delaware Estuary. A profile of water quality in the Estuary is also provided.

Land Transformation

Chester-Betz Engineers. "Hydrologic Modification Non-Point Sources of Pollution, Best Management Practices Approaches, BMP No. 14, " (Plymouth Meeting, PA: CBE for the DVRPC and Penn DER, May 13, 1977).

This report gives a fairly detailed (yet not specific for the Delaware Estuary) account of potential pollution and toxic effects associated with river dredging and with different methods of spoil disposal.

U.S. Army Engineer District. Final Composite Environmental Impact Statement, Project Maintenance, Delaware River, etc. (Philadelphia, PA; U.S. Army Engineer District, 1975).

This report gives a description of dredge operations on the Delaware Estuary and Schuylkill River, existing and planned sites for dredge spoil disposal and the physical and socioeconomic impacts arising from channel maintenance activities.

Jack McCormick & Associates, Inc. "Interim Report on the Vegetation, Wildlife, and Water Quality of the Pennsbury Manor Study Area, Lower Bucks County, Pennsylvania." (Philadelphia: JMA for the Warner Realty Investment Company, January 1974).

Gives some general information on the manner in which sand and gravel mining activities affect the ecology of the large man-made lakes in the Bucks County Coastal Zone.

Natural Resources Management

Clark, John C. Coastal Ecosystems: Ecological Considerations for Management of the Coastal Zone. (Washington, D.C.: THe Conservation Foundation, March 1974)

This book provides general information on development constraints needed to protect marine ecosystems.

Thurow, C., Toner, W., and Erley, D. Performance Controls for Sensitive Lands. (Chicago: American Society of Planning Officials, June 1975).

This report discusses the importance of wetlands and streams and creeks (among other features) and methods of local control to protect natural processes.

Developed Waterfront Recreation

Roy Mann Associates. Recreational Boating on the Tidal Waters of Maryland. (Cambridge, Mass: RMA for the Maryland Energy and Coastal Zone Administration, 1976).

This report provides an overview of conflicts between recreational boating and marine shipping and the possible impacts of recreation development on natural shorelands.

Wholesale Trade and Storage

Toner, W. Mini-Warehouses. (Chicago: American Society of Planning Officials, (Report No. 324) February 1977).

Although primarily focussing on mini-warehouses, this report discusses the impacts of storage facilities on traffic, runoff, aesthetics, noise and public service requirements.

Commercial and Service

Muller, T. and Dawson, G. The Fiscal Impacts of Residential and Commerical Development: A Case Study. (Washington, D.C.: The Urban Institute, December 1972).

This report balances the municipal service costs of commercial development against local tax revenues; it does not detail benefits derived from income and jobs created by development.

The Urban Institute and International City Management Association. Measuring the Effectiveness of Basic Municipal Services. (Washington, D.C.: TUI and ICMA, February 1974).

This report gives background information on measures of the adequacy of community services and their role in serving urban needs. Included are recreation, library, crime, fire protection and citizen complaint services.

LAKE ERIE COASTAL ZONE

INTRODUCTION

Pennsylvania's coastline, like the air we breathe and the water we drink, is a vital resource. The amount of Commonwealth coastland is limited, but is important to our existence. Several significant differences are evident among air, water and land resources. Land in most cases is privately-owned while air and water are normally considered as resources shared by all. The quality of our air and water is carefully monitored and controlled for the common welfare of all citizens. The use of our most limited resource land, and more specifically coastland, continues to occur in many instances with only the owners welfare in mind. Often, the effects of insensitive land use do not recognize or heed property boundaries.

Historically, coastal land planning and regulation was largely a matter of economic and cultural concern. Plans and regulations have been based primarily on the ability of land to accomodate man-made structures and uses. This "approach" to coastal planning is no longer satisfactory or acceptable. A critical need exists to recognize the natural values of land, to encourage future development in suitable areas, and to coordinate local land use plans with neighboring communities so that conflicts will be minimized and uses benefiting several communities are not arbitrarily excluded.

The Lake Erie Coastal Zone, unlike the Delaware Estuary Coastal Zone, confronts the coastal planner with use conflicts characteristic not only of an urbanized shorefront area, but also a rapidly developing and predominately rural coastal area. Growth areas no longer coincide with urban centers. Instead, development is sprawling outward from urban concentrations to areas which just several years ago were considered very rural in nature. The objective of this chapter is to systematically determine coastal areas most capable of supporting the kinds of future development anticipated to occur within the Lake Erie Coastal Zone. To accomplish this all land and water resources were inventoried, and then assessed for their capability and suitability to support various uses.

This permissible use analysis will seek to optimize the balance between the development of economic opportunity areas and the preservation of areas of significant natural, historical, or aesthetic values. The analytical process to be discussed will be developed carefully and understandably to provide maximum utility to the most prevalent users-local planners and decision-makers.

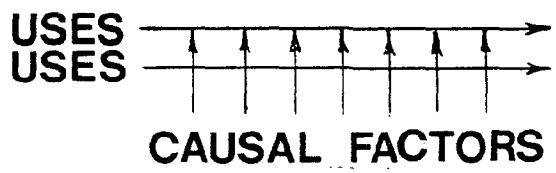
PERMISSIBILITY METHODOLOGY

In order to determine use permissibility, all land and water uses which are presently supported by or planned for the Lake Erie Coastal Zone were inventoried. Coastal resources that were inventoried early in program development were used for this analysis. These coastal resources are commonly recognized as factors which contribute to economic activities, and support natural processes. The primary objective of this analysis will be to ascertain the direct and significant impacts of coastal uses upon the waters of Lake Erie, however, the following analysis will also assess all conceivable use impacts that may be exerted upon the inventoried coastal resources.

As a first step in determining permissible uses, a very general method was used to assess the possible adverse impacts of uses upon resources for the entire Lake Erie Coastal Zone. The general land and water use categories selected for analysis include: residential, commercial, industrial, agriculture, transportation, recreation, and extraction. In certain cases, uses having similar or closely related activities were combined to avoid unneccessary duplication of work. For example, uses involving some degree of land transformation such as, residential, commerical, and agricultural uses were combined for purposes of this analysis. Specific activities associated with these uses were identified and include: structures, fences, vehicles, roads and parking areas, clearing, drainage improvements, etc.

Once the activity selection was accomplished, the impact assessment was completed by using an adopted version of the Sounsen Impact Matrix System. This method was used because it allows the resource planner to follow a clear step by step process from the general use category to a very specific effect on a particular resource. uses. Though in this analysis it is used for general uses as applied to the entire coastal zone, it could also be applied to site specific uses. The following explanation of the development and use of impact assessment networks will provide a detail understanding of this initial step in determining use permissibility.

The Impact Assessment Network or matrix system, works as follows: First the major land use group containing the use in question is selected. Let us say for illustration purposes that the "industrial, transportational" use group is chosen. Next a simple matrix is established showing associated industrial and transportation USES down the vertical axis. Some these might be: highway transportation; manufacturing; and power plants. Then CAUSAL FACTORS are selected for the USE category and placed on the opposite or horizontal axis of the matrix. Causal factors are the individual components which comprise or support the various uses and which actually impact coastal resources. Some of these are: Roadways and parking areas; water and sewer systems; structures. The matrix now looks like this:



With this matrix established, the user can determine which causal factors relate to which uses. When the rest of the system is developed this initial matrix provides a convenient reference for relating a specific causal factor to a specific use category.

The next step in the network development is to establish "Initial Conditions" which might occur in coastal waters should the causal factors become a reality. An example for this element might be: Introduction of sewage and industry liquors. The initial conditions are then set up in matrix form on an axis opposing the causal factors. In this manner each initial condition can be easily traced back to its causal factor. Using the same matrix axis as for initial conditions an impact, or effect, progression is developed for each initial condition. The progression, the initial condition; the consequent condition resultant from the initial condition; and the possible effect of the consequent condition on lake waters. For example, some consequent conditions to the introduction of sewage and industry liquors (initial condition) might be: A) Unappealing water color and noxious odor; B) Introduction of human disease vectors or; C) Introduction of poisons, toxins and inhibiting agents.

The possible effects or impacts of such consequent conditions might be: A) Aesthetic displeasure; B) Contamination of water sources and; C) Mortality of biota and habitat destruction. The completed impact assessment networks can be examined on the following pages (figures vii-7 thru vii-12).

These effects which have now been identified can then be evaluated as to whether or not their impacts are direct and significant to coastal waters.

Section 305 of the Coastal Zone Management Act requires each coastal state to develop a definition of what shall constitute a direct and significant impact upon coastal waters. Direct and significant impact was briefly discussed in Chapter 6, Boundaries.

As a next step in the procedure to determine permissible uses, an operational definition of direct and significant impact was developed. In formulating this definition, various characteristics of coastal waters which may be subject to change primarily from land use impacts were examined. These water characteristics included: physical, chemical, biological, riparian, socio-economic and aesthetic conditions. For purposes of this analysis, an impact can be defined as the result of an action which causes a change to some element in the human or natural coastal environment. Further, an impact is considered DIRECT when a change in the ambient characteristics of coastal waters is the immediate or primary result of a particular action, activity, or use. The action, activity or use in question must have a direct link to the coastal waters of Lake Erie or Presque Isle Bay, and must change one or more of the above mentioned water characteristics.

Some examples of actions which directly impact coastal waters include-direct discharge of chemical, biological, or thermal wastes

into the waters of Lake Erie or Presque Isle Bay, physical barriers which impede the littoral drift, oil spills, or offshore extractive activities.

An impact is SIGNIFICANT when it results from an action which changes the ambient characteristics of coastal waters to the degree or extent that such changes become: irreversible, reversible only by use of extraordinary means; create a lasting or prolonged effect; or are of a highly controversial nature. Such changes may, but need not be limited to the following:

1. Have both beneficial and detrimental effects if, in balance, the net effect is beneficial.

2. Result in degradation of the quality of the water environment. (for example: Eutrophication caused by excessive addition of phosphates to lake waters.)

3. Curtail the range of beneficial uses of the coastal waters. (for example: continual and large industrial waste discharges into lake waters.)

4. Though of individually small impact, result cumulatively in a large impact. (for example: a concentration of 100 homes dumping untreated sewage into the lake.)

5. Be of such frequency or regularity that the change is sustained causing a significant impact. (For example: A power plant which daily adds large volumes of water to Presque Isle Bay at temperatures which vary greatly from ambient water temperatures.)

6. Be of a highly controversial nature. (For example: Offshore drilling for natural gas.)

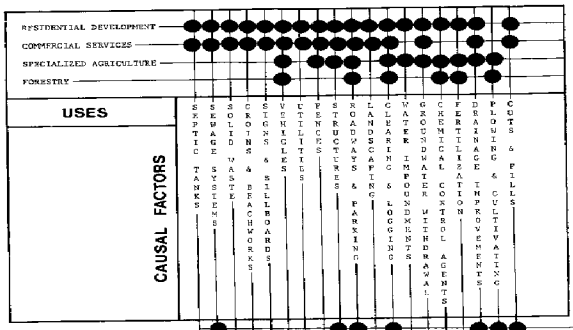
The determination of uses capable of exerting a direct and significant impact upon coastal waters provides the coastal planner with a tool to plan more sensitively for critical coastal resources. A working knowledge of general use impacts is important for the proper planning of any area at any governmental level. However, it is particularly critical for local resource planners to have available more specific information regarding use impacts and the areas in which they are most likely to occur. In order to develop this detailed information, a second, more site-specific impact analysis was undertaken. This localized dimension of permissibility analysis was accomplished through a three-part analysis that assessed:

1. The capability of coastal land and water resources to support both existing and planned uses or to absorb negative consequences of use.

2. The suitability of socio-economic coastal resources to support both existing and planned uses.

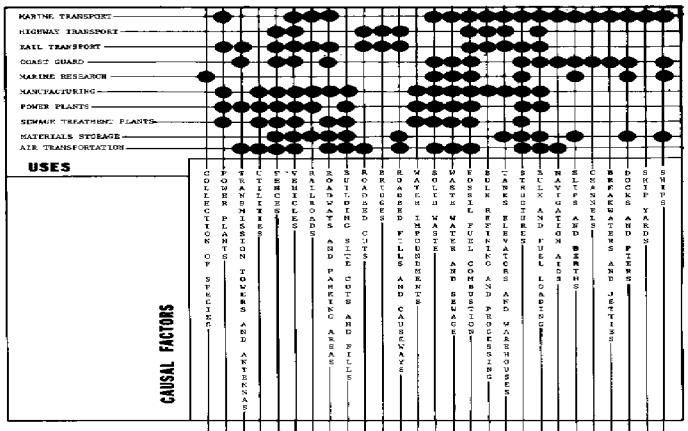
RESIDENTIAL, COMMERCIAL, AGRICULTURAL

POTENTIAL ADVERSE IMPACTS



INITIAL CONDITION	CONSEQUENT CONDITION	POSSIBLE EFFECTS
1. Increased Runoff into streams	A. Stimulate/Increase Bluff Erosion B. Increased Freq. & intensity of Floods C. Increase Sheet & Gully Erosion	A. Imperil Cliff Structure B. Imperil Flood Plain Development C. Alter Benthic Community
2. Decreased Fresh Water into Lake & Bay	A. Decreased Flushing of Pollutants B. Decreased Dissolved Oxygen C. Concentrate Sediment Inshore D. Decreased Sediment Available for longshore transportation system	A. Reduce coastal system capability to assimilate pollutant supply B1. Mortality & habitat destruction of high oxygen demand biota B2. Proliferation of low oxygen demand biota. Reduction of Productivity C. Increase evolution into dry lands D. Move sedimentation and shoaling upstream
3. Increased Turbidity	A. Cut-off light to primary production Photosynthesizers B. Impair Feeding of sight-feeding fish C. Favor species tolerant to high turbidity D. Changed color and clarity of water E. Increased amounts of suspended material F. Increased Sedimentation	A1. Reduce Biotic production, reduce size and number of species A2. Reduce dissolved oxygen B. Impair sport fish attraction to lure C. Change species composition D. Aesthetic displeasure & impair skin diving and underwater exploration E. Reduced desirability for body contact F. Substrate unsuitable for recolonization. Habitat destruction
4. Introduction of Sewage	A. Unappealing water color and noxious odor B. Nutrient Stimulated Phytoplankton blooms C. Increased oxygen demand - decreased dissolved oxygen D. Introduction of human disease vectors E. Introduction of floatable material F. Proliferation of sewage tolerant species G. Increased Turbidity H. Precipitated blanket of sludge I. Introduction of poisons and inhibiting agents	A. Aesthetic displeasure B1. Production of toxins fatal to biota B2. Decreased light penetration B3. Reduce dissolved oxygen C1. Mortality and habitat destruction of high oxygen demand biota reduce productivity C2. Proliferation of low oxygen demand to weed or pest level C3. Anerobic condition noxious odors D. Contamination of water contact areas E. Refouling of shoreline & contact area F. Proliferation of populations to weed or pest levels G. See Number 3 H. Mortality & habitat destruction of benthic biota I. Mortality and habitat destruction of biota
5. Animal effluvia into coastal drainage	A. Introduction of poisons and inhibiting agents B. Nutrient stimulated phytoplankton blooms	A. Contamination of water contact areas B. Aesthetic displeasure
6. Nutrified runoff & Groundwater	A. Nutrification of groundwater B. Stimulation of phytoplankton blooms	A. Groundwater contamination methemoglobinemia B. See B of number 4
7. Sewage effluents into groundwater	A. Introduction of human disease vectors B. Seepage of polluted groundwater into coastal drainage	A. Contamination of water contact areas B. Aesthetic displeasure
8. Organic debris into coastal drainage	A. Increase biochemical oxygen demand	A1. Mortality & habitat destruction of high oxygen demand biota. Reduce productivity A2. Proliferation of low oxygen demand biota to weed or pest level A3. Anaerobic conditions noxious odors
9. Introduction of chlorinated hydrocarbons (Pesticides)	A. Concentration in biotic food chain B. Depress photosynthesis and reproduction of plankton	A1. Reproductive failure of pelagic birds, crustaceans and fish A2. Contamination of certain shellfish B. Reduce biotic productivity
10. Sheet and Gully Erosion into coast drainage	A. Change bottom sediment composition B. Increased turbidity C. Accelerate evolution to wet and marshlands	A. Mortality of biota and spawning populations B. Reduce biotic production. Reduce size and number of species C. Mortality and habitat destruction of submerged communities
11. Blockage of Sand Erosion and Transport	A. Decreased deposition of sand to beaches	A1. Imperil cliff edge structures and utilities A2. Increased exposure to storm drainage, inland flooding
12. Increased Sedimentation	A. Sediment deposition faster than biotic adjustment B. Change composition of bottom substrate C. Shoaling of estuarine water courses	A. Abnormal increase in bottom deposits B. Substrate unsuitable for recolonization. Habitat Destruction C. Shoaling of berths, channels and harbors
13. Stimulation of Landslides	A. Sheet and gully erosion into coast drainage B. Highly visable areas of earth and vegetation disturbance	A1. Alter benthic community A2. Substrate unsuitable for recolonization B. Aesthetic displeasure
14. Changed Shore Profile	A. High wave run-up and overtopping	A. Inland flooding
15. Reflection of on-shore waves	A. Increased backwash across shore B. Reflected waves into waterways	A1. Increased beach erosion A2. Impair cliff edge structures and utilities B. Small boat navigation hazard
16. Interception of longshore drift	A. Downdrift beach and shore erosion	A1. Removal of beaches. Undermining & collapse of shoreline developments A2. Scouring away of benthic habitats
17. Dredging or Excavation for Landfill	A. Changed composition of substrate B. Increased turbidity C. Collection and decomposition of organic material D. Decreased or elimination of light penetration to bottom photosynthesizers	A1. Substrate unsuitable for recolonization A2. Habitat destruction B1. Reduce biotic production. Reduce size and number of species B2. Reduce dissolved oxygen C. Release of noxious odors. Olfactory discomfort D. Reduced primary production. Decreased size and number of species
18. Block anadromous fish migration	A. Block anadromous fish migration	A. Reduce anadromous populations
19. Prevent public access to shoreline	A. Concentrate public access to specific points	A1. Overuse and deterioration of public areas and facilities A2. Congestion and overcrowding of public access areas A3. Provoke trespassing and vandalism
20. Physical barrier along shore access	A. Navigation hazard boating congestion B. Rough jagged surfaces in water contact areas	A. Poor boating conditions B. Bodily injury
21. Unsightly intrusions within coastal scene	A. Increased desirability of unspoiled scenic areas	A1. Overuse of areas and deterioration of scenic appeal A2. Disease, vectors, aesthetic displeasure
22. Upset ecology of indegenous communities	A. Alter natural vegetational pattern B. Decimation of endangered species	A. Aesthetic displeasure B. Elimination of desirable species

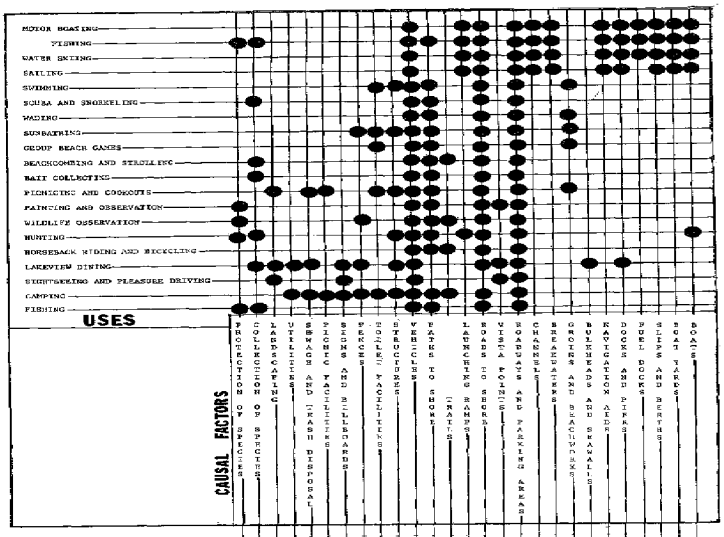
INDUSTRIAL, TRANSPORTATIONAL



POTENTIAL ADVERSE IMPACTS

	INITIAL CONDITION	CONSEQUENT CONDITION	POSSIBLE EFFECT
1.	Increased fresh water flow into Lake and Bay and Streams	A. Stimulate or increase cliff erosion B. Increased frequency and size of floods	A. Imperil cliff edge structures and utilities B. Imperil coastal flood plain developments
2.	Dented effluent, calification	A. Reduction of dissolved oxygen B. Decreased species diversity C. Proliferation of warmer water biota D. Barrier to migration of heat sensitive biota	A. Reduce biotic reproductivity B. Instability of population and communities C. Proliferation of species into weed or pest level D1. Reduce predatorial populations D2. Mortality of heat sensitive biota D3. Stimulation of surface fog
3.	Introduction of Sewage and Industry Liquors	A. Unappealing water color and noxious odor B. Excessive stimulated phytoplankton blooms C. Increased oxygen demand-decreased dissolved oxygen D. Introduction of human disease vectors E. Introduction of floatable materials F. Increase of sewage tolerant species G. Precipitated blanket of sludge H. Introduction of poisons and inhibiting agents	A. Aesthetic displeasure B1. Aesthetic displeasure B2. Production of toxins fatal to biota B3. Decreased light penetration B4. Reduce dissolved oxygen C1. Mortality and habitat destruction of high oxygen demand biota. Reduce productivity C2. Proliferation of low oxygen demand biota to weed or pest level C3. Anaerobic conditions. Noxious odors D1. Contamination of water contact areas D2. Contamination of water source E1. Fouling of shorelines and water contact areas E2. Aesthetic displeasure F. Increase of populations to weed or pest level G. Mortality and habitat destruction of biota H. Mortality and habitat destruction of biota
4.	Ship Sewage	(SAME AS 3 ABOVE)	(SAME AS 3 ABOVE)
5.	Introduction of new bioaccumulables (heavy metals, PCBS)	A. Biotic concentration in food chain	A1. Biota contaminated to human ingestion A2. Mortality or reproductive failure of concentrating species
6.	Leakage from Petroleum loading facilities *Studies have shown that the chance of oil being produced from offshore wells is extremely unlikely	A. Accumulation with suspended material and precipitation to bottom B. Block airborne oxygenation of water C. Increased oxygen demand-decreased dissolved oxygen D. Ingestion and concentration of oil by biota E. Floatable scum F. Oil coating of pelagic birds and mammals G. Fouling of fishing gear H. Application of dispersion chemicals and detergents	A. Concentration of toxic hydrocarbons on bottom benthic habitat destructive B1. Reduce biotic productivity B2. Mortality and habitat destruction of high oxygen demand biota B3. Increase of low oxygen demand biota to weed or pest level B4. Noxious odors and anaerobic conditions C. (SAME AS B1.-B4. ABOVE) D1. Twist appearance and taste of fish and shellfish flesh D2. Mortality of biota and habitat destructive E1. Contaminate swimming areas and BEACH, BOATS and BEACHES E2. Aesthetic displeasure F. Mortality of pelagic birds and mammals G. Impair fishing operation H. Mortality and habitat destruction of sensitive biota
7.	Oil Slicks from Bunker and Bilge Cleaning	(SAME AS 6. A.-H. ABOVE)	(SAME AS 6. A.-H. ABOVE)
8.	Jettisoning of Fuel	A. Fuel oil slicks	A (SAME AS 6. A.-H. ABOVE)
9.	Smoke, Fumes and Dust	A. Increased particulates B. Noxious odors C. Smog formation D. Fallout onto land or coastal waters	A1. Increased load and fog frequency A2. Decreased mean temperatures B. Aesthetic displeasure C. Eye irritation, lung irritation and insomnia. Aesthetic displeasure D1. Biota contaminated to human ingestion D2. Mortality or reproductive failure of concentrating species D3. Habitat destruction of biota
10.	Sheet and Gully Erosion into Coast Drainage	A. Change bottom sediment composition B. Silt covered biota and spawning grounds C. Increased turbidity D. Accelerate evolution to wet and marshlands	A. Alter benthic community B. Mortality of biota and spawning populations C. Reduce dissolved oxygen D1. Mortality and habitat destruction of submerged communities D2. Increase water levels
11.	Increased Sedimentation	A. Sediment deposition faster than biotic adjustment B. Change composition of bottom substrate C. Shoaling of waterway water courses D. Decrease depth to bottom	A. Smother benthic biota habitat destruction B. Substrate unsuitable for repopulation C. Shoaling of berths, channels and harbors D. Increase water levels
12.	Stimulation of Landslides and Slumps	A. Sheet and gully into coast drainage B. Highly visible areas of earth and vegetation disturbance	A. (SAME AS 10. A.-J. ABOVE) B. Aesthetic displeasure
13.	Interception of Longshore Drift	A. Downdrift beach and shore erosion B. Ballooning of updrift beach and shoreline	A1. Removal of beaches. Undermining and collapse of shoreline development A2. Scouring away of benthic habitats A3. Smother benthic habitat B1. Infilling of harbors, lagoons and bays B2. Remove shoreline development from immediate access to water
14.	Dredging	A. Removal of substrate B. Changed composition of substrate C. Increased turbidity D. Release of toxins	A. Mortality of biota in substrate B. Substrate unsuitable for repopulation C1. Reduce biotic production C2. Reduce dissolved oxygen D. Habitat destruction
15.	Prevent or Restrict Public Access to the Shore	A. Concentrate public access to specific points	A1. Overuse and deterioration of public areas and facilities A2. Congestion and overcrowding A3. Provoke trespassing and vandalism
16.	Increased Vehicular Access to the Coast	A. Vehicular fumes and noise B. Increased traffic congestion along coast	A1. Disruption of wildlife A2. Aesthetic displeasure B. Traffic control and accident prevention problems
17.	Anchors Dragged Across Pipelines and Cables	A. Rupturing of pipeline or cable break	A1. Spill and water contamination A2. Biotic contamination A3. Loss of communication A4. Loss of vessel or ship damage
18.	Collision Spillage of Cargo and Fuel	A. (SAME AS 3. AND 6. ABOVE) B. Floatable materials	A. (SAME AS 3. AND 6. ABOVE) B1. Navigation hazard B2. Aesthetic displeasure
19.	Loud or Persistent Noise	A. Disruption of wildlife	A1. Abandonment of feeding and nesting grounds inhibit reproduction A2. Aesthetic displeasure
20.	Unsightly Intrusions Within Coastal Scene	A. Increased desirability of unspoiled scenic areas	A1. Congestion and aesthetic displeasure A2. Overuse of areas and deterioration of scenic appeal
21.	Highly Visible Slopes of Disturbed Cover	A. Moved natural landform and vegetation	A1. Aesthetic displeasure A2. Increased desirability of unspoiled scenic areas
22.	Dumping Compounds Into Lake and Stream Water	A. Alter chemical makeup of water	A1. Require further processing for human consumption A2. Endanger or kill biotic life

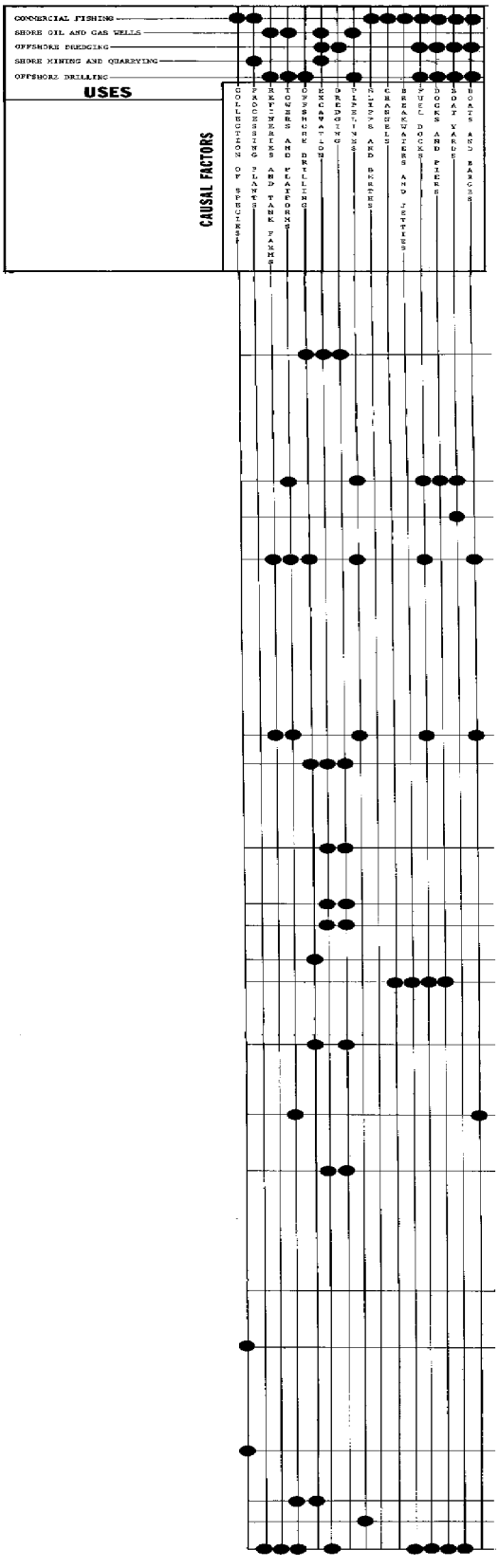
RECREATIONAL



POTENTIAL ADVERSE IMPACTS

INITIAL CONDITION	CONSEQUENT CONDITION	POSSIBLE IMPACTS
1. Increased Runoff	A. Stimulate or increase cliff erosion	A. Imperil cliff edge structures and utilities
	B. Increased frequency and size of floods	B. Imperil coastal flood plain development
	C. Increased sheet and gully erosion	C. Alter benthic community
2. Boating Wakes	A. Increased turbidity	A. Capsize small craft
	B. Bucking of moored or docked craft	B. Hull damage
3. Introduction of Sewage	A. Unappealing water color and noxious odors	A. Aesthetic displeasure
	B. Nutrient stimulated phytoplankton blooms	B1. Aesthetic displeasure B2. Production of toxins fatal to biota B3. Decreased light penetration B4. Reduced dissolved oxygen
	C. Increase oxygen demand – decreased dissolved oxygen	C1. Mortality and habitat destruction of high oxygen demand biota C2. Increase of low oxygen demand biota to wood up next level C3. Anaerobic conditions – noxious odors
	D. Introduction of human disease vectors	D1. Contamination of water contact areas D2. Contamination of fish
	E. Introduction of floatable material	E. Befouling of shoreline and water contact areas
	F. Increase of sewage tolerant species	F. Increase of populations to weed or pest level
	G. Precipitated blanket of sludge	G. Mortality and habitat destruction of benthic biota
	H. Introduction of poisons and inhibiting agents	H. Mortality and habitat destruction of biota
4. Boatyard Effluents	A. Introduction of poisons and/or inhibiting agents	A. Mortality of biota and habitat destruction
	B. Concentration of heavy metals by fish	B. Contamination of fish
	C. Slick of slowly degradable oils	C. Befouling of shoreline and boats
5. Leaching of Toxins From Antifouling Coatings	A. Concentration of heavy metals and toxins by biota	A. Mortality of biota and degeneration
6. Collection of Floatable Debris and Slick Spills		A1. Aesthetic displeasure A2. Befouling of boat, hull, and prop A3. Damage to blades
7. Open Fires	A. Charred remains	A. Aesthetic displeasure
	B. Noxious odors	B. Physical annoyance
	C. Ignition of driftwood or shoreline vegetation	C1. Fire escaping of shoreline C2. Damage of shoreline buffer strip
8. Sheet and Gully Erosion Into Coast Drainage	A. Increased turbidity in littoral	A. Decrease buffer stability
9. Interception of Longshore Drift	A. Downdrift beach and shore erosion	A1. Removal of beaches, undermining and collapse of shoreline development A2. Scouring away of benthic habitat
10. Dredging	A. Changed composition of substrate	A. Substrate unsuitable for recolonization. Habitat destruction
	B. Increased turbidity	B. Cut off light to primary photosynthesizers
	C. Uncovered sludge or contaminated sediments	C. Release of toxins
	D. Pits formed below bottom level	D. Collection and decomposition of organic debris. Releasing noxious odors
	E. Decreased light penetration to bottom photosynthesizers	E. Reduce primary production. Decrease size and number of species
	F. Penetration of freshwater aquifer sediment cover	F. Contamination or change of groundwater supply
	G. Subsidence of bottom	G. Threat or collapse of offshore structural supports
11. Litter Left on Beach	A. Attraction of insects, gulls and rodents	A. Physical annoyance, disease vectors, aesthetic displeasure
	B. Broken glass, sharp objects, rusty debris	B. Bodily injury
	C. Increase public disregard for area	C. Increased litter, vandalism, misuse
	D. Unsightly accumulations, noxious odors	D. Olfactory discomfort, aesthetic displeasure
	E. Clean-up necessary	E. Taxpayer expense
12. Overboard Disposal of Refuse	A. Floatable material	A1. Accumulation on shoreline A2. Navigational hazard
	B. Debris accumulation on bottom	B1. Physical hazard in water contact areas B2. Fouling of fishing gear B3. Aesthetic displeasure to underwater sports
13. Trampling of Beach and Shoreline Vegetation	A. Mortality or stunting of vegetation	A1. Dune blowout. Wind erosion of shoreFront A2. Sand driven inland to coastal developments A3. Expose shoreline development to storm damage
	B. Scarring of natural vegetation pattern	B. Disrupt natural succession
14. Trampling or Clearing Bluff, Rim or Slope Vegetation	A. Increased recession of bluff edge	A. Loss of bluff property, collapse
	B. Sheet and gully erosion into coastal drainage	B. Change bottom sediment composition
	C. Silt covered biota and spawning grounds	C. Mortality of biota and spawning populations
	D. Increased turbidity	D. Decrease light to primary Photosynthesizers
15. Over-collection of Shoreline Species	A. Alter or destroy shoreline habitats and communities	A. Endanger survival of rare species
	B. Increase of uncollected competitor species	B. Abandonment of feeding and nesting grounds
	C. Increase in forage species need	C. Same as C Above
	D. Decrease population dependent on species as forage	D. Endanger survival of dependent species
16. Disturbance of Wildlife	A. Abandonment of feeding and nesting grounds. Inhibit reproduction	A1. Endanger survival of rare species A2. Increase of forage to pest level. Reduce population for sport A3. Reduced aesthetic potential A4. Increase pressure on remaining wildlife habitat
17. Physical Barrier to Alongshore Beach and Water Access	A. Navigation hazard boating congestion	A. Jousting collisions
	B. Rough, jagged surfaces in water contact areas	B. Bodily injury
	C. Concentrate public use within a limited area	C1. Mortality or stunting of vegetation C2. Endanger survival of rare species C3. Alter or destroy shoreline habitats and communities C4. Overuse, contamination, and deterioration of public areas and facilities C5. Provide trespassing and vandalism
18. Focus Public Access to Specific Points	A. Mortality or stunting of vegetation	A1. Dune blowout. Wind erosion on shoreFront A2. Sand driven inland onto coastal development A3. Expose shoreline development to storm damage
	B. Over-collection of shoreline species	B1. Endanger survival of rare species B2. Alter or destroy shoreline habitat and communities
	C. Increase people traffic	C1. Overuse and deterioration of public areas and facilities C2. Congestion and overcrowding
19. Insufficient Space to Accomodate Parking Demand	A. Roadbed or shoulder parking	A1. Insufficient parking for commercial and residential uses A2. Traffic congestion A3. Concentrate public demand to easily accessible areas A4. Impede or block view from road to shore A5. Increased danger of highway accidents
20 Loud and/or Persistent Noise	A. Disruption of wildlife	A. Abandonment of feeding and nesting grounds
	B. Aesthetic displeasure	B. Public seeks quiet areas
21. Unsightly Intrusions on Coastal Scene	A. Blocks view of natural vista	A1. Public seeks clear vistas A2. Congestion and overcrowding of other areas
	B. Aesthetic displeasure	B. Same as A1 and A2 Above
22. Derelict Hulls and Junked Parts	A. Rust and metal fragments into coastal waters	A1. Bodily injury A2. Mortality of biota and habitat destruction
	B. Navigation hazard	B. Boating collisions
	C. Unsightly intrusions within coastal areas	C. Physical annoyance Aesthetic displeasure

EXTRACTIVE



POTENTIAL ADVERSE IMPACTS

INITIAL CONDITION	CONSEQUENT CONDITION	POSSIBLE EFFECT
1. Increased Turbidity	A. Cut off light to primary production photosynthesizers	A1. Reduce biotic production, reduce size and number of species. A2. Reduce dissolved oxygen A3. Mortality and habitat destruction of high oxygen demand biota. Reduce productivity A4. Increase of low oxygen demand biota to weed or pest level A5. Anaerobic conditions. Noxious odors
	B. Impair feeding of sight feeding fish	B. Impair sport fish attraction to lure
	C. Favor species tolerant to high turbidity	C. Change species composition
	D. Changed color and clarity of water	D. Aesthetic displeasure
	E. Increased amounts of suspended materials	E. Reduced desirability of bodily contact
	F. Reduced clarity and underwater visibility	F. Impair skin diving and underwater exploration
	G. Increased sedimentation	G. Substrate unsuitable for recolonization. Habitat destruction
2. Leaching of Toxins from Anti-Fouling Coatings	A. Concentration of heavy metals and toxins by Biota	A. Mortality of biota and degeneration of habitat B. Damage boat hull and crop C. Aesthetic displeasure
3. Boatyard Effluents	A. Introduction of poisons and/or inhibiting agents	A. Mortality of biota and habitat destruction
	B. Concentration of heavy metals by shellfish	B. Contamination of shellfish beds
	C. Slick of slowly degradable oils	C. Damage of shorelines and boats
4. Blow-out Oil Spills *Studies have shown that the likihood of oil being produced from offshore wells is extremely unlikely.	A. Flocculation with suspended material and precipitation to bottom	A. Concentration of toxic hydrocarbons on bottom. Benthic habitat destruction
	B. Block airborne oxygenation of water	B. Reduce biotic productivity. Decreased size and number of species
	C. Increased oxygen demand-decreased dissolved oxygen	C1. Mortality and habitat destruction of high oxygen demand biota. Reduce productivity C2. Increase of low oxygen demand biota to weed or pest level C3. Anaerobic conditions. Noxious odors
	D. Reduce light penetration to biota	D1. Reduce biotic productivity. Decreased size and number of species D2. Impair feeding of sight feeding fish
	E. Floatable scum	E1. Contaminate swimming areas E2. Damage boats, intertidal exposure and beaches E3. Obnoxious odor of shoreline scum. Olfactory discomfort E4. Aesthetic displeasure
	F. Oil coating of pelagic birds and mammals	F. Mortality of pelagic birds and mammals. Endanger survival of rare species
	G. Fouling of fishing gear	G. Impair fishing operations
	H. Application of dispersion chemicals and detergents	H. Mortality habitat destruction of biota sensitive dispersants
5. Leakage From Oil Transfer Operations	A. Introduction of highly toxic fuel oils	A. Wide spread mortality of biota and long term destruction of habitats
	B. Same as A - H Above	B. Same as A - H Above
6. Removal of Substrate	B. Changed composition of substrate	A. Mortality of biota in substrate B. Substrate unsuitable for recolonization. Habitat destruction
	C. Increased turbidity	C1. Cut off light to primary production photosynthesizers C2. Impair feeding of sight feeding fish C3. Favor species tolerant to high turbidity C4. Changed color and clarity of water C5. Increased amounts of suspended material C6. Reduced clarity and underwater visibility C7. Increased sedimentation
7. Uncovered Sludge or Contaminated Sediments	A. Increased oxygen demand-decreased dissolved oxygen	A1. Mortality and habitat destruction of high oxygen demand. Reduce productivity A2. Increase of low oxygen demand biota to weed or pest level A3. Anaerobic conditions. Noxious odors
	B. Release of toxins	B. Mortality of biota and habitat destruction
8. Fill Formed Below Motion Level	A. Collection and decomposition of organic debris	A. Release of noxious odors, olfactory discomfort
9. Increased Depth to Bottom	A. Decreased or elimination of light penetration to bottom photosynthesizers	A1. Reduced primary production, decreased size and number of species A2. Destruction of submerged lands vegetation
10. Penetration of Fresh Water Aquifer Sediment Cover		A. Contamination or escape of groundwater supply
11. Interception of Longshore Drift	A. Downdrift beach and shore erosion	A1. Removal of beaches, undermining and collapse of shoreline developments A2. Securing away of benthic habitats
	B. Ballooning of updrift beach and shoreline	B1. Smother benthic habitat B2. Building and shoaling of harbors lagoons and bays B3. Remove shoreline development from immediate access to water
12. Disposal of Dredging	A. Deposition on bottom faster than benthic biotic adjustment	A. Smother benthic biota. Habitat destruction
	B. Change composition of substrate	B. Substrate unsuitable for recolonization. Habitat destruction
	C. Spoils dumped above waterline	C. Noxious odors. Olfactory discomfort
	D. Filling of wetlands and submerged lands	D. Blocks or reduces tidal and/or muck currents
	E. Increased turbidity	E. Cuts off light to photosynthesizers and sight feeding fish
13. Overboard Disposal of Refuse	A. Floatable material	A1. Accumulation on shoreline A2. Navigational hazard A3. Physical hazard in water contact areas
	B. Debris accumulation	B1. Fouling of fishing gear B2. Aesthetic displeasure to underwater exploration B3. Bodily injury to shallow water users
14. Removal of Material From Shoreline	A. Removal of storm wave dissipation strip	A. Increase exposure to storm damage, inland flooding
	B. Mining cuts, pits and mounds	B1. Highly visable slopes of disturbed cover B2. Unsightly intrusions within coastal zone B3. Overuse and deterioration of scenic appeal
	C. Sheet and gully erosion into coast drainage	C1. Change bottom sediment composition C2. Silt covered beds and spawning grounds C3. Increased turbidity C4. Accelerate evolution to wet and marshlands
	D. Remove sand supply to beaches	D. Shortage bluff erosional process
	E. Bypass have ground to wind erosion	E. Sand, dust blown inland or alongshore
15. Introduction of Exotic Species	A. Increase of exotic species with a reduction of indigenous species	A1. Introduction increases to weed or pest level A2. Permanent reduction in size of indigenous populations. Reduced community stability A3. Increase of exotic beyond habitats carrying capacity
16. Overpollection of Populations	A. Population reduced far below level of sustained yield	A1. Elimination of localized commercial and/or sport fishery A2. Endanger the localized survival of rare species
	B. Reduce species dependent on population for forage	B. Same as A1
	C. Increase of collected species forage	C1. Increase beyond habitat carrying capacity C2. Decrease habitat's productive capacity, permanent habitat degradation C3. Endanger survival of rare species
	D. Increase of uncollected competitor species	D. Same as C
17. Collection of Sportfish Forage Populations	A. Decreased sportfish forage supply	A1. Decreased size of sportfish and amount of population A2. Increase of collected species forage A3. Increase of uncollected competitor species A4. Decreased sportfish bait supply
18. Structures in Fishing Areas and Shipping Lanes	A. Navigation hazard	A. Collisions
19. Snagging of Trawling Gears or Anchors	A. Rupture of pipline or cable	A1. Spills or leaks A2. Loss or communication A3. Loss of anchor
20. Unsightly Intrusions Within Coastal Zone	A. Increased desirability of unspoiled scenic areas	A1. Overuse of areas and deterioration of scenic appeal A2. Congestion and overcrowding A3. Endanger survival of biota in affected areas

3. The compatibility of future uses with existing uses and conditions throughout the coastal area.

The major purpose of this analysis is not to totally exclude future development from occurring within the Lake Erie Coastal Zone, but instead, to guide this development so that use conflicts and impacts upon coastal waters may be minimized. If population growth and related development follows projected levels, future planning and zoning must reflect wise and sensitive rescource management. For example, life and property can be best protected by restricting development within coastal hazard areas such as rapidly eroding lakefront areas and the floodplains of Lake Erie tributaries. Significant natural, cultural, and aesthetic coastal features should be preserved and or restored for future generations to experience and enjoy. it is essential to the economic vitality of the coastal zone to properly manage natural and exploitable natural resources such as natural gas and prime farmland. The screen-out process used in completing this analysis systematically identifies areas of development opportunity. It is within these areas that economic activities can be promoted in the most environmentally compatible manner.

The capability of coastal resources to support varying degrees of development was determined through use of a map-overlay technique. That is, physical conditions or parameters which restrict development were mapped separately for the entire Lake Erie Coastal Zone. An overlay was prepared for each of the following coastal parameters-steep slopes (greater than 15%), the 100-year floodplain, beaches, wetlands adjacent to water bodies, prime and unique farmland, unique plant/animal habitat areas, areas with a permanent high water table, areas with poor soils for structural support, critically eroding shorefront areas, aquifer recharge areas, nursery waters for spawning fish species, mineral deposits and unique geological features.

The degree to which development should be limited in specific area can be simply determined by the number of above mentioned parameters found to be coincident when overlain one on top of another. It is very apparent that development activities such as industrial, commercial, and residential use should not be located in those coastal areas with two or more development restrictions. These uses should be only conditonally permitted, and in some cases unconditionally restricted, within critical hazard areas such as eroding shorefront areas, floodplains, and steep slope areas. Development activities may be found, through the subsequent suitability and compatibility analyses, to be acceptable within areas covered by only one development restriction. Agricultural use can occur practically anywhere excepting areas of excessive slope and poorly drained, infertile soil conditions. Also land and water recreational use which does not involve land transformation activities can occur within all areas of the coastal zone. The conservation and preservation use restrictions are recommended for areas with a number of development limitations, such as a steep-banked stream corridor where steep slopes, unique geologic features, nursery waters for spawning fish species, and poor soils for

structural support may all be present. This restriction is recommended also for very hazardous areas such as steep lakefront bluffs, and for very unique and fragile coastal systems such as exist on Presque Isle Peninsula and the Crooked Creek watershed in the Western Study Area.

When the physical constraints for development have been fully realized through examination of coastal resource capabilities, the socioeconomic opportunities afforded development in certain coastal areas can be determined through suitability analysis. To accomplish this, map overlays were prepared for socio-economic parameters which exist and support development within the Lake Erie Coastal Zone. An overlay was prepared for each of the following parameters-lake access; transportation service; public utility service; land ownership, historical, cultural, and aesthetic amenities; proximity to compatible uses, availability of communities services (police and fire protection). By overlaying this series of suitability parameters, the local planner can easily determine areas best suited for varying degrees of development.

The purpose of examining the socioeconomic suitability of the Lake Erie Coastal Zone development opportunity areas was to determine the most economically feasible sites for future development. An area covered by two or more of the aforementioned overlain parameters will be recommended as a highly desirable site for development. This analysis also serves to emphasize the importance of encouraging development near established centers of similar use. With the placement of residential development near existing residential neighborhoods the cost to local governments for expanded community services and public utilities is greatly reduced. Also the siting of future industrial facilities near areas supporting similar uses that are currently served by transportation systems, existing water sources, and waste disposal systems, reduces the need for new or expanded systems and also concentrates associated impacts where effects will be least harmful and noticeable. This analysis can be used to further refine or "screen-out" development opportunity areas identified through capability analysis. More specifically, if two areas are equally capable of supporting a particular use, the area closest to required infrastructure and similar uses would offer the greater opportunity for development.

The final phase of this detailed impact analysis involves the determination of use compatibility. That is, the conformance between environmental conditions desirable for a particular land use and existing uses and conditions which characterize a particular area. Traffic, noise, air quality, existing uses, pre-emption of land, and coastal dependency of use are factors to be considered in compatibility analysis. This analysis by the very nature of parameters involved, has been subjectively accomplished using results obtained from the aforementioned analyses of resource capability (development constraints) and area suitability (development opportunity).

Upon completion of the three-part analysis, a comparison was made between the resultant Coastal Zone Management use recommendations and the existing zoning maps and comprehensive plans of coastal municipalities. In order to identify anticipated land and water use conflicts, several planning research steps were integrated. First, all existing comprehensive development plans within the Lake Erie Coastal Zone were reviewed to see where future development is planned. Next, all existing zoning maps were reviewed to see whether the uses anticipated in the comprehensive plans are, in fact, allowed under existing zoning. Then by using the resource overlays prepared for locating current conflicts, comparisons were made between the anticipated uses and existing resources. In this way potential conflicts can be pointed out with reference to resource uses.

Resultant overlays were prepared which show geographic areas where potential uses can be expected to conflict. For example: residential development in the Lake Erie Coastal Zone was found to be highly competitive with agricultural uses. Residential and agricultural uses also compete for potential recreational sites except where steep slopes and flood plains are a factor. Agriculture and residential development are also in competition with the mineral extraction industry where sand and gravel deposits are found. These conflict areas have been identified on Figure vii-13.

Conflicts are closely related to the capability and suitability of a particular area. If the area is capable of supporting different uses based upon its resources, there are bound to be conflicts. The suitability of each area for a particular use determines which of the conflicting uses will be given the highest planning priority.

PERMISSIBILITY OF USES

Important considerations in determining permissible uses are the land and water uses themselves, the area of land or water where such uses are proposed, the resources affected by the uses, the capability and suitability of the resources to support the proposed use, and whether or not the use will have both a direct and significant impact upon coastal waters.

With the results of the aforementioned analyses, three levels of permissibility are assigned to coastal uses examined. They are uses to be actively encouraged, uses to be conditionally permitted (subject to special considerations), and uses to be discouraged. In assessing use attributes of specific coastal resources, potential benefits are weighed against probable adverse impacts to arrive at a judgement of overall acceptability of impacts upon coastal resources. For purposes of this analysis, criteria were formulated to facilitate judgement of permissibility level assignments. Uses that are to be encouraged have benefits strongly outweighing negative impacts and are defined as permissible. Uses to be discouraged would seriously

disrupt or degrade coastal resources without compensating benefits, and are generally defined as non-permissible.

Uses that are conditionally permitted have a number of potential adverse impacts but are also beneficial in some respects. These uses should only be permitted if the adverse impacts can be ameliorated through site design practices or additional technological advances.

In general, permissible use determinations are derived from the results of previous coastal resource capability and suitability analyses. These determinations are well founded and can be easily justified using the available resource and resource use information. It is hoped that these permissibility findings will simply serve to reinforce a common sense approach to local resource planning within the Lake Erie Coastal Zone.

> "Permissible uses are those land and water uses which can be reasonably and safely supported by the resource, which are compatible with surrounding resource utilization and which will have a tolerable impact on the coastal environment."

This definition adopted from CFR 920.12 of the Federal Rules and Regulations for this Program is the baseline from which permissible uses are determined. It must be noted, however, that only uses exerting or with the potential to exert both direct and significant impacts on the coastal waters are subject to the management program and only they shall be deemed as permissible or non-permissible uses. Thus, any use not meeting these criteria will be excluded from the Coastal Zone Management framework until such time as the use impact becomes direct and significant. The direct and significant impact exerted by a use depends not only on the type of use, but also on its relative location to the coast, its frequency of occurrence and duration, as well as any cumulative effect that may result from a combination of use impacts.

In considering use acceptability for the Lake Erie Coastal Zone it was felt that a combination of approaches would be best. In cases where laws or regulations, such as air and water quality standards exist, only actions or uses which comply with these regulations are considered permissible. In combination with such specific standards and in order to give flexibility of use within the Coastal Zone it was felt that use priorities should be assigned at least to coastal areas of particular concern. In theory then all uses subject to management under the CZM Program would be permissible in any area as long as they met specific standards covered by appropriate air and water quality regulations or they occurred in areas capable of absorbing significant negative impacts.

Except for those uses covered directly by existing regulations, the determination of acceptability will be subjectively based on existing information and methodologies. Some of this information includes: an inventory of significant natural and man-made coastal resources; a comprehensive "impact assessment network"; a capability-suitability

and compatibility analysis; and an assessment of present and anticipated use conflicts.

LOCAL IMPLEMENTATION

The permissibility determinations presented in this chapter are designed as guidelines for local planners and officials implementing the Coastal Zone Management Program. The methods for determining use permissibility were developed specifically for utilization by local resource planners. All information used in completing this exercise, can be easily obtained and accurately applied to site-specific planning requirements. The adoption of permissible use determinations will represent a first step toward uniform comprehensive planning on a coastwide basis.

To effectively implement the permissible use determinations, local governments must develop, review or update their comprehensive plans and zoning ordinances where in conflict with these determinations. Federal funds to support these activities will be provided to local governments as part of the Coastal Zone Management Program.

In addition, goals and policies for wise coastal management should be reflected in the "Statement of Community Development Objectives" contained in most zoning ordinances. Since local resources will be able to absorb the "encouraged uses," the municipality should allow these uses "by right" in the appropriate zoning districts. On the other hand, uses to be "discouraged" should NOT be permitted "by right" in the zoning ordinance. "Conditional" uses may be selectively accomodated through devices such as "Special Exceptions" or "Conditional Use" provisions, where specific standards and criteria have been established by the governing body. In order to be permitted, "conditional" uses would have to demonstrate that adverse impacts (constraints) were modified by technology, site design considerations, or a combination of efforts.

FOOTNOTES

1. Act 93 of 1972 amended the Pennsylvania Municipalities Planning Code to require a "Statement of Community Development Objectives" as part of every zoning ordinance. (Article VI, Zoning, section 606) the Planning Code applies to all Coastal municipalities except Philadelphia.

GEOGRAPHIC AREAS OF PARTICULAR CONCERN

8

8 GEOGRAPHIC AREAS OF PARTICULAR CONCERN

INTRODUCTION TO CONCEPT

Geographic areas of particular concern (GAPC's) have been identified in both the Lake Erie and Delaware Estuary coastal zones. These are critical areas where the need for special management procedures is indicated in order to deal with land use issues which are of "regional benefit" or greater than local concern.

There are four types of GAPC's identified for the Lake Erie and Delaware Estuary Coastal Zones: "areas of significant natural value", "development opportunity areas", "areas of significant recreational, historic, or cultural value", and "overlap areas". Although they are considered under the same general heading (GAPC), these areas exhibit different characteristics, represent different concerns, and will be subject to different kinds of land use conflicts. Development opportunity areas predominate the listing of GAPC's within the Delaware Estuary Coastal Zone. In comparison, seventeen of the twenty Lake Erie Coastal GAPC's are classified as either areas of natural or recreational significance. Most of the Lake Erie natural/recreational areas do overlap to some extent or have the potential for dual utility in the future.

CRITERIA FOR DESIGNATION OF GAPC's

Areas of significant natural value were determined according to the concentration of natural characteristics that were either valuable as amenities, unique as related to the coastal environment or vulnerable to developed uses. These land-based characteristics included woodlands, wetlands, wildlife, habitats, prime agricultural and erodible soils, and flood plains. Each characteristic was mapped, for the entire Coastal Zone. Transparent sheets were then registered on one another to reveal "overlaps" of characteristics. Locations with heavy concentrations or combinations of these natural characteristics were designated as areas of particular concern. Once designated these areas were discussed and modified by the Coastal Zone Steering Committees and interested citizens in both coastal areas. The cumulative value of the natural amenities and complexities of management in these areas suggest the need for a stronger State role in the preservation, protection, or enhancement of these GAPC's.

Development opportunity areas are those especially suited to more intensive use through development or redevelopment. The purpose for designating these areas is to stimulate the economic use of the river or lake and related waterfront properties. In particular, some of these opportunity areas could be considered

as potential locations for riverfront or lakefront facilities serving the regional, State or national economic interests. These uses may include port facilities, energy generating plants, or other commercial and industrial activities. Currently vacant or underutilized sites have been identified through the investigation of site characteristics and the proximity of infrastructure and compatible land uses. These areas have been discussed with local and county planners and industrial representatives familiar with their development suitability and economic potential. Policies for these areas will seek to encourage the location of significant economic developments consistent with the overall objectives of the program.

Areas of significant recreational, historic or cultural value are areas where reclamation, restoration, public access and other remedial actions may be needed. Because of the wide range of activities and uses included in this group, criteria establishing them was flexible and responsive to individual conditions. They include the following types of areas:

Areas of reclamation or restoration include those which have experienced serious detrimental modification, but which possess potential for recovery or reuse.

Areas of existing open space have identified where recreational needs can be served, and public access to the water's edge exists. Other areas, that are not in their natural state, but which seem appropriate for future public access have also been identified.

Unique situations-Overlap Areas: In some cases the distinction between a natural area, a recreational area, and a development opportunity area is not as simply defined. For example, many undeveloped sites in the lower Bucks County portion of the Delaware Estuary Coastal Zone and in the Western Study Area of the Lake Erie Coastal Zone, are characterized by a significant combination of natural amenities and recreational potentials. Yet, given economic trends and the current ownership patterns, these same sites are subject to development pressures as well. These areas represent the most intensive conflict of use and have been termed "overlap areas." The Van Sciver Lake area, and Biles Island in Falls Township, Delaware Estuary, are prime examples of such areas. These areas have been the subject of more detailed study. A strategy for dealing with such areas is outlined in Chapter 9. The Penn's Landing area in Philadelphia and the Presque Isle Bay Area and waterfront district in Erie represent another kind of overlap area with potential for both recreational and economic development.

PURPOSE OF DESIGNATION

Priorities for future use will be recommended for each designated GAPC. Future use priorities will be presented as a range from the most desirable to least desirable from the perspective of the entire Coastal Zone. Future use priorities and the method for assessing them are described in Chapter 9.

Municipal officials having authority over local planning and development must consider these priorities in making decisions regarding the future uses for these areas. The State will review major development decisions which affect land use within GAPC's for consistency with the uses recommended and with overall program goals and objectives.

Special state interest and concern will be focused on GAPC's where more attention to State land use policies are necessary. Certain GAPC's have been identified as Areas for Preservation or Restoration (APR) when:

- they contain features, resources, or potentialities of extraordinary significance or uniqueness to the region or State and when
- those resources are especially vulnerable to irreversible detrimental change due to development pressures.

APR's have been identified and will be discussed in detail in Chapter 9.

DELAWARE ESTUARY COASTAL ZONE

DELAWARE COUNTY	GEOGRAPHIC AREAS OF PARTICULAR CONCERN	
Identification #	Natural Value Areas	Size (acres
NV-1	Little Tinicum Island	
NV-2	Tinicum Marsh (Delaware County)	
	Development Opportunity Areas	
DO-1	Chester Terminal Area	
DO-2	Chester Waterfront	
DO-3	Baldwin Industrial Park	
DO-4	Eddystone Waterfront	
DO-5	Airport Area	
	Recreational, Cultural, Historic Value Areas	
R-1	McClure Park	
R-2	Commodore Barry Bridge Area	
R-3	Chester Creek Mouth	
R-4	Essington Waterfront	
R-5	Folcroft Landfill	

DELAWARE COUNTY
AREAS OF SIGNIFICANT NATURAL VALUE

NV-1 Little Tinicum Island
Tinicum Township

Little Tinicum Island is located in the Delaware River across from Tinicum Township (Essington) in Delaware County. The 11,400 foot island lies southwest of the Philadelphia International Airport and is in a line with existing landing patterns. The history of the island dates back to the Swedish settlement of 1640 led by Johan Printz when it was used for agricultural purposes.

Current investigations of the island indicate a wide variety of vegetation which supports a large population of waterfowl and land birds, with small populations of mammals.

Proposals for filling sections of Little Tinicum Island and using selected sites for spoils deposition have been made. This has the potential for seriously increasing the existing sedimentation in the back channel, an important fish habitat.

In addition to Little Tinicum Island's significance environmentally, the island acts as a visual barrier to the intensive industrial development along the New Jersey Coastline. The island was the focus of a special ecological study, published separately[1] and summarized in Appendix C.

NV-2 Tinicum Marsh
Tinicum, Ridley, Darby Townships, Prospect Park, Norwood, Folcroft Boroughs

Tinicum Marsh occupies the lowlands along the channel of Darby Creek in Delaware and Philadelphia counties. The modern Marsh extends from a point above the junction of Darby Creek with the Delaware River, upstream approximately 5 channel miles almost to the northern boundary Tinicum National Environmental Center in the City of Philadelphia. The Marsh is bounded on the north and west by natural high ground and artificially filled areas. On the south and east the boundaries are natural high ground, filled areas and dikes formed by the Industrial Highway and Interstate Route 95. The total area of the region is 1,400 acres, most of which is filled and presently undeveloped, only a small portion remains subject to tidal influence.

The marsh itself is located on the primary Atlantic flyway. As such, it is heavily used as a resting place by migratory birds of

many species. The marsh contains a wide variety of vegetative species including wild rice, spatterdock and cattails. In addition, it plays a significant role in improving the water quality of Darby Creek. Studies of the marsh show that wildlife in the marsh has been "severely injured" by organic pollution, and that the size of the marsh has been significantly reduced by dredging, fill and development. Nevertheless, the remaining marsh represents a unique natural resource of the Commonwealth of Pennsylvania.

Most of the Delaware County portion of the marsh remains in private ownership. However, recognizing its potential as an outdoor environmental laboratory within close proximity to a major urban center on the East coast, the Department of Interior (Fish and Wildlife Service) has proposed expanding the existing Tinicum National Environmental Center (TNEC). According to the CZM Act Amendment of 1976 recently passed by the Congress and signed by the President which authorizes federal acquisition and restoration in order to protect the unique habitat areas while providing recreational opportunities for the region's residents.

Local governments adjacent to the marsh have not yet enacted sufficient planning and zoning controls to protect the wetlands and buffer areas. A special study [2] has been completed which examines the ecology of Tinicum Marsh and the impacts of development upon wetlands. This report is summarized in Appendix C.

DELAWARE COUNTY

DEVELOPMENT OPPORTUNITY AREAS

DO-1 Chester Terminal Area
Chester City

The Chester Tidewater Terminal is an independent cargo terminal in Chester City. At one time the site was proposed for the location of a containerized marine terminal in Delaware County. Currently the terminal is marginally utilized for bulk cargo storage. The property, consisting of 50 acres, is adequately served by rail, highways, and utilities. A 25 acre parcel of vacant land owned by the Philadelphia Electric Company, which is now used as a solid waste disposal site, lies to the east of the terminal. The new Western Regional DELCORA Water Pollution Control Plant now under construction is located west of the site.

A proposal has recently been received for reuse of a portion of the Chester Terminal. This area and the vacant land next to it is important to the economic health of the Delaware County region because of its potential for significant water-related use.

DO-2 Chester Waterfront
Chester City

The City of Chester has proposed a major restructuring and redevelopment of the downtown waterfront area to provide for the expansion of industrial uses in concert with the development of an improved Rte. 291 (Industrial Highway). The redevelopment area encompasses a broad area from Ridley Creek to Flower Street and from the Delaware River to the Conrail right-of-way. Due to its regional location, availability of utilities, and large labor force, this area represents the primary waterfront location for new industrial activity in Delaware County.

The proposed redevelopment plan recommends that the entire area between the river and the proposed alignment of new Route 291 be industrially developed. The resulting industrial park will occupy approximately 55 acres, which presently includes major utilities and industrial firms in Delaware County along the waterfront, and inland commercial activities, many of which are in disrepair.

The realization of the proposed waterfront industrial park for expanded industrial use requires a coordinated public as well as private effort. The potential of this area for expanded employment opportunity is of critical importance to the entire region.

DO-3 Baldwin Industrial Park
Eddystone Borough

Marginally used buildings occupy a large inland industrial park in Eddystone with direct highway and railroad access. This area formerly housed the Baldwin-Lime-Hamilton Corporation. Only one building is presently used while a number of the warehouse buildings are unoccupied. The area consists of 60 acres and adjoins Crum Creek. The area directly to the east of the Conrail Tracks is owned by the Industrial Park Development Company. Approximately one-third of this area is currently available for use.

Because of the area's strategic location with respect to existing infrastructure, on a major rail route, it represents a unique industrial park opportunity in close proximity to the riverfront.

DO-4 Eddystone Waterfront
Eddystone Borough

Approximately one mile of Eddystone waterfront is presently underutilized or available for development. Owned by two large Delaware County firms, including a major shipyard along the Delaware River, the vacant portion of the area is apparently being held for planned future expansion. This is particularly true of the Sun Shipbuilding and Dry Docks property, which, on its active site in Chester City, contains floating dry docks, derricks, wet docks and pier side facilities.

Additional parcels, including 1000 feet of river frontage south of Crum Creek with industrial buildings, are available. Recent proposals have been made for use of a portion of the area.

The Eddystone Waterfront adjoins the proposed Chester City Waterfront Industrial Park. It is well-served by rail and highway facilities. Future use of this area is dependent on the

economic health of existing business as well as improvements on Rte. 291 (Industrial Highway) and the implementation of redevelopment plans in nearby Chester City.

DO-5 Airport Area
Tinicum Township

Two large parcels adjacent to Philadelphia International Airport in Tinicum Township provide significant opportunity for industrial or airport-oriented development. At one time this area was part of the tidal marshes of Tinicum, however the land is presently available for development as a result of filling activities. Some additional improvements and site preparation may be required before development can proceed.

The parcel located opposite Little Tinicum Island and owned by the Westinghouse Corporation has development restrictions due to noise impacts from planes arriving and departing the airport. This area is well served by rail and highway (Tinicum Island Road); however water access is limited by the shallow depth of the back channel of the Delaware River. The back channel is used by private marine and pleasure craft harbored at nearby marinas and is a valuable fish habitat. The Westinghouse parcel is used for minor cargo purposes.

The other parcel is located between Cargo City (Airport) and industrial plants in Tinicum. Although the parcel is well suited for industrial or commercial uses related to the airport some land may have to be held in reserve for the planned extension of a runway.

DELAWARE COUNTY
AREAS OF RECREATIONAL, CULTURAL AND HISTORIC VALUE

R-1 McClure Park
Marcus Hook Borough

McClure Park, located at the foot of Market Street in Marcus Hook Borough, is so small that it might not appear to be of greater than local concern. It occupies approximately 1.2 acres and is municipally maintained. The outstanding feature of this park is its vantage point for viewing river activity. From here one can see many international vessels sailing to upstream points as well as observe the vessel loading and unloading operations occurring adjacent to the park. The area has been landscaped and benches and swings have been provided.

Marcus Hook is the only municipality in the study area that lacks both a zoning ordinance and comprehensive plan. Existing land uses in the vicinity of the park include residential use surrounded by heavy industrial use.

Although residential uses are decreasing in the immediate area, the park does provide one of the very few public access points to the River in Delaware County.

R-2 Commodore Barry Bridge Area
Chester City

Immediately adjacent to the Pennsylvania side of the Commodore Barry Bridge lies four acres of undeveloped waterfront property. It is well maintained, partially paved with concrete and otherwise grass-covered. The area is owned by the Delaware River Port Authority.

The view of the river from this location is striking. It provides for the viewer the dramatic contrast of urban and natural environmental features. The bridge itself, an imposing structure, is of central interest in the vista.

The area is planned and zoned for industrial development, but has been suggested for consideration as a future recreational site.

R-3 Chester Creek Mouth
Chester City

The mouth of the Chester Creek, because of its critical location with respect to the river and the proposed Chester City Waterfront Industrial Park, possesses unique recreational potential.

The existing use of this parcel is an auto salvage yard. The site is partially isolated from the Chester City central business district by a railroad tressel spanning the Creek and by a sewage treatment facility. This site exhibits potential for commercially provided access to the river within easy walking distance of the Chester business district.

R-4 Essington Waterfront
Tinicum Township

The Delaware River waterfront in the town of Essington (Tinicum Township) is an area with great potential for water-related recreation. Governor Printz Park, located at the foot of Wanamaker Avenue, is a 5-acre public park operated by the Pennsylvania Historic and Museum Commission. The park is landscaped for passive recreation. Its significance can be

attributed to its unique historic and archaeological interest and opportunity it affords for public access to the river. Located at a bend of the river, the park provides a rare scenic vista in both directions, which is enhanced by the presence of Little Tinicum Island. The island serves as a visual buffer of the industries on the opposite shore. Although the site is planned for open space, it is currently zoned for heavy industrial use.

In addition to the park, there are eleven private marinas, and a seaplane base located along the Essington waterfront. The dock facilities presently operate at partial capacity due to reduced interest in recreational boating on the Delaware. Accumulation of silt in the back channel has impaired navigation by pleasure boats and consequently usage to boats having a draft of four feet or less.

The back channel and Essington waterfront might again be an important recreation resource within the Coastal Zone if the depth of the channel were artificially maintained.

R-5 Folcroft Landfill
Folcroft Township

This area once used for the deposit of municipal trash now represents a unique recreation opportunity. The mound of high ground resulting from years of disposal activity now provides an excellent view across the Tinicum Marsh and is easily accessible by car or by foot. Access is also possible by boat or canoe from the marsh. Obviously the recreational significance of the former landfill depends on the preservation of the marsh itself and public site improvements. The landfill has recently been included in Federal plans for the expansion of the Tinicum National Environmental Center. Federal proposals suggest the complete restoration of the marsh and landfill area as a habitat reserve and recreation educational center for residents of the Philadelphia area.

PHILADELPHIA COUNTY GEOGRAPHIC AREAS OF PARTICULAR CONCERN

Identification #		Size (acres)
	Natural Value Areas	
NV-3	Tinicum Marsh (Philadelphia)	
NV-4	Pennypack Creek	
NV-5	Poquessing Creek	
	Development Opportunity Areas	
DO-6	Fort Mifflin Res./Penrose Avenue Area	
DO-7	Mustin Field	
DO-8	Walt Whitman Bridge Area	
DO-9	Washington Avenue Area	
DO-10	North Center City Area	
DO-11	Port Richmond	
DO-12	Frankford Arsenal	
DO-13	Cottman Avenue Area	
	Recreational, Cultural, Historic Value Areas	
R-6	Fort Mifflin	
R-7	Schuylkill River Park	
R-8	Penn Treaty Park	
	Overlap Areas	
OV-1	Penn's Landing	

NV-3 Tinicum Marsh
Philadelphia County

The Tinicum National Environmental Center (TNEC) is located on the borderline of Philadelphia and Delaware County, north of the Philadelphia International Airport. A parcel of 183 acres is diked and not subject to the tidal fluctuations which affect other areas of the Marsh in Delaware County. In 1974, the City of Philadelphia turned this land over to the United States Department of the Interior, Bureau of Sport Fisheries and Wildlife to found the TNEC. The area is environmentally significant because it is a habitat area with known concentrations of wildlife, especially birds. Tinicum is considered to be of "greater than local concern" because it is a federally administered wildlife sanctuary with benefits extending far beyond the Delaware Estuary boundary.

Tinicum is planned as an open space, although there are areas adjacent to the marsh which are currently used for industrial purposes. The zoning is consistent with both the open space and industrial uses. However, should the federal government acquire the balance of the marsh it is possible that development pressure would increase on lands adjacent to the marsh. The value of this area, as well as its history are discussed in detail in a miscellaneous technical report entitled "Four Environmentally Significant Areas", as noted in appendix C.

NV-4 Pennypack Creek
Philadelphia County

The mouth of the Pennypack Creek is located along the northern stretch of Philadelphia's Delaware River shore. Most of the lands along the creek are characterized by a variety of natural resources. Wooded areas, wetlands, and wildlife habitats are located in close proximity. Much of the creek corridor is permanently protected by Pennypack Park, under the Fairmount Park Commission. The city's natural resources are greatly enhanced by preserving the creek's banks from disruptive development. The mouth of the Pennypack from the Delaware to the west side of State Road is not currently protected although the area is characterized by significant wetlands vegetation. This is one of the most valuable natural resources found in the entire study area.

Open space, high density residential, industrial and institutional use are all proposed for this area by the City of Philadelphia's Comprehensive Plan. Zoning is consistent with portions of the plan but heavy industrial categories are also indicated for a large area. Recent proposals specific to the

mouth of the Pennypack included a marine terminal for the loading and unloading of foreign cars, and a Bicentennial exhibition grounds. The area is presently being used to dispose of incinerator residue. The future of this prime site requires additional consideration.

NV-5 Poquessing Creek
Philadelphia County

The Poquessing Creek forms the border between Philadelphia and Bucks County, and is a tributary to the Delaware River. The natural characteristics of the mouth include areas of scenic potential. The presence of water and mature vegetation provide an amenity unique to this stretch of the River and serve to qualify it as an area of significant natural value.

The area is presently zoned (R5) for residential use. The planned use by the Philadelphia City Planning Commission includes an open space corridor lining the creek, approximately one-quarter mile wide. Behind this corridor a high density housing development is proposed. Across the bank in Bensalem, Bucks County, there currently exists a high density "low rise" housing development which adds significantly to the development pressure on the Philadelphia area. The market to be served by this housing type would appear an attractive target for future development although considerations of the natural features must receive priority attention.

PHILADELPHIA COUNTY
DEVELOPMENT OPPORTUNITY AREAS

DO-6 Fort Mifflin Reservation - Penrose Avenue Area
Philadelphia County

A prime development opportunity area lies at the confluence of the Schuylkill and Delaware Rivers. Consisting of a number of large parcels in separate public ownership, the area is utilized for a variety of marginal and unrelated functions. The Corps of Engineers currently uses the most economically valuable portion (420 acres) for the disposal of dredge spoil. Alternative sites or methods for disposal must be developed before this area can be reclaimed for industrial or commercial use. Recent agreements between the City of Philadelphia and the Corps have restricted the height and suspended disposal activity in the northwestern sector. This was done to expedite the ultimate reclamation process.

A second parcel of the area (100 acres) is used for storage of sludge from the Philadelphia Water Department's Southwest Sewage Treatment Plant. If alternative methods of sludge disposal could be found, more productive use of this land can be realized.

The Philadelphia Police Department currently owns an abandoned auto facility adjacent to the Penrose Avenue Bridge. Again, an alternative site for this operation needs to be found if this valuable land is to be used more intensively.

The area also contains land owned by the Philadelphia Industrial Development Commission that is planned for industrial park development. Together these parcels form a unique opportunity for attracting water and non-water related uses. Because of its proximity to downtown Philadelphia, the potential for future connections with interstate (I-95) and interstate freight railroads, and its location at the mouth of the Schuylkill River, the Ft. Mifflin/Penrose Avenue area is commonly agreed to be a prime development opportunity area within Philadelphia County.

DO-7 Mustin Field - Naval Base
Philadelphia County

Although Federally owned and therefore not subject to the Commonwealth's Management Program, a portion of Philadelphia's Naval Base, Mustin Field, has been identified as a development opportunity area due to its economically strategic location on the Delaware River and its proximity to the Greenwich Rail Yard. A portion of the 175 acre air field is presently being developed for housing for Naval personnel. Approximately 350 dwelling units are being constructed at the southern extremity of the field. Another 350-400 units have been proposed for a large portion of the interior of the air field adjacent to the rail yard. Ball fields and related facilities have recently been located nearby.

A smaller portion of the field, yet to be determined, may eventually become available for public use. In the future, maximum effort should be devoted to ensuring that this valuable area is used to its fullest potential. The Navy should carefully consider the priorities of use identified in Chapter 9, and attempt to implement them whenever possible.

DO-8 Walt Whitman Bridge Area
Philadelphia County

A large area (approximately 350 acre) including water related port facilities and inland industrial property is immediately available for reuse. This area, located south and west of the Packer Avenue Marine Terminal, is prime for development for the

- Major portions of the ConRail owned rail yards which are now vacant may be abandoned. Nearby industries have indicated a willingness to buy the rail yards for expansion purposes.

- Improvements to Delaware Avenue in this area (Catherine Street to Oregon Avenue) have been programmed by PennDOT and the City of Philadelphia.
- Philadelphia Port Corporation land (Pier 98 Annex) is now vacant and available for reuse.

This area is well served by existing rail facilities. Moreover truck access would be improved from the south by the contemplated connection of Delaware Avenue with Pattison Avenue.

Currently active, public owned, finger piers are located adjacent to this area. Experts consider this type of facility to have a limited life span for general cargo handling purposes.[3] Study should be directed to determine the most appropriate long-term, economic uses of these finger piers.

Because of the significant changes that are likely to occur in this area in the future and its location on the Philadelphia waterfront this area is considered to be a development opportunity area.

DO-9 Washington Avenue Area
Philadelphia County

Located north and south of Washington Avenue are various parcels in marginal use and piers which are either vacant or have limited active life. In addition Conrail owned rail yards which may be abandoned are located at the terminus of Washington Avenue at Delaware Avenue. This area at one time formed the heart of the South Philadelphia waterfront; however the area in recent years has become inactive.

Principal exceptions to this condition are two major industries, one with active pier utilization, and two public piers which have been joined with full providing additional storage space.

Philadelphia City Planning Commission studies indicate the immediate availability of these parcels for sale and reuse. A recent reuse of one finger pier for an indoor tennis facility is of particular interest.

The northern portion (north of Washington St.) of this area adjoins the Queens Village residential area undergoing private rehabilitation. Penns Landing, a City-sponsored waterfront redevelopment project immediately north, is now being developed. Furthermore, Delaware Avenue improvements will provide added stimulus to redevelopment of this area. Together these factors suggest a reconsideration of the future use of this portion of Philadelphia's waterfront.

DO-10 North Center City Area
Philadelphia County

Vacant, marginal, and active piers line the waterfront from Penns Landing in Center City to Shackamaxon St. In addition, several inland lots and one pier adjacent to land cleared for I-95 serve as parking lots. Active uses include the city incinerator at the base of Spring Garden St. on Delaware Avenue. A riverfront dinner theatre occupies an old finger-pier.

This area adjoins the Callowhill Urban Renewal Area. The project, planned for industrial reuse, is the largest of its kind in the Philadelphia area.

The overall marginal use of facilities and land in this area and its relationship to the Callowhill Urban Renewal area and private rehabilitation efforts in Old City suggest significant reuse potential for this area. Proposals have been made for reuse of isolated parcels, but no overall plan has been devised for the reuse of this area which relates it to adjoining interior land areas.

DO-11 Port Richmond
Philadelphia County

The Port Richmond area contains a major rail yard presently used for shipping grain and general cargo and a large site held by the Philadelphia Industrial Development Commission. This site, created by filling, is vacant and immediately available for industrial development. The future of the rail yard and its related port facilities is dependent on decisions by Conrail. If it is determined that this yard is no longer required and no competing use (Chessie System) acquires it, Port Richmond would be available for redevelopment. (One of the largest development opportunities in the Philadelphia Study Area.)

Pier facilities on the northern portion of the Port are obsolete. This site has been suggested as a possible location for a third containerized cargo terminal in Philadelphia. Coal piers to the south are presently active, although their future use is in doubt.

In summary, the future reuse of this area is dependent on major decisions by Conrail which would have far-reaching implications for the surrounding area.

DO-12 Frankford Arsenal
Philadelphia County

Military use of the Frankford Arsenal will be phased out in the near future. The arsenal is located on 110 acres and contains a dense development of 209 buildings, a majority of which are in

good repair. At one time the Frankford Arsenal employed as many as 22,000 people. The arsenal adjoins a strong residential community, a number of major industries and a dredged channel leading to the Delaware River. It is served by an extensive utility system. A special study should be undertaken to determine the most appropriate public or private reuse of the facility which takes maximum advantage of existing structurally sound buildings and provides continuing employment to residents of the area.

Since this area is Federally owned it is not subject to the priorities outlined in Chapter 9. However, it would be very desirable if the Federal government considered these priorities carefully when contemplating future uses.

DO-13 Cottman Avenue Area
Philadelphia County

Several major industrial waterfront parcels north of Cottman Avenue are either vacant, marginally used, or soon to become available for reuse. These areas form the northmost point of intensive commercial port and shipping related activity in Philadelphia. The area is well served by rail and highway access from I-95.

Immediately north of the area are large institutional uses and the major city water intake at Torresdale, as well as the mouth of the Pennypack Creek.

The Philadelphia Industrial Development Corporation has considered buying the least developed of these parcels.

PHILADELPHIA COUNTY
AREAS OF RECREATIONAL, CULTURAL, & HISTORIC VALUE

R-6 Ft. Mifflin
Philadelphia County

Fort Mifflin, located on the riverfront at the edge of Philadelphia's International Airport, is an historic site of regional significance. Designated a National Historic Site in 1970, Fort Mifflin has architectural as well as historic interest. Potential exists for its expansion and improvement. It is owned by the City of Philadelphia and is being restored by the Shackamaxon Society, a non-profit organization.

R-7 Schuylkill River Park
Philadelphia County

A 42-acre strip of Center City land presently occupied by marginal uses and an active rail line exists along the Schuylkill River. This strip, extending from South St., to the Art Museum, is of principle interest as a recreational resource in an area which lacks open space and areas for public access to the riverfront. Currently the University of Pennsylvania utilizes land across the Schuylkill River for active recreation. The Schuylkill Expressway also is located on the opposite bank. Since there is no public access to the Schuylkill on the Center City side below Fairmont Park, this area represents a scarce resource. The City has programmed $8.9 million for acquisition of the land, bulkheading of the entire length, filling and development.

At Taney and Spruce Streets, the south end of the future park, an area which presently has tennis courts will be expanded to include baseball, basketball and street hockey facilities. A playground near the Benjamin Franklin Parkway will provide active recreation as well. The rest of the park will be landscaped, with bicycle paths, promenades and benches for passive recreation. The project will proceed in four stages, and is expected to be completed in 1980.

R-8 Penn Treaty Park
Philadelphia County

This 1.8 acre park, operated by the Fairmount Park Commission commemorates William Penn's signing of a treaty with Indians. Largely developed for passive recreation, it is the only public access point between Penn's Landing and Pleasant Hill Park at Linder Street in northeast Philadelphia. It is an isolated parcel surrounded by intensely developed industrial uses. Improvements to the park itself (including fencing, parking and other security facilities) have been programmed by the City of Philadelphia and access will be improved by a traffic light at Delaware Avenue.

PHILADELPHIA COUNTY
OVERLAP AREAS

OV-1 Penn's Landing
Philadelphia County

The Penn's Landing project on the Philadelphia riverfront represents a unique type of overlap area. The plans for the site include opportunities for both commercial development and recreation. Penn's Landing is a joint project of the Commonwealth of Pennsylvania and the City of Philadelphia. It will be a commercial and cultural center including a mixture of apartments, restaurants, offices, shops, a hotel, museum, public open space and a boat basin. The basin will host riverfront

attractions such as old ships, a seaplane service, river tours, and an annual boat show. It is not intended to be a marina facility for private vessels.

Following completion of the landscaped cover over the Delaware Expressway, there will be a direct connection between Penn's Landing, the Society Hill renaissance area and the historical Independence Hall area. Stage I of the project is presently being developed. It extends from Lombard to Market Street, and covers 37.7 acres, 22.5 of which are new landfill. Plans for Stages II and III have not been finalized, but would extend Stage I to the north and south.

BUCKS COUNTY GEOGRAPHIC AREAS OF PARTICULAR CONCERN

Identification #		Size (Acres)
	Natural Value Areas	
	Development Opportunity Areas	
DO-14	Neshaminy Industrial Park	110
DO-15	Burlington-Bristol Bridge Area	320
DO-16	Turkey Hill-Van Sciver Area	2,098
DO-17	Fairless Works Area	498
	Recreation, Historic, Cultural Value Areas	
R-9	Biddle Andalusia	70
R-10	Bucks County Delaware River Access Area	8
R-11	Neshaminy State Park	220
R-12	Creek Road-South	31
R-13	Radcliffe Street	-
R-14	Pennsylvania Canal	
R-15	Bordentown Road Causeway	
R-16	Pennsbury Manor State Park	40
R-17	Falls Township Delaware River Access Area	14
	Overlap Areas	
OV-2	Linton Avenue - River Road	108
OV-3	Martins Creek - Van Sciver	117
OV-4	Money Island	600
OV-5	Fordmill Road	74
OV-6	Biles Island	529

DO-14 Neshaminy Industrial Park
Bensalem Township

The principal development opportunity area on Bensalem's waterfront is the Neshaminy Industrial Park. It is located at Street Road and State Road. Approximately 75 acres are available for use at this time. The park is well served by rail, highways and utilities. In addition, the potential exists for shipment of cargo by water.

The Industrial Park is adjacent to several large established industrial plants and warehousing activities and is an important potential tax ratable for the community. The area is presently planned and zoned for industrial use.

DO-15 Burlington - Bristol Bridge Area
Bristol Township

A portion of Bristol Township's waterfront is now vacant and may be available for industrial use. Extending approximately three quarters of a mile north and south of the Burlington-Bristol Bridge is an area owned by the chemical firm of Rohm and Haas. The site presently acts as a buffer and provides land for private recreational use. However, because of its strategic location on the river and its relationship to existing industrial activity, this area has been considered a development opportunity area. While the site is currently unavailable for development, it may at some future date become a prime location for productive multiple use. The area is well served by utilities and public services.

Proposals have been made for the development of oil storage facilities on the northern parcel at Otter Creek; however, because of potential environmental impacts on the water these have been withdrawn. The site is planned for open space along the riverfront and industrial use inland. Existing zoning permits industrial use throughout this area except for a small area, Maple Beach, which is zoned residential.

DO-16 Turkey Hill - Van Sciver Area

Falls Township

An area of approximately 2,000 acres between Van Sciver Lake and the Fairless Works of the U.S. Steel Corporation represents one of the largest and most significant development opportunity areas in Lower Bucks County. The area is subdivided into numerous parcels and is principally owned by the Warner Company, a cement and real estate firm. Falls Industrial Park, immediately west of the Fairless Works, has been developed by U.S. Steel. A small portion of that park is included in this development opportunity area. At present, extensive mining operations and farming activity occur on the site. Privately constructed rail spurs from the branch of the Conrail system linking the Fairless Plant with the northeast serve this area. A privately constructed road system (Old Tyburn Road, Bordentown Road, and Lower Morrisville Road) provides access to U.S. Route 1 and Route 13. Extractive materials (e.g., sand and gravel) are shipped on the Delaware River opposite Newbold Island.

The significance of this particular area lies in the long-term potential of the land for productive, multiple use rather than its extractive resource capabilities. This has been anticipated by the owner who has been developing plans for the future use of the area. These plans should be evaluated recognizing the significance of this area to the coastal region.

DO-17 Fairless Works Area

Falls Township

The land between Fairless Works and the Delaware River, owned by the U.S. Steel Corporation provides extensive opportunity for plant expansion or for other developments making use of the

river. Although partially covered with natural vegetation and harboring some wildlife, the area has lost some of its natural value due to man-made intrusions and the nearby activity of the steel plant.

The Falls Township plan proposes future industrial use for this area retaining an open space buffer along the riverfront. Existing zoning permits industrial use.

BUCKS COUNTY
AREAS OF RECREATIONAL, CULTURAL, HISTORIC VALUE

R-9 Biddle - Andalusia
Bensalem Township

The Biddle Estate at Andalusia is a privately owned estate of approximately 70 acres located on State Road, Bensalem Township. The property has been identified as one of the areas of significant natural value along the Delaware riverfront in Bucks County. It contains extensive stands of deciduous trees, and serves as a general wildlife habitat area. The property affords direct access to the waterfront, but has not undergone intensive pressure for development.

The principal structure on the estate is an historic house built in the late 18th century. In fact, the surrounding community of Andalusia derived its name from the house. The estate is continuous with a low density residential neighborhood, a school and undeveloped parcels. The proposed land use and zoning are for low density residential development.

R-10 Bucks County Delaware River Access Area
Bensalem Township

Bucks County has recently developed an eight acre multi-purpose park, with direct access to the Delaware River. It is located at the base of State Road and Station Road in Bensalem Township. This park contains attractive facilities for boat landing, picnicking and fishing. The facility is planned for multiple use and is unique within the Coastal Zone.

The park itself represents a scarce opportunity for public enjoyment of the river from the Lower Bucks County-Northeast Philadelphia area. The park is close to several arterial routes including Woodhaven Road, Bristol Pike (Route 13) and I-95.

R-11 Neshaminy State Park
Bensalem Township - Bristol Township

At the confluence of Neshaminy Creek and the Delaware River the Pennsylvania Department of Environmental Resources has recently developed a regional park. The State park, located on both banks of the Neshaminy Creek consists of 220 acres. The north bank provides marina and boat launching facilities. The south bank contains facilities for picnicking and two large swimming pools. The park provides a striking view downstream of the center city Philadelphia skyline. Extensive parking facilities have been developed to accomodate visitors.

R-12 Creek Road South
Bensalem Township

This area between Newportville Road and Creek Road in the vicinity of Flushing is the site of a small redevelopment project. The amount of land involved is approximately 30 acres situated in the floodplain of the Neshaminy Creek. The project entails the acquisition of homes which were flooded in June, 1972, and conversion of the land to public open space. The park will provide opportunities for passive recreation and hiking along the south bank of the creek.

R-13 Radcliffe Street
Bristol Borough

Bristol Borough was laid out as a river port about 1700. It is Pennsylvania's third oldest borough. Radcliffe Street, located on the Bristol waterfront, is bordered by a number of buildings and homes which date from the revolutionary and post-revolutionary era. They include the Runyan House, Delaware House, Gundy House, Farmers Bank and Keystone Hotel. Together they form a cluster of historic buildings in a scenic waterfront setting unique to the Delaware Estuary. The new Borough library has been designed to respect the scenic and historic qualities of the area, and to take maximum advantage of its riverfront location.

R-14 Pennsylvania Canal
Morrisville Borough to Bristol Borough

Stretching approximately ten miles from Morrisville to Bristol is a portion of the historic Pennsylvania Canal. The canal originally opened in 1830 and was operated from Bristol to Easton for coal transport. The route of the canal parallels present day major arterials including Route 13 and passes through dense urban development. The canal is not a dominant form on the urban landscape because in most places, it occurs behind private property. In some locations, the canal has been filled to accomodate new development. Yet, the canal provides the potential for an attractive linear pedestrian system of use to hikers, fishermen, and children in this portion of Lower Bucks County.

The Department of Environmental Resources maintains the canal. Maintenance has included recent dredging and improvements through dike construction. Possible improvements to the system would include provision for pedestrian access to portions of the canal which are covered and direct connection with Theodore Roosevelt State Park, the State managed canal which parallels the Delaware River north of Morrisville.

R-15 Bordentown Road Causeway
Falls Township

The principal access road across Van Sciver Lake in Falls Township is also a recreational and scenic resource. Located on land remaining from the excavation of Van Sciver Lake, Bordentown Road provides a connection between Route 13 in Tullytown, the Warner Company mining operations and the Fairless Works of U.S. Steel, in Falls Township. In addition, the construction of a new bridge over the Conrail tracks within Tullytown to improve traffic flow from Route 13 to Bordentown Road is now being considered by the Bucks County and Pennsylvania Department of Transportation. Along the roadway, grass areas have been preserved for picnicking and enjoyment of the scenic qualities of the man-made lake. The causeway provides a unique visual opportunity in the Coastal Zone.

R-16 Pennsbury Manor State Park
Bucks County

Located on the Delaware River at the foot of Pennsbury Road, Pennsbury Manor State Park provides the setting for an authentic reproduction of William Penn's 17th century home. The 40 acre estate contains woods and landscaped areas and offers a good vista of the river.
Picnic and parking facilities have been provided on site for visitors. The park is managed by the Historical and Museum Commission. This area is one of the most significant historic sites on the Delaware River.

R-17 Falls Township Delaware River Access Area
Falls Township

At the base of Lauderback Road, Falls Township has recently acquired a natural area with immediate access to the river. The area is adjacent to the Fairless Works and the barge loading operation of the Warner Company. The land donated by these two companies consists of approximately 30 acres and is heavily wooded.

The Township is considering the development of this site for recreation. The park has potential for picnicking, fishing and

boat access. Possible improvements to the area would include better access and signing to acquaint residents of Lower Bucks County with the park.

BUCKS COUNTY
OVERLAP AREAS

OV-2 Linton Avenue - River Road
Bristol Township

A 108 acre tract along River Road, Bristol Township has conflicting potentials. This area is large wooded and is a general wildlife habitat area. Moreover, it is located on a major urban arterial and is flat and has the potential for development compatible with surrounding residential, commercial and industrial uses.

Future development of this tract should respect the natural features of significance to the area. Possible multiple public and private use may be appropriate.

The area is presently planned for industrial use. It is zoned for industrial and residential use. It is presently owned privately by a chemical firm, Rohm and Haas, who consider the area as a buffer between the residential areas and intense industrial activity on the river.

OV-3 Martins Creek-Van Sciver
Falls Township

This area, adjoining Van Sciver Lake and the Pennsylvania Canal in Falls Township, has been identified as an overlap area. Martins Creek runs through this tract which consists of a number of parcels. The area is partially wooded, supports diverse wildlife and contains prime agricultural land. However, it has potentials for development due to its rail line location and the presence of Route 13. It is also adjacent to commercial and mining activities along this transportation corridor.

Proposed land-use for the interior of the tract is industrial; the area adjacent to the lake is planned for open space. Existing zoning permits industrial uses.

OV-4 Money Island
Tullytown Borough and Falls Township

Money Island is a large land mass of approximately 600 acres across the Delaware River from Florence, N.J. within Tullytown Borough and Falls Township. Various parts of Money Island are suitable for recreation or development and contain significant

natural amenities. The entire area (not a true island) is considered an overlap area.

The southern part of the island (about 200 acres), presently being used for deposition of dredged material and low-intensity agriculture, has potential for large-scale industrial development. The area could, with major costly improvements (sewer, utilities, road or rail access) serve a wide variety of productive uses.

The bulk of the area is planned and zoned for industrial use. In addition, present plans recommend a narrow, open space buffer for areas fronting the Delaware River. Local officials in Tullytown have recently considered a proposal for the development of a fifteen acre site for water-related industrial use.

Money Island has frontage on both the Delaware River and Manor Lake. Woodlands, aquatic vegetation, grasslands and wildlife habitat areas combine to constitute an area of natural value that is of exceptional value within the Coastal Zone. The outstanding forests grow predominantly on the northern half of the "island."

Due to its access to coastal waters and scenic qualities this area has significant recreation potential. The immediate lakeshore frontage on Manor Lake has been utilized by the privately operated Penn Warner Club for camping, boating fishing and picnicking. The lake itself, periodically recharged by pumping from the Delaware River, is stocked with game fish by the Penn Warner Club.

Because of the unique natural resources of the area, the potential for environmental degradation and the conflicting long-term potentials of this area, a special study was undertaken to examine the ecological system of the area and its relationship to the water. This study is summarized in Appendix C.

OV-5 Fordmill Road
Falls Township

A narrow strip of land located along Fordmill Road, Falls Township, has been identified as an overlap area. This area is wooded and contains erodible and agricultural soils. It is also naturally distinct from the surrounding area which has had vegetative cover removed. Because of its location on an existing rail spur, its direct link to Tyburn Road and the existing pattern of use, the area has potential for development as well as preservation. The area is planned and zoned for industrial use. It is owned by the Warner Company.

OV-6 Biles Island
Falls Township

Located above the Fairless Works on the Delaware River, Biles Island is a large undeveloped land mass of approximately 500 acres. The area is heavily wooded and contains a variety of wildlife cover. The island is almost completely separated from land by the narrow Biles Creek, which runs parallel to the river. Access to the island is difficult. Biles Island has natural value which is increased by its isolated condition.

However, the island has potential for development due to the presence of a branch of the ConRail system leading to the Fairless Works. Shipping potential exists along the Delaware River, which is dredged to 25 feet. The area is owned by U.S. Steel Corporation.

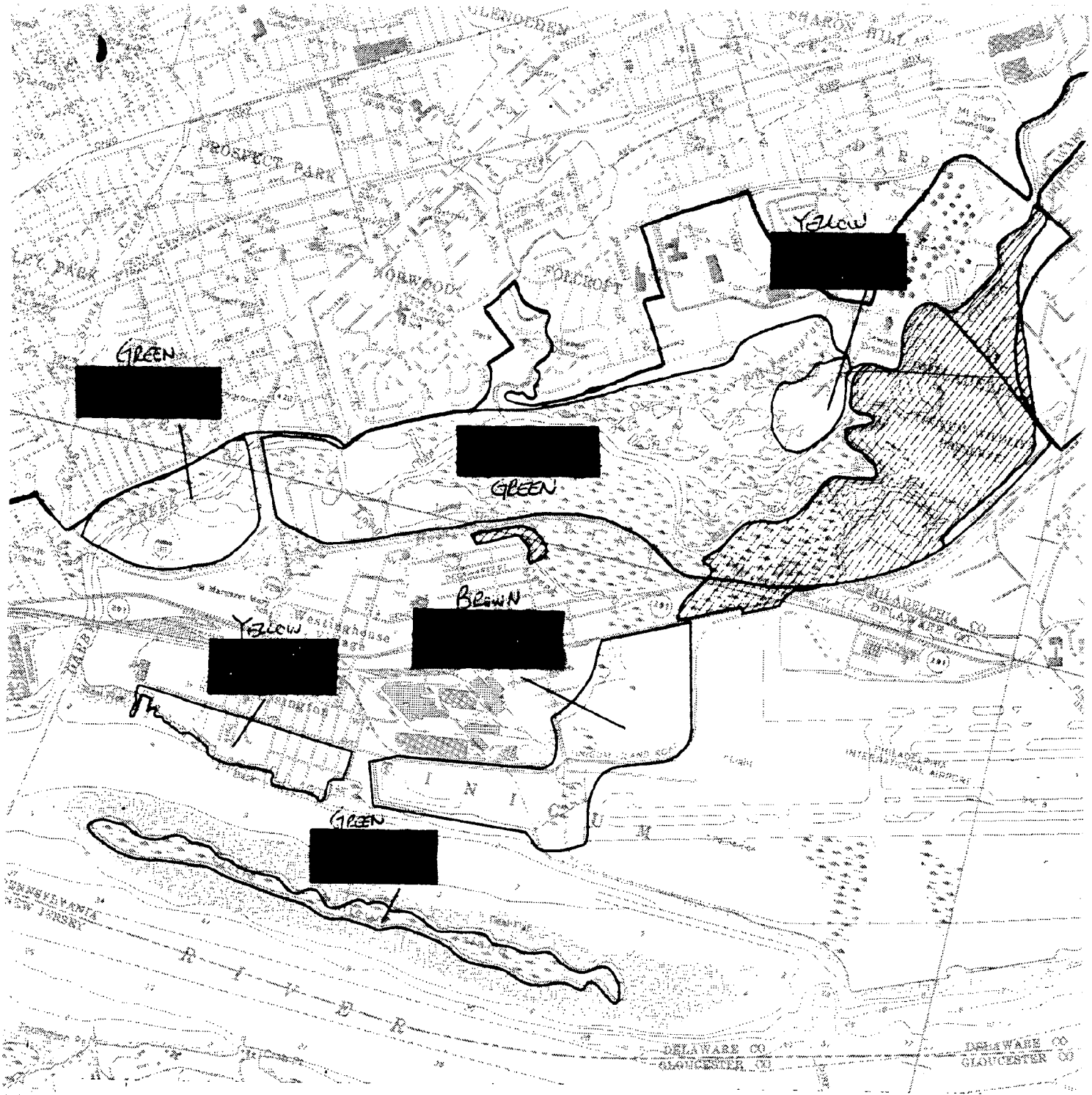
Township plans propose industrial use for this island with a narrow open space buffer. Existing zoning permits industrial use.

The ecology of Biles Island was the subject of a detailed study, summarized in Appendix C.

1. Four Environmentally Significant Areas, Working paper, Delaware Estuary Coastal Zone Management Program, November, 1976.

2. Four Environmentally Significant Areas

3. Finger piers, prevalent along the Philadelphia waterfront, are often thought to be obsolete for the following reasons: they are often too short for modern bulk carriers, contain insufficient space for temporary storage, lack apron space for loading and unloading and have limited direct truck access.



DETAILED SECTOR MAP

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1 INCH = 0.8 KILOMETERS

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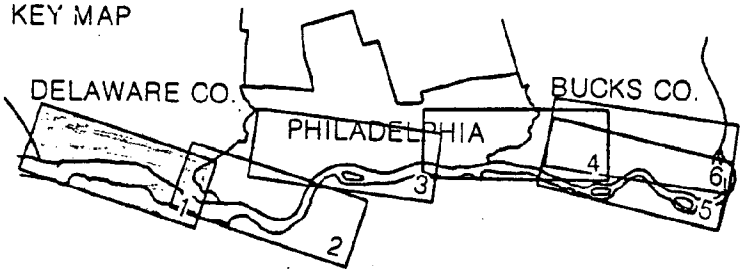
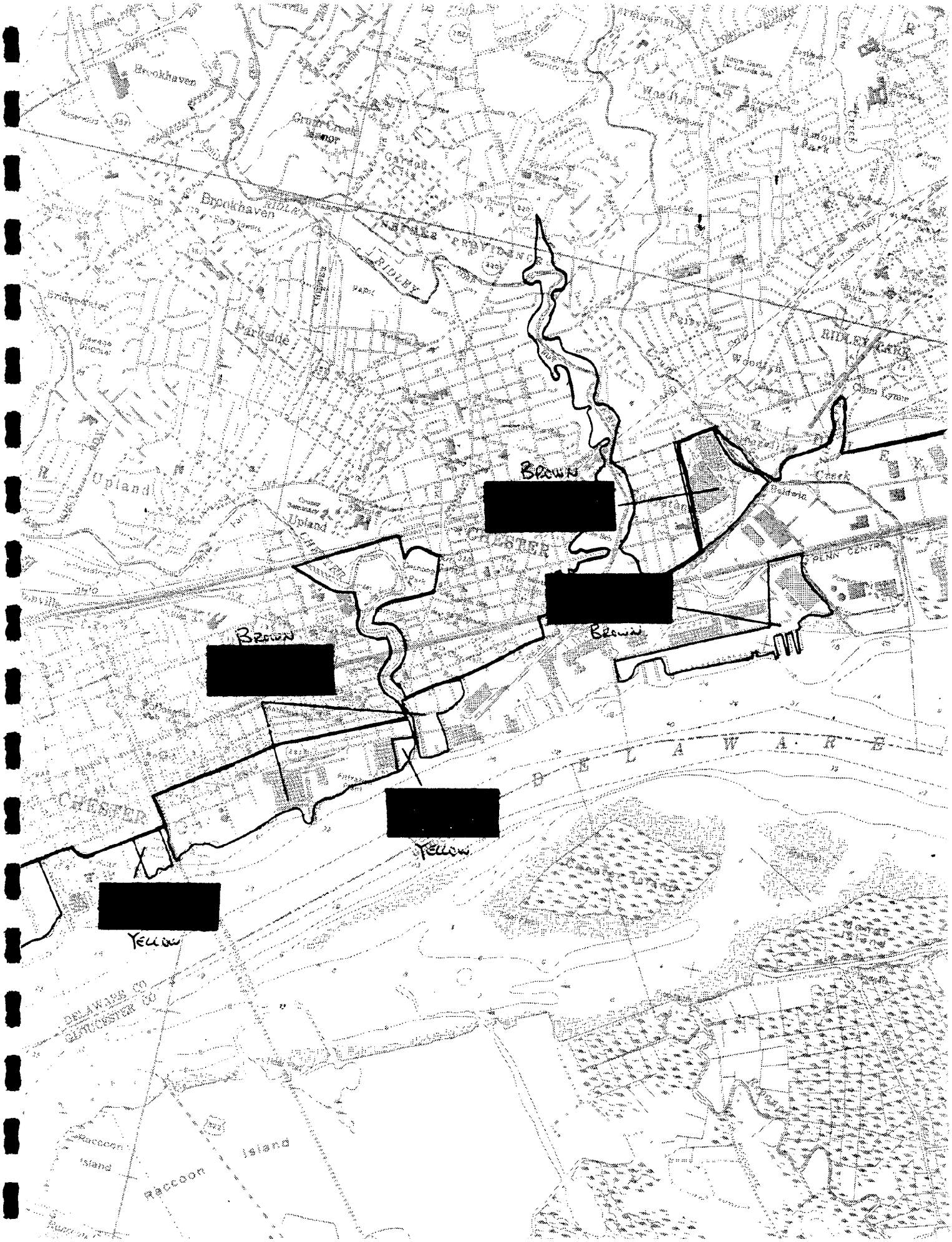


160 ACRES

25 HA.

DELAWARE ESTUARY COASTAL ZONE


Brookhaven
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PENN CENTRAL
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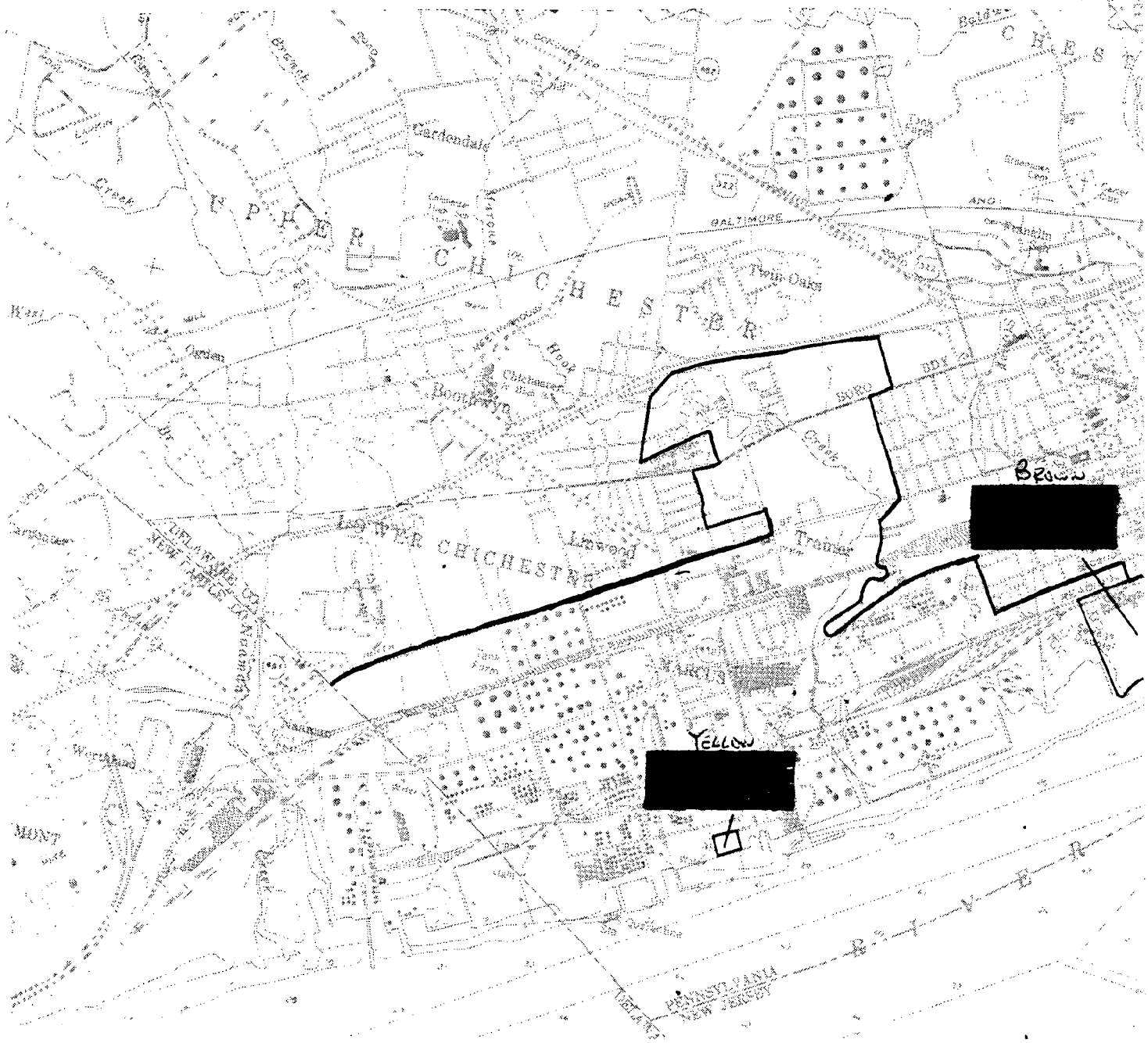
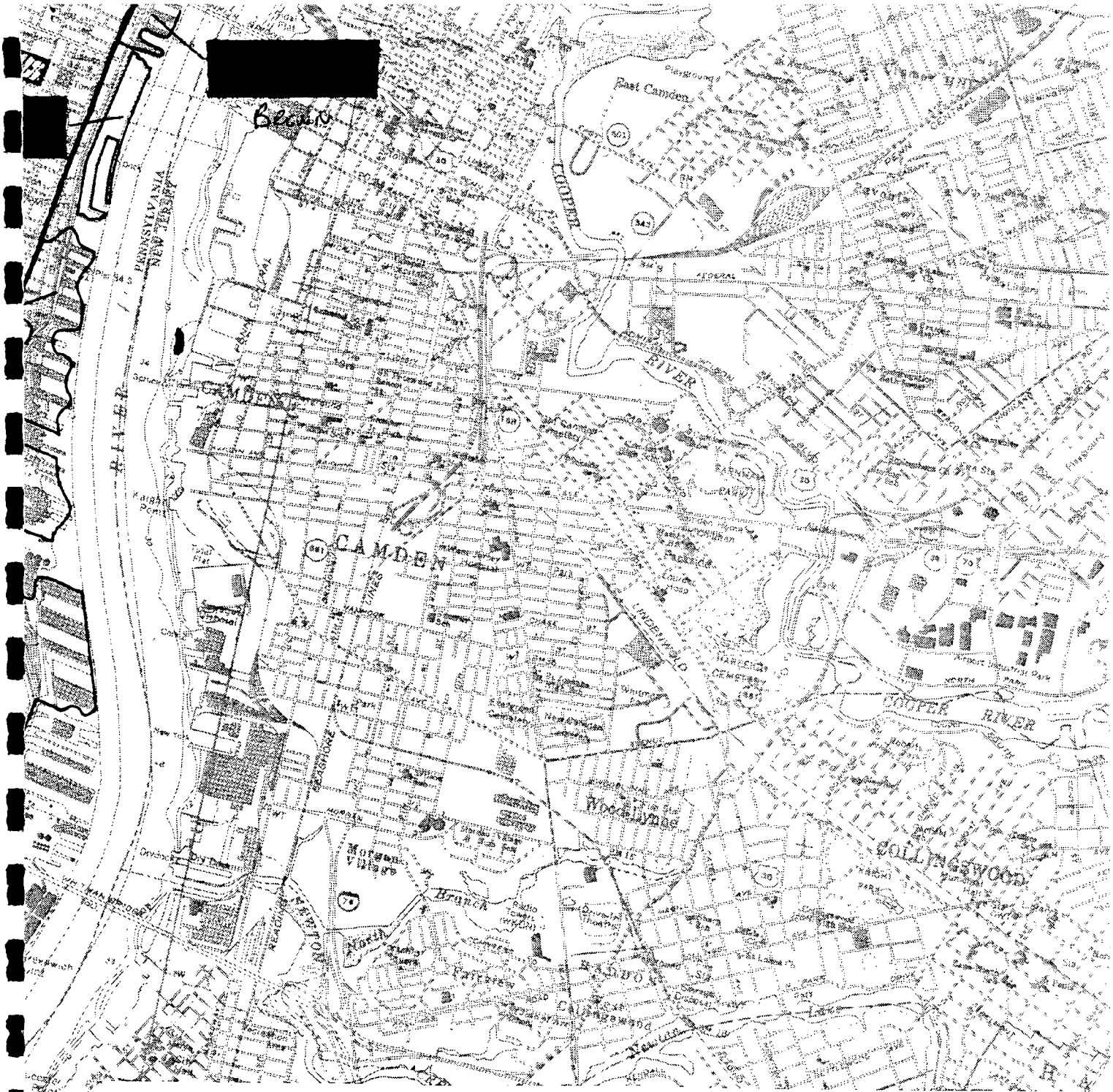
GLOUCESTER CO
Raccoon Island
Raccoon Island

LEGEND

NV-1	AREA OF SIGNIFICANT NATURAL VALUE (GREEN)
DO-1	AREA OF DEVELOPMENT OPPORTUNITY (BROWN)
RV-1	AREA OF SIGNIFICANT RECREATIONAL, HISTORIC, OR CULTURAL VALUE (YELLOW)
OV-1	AREA OF OVERLAP (COMBINATION OF TWO OF THE ABOVE) (GREY)
	FEDERAL PROPERTIES (EXEMPT FROM MANAGEMENT)
	PRELIMINARY STUDY BOUNDARY
	FINAL COASTAL ZONE BOUNDARY





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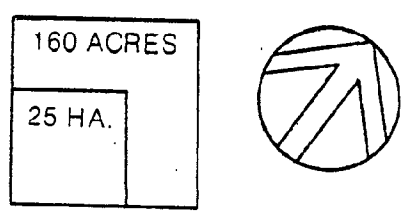

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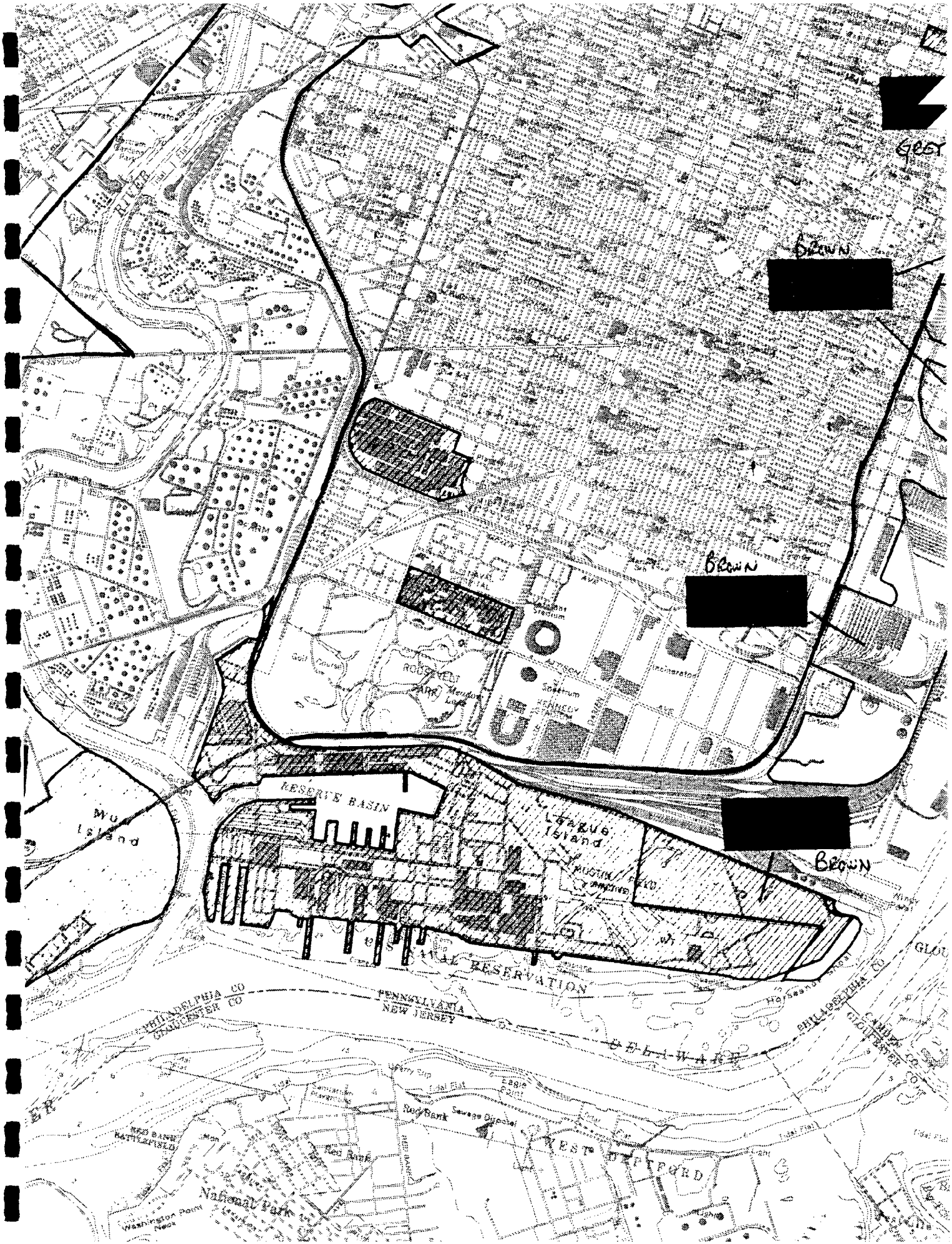

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RESERVE BASIN
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RIVER
PENNSYLVANIA
NEW JERSEY
PHILADELPHIA CO
GLOUCESTER CO
DELAWARE
Red Bank
Sewage Disposal
WEST DEPTFORD
National Park
Washington Point

LEGEND

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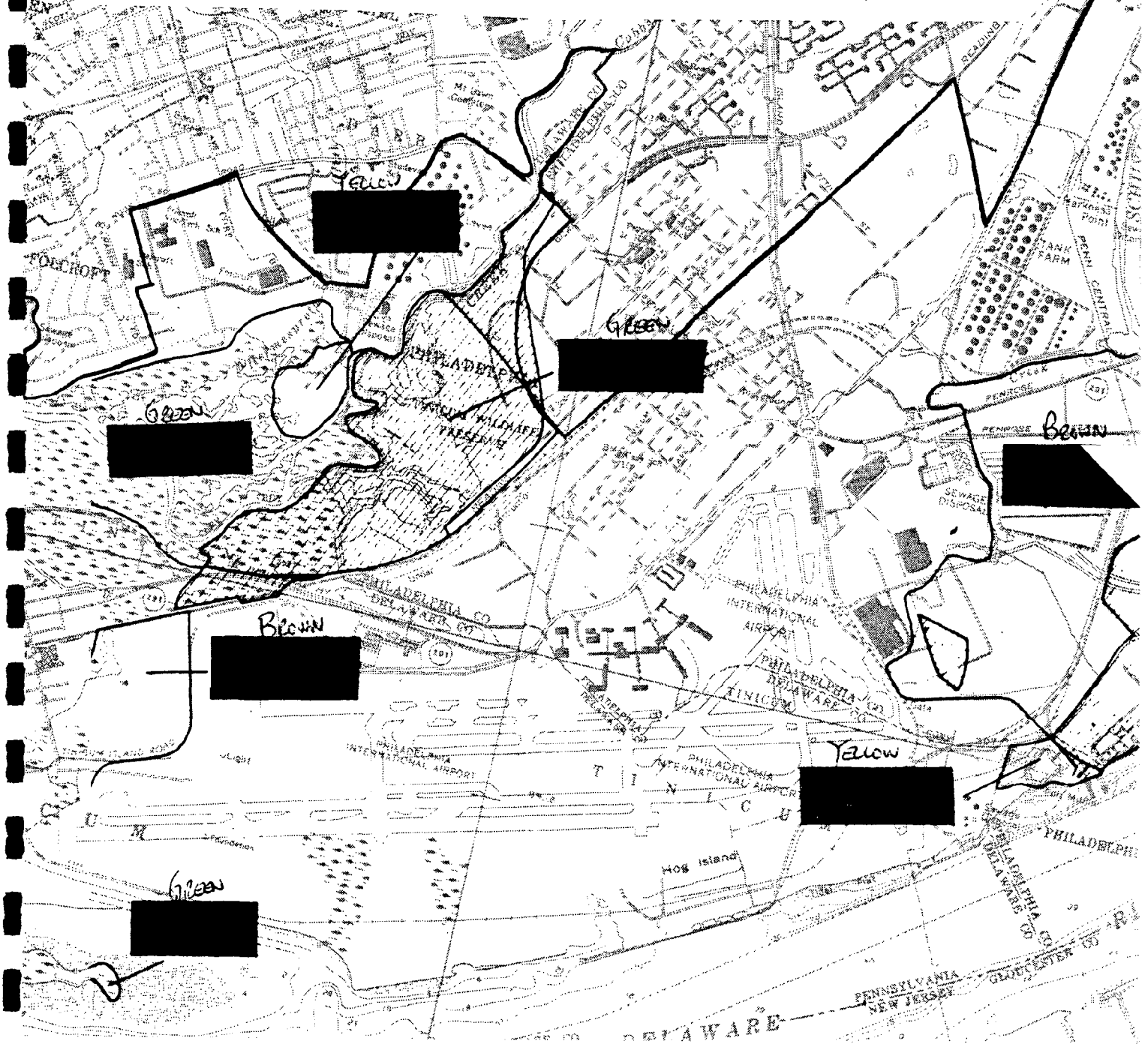

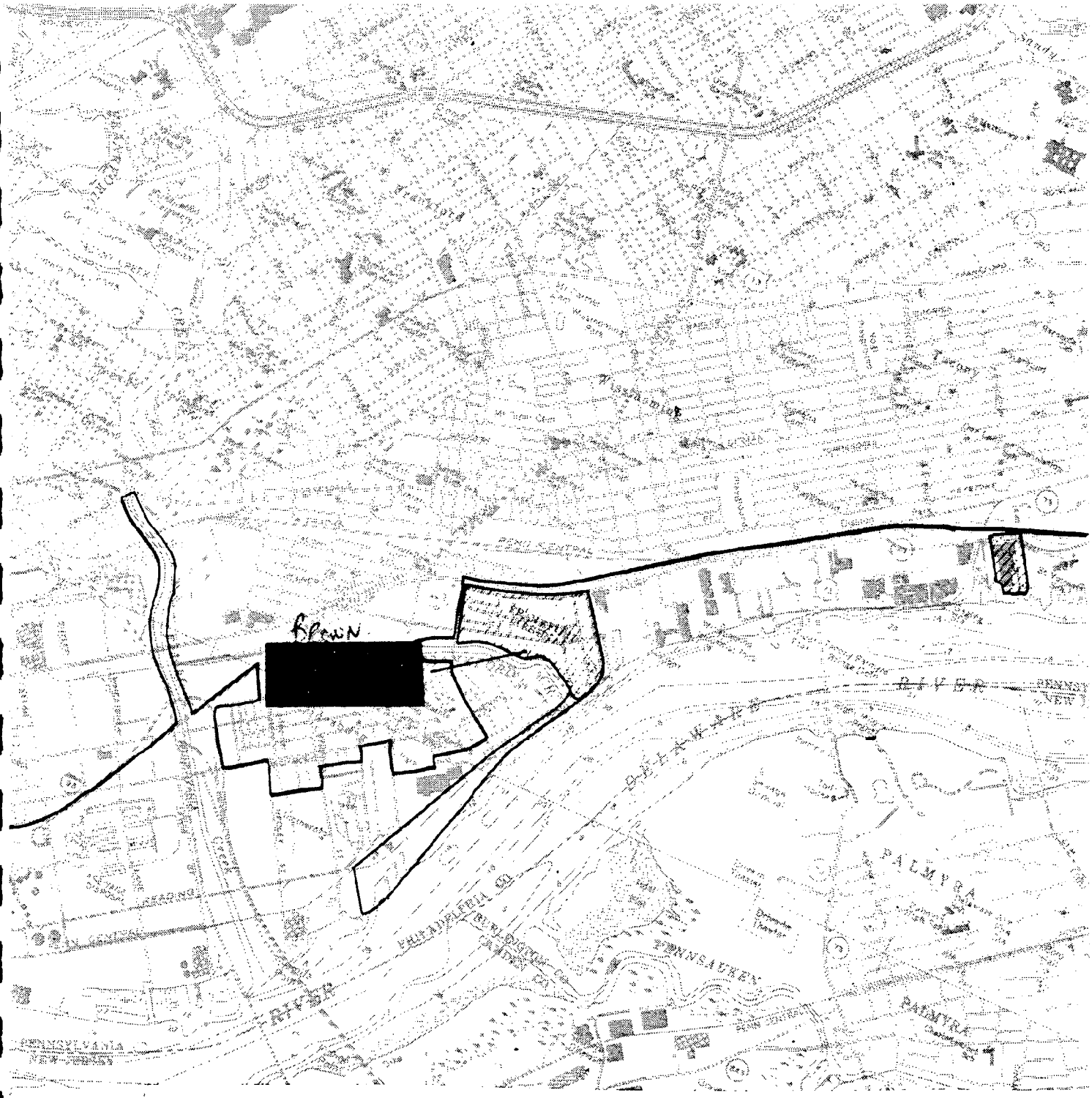

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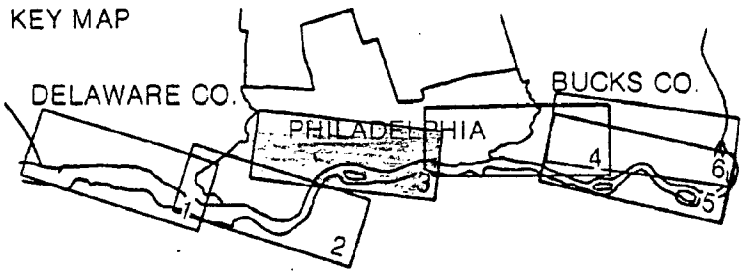

160 ACRES

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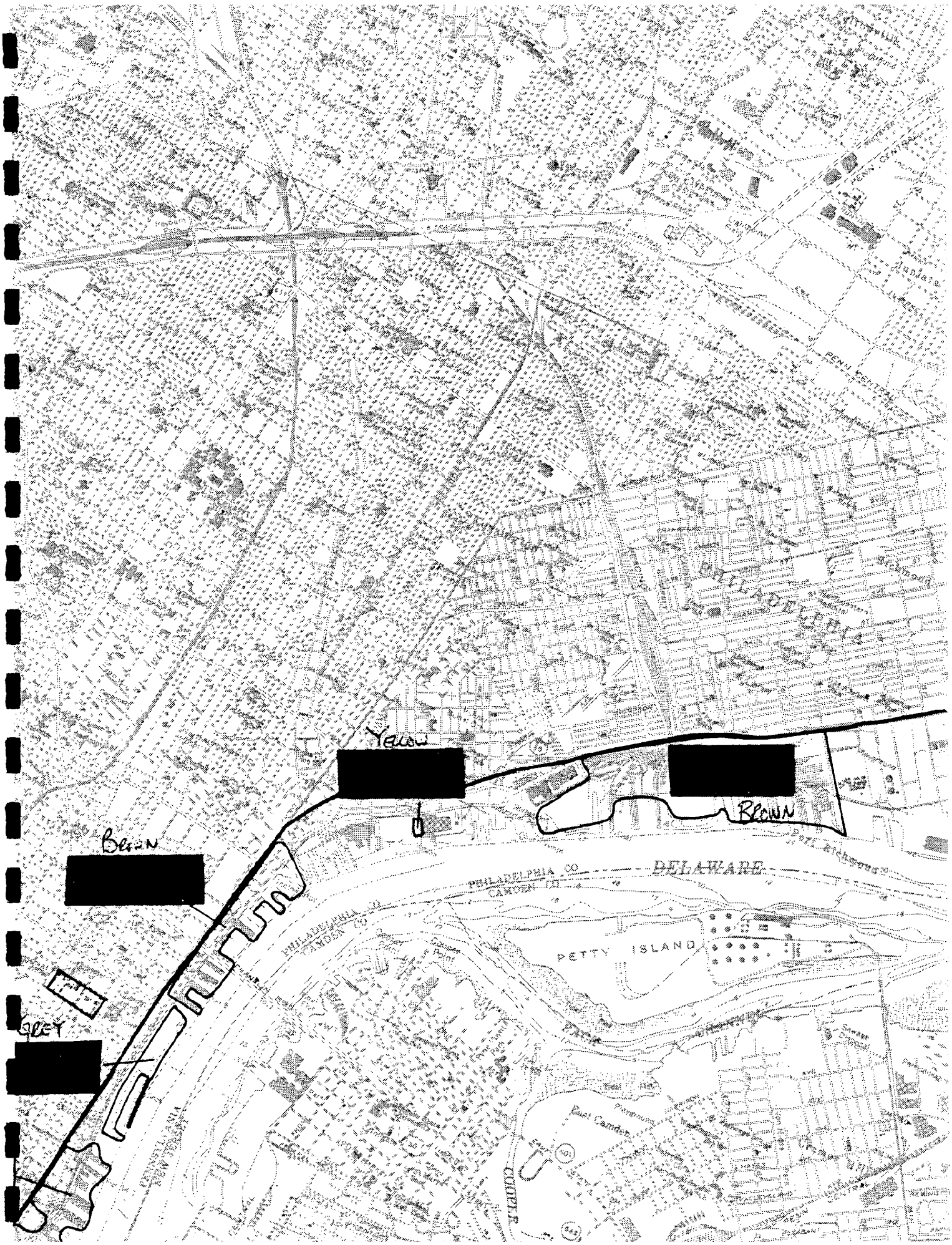
DELAWARE ESTUARY COASTAL ZONE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LEGEND

NV-1	AREA OF SIGNIFICANT NATURAL VALUE (GREEN)
DO-1	AREA OF DEVELOPMENT OPPORTUNITY (BROWN)
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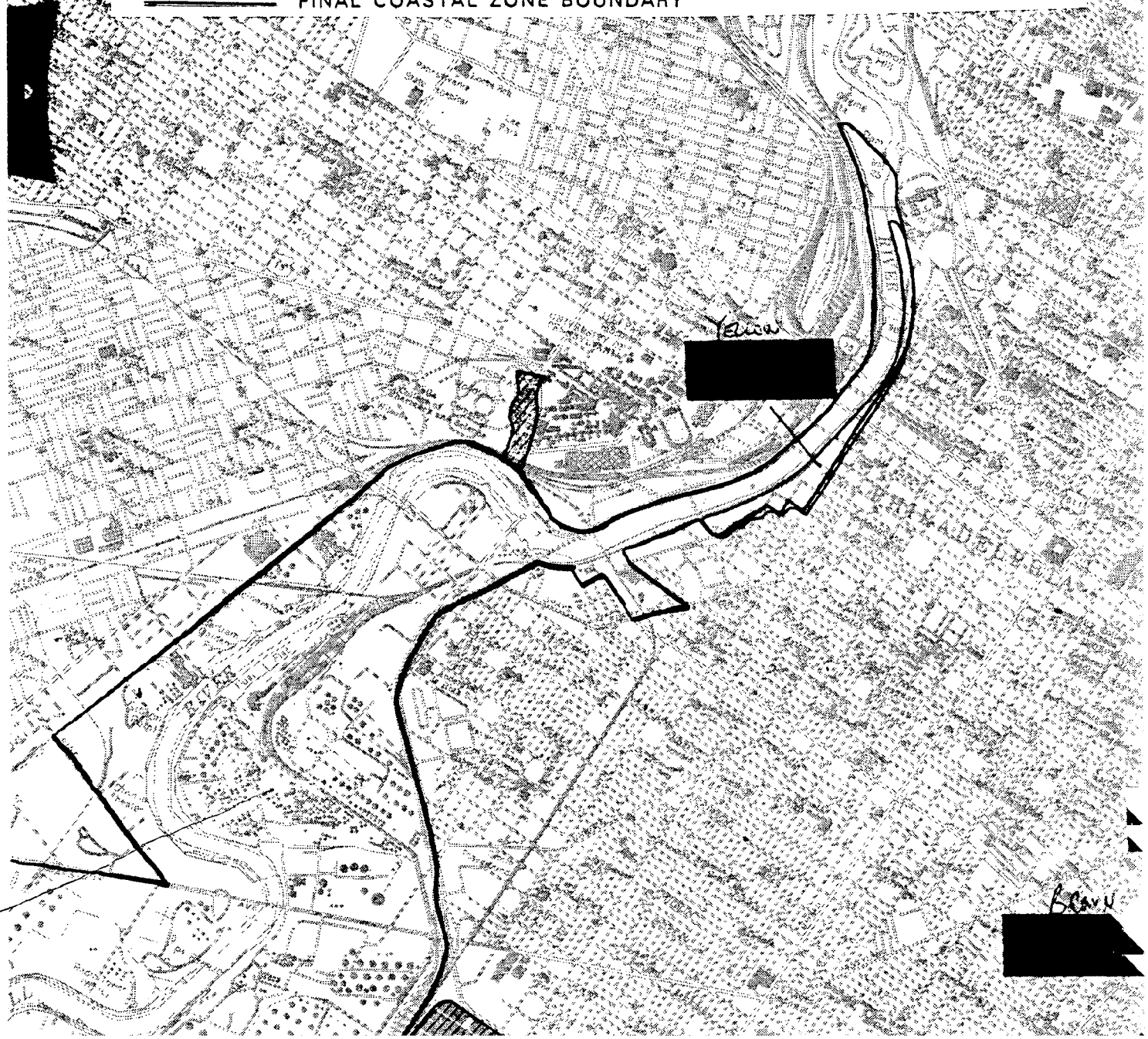

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1 INCH = 0.8 KILOMETERS

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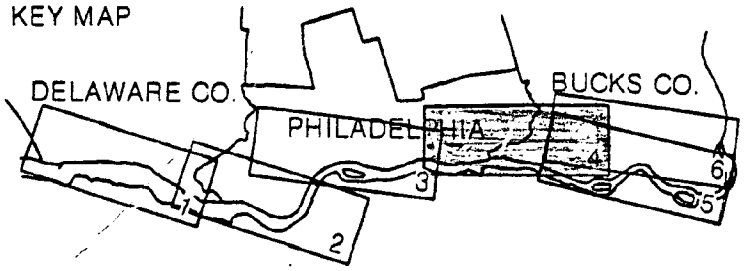

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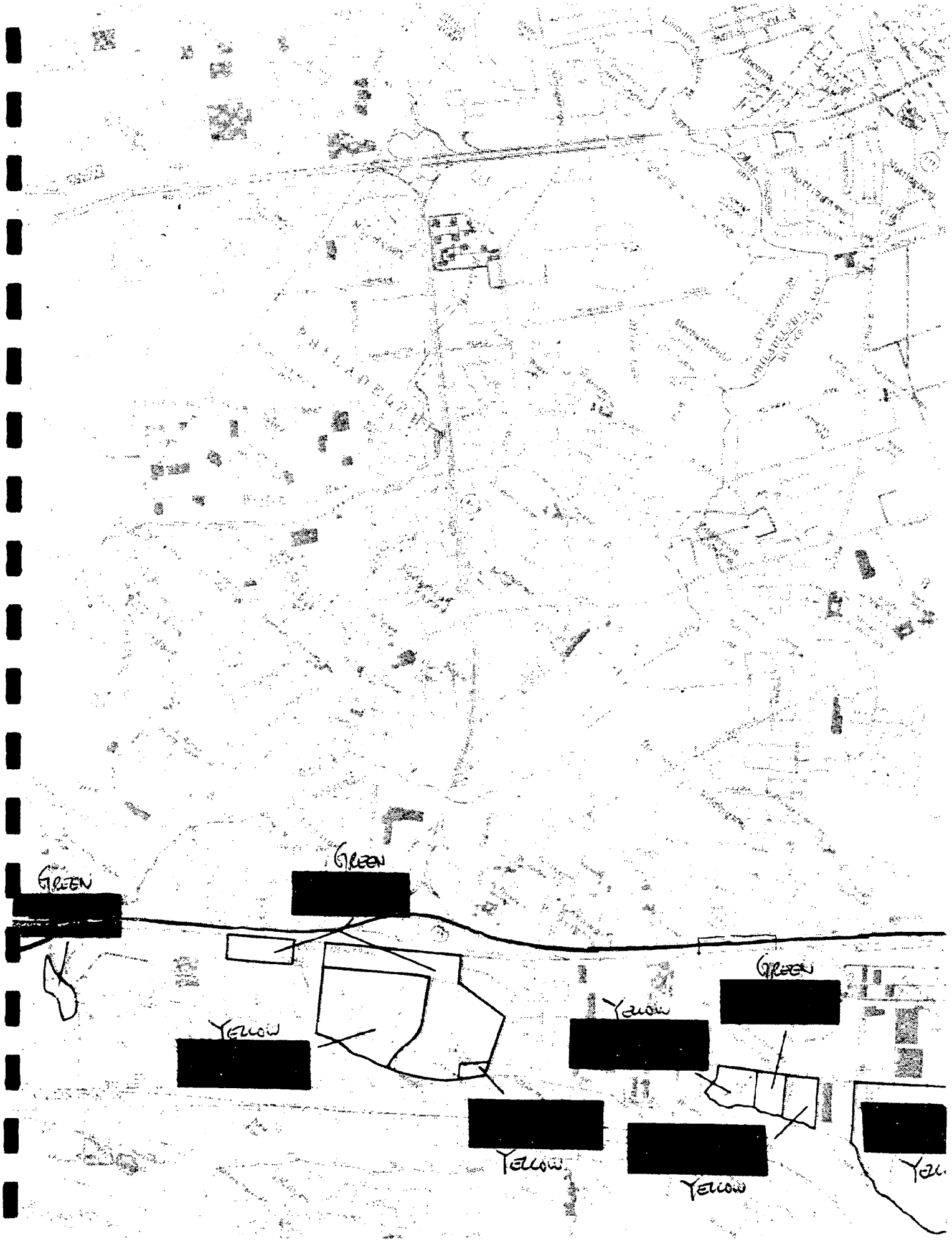
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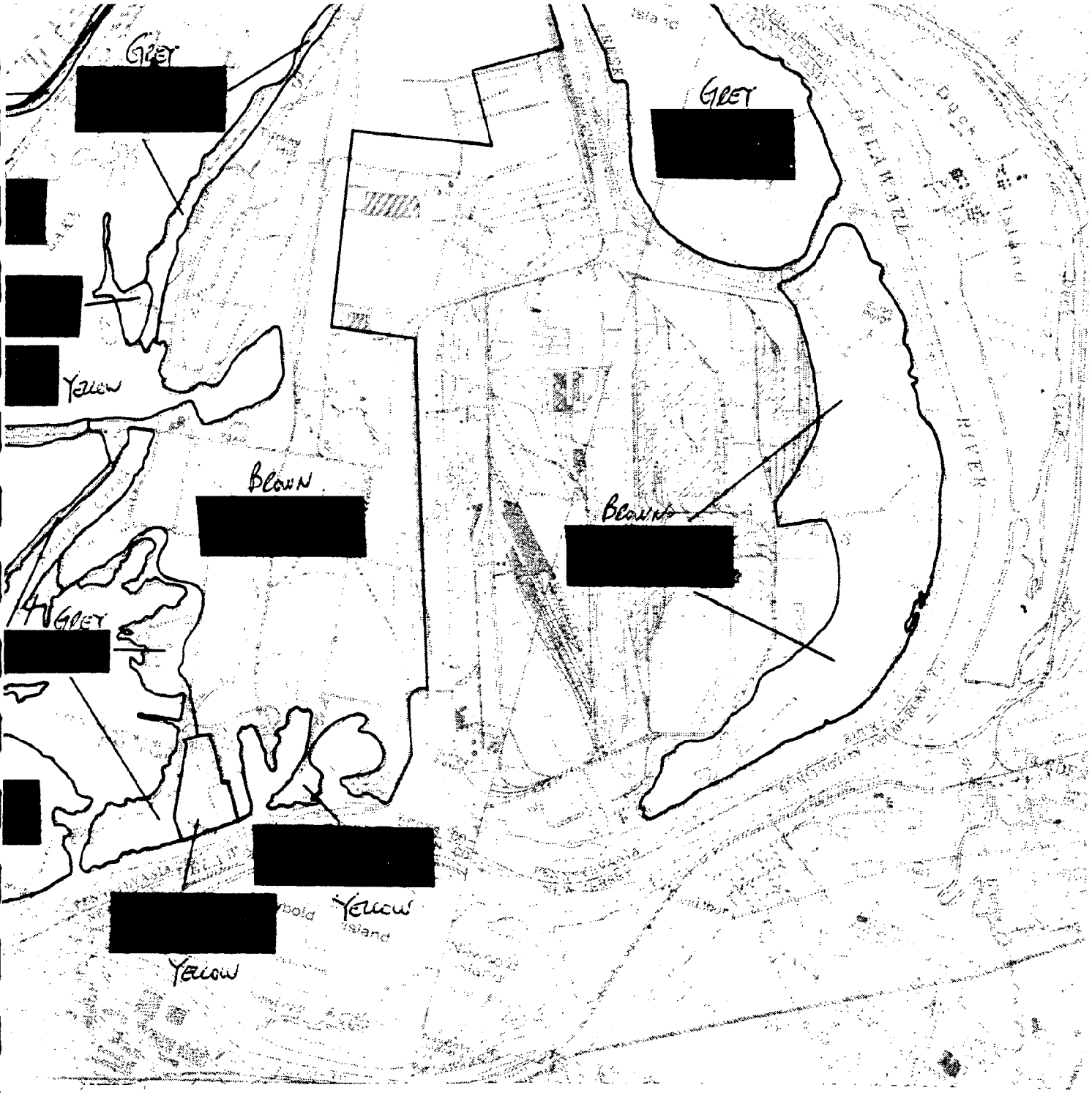

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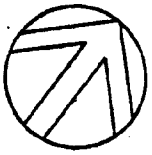

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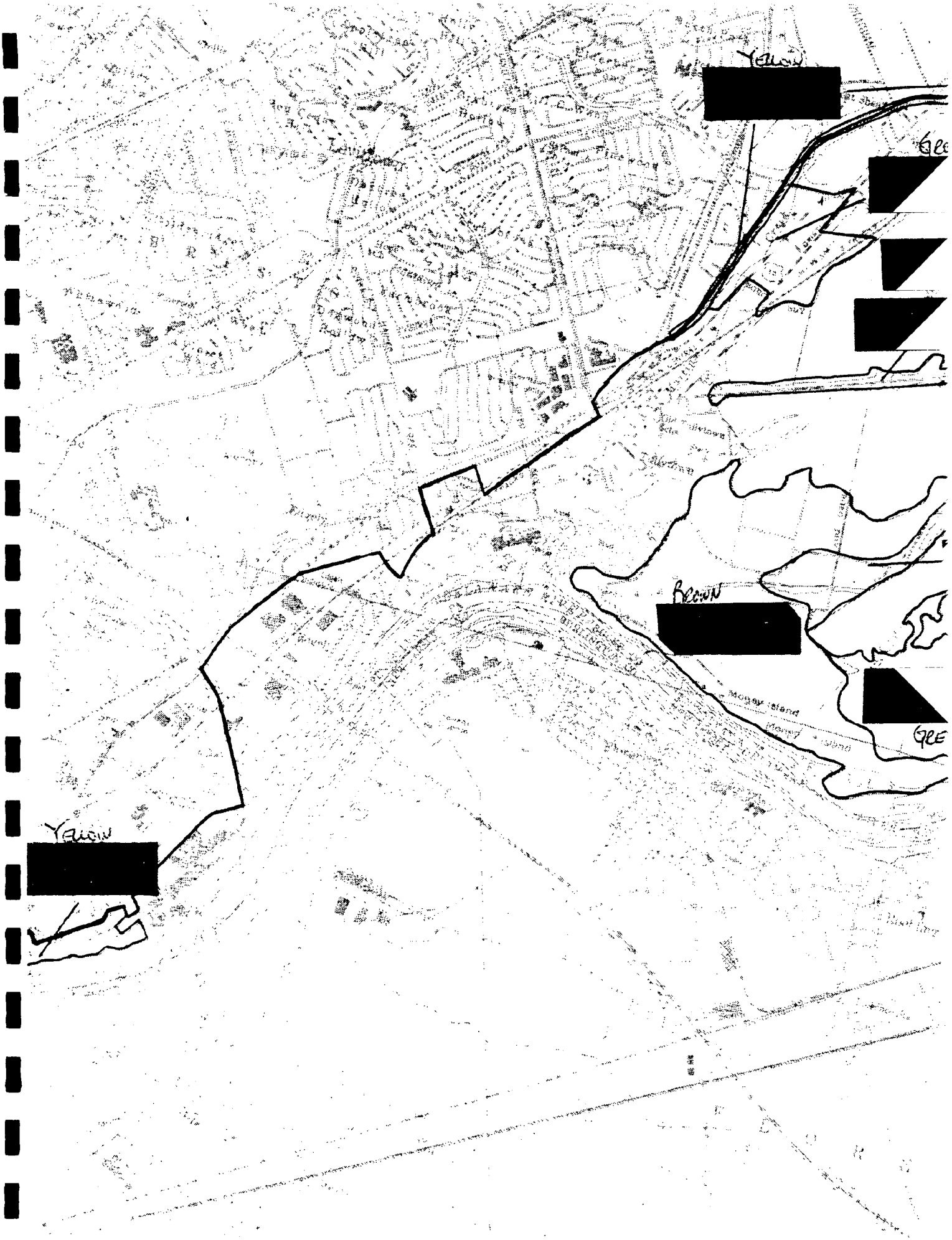
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LEGEND

NV-1	AREA OF SIGNIFICANT NATURAL VALUE (Green)
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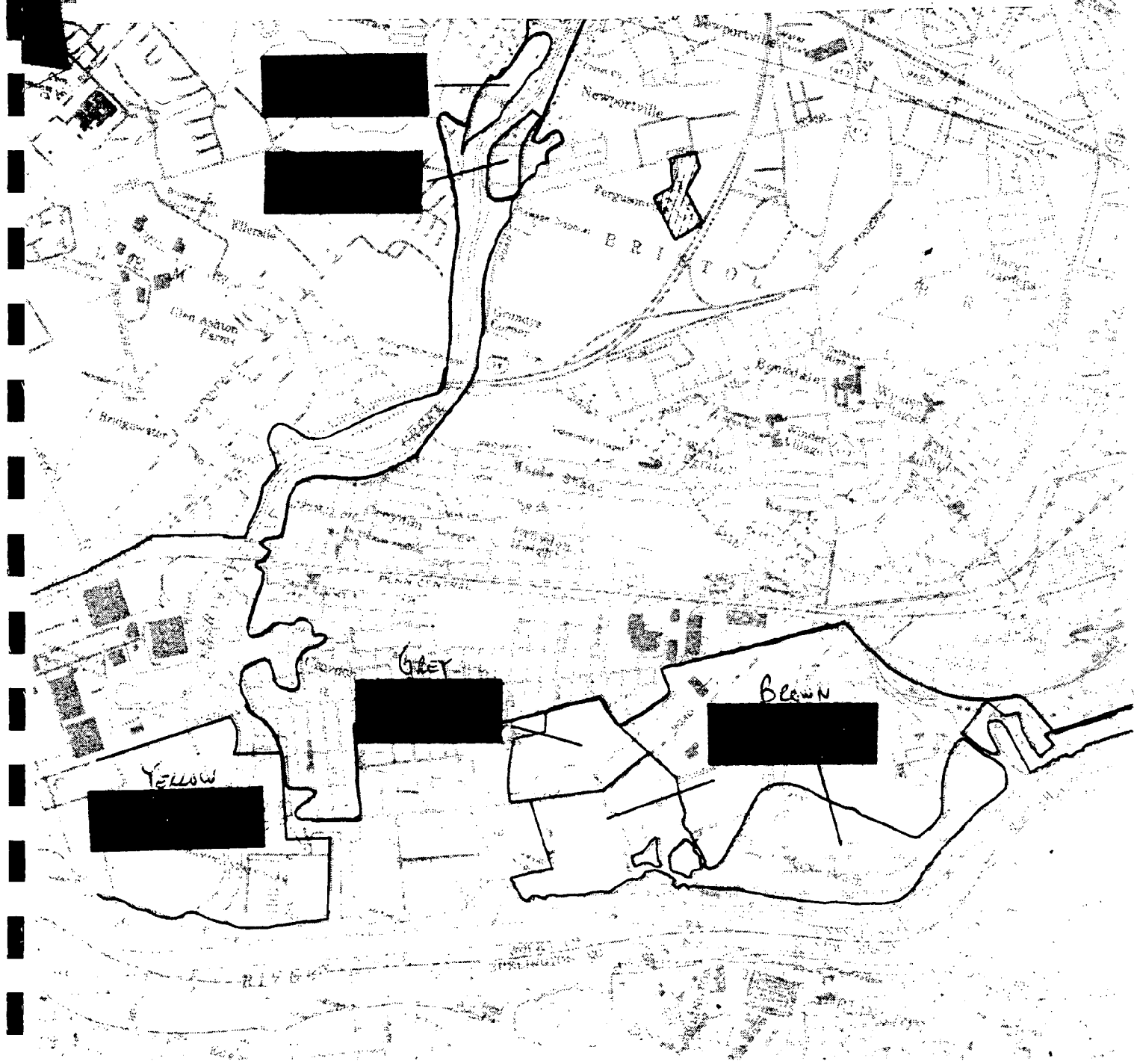

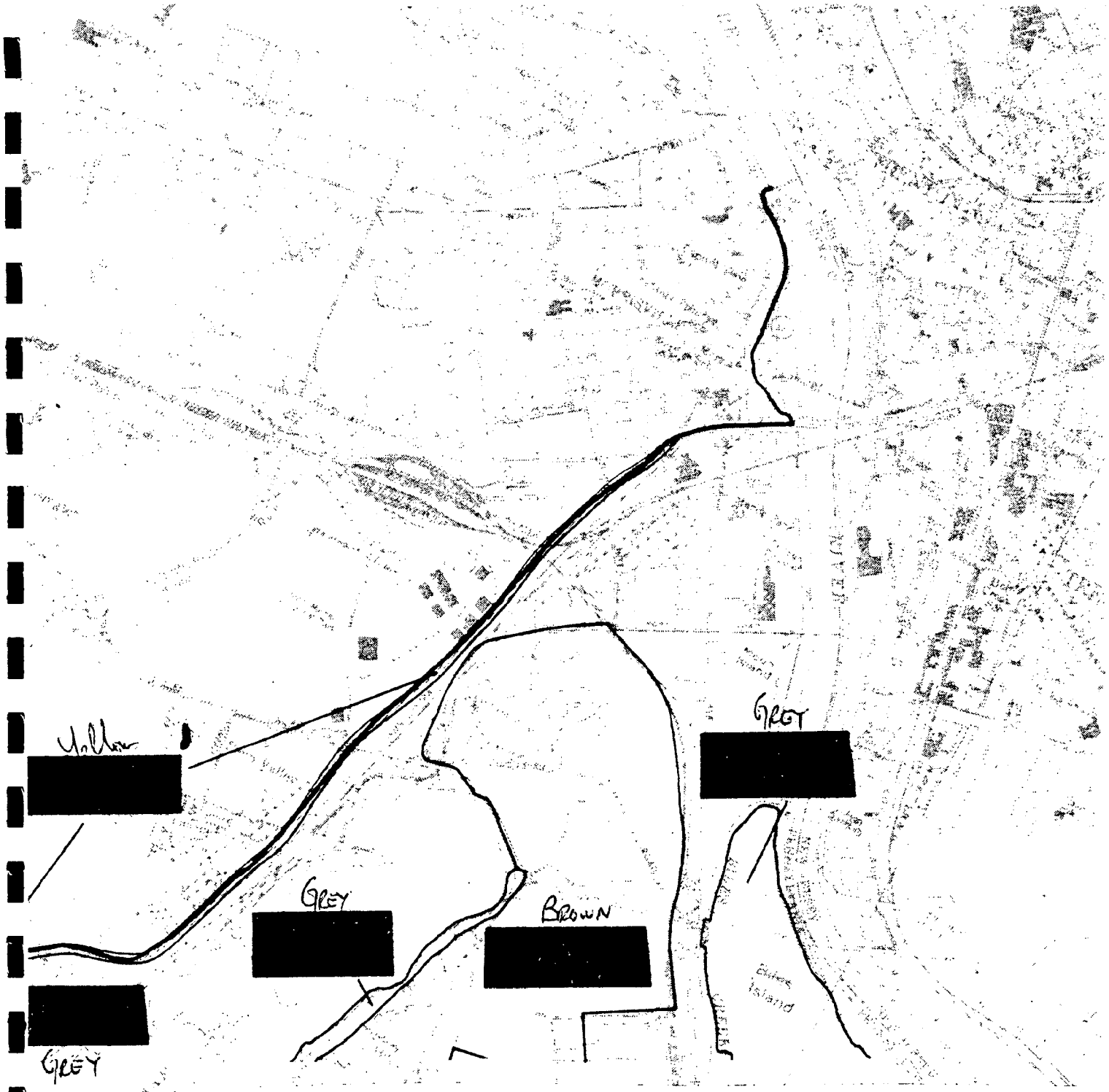

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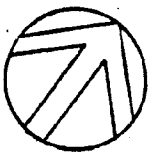
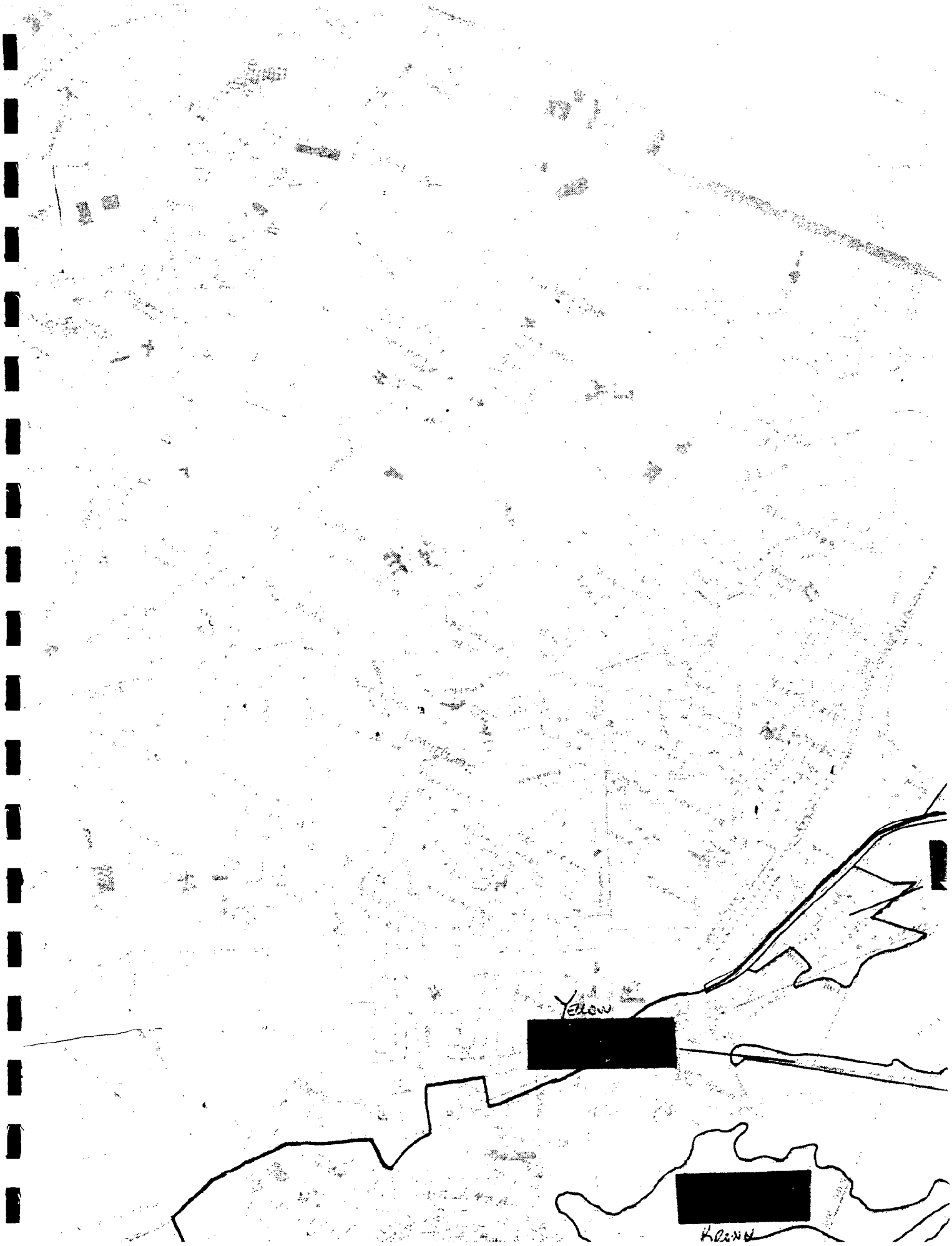


DELAWARE ESTUARY COASTAL ZONE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LEGEND

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DO-1	AREA OF DEVELOPMENT OPPORTUNITY (Brown)
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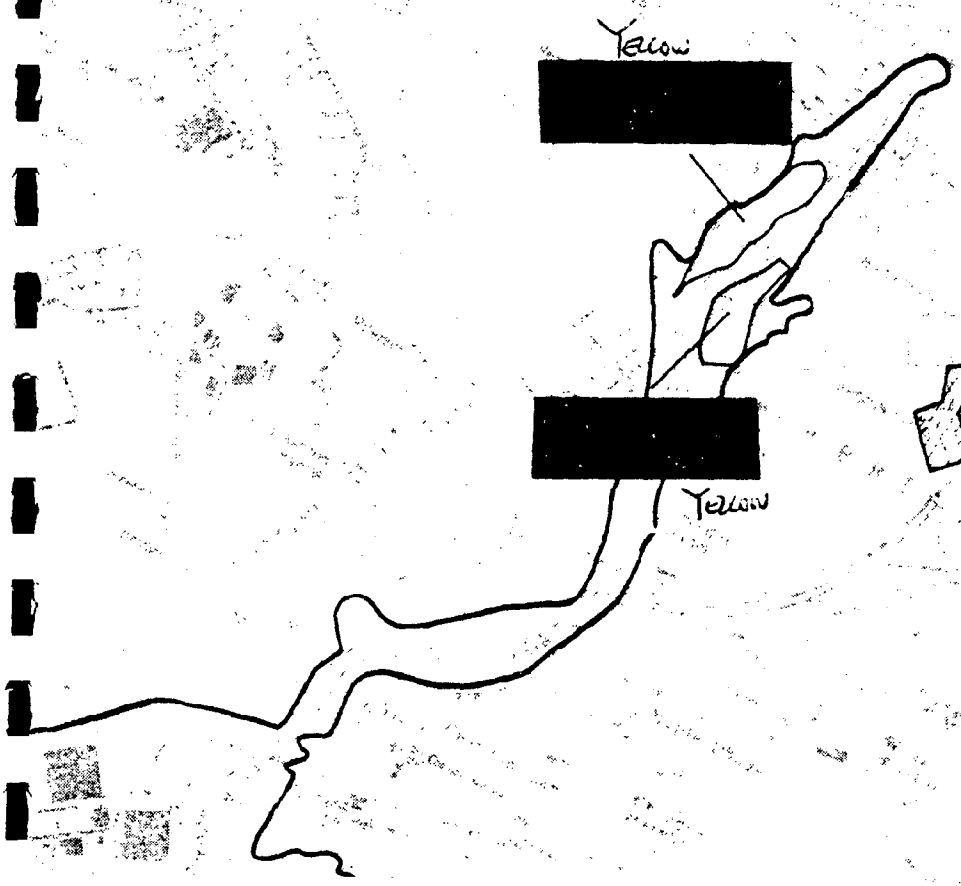


LAKE ERIE COASTAL ZONE

WESTERN STUDY AREA GEOGRAPHIC AREAS OF PARTICULAR CONCERN

Identification #		Size (acres)
	Natural Value Areas	
NV-1	Lake Erie Bluff	
NV-2	Crooked Creek Stream Corridor	275
NV-3	Girard and Fairview Township	1,400
NV-4	Prime Agricultural Lands Trout Run Stream Corridor	90
	Development Opportunity Areas	
DO-1	United States Steel Site	2,100
DO-2	Pennsylvania Electric Site	550
	Recreational, Cultural and Historic Value Areas	
R-1	Raccoon Creek Stream Corridor	300
R-2	Elk Creek Estuary Site	320
R-3	Lake Erie Community Park	111
R-4	Walnut Creek Access Area	40

AREAS OF SIGNIFICANT NATURAL VALUE

NV-1 Lake Erie Bluff
Springfield, Girard and Fairview Townships,
Lake City Borough

Approximately fifteen linear miles or over 85 percent of the Erie County western study region's coastline consist of bluffs which reach heights of up to 120 feet above the average water level of Lake Erie. Virtually the only points of easy access to the Lake in the western study region are those areas which have been leveled by the erosive action of streams and creeks which enter the Lake. The lake bluffs are environmentally significant as habitat areas for many species of wildlife and vegetation, and serve aesthetically as open space areas. These bluffs are also fragile environmental zones. Erosion is constantly occurring and is even more prevalent in the western study region than along the remainder of the coastal zone area due to the lack of a exposed shale base to protect the bluff face from wave action. The clearing of the vegetation from the bluff face and crest has significantly increased erosion rates in many areas.

Thus far the bluffs in the western portion of Erie County have not undergone severe developmental pressures. Most are essentially untouched. There is, however, the likelihood of rapid urbanization of the coastal lands should industrial development occur in the Conneaut, Ohio - Springfield, Pennsylvania vicinity. Even without the construction of an industrial complex development encroachment is likely to occur, but at a greatly reduced rate. Problems associated with the preservation of the lake bluffs will not necessarily be eliminated by attempts to halt developmental trends in these environmentally sensitive areas, as erosion is a continuing natural process. Such attempts, however, will dramatically reduce the rate of erosion as native vegetation will be retained, thus stabilizing or at least retarding erosion of the bluffs. Residential and other urban development will in turn be protected from hazards associated with bluff deterioration.

NV-2 Crooked Creek Stream Corridor
Springfield Township

The Crooked Creek stream corridor is approximately 275 acres in size and is probably the most unique natural area in the entire Erie County coastal zone. Sampling has revealed that Crooked Creek exceeds all water quality standards and as a result has been designated as a state conservation stream, which enables the use of this stream as prime nursery waters for fish propagation.

Crooked Creek is one of only three streams in the Lake Erie coastal area which meets all water quality standards.

Also within this area are escarpments which are predominantly located on the east side of Crooked Creek, and flood prone lands which follow the creek from its mouth to beyond the coastal zone boundary designation at the ConRail right-of-way. The mouth of Crooked Creek is one of relatively few areas in the western study region where topography does not restrict access to Lake Erie. This fact is evidenced by the numerous cottages which are located in this vicinity.

The lands east of Crooked Creek through which this GAPC extends are owned by the Youngstown, Ohio YMCA (Camp Fitch) and the Washington Trail Council of the Boy Scouts of America (Camp Sequoyah). The mouth of Crooked Creek and all lands west of this Creek are under private ownership.

Of local historical interest are two dwellings in excellent repair located on the fringes of the Crooked Creek area on Holliday Road. The original house, a New England style, "Salt Box", was built by Captain Samuel Holliday in 1806, reportedly the first settler of Springfield Township. A second house, also built by the Holliday family in 1832, has a natural gas well, 700 feet deep, which has provided gas for the house since it was drilled near the turn of the century. Decendants of the Holliday's still live in both homes.

NV-3 <u>Prime and Unique Agricultural Lands</u>
Girard and Fairview Townships

Approximately 1,400 acres in the western study region have been designated as a GAPC having natural value as an agriculturally significant area. The area east of the Elk Creek GAPC is currently being used primarily for grape, fruit and vegetable production. Its unique climatic relationship with the Lake provides growers with a moderate climate ideal for such crops. Much of the area west of Elk Creek is cultivated as a nursery for evergreens. These lands are part of a larger region which extend below the coastal boundary designation and primarily consists of prime agricultural soils which follow an east-west pattern along the beach ridges of the Lake Erie plain.

These prime agricultural soils, however, are also ideal for various types or urban development. The lake plain between the Lake City Borough-Girard Borough vicinity and the Erie Metropolitan area has been developing at a steady rate and has the potential of rapid growth should any major industrial expansion occur within the region. Thus, foresight and proper management is required to retain this essential resource as a unique agricultural area.

NV-4 Trout Run Stream Corridor
Fairview Township

This 90 acre natural area is entirely located within the coastal zone final boundary designation and is a wooded stream valley which is likely to require sensible management efforts to protect it as an environmental corridor within an area experiencing increased residential development. The Trout Run corridor is an excellent example of development occurring along points of immediate access to the shore zone. A small beach at the mouth of this creek offers public access for local swimming and fishing enthusiasts but the remainder of this forested stream valley has developed to serve the recreational interests of a few local land owners. The area has expanded from seasonal residential use to a community of permanent residents.

The stream ecology of Trout Run is of extreme importance, particularly to the Pennsylvania Fish Commission which has constructed a catchment device near the mouth of this creek as part of the Coho Salmon propogation program. Monitoring of the creek reveals dramatic increases of polluted materials as the stream approaches the lake. This is probably due to wastewater discharges. Strict enforcement is required to prevent degeneration of the environmental quality of this stream.

DEVELOPMENT OPPORTUNITY AREAS

DO-1 United States Steel Site
Springfield Township

The United States Steel site is a prime area for the location of an industrial complex. The U.S. Steel Corporation currently owns or has control of approximately 4,000 acres in western Springfield Township and close to 2,500 acres east of Conneaut, Ohio. Of the total U.S. Steel property in Pennsylvania, about 2,100 acres is within the coastal zone final boundary designation. About 3.5 miles of coastline are owned by the Corporation and nearly two miles of this is within Springfield Township. The land within the coastal zone was at one time used for agricultural purposes but now is all but completely abandoned. A few homes and cottages remain in this area and only

the cottages located between Old Lake Road and the lake bluffs are occupied, and only during the summer months. Future development of the area should be planned in a compatible manner with the existing environment.

Along with the vast amount of undeveloped land, there are several other reasons for industrial development opportunity in this area. First, water is available in sufficient quantity and quality for potential use in the steel-making process. Secondly, numerous transport facilities are available. The Ports of Conneaut and Erie are capable of handling all water-bound shipping needs. Numerous rail lines including the Bessemer and Lake Erie Railroad, a wholly owned subsidiary of U.S. Steel, and the Conrail and Norfolk and Western Railroads pass through this area. The area is well serviced by numerous highway arterials, specifically, Interstates 90 and 79, U.S. Routes 20 and 6N, Pennsylvania Route 5 and Ohio Route 7. Finally, the Pennsylvania Electric Company (Penelec) owns lakefront property about five (5) miles east of the U.S. Steel site which is proposed for power plant construction by the late 1980's and will be able to handle a large portion if not all of U.S. Steel's power needs, if the corporation does not construct an independent source of its own.

DO-2 Pennsylvania Electric Company Site
Girard and Springfield Townships

The Pennsylvania Electric Company (Penelec) owns approximately 550 acres within the coastal zone boundary which includes about one and one-half linear miles of shoreline. This property has been selected for the construction of a major fossil fuel power plant in the early 1980's and such a facility could have a

significant economic and environmental impact on the entire region.

Penelec has reportedly offered Girard Township a portion of their lands for use as a park. The Township has thus far refused the offer for lack of funds to develop such a facility and the concomitant tax base decrease. A desirable proposal for this site could focus on granting public access to the lake bluff. The placement of a scenic access easement around the Penelec plant, which would roughly follow the Elk Creek, Lake Erie and Duck Run bluffs and then extend back out to Route 5, would be highly advantageous to the public. Access to the Lake would be impossible except, perhaps, as pedestrian traffic due to the bluff excarpments which are approximately 100 feet in height and have a minimum slope of 30 percent. These bluffs, however, are aesthetically significant and acquisition or easement for public use is recommended.

AREAS OF RECREATIONAL, CULTURAL AND HISTORICAL VALUE

R-1 Raccoon Creek Stream Corridor
Springfield Township

The Raccoon Creek stream corridor, has been designated of particular concern as a recreational area. This ecologically significant recreational site, approximately 300 acres in size, consists of a stream valley, lake bluff escarpments, and wetalnds. The core of this area is Raccoon Creek County Park, a 195 acre land tract which is primarily undeveloped and densely wooded. Only about twenty acres of this park near the mouth of Raccoon Creek are actually developed for recreation, with such facilities as picnic shelters, children's play apparatus, a boat ramp, and a bath house. Swimming is available at a small beach lakeward of these facilities.

The remainder of the park, being predominantly undeveloped, is utilized for primitive camping and hiking trails. Portions of the park have extremely scenic natural features and future development should respect these amenities. Also of significance, but not within the bounds of Raccoon Creek Park, is a wetland area immediately adjacent to the park's southeast corner. This wetland is environmentally significant as a wildlife habitat and consequently the protection of this area is a concern of the coastal management program.

The Raccoon Creek stream corridor offers the springfield area an opportunity to establish a buffer zone between a proposed industrial complex to the west and the area to the east of this corridor which in all likelihood will develop as a permanent and/or summer residential district. With the probable development of the U.S. Steel Corporation and Penelec industrial

complexes, an area such as this will serve to lessen the impact upon neighboring residential areas and at the same time will protect this ecologically significant recreational area.

R-2 Elk Creek Estuary Site
Girard Township

The mouth of Elk Creek has long been considered as a potential site for recreational development. This site consists of approximately 320 acres, all of which are under private ownership except for a 13.5 acre parcel immediately south of Route 5. Two principle land uses are located north of Route 5; summer residences (cottages) and agriculture. The land south of Route 5 is owned and managed by the Lake City Municipal Sewer Authority and is the location of the Lake City Borough sewage treatment plant. The west bank of the Elk Creek mouth is owned by the Pennsylvania Electric Company. To the south and east of the valley is an area currently developing as a residential district.

The most appropriate use of this stream valley should focus upon its recreation potential. The estuarine nature of the mouth of Elk Creek provides excellent opportunities for fishing and swimming, and serves as a shelter for samll boats. During peak fishing periods the flat valley floor is extensively utilized by fishermen as a boat launching and camping site, though no organized camping facilities are present. This area is capable of supporting publicly owned camp sites and possibly numerous other recreational facilities as well.

The forested bluffs which completely surround this stream valley serve as a natural and scenic backdrop to the area. Protection of these bluffs from any degrading influences which potentially may accompany development should be a primary goal of the CZM Program.

R-3 Lake Erie Community Park
Girard Township

Lake Erie Community Park is approximately 111 acres in size and is owned by Girard Township. Within this park are recreational facilities including a general purpose field, children's play apparatus, picnic shelters, and a small beach for swimming along the lake shore. Access to the lake, however, is limited to pedestrians only. This is due to the steep lake bluffs which are among the highest in the coastal zone. A deep ravine formed by a small stream that dissects the park provides additional natural and aesthetic areas. Both the lake and stream bluffs should remain densely forested lands in order to reduce the risk of increased bluff recession and to maintain the natural character of the area.

R-4 Walnut Creek Access Area
Fairview Township

The Pennsylvania Fish Commission currently manages this forty acre site at the mouth of Walnut Creek. This area, also known as Manchester Beach, offers prime recreational access to both Lake Erie and Walnut Creek for fishing and boating purposes. A boat launch already exists at this site and a marina has recently been constructed as a temporary harbor of refuge for boaters in the event of bad weather conditions on Lake Erie. It is unlikely that recreational facilities will be expanded beyond this point. Further up the Walnut Creek Valley there are available lands which potentially could be acquired and developed for summer camping, picnicking, etc., however, existing facilities basically meet most current recreational requirements of area residents.

CENTRAL STUDY AREA GEOGRAPHIC AREAS OF PARTICULAR CONCERN

Identification #		Size (acres)
	Natural Value Areas	
NV-1	Lake Erie - Presque Isle Bay Bluff	-
	Recreation, Cultural and Historic Value Areas	
R-5	Scott Park, Sommerheim Park	108
R-6	Presque Isle State Park	3,250
	Overlap Area	
OV-1	Presque Isle Bay	400
OV-2	Port of Erie and Waterfront Area	825

AREAS OF SIGNIFICANT NATURAL VALUE

NV-1 Lake Erie - Presque Isle Bay Bluff
City of Erie, Millcreek and Lawrence Park Townships

The lake bluffs in the central study region follow virtually the entire Lake Erie-Presque Isle Bay coastline. These bluffs extend approximately ten linear miles and reach heights of up to 100 feet above the Lake Erie water level. Access to the waterfront is available at many points in this area, most notably to Presque Isle State Park and to the bayfront, but in many of the remaining areas, the bluffs restrict access to pedestrian traffic only.

As with the bluffs in the remainder of the coastal zone, the central area bluffs act as an environmental buffer zone which supports many species of wildlife and vegetation. However, urban development pressures within the central study region, especially within an area between Cascade Creek and the City of Erie-Lawrence Park boundary, have eliminated much of the ecologic significance of these bluffs. In Millcreek and Lawrence Park Townships, residential development continuously reduces the vegetation at the top of the bluffs, a factor which accelerates erosion problems.

Ownership of the bluffs in the central study region is predominantly by private individuals and organizations with the major exceptions of the port and waterfront area of the City of Erie. More than half of this area is owned by both municipal and semi-public firms and agencies. The only other large land holding where bluffs are publicly owned is located at the west end of Presque Isle Bay in Scott County Park.

Public and semi-public ownership of the bluffs will not necessarily preserve them as natural areas. Proper management of these lands is required to insure their protection as unique geological features. The development of proper bluff management procedures will also protect developed areas from hazards caused by bluff recession.

The Lake Erie Bluffs include one site of historic significance. The Land Lighthouse, which is located at the foot of Lighthouse Street in the City of Erie, overlooks the channel entrance to the Erie Harbor and stands about 130 feet above the lake level. It was first erected in 1818, rebuilt in 1858 and again in 1866, but was not used as a lighthouse after 1885. The structure is owned by the City of Erie.

R-5 Scott Park, Sommerheim Park
Millcreek Township

This area has the potential for development as a recreational site without the disturbance of the majority of its natural setting. Most of this property is an area now called Scott Park, a 108 acre former estate which was donated to Erie County in 1974. Sommerheim Park, southeast of Scott Park, is a ten acre parcel owned and operated by the Millcreek Township School District.

Scott Park is currently a completely undeveloped wooded area. There are many tentative proposals for this park which include the clearing of land for recreational facilities such as ballfields, picnic areas, hiking trails, bikeways and tennis courts. These facilities, as well as an administrative building, supporting utilities, and parking lots are scheduled for completion by the mid-1980's. Additional facilities may be added after that date.

Not all of the park is to be developed. The northern and eastern portions are strikingly scenic sites and from the lakebluff the entire neck of Presque Isle can be seen jutting into Lake Erie. The only proposed development this part of the park will be the addition of hiking trails. Any further development must be compatible with the natural features of this area.

Facilities at Sommerheim Park are limited to three ballfields and a parking area. The parameter of this park currently consists of woodlands which adjoin what will be part of the natural area of Scott Park.

R-6 Presque Isle State Park
Millcreek Township

Presque Isle State Park, 3,250 acres in size, is one of the most unique natural features in Pennsylvania and along the shore of Lake Erie. Its value as an ecological and recreational resource is second to none in the State. A diversity of recreational facilities is available for public use. Much of the interior of the park serves as habitat for numerous vegetative and wildlife species, and as protective areas and nesting sites for migratory waterfowl.

The Peninsula would not be intensely affected by any additional management program as it already is protected as a state park. In any event Presque Isle's lands and waters now used for recreational purposes or maintained as natural areas should not be significantly altered. Any future recreational development

which does occur should respect all significant ecologic resources within this park.

Presque Isle State Park also has historic significance. A monument erected at the entrance to Misery Bay by the Commonwealth of Pennsylvania in 1926 commemorates Oliver Hazard Perry's victory of the Battle of Lake Erie. It was here that Perry harbored his fleet before the famous Battle.

A second historic site, one of local significance, is the Presque Isle lighthouse. This structure is located on the Lake side of Presque Isle, immediately southwest of Beach 9. The lighthouse has been in continuous operation since 1872.

OVERLAP AREAS

OV-1 Presque Isle Bay
Millcreek Township

Presque Isle Bay is of significance not only as a natural system but also as a socio-economic resource. There is year-round use of the Bay as a recreational area and as Pennsylvania's only Great Lakes harbor.

The Bay is approximately 400 acres in size and its depth ranges from several feet near the shore of Presque Isle and the waterfront area, to a dredged depth of 29 feet at the channel entrance and the harbor area. The shelter afforded by the Presque Isle peninsula virtually eliminates circulation within the Bay. Thus water quality of the Bay is an important environmental issue. The primary contributor to environmental degradation of the Bay is storm sewer overflow which occurs during heavy rainfall periods. The additional storm sewer runoff which normally is processed at the sewage disposal plan near the mouth of Mill Creek cannot be accommodated due to the tremendous additional burden on this facility. Runoff overflow is dumped directly into the Bay with no sanitary processing whatsoever. Thus, additional efforts are required to maintain the water quality of the Bay for the recreational and environmental benefits that it brings.

OV-2 Port of Erie and Waterfront Area
City of Erie

The port and waterfront district in Erie is approximately 825 acres in size with ownership divided among five groups. Private ownership in the form of corporate interests accounts for 46% of the land and water holdings in this area. A few waterlots located at the mouth of Cascade Creek do belong to individuals. The Erie-Western Pennsylvania Port Authority owns about 33% of the waterfront district. The largest and most significant of

these holdings are the Port of Erie, the East and West Canal Basins, and the ore docks, the latter of which were recently purchased from the trustees of the Penn Central Railroad. Approximately 13% of the waterfront district is owned by the City of Erie. These holdings include the sewage treatment plant, a coal storage pier, a grain dock, and a water treatment and pumping plant. The fourth largest land and water holdings, the Cascade Docks, still remain under the ownership of the trustees of the defunct Penn Central Railroad. These holdings which amount to slightly over 5% of the waterfront district, are scheduled for sale in the near future. Conrail has acquired the railroad rights-of-way which run in an east-west direction following Front Street and both the Bessemer and Lake Erie and the Norfolk and Western Railroads are permitted use of these tracks. The Commonwealth of Pennsylvania owns the remaining acreage which amounts to less than 1% of the waterfront district. On this property is the historic replica of the U.S.S. Niagara, Oliver Hazard Perry's flagship during the Battle of Lake Erie in 1813.

The port is currently not utilized to capacity. A comparison with neighboring Lake Erie Ports indicates that the Port of Erie ships only a small fraction of the tonnage of these individual ports. Additional facilities such as a 300 ton capacity crane have improved the shipping outlook, however, and with the occurrence of this and other developments, the port has the opportunity to increase its competitive standing.

The waterfront district is not only a development opportunity area. Recreational activities such as boating and fishing have long been enjoyed here. Within the waterfront area are several small yacht clubs and five commercial marinas with a total capacity of 389 boat slips. Two additional marinas with planned capacities of 350 additional slips are proposed for the immediate waterfront area. There are also one private and three public boat ramps. Fishing is another popular recreational activity along most of the docks and especially along the channel entrance to the harbor.

Also worth noting are three sites of historic significance. The U.S.S. Niagra, mentioned previously, is located on lower State Street adjacent to the West Canal Basin. This replica is one of only three Erie County landmarks which have been placed on the Federal Register of Historic Sites. Perry's shipyards, a second historic waterfront site, were located at the mouth of Cascade Creek. Perry's two flagships the Lawrence and the Niagara, were built in the spring of 1813 because the plans for these two brigs indicated that they would be too large to be constructed at Garrison Run (foot of Peach Street) where the remainder of the fleet was being constructed. Factors such as a beach, many oak trees and a small cascade made this site an opportune place for the location of a shipyard. A third historic site within the waterfront district was the Erie Extension Canal. This Canal ran from the West Canal Basin at the foot of State Street west to

Girard Borough and then south to Crawford County. A horse-drawn boat which took this route would eventually reach Pittsburgh. The canal system was completed in 1844 and remained in use until 1871, by which time the railroads superceded it.

EASTERN STUDY AREA GEOGRAPHIC AREAS OF PARTICULAR CONCERN

Identification #		Size (acres)
	Natural Value Areas	
NV-1	Lake Erie Bluff	-
NV-5	Harborcreek and North East Township Prime and Unique Agricultural Land	21,000
	Recreation, Cultural and Historic Value Areas	
R-7	Sixmile Access Area	75
R-8	Shades Beach County Park	50
R-9	Twentymile Creek Access Area	75

AREAS OF SIGNIFICANT NATURAL VALUE

NV-1 Lake Erie Bluff
Harborcreek and North East Townships

The lake bluffs of the eastern study area extend along about ten of the fifteen linear miles of shoreline in this area. It is within the Eastern Study Area that the lake bluffs reach heights greater than any other bluff areas along Lake Erie. In North East Township, between Twelvemile and Sixteenmile Creeks, the bluffs exceed heights of 170 feet above lake level. Principal access points to Lake Erie are found along the shoreline where the bluffs have been cut by stream runoff. These points include the Sixmile - Sevenmile access area, Shades Beach (Eightmile Creek), the mouth of Twelvemile and Sixteenmile Creeks and several points east of Sixteenmile Creek where the bluffs average only thirty to forty feet in height. Publicly owned points of access are limited to Shades Beach, Orchard Beach and Dalrymple Beach areas. The remainder of the eastern study area bluffs are semi-publicly and privately owned.

Development along these lake bluffs is predominantly limited to residential land uses, however, some agricultural lands still exist north of Route 5 in North East Township. Lakefront areas will continue to attract residential development and the resulting impact on the fragile lake bluffs will increase the need for the protection of these coastal lands. Unlike much of the Erie County coastline, the eastern bluffs are protected from wave-induced erosion by an exposed shale base. The erosion rate is rapidly accelerated by man's actions in this critical zone. Habitat areas for wildlife are also harmed or destroyed as a result. Thus the degree of development must correspond with practical bluff conservation methods.

NV-5 Prime and Unique Agricultural Lands
Harborcreek and North East Townships

The largest of the coastal zone areas of particular concern is the prime agricultural areas of the eastern study region, a 21,000 acre tract which is favorably influenced by the moderating climatic effects of Lake Erie. Vineyard and orchard produce are the principal crops of this area and a unique combination of climatic and soil factors make Harborcreek and North East

Townships among the best producing regions in the nation for Concord grapes.

Development trends in this productive district indicate a growing threat to the agricultural industry here. Prime farmland is important because it is the base from which our present and future supply of food will come. Such land is in limited supply however and cannot be replaced if once disturbed by insensitive development. The Erie Metropolitan area for instance, is expanding into the Harborcreek farm belt, and North East Borough, in the heart of this agricultural district, is experiencing a similar growth pattern in its immediate vicinity. Thus far the high cost of productive land has limited this development trend. Urban pressures are continuing in this area, however, and are not likely to decline. This situation mandates the need for a policy that will ensure the continued agricultural utilization of these valuable lands.

AREAS OF RECREATIONAL, CULTURAL AND HISTORICAL VALUE

R-7 Sixmile Creek Access Area
Harborcreek Township

The beach at the mouth of Sixmile Creek is a potential public access and recreational site. This area of particular concern is about 75 acres in size and is currently used as a privately-owned summer residential district. The eastern study area is limited to only three publicly owned beach access areas and only one of these, Shades Beach, is located in Harborcreek Township. As residential neighborhoods in this area of Harborcreek Township

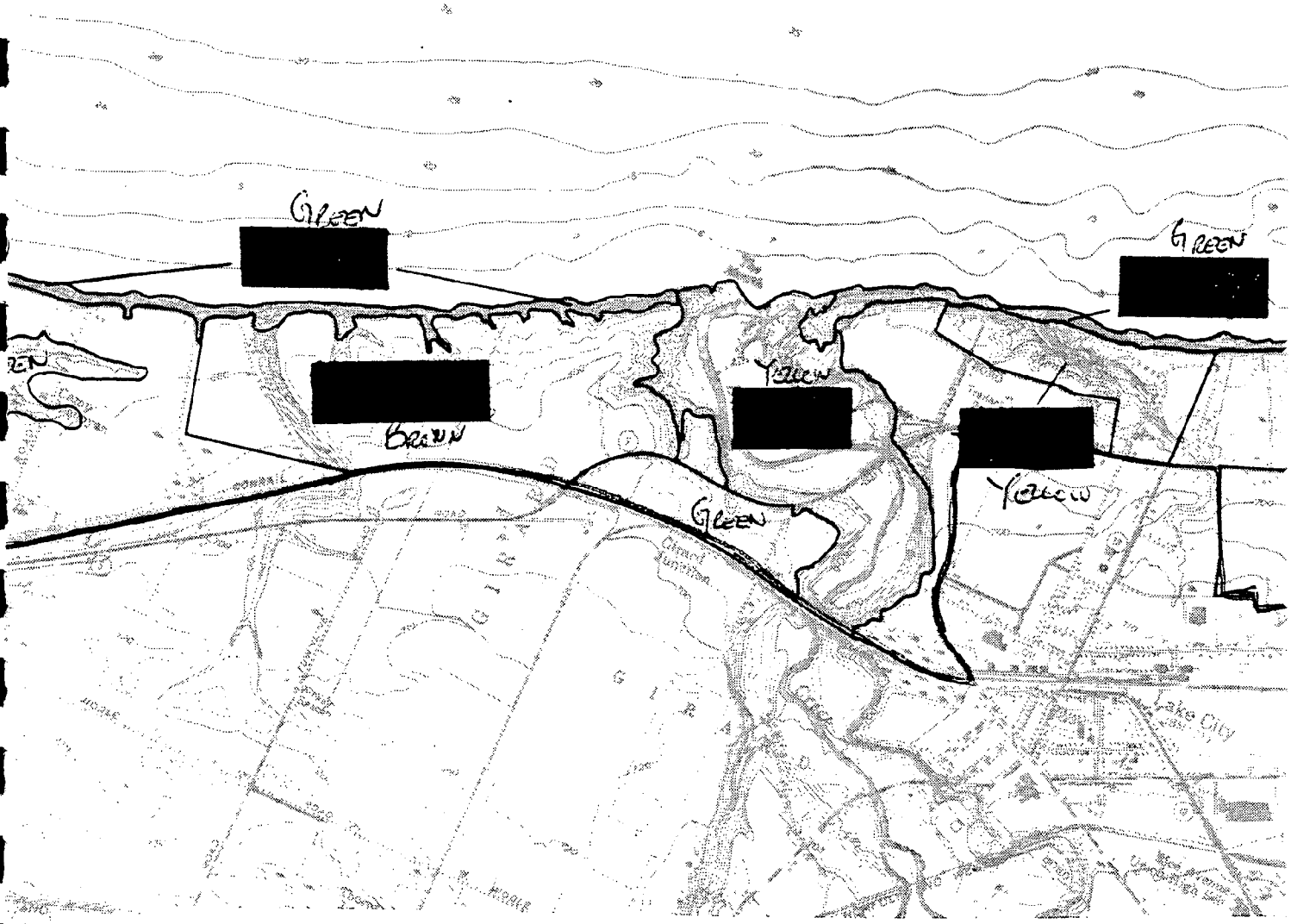
continue to expand, so will the demand for public recreational facilities along Lake Erie. The acquisition of the Sixmile Creek access area would alleviate some of that demand.

R-8 Shades Beach County Park
Harborcreek Township

That part of Shades Beach County Park within the final coastal zone boundary designation is approximately fifty acres in size and has been owned by the County of Erie since its purchase in 1965. Since that time much of this acreage has been developed and now includes facilities such as picnic shelters, children's play apparatus, open areas for field sports, and a boat ramp. Swimming is also available at a small beach just west of the mouth of Eightmile Creek. These recreational facilities are all located on the west portion of Shades Beach Park north of Route 5. The remainder of the park north of this arterial is a natural stream corridor which is completely undeveloped at this time. This small natural area is isolated by topography which reaches heights of about fifty feet on either side of the stream. Most of this area is likely to remain undeveloped except, perhaps, for a proposed perimeter hiking trail which would follow Eightmile Creek.

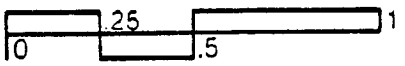
R-9 Twentymile Creek Access Area
North East Township

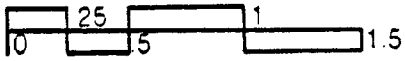
This area of particular concern at the mouth of Twentymile Creek is approximately 75 acres in size and is privately owned. There are approximately three dozen residential units in this area and the majority of these are summer cottages located near the lakefront on either side of the Creek. The insufficient amount of existing public access in the eastern study region makes this area a prime target for development as a recreational site which potentially could include a small boat shelter and launch ramp.



DETAILED SECTOR MAP

1 INCH = 1/2 MILE





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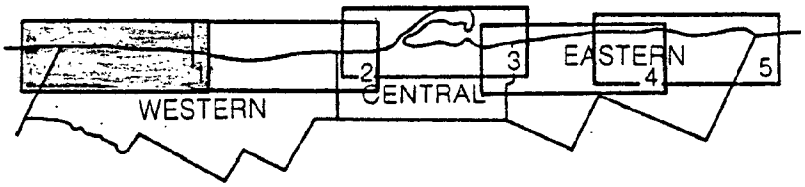
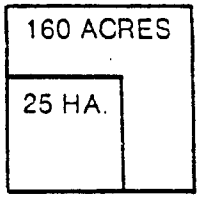
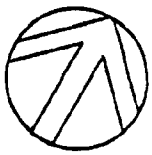
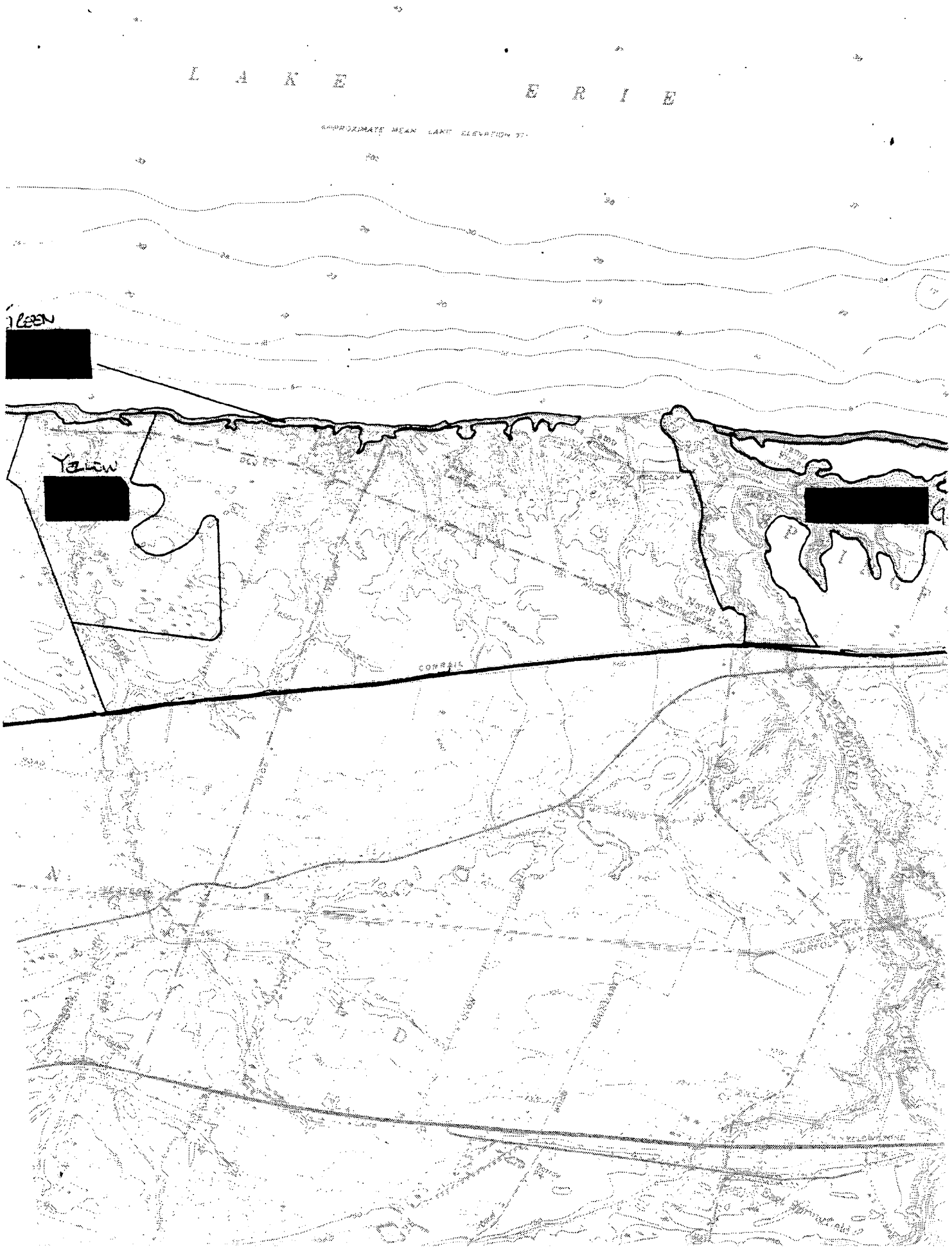
KEY MAP







LAKE ERIE COASTAL ZONE


LAKE ERIE
Green
[redacted]
Yellow
[redacted]
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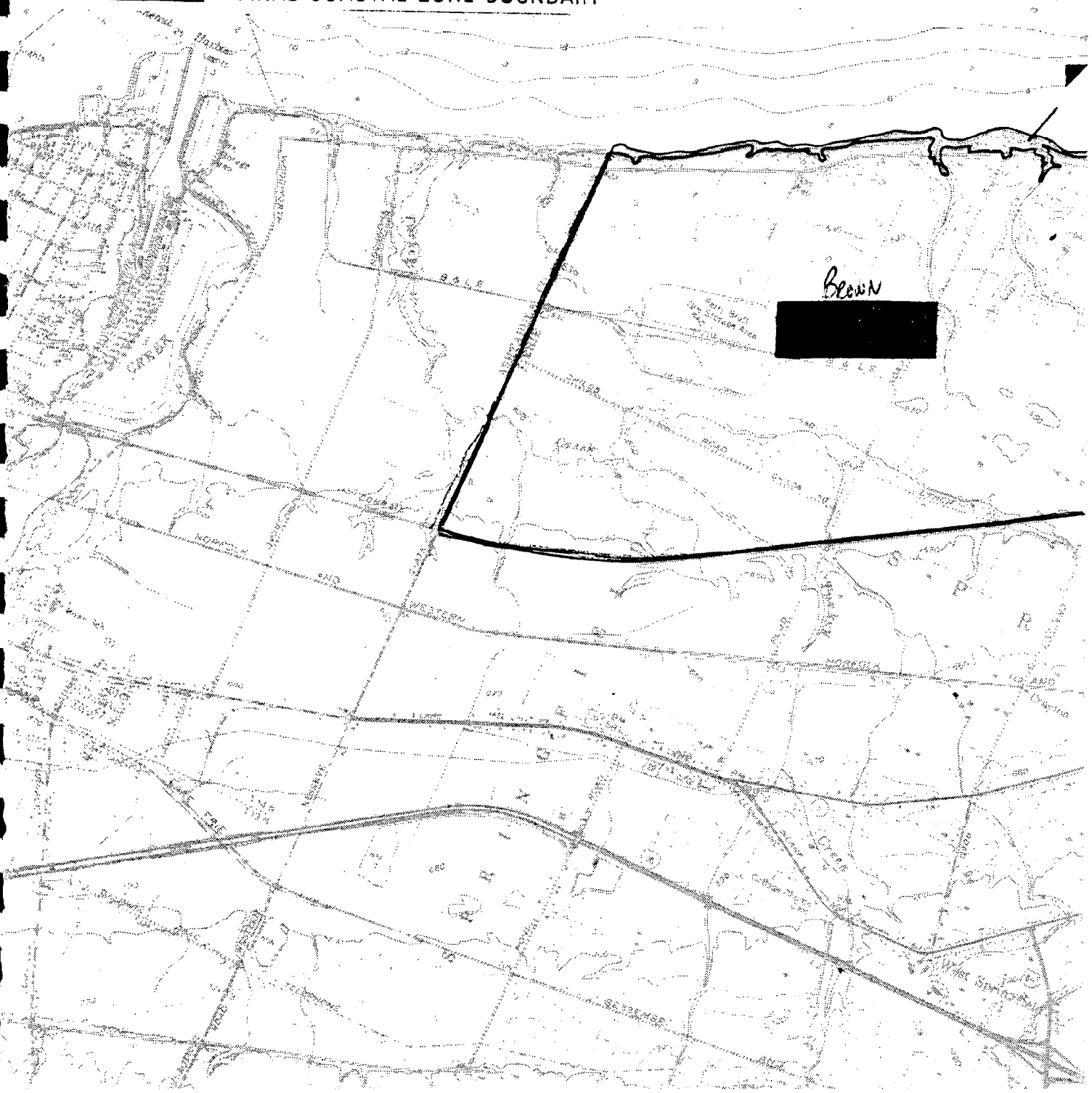
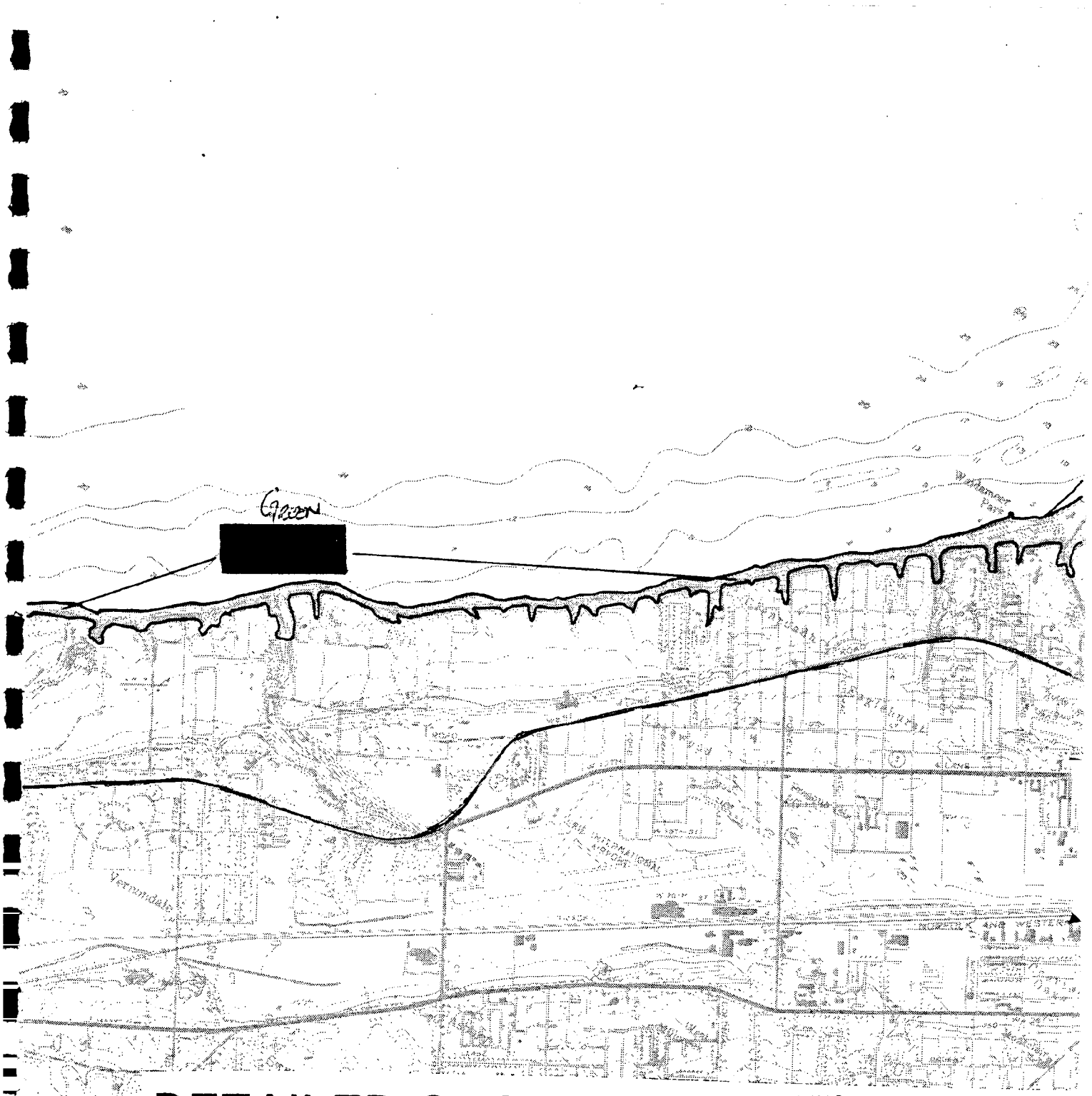
LEGEND

NV-1	AREA OF SIGNIFICANT NATURAL VALUE (GREEN)
DO-1	AREA OF DEVELOPMENT OPPORTUNITY (BROWN)
RV-1	AREA OF SIGNIFICANT RECREATIONAL, HISTORIC, OR CULTURAL VALUE (YELLOW)
OV-1	AREA OF OVERLAP (COMBINATION OF TWO OF THE ABOVE) (GREY
	FEDERAL PROPERTIES (EXEMPT FROM MANAGEMENT)
	FINAL COASTAL ZONE BOUNDARY





DETAILED SECTOR MAP

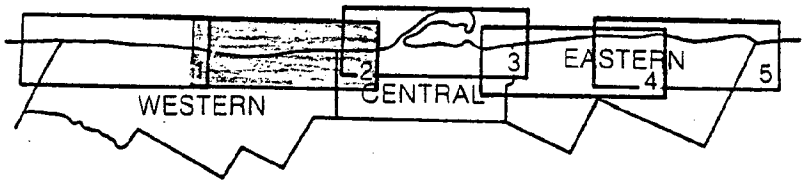
1 INCH = 1/2 MILE

0 .25 .5 1

0 .25 .5 1 1.5

1 INCH = 0.8 KILOMETERS

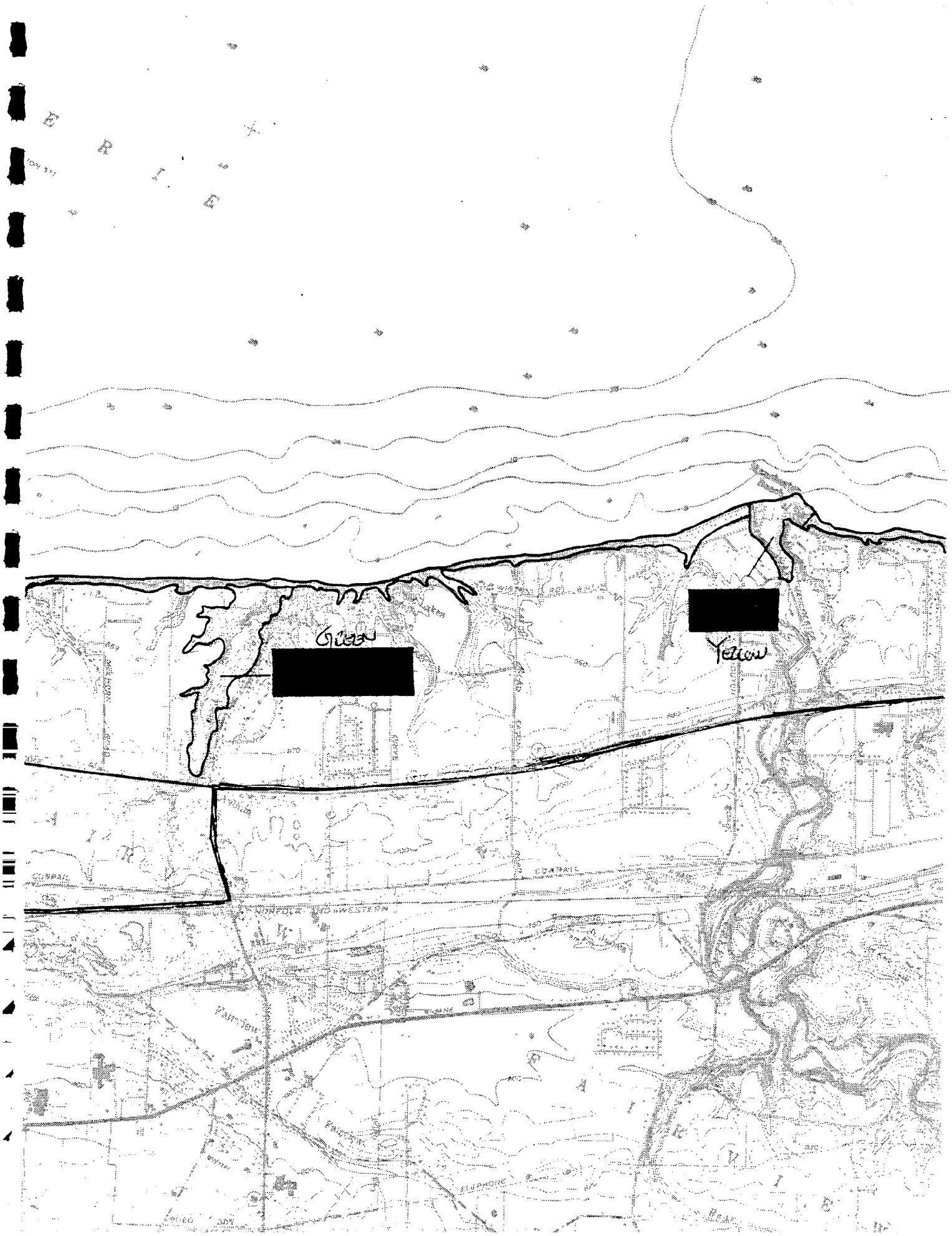
KEY MAP



160 ACRES

25 HA.

LAKE ERIE COASTAL ZONE


Green
[redacted]
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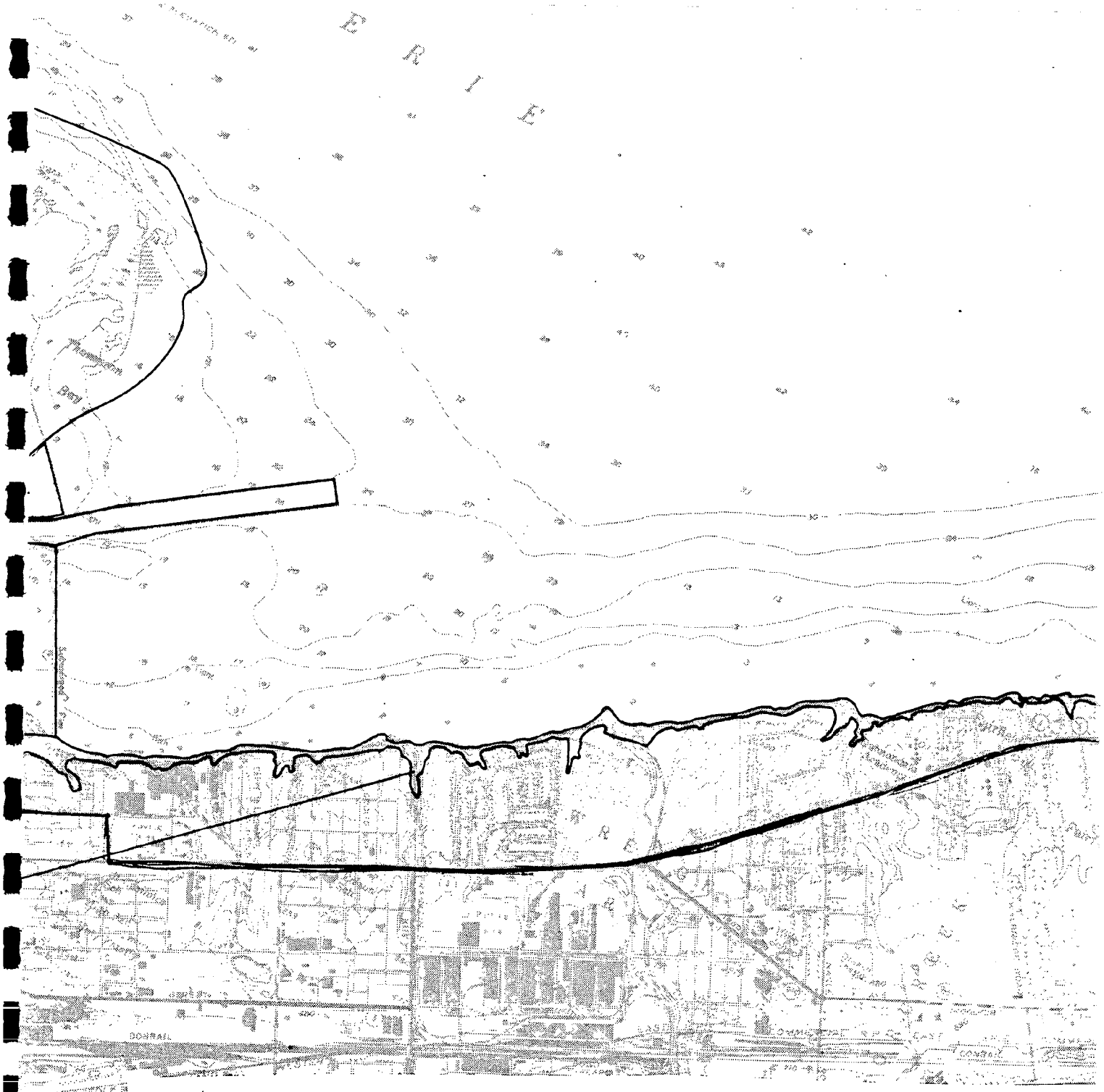
Yellow

LEGEND

NV-1	AREA OF SIGNIFICANT NATURAL VALUE (GREEN)
DO-1	AREA OF DEVELOPMENT OPPORTUNITY (BROWN)
RV-1	AREA OF SIGNIFICANT RECREATIONAL, HISTORIC, OR CULTURAL VALUE (YELLOW)
OV-1	AREA OF OVERLAP (COMBINATION OF TWO OF THE ABOVE) (GREY)
	FEDERAL PROPERTIES (EXEMPT FROM MANAGEMENT)
	FINAL COASTAL ZONE BOUNDARY



DETAILED SECTOR MAP

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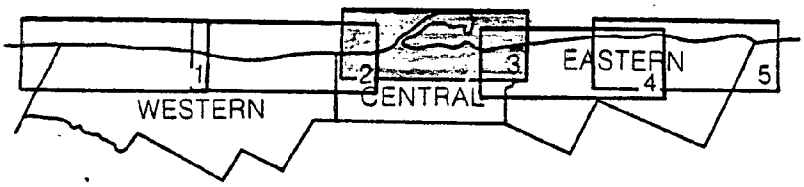
KEY MAP



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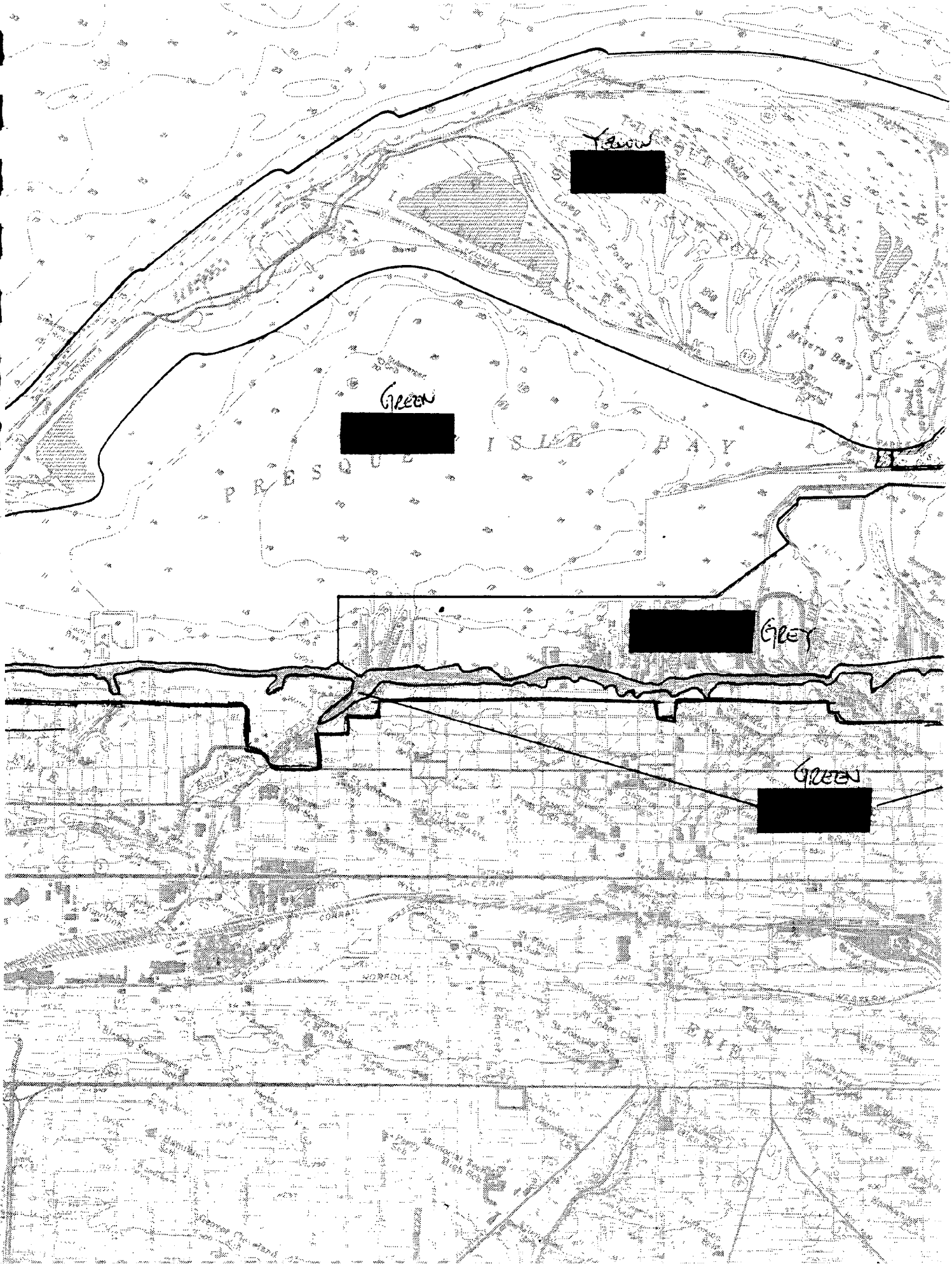
LAKE ERIE COASTAL ZONE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LEGEND

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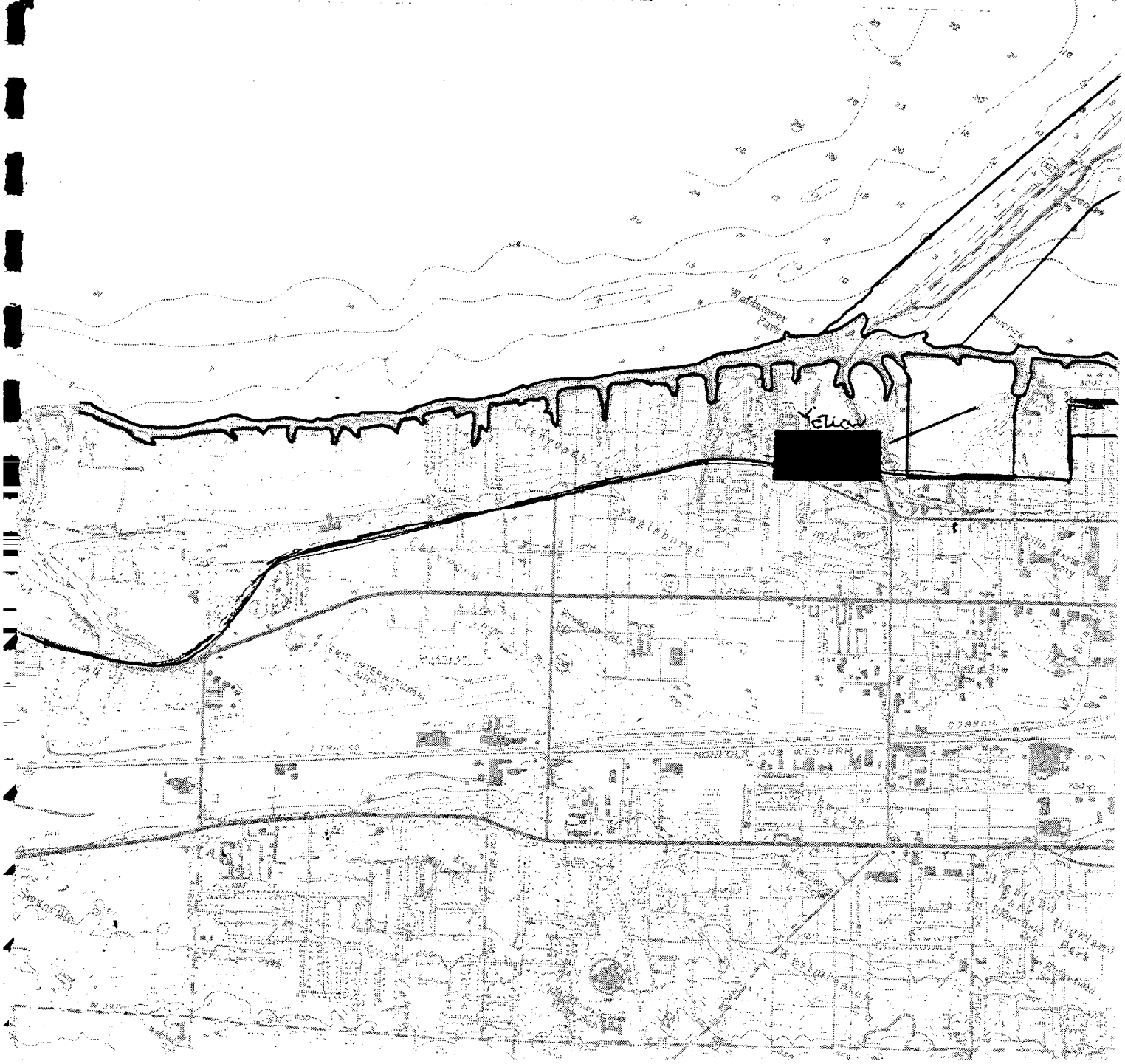

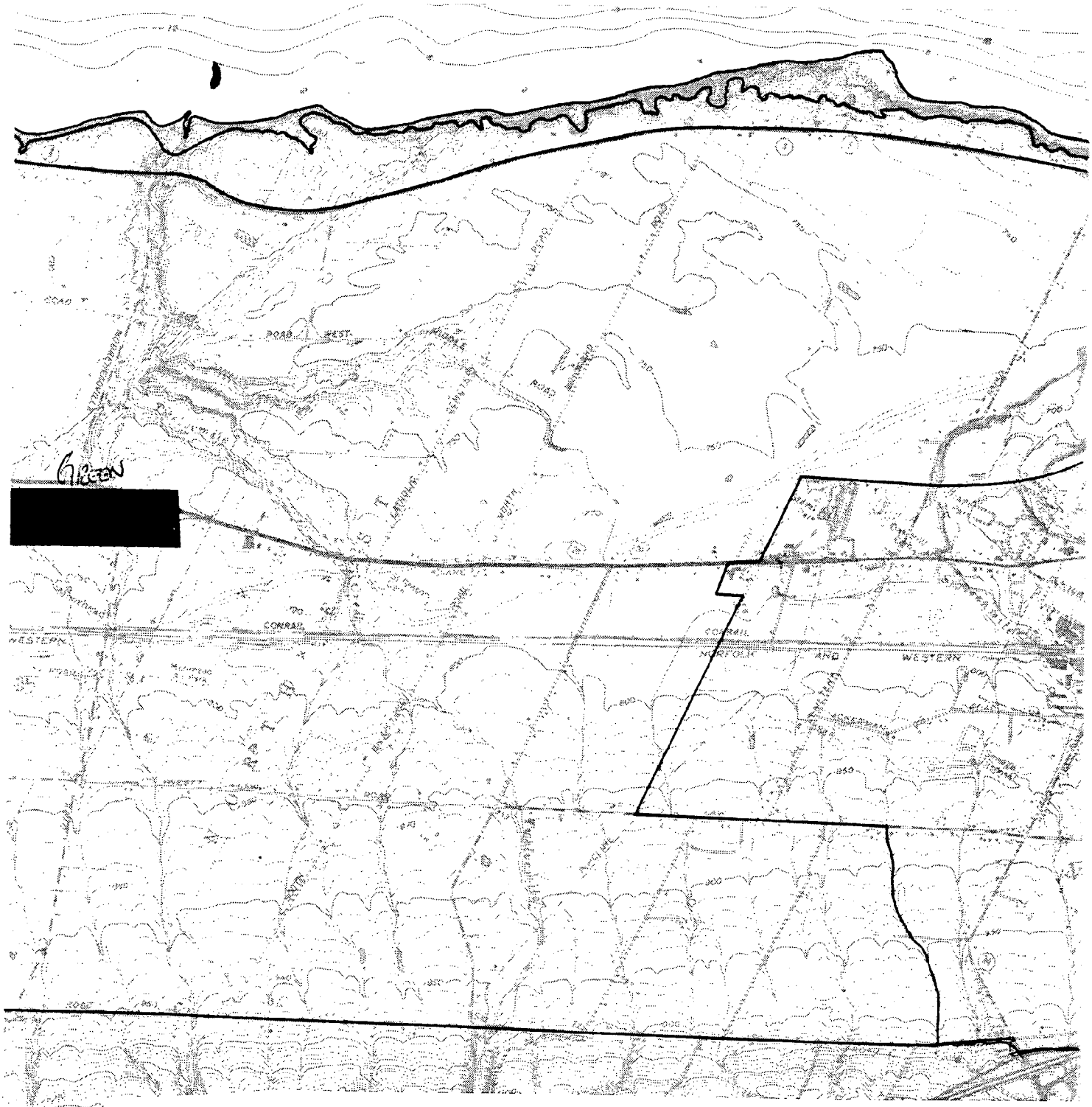

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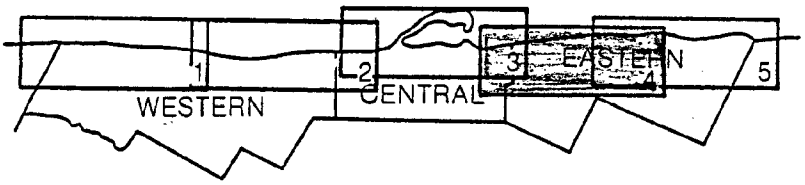
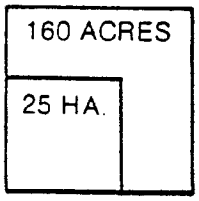
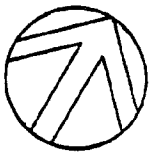
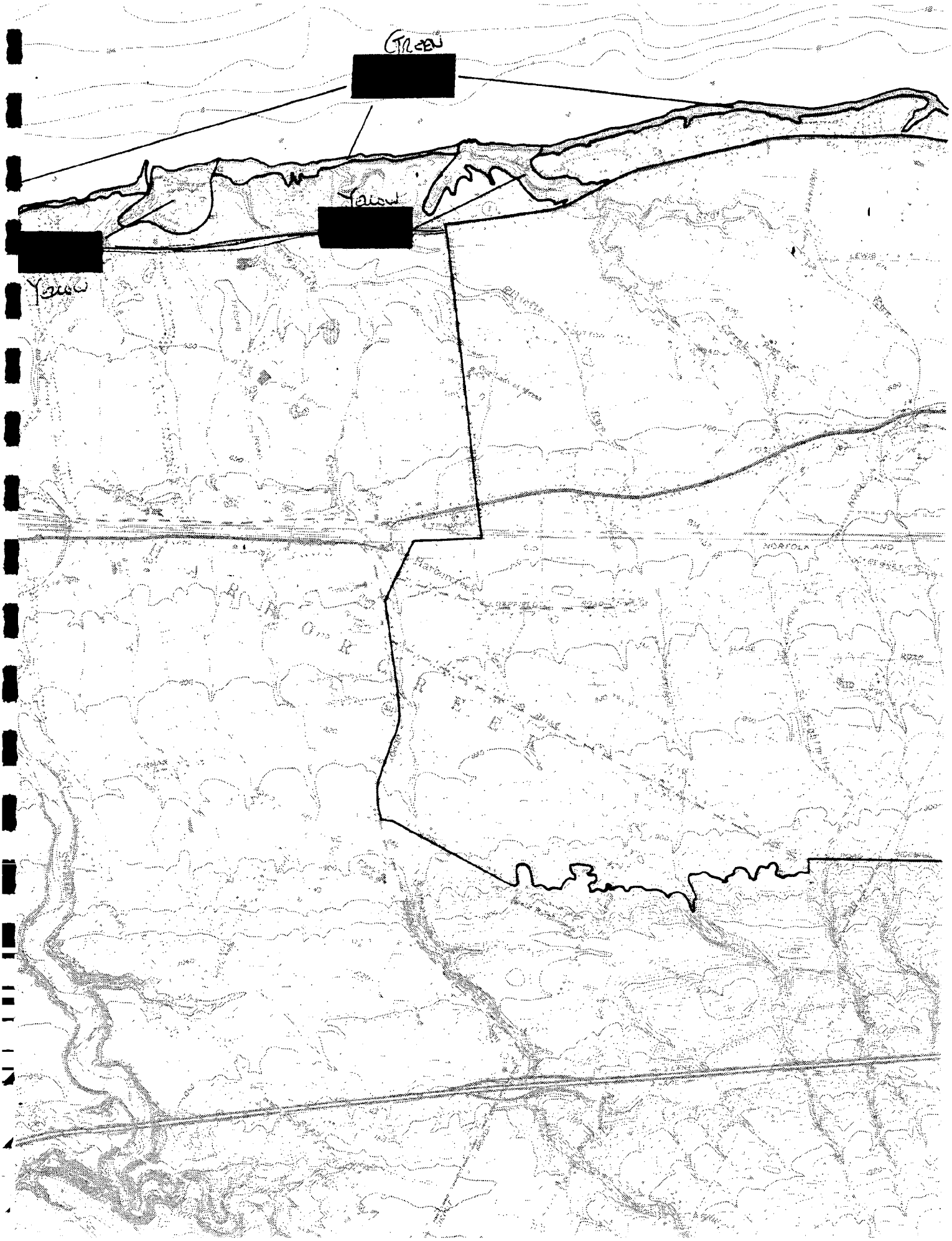






LAKE ERIE COASTAL ZONE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LEGEND

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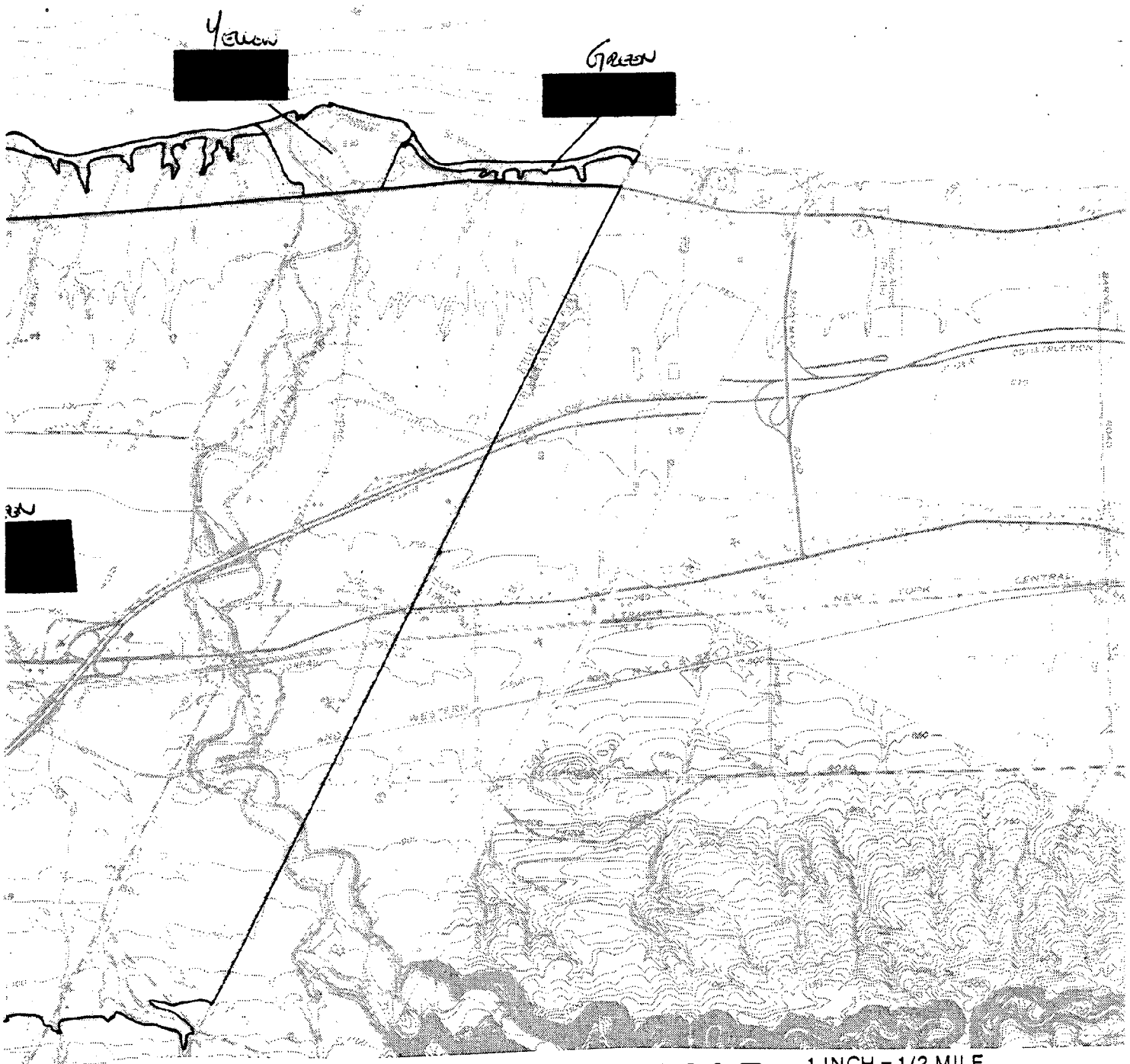

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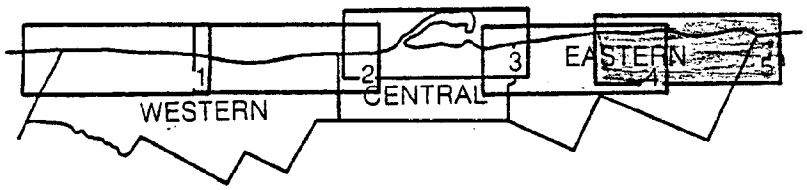
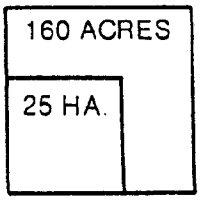
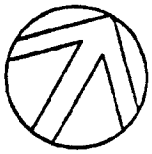
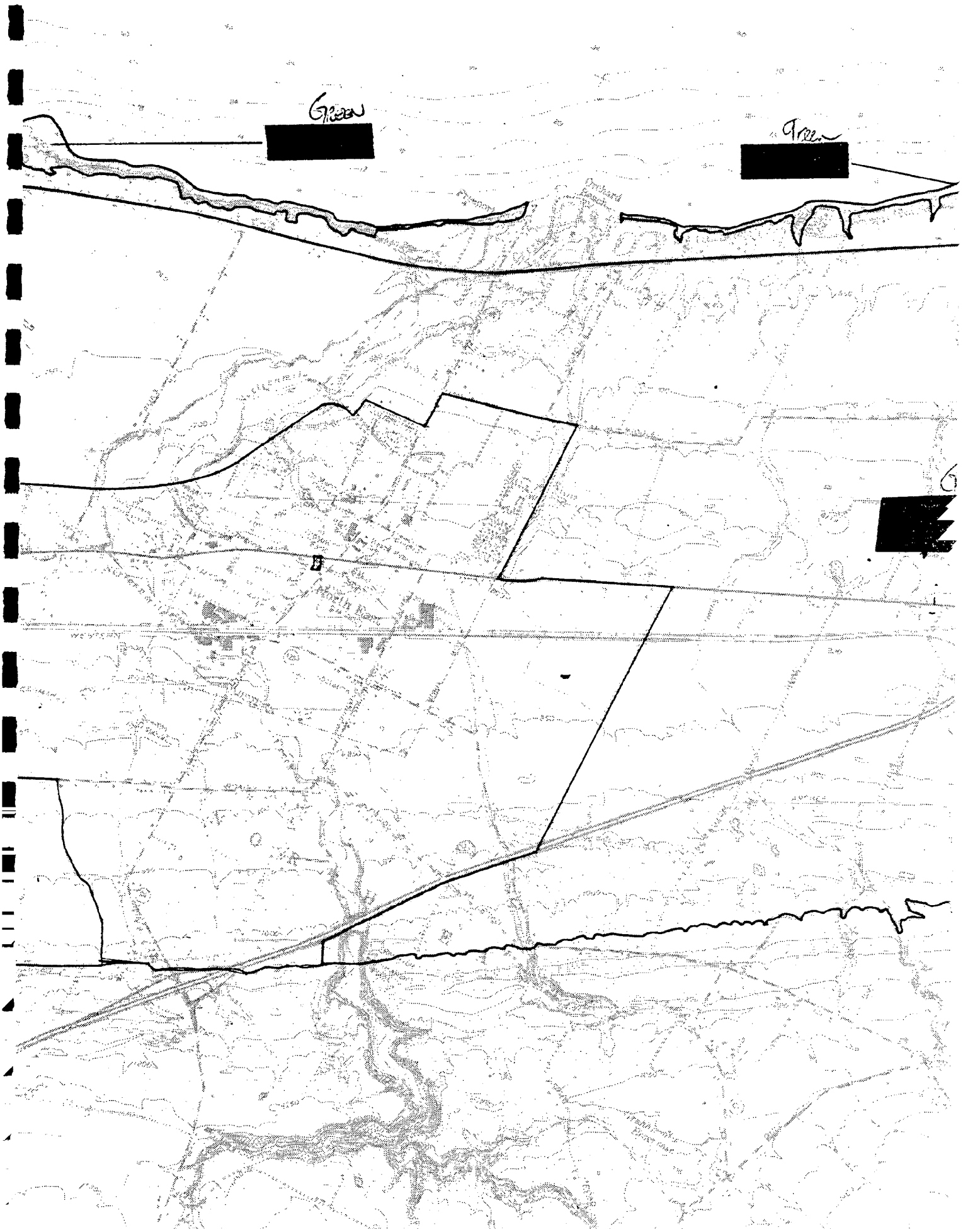






LAKE ERIE COASTAL ZONE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LEGEND

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PRIORITY OF USES IN THE COASTAL ZONE

9

INTRODUCTION 6

Chapter 9, "Priority of Uses in the Coastal Zone," is an important Chapter in the Coastal Zone Management Program. In this Chapter, recommendations are made for the priorities given to the use of resources within the coastal zone. These recommendations represent the culmination of previous Chapters including, the Inventory (1), the Identification of Problems and Issues (2), Projection of Future Land and Water Requirements (3), the Delineation of Coastal Zone Boundary (6), and critical areas called Geographic Areas of Particular Concern (8).

Section 305(b)(5) requires that the management program contain "broad guidelines on priorities of uses in particular areas including specifically those uses of lowest priority." In implementing this requirement, two sets of priority ratings will be introduced in this Chapter. The first set, a general list of coastal-wide priorities for land and water uses, is notable for its consideration of uses of "regional benefit" and facilities of "national interest." The second, more specific set of priorities relate to four kinds of Geographic Areas of Particular Concern (GAPC's), which are those land areas where the most critical land use decisions will have to be made in the future.

This Chapter is important for two reasons.

- Priority recommendations give a clear indication to state and local officials of statewide objectives for the use of coastal resources.

- Since several uses will generally be identified as high priority the chapter will encourage flexibility in the development of GAPC's.

The purpose of this Chapter is to clearly state the guiding policies behind priority recommendations. Whereas in Permissibility Analysis, Chapter 7, the balance between beneficial and adverse impacts of resource use determined the acceptability of uses along the coast, this Chapter defines the preferences for different uses. Uses to be discouraged, defined in Chapter 7, will rank as low priority, while those that were judged previously as "uses to be encouraged" or "uses to be conditionally permitted" will now be reevaluated in greater detail, and for more specific locations. This reevaluation will define the regional priorities that should be promoted within the Coastal Zone.

BROAD PRIORITIES FOR RESOURCE USE

Overview - The priority analysis proceeds in two steps - first for the entire coastal zone and then for the particular areas identified in Chapter 8 as GAPC's. The first part of priority analysis described in this section of the Chapter primarily outlines broad, coastal-wide policies for the use of coastal resources.

Three considerations influence coastal-wide priorities.

1. The demand for uses of greater-than-local concern (including uses of regional benefit and faciltities of national interest) is an important consideration in establishing priorities.

2. In addition, water-dependent uses are given priority either water enhanced or non-water related uses.

3. The third factor is the nature of impacts associated with each use, an extension of the impact analysis already used in Chapter 6 and 7. Uses with benign or beneficial impacts are given higher priority than those with mostly adverse impacts on physical or socioeconomic resources.

Demand for Uses of Greater-Than-Local Concern - Much of the development which will take place in the Coastal Zone will be of strictly local concern. Small residential developments and the

"neighborhood" commerical areas which serve them will not significantly affect coastal resources and, therefore, will not be subject to any new requirements as part of the Coastal Management Program. However, some developments are of greater-than-local concern because they serve a larger constituency and/or have impacts that "spillover" to neighboring communities. The federal guidelines for the Coastal Zone Management Act require that each state's management program address development projects that have a side influence. More specifically, the management program must consider "uses of regional benefit" and "facilities of national interest," assuring that such uses are not arbitrarily excluded from the Coastal Zone nor neglected when planning the use of coastal resources. To assure adequate consideration of uses of regional benefit or national interest, one major factor in establishing coastal- wide priorities is the demand in the Coastal Zone for uses of greater-than-local concern.

The Delaware Estuary Coastal Zone, as one of the major seaports in the nation, is a major center for activities of regional and national significance. Most of the types of land and water use that can be considered "greater-than-local concern" are already represented in the coastal zone, including:

- An international airport

- Four major petroleum refineries

- Related petrochemical industries 80

- A naval base 82

- A large ship building facility 84

- Two modern marine terminals 86

- One of the largest steel mills in the country 88

- Six electric generating stations 90

- Numerous sewage treatment facilities 92

- Sand and gravel extraction operations 94

- Channel dredging and spoil disposal 96

- Several State Parks and other "region-serving" 98
recreational facilities 98

The Coastal Zone Management Program must recognize that these 100
facilities are crucial, and provisions must be made to plan for 101
their continued existence and vitality. 101

This Chapter will not attempt to differentiate between those uses 103
which are of "regional benefit" and facilities that are of 104

"national interest". Many uses of regional benefit are also of national interest. Instead of attempting to make this distinction it is important to recognize that:

- Both kinds of uses are extremely significant

- That the Coastal Zone may very well provide the ideal location for these activities, and

- That uses of regional benefit and facilities of national interest are almost always of greater-than-local concern, with major impacts, affecting more than one community.

For these reasons, if conditions indicate that these facilities of greater-than-local concern are reaching capacity or will be inadequate to serve future demand, they should be given high priority in the Coastal Management Program.

In previous Chapters of this report, there has been considerable discussion of major problems and issues, future demands on resources, and goals and policies for coastal management. These discussions have set the foundation for identifying the "demand" for uses of regional bendfit and for facilities of national interest. Figure ix-1 shows those uses for which a demand has been identified, followed by a reference to the section of this document where the demand was discussed.

Figure ix-1

Demand for Uses of Greater-Than Local Concern

(Regional Benefit and National Interest)

Uses	Relevant Chapter of Section of Coastal Zone Management Report Establishing Demand
HIGH DEMAND	
1. New industries (to stabilize the city's job market).	Chapter II; Chapter III, port viability; Chapter V, Economic Health and Revitalization.
2. Preservation of Tinicum Marsh and other areas of high ecological value.	Chapter II; Chapter V, Problem #3 in Land Use Resources, Environment.
3. Public-recreational facilities as exclusive uses or in combination with other uses and facilties.	Chapter II; Chapter III, Recreation Demand; Chapter V, problem #8 in Land Use, Resources, Environment.
MODERATE DEMAND	
1. Upgrade port facilities and land transportation linkages.	Chapter II; Chapter III, Future Port Viability; Chapter V, Economic Health and Revitalization.
2. Improve water quality through upgraded waste treatment. (This problem is currently being addressed by other program).	Chapter I, Water Uses and Resources; Chapter II; Chapter III, Water Resources; Chapter V, Land Use, Resources and Environment.
3. Dredge Spoil Disposal Sites.	Chapter II, Chapter V, Problem #1 in Land Use Resources and Environment.
LOW DEMAND	
1. Deepwater Port/Pipeline and Expanded Refineries.	Chapter III, External decisions.
2. Expansion of Power Generation.	Chapter III, Water Resources and external decisions (adequate sites already available).

Water-Dependency of Uses - The second factor influencing coastal-wide priorities is the dependency of land-use activities on the river. Three categories of dependency are defined below, and examples of uses fitting each category are given.

- Water-dependent uses - require direct access to large volumes of water or to the marine channel. Uses defined as water-dependent include:

  1. marine terminals and other pier or dock facilities

  2. electric power generating facilities

  3. sewage treatment and water supply facilities

  4. shipbuilding manufacturers

  5. natural aquatic processes, such as fish breeding and wildlife habitat.

- Water-enhanced and "port-related" uses - derive benefits from access to the River or marine facilities but could, if necessary, locate elsewhere. Water-enhanced uses include:

  1. sand and gravel processing

2. land transportation (rail, highways) 155

3. bulk storage and truck terminal facilities serving 158
the port 158

4. industries needing cooling or process water, such 160
as petroleum refineries, chemical and primary metal 161
industries 162

6. labor-intensive manufacturing attracted to port 164
facilities 164

. Non-water related uses - have no direct link to river 166
water or the port economy (although aesthetic benefits 167
may be obtained). Such uses include: 168

1. residential 170

2. community service 172

3. wholesale and commercial trade 174

4. agriculture 176

5. most warehousing and storage 178

6. solid waste disposal 180

Assessment of Impact - The third factor influencing coastal-wide priorities is the nature and balance of the anticipated impacts on coastal resources. The impacts associated with the use of physical and socioeconomic resources have been previously described in Chapter 7, using capability and suitability analysis.

While it might appear desirable to simply encourage uses with positive impacts and discourage uses with negative impacts, this procedure will not produce satisfactory results. Because uses with negative environmental impacts often have significant positive economic impacts, priorities must consider the "balance" between positive and negative impacts. Uses which combine the greatest positive benefits with the fewest negative impacts (i.e. those that have net positive impacts) should should be assigned the highest "scores". In terms of the language of Chapter 7, those land and water uses which combine the greatest number of O's (for opportunity) with the fewest C's (for constraints) should be actively encouraged through the establishment of priorities in GAPC's.

The process of setting broad priorities for the entire Coastal Zone includes analysis of demand for uses of greater-than-local con concern and degree of water dependency as well as impact assessment. The addition of the first two distinguishes this process from the Permissibility Analysis, described in Chapter 7.

Ranking Coastal-Wide Priorities - The three parameters discussed above - coastal-wide demand, water dependency and impacts - were combined to give an overall priority ranking to uses within the coastal zone. Uses were assigned to one of three priority classes - high, medium, or low priority based on ratings received in each of the three categories. The results are arrayed in Table ix-2.

PRIORITIES FOR USES IN GAPC's

Introduction - Chapter 8 introduced four kinds of Geographic Areas of Particular Concern - Areas of Significant Natural Value, Areas of Significant Recreational, Historic or Cultural Value, Development Opportunity Areas, and Overlap Areas. In this section of Chapter 9, priorities for uses within these four kinds of GAPC's will be developed.

GAPC's are those portions of the coastal zone where the most significant land-use decisions will be made in the future. GAPC's are also the areas in which uses of high, coastal-wide priority may be best located. Much of the future development activity is likely to take place in Development Opportunity Areas. The best opportunities to acquire or protect new parkland

BROAD PRIORITIES FOR THE COASTAL ZONE

High Priority	Demand	Water Dependency	Net Impact	Overall Ranking
1. Developed Waterfront Recreation (marinas, boat ramps, etc.)	High	Water Dependent	Positive	High
2. Preservation of Wetland and Natural Areas	High	Water Dependent	Positive	High
3. Modern Marine Terminals	Currently under study	Water Dependent	Positive Socio-econ.;Env. impacts could be negative	High
4. Manufacturing	High Demand in Region, declining in Coastal Zone	Water and port enhances	Positive Socio-econ. impacts; labor intensive	High
5. Multiple-Use Projects	Few examples currently available	Water Enhanced	Positive	High
Medium Priority	**Demand**	**Water Dependency**	**Net Impact**	**Overall Ranking**
1. Expansion of Energy Generating Facilities	Immediate demand Necessary sites are available	Water Dependent	Positive Regional impacts. Possible negative env. impacts	Medium
2. Petroleum Refinery	Moderate Demand depending on OCS developments, Regional Benefit/Nat'l Int.	Water enhanced; requires water for processing and shipping	Negative Env. Impacts. Few jobs, capital intensive	Medium
3. Up-grade railroad, highway and air transportation	Moderate, better utilization of existing facilities	These uses support port facilities	Overall impact positive with neg. impacts at site specifications	Medium
4. Sand and Gravel Mining	Moderate	Water enhanced; shipping is more economical by water.Activity restricted by location of deposits	Very Variable	Medium
Low Priority	**Demand**	**Water Dependency**	**Net Impact**	**Overall Ranking**
1. Agricultural Activities	Low, land is too valuable for alt.use	Not water dependent	Env. impact varies by crop & management practice. Aesthetic impacts are sometimes positive.	Low
2. Development Activities without provision for multiple use & public access	Medium;Traditionally multiple use and public access are not encouraged	Many are not water dependent	Potential neg. impact as access is blocked by development	Low
3. Solid Waste	Low demand in Coastal Zone - land values are too high	Not water dependent	Potential neg. env. impacts unless great care is exercised.	Low

and wildlife habitat areas or to improve existing ones, are within Areas of Significant Natural Value and Areas of Significant Recreational, Historic or Cultural Value.

Methodology - The objective of this analysis is to identify the activities which are most appropriate in each of the four kinds of GAPC's considering the distribution of available resources. Activities of high, medium or low priority will be recommended for the four GAPC classes drawing upon the Impact Analysis (described in Chapter 7) and the coastal-wide priorities presented in the preceding section.

An important step in identifying appropriate activities for different types of GAPC's was accomplished at the time the areas were first identified. The identification process required the inventory and analysis of physical and socioeconomic resources of potential sites. The classification of these sites into one of four classes strongly indicates the priority of uses appropriate to each GAPC. Lands with the greatest potential for open space, recreation, resource management and wildlife habitats were chosen as Areas of Significant Natural Value. Lands being actively promoted for development by private and public agencies and those best able to support growth were selected as Development Opportunity Areas. Lands in the "Overlap" category present conflicts between alternative uses with high priority.

The recommendations made below set out general policies for use of GAPC's and then give examples of the kinds of activities consistent with the policies. Coastal-wide priorities were used as a reference to assure that high priority uses were allocated to the appropriate GAPC.

Although recommendations for land use activities have been made only for the four classes of GAPC's specific comments have been included, where appropriate, on the need for "immediate action". Those GAPC's requiring improved management, or planning studies to identify an appropriate management strategy, have been identified for high priority attention. In each of the following sections there will be a discussion of the criteria used to determine GAPC's requiring immediate action.

Priorities for Uses in Areas of Significant Natural Value - The wildlife and vegetation communities within these GAPC's are particularly scarce in the Coastal Zone because much of the riverfront has been disturbed by past development activity. An important goal of the Management Program is to protect and to enhance the natural functions of these few remaining natural areas.

- High Priority Activities

  1. Uses that protect, maintain or enhance natural resource functions. The protection of these areas

as open space, passive recreation and wildlife preserves, and the removal of trash and restoration of natural plant communities are examples of high priority activities.

2. Uses, such as bird-watching, hiking, and scientific or educational study, that take advantage of the natural amenities without destroying them.

- Medium Priority Activities

1. Uses that cause minimal disturbance of ecosystems but which are supported by natural settings, for example, parks with picnic areas, ponds, trails, and limited parking.

2. Limited development activity, such as boat launches and other recreation facilities in cases where the developed portions are on those margins of the natural area most suited to development.

3. Utility and communication rights-of-way are acceptable only in cases where restoration of land to natural conditions can be successfully carried out, or where rights-of-way incorporate active recreation activities such as trails.

- Low Priority Activities 273

Any intensive development activity which will cause 275
widespread, irreversible destruction of natural 276
ecosystems. 276

- Areas Requiring Immediate Action 278

All lands in this catgory have environmental importance, 280
but not all sites are equally protected from future 281
intensive development. Areas requiring immediate action 283
include: 283

NV-1 - Little Tinicum Island - privately owned and 286
zoned for industrial development. While no 288
development has been proposed recently, the 288
area was once considered as a location for the 288
disposal of dredged spoil. 289

NV-2 - Tinicum Marsh - privately owned and slated 291
for acquisition by the Department of Interior 292
to expand the National Environmental Center. 293
Plan for development of a shopping center have 294
been proposed within this GAPC 294

Other areas identified in Chapter 8 as areas of 297
Significant Natural Value are not in immediate jeopardy 298

but must be considered and incorporated into local plans, and zoning ordinances.

Priority of Uses in Development Opportunity Areas - Buildable lands, fully served with urban infrastructure, can be used to satisfy many essential purposes - development of new manufacturing plants, siting facilities of regional benefit and national interest, and providing public access to the river. The goal is to attract uses to these areas that create jobs and enlarge the tax base, while at the same time improving the visual character of the shoreline by upgrading vacant and under-utilized lands. Preference should be given to those uses requiring large volumes of water or access to the marine channel.

- High Priority Activities

  1. Development of new manufacturing facilities, preferably designed in such a way as to offer "multiple-use" recreational access to the river. The recreational use of industrial areas could be during non-working hours.

  2. Such high impact uses as petroleum refining and dredge spoil disposal may be located in those particular GAPC's contiguous with existing refineries or disposal sites. Special care should be exercised to insure that spoil disposal areas

can be reclaimed and used for necessary, 318
river-related activities. While these spoil 320
disposal areas are often developed for recreational 320
purposes, Development Opportunity Areas may be too 320
valuable to be devoted solely to recreational 321
reuse. 321

3. Development or expansion of marine terminal 323
facilities to serve anticipated expansion in demand 324
for containerized shipping. 324

4. Activities that upgrade the efficiency of highways 326
and railroads that are conduits for goods delivered 327
to the port. 328

5. Expanded government services to those manufacturers 330
already located within these Development 331
Opportunity Areas, thereby helping to forestall 332
relocations outside the coastal zone. 332

1. Medium Priority Activities 334

1. Development of commercial, warehousing, and 336
wholesale activities, preferably designed to offer 337
recreational access to the river on weekends. 338

2. Residential or "mixed-use" developments at the riverfront especially when public access is provided.

3. Development of marinas, boat launches and fishing piers. In many cases, it will be difficult to design attractive, pleasant recreational facilities in Development Opportunity Areas. Instead of investing large sums to make these areas suitable for recreation, it would be more appropriate to take advantage of areas designated as GAPC's of Significant Natural Value, or of Recreational, Historic, and Cultural Value.

Low Priority Activities

1. Natural resource management is not feasible in these areas because there are no natural ecosystems of any consequence.

2. Solid waste disposal on public and non-industrial private lands is low priority. Such disposal is acceptable on idustrial lands when strict environmental safeguards are used.

3. Any development which jeopardizes the quality of life in adjacent communities by increasing noise,

traffic, and odor would have to be carefully scrutinized and be acceptable to the neighboring municipalities. No development that exceeded state and federal environmental standards would be permitted, even in Development Opportunity areas.

- Areas Requiring Immediate Action

Of the seventeen Development Opportunity Areas that have been identified as GAPC's in Chapter 8, the following appear to be the most critical at this time.

DO-6 Fort Mifflin/Penrose - Much of this GAPC is Federally owned and, therefore, not technically subject to Coastal Management. A proposal by the U.S. Army Corps of Engineers to add 15 to 20 feet of additional hydraulic fill to this area conflicts with Philadelphia's plans for industrial development. This key piece of land at the confluence of the Schuylkill with the Delaware is currently the object of a special demonstration study by the Corps which will examine strategies for the eventual reuse of this area. The area is especially important to Coastal Management because of its large size and strategic location.

DO-7 Mustin Field - This GAPC is also Federally owned and as such is not subject to Coastal Management. Some of the area has been devoted to housing which appears to be a low priority use for this key piece of waterfront land. Future use of the area should be more closely aligned with Coastal goals for resource use.

DO-12-Frankford Arsenal - is currently Federally owned, but may eventually be declared surplus property since the facility has been disbanded and relocated. At various points in the past, this facility employed thousands of the region's residents and efforts must be made to identify and promote an appropriate reuse for this site. As a Development Opportunity Area, first priority should be given to uses of regional benefit or national interest identified previously, especially if the use requires access to the river.

DO-15-Turkey Hill/Van Sciver Area - this 2000 acre GAPC is the largest Development Opportunity Area identified in Chapter 8. Zoning changes have already been granted for the first phase - a new, mixed-use development. Adjacent communities will be affected by this large

development which may eventually house new residents. Care must be exercised to see that future development respects and makes maximum use of the sensitive lakes in the vicinity.

Other Development Opportunity Areas are important because of their ability to provide a suitable location for new industry and its associated job. If suitable locations are to be found in the Coastal Zone for Uses of Regional Benefit and National Interest, these GAPC's will be required.

Priority of Uses in Areas of Significant Recreational, Historic or Cultural Value - These areas have significant social value to citizens as a resource for recreational and cultural activities associated with the river and port. The goal of the coastal program should be to protect, maintain, or restore these areas, which include several existing state, county and local parks.

- High Priority Activities

  1. Activities that maintian or increase the resource value of these GAPC's such as better access and walkways, increased parking, improved security, new park equipment, public boat launches, landscaping, etc.

2. Activities which provide financial support; e.g. 418
subsidies, public acquisition, fund raising. 419

3. For lands in private ownership, acquisition of 421
easements that permit access to the shoreline 422
should be encouraged. 423

- Moderate Priority Activities 425

1. Commercial activities of limited extent supporting 428
recreational activities. 429

2. Residential development which helps to upgrade the 432
character of these GAPC's and which furnishes 432
recreational opportunities otherwise not provided 433
to residents in adjacent neighborhoods. 433

- Low Priority Activities 435

1. Development, public or private, which fails to 437
contribute to the cultural, recreational or 438
historic activities in the area. 439

- Areas Requiring Immediate Action 441

Of the twenty-two GAPC's identified in Chapter 8 as 443
areas of Significant Recreational, Historical, or 444

Cultural Value the following appear to require the most immediate attention.

R-7 Schuylkill River Park - Development of this park is just getting underway although the project has been discussed for several years. It would form an ideal extension of the park south of the Philadelphia Art Museum.

R-8 Penn's Treaty Park - Has a good central city location but has fallen into a state of serious disrepair. Improvements and revitalization would emphasize the benefits of riverfront access, without the expenditure of large sums of money.

R-9 Mouth of the Pennypack - Reportedly discussed as a potential park addition for many years. This area is currently used for the disposal of incinerator residue. It's already publicly owned and could be readily developed to relieve pressure on the nearby Pleasant Hill Park, where demand for boat launching taxes available facilities.

R-15 Neshaminy State Park - Requires maintenance, better signing and more launching ramps with additional parking for cars and trailers.

R-22 Falls Township Access Area - This area was donated to the Township for public use but has not yet been developed. If designed as a waterfront recreation area serving a variety of functions, this park could draw attention to improved water qulaity in the Delaware and the benefits of Coastal Zone Management.

Priority of Uses in Overlap Areas - Overlap Areas contain resources of value both for development activities as well as for recreation and natural resource management. Each area has a wide range of alternative uses which, while not mutually exclusive, may pose problems for wise use and sensitive management. However, with careful site planning, development may be made compatible with the natural resources within the Overlap Area. Because the distribution of resources is unique for each area, the priority of uses for the six Overlap Areas are discussed separetely below.

OV-1 Penn's Landing - The development plans for Philadelphia's Penn's Landing are well established. The site is being developed to accomodate a mix of uses - commercial, recreational, cultural and residential uses. Except for minor changes in the master plan, options for alternative sets of uses have been resolved. This area represents a major focal point of the Delaware Estuary Coastal Zone,

but the tremendous expense involved makes replication of this concept extremely difficult.

OV-2 Linton Avenue-River Road - This 80 acres of wooded land owned by Rohm and Haas is surrounded by a mixture of uses. A public school and a residential neighborhood border on the north, and across River Road to the south, Rohm and Haas and a second chemical company have industrial facilities and waste disposal lagoons. Between the wooded area and River Road, Philadelphia Electric Company (PEC.) has a transmission corridor for overhead lines. This undeveloped parcel is covered with about 2/3 mature woodland crossed with samll streams, and with about 1/3 shrubby cover, through which children have formed paths that lead to the school grounds.

Because of the close proximity of homes and school, this Overlap Area is most suited for residential development and recreation facilities. An alternative scheme might be a small-scale industrial facility just north of the PECo right-of-way, with access to River Road, but well-buffered with woodlands from the school and residential areas. However, since the power lines and River Road provide a clear boundary between

residential and non-residential activities in this stretch of the coastal zone, the non-industrial alternative appears preferable.

OV-3 Martin Creek-Van Sciver - This 85 acre Overlap Area, while containing important natural resource features, is surrounded by intensive kinds of land use, e.g., gravel extraction, apartment developments and residential and commercial areas. The site has both wooded areas and open, vacant lands and is surrounded on three sides by man-made lakes. Because over 90% of the land is owned by companies involved with gravel extraction, the short term use of this site will continue to be gravel production. However, because of its strategic location gravel extraction is not a high priority use. Because the site is bordered by a large apartment complex and because the school authority owns a vacant parcel in this GAPC, the wooded areas are a high priority for recreational activity and wildlife protection. The open, recently farmed land and the marshy areas on each side of Route 13 would be candidates for residential (most likely apartments or town houses) or industrial development.

OV-4 Money Island - Money Island, a large land area owned by the Warner Company, has a wide variety of land conditions with varying potential for future development. Although a large portion of this area is zoned for industrial use, the abundance of natural resources and amenities at the shoreline of Van Sciver and Manor Lakes and at the Delaware River offer many opportunities for recreational and wildlife protection activities. These more passive uses are compatible with the present use of part of this Overlap Area by the Penn Warner Club. Between 1/2 and 1/3 of this area presently has a scrub cover; this area should be a higher priority than the shoreline or forested areas for residential or mixed-use. In addition, the old dredge spoil disposal areas along the River could be profitably reclaimed or restored with industrial or other intensive uses requiring river access, leaving wooded stretches of shoreline free from disturbance.

OV-5 Fordmill Road - This narrow land bordering Van Sciver Lake, covered with woodland scrub vegetation and crossed by dirt roadways, offers interesting views of Van Sciver Lake and provides wildlife habitat. This natural area is in sharp contrast to the mined surface of adjacent "Turkey Hill". Although sand and gravel could be conveniently extracted from the margin of this area, the

preservation and restoration of this site for recreation and wildlife protection should be given higher priority. In the future the nearby stripped land could be developed for residential or industrial uses, thus utilizing the natural areas as amenities for residents or workers.

OV-6 Biles Island - Biles Island has a variety of surface conditions - forests, fields, and dredge spoil disposal areas. For each of these areas different uses will be appropriate. Within forested areas, at the narrow northern part of the island and in the southern portion along the river, open space and wildlife preservation should be of high priority. The abandoned fields in the interior of the island and the dredge spoil sites offer a high priority location for future industrial development, including expansion of the steel mill or related activities.

Relating GAPC Priorities to Coastal-Wide Priorities - To clearly demonstrate that priorities for land-use activities in GAPC's are consistent with coastal-wide priorities, Figure ix-3 has been developed. In most cases there is an appropriate GAPC for each priority activity.

Figure ix-3

RELATING COASTAL-WIDE PRIORITIES TO GAPC's

Coastal-Wide Priorities	GAPC's appropriate for accomodation of Priority Uses				
	Natural Value	Development Opportunity	Recreational Historical Cultural	Overlap Areas	
High Priority Activities					
1. Developed Waterfront Recreation	•	•	●	●	
2. Preserved Wetlands, etc.	●		•	●	
3. Efficient Marine Terminals		●			
4. Manufacturing		●		•	
5. Improved Sewage Treatment	(achieved on site of existing facilities)				
Medium Priority Activities					
1. Expansion of Energy Generation	(achieved on site of existing facilities)				
2. Energy Refining (expansion)		●			
3. Dredge Spoil Disposal		●	(limited)	•	
4. Upgraded Transportation Links		●			
5. Development with River Access		●		●	
6. Sand and Gravel Mining		●		●	short term

● Appropriate GAPC's
• Possible, secondary locations

The Development OpportunityAreas, because they stand out as 549
achieving the largest number of coastal-wide priorities, may well 549
be the most significant GAPC's for Coastal Management. 550

However, achieving adequate protection of natural areas, is not 552
only a more difficult priority to achieve than the other ones, 552
but there are many fewer sites available for preservation and 553
resource management. 553

AREAS FOR PRESERVATION OR RESTORATION 555

The Coastal Zone Management Act requires that procedures be 557
devised to designate specific areas "for the purpose of 557
preserving or restoring them for their conservation, 558
recreational, ecological or esthetic values" (Section 306(c)(a)). 558
The Management Program must establish criteria for designating 559
these "Areas for Preservation or Restoration", so that as the 560
program is implemented "special attention" can be focused on 560
these areas. 560

For the most part, the process of nominating and selecting 562
GAPC's, and the subsequent development of priorities for them, 562
provides a satisfactory starting point for protecting natural 563

resource areas along the River. Areas of Significant Natural 564
Value have the highest ecological value, and in this Chapter 564
conservation uses have been recommended as the highest priority 565
for these areas. Areas of Significant Recreational, Historic or 566
Cultural Value include numerous sites with a potential for being 566
restored as important recreational, ecological or esthetic lands. 567
Portions of the Overlap Areas also contain significant natural 568
resources and, hopefully, future development will sensitively 569
respect these sites so that natural areas are employed as 569
community amenities. 569

Areas for Preservation or Restoration (APR's) are those GAPC's 571
that should receive special consideration because of their 571
particularly important natural resource value. To qualify as an 573
APR, three conditions must be met. 573

1 The site must be a GAPC. Proposed APR's which have not 576
been formerly identified as GAPC's must be designated as 577
a GAPC prior to consideration for APR disignation. 577

2. The site must be currently available or capable of being 579
made available for public use, recognizing that use 580
restrictions or regulations may be necessary to preserve 581
the natural character of the site. Private lands 583
without public access cannot be designated as APR's. 583

3. The site must have value, or potential value when restored, as a natural resource area supporting viable plant and animal communities. Parklands devoted to active recreation or open grassy fields may not satisfy this criterion. APR's are intended to serve primarily as wildlife preserves, as waterfowl nesting and breeding grounds and for such passive recreation as hiking, bird-watching and scientific study.

Examples of areas along the Delaware Estuary which satisfy these three criteria for APR designation include Tinicum Marsh (NV-2), Tinicum Island (NV-1) and the mouth of the Pennypack Creek (R-9). Should an effort be made to secure conservation easement for the wooded shoreline of Biles Isalnd, this area, too, might qualify as an APR.

Three of these four potential APR's are described in a working paper entitled, "Four Environmentally Significant Areas", published by the Delaware Valley Regional Planning Commission in November 1976.

The degree of special attention that can be devoted to Areas for Preservation and Restoration will depend in part on the amount of financial support that Pennsylvania receives from the U.S. Department of Commerce during the implementation phase of the Coastal Zone Management Program. Other funding agencies should

consider adjusting priorities and capital improvement programs to 603
assist in the support of the areas identified as APR's. 604

LAKE ERIE COASTAL ZONE

Introduction

The definition of permissible coastal land and water uses developed in Chapter 7 establishes the basis for assigning priorities of use within specific coastal areas. It becomes important to rank the use permissibility determinations, at least within geographic areas of particular concern so that local planners and decision makers will be better able to recognize which uses should most appropriately occur in specific coastal areas, and the trade-offs involved when lower priority uses are permitted to occur.

CFR 920.15 of the Federal Rules and Regulations for program development states that broad guidelines on priorities of uses must be developed within geographic areas of particular concern (GAPC's), including guidelines regarding those uses of lowest priority. To accomplish this requirement within the Lake Erie Coastal Zone, permissible uses were prioritized on three different levels of geographic detail. More specifically, this process was applied to the entire Lake Erie Coastal Zone, to area types within the Lake Erie Coastal Zone and to the designated GAPC's discussed in Chapter 8.

A broad priority ranking system was devised for application to the entire Lake Erie Coastal Zone. According to this system, land and water uses are ranked with regard to degree of coastal dependency, demand, scale of significance, and permissibility of use impact. For example, uses which are dependent on coastal waters received the highest priority. Those uses enhanced by the coast but not dependent on a coastal location attained secondary priority and those uses unrelated to a coastal environment were assumed the lowest position on the priority scale.

Since proper treatment of uses of national interest is essential to Federal acceptance of the Commonwealth's Coastal Zone Management Plan, it was given full consideration in this analysis. Such uses include: offshore drilling, the siting of power plants and military installations. In order to establish priorities within the coastal dependency scheme, permissible uses of national interest which are coastal dependent were assigned the highest priority permissible use. The same holds true for uses of national concern under the "enhanced" and the "unrelated" to coastal waters category. The logical progression of this idea was to include uses of State concern which are coastal dependent as the second highest priority. This then follows from uses of State concern on down through regional to those uses of local concern.

Use priorities were next established within specific geographic areas of the Lake Erie Coastal Zone. Use priority assignments within specific coastal area types represent the intermediate step in the

three step process of prioritizing permissible coastal uses. A different set of use priorities was established for each of seven area types. Each coastal area within an area type reflects similar land or water use development. All coastal lands within a given area type respond in a similar manner when subjected to a development activity. The Lake Erie Coastal area types include: (1) urban, built-up areas, (2) strip or cluster settlements, (3) planned conversion-open space, (4) natural-hazard areas, (5) agricultural lands, (6) park and recreation lands, and (7) offshore areas.

The final step in the procedure for assigning use priorities applies to only those areas designated of particular concern within the Lake Erie Coastal Zone. Although quite similar to the prioritization of uses within coastal area types, this step requires slightly more detailed analysis. Each geographic area of particular concern was examined as a unique area with unique coastal resources only capable of supporting a limited spectrum of uses. The information developed through coastal resource capability, suitability and compatibility analyses along with the results of a general impact analysis were used in completing this program element. Because each coastal area of particular concern is of greater than local significance, much time and careful study was focused upon this third and most specific step of prioritizing permissible coastal uses. Consequently, the greatest portion of this Chapter will be devoted to the designation of use priorities within designated coastal areas of greater than local concern.

This portion of Chapter 9 will be developed so that maximum utility will be gained by local coastal resource planners. It is also important to note that many of the conclusions drawn in this section are based upon information already developed in Chapters 7 (Permissible Uses) and 8 (Geographic Areas of Particular Concern).

Zone-Wide Priorities for Resource Uses

As the initial step in priority analysis, a coastal-wide ranking scheme of permissible uses was undertaken. The results of this analysis were used as a framework in developing broad policies for the sensitive use of coastal resources.

The criteria used in assigning priorities to coastal uses are by necessity very broad and applicable to any area within the coastal zone. These criteria are quite similar to the determining conditions used in assigning use priorities within the Delaware Estuary Coastal Zone. Those determinants of relative coastal-wide use priorities include; the demand for uses of greater than local concern, the coastal dependency of shore zone uses, and finally the permissibility of coastal uses. Thus, uses which are dependent on coastal waters would receive the highest priority. Those uses enhanced by coastal conditions but not dependent upon them would be assigned secondary or

moderate priority and those uses unrelated to coastal conditions would be assigned a low priority.

Much of the development activity which occurs within the Lake Erie Coastal Zone is of relatively small scale and impacts or affects only a single municipality. Of prime concern in this analysis are the large scale uses which for purposes of this report are termed uses of greater than local concern. It is these uses which impact more than one municipality that are also of high priority when applied to the suggested ranking system.

It is essential that uses of greater than local concern be carefully planned for and properly managed. The federal rules and regulations for this Program state that facilities of national interest or uses of regional benefit must not be arbitrarily excluded from occurring with the coastal zone. Uses of greater than local concern are defined as all development activities or resource uses capable of exerting either beneficial or adverse impacts which affect more than one municipality. Since current zoning practices do not involve coordination between adjacent municipalities, the uniformity in planning and zoning practices gained through recognition or adoption of the CZM program ensures that uses of greater than local significance will be properly addressed and not arbitrarily excluded.

The Lake Erie Coastal Zone already contains both existing and proposed uses of greater than local concern. The port associated activities within the Central Study Area and the agricultural activities that currently exist in the Eastern Study Area are better considered to be uses of greater than local concern. Several uses are planned for the Western Study Area which could potentially change the rual character of the area. The construction of an integrated steel mill and a medium size electric generating plant at different locations within the western portion of the Lake Erie Coastal Zone represent uses of greater than local concern for which only a small amount of coordinated local planning has been accomplished. The areas where these uses are proposed have been designated as geographic areas of particular concern. Consequently, industrial use will receive a high priority ranking in each of these areas because of high demand, determined permissibility, and the greater than local significance of each proposed use.

Although the scale of significance of coastal uses is important to the designation of coastal-wide use priorities, the coastal dependency of particular uses is the primary determinant in prioritizing uses in this analysis. Subsequently, coastal dependent uses of greater than local concern would receive the highest priority designation. For purposes of this analysis, three specific levels of coastal dependency have been recognized and applied to Lake Erie Coastal uses. More specifically, uses occurring within the Lake Erie Coastal Zone have been categorized as coastal dependent uses, uses which are not related to the coastal environment. Accordingly, coastal dependent uses are highest priority uses and uses which are unrelated to the coastal environment are of lowest priority.

The information derived through the analysis of coastal use impacts (Chapter 7) was used in this broad prioritization of uses. The nature of various use impacts represents yet another parameter in the determination of coastal-wide use priorities. It may seem obvious, but worth mentioning, that permissible uses were ranked higher within the priority scheme than uses found to exert one or more adverse impacts upon the coastal environment.

Figure ix-2 depicts high, medium, and low priority uses. The uses have been ranked under major levels of coastal dependency. Within these major priority levels, uses of national, state, regional and local concern and the permissibility of various uses has been reflected.

Some examples of coastal dependent uses which are of the highest priority include:

National concern:	Harbor facilities; Coast Guard Facilities, unique coastal agriculture.
State concern:	Port of Erie development; Presque Isle State Park; offshore drilling in Lake Erie; proposed development of a major power and generating facility; maintenance of State water recreation and access areas; coastal dependent commercial business;
Local concern: (municipal)	Water recreation and access areas; coastal related commercial business;

Uses which are enhanced by but are not dependent on a coastal location follow:

National concern:	Major industrial complexes; interstate rail transportation system within the Coastal Zone; preservation of major historical sites;
State concern:	Major industrial facilities; preservation of historical sites of State significance.
Regional concern:	Industrial development; preservation at historical sites of regional significance; public and private camps;
Local concern:	residential and seasonal cottage development;

Uses which are not related to the coastal environment, and are of the lowest priority follow:

National concern:	Most military bases;
State concern:	Most air transportation facilities; most land transportation facilities;

Regional concern:	Manufacturing; housing; commercial uses; other land uses;
Local concern:	Land use; i.e. manufacturing; housing; commercial; transportation; community service;

Area Type Priorities for Resource Use

Although first level use priorities provide a basic framework within which to logically plan for uses best suited and of greatest significance to the Lake Erie Coastal Zone, it is important to develop use priorities in greater detail. To accomplish this, the entire coastal zone, was broken into specific area types with similar physiographic conditions and development patterns. It is readily apparent that uses found to be permissible within the City of Erie may not be permissible within the agricultural area of Northeast Township or within the Crooked Creek watershed.

The Lake Erie Coastal Zone is characterized by development patterns and open space opportunities quite unlike those of the Delaware Estuary Coastal Zone. Consequently, the area types within the Lake Erie Coastal Zone chosen for this analysis differ from the four area types used to determine use permissibility (Chapter 7) within the Delaware Estuary Coastal Zone. These areas of relative use uniformity include the following categories:

1. Urban, Built-up Areas

Land and water uses in this area type are common to any urban area. The factors which distinguish this area from others within the Lake Erie Coastal Zone are the intensity and extent of development. Thus, the Urban, Built-up area would include any area within the inland boundary where development has reached medium to high density levels. Examples include: all of the City of Erie, Millcreek and Lawrence Park Townships, the western portion of Harborcreek Township and North East Borough.

The uses of highest priority within two urban built-up area types include development related activities. Residential uses, all modes of transportation, commercial and both light and heavy industrial uses are of high priority. Lower priority uses include uses which endanger public safety such as energy refining facilities and those uses which require large land areas such as air transportation (i.e. airports). Open space uses such as agriculture and passive recreation are low priority uses.

2. Strip or Cluster Settlement

Strip and cluster settlement is typical of most of the rest of the development within the Lake Erie Coastal Zone. Strip development occurs along roads and highways in the form of residential homes, scattered commercial and other uses commonly found adjacent to roadways. Some typical examples of this kind of development is found along most of PA Route 5 from Millcreek Township to Lake City Borough in the Western Area; and along most of PA Route 5 in the Eastern Area between Sixmile to Twelvemile Creeks in Harborcreek Township.

Cluster development includes such uses as individual subdivisions, mobile home parks, small villages, small plazas, and commercial developments usually found at road intersections. Some examples are: the Village of North Springfield; Whitehall Village Subdivision, Fairview Township; Cowell's Beach, Harborcreek and the I-90 Route 20 interchange in North East Township.

Uses of highest priority within strip and cluster settlements include residential and commercial use, community services, and all forms of land transportation. Recreation and other open space uses receive a somewhat lower priority rank within the area type. Development activities planned for this area type where available infrastructure is inadequate to support them receive a low priority ranking.

3. Planned Conversion-Open Space

This area type includes areas of open land or land areas where a conversion has been planned from one use to another. Open areas are easy to spot on a land use map, but areas of planned conversion are not so easily distinguished. Areas of planned conversion can only be seem on maps showing municipal comprehensive plans or private development plans. Some examples of this area type include: the large tract of land owned by U.S. Steel Corp. within Springfield Township and the tract of land owned by the Pennsylvania Electric Co. within Girard Township.

Within the planned conversion, open space area type, the most desirable and thus highest priority uses are open space uses (recreation, agriculture) and development activities (i.e. residential use, manufacturing) that are capable and suitable of being supported on a site by site basis. Land transformation activities which adversely impact coastal waters, which are found incompatible with adjacent uses, or which are unable to be supported by existing infrastructure are considered low priority uses within this area type.

4. Natural-Hazard Areas

This are type comprises all the natural and hazard areas within the Lake Erie Coastal Zone. It includes stream corridors, beaches, wetlands, lake bluffs, and all unique and fragile natural coastal areas. Both natural areas and coastal hazard areas were inventoried and analyzed in interim investigations conducted by the Edinboro Foundation. Some specific examples are: All flood0prone areas adjacent to Lake Erie tributaries Kelso Beach in Millcreek Township,

the uniquely natural Twelvemile Creek and Crooked Creek watersheds, Orchard Beach in North East Township, and the high bluffs which front Lake Erie along almost the entire reach of Pennsylvania shoreline.

The natural hazard area type represents the only such category where all development activities are deemed of lowest priority. Even uses previously designated as open space uses, although of higher priority, are not encouraged. The highest priority use within this area type has been designated as passive recreational use. Uses of lower priority, yet still acceptable, include the carefully controlled construction of access roads and utility right-of-ways.

5. Agricultural Lands

This area type includes all agricultural lands within the Lake Erie Coastal Zone. Agricultural land includes those coastal areas supporting prime and unique soils and particularly those prime farmland areas coincident with concentrated agricultural activity. Agriculture typical of the Lake Erie Coastal Zone includes: vineyards and orchards, mostly in the Eastern Study Area; fruit and vegetable farming, in the Western Study Area; and some dairy farming in the Western Area. There is no agricultural land to speak of in the Central Area.

The most economically significant and highest priority use to be recommended for this area type is agricultural use. This activity represents the major land use in the Eastern and Western Study Areas. Consequently, it provides the major source of income within each of these areas without the need to trade-off open space and environmental quality.

Prime and unique agriculture land exists as one of the Lake Erie Coastal Zone's most important vanishing resources. Development activities (i.e. construction related uses) are recommended as low priority uses within prime and unique soil areas where development does not already exist and farming is the predominant use. Other open space uses, such as recreational use, which does not involve cut and fill activities is recommended as a moderate priority use. Activities such as land transportation and utility right-of-ways are also moderate priority uses.

6. Park and Recreational Lands

This area type includes all existing or potentially significant recreational areas. Some examples of existing recreational areas are: Eagley Township Park, Springfield Township, Church camps, Boy Scout camps, and YMCA camps on the Eastern and Western shores; as well as Freeport Park and Orchard Beach adjacent to each other to the north of North East Borough. Examples of potentially significant lands for recreational use include the lower Elk Creek and Twentymile Creek valleys.

Recreational use represents the use of highest priority within this area type. Recreation support activities such as waste disposal, boat mooring and launching facilities and local maintenance

activities are also high priority uses. Seasonal residential development and recreation related commercial development are moderate priority uses. Development activities which disregard the recreational and aesthetic opportunities of a potential recreational site are low priority use recommendations. However, similar development activities which accomodate the recreational attributes of a recreational site within design criteria are medium priority uses.

7. Offshore Areas

This area type includes all the waters of Lake Erie and the land under them from Ohio to New York and north to the International Boundary with Canada. This large water body provides the Lake Erie Coastal Zone with unique water related opportunities. Uses found to be of highest priority within this are type include commercial navigation, public water use, and water related recreation. Commercial fishing offshore mineral extraction represent moderate priority uses. Uses of lowest priority within this area type include manufacturing and municipal waste disposal and dredge spoil disposal.

To assign priorities of use within the aforementioned area type categories, a great deal of professional judgement was exercised and where possible supported by information generated through the capability, suitability, and compatibility analysis outlined in Chapter 7. The overlay technique utilized in these analyses serve a two-fold purpose. Not only can the map overlays depicting both physical and socioeconomic parameters be used to determine use permissibility in specific areas, but further, by simply interpreting coincident parameters overlain in specific area types a ranking scheme of permissible uses can be derived. A particularly significant product of this exercise is the determination of least acceptable or lowest priority uses found to be permissible within an area type.

Following careful analysis of the land and water resource and socioeconomic resource overlays prepared for capability and suitability analysis, uses already found to be permissible within each designated area type could be ranked.

The area types identified in this analysis include all areas of "use uniformity" within the Lake Erie Coastal Zone. The third and final step of this analysis will involve use priority assignements only within areas of greater than local concern, geographic areas of particular concern.

Priorities for Uses in GAPC's

The third and final step in the process of assigning priorities to permissible coastal zone uses involves the Lake Erie Coastal Areas of particular concern designated in Chapter 8. This step follows very

closely the procedure used in defining second level priorities of use, or uses within coastal area types. That is, all GAPC's designated within Chapter 8 are located within a specific Lake Erie Coastal area type. It is therefore conceivable that uses found to be of lowest priority within a specific area type will similarly be found to be of low priority within any GAPC in that area type. These areas of greater than local significance have already been categorized according to the opportunities afforded by them. That is, Lake Erie coastal areas of particular concern have been divided into four categories: areas of development opportunity; areas of significant natural value; areas of historic, cultural, and recreational value; and overlap areas offering a combination of two or more aforementioned opportunities.

The objective of this analysis is to determine the uses of high, medium, and low priority within each category of areas of particular concern. To accomplish this, information derived through this completion of previous program elements was utilized. The capability analysis performed to determine the ability of coastal resources to support certain activities was helpful in the designation of areas of significant natural value. In addition, the suitability analysis completed in (Chapter 7) to determine the availability of cultural or man-made resources in coastal areas to support certain activities was useful in substantiating both development opportunity areas and areas of recreational, historic and cultural value.

The overlay techniques so effectively utilized in determining prime areas for future development as well as unique fragile areas for protection against transforming uses proved just as useful in the determination of areas which provide both dévelopment and either natural, recreational, historical, and cultural opportunities. An example of a coastal area of particular concern designated as an "overlay area" in Chapter 8 because of both development and recreational opportunities is Presque Isle Bay. Although "overlay areas" provide unique combinations of coastal use opportunities, the resource planner must be extremely careful in prioritizing use attributes in these areas. That is, the priority ranking system must be such that high priority development activities do not exclude or conflict with high priority recreational uses or natural processes.

A comprehensive review of areas found, by aforementioned analysis to be of particular concern was conducted to strengthen area designations. This review provided the essential local input needed to accurize any planning effort. Local officials, planners, and citizens were not the only participants in this review; however, both regional and state agency comments and input was incorporate , where appropriate, within the preliminary list of areas designated for special consideration in future planning and management. The completion of GAPC designations which is discussed in much greater detail in Chapter 8, establishes the framework for the assignment use priorities within the most significant Lake Erie Coastal areas.

The recommended use priorities for the four categories of GAPC's which will follow represent policies for use of each GAPC category.

Activities that are consistent with these policies will also be defined. The broadly defined use priority designations for the entire coastal zone and coastal area types as developed previously in this analysis will be reflected in the specific use priority assignments for GAPC's.

Recommendations for land use activities have been prioritized for the four categories of Lake Erie coastal areas of particular concern. Using a procedure similar to that by which uses were prioritized within Delaware Estuary coastal areas of particular concern. In addition, specific comments regarding development pressure, greater than local significance, and priority for action relating to each individual GAPC were incorporated within charts developed for each GAPC category. Even though the highest priority uses are already occurring or have been encouraged through local planning and zoning in some GAPC's, the opportunities of other GAPC's are not being fully realized because of the existence of or planning for low priority uses. In the following sections, high, medium and low priority use recommendations will be made for each GAPC category. In addition, the criteria used to identify the GAPC's with the highest priority for action will be outlined and discussed.

Priorities for Uses in Areas of Significant Natural Value - The prioritization scheme which follows recommends the restriction of development activities within the <u>unique and fragile</u> Lake Erie coastal areas of significant natural value. Although only two areas have been designated coastal areas of greater than local concern because of their unique natural characteristics, many other "pocket-type" natural coastal ecosystems exist within the Lake Erie coastal area which are considered on only local significance. Nevertheless, most of these smaller "locally significant" coastal areas of natural value are found within the GAPC category, areas of recreational, historical and cultural value. In addition, the entire lakefront bluff system has been identified as a unique geological feature and as a hazardous zone within which future development activities must be carefully controlled. Areas supporting concentrations of prime and unique agricultural soils were also identified within this category. Only those uses which are compatible with the natural processes supported by GAPC's of natural value will be recommended of high and medium priority. It is of utmost concern to protect and where possible to enhance the amenities and significant attributes within these areas which have been determined of greater than local concern.

<u>High Priority Activities</u>

1. Uses that protect, maintain, or enhance natural resource functions. Use of these areas for wildlife preserves and the preservation or restoration of native plant communities are recommended as high priority uses.

2. Passive recreation, such as birdwatching, hiking, non-power boating, and scientific or educational study, which uses the

unique resources of these areas without degrading or destroying them.

3. Agricultural activities which occur within prime and unique soil areas

Second or Moderate Priority Activities

1. Uses of moderate priority include only activities which exert a minimal or insignificant impact upon the area.

2. Moderate priority uses may involve very limited land transformation activities.

   These activities could include construction of hiking trails, primitive access roads and boat launches which are located on or planned for the "fringe" or transitional zone of the natural area so that natural processes which maintain unique amenities are not disrupted.

3. Utility right-of-ways which do not interrupt natural processes and which maintain the natural amenities within these areas.

4. Agricultural activities which occur in areas not characterized by prime and unique soils.

Low Priority Activities

1. Any development activity which causes irreversible destruction of unique natural ecosystems. This includes any development activity which involves the removal or alteration of wildlife habitat and terrain, the draining or filling of wetland areas, and the deterioration of stream or coastal water quality.

Character and "priority for action" of Areas of Significant Natural Value - All Lake Erie coastal areas of significant natural value equally deserve the proper planning applications described in previous paragraphs. The largest and most valuable Lake Erie coastal natural area is Presque Isle Peninsula. This area, unlike many other significant natural areas, is already publicly owned and maintained. Each of the designated GAPC's of significant natural value are ranked according to a derived priority for action which is based upon the ownership of the area, development suitability, and compatibility of existing local planning and zoning. The determinations of priorities for action can be found on Figure ix-4.

Priorities for Uses in Development Opportunity Areas - These areas have been found through both capability and suitability analysis to be the most desirable areas for supporting development activities. The areas designated either represent already productive economically significant coastal areas, or areas where a combination of land ownership, the absence of development hazards or constraints, and the availability of infrastructure combine to provide highly desirable areas for future economic development. The overlying objective of

Figure ix-4

CHARACTER AND PRIORITY FOR ACTION OF AREAS OF SIGNIFICANT NATURAL VALUE

Name of Area	Ownership	Present Use of Area	Compatibility of Existing Planning and Zoning	Development Capability	National Interest Regional Benefit	Priority for Action
Lake Erie Bluff Zone	Private or Semi-private	Vacant or occasional clusters of residential development	Incompatible	Low	High	High
Crooked Creek Stream Corridor	Semi-public	Organizational Camps	Compatible	Low	Moderate	Moderate
Western Study Area Prime Agricultural Lands	Private	Agriculture and scattered strip development	Incompatible	High	Moderate	High
Trout Run Stream Corridor	Private	Scattered residential development	Incompatible	Low	Moderate	Moderate
Eastern Study Area Prime Agricultural Lands	Private	Agriculture and scattered residential development	Largely Compatible	High	High	High

Figure ix-5

CHARACTER AND PRIORITY FOR ACTION OF DEVELOPMENT OPPORTUNITY AREAS

Name of Area	Attractiveness for Development	Degree of Effort to Promote	Suitability for Uses of Regional Benefit and National Interest	Priority for Action
United States Steel Site	High	High	High - manufacturing	High
Pennsylvania Electric Site	High	Moderate	High - Electric Power Generation	High

this analysis is to effectively plan for the siting of facilities of national regional significance, to encourage the future siting of economic uses in the most suitable coastal areas, to encourage the multiple use concept in existing and planned economic developments, and to minimize the stabilization or restoration of degraded economic areas at the expense of environmental quality.

High Priority Activities

1. The development of new manufacturing facilities which permit access to Lake Erie, where physically possible, at least during non-working hours.

2. Revitalization of port facilities by promoting coastal dependent activities and improved land transportation systems to and from port facilities.

3. The development of new facilities which contribute tax revenues and increase employment opportunities, particularly when sited in close proximity to uses existing similar impacts and to essential support services.

4. Development activities which occur a safe distance back from critically eroding shorefront areas.

Moderate Priority Activities

1. The development commercial and manufacturing support activities which afford public access to Lake Erie during non-working hours where possible.

2. Residential development which maintains the aesthetic attributes of the coastline where other more economically significant uses are unsuitable.

3. The construction of boat launches, marina and other water related recreation facilities such as commercial resort facilities.

Low Priority Activities

1. Natural resource management is defined as a low priority use within most development opportunity areas. This activity may however, receive a higher priority where unique natural areas are found within large tracts of agricultural land or undeveloped economic opportunity areas.

2. Solid waste disposal on public and non-industrial private land is a low priority activity.

3. Construction of shorefront facilities within erosion hazard areas.

Character and "Priority for Action" for Development Opportunity Areas - In the following profile of Development Opportunity Areas, determinations are made regarding the attractiveness of each particular site for development, the degree of effort to promote the siting of a desirable activity upon each site, the suitability of each site to support uses of national interest and regional benefit, and finally, the priority for action. The priority for action determinator reflects local sentiment for site development or restoration, the capability and suitability of the site to support the proposed use, the need for site restoration, both existing and proposed use compatibility with neighboring development patterns and ownership. The determination of priorities for action within development opportunity areas are shown on Figure ix-5.

Priorities for Uses in Areas of Recreational Historic or Cultural Value - The objective of this analysis is to fully recognize and promote the unique recreational and cultural opportunities afforded Lake Erie Coastal residents and visitors to the area. The developed priority scheme of uses within the areas will reflect the need to protect, enhance, and restore these areas.

High Priority Activities

1. Public access to the Lake in areas so designated, regardless of present ownership patterns. Where private ownership presently precludes this use, acquisition, easement, or base arrangements are high priorities for action.

2. The preservation and/or restoration of historical sites and structures of greater than local concern.

3. The development of coastal related recreational facilities (i.e. boat launches mooring sites, marinas) in these areas when constructed in a manner compatible with the existing environment.

4. The enhancement or restoration of cultural opportunities of greater than local concern.

Moderate Priority Activities

1. Recreational support activities (i.e. commercial services) when conducted in a manner compatible with the existing environment.

2. Seasonal residential development which does not degrade the aesthetic appeal of the coastline, and which does not preclude recreation access to the Lake waters.

Low Priority Activities

1. Existing or proposed public or private uses for these areas which fail to recognize their significant recreational, historic, or cultural values.

Character and "Priority for Action" of Significant Recreational, Historic, and Cultural Areas - In the following profile of areas of significant recreational, historic and cultural value, the resource value of each area, the ownership of each area, the degree and effectiveness of present use and management, the compatibility of existing planning and zoning, and the potential conflict with development were all important determinants of the priority for action. The determination of priority for action will prove quite useful in identifying areas in greatest need of recommended planning and management procedures. This information is developed in Figure ix-6.

Priorities for Uses in Overlap Areas - The two overlap areas identified within the Lake Erie Coastal Zone are unique in that they offer both development as well as recreational opportunities. In other areas of the Lake Erie Coastal Zone, similar areas of only local concern exist where both development and natural resource management opportunities are afforded coastal residents. Care must be exercised in prioritizing uses within these areas so that high priority development activities do not exclude high priority recreational opportunities. A detailed description of the designated overlap areas of particular concern within the Lake Erie Coastal Zone, Presque Isle Bay and the Port of Erie and Waterfront Area, will be developed in subsequent sections.

Priority of Uses within the Presque Isle Bay Overlap Area - The Presque Isle Bay is an extremely valuable socioeconomic resource of the Lake Erie Coastal Zone. The Bay, sheltered from Lake Erie storms by Presque Isle Peninsula, doubles as a prime area for all water related recreational uses, and as Pennsylvania's only harbor on the Great Lakes System. Recreational water uses are of highest priority on the north side of the Bay. Industrial activities and commercial navigation of highest priority occur with minimal or no interference with recreation uses on the south side of the Bay. Although marina facilities for recreational vessels exist on the south side of the Bay, the poor water quality along the south shore of the Bay preclude most water contact activities. The availability of recreation support services on Presque Isle Peninsula further supports the assignment of a high priority upon recreational use of the north Bay area.

Priority of Uses within the Port of Erie and Waterfront Area - The Port of Erie and waterfront area supports a mix of industrial, commercial, recreation, and related support activities. All land and water lots in both the east and central zones of the Erie Waterfront Area are zoning either for industrial use or commercial activities. The Western waterfront district is currently zoned for residential use on top of the lake bluff and recreational use along the immediate shoreline area. Current zoning of the Erie Port and waterfront area reflects, the highest priority uses for this area. Restoration of abandoned waterfront facilities within both the east and central waterfront zones is also a high priority use. Industrial or commercial activities which are not water related or dependent upon a

Figure ix-6

CHARACTER AND PRIORITY FOR ACTION OF AREAS OF SIGNIFICANT RECREATIONAL, HISTORIC, AND CULTURAL AREAS

Name of Area	Ownership	Resource Value of GAPC	Degree of Present Management & Use	Compatibility of Existing Planning & Zoning	Potential Conflict With Development	Priority for Action
Raccoon Creek Stream Corridor	Public	High	Low	Compatible	High	High
Elk Creek Estuary	Private	High	Moderate	Incompatible	High	High
Lake Erie Community Park	Public	Moderate	Moderate	Compatible	Low	Low
Walnut Creek Access Area	Public	High	High	Compatible	Low	High
Scott Park	Public	High	Low	Incompatible	High	High
Presque Isle State Park	Public	High	High	Compatible	Low	Low
Sixmile Creek Access Area	Private	Moderate	Low	Incompatible	High	Moderate
Shades Beach County Park	Public	High	Moderate	Incompatible	Moderate	Moderate
Twentymile Creek Access	Private	High	Low	Incompatible	High	High

coastal location would be designed as lower priority uses for this area.

Relationship of Coastal Resource Use Priorities to the Formulation of Coastal Use Policies

In order to develop use priorities within Lake Erie Coastal areas of particular concern, priority determinations were first made for the entire coastal area and areas of use uniformity or area types within the coastal zone. Although priorities for use of the entire coastal zone were very broad in nature, these priorities served as the basis upon which more specific priority determinations were made in GAPC's. The sequential priority determinations for resource use on each geographic level provided the information essential to the formulation of the coastal zone policies and recommendations (Chapter 5). Using the results of this analysis, solutions to identified problems and the courses of action necessary to accomplish specific objectives as outlined in the coastal zone policy framework can be more easily understood.

AREAS FOR PRESERVATION AND RESTORATION 3.3

Introduction 3.5

Geographic areas of particular concern (GAPC's) have been defined 3.7
as critical areas where there is a need for special management 3.8
procedures in order to deal with land use issues which are of 3.8
"regional benefit" or are of "greater than local concern". 3.9
Within GAPC's there may well be "special areas" which are 3.10
valuable enough to require specially designed management 3.10
techniques in order to protect or enhance their significance as 3.11
natural or economic resources. These special areas are 3.12
categorized as areas for preservation and restoration (APR's) and 3.12
have particular significance with regard to their conservation, 3.13
recreation, ecologic or aesthetic values. 3.13

Each GAPC is likely to be at least partially comprised of areas 3.15
where preservation or restoration efforts are required. It thus 3.16
becomes essential to analyze each GAPC to find the necessary 3.16
criteria needed to determine these critically sensitive lands 3.17
which require special management techniques. 3.17

Several sources were used as references for determining such criteria and through the use of these documents, five APR classifications have been categorized and special management techniques have been devised for each classification. Areas to be preserved and/or restored have been categorized to include: (1) areas of significant natural value, (2) recreation lands and lake access areas, (3) prime and unique farmland, (4) historic sites, and (5) derelict or abandoned areas.

Preservation Areas

The first four of the five categories mentioned above are areas which require special management techniques to preserve the unique environmental or social features which may be threatened by and vulnerable to urban development pressures. Such features may be irreversibly altered by urban-related change and consequently may lose their original uniqueness as natural areas, recreational opportunity areas, etc.

The first category, areas of significant natural value, have been defined and illustrated in a document entitled Areas of Natural Value, Erie County Coastal Zone. Within this report areas which have been designated as "preservation" and "conservation" include such natural features as lake bluffs, stream valley escarpments,

flood plains, marsh lands, wildlife habitats, and forest lands. 3.34
Areas of significant natural value such as these can be found in 3.35
all geographic areas of particular concern and concentrated 3.36
efforts should be made to protect such areas. 3.36

A second preservation category includes recreation lands and lake 3.38
access areas. Such areas have been illustrated in the above 3.39
mentioned report and are usually considered to be areas available 3.39
for "active" recreation. Such areas would permit facilities for 3.41
boating, swimming, camping, sports, etc. Many facilities such as 3.42
these already exist in recreation areas along the Lake Erie 3.42
coastline but demand for such facilities will continue to 3.43
increase, and access points to Lake Erie waters are limited in 3.43
supply. Should lake access areas be privately developed as has 3.44
already occurred in some areas, the increased demand for 3.44
recreational facilities may not be fulfilled. 3.45

A third land use classification requiring preservation efforts is 3.47
agriculture. Not all farmlands along the lakefront should 3.48
necessarily be preserved for agricultural purposes, but certain 3.48
agricultural areas, upon which significant cash crops are 3.49
concentrated, require some form of protective management. Such 3.50
lands are in limited supply and will ultimately be transformed 3.50
due to their ability to easily accomodate residential and other 3.51
urban-related development. 3.51

A final land use classification which requires preservation efforts includes historical or cultural sites of significance. Several State and city owned historic landmarks exist in the coastal zone and such landmarks require special management techniques in order to maintain the unique heritage of sites having historic significance.

Restoration Areas

The Erie County coastal zone is largely an undeveloped or minimally developed region, a concept that becomes evident after reading Chapter 1 of this study. The need for special management techniques can thus become difficult to comprehend. Management efforts in Erie County will predominantly consist of preventative measures for those lands designated as preservation areas. Lands and waters do exist, however, that are (1) environmentally damaged or (2) economically dysfunctional. Such derelict or abandoned areas are not a very common occurrence in the Erie County coastal zone but those that exist require special management techniques to restore ecologic damage or to rejuvenate economically lax areas.

APR Classifications 3.68

The five land use classifications designated above are areas 3.70
which require special preservation and restoration management 3.70
efforts. These areas of the Erie County coastal zone are 3.72
especially sensitive to environmental transition by urban-related 3.72
development. Each geographic area of particular concern (GAPC) 3.73
will have an area requiring preservation or restoration (APR) 3.73
within its bounds. The following write-up lists each APR 3.75
according to the GAPC in which it is located. 3.75

1. Lake Erie Bluff (west): This Lake Erie bluff system extends 3.77
the entire distance from the Ohio boundary to the Mill creek 3.78
Township line and is an area which should be preserved and in 3.79
some instances restored. In the western study area most of 3.80
the lake bluffs are as yet relatively undisturbed. 3.80
Vegetation acts to "hold" the bluff from erosive forces, 3.81
although the bluffs are continuously being worm away. When 3.82
this vegetation is disturbed for the sake of a "good view", 3.82
erosion is accelerated, often damaging or destroying homes 3.82
which at one time were thought to be safe. Thus, a certain 3.84
amount of restoration in the form of reforestation on and 3.84
above the bluffs is essential. Management techniques for 3.85
this area will be those which apply for APR's classified as 3.85
Areas of Significant Natural Value. 3.85

2. Crooked Creek Stream Corridor: The entire Crooked Creek 3.87
stream valley north of Route 5 has been designated as on APR. 3.88
Very little development has occurred in this area as most of 3.89
this stream valley is currently owned by semi-public groups 3.90
for recreational use as campgrounds. However, as development 3.91
of the Springfield area expands, the likelihood of 3.91
residential or other development will increase, with 3.91
resultant damage to this sensitive natural area. Management 3.93
techniques for this area will be those which apply for APR's 3.93
classified as Areas of Significant Natural Value. 3.93

3. Girard and Fairview Prime Agricultural Lands: Within this 3.95
GAPC, areas designated for preservation are limited to: (1) 3.96
existing vineyard and orchard croplands and (2) undeveloped 3.96
prime and unique agricultural soils. Existing vineyard and 3.97
orchard croplands have been mapped by making use of aerial 3.97
photos. Prime agricultural soils may be defined as land used 3.98
for production of food and fiber, or available for these 3.98
uses. It has the soil quality, growing season, and moisture 3.99
supply needed to produce sustained high yields of crops 3.99
economically when treated and managed according to modern 3.100
farm methods. Unique farmland may be defined as land other 3.101
than prime farmland that is used for the production of 3.101
specific high value food and fiber crops. Fruits and 3.103
vegetables are examples of such crops grown in the Erie 3.103
County coastal zone. Management techniques for this area 3.104

will be those which apply for APR's classified as Prime and 3.104
Unique Farmland. 3.104

4. Trout Run Stream Corridor: This GAPC is currently an 3.106
undeveloped stream valley under private ownership. Should 3.107
this area be developed as a low density residential district, 3.107
many of the sensitive natural aspects of this stream valley 3.108
could be seriously altered. Management techniques for this 3.109
area will be those which apply for APR;s classified as Areas 3.109
of Significant Natural Value. 3.109

5. United States Steel Site: No part of this GAPC has been 3.112
designated as an area for preservation or restoration 3.113
requiring special management techniques. 3.113

6. Pennsylvania Electric Site: No part of this GAPC has been 3.115
designated as an area for preservation or restoration 3.116
requiring special management techniques. 3.117

7. Raccoon Creek Stream Corridor: Raccoon Creek County Park and 3.119
the marshlands to the southeast of this Park have been 3.120
designated as two APR classifications. The stream 3.121
valley-wetland system is an entirely undeveloped and 3.121
sensitive natural area. This portion of the Raccoon Creek 3.122
GAPC has been designated as an APR having significance as an 3.122
Area of Significant Natural Value. Management techniques for 3.124
this area will be those which apply under this category. 3.124

Remaining portions of the park which are not located within 3.125
the stream valley have been designated as an APR having 3.125
significance as Recreation Lands and Lake Access Areas. The 3.127
area at the mouth of Raccoon Creek is already extensively 3.127
developed as a recreational site and as such has also been 3.127
designated as a Recreation APR. 3.128

8. Elk Creek Estuary Site: Within the Elk Creek stream valley 3.130
there are two APR classifications. The sand bar system at 3.131
the mouth of Elk Creek and the escarpments which border this 3.131
stream valley have been designated as Areas of Significant 3.132
Natural Value. The flood plain and lowlands of the Elk Creek 3.133
GAPC have been designated as an APR having significance as a 3.133
Recreation Land and Lake Access Area. Management techniques 3.135
for these areas will be those which apply under the 3.135
appropriate APR classification. 3.135

9. Lake Erie Community Park: Within this GAPC the stream valley 3.137
which bisects this park and the bluffs fronting Lake Erie 3.138
have been designated as an APR having Significant Natural 3.138
Value. All remaining portions of this park fall under the 3.139
APR classification entitled Recreation Lands and Lake Access 3.139
Areas. Management techniques will be those which apply under 3.140
the appropriate APR classification. 3.140

10. Walnut Creek Access Area: The entire Walnut Creek Access Area 3.142
has been designated as an APR having significance as a 3.143

Recreation Land and Lake Access Area. Management techniques 3.144
will be those which apply under this classification. 3.144

11. Lake Erie - Presque Isle Bay Bluff: The entire bluff system 3.146
within the central study area has been designated as an APR 3.147
having Significant Natural Value. Management Techniques will 3.148
be those which apply under this APR classification. At the 3.149
top of this lake-bay bluff are two historical and cultural 3.149
sites of significance. The Wayne Blockhouse is a replica of 3.150
the original northwest blockhouse of the American Fort 3.150
Presque Isle in which General "Mad" Anthony Wayne died in 3.151
1796. The fort was constructed in 1795 to protect incoming 3.152
settlers from the Indians. The present blockhouse was built 3.153
by the Commonwealth in 1880 as a memorial to General Wayne. 3.153
The Land Lighthouse was erected on the site of the first 3.154
lighthouse constructed on the Great Lakes by the United 3.154
States Government. It is a circular structure, about 18 feet 3.156
in diameter at its base. Built of gray cut stone, it stands 3.157
about 127 feet above the lake level and overlooks the channel 3.157
entrance to the Erie harbor. The origi nal lighthouse was 3.158
constructed in 1818 and was rebuilt in 1858 and again in 3.158
1866. It was last used in 1885. Management techniques for 3.160
these sites will be those which apply within the Historic and 3.160
Cultural Sites APR. 3.160

12. Presque Isle Bay: This GAPC has been designated as an Area of 3.162
Significant Natural Value, as a Recreation and Lake Access 3.163

Area, and as a Derelict or Abandoned Area. The first two 3.164
classifications require preservation management techniques. 3.164
The last category is a restoration classification. 3.165
Management techniques will be those which apply under these 3.166
three APR categories. 3.166

13. Scott Park, Sommerheim Park: These parks have been designated 3.168
as Areas of Significant Natural Value. Management techniques 3.169
will be those which apply under this category. 3.169

14. Presque Isle State Park: This GAPC has been designated as 3.171
Area of Significant Natural Value and as Recreation Lands and 3.172
Lake Access Areas. Management techniques will be those which 3.173
apply under these categories. Two Historic and Cultural 3.174
APR's are located on the Presque Isle Peninsula. The Perry 3.175
Monument was erected by the Commonwealth of Pennsylvania in 3.175
1926 in honor of Commodore Oliver Hazard Perry, commander of 3.176
the American fleet on Lake Erie during the War of 1812. A 3.177
second site, the Presque Isle Lighthouse is operated by the 3.177
United States Department of Commerce, Bureau of Lighthouses. 3.177
The end portion and the square light tower were constructed 3.178
in 1872. The lighthouse is fully operational except for two 3.179
months during the winter season. Management techniques will 3.180
be those which apply under the APR entitled Historic and 3.180
Cultural Sites. 3.180

15. Port of Erie and Waterfront Area: Four APR categories are located within the Port of Erie and Waterfront Area GAPC. In much of this GAPC, there are numerous publicly and privately owned lands which have remained vacant or are in need of rejuvenation. These areas have been designated as Derelict or Abandoned APR's and require management techniques involving restoration. Restoration efforts, while taking into consideration any natural features which might exist, would be a positive step toward encouraging water dependent industry and commercial uses. Two other APR's which exist in the port and waterfront area are Areas of Significant Natural Value and Recreation and Lake Access Areas. There is the possibility that portions of the Port Authority lands adjacent to the Marine Terminal as well as other waterfront could be established as recreational areas. Recreational facilities for boating and fishing enthusiasts are already in demand and every indication is that additional facilities would be used to capacity. The Bay is a unique environmental and economic asset. It is also extremely vulnerable to waste accumulation because of insufficient circulation into and out of the Bay through the small ship channel. Good water quality would benefit all forms of water-related recreational activities within the Bay area. Improved water quality would also improve the waterfront area's standing as a unique recreational attraction. The fourth and last APR is the U.S.S. Niagara, a historic site located at the foot of State Street within the Port of Erie and Waterfront Area GAPC. The

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flagship Niagara, Oliver Hazard Perry's victory brig, was 3.201
sunk in Misery Bay after the Battle of Lake Erie in 1812. 3.201
The vessel was raised from the waters in 1913 for the Battle 3.202
of Lake Erie Centennial, restored and placed at its present 3.202
location. Management techniques are those which apply within 3.204
the Historic and Cultural APR classification. 3.204

16. Lake Erie Bluff (east): The entire Lake Erie bluff system in 3.206
Harborcreek and North East Townships has been designated as 3.207
an APR having significance as an Area of Natural Value. 3.207
Management techniques are those which apply within this APR 3.208
classification. 3.208

17. Harborcreek and North East Township Prime Agricultural Lands: 3.210
Within this GAPC, areas designated for preservation are 3.211
limited to: (1) existing vineyard and orchard croplands and 3.211
(2) undeveloped prime and unique agricultural soils. 3.212
Existing vineyard and orchard croplands have been mapped 3.213
through the utilization of aerial photos. Prime agricultural 3.214
soils may have been defined as land used for production of 3.214
food and fiber, or available for these uses. It has the soil 3.215
quality, growing season, and moisture supply needed to 3.215
produce sustained high yields of crops economically when 3.216
treated and managed according to modern farm methods. Unique 3.217
farmland may be defined as land other than prime farmland 3.217
that is used for the production of specific high value food 3.217
and fiber crops. Fruits and vegetables are examples of such 3.219

crops grown in the Erie County coastal zone. Management 3.220
techniques for this area are those which apply for APR's 3.220
classified as Prime and Unique Farmlands. 18. Sixmile 3.221
Access Area: This geographic area of particular concern has 3.221
been designated as an APR having significance as a Recreation 3.222
and Lake Access Area. Management techniques are those which 3.223
apply under this category. 3.223

19. Shades Beach County Park (north of Route 5): This geographic 3.225
area of particular concern has been designated as an APR 3.226
having significance as a Natural Value Area. Management 3.227
techniques are those which apply under this classification. 3.227

20. Twentymile Creek Access Area: The mouth of Twentymile Creek 3.229
and the Twentymile Creek flood plain north of Route 5 have 3.230
been designated as an APR having significant Natural Value. 3.230
Management techniques are those applicable to this APR 3.231
classification. 3.231

Special Management Techniques 3.233

Lands and waters within the Erie County coastal zone that have 3.235
been designated for preservation and restoration are ecologically 3.235
sensitive areas that are going to require special management 3.236

techniques if a serious effort is to be initiated to protect them 3.236
from environmental degradation. An objective such as this, which 3.238
has no immediately visible benefits, is often difficult to 3.238
comprehend and even more difficult to initiate. Erie Countians 3.240
are fortunate enough, however, to be able to salvage many of 3.240
their most sensitive areas before unplanned development can 3.241
occur, thus saving the time and expense of restoring these lands 3.241
in the future, if restoration would, in fact, be possible. 3.242

It is not the intention of this write-up to recommend any 3.244
additional Federal or State regulations. Current municipal 3.245
comprehensive plans and zoning ordinances give the individual at 3.245
the local level the power to enforce the protection of sensitive 3.246
areas. Many existing municipal ordinances, however, have 3.247
insufficient standards for protection of APR's. 3.247

The following are special environmental management techniques, as 3.249
listed by APR classification. All of these techniques are 3.250
practical methods of enforcing the protection of vital 3.250
environmental resources at the local level. 3.251

Areas of Significant Natural Value - Areas of significant natural 3.253
value include lake bluffs, flood plains and steep slopes within 3.254
stream corridors, marshlands, heavily forested areas, and 3.254
beaches. These lands and waters are particularly vulnerable to 3.255
development. In the Erie County coastal zone most natural value 3.256

areas are under private ownership, however, there are numerous environmentally sensitive areas that are owned or regulated under the auspices of State, county or local level governments.

On publicly-owned lands such as parks or gamelands government has the opportunity to restrict development of the most sensitive lands and waters. Usually such lands will be utilized for passive recreational purposes or will remain undeveloped, thereby enforcing the conservation of such lands. Restrictions or privately owned lands include local zoning ordinances and State-wide regulations involving water runoff. In the Erie County coastal zone State-wide pollution standards are regularly enforced. However, most comprehensive plans and zoning ordinances within this region do not reflect the need for preservation of the natural areas listed above.

zoning ordinances should be altered to include management techniques that utilize conservation zoning as the foremost method of protecting areas of natural value. Examples of conservation zoning include the following:

1) Developmental setbacks are necessary along bluffs facing Lake Erie and bluffs within stream valley corridors. Setbacks may vary according to location but should take into consideration the extent of erosion that occurs per year and the number of years a newly constructed building is likely to remain standing. Setback regulations also should be written to

restrict any vegetative clearance a set number of feet back 3.276
from the bluffs highest point. Such regulations will act to 3.278
check erosion caused by clearing vegetation from these 3.278
vulnerable areas while at the same time will limit structural 3.279
damages caused by bluff erosion. 3.279

(2) Expanded lot size regulations would act to reduce 3.281
developmental densities, thus reducing the chances for 3.281
environmental damage. A lot size of ten acres is currently 3.283
required by the Pennsylvania Department of Resources for 3.283
on-lot septic systems which do not meet with wastewater 3.284
requirements. Within vulnerable natural areas this figure 3.285
could serve as a minimum acreage requirement. Bluff setback 3.286
requirements would be incorporated into these expanded lot 3.286
size regulations. 3.286

(3) Performance standards are a third alternative of conservation 3.288
zoning. This method of zoning is unlike traditional zoning 3.289
practices. These standards need not be tied to specific 3.290
zones or districts. They utilize two basic criteria, runoff 3.291
and erosion. Since runoff and erosion are common to all land 3.292
(although they vary from site to site), the regulations can 3.292
apply to all development within a municipality's 3.293
jurisdiction. Thus, environmental land controls are made 3.294
distinct from the questions of districting or zoning and are 3.294
administered as parallel or supplementary regulations to the 3.295
basic zoning controls. The critical factor in determining 3.296

the feasiility of performance standards for natural processes 3.296
is the technological feasibility of setting precise numerical 3.297
measurements on the process. Substantial research and data 3.298
accumulation are available for runoff and, to a lesser 3.298
degree, for erosion. Agencies such as the Soil Conservation 3.299
Service and the Erie County Health Department already utilize 3.299
performance standards for runoff and erosion to a limitee 3.300
extent. Performance standards can be utilized at the 3.301
municipal level, however, it would entail the hiring of an 3.301
environmental specialist to regularly inspect urban 3.302
developments and enforce pollution standards. Whereas urban 3.303
municipalities within the Erie County coastal zone might be 3.303
able to accomodate the added expense of having such a 3.304
specialist, the more rural and developing municipalities, 3.304
those areas that could benefit the most by utilizing such a 3.304
service, would probably be the least able to afford the cost. 3.305

(4) Acquisition by governmental agencies is the fourth and last 3.307
alternative. This method has certain drawbacks such as 3.308
reduced tax revenue, but on the plus side offers the most 3.308
control over the ultimate use of the natural area. Decisions 3.310
on public acquisition must be based not only on the natural 3.310
significance of an area, but also on factors such as 3.310
recreational needs and aesthetic benefits. Stream corridors, 3.312
lake bluffs, marshlands, and forested areas can offer 3.312
opportunities for expanded recreational developments while 3.312
also providing aesthetically pleasing greenbelts throughout a 3.313

community, which can act to protect a community from 3.313
undesirable encroachments. 3.314

Recreation Lands and Lake Access Areas - Numerous recreational 3.316
lands and lake access areas exist along the Erie County 3.316
coastline. Many publicly owned parks already are located in the 3.318
coastal zone, providing facilities for local and regional 3.318
recreation enthusiasts. The topographic composition of the Erie 3.320
County coastline, however, is a limiting factor upon the 3.320
availability of recreation lands for many individuals, 3.321
particularly those living in the east and west portions of the 3.321
coastal zone. Lake bluffs are the rule rather than the 3.322
exceptions along the shoreline and in many areas of the Erie 3.322
3.323
County coastline access is limited to those areas where the 3.324
erosive action of streams has leveled these bluffs. Many of 3.325
these stream valley access areas are privately owned. As the 3.326
coastal zone becomes further populated, developmental pressures 3.326
also increase within these access are s. The attraction of 3.327
having a home or cottage near the lake tends to multiply the 3.327
urban-related developmental pressures in these "choice" areas, 3.328
eliminating or at least reducing the possibility of public 3.328
recreation. 3.328

Management techniques which would act to preserve these areas for 3.330
public recreational purposes include the following: 3.330

(1) Comprehensive Plans should indicate all existing and proposed 3.332
recreational lands, especially those which are privately 3.333
owned and predominantly undeveloped. 3.333

(2) Conservation Zoning should be utilized to limit development. 3.335
Minimum lot size requirements of ten acres or more would 3.336
serve to slow residential and cottage developments, 3.336
maintaining much of the natural value of a site and reducing 3.337
the chances of environmental damage. 3.337

(3) Acquisition by governmental agencies is a third alternative. 3.339
As with any governmental acquisition, tax revenues are 3.340
immediately reduced but other benefits such as money from 3.340
tourism and preservation of areas to meet future recreational 3.341
requirements must also be considered. 3.341

Prime and Unique Farmlands - Efficient food and fiber production 3.343
is largely dependent upon the availability of high quality soils. 3.344
Not all soils are well suited for agriculture. Stoniness, steep 3.346
slopes, shallow soil and high water tables are restrictions upon 3.346
agricultural productivity. Soils which have the highest 3.347
potential for productivity are usually known as prime 3.347
agricultural soils. Such soils are typically deep, fertile, well 3.348
to moderately well drained and are found on slopes which usually 3.348
measure less than ten percent. 3.349

Unique farmlands are lands upon which are grown specific cash 3.351
crops such as fruits and vegetables. Such lands do not have the 3.352
quality of soils that occur within prime agricultural areas but 3.352
nonetheless are productive lands. 3.352

Agricultural soils play important environmental roles in many 3.354
areas. Being found on relatively flat terrain, prime 3.355
agricultural soils are often very important ground water recharge 3.355
areas. Geologic formations associated with particular prime 3.356
soils can recharge aquifers even during dry periods. The 3.357
presence of biologically valuable bacteria, soil organisms, and 3.357
fungi in prime agricultural soils provides for the decomposition 3.358
of organic matter thereby enriching and building the soil. The 3.359
ability of soil environments to break down organic matter 3.359
enhances their potential value for wastewater renovation. 3.359
3.360

By respecting the assimilative capacities of the soil, the 3.361
application of wastewater on agricultural soils can, in turn, 3.361
renovate the wastewater, potentially increase soil productivity, 3.362
and recharge local groundwater tables. 3.362

Agricultural lands have been going out of production at alarming 3.364
rates over the past 25 years. In Erie County, there were 4,054 3.365
commercial farms in 1950 which employed 4,100 persons and in 1975 3.365
these totals had dropped to 1,048 commercial farms employing less 3.366
than 1,900 full time workers. The average size of an Erie County 3.367
farm has substantially risen in acreage; where in 1950 the 3.367

average farm size was 80 acres, today it has almost doubled. 3.368
Thus, in 25 years Erie County's agricultural significance has 3.369
been halved. 3.369

Two general land uses account for most of this conversion; urban 3.371
development and woodland. Although woodland acreage has been 3.372
increasing on a national average at a rate of one percent 3.372
annually in recent years, conversion of agricultural lands to 3.373
woodland does not destroy the productive potential and other 3.373
environmental values associated with prime agricultural soils. 3.374
Urban development, however, preempts the productive potential of 3.375
the soil and destroys the ecologic and aesthetic values of prime 3.376
agricultural soils. Since prime agricultural soils have few 3.377
natural limitations for urban activities, these lands are quickly 3.377
acquired by developers. Urbanization has been a major factor 3.378
contributing to the conversion of nearly one-half of 3.378
Pennsylvania's original prime agricultural soils to 3.379
non-agricultural uses. 3.379

Protecting the environmental values of Erie County's remaining 3.381
prime agricultural soils through agricultural use will be 3.381
extremely difficult if farming does not remain a viable economic 3.382
activity. Against mounting production costs, and shifting 3.383
consumer food preferences, farmers often have a difficult time 3.383
staying in business. In this kind of atmosphere additional 3.384
economic burdens in the form of higher property taxes can often 3.384
eliminate the profitability of farming. Prime agricultural soils 3.386

cannot remain in production in the presence of a changing 3.386
economic climate which does not support agricultural activities. 3.387

Conversion of agricultural soils to urban land uses has also been 3.389
accelerated by public service availability and changing land use 3.390
patterns. Sewers, water mains, and highways have served to guide 3.391
the location of growth and development in metropolitan areas. 3.391
Municipal authorities frequently extend sewer lines into prime 3.392
agricultural soils in advance of actual demand. New and improved 3.393
highways permit urbanization to rapidly expand into outlying 3.393
areas. Where public services are available, speculation and 3.394
higher tax assessments often follow. Faced with increased costs, 3.395
higher tax assessments, rural-urban land use conflicts, and the 3.395
loss of necessary services, farmers frequently find it more 3.396
convenient to sell their lands for development. 3.396

In addition to the location of public facilities, existing 3.398
regulatory programs to control environmental pollution may 3.398
inadvertently create pressures for the conversion of prime 3.399
agricultural soils to uses which preempt the productive use of 3.399
the soil. Unless limited by seasonal high water tables, prime 3.401
agricultural soils normally pass percolation tests of on-site 3.401
sewage disposal systems. In areas not serviced by sewers, this 3.403
characteristic of prime agricultural soils creates pressures for 3.403
conversion especially in metropolitan areas where development 3.404
pressures are likely to be severe. 3.404

Existing State tax policies also pose a potential threat to the 3.406
protection of prime agricultural soils. Local governments have 3.407
traditionally relied on property taxes for the bulk of local 3.407
revenues. In order to provide new or maintain existing municipal 3.408
services, more intensive use of land yeilding high property taxes 3.408
is desired. This results in productive soils being converted to 3.410
industrial parks, shopping centers, high rise apartment 3.410
complexes, and new residential development. Due to the large 3.412
number of local governments in Erie County, municipalities are in 3.412
constant competition for more extensive land uses which serves to 3.413
increase the threat of urbanization and conversion of farmland to 3.413
other uses. This threat is aggravated by conflicting procedures 3.414
for assessing fair market values of land which may not consider 3.414
soil productivity ratings. Assessments on the extension of 3.416
public facilities including water and sewer lines through 3.416
farmlands used to be another cost to the farmer, however, 3.417
Pennsylvania Act 71 of May, 1976 has provided that owners of 3.417
agricultural land may not be assessed for water and sewer lines 3.418
as they do not (1) use the services, or (2) use their land for 3.418
non-agricultural purposes. The only farmland that may be 3.419
assessed is that portion which is actually being used for 3.419
residential use, i.e. the farmhouse. Assessment can be collected 3.420
by the municipality if the agricultural land is sold for 3.420
development purposes, as under the new law the municipality 3.421
places a lien on the farm property. 3.421

Prime agricultural soils are becoming an increasingly significant 3.423
resource. Thus it should be policy to protect and preserve the 3.424
productive capability, resource potential, ecologic significance 3.424
and open space values of prime agricultural soils. Management 3.426
techniques for preserving such soils and farmlands include the 3.426
following: 3.426

(1) Comprehensive Plans should indicate the location of all prime 3.428
and unique agricultural soils. After such policy has been 3.429
established, utilities and public facilities which promote 3.430
development can be directed elsewhere. 3.430

(2) Agricultural Zoning as currently practiced in Erie County 3.432
does not discourage residential development of prime 3.432
agricultural soils. Where agricultural zoning occurs, a 3.434
minimum lot size of 10 acres or more should be encouraged. 3.434
Even if such lots come to be utilized by residential 3.435
structures the land would be preserved for possible 3.435
utilization at some later date. The optimal zoning practice, 3.437
of course, would prohibit all non-farm related development. 3.437

(3) Preferential Tax Assessments should be encouraged to promote 3.439
agricultural utilization of prime and unique agricultural lands. 3.440
Two State laws have recently been passed by the Pennsylvania 3.441
General Assembly which act to reduce tax pressure upon farmers. 3.441
The first law, Pennsylvania Act 71 of May, 1976, was mentioned 3.442
above. A second law, the Farmland and Forest Land Assessment Act 3.443

of 1974, states that lands currently used for agricultural 3.443
purposes and lands devoted to agricultural and forest reserve are 3.444
elibible for preferential tax assessment. The law stipulates 3.445
that land devoted to agricultural use must satisfy one of the 3.445
following: (1) the land is now devoted to 3.445

agricultural use and has been for the preceding three years, 3.446
and the land is not less than ten contiguous acres, or (2) 3.447
the land is now devoted to agricultural use and has been for 3.447
the preceding three years and the owner is able to 3.447
demonstrate to the assessor how the land will be used to 3.448
generate a $2,000 gross income. Land devoted to agricultural 3.449
reserve must satisfy all of the following criteria: (1) the 3.449
land is not less than ten contiguous acres in area, (2) the 3.450
use of the land must be non-commerical, (3) the land must be 3.450
open to the public and used for outdoor recreation or for the 3.451
enjoyment of scenic or natural beauty, (4) there can be no 3.451
charge or fee for the use of the land, and (5) there can be 3.452
no discrimination against persons using the land. Land 3.453
devoted to forest reserve must satisfy all of the following 3.453
criteria: (1) the land is stocked by forest trees of any size 3.453
and is capable of producing timber or other wood products, 3.454
and (2) the land is not less than ten contiguous acres. 3.454

Historic and Cultural Sites - A community develops through time. 3.456
Considered as a whole, its physical features are constantly 3.457
changing. At the same time, smaller areas within a community, 3.458

once developed, are usually stable and relatively permanent. The 3.459
physical forms of urban neighborhoods, i.e. street and road 3.459
patterns, architectural design and relationships, extent and 3.459
character of landscaping, etc., represent the development ideas, 3.460
and perhaps ideals, of their period of construction. The history 3.461
of a community is reflected in its development pattern. 3.461

Most communities have some buildings, sites or neighborhoods of 3.463
particular interest or significance. Some may be the locations 3.464
of historic events of national, state or local importance. Some 3.465
may be associated with notable persons or groups, whether 3.465
historic or contemporary. Some may be distinctive in 3.466
architectural design, landscape treatment, or other artistic 3.466
features. Some may have unique characteristics or may be 3.467
interesting simply as curiosities. Such buildings and areas 3.468
contribute to the variety and vitality of the urban scene by 3.468
enriching the daily experiences of both resident and visitor. 3.469
They form an important part of a community's historic and 3.470
cultural heritage, which, if lost, cannot be replaced. 3.470

This does not mean that any building must be saved simply because 3.472
it is old nor that any site must be developed as a special park 3.472
because it was once vaguely associated with some historic event. 3.473
It does mean that a municipality, preferably as part of its 3.474
comprehensive planning program, should make a thorough inventory 3.474
of its resources and take the necessary steps to preserve those 3.475

buildings, sites and areas that are found to contribute significantly to its physical and cultural heritage.

Within the Erie County coastal zone, five publicly owned sites have been designated to have historic and cultural significance. Each of these sites have previously been identified and the significance of each noted. This, of course, does not imply that additional sites, privately owned, do not exist within the coastal zone. Management techniques must be available to preserve both known historic and cultural sites, as well as potential sites of significance not already mentioned. The following are examples of such management techniques:

(1) Comprehensive Plans should locate and identify the merits of each historic and cultural site. Methods for preserving existing sites should be indicated. Also, potential historic and cultural sites should be identified in the comprehensive plan, thus making it public that official policy is promoting the eventual preservation or restoration of specific sites or neighborhoods.

(2) Historic District Zoning is a management technique whereby historic districts are identified and a Board of Historical Architectural Review is appointed and authorized to review and make recommendations before any

building erection, alteration or demolition within a designated 3.493
historic district can occur. To enact an historic district 3.494
ordinance the governing body must first define appropriate areas 3.494
as historic districts. These designated historic districts must 3.495
then be presented to the Pennsylvania Historic and Museum 3.495
Commission for certification of their historic significance. 3.496
Upon receipt of this certification from the Pennsylvania Historic 3.497
and Museum Commission, the governing body then appoints a Board 3.497
of Historical Architectural Review. This Board must be composed 3.499
of at least five members of which one must be a registered 3.499
architect, one a real estate borker, and one a building 3.500
inspector. The remaining members must be persons with knowledge 3.501
or interest in the preservation of historic districts. Upon 3.502
enactment of the historic district ordinance the governing body 3.502
is empowered to issue Certificates of Appropriateness for any 3.503
building construction, alteration or demolition within the 3.503
district. No building permit is to be issued for any project 3.504
within the district until a Certificate of Appropriateness is 3.504
issued. The major duty of the Board of Historical Architectural 3.505
Review is to give counsel to the governing body regarding the 3.505
advisability of issuing Certificates of Appropriateness. The 3.507
purpose of enacting historic district ordinances is to protect 3.507
the historically significant areas of the municipalities of 3.508
Pennsylvania. This is accomplished by ensuring that the 3.509
historical significance and character of the historic areas are 3.509
considered by the municipal governing body, the building 3.510

inspector, and the property owner or developer on any proposed building project within the districts.

(3) Special Commissions are another device for exerting architectural controls over historic structures and places. Functions of such commissions are similar to those of the Board of Historical Architectural Review, mentioned in the previous section, and are not limited only to an historic zoning district, but instead include all districts within a community. The commission will prepare and maintain an approved list of historically and architecturally important structures and sites throughout the community, and no demolition, removal, or substantial alteration of any structure on the list could occur without the commission's approval, or at least, review. The special commission approach is concerned primarily with architectural integrity of important structures. Regulations concerning any alteration such as painting or renovation of a building's facade would first be examined by such a commission. A major function of the commission would therefore be to find economically feasible reuses of structures in which no drastic alteration of a structure would occur causing the architectural significance to be damaged or destroyed.

(4) The Scenic Easement is a tool for public control of the 3.526
architectural integrity of certain historic structures. 3.526
It is a device that allows preservation of the public 3.527
interest in the appearance of the building without 3.527
substantially affecting the use of the property. The 3.529
purpose is to prevent exterior alterations detrimental 3.529
to the original architectural design. The approach is 3.530
for a public body to acquire, through purchase, 3.530
condemnation, or perhaps donation, a negative easement 3.530
over the facade of the building which does not allow the 3.531
owner to alter the exterior appearance of the building 3.531
without approval of a designated public agency. 3.532

(5) Urban Renewal offers a community a fifth alternative for 3.534
protecting historic sites. Most historically important 3.535
structures are found in the older central portions of 3.535
cities, areas that have become subject to deterioration 3.536
and possible urban renewal treatment. Through proper 3.537
coordination with overall comprehensive planning and 3.537
preservation program approaches, urban renewal can 3.537
greatly aid the objectives of historic preservation. A 3.539
major contribution is the provision of improved settings 3.539
for historic structures. Through urban renewal, 3.540
blighting conditions in the vicinity can be removed. 3.540
With various public improvements, a restored environment 3.541
can be provided for historic structures. New uses can 3.542
be returned to old areas, and new construction can be 3.542

related to the old through appropriate aesthetic 3.542
controls within renewal project areas. Restoration of 3.544
important structures can be aided either by acquistion 3.544
and resale to private interests for restoration or by 3.544
acquisition and restoration by the local public agency 3.545
for later resale, with deed restrictions appropriate to 3.545
protect the architectural integrity of the structure and 3.546
the public investment in the restoration. In addition, 3.547
as part of an urban renewal project, historic buildings 3.547
can be moved to new sites either inside or outside the 3.547
project. In all instances, renewal planning needs to be 3.548
closely coordinated with planning for the comprehensive 3.548
preservation program. 3.548

(6) Tax Incentives are a possible device to encourage 3.550
rehabilitation and preservation. Such incentives could 3.551
take numerous forms -- assessment or rate reduction, 3.551
assessment or rate freeze, temporary exemption, refund 3.552
and so on. The basic idea is to encourage the owner to 3.553
restore and preserve the building by offsetting some of 3.553
his improvement expenses with some type of tax relief. 3.554
The feasibility of any such proposal, of course, must be 3.555
evaluated thoroughly, in terms of both State and local 3.555
laws. Any tax incentive proposal must be realistic and 3.556
linked to a strong case that it is clearly in the public 3.556
interest to insure the preservation and proper 3.557

maintenance of particular significant structures. 3.557
Appropriate safeguards must be included. 3.558

(7) Acquisition is an option available to both public and 3.560
private preservation groups. Public acquisition to 3.561
preserve select buildings and sites, either by purchase 3.561
or condemnation should be considered when a significant 3.562
structure becomes available in a location appropriate to 3.562
the performance of a particular public function or when 3.563
this is the only chance remaining to save a truly 3.563
outstanding building. Not all publicly owned historic 3.564
structures need to become period museums. Other public 3.565
uses should also be considered. Depending on location, 3.566
other possible uses for significant old houses might 3.566
include a branch library, office space for growing city 3.566
agencies, an art school annex or rental gallery 3.567
affiliated with the local art museum, a neighborhood 3.567
center for the provision of various city services, or an 3.568
information center. Decisions on public acquisition 3.569
must be based not only on the architectural and historic 3.569
merits of the structure but also on the potention for 3.57(
productive use by public agencies. 3.57(

(8) Revolving Funds are a technique which applies private 3.57
funds to the redevelopment and conservation of historic 3.57
areas. A private organization raises funds to purchase 3.5
and restore historic structures. These are then rented 3.5

or resold (usually with deed restrictions to protect the 3.574
exterior appearance of the structures), with the 3.574
proceeds returning to the fund to be applied to other 3.575
structures. In some cases structures are resold to 3.576
other parties committed to carry out the restoration 3.576
work. 3.576

(9) Occasionally, Restrictive Covenants have been used to 3.578
preserve certain features of the character of an area, 3.578
usually a small prestige address area. A covenant runs 3.580
with the land and binds owners and their successors to 3.580
particular practices with respect to their property. 3.580
Private covenenats depend on the consent of all owners 3.581
in the area in question, a consensus that will probably 3.581
be difficult to achieve, especially in larger areas. 3.582
While restrictive covenants may provide effective 3.583
controls, they may be virtually impossible to create in 3.583
historic areas with many property owners. Though such 3.585
covenant agreements among owners may be rare, the 3.585
restrictive covenant may still be a useful tool when an 3.585
individual owner or foundation purchases and restores 3.586
numerous old structures. In some cases effective 3.587
covenants can become conditions of the resale of the 3.587
properties. 3.587

Derelict or Abandoned Areas - As has been indicated previously, 3.589
most portions of the Erie County coastal zone remain undeveloped 3.590
or minimally developed. The preventative measures listed above 3.591
will act to preserve the most sensitive natural and socioeconomic 3.591
areas of the coastal zone. Unfortunately, however, portions of 3.592
the coastal zone have been environmentally damaged or are 3.592
economically dysfunctional. Three such areas have been 3.593
identified as requiring restoration management techniques. These 3.594
areas are (1) the lake bluffs which have been cleared of 3.594
vegetation, (2) the waters of Lake Erie and Presque Isle Bay 3.594
which have been environmentally damaged due to 3.595
pollutant-drainage, and (3) the port and waterfront area of the 3.595
City of Erie. 3.595

Preservation management techniques for the protection of the lake 3.597
bluffs have already been suggested in the section entitled Areas 3.598
of Significant Natural Value. Through conservation zoning 3.599
practices such as developmental setbacks and expanded lot size 3.599
regulations, efforts to restore the vegetation which acts to slow 3.600
the erosion rate of the bluffs could essentially restore most of 3.600
the bluffs, at least to their former rate of erosion before 3.601
development took place. A campaign to inform lake bluff owners 3.602
of the hazards involved with clearing vegetation from the bluffs 3.602
would round out all required restoration management techniques. 3.603

A second "environmentally derelict" phenomena is the quality of 3.605
water which enters Lake Erie and Presque Isle Bay from sources in 3.606

Erie County. Management techniques already exist through the 3.607
enforcement of regulations by the Federal Environmental 3.607
Protection Agency and the Pennsylvania Department of 3.608
Environmental Resources. At the local level, however, policies 3.609
for the preservation of natural areas, recreation sites and prime 3.609
and unique agricultural farmland can have a great effect upon 3.610
water quality management, greatly reducing the need for 3.610
enforcement by Federal and State agencies. 3.611

Portions of the port of Erie and waterfront area are the only 3.613
areas that qualify as being "economically abandoned". Erie's 3.614
potential significance as an international port-of-call has been 3.614
highly underemphasized. Developments which could renew an 3.615
interest in this area as an attractive site for import-export 3.615
business, water related industry, and recreation are listed as 3.616
follows: 3.616

(1) Completion of the Bayfront Road and its interconnection 3.618
with Interstate 79 will be instrumental in opening the 3.619
Port of Erie to vitally needed truck transportation. 3.619
The current proposal is for a 2-lane controlled access 3.620
highway to provide access for traffic to the bay front 3.620
and is to extend from 12th Street in the area of I-79 to 3.621
East Avenue and East Lake Road. Engineering is being 3.622
initiated at this time, however, the project is number 3.622
20 on the priority listing of the Erie County 12 Year 3.623

Program. Construction is scheduled for fiscal year 3.624
1985-1986 at a cost of over $25 million dollars. 3.624

(2) Expansion of existing port facilities to accomodate 3.626
additional vessels and material storage would assist in 3.626
the development of the port. Planned improvements for 3.628
the Marine Terminal include an administration building, 3.628
additional bulkheads for berthing areas on both the 3.629
northwest and west face of the East Bay Area, additional 3.629
bulk storage areas, and expansion of the existing 3.629
transit shed. 3.630

(3) Construction of a marina, a four-lane launching ramp and 3.632
parking in the East Bay area would serve to increase 3.632
recreational opportunities in the port and waterfront 3.633
area. The Erie-Western Pennsylvania Port Authority 3.634
proposes to construct such a facility immediately south 3.634
of the proposed diked dredge material disposal facility 3.635
south of the channel entrance on Lake Erie. There are 3.636
several advantages of a small boat launching and 3.636
berthing facility in this area. Such a facility would 3.637
prove to be beneficial to Erie's East Side where there 3.637
presently is a virtual absence of launching and berthing 3.638
facilities. Secondly, it would provide a harbor of 3.639
refuge on the lake side of the sometimes treacherous 3.639
Presque Isle Bay channel entrance. It would also 3.640
provide a partial relief to the intense demand for small 3.640

boat launching and berthing facilities that presently 3.640
exists in the Erie area. 3.641

Three levels of development have been considered for 3.643
this site. The lowest level would have 50 slips, a 3.644
four-land launching ramp, parking for 114 cars and 152 3.644
cars with trailers, a travel hoist and basin, a jib 3.645
crane and a small marina building for a total cost of 3.645
$2,469,920. A medium level of development would add 3.647
more piers and docks and accomodate 204 boats, and an 3.647
increase of 100 parking spaces for cars. The total cost 3.649
would be $2,971,220. The ultimate plan for a marina at 3.650
this site would enclose slips for 518 boats, four 3.650
additional launching ramp lanes, 620 parking spaces for 3.651
cars, 300 parking spaces for cars with trailers, a dry 3.651
storage facility for 120 boats, and possibly even a 3.652
restaurant and sales building. The total cost would be 3.653
$8,292,150. 3.653

(4) Reactivation of the Grain Dock would be an enterprise 3.655
that would assist in the restoration of a viable port. 3.655
This would probably entail building a new west pier 3.656
face, extending the pier to the U.S. Harbor line and 3.656
removing the eastern 100 feet of the State Street 3.657
Extension Pier. Alternatively, if it proves impossible 3.658
to attract a tenant who could use the grain elevator, 3.658
then it might be prudent to demolish that structure with 3.659

all its ancillary installations and restore the grain dock as a general purpose berthing facility.

(5) Construction of East Bay Drive would assist in the restoration of the port area by improving access from East Avenue to Wayne Street and the Port Access Road. This is a high priority project on the Erie County 12 Year Program and construction is scheduled to begin by 1981 with an estimated total cost of $350,000.

(6) Reclamation of the underwater area between Poplar and Myrtle Streets could enhance the waterfront area as a recreational site. This might best be accomplished with the cooperation of the U.S. Army Corps of Engineers if they would agree to deposit their dredge spoil in this area. In that event, it is estimated that 45 acres could be reclaimed in five years.

1. Areas of Natural Value, Erie County Coastal Zone, Paul D. Knuth and Dennis De Figio (consultants), January, 1976.

2. Performance Controls for Sensitive Lands, ASPO Planning Advisory Service, June, 1975.

3. Erie County Historical and Architectural Preservation Plan, Erie Metropolitan Planning Department, June, 1976.

4. Pennsylvania Coastal Zone Resources Analysis for Lake Erie, Erie Metropolitan Planning Department, September, 1975.

5. Port of Erie Waterfront Development Plan, Parsons, Brinckerhoff, Quade and Douglas, Inc. (consultant engineers for the Port Commission), April, 1968. 3.685 3.686 3.686

6. Feasibility Study, East Side Boat Launching Ramp, Parking and Marina, D'Appolonia (consulting engineer for the Erie-Western Pennsylvania Port Authority), October, 1976. 3.688 3.689 3.690

PROGRAM IMPLEMENTATION 10

10 PROGRAM IMPLEMENTATION

PROPOSED MEANS FOR PROGRAM IMPLEMENTATION

The Coastal Zone Management (CZM) Act specifically requires that the state, acting through its chosen agencies and governing bodies, possess the necessary authorities to implement the management program and be organized to do so. Such organization and authority must include power to: (1) administer land and water use regulations; (2) control development to ensure compliance with the management program; (3) resolve conflicts among competing uses; (4) acquire fee simple and less than fee simple interests in lands, waters and other property through condemnation or other means when necessary to achieve conformance with the management program; and (5) assure that local land and water use regulations within the coastal zone do not unreasonably restrict or exclude uses of regional benefit. A single agency must be designated to receive and administer grants for the purpose of implementing an approved management program.

Before a program may be approved, the Secretary of Commerce must find that it provides for one or a combination of techniques for control of land and water uses. These techniques of control include direct state planning and regulation;state establishment of criteria and standards for local implementation subject to administrative review and enforcement of compliance; and state administrative review for consistency with the management program of all projects, variances, land and water use regulations.

To the extent that Pennsylvania has adequate existing authority and organization, based upon direct state planning and regulation, it will be used to implement the management program. Examples of such authority, discussed in Chapter 4, include regulation of air and water quality and supply, sewage treatment operations, dredging and extraction of minerals, and conservation of natural resources for fishing and recreation. Economic incentives for the development of commerce and industry can be provided by the Commonwealth, and current programs for public information and comment will supplement the CZM program efforts to assure citizen education and involvement.

However, all of Pennsylvania's authorities relevant to the implementation of the management program will not provide the degree of control necessary to meet the requirements of the Coastal Zone Management Act, because critical powers to control land and water uses in the coastal zones have been delegated by the General Assembly solely to local governments. Since these local governments have largely unrestricted and exclusive authority to make land use decisions, the state is unable to control development to ensure compliance with its management program, or to resolve conflicts among competing uses as required by the federal legislation. Neither does it have the power to assure that local regulations do not exclude or unreasonably restrict uses of regional benefit. Pennsylvania must, therefore, seek additional legislative authority if it is to implement its coastal zone management program in accordance with the mandates of the Coastal Zone Management Act.

The legislation which will be sought will rely upon state establishment of criteria and standards for implementation by local governments as its technique of control. The implementation of the program through land use regulation by local governments with an overview by a state coastal zone management agency is an approach grounded in intergovernmental cooperation. This mechanism would retain the strong tradition of local land use control and allow maximum sensitivity to and accountability for local concerns. But, at the same time, it will ensure that local decisions will safeguard statewide interests in the wise use and development of Pennsylvania's coastal resources. A general description of the legislation which will be proposed follows.

The General Assembly will adopt the state coastal zone management plan, create state commissions with defined duties in implementing the plan, and assign additional responsibilities to local governments. The coastal commissions will promulgate standards and criteria relative to the implementation of the management program by local governments. Those local governments would be responsible for amending their comprehensive plans and zoning ordinances so that they are consistent with the standards promulgated by the coastal commissions and in accordance with the policies and goals of the state management plan. If a local government fails to amend its plans and ordinances or fails to administer them in a manner consistent with the coastal zone management program, these commissions would have the power to step in and develop and, if necessary, administer the plans and ordinances so that they are consistent with the state criteria and standards. The coastal commissions would then certify whether a local government's plans and ordinances are consistent with the state management plan and the standards and criteria promulgated. If a local government fails to amend or update its plans and ordinances, the commissions would have the authority to step in and do so for the local government. In order to assure that actions taken by the local government with regard to development plans and projects, variances, and exceptions are in accordance with its certified plans and ordinances, the coastal commissions would have the power to intervene in any proceedings before the local government involving plans, projects, variances, and exceptions in the coastal area. If a local government exhibits a continual disregard for administering land and water use controls in a manner consistent with its certified plans and ordinances, the coastal commissions would have the authority to step in and administer the plans and ordinances in the coastal area. The coastal commissions would also sit as dispute settling tribunals where no resolution has occurred at the local government level. State agencies would be required to conduct all their activities affecting the coastal zone in a manner consistent with the statewide coastal zone management plan and the certified local plans and ordinances.

Two implementation strategies utilizing this approach are set forth and summarized in chart form in Figures x-1 and -2.

Figure x-1

IMPLEMENTATION ALTERNATIVE I

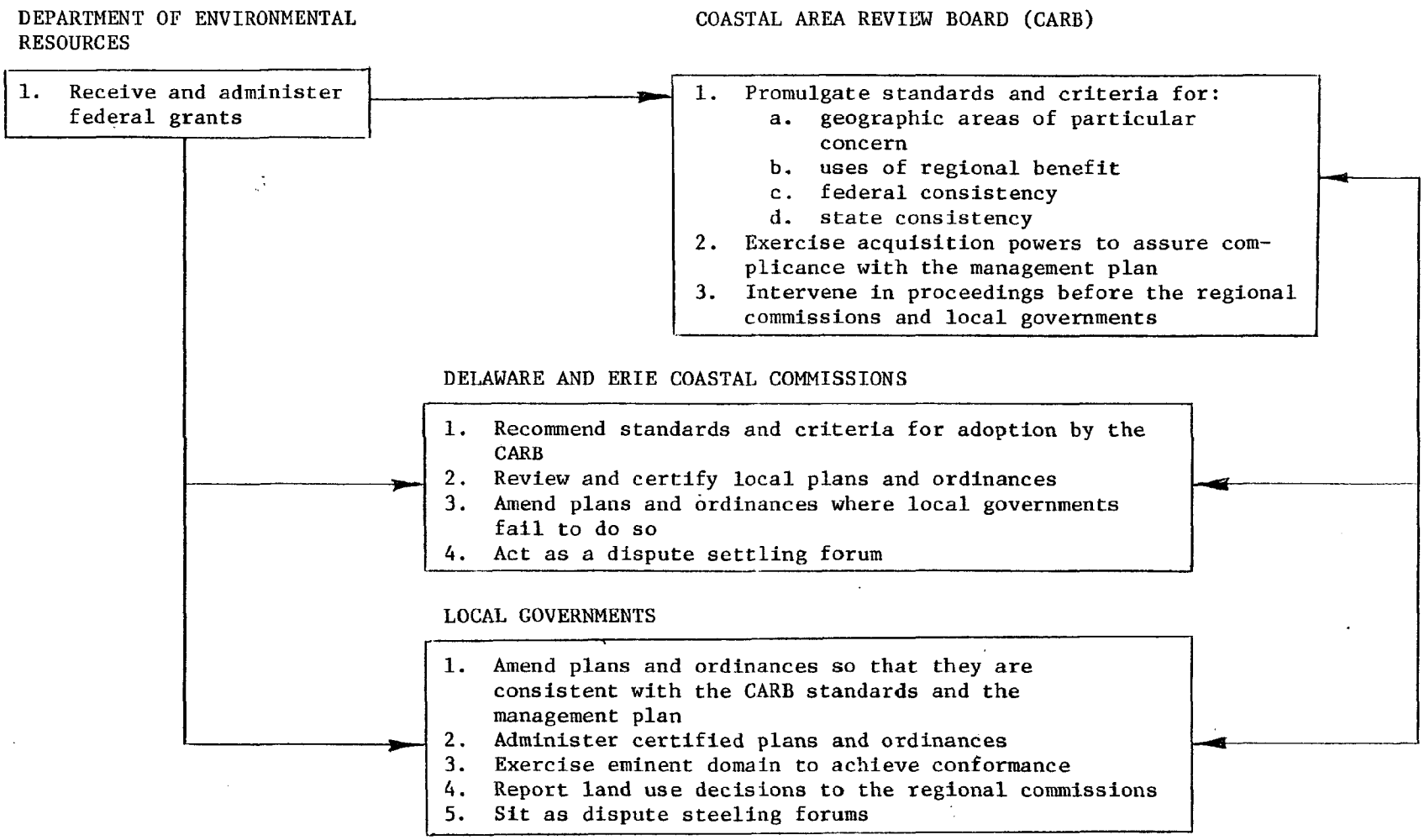
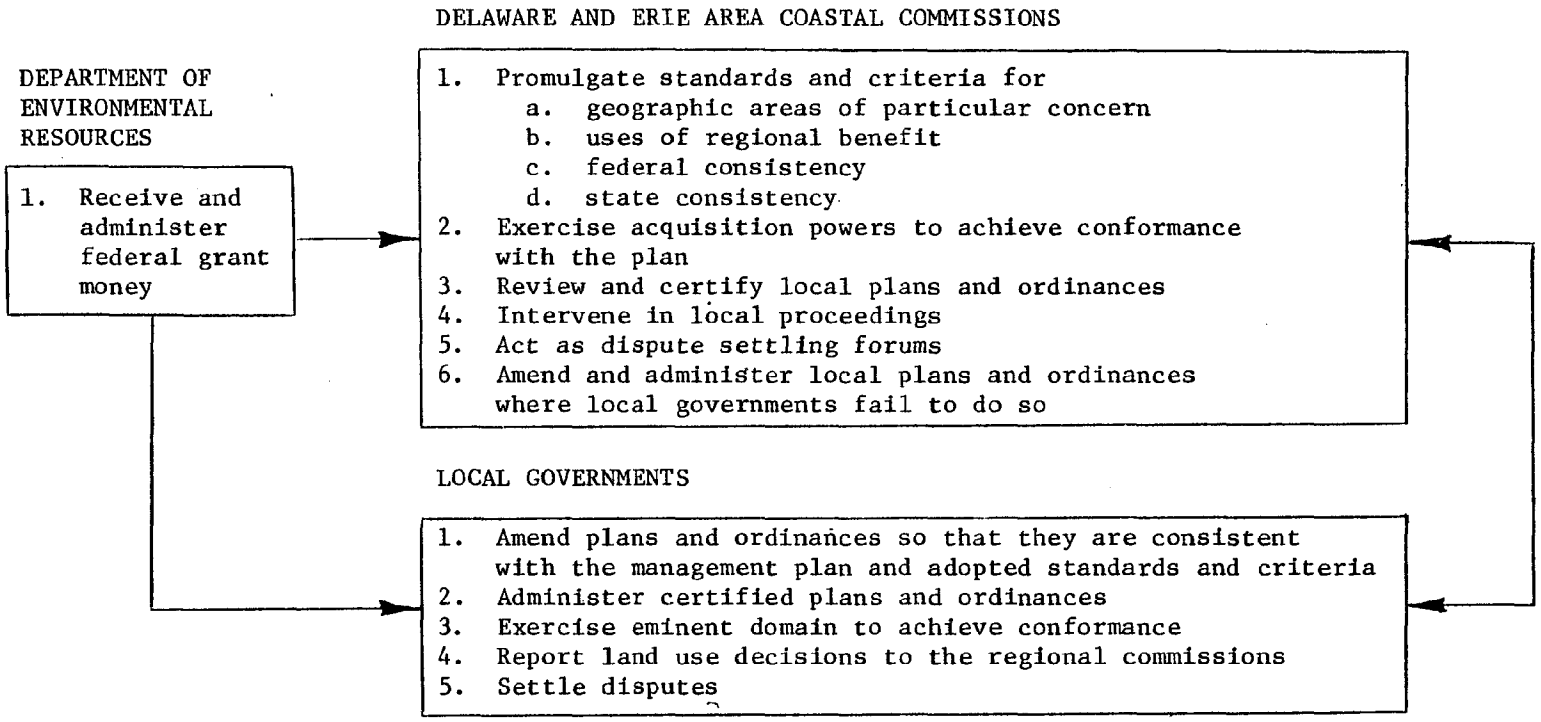


Figure x-2

IMPLEMENTATION ALTERNATIVE II



The first alternative is based on an independent state Coastal Area Review Board (CARB) and two regional Coastal Commissions, one for Lake Erie and one for the Delaware region. The CARB, composed of representatives from both regional Commissions, would promulgate standards and criteria for geographic areas of particular concern, uses of regional benefit, and consistency of state and federal projects with the CZM program. The Board would intervene in proceedings before local governments and regional commissions to assure compliance with the state plan, and would exercise the power of eminent domain, or other means of acquisition, as a last resort compliance measure. Federal grants would be administered by the Department of Environmental Resources.

Under the first alternative, the regional Commissions would recommend standards and criteria for adoption by the CARB, and review local plans and ordinances for compliance with the CZM program and the criteria and standards promulgated. The Commissions would develop plans and ordinances for local governments which failed to submit or revise them, and would administer these controls if necessary. Regional Commissions would also serve as forums for dispute settlement, in the event local dispute settling mechanisms fail.

The second alternative implementation mechanism is based upon the exercise of legislative as well as executive functions by the regional Commissions. They would sit separately to develop and promulgate criteria and standards for local implementation in each region, as well as to review local plans and ordinances for compliance with the CZM program. Each regional Commission would intervene in local government proceedings in its respective region to assure compliance, and would make acquisitions, when necessary, to assure compliance. As in the first alternative, the regional Commissions would develop or enforce plans and ordinances for local governements which failed to submit or revise conforming measures of control.

The regional Commissions would sit jointly to develop and implement federal consistency procedures and state regulations for consistency with the CZM program. The lead agency for the receipt and administration of federal grants would be the Department of Environmental Resources.

Under both alternatives, local governments would adopt and administer plans and ordinances subject to regional Commission approval, report land use decisions to these Commissions, and exercise the power of eminent domain to achieve compliance with the program and sit as dispute settling tribunals.

The nature of the organizational mechanism, as well as its functions and composition, will be ultimately dictated by the final version of the proposed legislation enacted by the General Assembly.

PROPOSED ORGANIZATION NETWORK FOR PROGRAM IMPLEMENTATION

Roles and Responsibilities of the Implementing Agencies

A Coastal Area Review Board (CARB) and/or two regional Coastal Commissions will administer the Pennsylvania CZM program. The allocation of functions among these agencies will depend on which of the implementation strategies outlined in the Introduction is selected by the Legislature. In the discussion which follows, therefore, "CARB" should be read as referring to the joint management efforts of both the state and regional agencies created to implement the program. It should be noted that most executive functions under either alternative will be exercised by the regional Commissions. Major functions of the management agencies are as follows:

1. Guidelines - establish standards and criteria to assist local governments in adopting or revising their comprehensive land use plans and zoning ordinances to comply with the state CZM program. The local coastal governments will then submit their plans and ordinances to CARB for certification. State and federal consistency guidelines will be promulgated to assure that state and federal agencies' actions affecting the coastal zones will be sonsistent with the state management programs.

2. Certification - assisted by the appropriate county planning staffs, administer the certification of the land use plans and ordinances of local governments. This function includes technical and financial assistance, review for compliance, and funding for the administration of certified plans and ordinances. If a municipality fails to revise or submit its plans and ordinances for review, CARB would have the authority to develop and, if necessary, administer conforming the plans and ordinances.

3. Plans and Projects Review - conduct a periodic administrative review of local plans and decisions for compliance with the goals and objectives of the Pennsylvania CZM program. Information regarding certain key projects of greater than local concern, as defined in the statute, will be sent to CARB for automatic review and comment.

4. Coastal Zone Policies - integrate coastal resource protection and development policy making by State agencies and refine the existing Coastal Zone policy framework as needed.

5. Local Planning Assistance - provide and coordinate financial, technical and administrative assistance to local CZM efforts in accordance with adopted program guidelines. CARB will have the authority to recommend that federal

acquisition and demonstration grants be directed to special coastal locations identified by program planning.

6. Staff Assistance - use the planning staffs of Bucks, Delaware, Erie and Philadelphia Counties for the preliminary review of local plans and ordinances for certification, and of local projects and decisions for administrative compliance. A small central staff in DER will provide administrative and coordinative assistance for CARB at the state level.

7. Budget - review and suggest modifications to the annual CZM budget prepared by DER.

8. Coastal Advocacy - establish and maintain effective forums for public involvement and intergovernmental coordination throughout program implementation. The promotion of public awareness and education will be a critical element in implementing an effective CZM program in Pennsylvania.

9. Coordination - coordinate major elements of the state CZM program with the planning and conflict resolution activities of certified coastal municipalities. The DER coastal zone staff will handle coordination for CARB at the state, interstate and federal levels, while the county planning staffs will perform a similar function at the local level. By relying on the strength of such cooperative efforts, the program will seek to address the views and concerns of all governmental levels in the coastal zone.

10. Program Review - As new economic, social and environmental problems, needs, demands and changes appear, conduct a periodic review and update of the CZM program to accomodate modifications in the data base, standards and criteria, and analytical methodology.

In order to adequately perform these functions,this joint state and local implementation mechanism must include a balanced membership drawn from among State agencies, local governments and coastal citizens. The composition and selection of the proposed Board is summarized in figure x-3.

Local governments and citizen representatives would participate in decisions involving land and water uses in their own Coastal Zone (i.e. Lake Erie representatives would not participate in decisions involving the Delaware Estuary and vice versa). All Board representatives would review coastal matters of statewide significance, including policy changes and promulgation of state and federal consistency guidelines. When it becomes necessary to vote on a key coastal issue, all board members would have an equal vote, and a 2/3 majority would be required to carry a certain decision. It is anticipated that most issues and conflicts would be resolved through informal dispute settlement procedures. More persistent disagreements could be handled through arbitration. The CARB will

Figure x-3

Proposed Coastal Zone Management Board

Agency	Entity Represented	Number	Method of Selection
1. Delaware Coastal Commission	City of Philadelphia	2	Mayor
	Bucks County	1	County Commissioners
	Delaware County	1	County Commissioners
	Delaware Estuary Citizens	2	Governor*
	Dept. of Envir. Resources	1	Secretary or designee
	Dept. of Comm. Affairs	1	Secretary or designee
	Dept. of Commerce	1	Secretary or designee
	Office of State Planning and Development	1	Director or designee
2. Erie Coastal Commission	Erie County	4	County Commissioners
	Lake Erie Citizens	2	Governor*
	Dept. of Envir. Resources	1	Secretary or designee
	Dept. of Comm. Affairs	1	Secretary or designee
	Dept. of Commerce	1	Secretary or designee
	Office of State Planning and Development	1	Director or designee
3. Coastal Area Review Board	Delaware Coastal Comm. (local government & citizen members)	6	See #1 above
	Erie Coastal Comm. (local government & citizen members)	6	See #2 above
	Dept. of Envir. Resources	1	See #2 above
	Dept. of Comm. Affairs	1	"
	Dept. of Commerce	1	"
	Office of State Planning and Development	1	"

* The Governor's selection of two concerned citizens from each coastal zone would be based upon the recommendations of the respective Coastal Zone Steering Committees.

meet on a quarterly basis to conduct general administrative business and program review. Special meetings may be called as needed to review and, where necessary, adjudicate disputes involving significant projects of greater than local concern.

Local Governments

certified local governments will have initial responsibility for the planning, management and regulation of coastal land uses and for resolving conflicts in their Coastal Zones. In order to gain required certification and to perform these tasks, the state CZM program will provide the municipality with technical and financial assistance, funded through the federal CZM implementation grants. The major functions of the local governments are summarized as follows:

1. Certification - bring the land use plans and/or ordinances into conformity with the state CZM program, based upon the policies and guidelines established by the management program and the standards and criteria promulgated by the CARB. If a municipality fails to become fully certified within two years after the effective date of CZM legislation the CARB will prepare the plans and administer them if necessary.

2. Regulation - regulate certain classes of coastal development subject to the administrative review of CARB. Coastal municipalities will retain their traditional prerogatives with regard to land use regulation in the coastal zone, so long as that regulation is consistent with the certified plans and ordinances.

3. Coordination - coordinate fully with adjacent local governments, individually or through the existing steering committees and CARB, for the purpose of resolving conflicts in the coastal zone and to ensure that activities by other municipalities are consistent with its coastal zone plan. Individual coastal municipalities will have standing to request participation in meetings of CARB or special hearings to voice their particular concerns on significant issues of controversy. Likewise, the CARB will have standing to participate in local hearings involving coastal related decisions for the purpose of ensuring that variances or special use permits inconsistent with a municipality's certified coastal zone plan are not deliberately or unintentionally issued.

4. Consistency - review proposed federal actions within the coastal zone for consistency with its coastal plans as described in the federal Consistency section of this document. The coastal municipalities will be given every opportunity to review and comment upon all state projects, grants or permit decisions which may conflict with the local

coastal plans or ordinances. Local governments should forward their recommendations to CARB.

5. Appeals - appeal to the appropriate administrative or judicial tribunals in cases where the local governments and their constituents desire relief from an unfavorable land use decision by a municipality or CARB.

6. Program Review - recommend amendments to the CZM program based upon new economic, social and environmental problems, needs, demands and changes.

7. Planning - use available CZM funds to carry out special research studies and training efforts to support the coastal zone effort at the local level.

8. Acquisition - acquire fee simple and other interests in property when necessary to achieve compliance with the CZM program. Existing powers of eminent domain may be used by the municipality, and powers of acquisition vested in other governmental units may be coordinated through the organizational network to make necessary acquisitions and transfers.

Department of Environmental Resources

It is recommended that DER retain a small staff in order to provide administrative and coordinative assistance to the Coastal Area Review Board at the state level. DER will provide the state matching portion of the annual federal CZM grants through the associated salary and overhead costs of maintaining such a staff. The major functions of this staff are summarized as follows:

1. Federal Grants - designated as the lead agency to solicit, receive and administer federal funds for the CZM program. The staff will be responsible for federal program requirements, such as program monitoring and preparing reports.

2. Coordination - ensure cooperation with all state and federal agencies operating within the boundaries of the coastal zone. The staff will represent the CZM program at meetings of the Great Lakes Basin Commission, the Delaware River Basin Commission, and any meetings of the Middle Atlantic states on matters of interstate importance.

3. Interagency Agreements - to ensure coordination and consistency, prepare agreements with the various state agencies involved in implementing various aspects of the CZM program through their existing statutory responsibilities. All state agencies would be statutorily bound to comply with and implement the adopted policies and guidelines of the state CZM program. The staff would review state projects

(under the A-95 clearinghouse process) within the coastal zone for their consistency with the state CZM program.

4. Federal Consistency - ensure that Federal programs, plans, activities and projects within the coastal zone are consistent with the adopted coastal policies and guidelines. The mechanism for ensuring this review is outlined below.

5. Permits - develop a shoreline permit procedural manual for public and private applicants, which will specify deadlines and other required information. It is hoped that such an innovative effort will streamline the permit process for construction along the shoreline. Through consultation and agreement with applicable state and federal agencies, the CZM program will strive to ensure the comprehensive, consistent and timely review of permits for proposed construction activities.

6. Acquisition - use the Department's existing authority to acquire lands and easements within the state's coastal zone by purchase, lease or gift, either alone or together with other governmental entities, whenever deemed appropriate to implement certain preservation or access objectives of the CZM program.

Coastal Zone Steering Committees

The existing Coastal Zone Steering Committees (CZSC) for the Delaware Estuary and Lake Erie will be continued in order to deal with the numerous agencies and groups within the coastal zone which may be affected by the management plan. While the existing membership (i.e. county planners, local officials, governmental agencies, special interest groups) would remain intact, efforts will be made to encourage additional representatives, especially citizens, to attend the meetings. These advisory committees should seek to enlist voluntary assistance whenever possible. Such efforts could be supplemented by appropriations from local governments, as well as support from the DER in the form of technical and administrative services, information, temporary assignments of personnel, and other coordinative activities. The main functions of the CZSC are summarized as follows:

1. Advisory - provide the CARB with timely and responsive advice on the transformation of planning guidelines into operating procedures, and serve as an informal liaison between the CARB and local governments. The Committees will provide an initial forum for the expression of local concerns and conflicts.

2. Public participation and education - ensure effective citizen involvement by developing and recommending programs for public participation in and education about coastal

planning. The CZSC will co-sponsor necessary workshops, seminars and other efforts.

3. Coordination - coordinate the various views, interests and concerns of local governments and citizens with the activities of the CARB in the administration of the CZM program.

Interagency Relationships

The central coastal zone staff of DER will retain responsibility for coordinating the activities of state agencies with program or planning responsibilities within the Commonwealth's coastal zones. DER will assist CARB by continuing all CZM subcommittee efforts to ensure that the CZM Program considers the views of affected state agencies throughout program implementation. As previously discussed, federal and local interrelationships with the CZM program will be handled through the Federal Consistency and Steering Committee mechanisms, respectively.

Agency Responsibilities

A listing of state agencies with CZM responsibilities and their involvement during program implementation is as follows:

1. Office of Environmental Protection (DER) - responsible for the administration and enforcement of water and air quality standards under Pennsylvania's Clean Streams Law and Air Pollution Control Act. As previously discussed in the section on Existing Authorities, the CZM program will use the regulations issued under the state water and air pollution control authorities. In general, this office will be responsible for achieving the water quality objectives of the State's CZM program (i.e., guidelines, permits, surveillance, monitoring), recommending solutions for water and pollution problems in each coastal zone, and coordinating air quality implementation plans and the Comprehensive Water Quality Management Plan with the CZM program. Other existing permit programs relating to water supply facilities, water obstructions, solid waste management, and sewage facilities would be administered by this office in support of the objectives of coastal zone management.

2. Office of Planning and Research (DER) - responsible for the development of an Environmental Master Plan for the Commonwealth. This plan includes policy recommendations for critical environmental areas within the coastal zone and evaluation of geologic, geographic and groundwater resources. The technical environmental expertise of this

office will be utilized to coordinate continuing environmental analyses in both coastal zones, the policies and potential implementation of the Environmental Master Plan, and special studies of geologic and mineral elements.

3. Office of Enforcement and General Counsel (DER) - responsible for providing legal advice and services to the Department of Environmental Resources. As part of the central DER coastal zone staff, this office will assist CARB in reviewing the administrative mechanisms of the CZM program. The office will also act as the legal support staff of the CARB in any required hearings or legal proceedings.

4. Office of Resources Management (DER) - responsible for management and leasing of state parks and forest lands, as well as sand, gravel or other minerals in or under the waters of the Commonwealth. Should oil and natural gas operations be commenced on Lake Erie, this office would administer the leasing of such resources.

5. Division of Comprehensive Resources Programming (DER) - responsible for the development of the State Water Resources Plan and for monitoring both consumptive and nonconsumptive uses of water in the coastal zone. Coordination with this plan will be helpful in coastal zone planning related to the amount of water needed to support industrial, municipal and private users, as well as in the identification of critical areas of overconsumption..

6. Office of State Planning and Development - responsible for the development of the State's Comprehensive Outdoor Recreation Plan, State Land Use Plan and the Economic Investment Plan. This office will coordinate the development of policies and information of the plans with the CZM program. This office could assist in local coordination.

7. Department of Community Affairs - responsible for coordinating regional, county and municipal planning activities for housing and land use within the coastal zone. Because the DCA possesses a wealth of experience in dealing with local governments, it may be called upon for advice in certifying coastal municipalities and coordinating local regulatory practices.

8. Department of Commerce - responsible for the promotion of industrial and commercial development within the state's coastal zones. This agency will be called upon to provide expertise in determining the best sites for industrial location after weighing economic benefits and costs. The Department of Commerce will encourage the development of coastal-dependent industry within recommended areas of development opportunity. Technical assistance will be

provided in evaluating industrial impacts, commercial navigation and the commercial fishing industry.

Several other state agencies will have only periodic involvement in the implementation of the CZM program. Coordination of related technical activities whenever deemed essential to sound and responsible program management will be required with the Department of Transportation (highway, rail, water and air facilities), the Bureau of Soil and Water Conservation of DER (coastal land and water conservation treatment and preservation), the Pennsylvania Historical and Museum Commission (historical, cultural and archaeological preservation), the Pennsylvania Fish Commission (recreational and commercial fishing regulations and facilities), the Pennsylvania Game Commission (wildlife management and sanctuaries) and the Pennsylvania Public Utility Commission (facility siting of utilities).

Coordinative Techniques

In order to achieve the desired administrative coordination with various State agencies, the Department of Environmental Resources as the central staff of CARB will use interagency agreements, the State Water Resources Coordinating Committee, and the Project Notification Review System of the Pennsylvania State Clearinghouse. The state's Water Resources Coordinating Committee, composed of representatives from the various agencies, will continue to provide forum for coordination, technical evaluation and policy proposals at the State level. The coastal zone staff will work with the Pennsylvania State Clearinghouse to identify coastal projects and programs and effectuate a comprehensive and expeditious review of such activities.

The proposed legislation will mandate that all state agencies with coastal zone management functions shall administer projects and programs consistent with the adopted policies and guidelines of the CZM program. A means of achieving this desired coordination would be to incorporate this final program document into the legislation as a statement of legislative intent and a policy framework for implementation of the program.

Continuing Program Review Process

As a result of the previously described planning processes, technical conclusions, and implementation strategy, the Commonwealth of Pennsylvania will have a firm base from which to pursue and achieve the necessary administrative and legislative tools to implement its CZM program. Once implemented however, the CZM program cannot abandon its coordinative commitments, regardless of how comprehensive and innovative the nature of the program may be. The management process must be subject to continuing self-evaluation in order to refine its operation and update its data base on new issues, changing conditions, and public needs.

The following discussion establishes certain guidelines that must be followed in developing a functional and timely review process. This continuing review process addresses two primary levels: (1) intergovernmental and public coordination, and (2) technical monitoring procedures. A third level, an information management system for efficient storage and distribution utilization of data throughout program implementation, is proposed in the final section of this chapter. This program review process will be refined and put into final form during the period before implementation, and become effective immediately upon federal approval and state implementation.

Intergovernmental and Public Coordination

The coastal zone staff of DER and the county and regional planning staffs will provide CARB with the necessary staff assistance to achieve the objective of continuing coordination with other governmental agencies, current and future plans, and the public. During program implementation, it will be essential to refine the procedures for dealing with Federal consistency, to improve interagency coordination at the state level, and to maintain strong state and local interrelationships.

To facilitate state and federal cooperation and understanding during program administration, special agreements on particular issues of mutual concern will be developed and the proposed federal consistency procedures will be implemented. Every effort will be made to use existing federal and interstate coordinative organizations (i.e. Federal Regional Council, Delaware River Basin Commission, Great Lakes Basin Commission, Mid-Atlantic Coastal Managers), as well as informal contacts. The central coastal zone staff of DER will prepare required materials and attend meetings, whenever necessary, to focus on common problems, joint technical applications, and program consistency requirements.

In the case of state agencies, another set of procedures will be employed to ensure the coordinated application of all relevant state efforts in the coastal zone. All appropriate state agency activities and programs within the coastal zone will be reviewed by the central coastal zone staff through the existing Project Notification and Review System. The existing multi-agency Water Resources Coordinating Committee will be used to conduct reviews of specialized coastal facilities and new programs, (i.e., recreational facilities, power plants) along with a periodic review of the objectives, policies and planning proposals of the CZM program. There will be a continuing need to reexamine components of the coastal zone legal network for gaps and overlaps in authorities. Also, interagency agreements between affected state agencies will be reevaluated in order to clarify and strengthen their stated functions, and ad hoc advisory committees will be formed as needed to deal with interagency concerns over coastal zone activities.

In order to improve and fortify the CZM program at the local level, where the management program will actually be implemented, the

interests of local governments and the public will be considered through use of several existing public participation mechanisms. The county and/or regional planning staffs will provide the necessary staff assistance.

Local coordination will be primarily through the existing Coastal Zone Steering Committees, which will be composed of county planners, municipal officials, and various interest groups. The committees will provide CARB with advice on current and future issues and suggest program refinements based upon changing needs and conditions. Local planning grants will be made available to revise and integrate new program components into municipal plans and ordinances as needed. Similarly, existing or new local and regional planning efforts will be taken into account during program reevaluations at the State and local levels. Emphasis will be placed on multi-jurisdictional approaches to program implementation so that coastal resources shared by more than one local government can be dealt with by all concerned. The public will be given opportunities to participate in the continuing program review process through scheduled workshops and seminars in order to enhance program awareness and to discuss problems and issues.

CARB, assisted by the central coastal zone staff, should function so as to prevent duplication of effort, ensure comprehensive review procedures, and improve the general responsiveness of the CZM lead agency. Specific activities which will be undertaken to meet this coordinative objective include the review of federal and state projects and programs affecting the coastal zone, response to federal consistency matters, use of the existing A-95 review procedures, and implementation of an effective system of interagency information exchange. Technical assistance to applicants for federal permits or licenses will be provided as an aid to meeting certification requirements. The CZM program will also attempt to expedite permit reviews among the state agencies.

Other administrative mechanisms to facilitate continuing review include providing notice and documentation for CZM actions requiring public hearings, administering pass-through grants to local governments, and developing administrative regulations for program implementation. CARB will also ensure that necessary site visitation, consultation, correspondence and project negotiations occur so that all alternatives are fully considered prior to making final land and water use decisions.

Technical Monitoring Procedures

CARB, through its central and local CZM staffs, will institute a policy of continual technical monitoring to accommodate modifications in the data base, standards and criteria, and analytical methodology in response to new economic, social and environmental problems, needs, demands and changes. These activities will identify problems, periodically report on their status, and develop recommendations and policies for their solution.

It is hoped that the following procedures will initiate a expeditious and comprehensive review of technical coastal zone planning, which will be the basis for most critical land and water use decisions.

One of the key policies of the CZM program will be to continually monitor and evaluate its effectiveness, especially that of the previous technical analysis and recommendations (i.e., boundaries, permissible uses, use priorities, managerial network) in order to guide future land and water use decisions. Such detailed evaluations will be carried out with input from other affected local, state and federal agencies, and the public. It will be essential to expand and improve the collection, processing and dissemination of data to ensure that future coastal zone decisions are made on a consistent basis. Efforts will be made to develop a detailed and reliable data management system capable of assisting local governments in making complex decisions affecting the coastal zone.

Because of the comprehensive nature of the CZM concept and the need to consider the coastal zone as a whole, the program staff will work with other agencies to ensure that the state's interests in certain technical issues of greater than local concern are recognized through well developed data, technical analysis, and specific policies. Examples of issues where the CZM program must monitor and play a key role include development of OCS resources, promoting maritime commerce, energy facilities siting, location of utility corridors, planning regional recreation facilities, developing major transportation modes and linkages, and allocating surface use of waters.

The CZM program will continue to assess GAPC's of significant natural, recreational, historical and cultural importance: development opportunities and areas for preservation and restoration will also be investigated.

Existing areas will be monitored and reevaluated for special management of problems and proposals for permissible uses, and the designation process will be updated when necessary to identify new GAPC's and APR's for special consideration. Moreover, efforts will be made to identify and examine potential sites for acquisition through the utilization of federal grants for the preservation of estuarine sanctuaries and coastal access areas under sec. 315 of the CZMA.

Special reports covering the technical studies, reevaluations, and recommendations will be issued to guide coastal problem solving decisions and to amend the program as necessary. Technical workshops and seminars will be sponsored to gain a diverse input from professionals and special interest organizations involved in coastal zone affairs.

Revised CZM Program

The CARB, in consultation with local, state and federal agencies and the affected coastal public, will issue an annual CZM program report to identify and analyze new issues, problems and conditions, and to recommend new policies and solutions to problems. It will also be necessary to periodically analyze Pennsylvania's coastal zone legislation to identify deficiencies. Existing legislation would be examined to identify overlapping authorities, and modifications would be considered to improve the various components of the managerial network.

Since the CZM program is a complex and innovative approach to land and water resource management, the problems associated with multi-level governmental actions to achieve a common purpose and resolve conflicts are many faceted, requiring a responsive practice of continuing assessment. These review procedures will attempt to keep the program on a reasonable course toward full realization of the coastal zone policy framework. Additional procedures will be investigated for their usefulness and suitability to carry out these objectives.

Information Management System

The coastal zone is a complex system composed of socioeconomic and environmental considerations as well as multi-level governmental institutions. The coastal zone manager must consider all aspects of the coastal zone in order to make perceptive decisions on land and water uses. The key to intelligent decision making is a continuous, up to date data base. This data must be of high quality and easily accessible to the program implementors.

Most data is generally available from secondary sources; therefore, the Coastal Zone Information Management system must manipulate this data so that is is kept up to date and easily transferred when necessary. The data base approach is recommended for the information management system. The data is broken down into general categories or modules. Each module is generally comprised of several different data types. A possible breakdown of these modules is shown with the data types and its functions on Figure X-4. This system must also be capable of data comparison, combination, manipulation, retrieval and analysis relating to project planning and review. Additionally, the system should be capable of developing models to explore the complex relationships to better evaluate and resolve competing land and water use conflicts.

In order to effectively monitor the changes in land and water uses as they relate to siting of facilities and demographic characteristics, graphic and mapping capabilities should be part of the system. Continuous investigation, verification and reporting is necessary to insure that all changes are incorporated into the system as they occur.

Figure x-4

Data Modules, Data Types, and Functions

Module	Data Types	Functions
Social	Ownership Patterns, Demographic Characteristics	Evaluates impacts of projects on these patterns and characteristics.
Economic	Income, Employment, Output, Input, Technology, Competitiveness	Evaluates economic contributions of projects to the areas economy
Land Use	Land Use Inventory, Critical Areas, Waste Disposal	Evaluates impact of projects on current land use patterns and examine future implications
Water Use	Water Use Inventory, Surface Water Withdrawal and Discharge, Waste Disposal, Groundwater Features	Evaluates impact of projects on current water use patterns and examines future implications
Resource Utilization	Climate, Minerals, Estuaries, Wetlands, Flood Plains, Woodland Areas, Beaches, Fish and Wildlife Habitat, Transitional Areas	Evaluates impacts of projects on utilization of natural resources and predicts future environmental consequences
Cost/Benefit	Financial Costs, Physical Costs, Environmental Costs, Social and Economic Costs	Evaluates the extent of project reliance on natural resources and computes the C/B of projects
Compliance	Zoning Regulations, CZM Plan Standards and Criteria, Permissible Land and Water Use	Evaluates projects for compliance with the required standards and criteria as set forth in local regulations, CZM Plan and Federal requirements
Report Generation	Output from Different Modules	Prepares Routine and Special Purpose Reports for users of Coastal Zone information, and aids in a more informed decision making process

The Information Management System should be centrally located with remote terminals in both coastal areas. This will provide efficient operation for rapid and low cost random access for either specific, routine transactions or unique summarizations. The cost effectively designed configurations such as high speed printers, plotters and connections to other information systems may be directly accessible for routine reports in either coastal zone through the remote terminals. Unique reports may be generated at the central location and mailed to the users in either coastal zone. A diagram of potential users is found on figure x-5.

The Information Management system is necessary to provide the potential program managers with up to date information in order to effectively manage, analyze, formulate and administer the CZM Program. Until the final implementation mechanisms are developed, the decision structure, information flows and user requirements are difficult to determine exactly. In any case, the local governments are the primary targets for the system; therefore, the responsibility for the design and development of an information system lies with the local planners who must determine the exact needs of their respective units of government.

FEDERAL CONSISTENCY

Introduction

Section 307 of the Coastal Zone Management Act, as amended, requires federal agencies which conduct or support activities directly affecting the coastal zone or which undertake development projects in the coastal zone to do so in a manner that is consistent, to the maximum extent practicable, with an approved state coastal zone management program. Deviations will only be justified if, because of unforeseen circumstances arising after the approval of a management program, adherence to the program would impose an unreasonable burden on the federal agency in light of the effect of deviation from the management program.

Section 307 further dictates that applicants for federal licenses and permits must certify that the proposed activity is consistent with the approved state management program. The state agency which is charged with administering the management program must communicate with the federal licensing agency and indicate whether it concurs or objects to the applicant's certification. If the state objects to the permit or license, the federal agency cannot issue it unless the Secretary of Commerce determines that the activity is consistent with the objectives of the Act or is necessary for national security reasons.

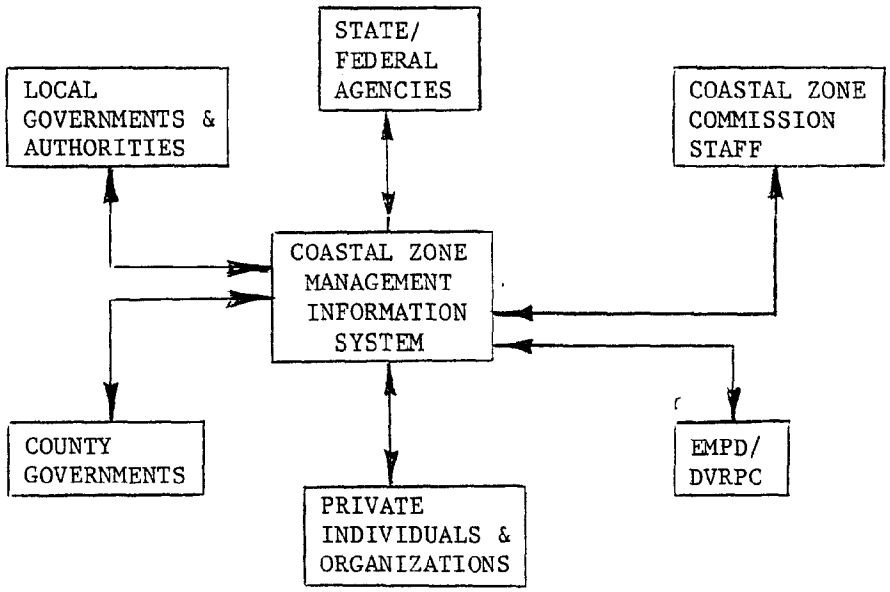
In the case of applications for federal assistance, the applicant must indicate the opinion of the appropriate management agency as to the relationship of the activity for which assistance is sought to

Figure x-5

POTENTIAL USERS

OF

COASTAL ZONE INFORMATION



the management program. If the proposed project is inconsistent with the state's management program, the federal agency cannot approve the application unless the Secretary of Commerce finds that it is consistent with the Act or in the interest of national security.

The consistency requirements embody the Congressional finding in sec 302(h) of the Act that the key to "effective protection and use of the land and water resources of the coastal zone" is in the state's exercise of full authority over the resources of the coastal zone and the establishment of effective intergovernmental cooperation.

The following procedures for implementing federal consistency in Pennsylvania's coastal zones involve the identification of federal actions in or directly affecting the coastal areas, the delineation of criteria for assessing whether federal actions are consistent with the state management program, and the establishment of review processes for assuring consistency. These procedures have been developed using NOAA rules, regulations, and guidelines as a foundation and will utilize existing state and local review processes in order to simplify the procedural requirements for review. The existing review procedures include the A-95 process for review of proposed federal assistance programs; the administrative agreement between the Department of Environmental Resources and the Delaware River Basin Commission for review of projects significantly impacting the water resources of the Delaware River; federal-state review procedures under secs. 401, 402, and 404 of the Federal Water Pollution Control Act, as amended, and state and local permitting programs.

Pennsylvania recognizes that refinement of these procedures will occur as a result of review by federal agencies. This review and refinement will occur during the interim period between program submission and actual implementation and will assure that an effective consistency mechanism will be functioning at the onset of the implementation phase of the program.

Federal Actions Affecting the Coastal Zone

The following federal actions will be subject to consistency procedures when they occur in, or directly affect Pennsylvania's coastal zones.

1. Federal Activities, Including Development Projects: These federal actions generally include any activity directly affecting the coastal zone which is undertaken by or on behalf of the federal government or any of its agencies. Development projects involve the erection of buildings or other structures or the alteration of terrain or bodies of water. The acquisition, use, and disposal of real property (including leasing) by the federal government are also considered to be development projects. Non-development activities include plans, policies, and regulations which, although general in

nature, will have a direct impact on the land and water uses of the coastal zone when implemented through existing programs (e.g. effluent guidelines and limitations).

2. Federal Licenses and Permits: These include all licenses or permits which any federal agency is authorized to issue to conduct any activity affecting land or water uses in the coastal zone. Examples are dredge and fill permits pursuant to sec. 404 of the FWPCA; nuclear power plant licenses issued by the Nuclear Regulatory Commission pursuant to 42 U.S.C. secs. 2131-2140; and permits for bridge construction in the navigable waters of the United States issued by the Coast Guard pursuant to 33 U.S.C. sec. 401.

3. Federal Assistance Programs: Assistance programs include grants, contractual arrangements, loans, guarantees, or insurance under federal programs other than those authorized in the Act received by state or local government units for the purpose of conducting an activity affecting the coastal zone. The assistance may be used for such diverse activities as housing projects, flood control works, stream channelization projects, purchase of recreation and natural areas, business loans, and transportation facilities.

4. Outer Continental Shelf Activities: Within this category of federal actions are any plans for the exploration or development of, or production from submerged lands leased by the Secretary of the Interior pursuant to the Outer Continental Shelf Lands Act, 43 U.S.C. Sec. 1331.

Federal agencies whose actions are likely to directly affect the land and water uses of Pennsylvania's coastal zones and, therefore, be subject to consistency requirements, include:

1. Air Force - development activities

2. Army Corps of Engineers - development activities, licenses and permits, assistance programs

3. Coast Guard - development activities, licenses and permits

4. Commerce (Economic Development Administration, Maritime Administration, National Marine Fisheries Service) - assistance programs, licenses and permits

5. Energy Research and Development Administration - assistance programs

6. Environmental Protection Agency - licenses and permits, assistance programs

7. Federal Energy Administration - assistance programs

8. Federal Power Commission - licenses and permits

9. General Services Administration - development activities

10. Health, Education and Welfare - assistance programs

11. Housing and Urban Development (Federal Insurance Administration) development activities, assistance programs

12. Interior (National Park Service, United States Geologic Survey, Bureau of Land Management, Bureau of Outdoor Recreation, Fish and Wildlife Service, Bureau of Mines) - development activities, licenses and permits, assistance programs

13. Navy - development activities

14. Nuclear Regulatory Commission - licenses and permits

15. Soil Conservation Service - development activities, assistance programs

16. Transportation - development activities, assistance programs

A detailed enumeration of actions requiring federal consistency may be found in Appendix A (Federal Consultation). Because federal agencies may engage in a variety of other actions which could indirectly impact the land and water uses of the coastal zone, the Pennsylvania coastal zone management program will review such actions by means of the A-95 process and will request that federal agencies notify it if they are considering actions, such as technical assistance to local governments, for which A-95 review is not required. By reviewing federal actions which may affect the coastal zone directly and indirectly, comprehensive and coordinated planning and decision-making by all levels of government in the coastal zone will be reinforced.

Criteria for Assessing Consistency

The following criteria will be employed to determine the consistency of federal actions within or directly affecting the Pennsylvania coastal zone.

Federal Activities, Including Development Projects: Any proposed land and water use, including necessary acquisition, in the designated coastal area of a certified municipality must conform to the permissible use and priority of use criteria delineated in the local zoning ordinances. Development projects must also fall within the permissible uses and priorities for a given segment of a certified municipality's coastal zone. Rules and regulations promulgated by federal agencies for coastal-oriented programs must be consistent with the goals and objectives of the Pennsylvania program. Rules and regulations which are general must be implemented in the Pennsylvania

coastal area in a manner that is consistent with the goals and objectives of the state program.

Federal Licenses and Permits: If a federal agency determines that a license or permit application is of significance in light of the state coastal zone program, or requires consistency with the Pennsylvania program, the application and supporting materials must be forwarded to the state and the certified coastal municipality for their review of the applicant's determination of consistency. If the state or local government object to the proposal because of its inconsistency with the management program, the application must be denied.

Federal Assistance Programs: Projects within or directly affecting the coastal zone for which federal assistance is requested must conform to the adopted use permissibility and priority criteria of the certified coastal municipality. Planning grants should be conditioned on the recipients' considering the goals and objectives of the state management program.

Outer Continental Shelf Activities: Although Pennsylvania will experience no direct impacts from outer continental shelf exploration or development, it is likely that the state will experience in direct or secondary impacts as a result of production from the leased areas. Consequently, production plans involving uses of lands and waters in certified coastal municipalities must conform to the permissible uses and use priorities for the affected segment of the certified coastal municipality.

Review Process for Assuring Consistency

The Pennsylvania coastal zone management program will utilize the following process to review federal actions within or directly affecting the coastal zone. It will be the responsibility of the Department of Environmental Resources, the lead agency in Pennsylvania's program, to develop criteria for assessing consistency and to provide other government agencies (local, state, interstate, and federal), and affected applicants with the requisite information which will be employed to judge consistency. Pennsylvania recognizes that its consistency process may require revision if, after consultation with affected federal agencies, identified deficiencies or conflicts arise, or if the federal consistency regulations promulgated by the Secretary of Commerce mandate changes.

Federal Activities, Including Development Projects: The Department of Environmental Resources will assist the above enumerated federal agencies in developing criteria for judging the consistency of their activities and in developing agreements with the agencies which delineate the activities which will require consistency review. The federal agencies will utilize these criteria to evaluate whether activities requiring review are consistent with the approved

management program. The federal agency will communicate its evaluation through the Office of Management and Budget's A-95 circular process and by direct communication. The Department of Environmental Resources, through its Coastal Zone Management Coordinator, will assist the federal agency if it encounters any difficulty in making its consistency determination. Upon receipt of the consistency determination and other required information (15 C.F.R. sec. 921.5 (c)), the Department of Environmental Resources, in cooperation with other appropriate state agencies and affected certified coastal municipalities, will review the consistency evaluation and respond to the federal agency within the time period and in the manner prescribed by 15 C.F.R sec. 921.5(d). Should the Department of Environmental Resources disagree with the federal agency's consistency evaluation and fail to resolve its differences with the federal agency, the Department will request mediation by the Secretary of Commerce and will represent Pennsylvania in the dispute settlement process established by 15 C.R.F. sec. 921.5(d)-(p). The federal agency will, after the mediation process, proceed with its activities or revise them to comply with the Pennsylvania program. Should Pennsylvania be dissatisfied with the outcome of the dispute mediation process, it may elect to pursue its remedies in the federal courts.

Federal Licenses and Permits: It will be the responsibility of the Department of Environmental Resources, with the assistance of the above described federal agencies, to develop a list of all federal licenses and permits which require state review to determine whether the activity for which the license or permit is requested will be consistent with Pennsylvania's program.

The Department of Environmental Resources will periodically review and modify the list and will also be responsible for transmitting such information to the appropriate federal agencies, the Office of Coastal Zone Management, and the public.

Any applicant for a federal license or permit for an activity affecting land or water uses in the coastal zone should consult with the Department of Environmental Resources to assure that the proposed activity will be conducted in a manner consistent with the coastal zone management program. Applicants for licenses or permits designated by the state as requiring consistency review or determined by the federal agency to require review because of effect on land or water uses in the coastal zone shall submit a copy of the license or permit application, as well as a signed certification statement indicating that the proposed activity will comply with and be conducted in a manner consistent with the management program. Upon receipt of the application, certification, and any additional necessary information, the Department of Environmental Resources will provide public notice, including requests for hearings and/or comments, as required by 15 C.F.R. sec. 921.6(d).

In the case of an application for a federal permit or license for an activity not determined by Pennsylvania to require state review, the Department of Environmental Resources must reply to the federal

agency, indicating its concurrence or objection to the certification or requesting additional review, within 30 days of receipt of the certification statement from the applicant, or state concurrence is presumed. In the case of an application for a permit or license determined to require state consistency review, the Department of Environmental Resources should make its decision within 90 days of receipt of the certification. If it hasn't replied within 180 days of receipt of the certification materials, concurrence will be presumed. The consistency determination will, in either case, be communicated to both the applicant and the federal agency.

If the Department of Environmental Resources concurs with the certification, the federal agency may proceed with normal processing of the application. If the Department of Environmental Resources objects to the certification statement, the federal agency may not issue the permit or license. The applicant or the federal agency may disagree with the state determination and request the Secretary of Commerce to overrule the decision through the appeal and negotiation process established by 15 C.F.R. sec. 921.6 (i) to (p). Otherwise, the applicant must reapply if he chooses to pursue the activity.

Where appropriate, existing permit review procedures at the state and local levels will be utilized to determine consistency. However, it is recognized that not all activities requiring federal permits will require state or local permits because of the doctrine of federal preemption.

Federal Assistance Programs: The state coastal zone management program will have the opportunity to review all federal assistance applications for activities within or affecting the coastal zone through the existing A-95 review process; the state will learn of proposals through the Pennsylvania clearing house. Before final federal action on the assistance application, the applicant must obtain a certification from the state indicating whether the activity for which assistance is requested complies with and will be conducted in a manner consistent with the management program.

In the case of planning and development assistance applications, the Department of Environmental Resources will forward the application and supporting material to the certified coastal municipality and it will have 30 days to review the application and make its consistency determination. The state will then have 30 days to make its own consistency determination. The state will prepare a consistency statement and send copies to the appropriate clearing house and the applicant.

If the Department of Environmental Resources does not object, the federal agency may proceed with processing the application. If, however, the Department of Environmental Resources objects to the application, the federal agency may not approve it. Should disagreement as to te consistency determination arise, negotiations between the federal agency and the Department of Environmental Resources pursuant to the process established by 15 C.F.R. sec.

921.8(b) to (g) may occur. If the process does not resolve the conflict, the Secretary of Commerce may enter as mediator.

Outer Continental Shelf Activities: Any applicant submitting any plan for the exploration or development of or production from any area leased under the Outer Continental Shelf Lands Act shall consult with the Department of Environmental Resources regarding the means for assuring that such activities will be consistent with the Pennsylvania management program. In addition, any applicant for such activities must submit to the Department of Environmental Resources a copy of the plan and a signed certification statement which indicates that each activity identified in the plan as affecting land or water uses in the Pennsylvania coastal zone complies with and will be carried out in a manner consistent with the management program. Upon receipt of the plan, certification statement, and necessary additional information the Department of Environmental Resources shall provide public notice (including requests for comments and public hearing if advisable) as required by 15 C.F.R. sec.921.7 (a).

The Department of Environmental Resources will review the plan and certification statement and notify the applicant, the Secretary of the Interior and the Secretary of Commerce of its decision within 90 days after receipt of the certification statement. In the event the Department of Environmental Resources does not respond within 180 days of receipt of the certification statement, concurrence will be presumed.

If the state concurs with the certification statement, or if concurrence is presumed, then the processing of the application may continue. If the Department of Environmental Resources objects to the certification statement, then no federal official or agency shall grant any license or permit for any such activity unless the decision is overruled by the Secretary of Commerce. The Department of Environmental Resources is responsible for representing the Commonwealth and participating in the appeal and negotiation process established by 15 C.F.R. sec. 921.7 (d) to (g).

Excluded Federal Lands

Section 304(1) of the Act provides that lands the use of which is subject solely to the discretion of the federal government or which are held in trust by the federal government are excluded from the coastal zone. The Department of Justice has interpreted this to include all lands owned by the United States. Even though federal lands are excluded from the coastal zone, the uses of those lands are subject to be consistency requirements of the Act where their use impacts the coastal zone. Absent such an interpretation, the consistency requirement of the Act would be rendered meaningless. Consequently, the federal consistency mechanisms described above will apply to all activities occurring on federally owned lands. Existing legislation which allows state control of certain activities on

federal lands, such as the FWPCA, will also be utilized as part of Pennsylvania's consistency procedure.

APPENDIX AB CD

A FEDERAL CONSULTATION

Introduction

A major part of preparing and implementing the Pennsylvania Coastal Zone Management Plan involves the development of processes and mechanisms to facilitate coordination among the various Federal Agencies and the Pennsylvania Program. The major objective of such a process is to provide an opportunity for the appropriate Federal Agencies to coordinate their plans and activities for consistency with the Pennsylvania Plan. This consultation mechanism can avoid overlaps and resolve conflicts between various programs, projects, and plans.

The Pennsylvania Program for Federal involvement began in April 1975, when the initial request was sent to various agencies requesting maps of Federally owned coastal lands as well as the agencies' current procedures and plans. A second letter was sent during August 1975 after Pennsylvania received NOAA's official listing of Federal Regional contacts. This letter requested verification of coordination and the name of the official contact person. On October 1975, a request was sent to the Federal agencies for their review of "Goals and Objectives of the Pennsylvania Coastal Zone Management Program". In January 1976 an invitation was sent to the various agencies inviting them to participate in a Department of Environmental Resources sponsored Federal consistency meeting in Harrisburg during February 1976. The discussions at the meeting concentrated on the Program update, the final review of goals and objectives, and the future plans for Program development and implementation. In November 1976, requests were sent to the Federal Agencies for the review of the applicable sections of the final document.

This appendix is a condensed documentation of the Federal consultation process. The CZM staff's interpretation of each agencies national interest, coastal facilities, and those activities which require state review during implementation, is presented in chart form. Also included on each agencies' chart are brief synopsis

of the interactions which occurred. The inclusions in this appendix are informal and brief discussions and are not to be taken as the complete nor official view of the Department or the Federal Agencies themselves.

This section contains copies of the letters and the agenda for the consistency meeting (Harrisburg 2/24/76) sent to the agencies. A list of the Federal agencies and their official contact is included also.

In reply refer to
RM-R
W 69:18F

April 11, 1975

The Pennsylvania Department of Environmental Resources is currently developing a program aimed at managing the land and water resources of the State's coastal areas located along Lake Erie and the tidal reach of the Delaware River. In compliance with the provisions of the Coastal Zone Management Act of 1972, we are contacting all Federal agencies with program responsibilities within the coastal areas, and which are likely to be affected by, or have a direct interest in, the development and implementation of a Coastal Zone Management program for Pennsylvania.

We extend to you the full opportunity to coordinate your program, projects, or plans with our Coastal Zone Management program. In addition, we will seek guidance from you concerning the siting of facilities meeting requirements (i.e., energy, transportation, recreation, national defense, etc.) which are of greater than local concern, and indicating a clear national interest.

At this stage of our program, we are interested in receiving maps of Federal lands that your agency controls within the coastal areas as well as copies of current operational procedures and plans that affect them. We are enclosing a schematic of our interim coastal zone planning boundaries for your region indicating our range of interest.

Please respond at your earliest convenience with your office's designated contact man in the program, including telephone number. Should you have any questions, please contact W. N. Frazier of our staff at the above address or by telephone: Area Code 717 787-5008 or 4053.

Sincerely yours,

C. H. McConnell, Deputy Secretary
Resources Management

Encl.

In reply refer to
RM-R
W 69:18 F

August 22, 1975

Dear Mr.

In compliance with Section 307 of the Coastal Zone Management Act of 1972, our office has contacted many Federal agencies with program or other responsibilities within the Commonwealth's coastal areas. A memorandum released on August 4 by NOAA's Office of Coastal Zone Management contained an official listing of Federal regional contacts. Prior to receiving this memorandum, our office transmitted a letter dated April 11, 1975, to you in an effort to gain this desired coordination.

We again wish to extend to you the full opportunity to coordinate your programs and plans with our Coastal Zone Management Program. Please respond at your earliest convenience to confirm your interest in this endeavor.

Should you have any questions, please contact W. N. Frazier of our staff at the above address or by telephone at (717) 787-5008 or 4053.

Sincerely yours,

C. H. McConnell, Deputy Secretary
Resources Management

Encl.

In reply refer to
RM-R
W 69:18 F

October 5, 1975

A document entitled, "Goals and Objectives of the Pennsylvania Coastal Zone Management Program," is enclosed for your review and comment. Please transmit any comments or questions you may have to George E. Fogg (telephone 717 - 787-6674) by October 31, 1975. We urge you to respond by this date so that your comments and suggestions may be considered. If we do not hear from you, we will assume that you agree with the goals and objectives as stated.

In addition, I have enclosed a brochure prepared by NOAA's Office of Coastal Zone Management. The brochure entitled, "It's Your Coast ... Get Involved," presents an overview of coastal zone management.

Your cooperation is essential to the successful development of this program.

Sincerely yours,

C. H. McConnell, Deputy Secretary
Resources Management

Enclosures (2)

In reply refer to
RM-R
W 69: 18 F

January 9, 1976

We cordially invite you to attend a meeting regarding Federal consistency in the development of Pennsylvania's Coastal Zone Management Program. The meeting will be held at 10:00 a.m. on February 24, 1976, in Room 224 of the Evangelical Press Building, Third and Reily Streets, Harrisburg, Pennsylvania. Participation by all Federal agencies with planning and other responsibilities in either of Pennsylvania's two coastal areas is being solicited.

A tentative meeting agenda is enclosed for your review. We will welcome any maps, reports, plans or other input you feel necessary to the satisfactory treatment of your interests or concerns in the development of our program.

If you would like to make any changes or additions to the agenda or if you are unable to attend the meeting, please contact George E. Fogg, Coastal Zone Management Program Coordinator, at the above address or at (717) 787-6674.

Sincerely yours,

C. H. McConnell, Deputy Secretary
Resources Management

Enclosure

AGENDA

FEDERAL CONSISTENCY IN COASTAL ZONE MANAGEMENT

ROOM 224, EVANGELICAL PRESS BUILDING

THIRD AND REILY STREETS

HARRISBURG, PENNSYLVANIA

FEBRUARY 24, 1976

10:00 A.M.

* *

1 - Opening Remarks

2 - Introduction

3 - Approve Agenda

4 - Final review and approval of the Goals and Objectives of Pennsylvania's Coastal Zone Management Program

5 - Progress update of Pennsylvania's CZM Program

6 - Future plans for the development and implementation of Pennsylvania's CZM Program

7 - Group discussion of Pennsylvania's coastal areas of Federal interest in the siting of facilities

8 - Final Remarks

9 - Adjournment

In reply refer to
RM-R
W69:18F

November 5, 1976

Dear Mr.

The Pennsylvania Coastal Zone Management staff has initiated work on the final program report. In compliance with the provisions of the original Coastal Zone Management Act of 1972, we are continuing our coordination with all Federal agencies with program responsibilities within the coastal areas, and which have a direct interest in the implementation of the CZM program in Pennsylvania.

At this time, we are interested in having your agency review the applicable sections of the completed document. We are enclosing information of the final CZM boundaries and the procedure for their delineation, as well as a description of the geographic areas of particular concern in the coastal zone and the rationale for their selection. Also enclosed are the draft CZM policy framework and the final CZM document outline.

We would appreciate your comments on the enclosed material at your earliest convenience. In addition, please let us know which section(s) of our draft CZM document (see enclosed outline) you would like to review. If you have any questions, please contact George Fogg, CZM Coordinator, of our staff at the above address or by telephone at (717) 787-6674 or 6816.

Sincerely yours,

C. H. McConnell, Deputy Secretary
Resources Management

Encls. (4)

Lake Erie Coastal Zone Information
Delaware Estuary Coastal Zone Information
Draft CZM Policy Framework
Final CZM Product Outline

In reply refer to
RM-R
W 69:18F

May 2, 1977

We wish to continue our Coastal Zone Management Program coordination with your agency by enclosing several draft chapters of our final program document for your review and comment. We have enclosed Chapter I (Inventory of Coastal Resources and Uses), Chapter II (Current and Past Problems and Issues), the National Interest Section of Chapter IX (Special Considerations in GAPC's), and the Federal Consistency Section of Chapter X (Program Implementation).

We would appreciate your comments on the enclosed material at your earliest convenience. A mailing of the remaining portion of our final program document will be forthcoming in June, 1977. If you have any questions, please contact George Fogg, CZM Coordinator, of our staff at the above address or by telephone at (717) 787-6674 or 6816.

Sincerely yours,

C. H. McConnell, Deputy Secretary
Resources Management

Encl. (4)

REVISED 2/4/77

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This section contains a brief documentation of the Federal Consultation according to agency.

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
U.S. DEPARTMENT OF INTERIOR * * * * * * * * * 1. National Park Service (NPS) 2. Fish & Wildlife Service (FWS) 3. Bureau of Land Management (BLM) 4. Bureau of Mines (BOM) 5. Bureau of Outdoor Recreation (BOR) 6. Geological Survey (GS)	A broad and general expression of policy with regards to the Departments National Interests in these seven major resource responsibility areas: 1. Natural, cultural, historical and archeological values. 2. Fish and wildlife resources 3. Energy and mineral resources 4. Recreational resources 5. Water resources 6. Food and fiber 7. Trust responsibilities	Tinicum Marsh Wildlife Center * * * * * * * Independence Mall Historical Park * * * * * * *	4/75-Maps of agency owned lands and operational plans and procedures 8/75-Follow-up requesting coordination and official contact officer 10/75-Review of final goals and objectives. 1/76-Invitation to attend Federal Consistency Meeting. 11/76-Agency review of applicable sections of the final document. 5/77-Review and Comment on draft chapters of the final document.	4/75-(GS) No agency controlled lands, sent list of activities and contact man appointed. (BOR) not a land management agency but available for technical assistance. Appointment of contact man. 6/75-(BOM) list of state liaison officers, no agency controlled lands, technical assistance contact men. * * * * 10/75 DOI guidelines & procedures to assist in CZM development. * * * * 1/76 Statement of National Interest in the Coastal Zone. (DOI) * * * * 2/76 Attended Federal Consistency meeting in Harrisburg. (DOI,BOM, GS) * * * * 10/76 (BOM) Statement of National Interest. * * * * 12/76 (BOR) No comments and list of applicable sections BOR desires to review.	Tinicum Marsh Plan ____ Outdoor recreation acquisition and development ____ State outdoor recreation planning ____ Historic preservation ____

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
U. S. DEPARTMENT OF INTERIOR (cont.)				1/77 (BLM) General comments on GAPC's in the Delaware Estuary. * * * * 2/77 (FWS) Corrections regarding GAPC's in Delaware CZ. * * * * 2/77 (BOM) Comments on GAPC's, draft policy framework, and offshore gas drilling in Lake Erie. * * * * 6/77 (BLM) Comments on National Interest section * * * *	

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
DEPARTMENT OF AIR FORCE	1. The essential role of the Air Force in the National Defense. * * * * 2. The potential to expand defense requirements on land, in the air, on and under the water in the coastal zone. Thereby making it a high priority use of coastal resources. * * * *	Air Force Station at the Phila. International Airport. (Delaware Estuary)	2/76 Invitation to attend Federal Consistency meeting in Harrisburg. * * * * 11/76 Agency review of preliminary sections of the final CZM documents. * * * * 5/77 Review and comment on draft chapters of the final document. * * * *	4/76 Statement of Policy on CZM plans. * * * * 5/76 Air Force facilities in the Coastal Zone. * * * * 11/76 Request additional data on exclusion of Federal lands and Federal agency Consistency, also identify Air National Guard Station. * * * * 5/77 Agree with the content of the draft chapters. Reserve approval of Federal Consistency until new regs. are published. * * * *	NONE

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
FEDERAL POWER COMMISSION	To achieve, and assure an abundant supply of electrical energy throughout the United States with the greatest possible economy and with regard to the proper utilization of natural resources and comparable responsibilities under the natural gas act.	NONE	4/75 Maps of agency owned lands and current operational plans and procedures. * * * * 8/75 Follow-up requesting official agency status on coordination and contact person. * * * * 10/75 Request for comments and input on program goals and objectives. * * * * 1/76 Invitation to attend Federal Consistency meeting in Harrisburg. * * * * 11/76 Agency review of applicable sections of the final CZM document. * * * * 5/77 Review and comment on draft chapters of the final document. * * * *	8/75 List of concerns, and official agency contact. * * * * 2/76 Attended Federal Consistency meeting in Harrisburg. * * * *	Natural Gas Act - Permits for construction and operation of interstate gas pipelines and storage facilities.

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
U. S. ARMY CORPS OF ENGINEERS Philadelphia District (P) Buffalo District (B)	No statement of National Interest was received.	C.O.E. dredge maintenance station Phila. Pa. (Delaware Estuary)	4/75 Maps of agency owned lands and current operational plans and procedures. * * * * 8/75 Follow-up request for coordination and official contact person. * * * * 10/75 Review of final goals and objectives * * * * 1/76 Invitation to attend Federal Consistency meeting in Hbg. * * * * 11/76 Agency review of applicable sections of the final CZM document. * * * * 5/77 Review and comment of draft chapters of the final document. * * * *	4/75 (B) No lands under agency control. Technical assistance offered and contact man. 5/75 (P) Maps of agency owned lands. * * * * 2/76 (B) Attended Federal Consistency meeting in Harrisburg. * * * * 12/76 (B) No comments, and specified sections of final document. * * * *	Dredge and fill permits. ____ Beach erosion control projects. ____

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
ENVIRONMENTAL PROTECTION AGENCY	No statement of National interest was received.	NONE	4/75 Maps of agency owned lands and current operational plans and procedures. * * * * 10/75 Request for review of program goals and objectives. * * * * 1/76 Invitation to attend Federal consistency meeting in Harrisburg. * * * * 11/76 Agency review of applicable sections of the final CZM doucment. * * * * 5/77 Review and comment on draft chapters of the final document. * * * *	5/75 No Federal land under agency control. Designated program coordinator. * * * * 2/76 Attended Federal Consistency meeting in Harrisburg. * * * *	Federal Water Pollution Control Act. ——— Clean Air Act ——— Construction grants for wastewater treatment works. ——— Water pollution control area wide waste treatment management program grants. ——— Water Pollution Control State and interstate program grants. ——— Air quality maintenance planning.

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION	No statement of National interest was received.	NONE	4/75 Maps of agency owned lands and current operational plans and procedures. * * * * 10/75 Follow-up requesting official agency status in coordination and contact person. * * * * 10/75 Request for review of program goals and objectives. * * * * 1/76 Invitation to attend Federal Consistency meeting in Harrisburg. * * * * 11/76 Agency review of applicable sections of the final CZM document. * * * * 5/77 Review and comment of draft chapters of the final document. * * * *	11/76 No comments presently, but would like to review the complete document. * * * * 6/77 No comments but would like to review the complete document. * * * *	NONE

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT	Consistency of planning activities between CZM and other plans.	NONE	4/75 Agency owned lands and current operational plans and procedures. * * * * 8/75 Follow-up requesting official agency status on coordination and contact person. * * * * 10/75 Request for review of program goals and objectives. * * * * 1/76 Invitation to attend Federal Consistency meeting in Harrisburg. * * * * 11/76 Agency review of applicable sections of the Final CZM document. * * * * 5/77 Review and comment of draft chapters of the document. * * * *	9/75 Appointment of official agency contact. * * * * 11/76 Insure adequate level of detail in Lake Erie Section and review of complete document. * * * *	"701 Planning" open space and housing. ——— Housing and community development act. ——— Public housing - acquisition and construction. ——— Mortgage Insurance ———

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
GENERAL SERVICES ADMINISTRATION	No statement of National interest has been received.	NONE	4/75 Maps of agency owned lands and current operational plans and procedures. * * * * 10/75 Request for review of Program goals and objectives. * * * * 1/76 Invitation to attend Federal Consistency meeting in Harrisburg. * * * * 11/76 Agency review of applicable sections of the final CZM document. * * * * 5/77 Review and comment on draft chapters of the final document. * * * *	5/75 No agency owned or controlled lands. Appointment of control officer. * * * *	NONE

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
U.S. DEPARTMENT OF TRANSPORTATION Federal Highway Administration (FHA) Federal Railroad Administration (FRA) Federal Aviation Administration (FAA)	The development of a balanced National Transportation system, including will articulated and integrated surface, air, water and subsurface modes.	NONE	4/75 Maps of agency owned lands and current operational plans and procedures. * * * * 8/75 Follow-up request for official agency status for coordination * * * * 10/75 Request for review of program goals and objectives. * * * * 1/76 Invitation to attend Federal Consistency meeting in Hbg. * * * * 11/76 Agency review of applicable sections of the final CZM document. * * * * 5/77 Review and comment on draft chapters of the final document. * * * *	4/75-(FHA) Transportation facilities under state and local control, appointment of contact person. 4/75-(FRA) No agency involvement. 5/75-(FAA) No agency responsibility or involvement. Appointment of contact men. * * * * 9/75 Clarification of DOT coordination. * * * * 10/75 Requested addition of transportation oriented goal. * * * * 12/76 (DOT) Comments concerning GAPC and Coast Guard responsibities, review of complete document. * * * * 6/77 (DOT) Comments are being compiled and will be sent. * * * *	Airport development aid program. (FAA) Airport planning grant program. (FAA) Highway research planning and construction. (FHA)

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
FEDERAL ENERGY ADMINISTRATION	The overriding concern of the FEA is that the siting of energy facilities is not excluded or unreasonably restricted.	NONE	4/75 Agency owned lands and current operational plans and procedures. * * * * 8/75 Follow-up requesting official status of coordination and contact person. * * * * 10/75 Request for review of program goals and objectives. * * * * 1/76 Invitation to attend Federal Consistency meeting in Harrisburg. * * * * 11/76 Agency review of applicable sections of the final CZM document. * * * * 5/77 Review and comment on draft chapters of the final document. * * * *	9/75 Official agency contact man appointed. * * * * 11/76 Review the complete final document with main interest in specific criteria and regulations for siting faciltities of Regional benefit. * * * *	NONE

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
U. S. DEPARTMENT OF COMMERCE Maritime Administration (MARAD) Economic Development Administration (EDA) National Marine Fisheries Service (NMFS) National Oceanographic & Atmospheric Administration (NOAA) National Weather Service (NWS)	Consider the Great Lakes and the Delaware Estuary as a prime resource providing essential transportation for both domestic and international commerce. Development program of the maritime industry should be given prime consideration as they relate to the economic benefit of the coastal communities and the inland industrial and urban centers which coastal port facilities serve. (MARAD) * * * * Preserve or enhance the remaining ecologically sensitive areas. (NMFS)	Weather recording substations in both Coastal Zones.	4/75 Maps of agency owned lands and current operational plans and procedures. * * * * 10/75 Request for review of programs goals and objectives. * * * * 1/76 Invitation to attend Federal Consistency meeting in Hbg. * * * * 11/76 Agency review of applicable sections of the final CZM document. * * * * 5/77 Review and comment of draft chapters of the final document. * * * *	4/75 (MARAD) No Federal lands under agency control and appointment of designated officer. 5/75 (NMFS) No Federal lands under agency control, appointment of contact officer. 5/75 (NWS) List of weather stations in the coastal zones and contact man appointed. 8/75 (EDA) Desired coordination with CZM program. * * * * 10/75 (NMFS) Concurred with program goals and emphasize preservation of ecologically sensitive areas. * * * * 2/76 (MARAD, NMFS, NOAA) attended Federal Consistency meeting in Hbg. * * * * 11/76 (MARAD) Consideration should be given to four major maritime related areas. * * * * 11/76 (NMFS) Close coordination between states is important and preserve unique wetlands. * * * *	Port development and promotion and intermodal planning grants. —— Port expansion planning assistance for new terminals and harbors. —— Grants and loans for public works & development facilities. —— Planning and Technical Assistance. —— Public works impact program.

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
U.S. COAST GUARD 9th District Cleveland, Ohio	Same as the U. S. Department of Transportation.	Presque Isle Coast Guard Station (Lake Erie) Presque Isle Light Station.	4/75 Maps of agency owned lands and current operations plans and procedures. * * * * 10/75 Request for review of program goals and objectives. * * * * 1/76 Invitation to attend Federal Consistency meeting in Hbg. * * * * 11/76 Agency review of applicable sections of the final CZM document. * * * * 5/77 Review and comment of draft chapters of the final document. * * * *	5/75 Maps of agency controlled lands sent. Appointment of contact man. * * * * 1/76 No comments on Program goals and objectives * * * * 11/76 Clarification of CZM lakeward boundary description. * * * * 5/77 Clarification of points in National Interest Section. * * * *	Water Safety Zone ___ Port and Waterway safety and fishing zones. ___ Anchorage grounds ___ Hazardous substances and materials ___ Permits for the construction and modification of bridges, causeways, dams or dikes in navigable waters of the U.S. ___

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
U. S. DEPARTMENT OF AGRICULTURE Soil Conservation Service (SCS) Forest Service (FS)	No statement of national interest has been received.	NONE	4/75 Maps of agency owned lands and current operational plans and procedures. * * * * 8/75 Request official agency status for coordination and contact person. * * * * 10/75 Request for reveiw of program goals and objective. * * * * 1/76 Invitation to attend Federal Consistency in Hbg. * * * * 11/76 Agency review of applicable sections of the final CZM document. * * * * 5/77 Review and comment of draft chapters of the final document. * * * *	4/75 (FS) No Federal lands under agency control and designated contact man. (SCS) No Federal lands under agency control and appointment of contact man. * * * * 8/75 (SCS) Appointment of agency contact. * * * * 2/76 (SCS) Attended Federal Consistency meeting in Hbg. * * * * 7/77 (SCS) General comments on boundaries, GAPC's and final product outline. * * * *	Watershed protection and flood prevention ——— SCS soil and water conservation. ——— Resources conservation and development. ———

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
U. S. DEPARTMENT OF COMMERCE				4/77 (EDA) Review and general approval of preliminary materials.	

AGENCY	NATIONAL INTEREST	FACILITIES	INTERACTIONS		ACTIVITIES REQUIRING CONSISTENCY
			REQUEST / DATE	REPLY / DATE	
U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE	No statement of National interest has been received.	Parcels of land	4/75 Agency owned lands and current operational plans and procedures. * * * * 8/75 Follow-up request for official status on agency coordination and contact person. * * * * 10/75 Review of Program goals and objectives. * * * * 1/76 Invitation to Federal Consistency meeting in Hbg. * * * * 11/76 Agency review of applicable sections of the final CZM document. * * * * 5/77 Review and comment of draft chapters of the final document. * * * *	8/75 No current land maps, some parcels of land, appointment of contact person. * * * *	

B INTERGOVERNMENTAL AND PUBLIC PARTICIPATION ACTIVITIES

Introduction

According to the Coastal Zone Management Act of 1972, public participation is required in the development and implementation of the coastal zone program. Effective citizens participation is an integral part of the Pennsylvania Coastal Zone Management Program. There are five essential parts to the participation-coordination mechanism. The first level is the citizens advisory committee, the next level is the steering committee, the third level is the State CZM Subcommittee, the fourth level is the consultants, and the fifth level is the Department of Environmental Resources.

Three citizens advisory committees (CAC) were organized in each coastal area to provide a formal forum for public input as well as to advise the State on key issues and problems. The members on the CAC are nominated by the steering committee and usually consist of representatives from public agencies, public and private interests including environmental, business, industrial and citizens groups. The CAC reports directly to the Coastal Zone Steering Committee (CZSC).

In the Lake Erie coastal zone, there is a steering committee for each of the three planning areas; the Eastern, Central, and Western study areas. In the Delaware Estuary, there is one steering committee for the three county coastal area. The steering committee voting membership includes a representative of each local government including counties, townships, and boroughs, whose jurisdiction is adjacent to the shoreline. The purpose of the CZSC is to advise the Department and assist in the coordination between the Department, the local governments, and the regional agencies. The steering committee will also provide assistance and direction to the Department in the planning processes and interim products so as to receive the maximum utility to participating agencies and governments. The CZSC also assists in ensuring that the duplication of efforts and studies are avoided by reviewing the work programs and mechanisms designed by the Department and the consultant.

The next level is the State CZM Subcommittee. This committee provides the opportunity to consult with and consider the views of the affected local, State, and Federal agencies in the formulation of the management program as well as involvement in the program implementation. The Subcommittee was used to develop a process and structure to resolve conflicts among competing coastal zone uses due to existing or proposed agency policies or programs. Voting membership on the Subcommittee is open to any member of the Water Resources Coordinating Committee with relevent interest in the coastal zone and program implementation. Non-voting technical advisory memberships are open to any consultants involved in coastal zone studies.

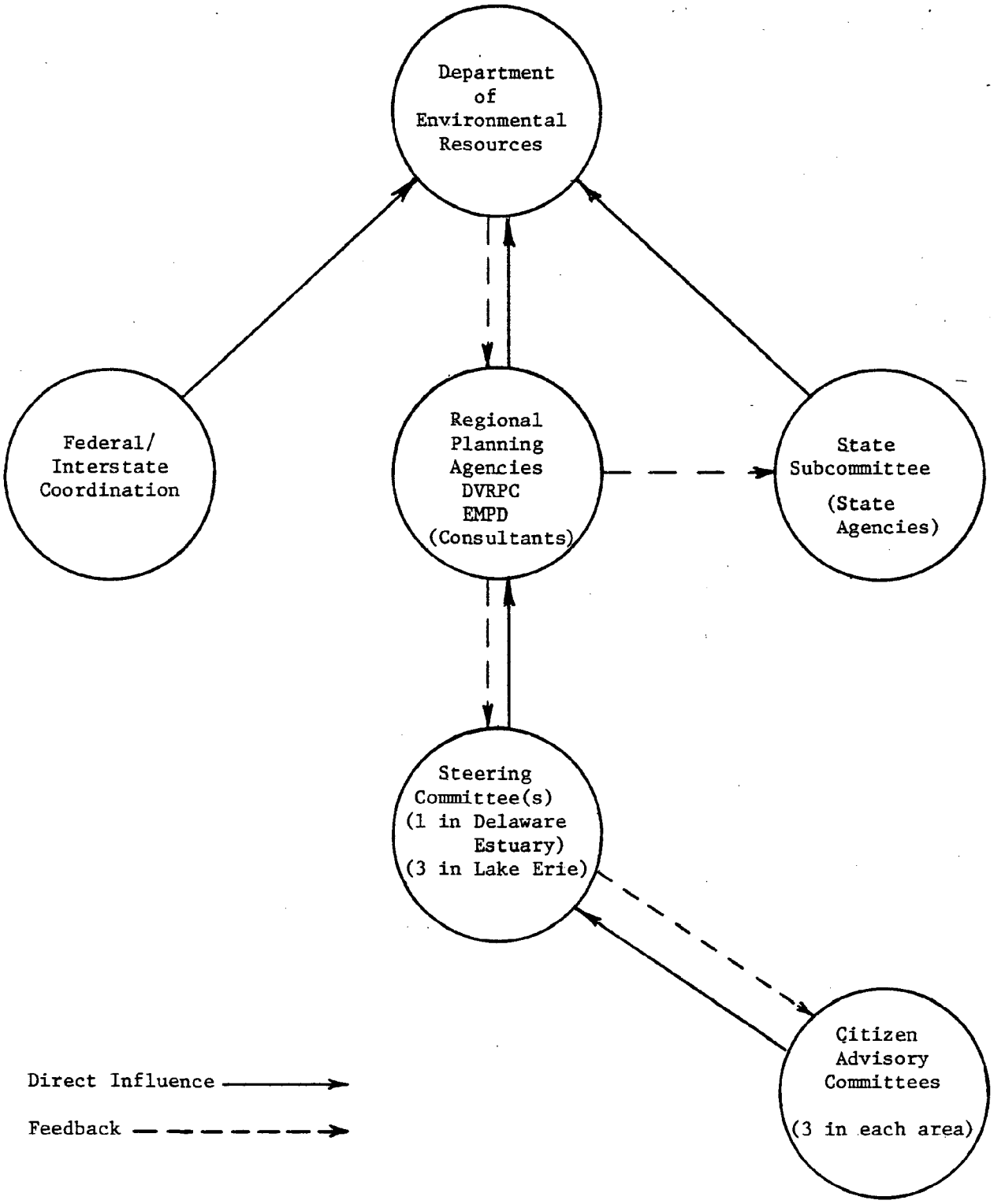
The consultants for public participation in the coastal zone program are the Erie Metropolitan Planning Deparrment in the Lake Erie Coastal Zone and the Delaware Valley Regional Planning Commission in the Delaware Estuary. These consultants are responsible for maintaining the operation of steering committees to represent local governments and to advise the State Subcommittee.

The Department has employed various devices to make it an effective public participation program. Slide presentations have been given to various citizens,business and environmental groups emphasizing problem areas, assets and recommended changes in the coastal zone. A brochure was published for the purpose of outlining the goals, objectives, issues and general description of the States two coastal areas. Localized quarterly newsletters and a public participation report were published by the consultants for widespread distribution to intensify general public awareness. The Department also took advantage of the news media for staff interviews and meeting coverage.

The Pennsylvania Coastal Zone Program has worked closely with neighboring coastal states to provide a more cohesive interstate coastal plan. The interstate coordinative mechanism for Lake Erie is the Great Lakes Basin Commission Standing Committee on Coastal Zone Management. In the Delaware Estuary Coastal Area, the Department

participates in the Middle Atlantic Coastal States meetings. In addition to the formal meetings, informal discussions and correspondence have been made with New York, Ohio, Delaware, New Jersey, and Maryland.

CZM CITIZEN PARTICIPATION AND INTERGOVERNMENTAL COORDINATING MECHANISMS



This section documents the intergovernmental coordinative and public involvement mechanisms for the Delaware Estuary Coastal Zone.

COASTAL ZONE STEERING COMMITTEE (DELAWARE ESTUARY):

Voting

David Froehlich (Chm.) - Bucks County Planning Commission

Gretchen Leahy - Bucks County Municipal Governments (Coastal)

Peter Allen - Philadelphia City Planning Commission

H. Edward Miles - Delaware County Planning Commission

Charles T. Boles - Delaware County Municipal Governments (Coastal)

Steve Merriken - Chester City Planning Department

Advisory

Delaware River Basin Commission

Delaware River Port Authority (Willard Cooper)

Water Resources Association (Paul Felton)

League of Women Voters (Margot Hunt)

Philadelphia Chamber of Commerce

Academy of Natural Sciences

Army Corps of Engineers (Sal Rucolo)

Environmental Protection Agency (Barbara D'Angelo)

Pa. Dept. of Community Affairs (Phila. Office) (Gretchen Hoekenga)

Warner Co. (Charles Walters)

Sun Oil Co. (R. H. Nichols)

Philadelphia Electric Co. (G. J. Beck)

Old City Civic Association (Woody Stange)

Greater Philadelphia Partnership (Paul Berger)

Representatives from 3 county citizen advisory committees.

DATE	MEETING and Location	SUMMARY OF THE MEETING
JUNE 5 1974	1st Delaware Estuary Ad Hoc Steering Committee	Discussion of grant application to NOAA DVRPC support Discussion of program basics
OCTOBER 9 1974	2nd Delaware Estuary Ad Hoc Steering Committee	Overview of CZM Act First year work elements and program Discussion of program basics
JANUARY 30 1975	3rd Delaware Estuary Steering Committee	Steering committee membership and roles established Two step process for boundary delineation
FEBRUARY 28 1975	4th Delaware Estuary Steering Committee	Discussion of . Initial inland boundary . Citizen participation . Local government participation
MARCH 26 1975	Delaware County Citizens Meeting	Election of local representative to steering committee
APRIL 3 1975	Bucks County Citizens Meeting	Discussion on election of local representative to steering committee - no representative elected.

DATE	MEETING and Location	SUMMARY OF THE MEETING
MAY 2 1975	5th Delaware Estuary Steering Committee	Work program introduced Citizen participation meetings discussed Defined direct and significant impacts
MAY 22 1975	Bucks County Citizens meeting	Election of local representative to the steering committee
JUNE 17 1975	Delaware County Citizens meeting	Discussion of . Nature of program . Objectives and policies . Slide show
JUNE 24 1975	Bucks County Citizens meeting	Discussion of . Nature of program . Objectives and policies . Slide show
JUNE 26 1975	Philadelphia County Citizens meeting	Discussion of . Nature of program . Objectives and policies . Slide show
JULY 1975		Marine Advisory Services Evaluate Coastal Zone Management Program

DATE	MEETING and Location	SUMMARY OF THE MEETING
JULY 17 1975	6th Delaware Estuary Steering Committee	Steering committee chairman elected Goals and objectives discussed Review and evaluate Citizen Questionnaire
AUGUST 28 1975	7th Delaware Estuary Steering Committee	Review of second year contract Review of MAS evaluation Discussion on papers on problems and issues and direct and significant impacts
SEPTEMBER 25 1975	8th Delaware Estuary Steering Committee	Discussion on Citizen participation program revision Discussion of paper on interrelationships of CZ program with other planning programs
OCTOBER 22 1975	9th Delaware Estuary Steering Committee	Discussion of . Transportation systems paper . Direct and significant impact methodology . Marine Advisory Service recommendations
NOVEMBER 1975		Pennsylvania Coastal Zone Management Program brochure is published
NOVEMBER 18 1975	Delaware County Citizens Meeting	Meeting held jointly with Delaware County Planning Commission . Overview concept of CZM . Citizen participation information . CZM boundary discussion

DATE	MEETING and Location	SUMMARY OF THE MEETING
November 24 1975	Bucks County Citizens Meeting	Problems and issues within and affecting the Coastal Zone Public access to river
December 2 1975	Philadelphia County Citizens Meeting	Overview concept of CZM Citizen participation information CZM boundary discussion
December 17 1975	10th Delaware Estuary Steering Committee	Discussion on: . Geographic areas of particular concern (GAPC) . Areas of natural value . Alternatives for economic analysis
January 1976		"TIDINGS" Volume 1 #1 (Delaware Coastal Zone Newsletter)
JANUARY 21 1975	Philadelphia County Citizens Meeting	GAPC's discussion CZM boundary discussion
JANUARY 26 1975	Bucks County Citizens Meeting	GAPC's discussion CZM boundary discussion

DATE	MEETING and Location	SUMMARY OF THE MEETING
JANUARY 29 1976	Delaware County Citizens Meeting	Problems and issues within and affecting the Coastal Zone GAPC discussion
FEBRUARY 4 1976	11th Delaware Estuary Steering Committee	GAPC's discussion of development opportunity areas Discussions on final CZM documents to be produced
MARCH 1976		"TIDINGS" Volume 1 #2 Published
MARCH 4 1976	12th Delaware Estuary Steering Committee	Final Product outline Discussions of legal aspects of State and County Agenda for Citizen Meetings
MARCH 25 1976	Bucks County Citizens Meeting	Discussion on impact assessment methodology Discussion of possible implementation schemes GAPC's discussed
MARCH 29 1976	Delaware County Citizens Meeting	Discussion of . Working methodology . Policy framework . Possible implementation schemes . GAPC's

DATE	MEETING and Location	SUMMARY OF THE MEETING
MARCH 31 1976	Philadelphia County Citizens Meetings with "208" Water Quality Study	Discussion of . working methodology . program elements . possible implementation schemes
APRIL 8 1976	Pennsylvania Intergovernmental Committee on Land Use	Coastal Zone Management and State planning efforts
APRIL 22 1976	13th Delaware Estuary Steering Committee	Means of implementation Discussion on areas for preservation and restoration (APR's) Impact analysis for direct and significant and permissible uses
MAY 20 1976	14th Delaware Estuary Steering Committee	Means of program implementation GAPC's and APR's discussion Resource types for coastal activities
JUNE 1976		"TIDINGS" Volume 1 #3 Published
JUNE 3 1976	Philadelphia County Citizens Meeting	Discussion on . Final management boundary . Ongoing impact analysis . Implementation advantages . Final designation of Philadelphia GAPC's

DATE	MEETING and Location	SUMMARY OF THE MEETING
JUNE 10 1976	Bucks County Citizens Meeting	Discussion of . Ongoing development of policies, objectives, program authorities and results . Final Management boundary
JUNE 15 1976	Delaware County Citizens Meetings	Discussion of . Final Management boundary . Ongoing development of policies, objectives, program authorities and results
JUNE 17 1976	15th Delaware Estuary Steering Committee	Review of CZM steering committee role Draft CZM policy framework Means of program implementation Impact analysis and determination of permissible uses for final boundary
JULY 30 1976	16th Delaware Estuary Steering Committee	Discussion of impact assessment network (IAN) List of coastal resources for impact analysis presented Discussion of tentative inland boundary in Delaware County
SEPTEMBER 16 1976	17th Delaware Estuary Steering Committee	Discussion of IAN Discussion of Philadelphia Inland Boundary
SEPTEMBER 30 1976	DVRPC sponsored boat tour of the Delaware Estuary	Explanation of CZM program Reconnaissance of Philadelphia shoreline from the Delaware River

DATE	MEETING and Location	SUMMARY OF THE MEETING
OCTOBER 5 1975	Bucks Audubon Society Lecture	Slide show on problems in Bucks County
OCTOBER 22 1976	18th Delaware Estuary Steering Committee	State authorities needed to implement CZM program Report on study of "Four Environmentally Sensitive Areas"
DECEMBER 3 1976	19th Delaware Estuary Steering Committee	Means of implementation Policy priorities for legal analysis Discussion on approach to permissible analysis Schedule of products through March 1977
JANUARY 27 1977	20th Delaware Estuary Steering Committee	Various implementation alternatives Procedures for delineation and layout of final boundary (Bucks Co.) Description of these step permissibility analysis
JANUARY 31 1977	Bucks County Citizen Meeting	Discussion on policy framework Legislative alternatives for implementation Procedure for delineation and physical layout of final Bucks Co. CZM boundary
FEBRUARY 7 1977	Philadelphia County Citizen Meeting	Discussion on three major implementation alternatives Status report on OCS impact study Discussion on draft policy framework Procedure for delineating and physical location of final Philadelphia Co. CZM boundary

DATE	MEETING and Location	SUMMARY OF THE MEETING
FEBRUARY 9 1977	Delaware County Citizen Meeting	Summary of CZM program Discussion of three major implementation alternatives Review of finalized CZ policy framework
FEBRUARY 18 1977	21st Delaware Estuary Steering Committee	Discussion on various aspects of implementation Comments on working paper and final document draft chapters Discussion of new legislation
MARCH 18 1977	22nd Delaware Estuary Steering Committee	Discussion on Draft Chapters Outline of final permissibility analysis work Outline of current NOAA shoreline access funding
APRIL 20 1977	23rd Delaware Estuary Steering Committee	Discussion on Draft Chapters Explanation of use-priorities Discussion of fourth year work tasks
APRIL 1977		"TIDINGS" VOLUME 2 #1 PUBLISHED
MAY 2 1977	Delaware County Citizens Meeting	Discussions on roles of LOWV and DCPD Presentation on overview of current and future status of the CZM Program Presentation on specific problems, issues, goals, and objectives General CZM discussions

DATE	MEETING and Location	SUMMARY OF THE MEETING
MAY 19 1977	CZSC Workshop	Review of Recreation section Comments on Chapter 5 Comments on Chapter 6
JUNE 10 1977	CZSC Workshop	Discussion and Comments on Draft Chapter 4 Chapter 7 Chapter 8

This section documents the intergovernmental coordinative and public involvement mechanisms for the Lake Erie Coastal Zone.

URBAN AREA STEERING COMMITTEE (LAKE ERIE):

Voting

John E. Horan (Chm.) - City of Erie

Mario S. Bagnoni - Erie City Council

Terrence Reagan, Jr. - Erie City Planning Commission

Theodore E. Mohnkern - Lawrence Park Twp. (Sup.)

Raymond M. DePlatchett - Lawrence Park Twp. (Sup.)

Gerald S. Salsburg - Millcreek Twp. (Sup.)

Paul J. Martin - Millcreek Twp. (Sup.)

Arthur F. Detisch - Millcreek Twp. Planning Commission

Robert Zawadski - Erie/N.W. Pa. Port Authority

Norman Stone - Wesleyville Borough

Advisory

Representatives from urban area citizen advisory committee

WEST COUNTY STEERING COMMITTEE (LAKE ERIE):

Voting

Fred Park - Girard Twp. (Sup.)

Korb Bryant - Girard Twp. (Sup.) - Chm.

Blaine Lehman - Girard Twp. Planning Commission

Thomas K. Hanninen - Girard Borough (Councilman)

R. M. Holliday - Girard Borough (Councilman)

Walter Nielsen - Girard Borough Planning Commission

Ray Babbitt - Platea Borough (Councilman)

Ronald Hinkle - Fairview Borough (Councilman)

Fred Wellman - Fairview Borough (Councilman)

Richard J. Petrone - Fairview Borough Planning Commission

Richard Walbridge - Springfield Twp. (Sup.)

Cecil Mullen - Springfield Twp. (Sup.)

William Johnson - East Springfield Borough (Councilman)

Roland E. Evans - East Springfield Borough (Councilman)

George N. Gilbert - Lake City Borough (Councilman)

Walter R. Blank - Lake City Borough (Councilman)

Steven D. Dusza - Lake City Borough Planning Commission

John Klier - Fairview Twp. (Sup.)

Advisory

Representatives from west county citizen advisory committee

EAST COUNTY STEERING COMMITTEE (LAKE ERIE):

Voting

George N. Burton - Northeast Borough (Councilman) - Chm.

John Cunningham - Northeast Borough (Councilman)

Dr. George Moylan - Northeast Borough Planning Commission

L. M. Davis - Northeast Twp. Planning Commission

C. Maurice Youngs - Northeast Twp. (Sup.)

Roy Thomson - Northeast Twp. (Sup.)

Gerald R. Blanchfield - Harborcreek Twp. (Sup.)

James E. Whitry - Harborcreek Twp. (Sup.)

J. T. Hallgren - Harborcreek Twp. Planning Commission

Advisory

Representatives from east county citizen advisory committee

DATE	EAST STUDY AREA STEERING COMMITTEE	CENTRAL STUDY AREA STEERING COMMITTEE	WEST STUDY AREA STEERING COMMITTEE
MARCH 5 1975	Program work objectives and specific elements established. Purpose of and membership on the Steering Committee.		
MARCH 19 1975	Citizen Advisory Committee established - Steering Committee members appointed, election of steering committee chairman.		
MAY 6 1975			Program work objectives and specific elements established. Purpose of and membership on the steering committee.
MAY 14 1975			Steering committee members appointed and chairman elected.
MAY 21 1975		Program work objectives and specific elements established. Purpose of and membership on the steering committee.	
JUNE 26 - 27 1975	NEWSPAPER ARTICLES CALLING FOR PUBIC PARTICIPATION IN THE COASTAL ZONE MANAGEMENT PROGRAM		

DATE	EAST STUDY AREA STEERING COMMITTEE	CENTRAL STUDY AREA STEERING COMMITTEE	WEST STUDY AREA STEERING COMMITTEE
JULY 1975	MARINE ADVISORY SERVICES EVALUATE PENNSYLVANIA PROGRAM		
JULY - AUGUST 1975	CZM STAFF TELEVISION INTERVIEW WICU (July 14) - - - -	WSEE (August 21)	
AUGUST 26 1975		Election of steering committee chairman.	
SEPTEMBER 16 1975		CZM background information. Public opinion survey. Bluff recession and shoreline erosion presentation.	
OCTOBER 21 1975	Erie Coastal Resource Analysis distributed. Public Opinion Survey. Discussions on various coastal zone topics.		
OCTOBER 22 1975			Draft copy of Pennsylvania goals and objectives distributed. Bluff recession and shoreline erosion presentation. Public opinion survey.

DATE	EAST STUDY AREA STEERING COMMITTEE	CENTRAL STUDY AREA STEERING COMMITTEE	WEST STUDY AREA STEERING COMMITTEE
NOVEMBER 17 1975		Presentation by Pennsylvania Fish Commission and discussion on "Salmon in Lake Erie." Public opinion survey.	
NOVEMBER 1975	"PUBLIC PARTICIPATION" INTERIM REPORT - - ERIE COUNTY PENNSYLVANIA COASTAL ZONE MANAGEMENT BROCHURE		
JANUARY 1976	PUBLIC VALUES AND PREFERENCES STUDY FOR THE LAKE ERIE COASTAL ZONE MANAGEMENT PROGRAM		
FEBRUARY 10 1976		Discussions on legal problems in the coastal zone. Goals and objectives approved.	
FEBRUARY 18 1976	Discussions on legal problems in the coastal zone. Goals and objectives approved.		
APRIL 14 1976			Discussions on statewide and specific local goals. Discussions on GAPC's and tentative CZM boundary.

DATE	EAST STUDY AREA STEERING COMMITTEE	CENTRAL STUDY AREA STEERING COMMITTEE	WEST STUDY AREA STEERING COMMITTEE
APRIL 20 1976	Discussions on statewide and specific local goals. Discussion on GAPC's and tentative CZM boundary.		
APRIL 21 1976		Discussion on statewide and specific local goals. Discussion on the GAPC's and tentative CZM boundary.	
JUNE 15 1976		Final CZM boundary approved. Discussions on GAPC's. Presentation on Great Lakes' Lake levels.	
JUNE 16 1976	Final CZM boundary approved. Discussion on GAPC's. Presentation on Great Lakes' Lake levels.		
JUNE 17 1976			Final CZM boundary approved Presentation on Great Lakes' Lake levels.
SEPTEMBER 27,28,29 1976	Joint Meeting with Municipal Officials DISCUSSIONS ON FEDERAL LEGISLATION AND FUNDING		

DATE	EAST STUDY AREA STEERING COMMITTEE	CENTRAL STUDY AREA STEERING COMMITTEE	WEST STUDY AREA STEERING COMMITTEE
OCTOBER 21 1976			Fairview Township Municipal officials meeting.
NOVEMBER 1976	Northeast Township supervisors meeting (11/8) Harborcreek Twp. supervisors meeting (11/10)		Springfield Township supervisors meeting (11/1) Girard Township supervisors meeting (11/9)
NOVEMBER 15 1976	COMPLETION OF FILM ON THE LAKE ERIE COASTAL ZONE (EMPD)		
MARCH 8 1977	CITIZENS CONCERNED WITH COASTAL ZONE MANAGEMENT IN ERIE COUNTY		
MARCH 14 1976	Discussion on legislative alternatives.		
MARCH 16 1977			Discussion on legislative alternatives.

DATE	EAST STUDY AREA STEERING COMMITTEE	CENTRAL STUDY AREA STEERING COMMITTEE	WEST STUDY AREA STEERING COMMITTEE
MARCH 21 1977		Discussion on legislative alternatives.	

This section documents the State inter-agency coordinative mechanism.

Members of Coastal Zone Management State Subcommittee.

Kenneth A. Bartal	Bureau of Water Quality (DER)
Vernon M. Beard, Chairman	Bureau of Resources Programming (DER)
David Berman	Historical and Museum Commission
David Blair	Office of Planning and Research (DER)
Christopher Capotis	Erie Metropolitan Planning Department
Raj Chadha	Office of State Planning and Development
John T. Fedko	Bureau of Systems Management (DER)
Bruce Hearn	Department of Community Affairs
Fred W. Johnson	Pennsylvania Fish Commission
Afton W. Schadel	Bureau of Soil and Water Conservation (DER)
Frank Schrey	Department of Commerce
Arthur A. Socolow	Bureau of Topographic and Geologic Survey (DER)
Nicholas I. Vukovich	Pennsylvania Game Commission
Alec J. Wisch	Governor's Energy Council
Maxine T. Woelfling	Office of Enforcement and General Counsel (DER)
Michael A. Wolf	Delaware Valley Regional Planning Commission

DATE	MEETING and Location	SUMMARY OF THE MEETING
JANUARY 10 1975	CZM Subcommittee	Introduction to CZM Act Role of CZM subcommittee Discussion on ecological analysis Designation of special task force
JANUARY 20 1975	CZM Task Force	Discussion of CZM program goals and objectives Roles and responsibilities of Task Force Members Task Force Work Assignments
FEBRUARY 14 1975	CZM Task Force	Recommendations of interim CZM boundaries Discussion of State role in program development and implementation Discussion of CZM "critical path" for three year work program Discussion of Environmental element master list
FEBRUARY 21 1975	CZM Subcommittee	Role of local citizen advisory committees Presentation of task force recommendations Advisory membership extended to public planning agencies Discussions by NOAA representatives
MARCH 12 1975	CZM Task Force	Discussions on program responsibilities DVRPC scope of work presentation Local steering committee status
MARCH 20 1975	CZM Subcommittee	Task Force report Revised CZM subcommittee role Task Force disbanded

DATE	MEETING and Location	SUMMARY OF THE MEETING
APRIL 17 1975	CZM Subcommittee	Discussion on three year planning process Discussion of draft second year grant application
JUNE 3 1975	CZM Subcommittee	DVRPC review of first year work on the program Presentation of slides on the Delaware Estuary
JULY 16 1975	CZM Subcommittee	EMPD presentation of first year work completed Slide presentation and narration describing the organization of public participation mechanisms in the Erie Coastal Zone
AUGUST 28 1975	CZM Subcommittee	Status report on second year activity Discussion on DVRPC draft copy of "Direct and Significant impact of land use on coastal water".
OCTOBER 9 1975	CZM Subcommittee	Outlined the revised critical path diagram Work activity status report Discussion on DVRPC paper on "Interrelationships between the CZM program and other planning efforts."
NOVEMBER 19 1975	CZM Subcommittee	Results of DVRPC Transportation Study Program coordination with all other ongoing State and Federal programs

DATE	MEETING and Location	SUMMARY OF THE MEETING
JANUARY 15 1976	CZM Subcommittee	Status at second year work activities Revised program goals and objectives discussed Discussion on final product, Federal requirement and threshold papers
MARCH 11 1976	CZM Subcommittee	Presentation on "Inventory and analysis of Lake Erie ecologically sensitive coastal areas Update on inventory and analysis of Delaware GAPC Discussions on means and organizational structure for CZM program implementation
MAY 12 1976	CZM Subcommittee	GAPC's for Delaware Estuary and Lake Erie presented Discussions on CZM program implementation
JUNE 18 1976	CZM Subcommittee	Presentation of conceptual framework for developing coastal zone management policies Policy framework format accepted
AUGUST 18 1976	CZM Subcommittee	Coastal Zone policy framework revised Discussion on State level policy making committee
OCTOBER 28 1976	CZM Subcommittee	Status report on third year work activities EMPD and DVRPC delineation of final CZ boundaries Report by Governor's Energy Council on OCS impact study

DATE	MEETING and Location	SUMMARY OF THE MEETING
NOVEMBER 1976	Erie legislative delegation briefing	Briefing on CZM program Discussion on legislative alternatives
DECEMBER 14 1976	CZM Subcommittee	Status report on third years activities Discussion on implementation Discussion on priorities
FEBRUARY 10 1977	CZM Subcommittee	Status report on third year activities Discussion on legislative alternatives Discussion of implementation Comments on Delaware Estuary Citizen involvement meetings
FEBRUARY 1977	Erie Legislative Delegation CZM briefing	Background to CZM Program Lake Erie film presentation Legislative alternatives Future CZM funding
MARCH 1 1977	Philadelphia Legislative Delegation CZM briefing	Background to CZM Program Delaware Estuary slide presentation Legislative alternatives Future funding for CZM
MARCH 21 1977	Bucks and Delaware Delegation CZM briefing	Background to CZM Program Delaware Estuary slide presentation Legislative alternatives Future funding for CZM

DATE	MEETING and Location	SUMMARY OF THE MEETING
APRIL 19 1977	CZM Subcommittee	Status Report on third year work activities Discussion on potential implementation alternatives Discussion draft chapters
JUNE 16 1977	CZM Subcommittee	Status Report on third year work activities Discussion on local coordinative efforts Review of document conflicts Discussion of 4th work activities

This section documents the interstate coordination that Pennsylvania has participated in for the Coastal Zone Management Program.

DATE	MEETING and Location	SUMMARY OF THE MEETING
APRIL 9 1974	1 Great Lakes Basin Commission (GLBC) Standing Committee on CZM Chicago, Illinois	Organizational meeting Boundary determinations Determination of permissible land and water uses
MAY 21 1974	2 GLBC Standing Committee on CZM Schiller Park, Illinois	Discussion on CZM grant application CZM committee structure
JULY 12 1974	3 GLBC Standing Committee on CZM Detroit, Michigan	Report on mapping activities in the Great Lakes Discussions on various Lake activities
SEPTEMBER 20 1974	4 GLBC Standing Committee on CZM Romulus, Michigan	Discussions of committees, State programs Planning and design manuals
DECEMBER 5 1974	5 GLBC Standing Committee on CZM Romulus, Michigan	Recession rate workshop Discussion on . Strategy alternatives . National interests . Committee work plans
FEBRUARY 20 1975	6 GLBC Standing Committee on CZM Detroit, Michigan	CZM boundary and segmentation workshop Discussion on . Out of State travel problems . Nuclear power siting

DATE	MEETING and Location	SUMMARY OF THE MEETING
JUNE 20 1975	MIDATLANTIC COASTAL STATES (MAS) Annapolis, Maryland	State Planning programs discussed Program development requirements Administrative issues
OCTOBER 1 1975	GLBC Standing Committee on CZM[7] Chicago, Illinois	Review of Federal regulations Committee future activities
OCTOBER 10 1975	MIDATLANTIC COASTAL STATES Sandy Hook, New Jersey	OCS Development Program approval by NOAA
DECEMBER 9 1975	GLBC Standing Committee on CZM[8] Madison, Wisconsin	Discussion on . Federal Insurance Administration . Erosion Hazard guidelines
JANUARY 23 1976	MIDATLANTIC COASTAL STATES New York, New York	Discussion of threshold papers
FEBRUARY 4 1976	GLBC Standing Committee on CZM[9] Cleveland, Ohio	Discussion of potential areas of planning conflict with CZM, 208 and 701 programs.

DATE	MEETING and Location	SUMMARY OF THE MEETING
MAY 5 1976	10 GLBC Standing Committee on CZM Detroit, Michigan	Discussion on: . Status reports . Shore erosion . State-Federal consultation & Federal consistency . Uses of regional benefit . Organization of State CZM programs to implement the plan
JUNE 3 1976	GLBC Standing Committee on CZM Energy Steering Committee Romulus, Michigan	Detailed breakdown of the work elements
JULY 14 1976	11 GLBC Standing Committee on CZM Duluth, Minnesota	Development of the Great Lakes Regional public awareness program
JULY 28 1976	MIDATLANTIC COASTAL STATES Lewes, Delaware	Introduction to the latest CZM amendments State submission schedule Tour of various projects at the College of Marine Studies
AUGUST 30 1976	MIDATLANTIC COASTAL STATES Annapolis, Maryland	Discussions on . CZM Act amendments . CZM boundaries . Permissible uses
SEPTEMBER 13 - 14	GLBC Energy Steering Committee Romulus, Michigan	Project overview Unit reports Assignment of work projects

DATE	MEETING and Location	SUMMARY OF THE MEETING
SEPTEMBER 29 - 30 1976	12 GLBC Standing Committee on CZM Buffalo, New York	Public involvement workshop
OCTOBER 13 1976	GLBC CZM Energy Steering Committee Romulus, Michigan	Progress reports by project managers
OCTOBER 15 1976	MIDATLANTIC COASTAL STATES Cape Charles, Virginia	Discussions on . GAPC's . Interstate coordination . Federal level interest
DECEMBER 1-2 1976	13 GLBC Standing Committee on CZM Chicago, Illinois	Vegetation workshop Discussions on . Fisheries Management . Federal Consistency . Great Lakes shoreline damage . Energy Facilities siting
FEBRUARY 2 1977	14 GLBC Standing Committee on CZM Detroit, Michigan	Discussion on Federal Insurance Administration plans for Great Lakes Region Discussion on vegetation publication Discussion on Budget

DATE	MEETING and Location	SUMMARY OF THE MEETING
JUNE 7 1977	16 GLBC Standing Committee on CZM Detroit, Michigan	Discussion on FIA/CZM Committee findings Discussion on: Hazardous materials transportation Vegetation publication Damage Survey Winter navigation programming Federal Consistency discussion

C TECHNICAL SUPPORT INFORMATION

INTRODUCTION

The coastal zone is a complex ecosystem made up of many smaller processes functioning as a unit . In order to understand the coastal zone, it is necessary to break the large unit into smaller, more easily studied systems. As the preliminary step in developing the coastal zone management program, extensive technical baseline studies were conducted by the program staff and consultants. These studies involved the physical as well as the socioeconomic characteristics of both the Pennsylvania coastal zones. The baseline studies enabled the Coastal Zone Staff to thoroughly understand the complex system and from there, to make perceptive decisions and recommendations on the wise use of our coastal zone and its resources.

This appendix is a compilation and synopsis of those basic technical support studies that are not directly included in Pennsylvania's final document. This information includes reports, maps, brochures, newsletters and other items. Most information is only applicable to one coastal zone or the other; however, some information is combined on both coastal zones and is noted in the text as such.

DELAWARE ESTUARY COASTAL ZONE

This first section contains a listing and brief description of those working papers developed for the Delaware Estuary Coastal Zone. These papers are listed chronologically according to chapter breakdown, and are only applicable to the Delaware Estuary except as noted for both areas.

These support documents are available on a limited basis, to those interested, from the offices of the Delaware Valley Regional Planning Commission or the Department of Environmental Resources, Coastal Zone Management Program.

CHAPTER I - INVENTORY OF COASTAL RESOURCES AND USES

ATLAS DESCRIPTIONS FOR THE DELAWARE RIVER ESTUARY:
Delaware Valley Regional Planning Commission.
August 1975 - 37 Pages.
This is a summary of the description, significance and source for each of the maps developed in the inventory phase of the Coastal Zone Management Program. These maps include environmental, ecological, demographic, and economic parameters within the Delaware Estuary. There are 35 maps described, and they are prepared at a scale of 1" = 2000'.

SOCIOECONOMIC DATA FOR COASTAL ZONE PLANNING IN THE DELAWARE RIVER ESTUARY:
Delaware Valley Regional Planning Commission.
August 1975 - 27 Pages.
This report summarizes various demographic and socioeconomic characteristics within the coastal zone. The parameters studied include total population, black population, employment, median

income, families with poverty level income, and housing tenure. This baseline study is useful in describing the residents and background characteristics of the Delaware River Estuary.

TRANSPORTATION SYSTEMS IN THE COASTAL ZONE:
Delaware Valley Regional Planning Commission.
October 1975 - 35 Pages.
This paper studies transportation systems which help to shape the patterns of urban life and the spatial structure of a community. The study considers the general problems of transportation systems and includes a cursory examination of highways, public transportation, highway network, freight rail facilities, airport facilities, and port facilities.

WORKING PAPER ON ALTERNATIVES FOR ECONOMIC ANALYSIS:
Delaware Valley Regional Planning Commission.
December 1975 - 6 Pages.
This paper discusses two general methodologies to analyze direct and indirect economic impacts. The first analytical method involves the matrix or checklist approach. The second method requires mathematical modeling or simulation.

CHAPTER II - CURRENT AND PAST PROBLEMS AND ISSUES

PROBLEMS AND ISSUES WITHIN AND AFFECTING THE COASTAL ZONE:
Delaware Valley Regional Planning Commission.
September 1975 - 58 Pages.
This paper discusses the problems which face coastal zone management. It represents the first element in the development of a policy framework by identifying problems and initiating agency involvement in the Coastal Zone Management Program.

CHAPTER III - FUTURE DEMANDS AND DECISIONS

COASTAL RECREATIONAL ANALYSIS:
Department of Environmental Resources, CZM Staff.
October 1976 - 30 Pages (Both Areas).
This analysis includes an examination of the coastal zone recreation issues, an analysis of regional data to formulate trends in coastal recreation. The paper also identifies the coastal recreation resources and the selection of sites to meet future recreational demands.

CHAPTER IV - EXISTING MANAGEMENT AUTHORITY

LEGAL ANALYSIS OF EXISTING STATE AND LOCAL AUTHORITIES:
Pennsylvania State Office of Enforcement and General Counsel.
September 1976 - 53 Pages (Both Areas).
This report identifies and analyzes the current legal constraints and prohibitions in determining the sufficiency of current State or local authorities for a management plan. The paper also takes the initial steps in the development of legal techniques, implementation authorities, an administrative procedures needed

for program implementation. An investigation of the need for new State legislation is also discussed.

CHAPTER V - COASTAL ZONE POLICY FRAMEWORK

PRELIMINARY STATEMENT OF PLANNING GOALS AND OBJECTIVES FOR DELAWARE ESTUARY:
Delaware Valley Regional Planning Commission.
June 1975 - 9 Pages.
This paper is a preliminary set of seven goals with objectives. These goals and objectives were drafted in response to problems identified in the Delaware Estuary Study Area.

GOALS AND OBJECTIVES OF THE PENNSYLVANIA COASTAL ZONE MANAGEMENT PROGRAM:
Department of Environmental Resources CZM Staff.
February 1976 - 5 Pages.

CHAPTER VI - COASTAL ZONE MANAGEMENT BOUNDARY

DISCUSSION OF TECHNIQUES FOR DETERMING INITIAL INLAND BOUNDARY OF THE COASTAL ZONE STUDY AREA:
Delaware Valley Regional Planning Commission.
January 1975 - 2 Pages.
This is a brief paper describing the pros and cons of six techniques for determining initial inland boundary.

CHAPTER VII - PERMISSIBLE LAND AND WATER USES

WORKING PAPER ON THE DEFINITION OF DIRECT AND SIGNIFICANT IMPACT:
Delaware Valley Regional Planning Commission
May 1975 - 9 Pages.
This paper discusses the legislative requirements and problems associated with defining direct and significant. Four alternative methods are discussed and recommendations are included.

DIRECT AND SIGNIFICANT IMPACT OF LAND USE ON COASTAL WATER:
Delaware Valley Regional Planning Commission.
August 1975 - 18 Pages.
The basic purpose of this early paper was to suggest a list of resources and goals with which the Coastal Zone Management Plan is concerned. Included in this paper is a matrix to display affect, and additional comments on impacts are also included.

DETERMINING PERMISSIBLE USES IN THE COASTAL ZONE OF THE DELAWARE ESTUARY:
Delaware Valley Regional Planning Commission.
November 1976 - 13 Pages.
The objective of this report is to determine those land uses which are appropriate for different areas of the coastal zone. The permissibility of uses is based on the ability of coastal resources to support land use and to absorb those impacts

resulting from the land use. Three major steps are used to determine permissible uses. The first is an inventory, the second is impact analysis, and the third is the actual determiniation of permissibility.

CHAPTER VIII - GEOGRAPHIC AREAS OF PARTICULAR CONCERN

GEOGRAPHIC AREAS OF PARTICULAR CONCERN (GAPC):
Delaware Valley Regional Planning Commission.
April 1976 - 52 Pages.
This paper identifies those critical areas where some form of State interest is required in order to deal with land use issues of greater than local concern. Four types of GAPC are identified for the Delaware Estuary: "areas of significant natural value", "development opportunity areas", "areas of significant recreational, historic, or cultural value" and "overlap areas".

FOUR ENVIRONMENTALLY SIGNIFICANT AREAS:
Delaware Valley Regional Planning Commission.
November 1976 - 58 Pages.
The purpose of this study is to determine the significance of four environmentally sensitive areas by studying the relationships of the living organisms and their physical environment. The four areas which were determined to be of significant natural value during the initial study include, Tinicum Marsh, Little Tinicum Island, Warner Lakes, and Biles Island.

CHAPTER X - PROGRAM IMPLEMENTATION

OUTLINE OF POTENTIAL COASTAL ZONE MANAGEMENT LEGISLATION:
Pennsylvania Office of Enforcement and General Counsel.
January 1977 - 12 Pages (both areas).
This is an initial working paper of generalized legislative outlines that present possible implementation alternatives. The three major legislative alternatives investigated include direct State planning and regulation of GAPC's and projects of greater than local concern; State legislation with State guidelines and local enforcement; and networking of current statutes with some type of legislation to allow State intervention in and override of local decisions.

MISCELLANEOUS INFORMATION

DISCUSSIONS ON MEMBERSHIP AND ROLE OF THE
COASTAL ZONE STEERING COMMITTEE:
Delaware Valley Regional Planning Commission.
January 1975 - 3 Pages.
This paper discusses the make-up and responsibilities of the Steering Committee in light of Federal requirements. Also included are recommendations for voting and non voting members. This paper was followed by a compromise paper in February.

WORKING PAPER ON CITIZEN PARTICIPATION:
Delaware Valley Regional Planning Commission.
February 1975 - 5 Pages.
This paper discusses reasons for and problems involving citizen participation mechanisms. This paper also includes analysis of alternative approaches and recommendations.

INTERRELATIONSHIPS BETWEEN THE COASTAL ZONE MANAGEMENT PROGRAM AND OTHER PLANNING EFFORTS IMPACTING THE COASTAL ZONE:
Delaware Valley Regional Planning Commission.
September 1975 - 27 Pages.
This report summarizes fourteen key planning efforts in the Delaware Estuary Coastal Zone by various State, Federal, interstate and regional agencies. The summary of each plan includes the title, the purpose, the source of funding and the role of Delaware Valley Regional Planning Commission in the Program. Discussion of the relationship to the Coastal Zone Program and conflicts which might arise are discussed also.

LAKE ERIE COASTAL ZONE

This section contains those working documents developed for the Lake Erie Coastal Zone. The documents are listed and briefly described in chronological order according to the chapter breakdown.

These documents are available on a limited basis to interested persons, from the offices of the Erie Metropolitan Planning Department and the Department of Environmental Resources Coastal Zone Management Program.

CHAPTER I - INVENTORY OF COASTAL RESOURCES AND USES

PENNSYLVANIA COASTAL ZONE RESOURCES ANALYSIS FOR LAKE ERIE:
Erie Metropolitan Planning Department.
September 1975 - 340 Pages.
The purpose of this analysis is to determine the condition of the physical, social, and economic resources as they presently exist and to project their cumulative effect by the year 2000 in the Lake Erie Coastal Zone. These effects will be used to determine which uses will exert a direct and significant impact on the coastal waters of Lake Erie. Also included in this report is a general description of the Lake Erie Coastal Zone Environment, and a summary of the issues and problems confronting the coastal zone.

CHAPTER VII - PERMISSIBLE LAND AND WATER USES

SHORELINE EROSION AND FLOODING:
Great Lakes Research Institute.
June 1975 - 160 Pages.

This study identifies and classifies erosion and bluff recession hazard areas along approximately 48 miles of Erie County Lakeshore and five miles of bayshore. The rates of bluff recession have increased significantly along with the shoreline erosion rate in recent years. The higher than normal lake levels have been the major cause of these severe problems. There are 109 sites classified as either critical (44), moderate (51), or limited (10) hazard areas.

PROPOSED DEFINITIONS OF DIRECT AND SIGNIFICANT IMPACT FOR THE ERIE COUNTY COASTAL ZONE MANAGEMENT PROGRAM:
Erie Metropolitan Planning Department.
October 1975 - 5 Pages.
This paper discusses the working definitions of impact, direct impact and significant impact as applied to coastal zone permissible uses. This was then used to establish a list of resources and goals with which the CZM plan concerns itself.

DESIRED CATAGORIES OF SIGNIFICANT IMPACT
(BENEFICIAL IMPACTS):
Erie Metropolitan Planning Department
October 1975 - 1 Page.
This brief working paper establishes those significant impacts which are to be considered beneficial on seven problem areas.

DESIRED COASTAL WATER CHARACTERISTICS AS PROPOSED FOR THE ERIE COUNTY COASTAL ZONE MANAGEMENT PROGRAM:
Erie Metropolitan Planning Department.
October 1975 - 2 Pages.
This cursory paper discusses those water quality characteristics of the Lake Erie Coastal waters and the minimum water quality criteria which should be met.

A BRIEF IMPACT ASSESSMENT METHODOLOGY FOR THE
LAKE ERIE COASTAL ZONE OF PENNSYLVANIA:
Erie Metropolitan Planning Department.
May 1976 - 1 Page.
This very brief paper discusses the methodology for assessment of impacts in the coastal zone. The impacts were assessed to determine priorities of uses and whether those uses exert a direct and significant impact on coastal waters.

LAKE ERIE OFFSHORE ECOLOGICAL INVESTIGATION:
Marine Science Consortium.
June 1976 - 488 Pages.
This investigation represents a baseline study of offshore and nearshore areas. Included in this study are the analysis of nearshore sediment transport processes and the analysis of the environmental implications of offshore gas drilling. The report also examines existing water quality conditions and any trends which might have a direct and significant impact on aquatic organisms found in Lake Erie. The study also identifies areas where water quality is severely affected by onshore land use activities and the factors which cause the adverse conditions.

PROCEDURE USED TO DEFINE PERMISSIBLE USES:
Erie Metropolitan Planning Department.
July 1976 - 11 Pages.
This report determines which land uses are appropriate for different areas of the Lake Erie Coastal Zone. The permissibility is based on the ability of coastal resources to support a land use and to absorb the impacts resulting from that land use. A three tier approach was used to determine permissible uses.

CAPABILITY AND SUITABILITY OF LAKE ERIE COASTAL ZONE TO MEET STATE NEEDS:
Erie Metropolitan Planning Department.
October 1976 - 7 Pages.
This report addresses each general category of State needs and determines whether or not the Lake Erie Coast is capable and suitable of meeting the needs.

ANALYSIS OF STATE NEEDS WHICH WILL BE MOST EFFECTIVELY MET THROUGH COASTAL LAND AND WATER USES:
Erie Metropolitan Planning Department.
October 1976 - 3 Pages.
This brief working paper analyzes the Pennsylvania needs which can best be met through coastal land and water uses in the Lake Erie Coastal Zone.

CHAPTER VIII GEOGRAPHIC AREAS OF PARTICULAR CONCERN

GEOGRAPHIC AREAS OF PARTICULAR CONCERN: AREAS OF SIGNIFICANT NATURAL VALUE WITHIN THE PENNSYLVANIA COASTAL ZONE OF LAKE ERIE:
Edinboro Foundation.
February 1976 - 200 Pages.
This report considers 20 major sites of natural significance. Streams, wetlands, forests, beaches and steep slopes are used as the parameters. A comparative secondary analysis is made of each selected site to determine uniqueness. A matrix type evaluation is used to evaluate the impact of natural processes. Each of the 20 areas is then designated as either a preservation area, a conservation area or a recreation area with recommendations on the maintenance of these areas included in the report.

GEOGRAPHIC AREAS OF PARTICULAR CONCERN (GAPC):
Erie Metropolitan Planning Department.
April 1976 - 5 Pages and 5 Pages on revision.
This paper identifies those critical areas where some form of State interest is required in order to deal with issues of greater than local concern. Three types of GAPC have been identified. The first are "areas of economic opportunity", the second are "areas of significant natural value" and the last are "areas of significant recreational, historic or cultural value."

MISCELLANEOUS WORKING PAPERS FOR LAKE ERIE COASTAL ZONE

INTERRELATIONSHIPS BETWEEN THE COASTAL ZONE MANAGEMENT PROGRAM AND OTHER PLANNING EFFORTS IMPACTING THE COASTAL ZONE:
Erie Metropolitan Planning Department.
September 1975 - 22 Pages.
This report summarizes all of the planning efforts in the Lake Erie coastal zone by various agencies. The summary of each plan includes the title, the purpose and a description of the funding. The paper also describes the role of Erie Metropolitan Planning Department within the program, the relationship of the program to the coastal zone study and any conflicts which might occur.

PUBLIC PARTICIPATION INTERIM REPORT (ERIE COUNTY):
Erie Metropolitan Planning Department.
November 1975 - 45 Pages
This report describes the public participation processes in the Lake Erie coastal zone. The description of the committees, their functions, and their memberships are included in this report.

PUBLIC VALUES AND PREFERENCES SURVEY FOR THE ERIE COUNTY COASTAL ZONE MANAGEMENT PROGRAM:
Erie Metropolitan Planning Department.
October 1975 - 22 Pages.
This is a compilation of the results from the public survey questionnaire. The questionnaire was used to gather citizens input from Erie County. The values and preferences are important to formulate an acceptable Coastal Zone Management Plan.

MISCELLANEOUS WORKING PAPERS FOR THE PROGRAM

DEVELOPMENT PROGRAM DESIGN FOR COASTAL ZONE MANAGEMENT:
Department of Environmental Resources, CZM Staff.
November 1974 - 14 Pages.
This early working paper set up the three phase program design. The first phase is policy development and problem identification, the second phase is the technical plan and management program and the third phase is the program resolution and adoption. The paper describes the purpose of each phase and its scope.

THREE YEAR PLANNING PROCESS FOR THE PENNSYLVANIA COASTAL ZONE MANAGEMENT PROGRAM:
Department of Environmental Resources, CZM Staff.
March 1975 - 9 Pages.
This paper is the three year program development outline. It identifies major work tasks with the needed completion time. The chart uses the "critical path" format.

ROLE OF THE COASTAL ZONE MANAGEMENT SUBCOMMITTEE:
Department of Environmental Resources, CZM Staff.
April 1975 - 4 Pages.
This paper describes the responsibilities of the State Agencies as applied to the Coastal Zone subcommittee. Each of the

cooperating State agencies is listed with its coastal zone program responsibilities.

COASTAL ZONE MANAGEMENT PROGRAM GENERAL PROJECT OVERVIEW:
Department of Environmental Resources, CZM Staff.
November 1974 - 10 Pages.
This paper briefly describes the necessity and purposes of the program, the goals and objectives, the resources inventory, the boundaries, the permissible uses, the standards and implementation possibilities. Also included is a flow chart of the coastal zone management act.

PRINCIPLES FOR GUIDANCE OF PENNSYLVANIA'S
COASTAL ZONE MANAGEMENT PROGRAM:
Department of Environmental Resources CZM Staff.
January 1975 - 2 Pages.
This is a brief paper listing those principles which give overall direction to the Program. All subsequent actions are evaluated for consisting with these three principles.

This section contains a list and description of the Delaware River Estuary Inventory Maps. The maps are hand colored mylar (non-reproducible) and are prepared at a scale of 1" = 2000' (1:24000).

TITLE	SOURCE	MAP DESCRIPTION
WILDLIFE HABITATS	Pa. Fish Commission Birds of Delaware Valley Guide to Bird Finding DVRPC Natural Inventory	Indication of areas that are suitable for wildlife habitats. Six classes are used; Wildlife sanctuaries, areas, of known concentration, warm water fishing, undeveloped areas, permanent open space areas and general habitat areas.
CHLORIDE CONCENTRATION	Philadelphia Water Department Sample Records 1972	This map shows the mean average summer chloride concentration for 1972 (June through August). This study was done during the low flow because the chloride concentrations are the highest.
DISSOLVED OXYGEN	Philadelphia Water Department Sample Records 1972	This shows the mean dissolved oxygen concentrations of weekly daytime samples for June through August, 1972.
WATER TYPES	USGS 7.5' Quadrangles. DER Water Resource Bulletin. Dams, Reservoirs and Natural Lakes - USACOE Flood Reports	Identification of different types of water areas. Various areas include tidal, intertidal or tidal flat and tributaries to the Delaware River which are under tidal influence. Also identified are reservoirs and other man-made impoundments.
DREDGE DISPOSAL AREAS	Delaware River Dredging U. S. Army COE.	Location of areas used for the disposal of spoil material dredged from the navigable stretches of the Delaware.
MUNICIPAL AND INDUSTRIAL DISCHARGERS: DRBC BOD ALLOCATIONS	Delaware River Basin Commission Reports.	This map shows the maximum allowable amount of biochemical oxygen demand (BOD) that may be discharged by each discharger. This amount has been determined by the DRBC.
WETLANDS	Delaware River Estuary Marsh Survey. Philadelphia Academy of Natural Sciences (1975).	Display of areas with emergent vegetation along the Delaware River and its tributaries. Communities differ in their composition of vegetative species and these various communities have been

TITLE	SOURCE	MAP DESCRIPTION
SOIL EROSION HAZARD	Bucks Co. Interim Soil Survey Report (1970). Soil Survey of Chester & Delaware Counties (1959). SCS, USDA. Land Treatment Alternatives Technical Guide, Penna. 7/71.	By applying the universal soil loss equation to those non-urban soil areas, erosion hazard potential is determined and displayed on this map. The areas shown were undeveloped at the time of the field survey.
PRIME AGRICULTURAL LAND	Soil Surveys of Bucks (1970 Interim), Chester (1959) and Delaware (1959) Counties. SCS, USDA.	Land is classified by the Soil Conservation Service according to its capability to support agricultural activity. There are eight agricultural capability land classes. Land in classes I and II is considered prime agricultural land.
SOIL LIMITATION FOR ON-SITE SEPTIC SYSTEMS	Soil Survey of Bucks (1970 Interim Report). Chester (1959) and Delaware (1959) Counties. SCS, USDA.	The capacity of soils to accept effluent from home septic systems is restricted by various factors. Soil is classified in five degrees of suitability; severe, slight, moderate, variable, sewered (usually urban).
SEWAGE DISPOSAL PROBLEM AREAS	Bucks County, Penna. Sewerage Facilities Plan 6/70	Indicates where failure of onlot septic systems have occurred. Approximately 20% or more of the septic systems in these areas are malfunctioning.
CRITICAL GROUNDWATER RECHARGE AREAS	COWAMP Resources Inventory COWAMP Chapter IV Preliminary Draft	This map shows the zones which recharge is critical to supply the large amounts of groundwater demanded by residential, commercial and industrial users.
AREAS OF GROUNDWATER OVERPUMPING	COWAMP Resources Inventory COWAMP Chapter IV Preliminary Draft	Displays areas which the users of groundwater may be extracting the groundwater at a rate in excess of that which is being replaced by the aquifer.
WOODED AREAS	DVRPC Interpretation of High Altitude Aerial Photography.	This map shows the areas vegetated with several kinds of forest cover. Coniferous, deciduous, combined, recent forest growth (secondary successional), and orchards and indicated.

TITLE	SOURCE	MAP DESCRIPTION
EXISTING LAND USE	DVRPC 1970 Land Use File	This map depicts 13 categories of land use within the Coastal Zone: 1) Residential single family detached, 2) Residential multiple units, 3) Manufacturing, 4) Transportation, 5) Communication, 6) Commerical, 7) Community service, 8) Recreational and cultural, 10) Agricultural, 11) Mining, 12) Forests and undeveloped land, 13) Water areas.
PROPOSED LAND USE CATEGORIES	Land Use Plans of Local Municipalities	A Composite of recent land use plans for each municipality. The categories have been organized into ten uniform classes. Five show various densities of residential development. The others are commercial, industrial, institutional, open space, transportation and utility.
HISTORICAL SITES	DVRPC Inventory of Historic Sites 1969. Updated by Pa. Historical & Museum Commission 1975.	Location of over 300 sites of historical and cultural interest. Shows historic districts comprised of concentrated multiple sites in a compact area.
CENSUS TRACTS	U. S. Bureau of the Census 1970	The 1970 Census tracts and boundaries and identifying numbers for the Delaware Coastal Zone.
GENERALIZED ZONING	Zoning Ordinances of Municipalities	Compilation of the most recent zoning maps of municipalities using a uniform set of categories. Shows eight classes of density related residential activity, as well as commercial, industrial, institutional and open space.
EMPLOYMENT	DVRPC Employment File 1970	This map shows the number of people employed in each census tract. There are five general categories: 1) Agriculture & Mining, 2) Construction & Manufacturing, 3) Transportation & Communication, 4) Wholesale & Retail, 5) Finance, Government & Military.
TOTAL POPULATION	U. S. Bureau of Census Tracts 1970.	The total population of each census tract is given on this map.

TITLE	SOURCE	MAP DESCRIPTION
SPANISH SPEAKING POPULATION	U. S. Bureau of Census 1970.	Shows the percentage of the total population that is Spanish speaking as one of five cagegories: 1) less than .5%, 2) .5-.9%, 3) 1-4.9%, 4) 5-14.9%, 5) more than 15.0%.
PERSONS 65 YEARS AND OLDER	U. S. Bureau of Census 1970.	Illustrates the percentage of persons 65 years and older in the total population as one of five categories: 1) less that 5.0%, 2) 5-9.9%, 3) 10-14.9%, 4) 15-19.9%, 5) more than 20%.
FAMILIES WITH FEMALE HEADS	U. S. Bureau of Census 1970.	This map shows the percentage of families in the total population that are headed by females as a percentage category. 1) less than 2.5%, 2) 2.5-4.9%, 3) 5-9.9%, 4) 10-29.9%, 5) more than 30%.
MEDIAN SCHOOL YEARS COMPLETED	U. S. Bureau of Census 1970.	The average number of school years completed by adults in each census tract as one of the following five categories: 1) less than 8 years, 2) 8-9.9 years, 3) 10.0-11.9 years, 4) 12.0-13.9 years, 5) 2-14 years.
MEDIAN INCOME	U. S. Bureau of Census 1970.	The median income of families within each census tract is shown as one of the following five categories: 1) less than $7,000, 2) $7,000-9,499, 3) $9,500-11,999, 4) $12,000-13,999, 5) more than $14,000.
FAMILIES WITH INCOME BELOW POVERTY LEVEL	U. S. Bureau of Census 1970.	The percentage of families with income below the poverty level ($3,743 for a family of four in 1969). 1) less than 3.0%, 2) 3.0-7.9%, 3) 8.0-15.9%, 4) 16.0-24.9%, 5) more than 25%.
MAJOR POWER GENERATING FACILITIES	DRBC Master Siting Study 12/71	This map shows electrical power generating stations that are presently located along the Delaware River. Plants which are planning expansions are shown. No new facilities are (shown) being planned.

TITLE	SOURCE	MAP DESCRIPTION
STRUCTURES BUILT PRIOR TO 1939	U. S. Census Bureau 1970.	The percentage of all structures built before 1939 is shown in one of five categories for each census tract: 1) less than 10%, 2) 10-29.9%, 3) 30-59.9%, 4) 60-89.9%, 5) more than 90%.
MEDIAN CONTRACT RENT MONTHLY	U. S. Census Bureau 1970.	The median rent paid by tenants in each tract is shown in one of five categories: 1) less than $60, 2) $60-79, 3) $80-109, 4) $110-139, 5) more than $140.
PERSONS IN GROUP QUARTERS	U. S. Census Bureau 1970.	The percentage of the population living in group quarters for each census tract is shown in one of five categories 1) less than 0.5%, 2) .5-.9%, 3) 1.0-9.9%, 4) 10-39.9%, 5) more than 40%.
BLACK POPULATION	U. S. Bureau of Census 1970.	This map shows the percentage of the total population that is Black. There are five categories: 1) less than 3.0%, 2) 3-14%, 3) 15-39%, 4) 40-74%, 5) more than 74%.
TENURE (OWNER, RENTER)	U. S. Bureau of Census 1970.	Shows the total number of owner and renter occupied housing units for each census tract.
MEDIAN VALUE OF OWNER OCCUPIED HOUSING	U. S. Bureau of Census 1970.	The median value of owner occupied housing units is shown as one of five categories: 1) less than $7,000, 2) $7,000-9,999, 3) $10,000-14,999, 4) $15,000-19,999, 5) more than 20,000.
EXTRACTIVE RESOURCES	USGS 7.5' Quadrangle DVRPC Aerial Photo	Any currently operating sand and gravel pits located in the Coastal Zone are shown on this map.

This section contains a list and description of the Lake Erie Coastal Zone Inventory Maps. The scale of these maps is generally 1" = 1 mile but the scale may vary from map to map.

TITLE	SOURCE	MAP DESCRIPTION
WASTEWATER DISPOSAL 3 STUDY AREAS	USGS 7.5' Quadrangle. (Base) Dept. of Env. Resources, Bureau WOM COWAMP, Erie County Health Dept.	These maps show the location of private, municipal, industrial and electrical generating wastewater disposal sites.
CLIMATE FEATURES ERIE COUNTY	U. S. Weather Service	These charts and maps show the various meteorological aspects of the Erie Coastal Zone. Characteristics shown include; Average depth of snow, avg. air temperature, precipitation (maximum, ave., minimum), and wind direction and velocity.
MINERAL EXTRACTION 3 STUDY AREAS	USGS 7.5' Quadrangle. (Base) and information Pa. DER - Bureau of Geology	These maps show the extraction resources in the Erie Coastal Zone. These include active and closed gas wells, gravel pits and salt brine wells.
LAND AND WATER FORMS ON THE PRESQUE ISLE PENINSULA	U. S. Army Corps of Engineers, Buffalo District	This map shows the land and water forms which exist on the Presque Isle peninsula. The forms are of two general kinds; dunes or bays and ponds.
SUCCESSION STAGES ON PRESQUE ISLE	Michael Baker Jr., Inc.	This cross sectional diagram show the land formations which occur on Presque Isle as well as their accompanying vegetation.
PRESQUE ISLE STATE PARK SHORE LINE CHANGES	Presque Isle State Park Master Plan Pa. Dept. of Env. Resources	This map illustrates the everchanging shore line of the Presque Isle Peninsula from 1819 through 1969.
BEACHES INTENSE STUDY AREA	EMPD from Aerial Photo.	This map shows the beach areas along the Erie Coast in Pennsylvania.

TITLE	SOURCE	MAP DESCRIPTION
REGIONAL LOCATION COASTAL ZONE, ERIE CO., PA.	Erie Metropolitan Planning Dept. (EMPD)	Shows the location of the Erie Coastal Zone in Pennsylvania in relation to the Great Lakes and the Middle Atlantic Seaboard.
ERIE COUNTY COASTAL ZONE INTENSE STUDY AREA	EMPD	Illustrates Erie County (Pa.), the three study areas, the Erie Basin boundary, and the townships and boroughs in the County.
ERIE COUNTY MAJOR WATERSHEDS 3 STUDY AREAS	USGS 7.5' Quadrangle (Base) EMPD Information	These maps show the watersheds within the Erie Coastal Zone intense study area.
EXISTING LAND USE 3 STUDY AREAS	USGS 7.5' Quadrangle (Base) EMPD Information	These maps show the present land use in the intense study area. Land uses fall into one of fourteen classes.
COMMERCIAL NAVIGATION & FISHING FACILITIES (CENTRAL AREA)	USGS 7.5' Quadrangle (Base). Pa. Fish Commission Port Development Plan 1968. Erie Port Authority	This map shows those areas in the Erie City Port which are used as facilities for navigation (oil, grain, etc.) and fishing.
SURFACE WATER WITHDRAWAL SITES (CENTRAL AREA)	USGS 7.5' Quadrangle. Dept. of Env. Resources. COWAMP. County Water Authority	This map shows the location of water intakes in the Lake for the municipal water supply.
RECREATIONAL WATER USES 3 STUDY AREAS	USGS 7.5 Quadrangle. (Base) EMPD Information.	These maps show the shore and near-shore recreational water uses. These uses are divided into two general categories; swimming and general fishing and boating.

TITLE	SOURCE	MAP DESCRIPTION
FISH & WILDLIFE HABITATS 3 STUDY AREAS	USGS 7.5' Quadrangle (Base). Pa. Fish Commission EMPD	These maps show the native fish in the Coastal Zone and tributary streams. Also shown are any unusually high wildlife concentrations or sanctuaries.
STREAMS, WETLANDS & FLOOD PRONE AREAS 3 STUDY AREAS	USGS 7.5' Quadrangle (Base) and information. U. S. Army Corps of Engineers	These maps show the streams, wetlands, small bodies of water and areas prone to flooding in the Erie Coastal Study Area.
SLOPES AND SOILS 3 STUDY AREAS	USGS 7.5' Quadrangle Erie County Soil Survey - SCS 12/60	These maps show the slopes on the Lake Erie Coastal Zone.
GENERAL SOIL MAP 3 STUDY AREAS	USGS 7.5' Quadrangle Erie County Soil Survey - SCS 12/60	These maps show the general types of soil which occur in the study area.
GENERAL GROUND WATER AVAILABILITY 3 STUDY AREAS	USGS 7.5' Quadrangle (Base). EMPD	These maps show the areas which may produce reliable supplies of groundwater as well as those areas of unreliable supply and those areas with public qupplies.
NATURAL & SCENIC HISTORICAL & ARCHAEOLOGICAL 3 STUDY AREAS	USGS 7.5 Quadrangle (Base). Erie County Historical Society. EMPD	These maps show those areas of greater than local interest. These areas are natural or historical.
OWNERSHIP PATTERNS 3 STUDY AREAS	USGS 7.5' Quadrangle (Base). County Tax Assessment Maps.	These maps show the ownership patterns for the Coastal Zone. The ownership is divided into four categories; public, semi-public, private, and roads.

TITLE	SOURCE	MAP DESCRIPTION
ZONING DISTRICTS BY MUNICIPALITY 3 STUDY AREAS	USGS 7.5' Quadrangle (Base) Municipal Zoning Maps	Illustration of the zoning districts of each municipality along the Coastal Zone.
MUTLIMODAL TRANSPORTATION SYSTEMS 3 STUDY AREAS	USGS 7.5' Quadrangle (Base) PennDOT EMPD	These maps show the transportation systems within the Coastal Zone including; highways, railroads, airports, and ferry boats.
HIGHWAY IMPROVEMENTS CENTRAL & EAST AREAS	USGS 7.5' Quadrangle (Base) PennDOT Erie Area Transportation Study	These maps show planned improvements to the highway system and their priority for completion.
ERIE WATERFRONT OWNERSHIP	EMPD Base Port Development Plan	This map shows the existing ownership of the property on the Erie City Waterfront.
ERIE WATERFRONT DEVELOPMENT PLAN	NOAA Base Map Port Development Plan	This is a general map of the Erie waterfront showing the three main zones.
PRESENT FACILITIES EAST BAY AREA	EMPD Base Map Port Development Plan	This map illustrates the existing facilities for handling shipping commerce in the East Bay Area of the Erie waterfront.
PLANNED FACILITIES EAST BAY AREA	EMPD Base Map Port Development Plan	This map illustrates the planned improvements for expanding the East Bay Area marine terminal facilities.

TITLE	SOURCE	MAP DESCRIPTION
EXISTING AND PROPOSED MARINAS AND BOAT LAUNCHING FACILITIES	NOAA Base Map -EMPD Presque Isle Master Plan Port Development Plan	This map shows the recreational boating facilities in Erie Harbor. This includes existing and proposed marinas as well as public and private boat launching ramps.
ERIE WATERFRONT DEVELOPMENT PLAN PROPOSED WATERFRONT IMPROVEMENTS	EMPD Base Map Port Development Plan	The map shows the planned improvements to the whole Erie waterfront.

MISCELLANEOUS INFORMATION

BROCHURES

PENNSYLVANIA COASTAL ZONE MANAGEMENT PROGRAM.
Pennsylvania Department of Environmental Resources, 11/75.
The purpose of this brochure was to increase public awareness of the program so as to increase and improve participation in the coastal zone program.

NEWSLETTERS

"TIDINGS". Delaware Valley Regional Planning Commission
Volume one; #1 (1/76), #2 (3/76), #3 (6/76)
Volume two; #1 (4/77)
Passes CZM information to the residents of the Delaware Estuary Coastal Zone.

"NEWS". Erie County Metropolitan Planning Commission.
This newsletter, published quarterly, is financed by HUD and passed important CZM information to the readers.

FILMS

"LAKE ERIE COASTAL ZONE MANAGEMENT PROGRAM".
Erie Metropolitan Planning Department, 11/77.

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